Digitally signed by 佐藤 豊
Date: 2020.10.10 05:23:07
+09'00'

```
/*<html>
<span id="gsh" data-title="GShell" data-author="sato@its-more.jp">
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<link rel="icon" id="GshFaviconURL" href=""><!-- place holder -->
<span id="GshVersion" hidden="">gsh--0.6.4--2020-10-09--SatoxITS</span>
<title id="GshTitle">GShell-0.6.4 by SatoxITS</title>

<div id="GshTopbar" class="MetaWindow"></div>
<div id="GshPerfMon"></div>
<div id="GshSidebar" class="SbSidebar"><div id="GshIndexer"></div></div>
<div id="GshMain">
<header id="GshBanner" height="100px" onclick="shiftBG();">
<div align="right"><note><a href="http://archive.gshell.org">GShell</a> version 0.6.4 // 2020-10-09 // SatoxITS</note></div>
</header>

//<!-- ---------- Work { ---------- -->
//<span id="Topbar_WorkCodeSpan">
/*
<details><summary>Topbar</summary>
<!-- ---------- Topbar // 2020-1008 SatoxITS { -->
<h2>Topbar</h2>
<input id="Topbar_WorkCodeViewOpen" class="HtmlCodeViewButton" type="button" value="ShowCode">
<input id="Topbar_WorkOpenSnapshot" class="HtmlCodeViewButton" type="button" value="Snapshot">
<input id="Topbar_WorkCodeSignature" class="HtmlCodeViewButton" type="button" value="Signature">
<span id="Topbar_WorkCodeView"></span>
</details>

<style>
.ConfigIcon {
    position:absolute;
    top:-6px;
    left:92%;
    width:32px;
    height:32px;
}
.MetaWindow {
    z-index:1000;
    position:relative;
    display:block;
    overflow:visible !important;
    width:99.9%;
    height:22px;
    top:-22px;
    border:1px solid #22a;
    margin:0px;
    left:0.0%;
    line-height:1.0;
    font-family:Georgia;
    color:#fff;
    font-size:12pt;
    text-align:center;
    vertical-align:middle;
    padding:4px;
    xxbackground-color:rgba(0,8,170,0.8);
    background-color:#3a4861;xxx-PBlue;
    vertical-align:middle;
}
.MetaWindow:hover {
    color:#000;
    border:1px solid #22a;
    background-color:rgba(255,255,255,1.0);
}
</style>
<script>
function Topbar_openWorkCodeView(){
    function Topbar_showWorkCode(){
        showHtmlCode(Topbar_WorkCodeView,Topbar_WorkCodeSpan);
    }
    Topbar_WorkCodeViewOpen.addEventListener('click',Topbar_showWorkCode);
}
Topbar_openWorkCodeView();
function Gshell_initTopbar(){
    GshTopbar.innerHTML = GshTitle.innerHTML;
    //<img id="ConfigIcon" class="ConfigIcon">
    if( true ){
        cfgi = document.createElement('img');
        cfgi.id = 'ConfigIcon';
        cfgi.setAttribute('class','ConfigIcon');
        GshTopbar.appendChild(cfgi);
        cfgi.src = ConfigICON_DATA;
    }
}
</script>
<!-- Topbar_WorkCodeSpan } -->
*/ //</span>
//<!-- ---------- Work } ---------- -->


//<!-- ---------- Work { ---------- -->
//<span id="Indexer_WorkCodeSpan">
/*
<details><summary>Indexer</summary>
<!-- ---------- Indexer // 2020-1007 SatoxITS { -->
<h2>Indexer</h2>
<input id="Indexer_WorkCodeViewOpen" class="HtmlCodeViewButton" type="button" value="ShowCode">
<input id="Indexer_WorkOpenSnapshot" class="HtmlCodeViewButton" type="button" value="Snapshot">
<input id="Indexer_WorkCodeSignature" class="HtmlCodeViewButton" type="button" value="Signature">
<span id="Indexer_WorkCodeView"></span>
</details>
<style id="SidebarIndex">
#gsh {
    display:block;
    xxxoverflow:scroll !important;
}
#GshMain {
    position:relative;
    width:80% !important;
    left:19.5% !important;
}
#GshSidebar {
    z-index:0;
    position:relative !important;
    overflow:auto;
    resize:both !important;
    xxoverflow-y:hidden !important;
    xxxheight:100px !important;
    xxxdisplay:inline !important;
    left:0px;
    top:0px;
    width:19.5%;
    min-width:80px;
    xxxheight:100% !important;
    height:0px;
```

```
    color:#f00;
    xxbackground-color:rgba(64,64,64,0.5);
    xxbackground-color:#DFE3EB;xxx-PBlue;
    background-color:#eeeeee;xxx-PBlue;
}
#GshPerfMon {
    position:relative;
    z-index:100000000;
    height:12pt;
    font-size:9pt;
    color:#f00;
}
#GshSidebar:hover {
    z-index:10000000;
    overflow-x:visible !important;
    background-color:rgba(255,255,255,0.7);
    width:50%;
}
#GshIndexer {
    z-index:0;
    position:relative;
    resize:both !important;
    height:100%;
    left:0px;
    top:0px;
    scroll-behavior: overflow !important;
    padding-left:4pt;
    font-size:0.5em;
    white-space:nowrap;
    xxx-background-color:rgba(64,160,64,0.6) !important;
    color:#7794c6;xxx-PBlue;
    xxbackground-color:#DFE3EB;xxx-PBlue;
    background-color:#eeeeee;xxx-PBlue;
}
#GshIndexer:hover {
    z-index:10000000;
    overflow-x:visible !important;
    color:#000000 !important;xxx-PBlue;
    xxxbackground-color:#FFFFFF;xxx-PBlue;
    background-color:rgba(255,255,255,0.7);
    padding-right:0px;
    width:80%;
}
#GshIndexer:select {
    color:#000000 !important;xxx-PBlue;
    background-color:#FFFFFF;xxx-PBlue;
}
.IndexLine {
    font-size:8pt !important;
    font-family:Georgia;
    display:block;
    xxx-color:#fff;
    xxx-color:#eff1f5;xxx-PBlue;
    xxx-color:#41516d;xxx-PBlue;
    xxx-color:#7794c6;xxx-PBlue;
    padding-right:4pt;
}
.IndexLine:hover {
    font-size:10pt!important;
    xxx-color:#228;
    xxx-background-color:#fff;
    xxxcolor:#fff;xxx-PBlue;
    color:#516487;xxx-PBlue;
    background-color:rgba(220,220,255,1.0);xxx-PBlue;
    xxxtext-shadow:1px 1px #3f3;
    text-shadow:1px 1px #eee;
    xxxbackground-color:#516487;xxx-PBlue;
    xxtext-decoration:underline !important;
}
</style>

<script id="Indexer_WorkScript">
function Indexer_openWorkCodeView(){
    function Indexer_showWorkCode(){
        showHtmlCode(Indexer_WorkCodeView,Indexer_WorkCodeSpan);
    }
    Indexer_WorkCodeViewOpen.addEventListener('click',Indexer_showWorkCode);
}
//Indexer_WorkCodeViewOpen.addEventListener('click',Indexer_openWorkCodeView);
Indexer_openWorkCodeView();

var startPerfDate = new Date();
var prevPerfDate = startPerfDate;
function ShowResourceUsage(){
    d = new Date();
    perf = DateShort0(startPerfDate) + '<br>\n';
    perf += DateShort() + '<br>\n';
    elps = d.getTime() - startPerfDate.getTime();
    itvl = d.getTime() - prevPerfDate.getTime();
    perf += 'Elapsed: ' + elps/1000 + ' s<br>\n';
    perf += 'Skew: ' + (itvl-1000) + ' ms<br>\n';
    prevPerfDate = d;

    m0 = performance.memory;
    mu0 = (m0.usedJSHeapSize / 1000000).toFixed(6);
    perf += 'Memory: '+mu0+' MB<br>';

    //GshSidebar.innerHTML = perf;
    GshPerfMon.innerHTML = perf;
    //GshIndexer.innerHTML = 'Memory: '+mu0+' MB';
    //console.log('-- PerfMon heap: '+mu0+'/'+m0.totalHeapSize+'/'+m0.jsHeapSizeLimit);
}

var iserno = 0;
var GeneratedId = 0;
function generateIndex(ni,e,chv,nch,ht){
    // https://developer.mozilla.org/en-US/docs/Web/API/Element
    c = '';
    if( e.classList != null ){
        c = e.classList.value;
    }
    //console.log('-- <'+e.nodeName+'> #'+e.id+' .'+c+' '+e.attributes);
    if( e.nodeName == '#text' ){ return ''; }
    if( e.nodeName == '#comment' ){ return ''; }
    if( e.nodeName == 'H2' || e.nodeName == 'H3' ){
        id = e.innerHTML;
        GeneratedId += 1;
        eid = 'GenratedId-'+GeneratedId;
        e.id = eid;
    }else
    if( e.nodeName == 'SUMMARY' ){
        id = e.innerHTML;
        GeneratedId += 1;
        eid = 'GenratedId-'+GeneratedId;
```

```
        e.id = eid;
    }else
    if( and(e.nodeName == 'DIV',c=='xxxxxxxxxxxxxxxxxxxentry-content') ){
        console.log('-- DIV entry-content begin');
        id = e.innerHTML;
        GeneratedId += 1;
        eid = 'GenratedId-'+GeneratedId;
        e.id = eid;
        console.log('-- DIV entry-content end hash-child=',e.hasChildNodes());
    }else
    if( e.id == '' || e.id == 'undefined' ){
        return '';
    }else{
        id = '#'+e.id;
        eid = e.id;
    }
    iserno += 1;
    ht = '<'+'div id="GenaratedEref_'+iserno+'" class="IndexLine" href="'+eid+'">'
        + iserno+' '+ni+':'+e.nodeName + ':' + id;
    if( e.id == '' || e.id == 'undefined' ){ return ht + '<'+'/div>'; }
    if( !e.hasChildNodes() ){ return ht + '<'+'/div>'; }
    chv = e.childNodes;
    nch = e.childNodes.length;
    if( chv != null ){ nch = chv.length; }
    ht += ' ('+nch+')' + '<'+'/div>';
    for( let i = 0; i < chv.length; i++ ){
        sec = ni+'.'+i;
        if( ni == '' ){ sec = i; }
        ht += generateIndex(sec,chv[i],null,0);
    }
    return ht;
}
function onClickIndex(e){
    tid = e.target.id;
    tge = document.getElementById(tid);
    eid = tge.getAttribute('href');
    rx = tge.getBoundingClientRect().left.toFixed(0)
    ry = tge.getBoundingClientRect().top.toFixed(0)
    if( false ){
        alert('index clicked mouse(x='+e.x+', y='+e.y+')'
            + '\ntid=#'+ tid + ' rx='+rx + ',ry='+ry
            + '\neid=' + eid + '\n'
            + '\nhtml='+ tge.outerHTML);
    }
    ee = document.getElementById(eid);
    sx = 'NaN';
    sy = ee.getBoundingClientRect().top;
    console.log('sx='+sx+',sy='+sy);
    ee.scrollIntoView()
    window.scrollTo(sx,sy)
    //window.scrollTo({left:'Non',top:sy,behavior:'smooth'});
}
function Indexer_afterLoaded(){
    sideindex = document.getElementById('GshIndexer');
    ht = '<'+'h3>G-Index<'+'/h3>';
    ht += generateIndex("",document.getElementById('gsh'),null,0,'');
    if( (pri = document.getElementById('primary')) != null ){
        ht += generateIndex("",pri,null,0,'');
    }
    ht += '<'+'br>';
    ht += '<'+'br>';
    ht += '<'+'br>';
    ht += '<'+'br>';
    sideindex.innerHTML = ht;
    sideindex.addEventListener('click',onClickIndex);

    if( (pri = document.getElementById('primary')) != null ){
        console.log('-- Seems in WordPress');
        pri.style.zIndex = 2000;

        GshSidebar.style.setProperty('position','relative','important');
        GshSidebar.style.top = '-1400px';
        //GshSidebar.style.setProperty('position','absolute','important');
        //GshSidebar.style.top = '0px';

        GshSidebar.style.setProperty('width','200px','important');
        GshSidebar.style.setProperty('overflow','scroll','important');
        GshSidebar.style.resize = 'both';

        GshSidebar.style.left = '-100px';
        GshIndexer.style.left = '100px';
        GshIndexer.style.height = '1400px';
        gsh.appendChild(GshSidebar); // change parent
    }else{
        console.log('-- Seems not in WordPress');
        GshSidebar.style.setProperty('position','fixed','important');
    }
}
//document.addEventListener('load',Indexer_afterLoaded);

DestroyIndexBar = function(){
    sideindex = document.getElementById('GshIndexer');
    sideindex.innerHTML = "";
}
</script>

<!-- Indexer_WorkCodeSpan } -->
*/ //</span>
//<!-- ---------- Work } ---------- -->


/*
<h2>GShell // a General purpose Shell built on the top of Golang</h2>
<p>
<note>
It is a shell for myself, by myself, of myself. --SatoxITS(^-^)
<a href="gsh-0.6.2.go.html">prev.</a>
</note>
</p>
<div id="GJFactory_x"></div>

<div>
<span id="GshMenu">
<span class="GshMenu1" id="GshMenuEdit" onclick="html_edit();">Edit</span>
<span class="GshMenu1" id="GshMenuSave" onclick="html_save();">Save</span>
<span class="GshMenu1" id="GshMenuLoad" onclick="html_load();">Load</span>
<span class="GshMenu1" id="GshMenuVers" onclick="html_ver0();">Vers</span>
<span id="gsh-WinId" onclick="win_jump('0.1');">0</span>
<span class="GshMenu1" id="gsh-menu-exit" onclick="html_close();"></span>
<span class="GshMenu1" id="gsh-menu-fork" onclick="html_fork();">Fork</span>
<span class="GshMenu1" id="GshMenuStop" onclick="html_stop(this,true);">Stop</span>
<span class="GshMenu1" id="GshMenuFold" onclick="html_fold(this);">Unfold</span>
<span class="GshMenu1" id="gsh-menu-cksum" onclick="html_digest();">Digest</span>
<span class="GshMenu1" id="GshMenuSign" onclick="html_sign(this);" style="">Source</span>
```

```
<!-- | <span id="gsh-menu-pure" onclick="html_pure(this);">Pure</span> -->
</span>
</div>
*/

/*
<details id="GshStatement" class="gsh-document"><summary>Statement</summary>
<h3>Fun to create a shell</h3>
<p>For a programmer, it must be far easy and fun to create his own simple shell
rightly fitting to his favor and necessities, than learning existing shells with
complex full features that he never use.
I, as one of programmers, am writing this tiny shell for my own real needs,
totally from scratch, with fun.
</p><p>
For a programmer, it is fun to learn new computer languages.  For long years before
writing this software, I had been specialized to C and early HTML2 :-).
Now writing this software,  I'm learning Go language, HTML5, JavaScript and CSS
on demand as a novice of these, with fun.
</p><p>
This single file "gsh.go", that is executable by Go, contains all of the code written
in Go. Also it can be displayed as "gsh.go.html" by browsers. It is a standalone
HTML file that works as the viewer of the code of itself, and as the "home page" of
this software.
</p><p>
Because this HTML file is a Go program, you may run it as a real shell program
on your computer.
But you must be aware that this program is written under situation like above.
Needless to say, there is no warranty for this program in any means.
</p>
<address>Aug 2020, SatoxITS (sato@its-more.jp)</address>
</details>
*/
/*
<details id="GshFeatures" class="gsh-document"><summary>Features</summary><p>
</p>
<h3>Cross-browser communication</h3>
<p>
... to be written ...
</p>
<h3>Vi compatible command line editor</h3>
<p>
The command line of GShell can be edited with commands compatible with
<a href="https://www.washington.edu/computing/unix/vi.html"><b>vi</b></a>.
As in vi, you can enter <i><b>command mode</b></i> by <b>ESC</b> key,
then move around in the history by <b><code>j k / ? n N</code></b>,
or within the current line by <b><code>l h f w b 0 $ %</code></b> or so.
</p>
</details>
*/
/*
<details id="gsh-gindex">
<summary>Index</summary><div class="gsh-src">
Documents
    <span class="gsh-link" onclick="jumpto_JavaScriptView();">Command summary</span>
Go lang part<span class="gsh-src" onclick="document.getElementById('gsh-gocode').open=true;">
    Package structures
        <a href="#import">import</a>
        <a href="#struct">struct</a>
    Main functions
        <a href="#comexpansion">str-expansion</a>   // macro processor
        <a href="#finder">finder</a>        // builtin find + du
        <a href="#grep">grep</a>        // builtin grep + wc + cksum + ...
        <a href="#plugin">plugin</a>        // plugin commands
        <a href="#ex-commands">system</a>       // external commands
        <a href="#builtin">builtin</a>      // builtin commands
        <a href="#network">network</a>      // socket handler
        <a href="#remote-sh">remote-sh</a>  // remote shell
        <a href="#redirect">redirect</a>    // StdIn/Out redireciton
        <a href="#history">history</a>      // command history
        <a href="#rusage">rusage</a>        // resouce usage
        <a href="#encode">encode</a>        // encode / decode
        <a href="#IME">IME</a>      // command line IME
        <a href="#getline">getline</a>      // line editor
        <a href="#scanf">scanf</a>      // string decomposer
        <a href="#interpreter">interpreter</a>  // command interpreter
        <a href="#main">main</a>
</span>
JavaScript part
    <a href="#script-src-view" class="gsh-link" onclick="jumpto_JavaScriptView();">Source</a>
    <a href="#gsh-data-frame" class="gsh-link" onclick="jumpto_DataView();">Builtin data</a>
CSS part
    <a href="#style-src-view" class="gsh-link" onclick="jumpto_StyleView();">Source</a>
References
    <a href="#" class="gsh-link" onclick="jumpto_WholeView();">Internal</a>
    <a href="#gsh-reference" class="gsh-link" onclick="jumpto_ReferenceView();">External</a>
Whole parts
    <a href="#whole-src-view" class="gsh-link" onclick="jumpto_WholeView();">Source</a>
    <a href="#whole-src-view" class="gsh-link" onclick="jumpto_WholeView();">Download</a>
    <a href="#whole-src-view" class="gsh-link" onclick="jumpto_WholeView();">Dump</a>

</div>
</details>
*/
//<details id="gsh-gocode">
//<summary>Go Source</summary><div class="gsh-src" onclick="document.getElementById('gsh-gocode').open=false;">
// gsh - Go lang based Shell
// (c) 2020 ITS more Co., Ltd.
// 2020-0807 created by SatoxITS (sato@its-more.jp)

package main // gsh main

// <a name="import">Imported packages</a> // <a href="https://golang.org/pkg/">Packages</a>
import (
    "fmt"       // <a href="https://golang.org/pkg/fmt/">fmt</a>
    "strings"   // <a href="https://golang.org/pkg/strings/">strings</a>
    "strconv"   // <a href="https://golang.org/pkg/strconv/">strconv</a>
    "sort"      // <a href="https://golang.org/pkg/sort/">sort</a>
    "time"      // <a href="https://golang.org/pkg/time/">time</a>
    "bufio"     // <a href="https://golang.org/pkg/bufio/">bufio</a>
    "io/ioutil" // <a href="https://golang.org/pkg/io/ioutil/">ioutil</a>
    "os"        // <a href="https://golang.org/pkg/os/">os</a>
    "syscall"   // <a href="https://golang.org/pkg/syscall/">syscall</a>
    "plugin"    // <a href="https://golang.org/pkg/plugin/">plugin</a>
    "net"       // <a href="https://golang.org/pkg/net/">net</a>
    "net/http"  // <a href="https://golang.org/pkg/net/http/">http</a>
    //"html"    // <a href="https://golang.org/pkg/html/">html</a>
    "path/filepath" // <a href="https://golang.org/pkg/path/filepath/">filepath</a>
    "go/types"  // <a href="https://golang.org/pkg/go/types/">types</a>
    "go/token"  // <a href="https://golang.org/pkg/go/token/">token</a>
    "encoding/base64"   // <a href="https://golang.org/pkg/encoding/base64/">base64</a>
    "unicode/utf8"  // <a href="https://golang.org/pkg/unicode/utf8/">utf8</a>
    //"gshdata" // gshell's logo and source code
    "hash/crc32"    // <a href="https://golang.org/pkg/unicode/hash/crc32/">crc32</a>
    "golang.org/x/net/websocket"
```

```
)

// // 2020-0906 added,
// // <a href="https://golang.org/cmd/cgo/">CGo</a>
// #include "poll.h" // <poll.h> // </poll.h> to be closed as HTML tag :-p
// typedef struct { struct pollfd fdv[8]; } pollFdv;
// int pollx(pollFdv *fdv, int nfds, int timeout){
//  return poll(fdv->fdv,nfds,timeout);
// }
import "C"

// // 2020-0906 added,
func CFpollIn1(fp*os.File, timeoutUs int)(ready uintptr){
    var fdv = C.pollFdv{}
    var nfds = 1
    var timeout = timeoutUs/1000

    fdv.fdv[0].fd = C.int(fp.Fd())
    fdv.fdv[0].events = C.POLLIN
    if( 0 < EventRecvFd ){
        fdv.fdv[1].fd = C.int(EventRecvFd)
        fdv.fdv[1].events = C.POLLIN
        nfds += 1
    }
    r := C.pollx(&fdv,C.int(nfds),C.int(timeout))
    if( r <= 0 ){
        return 0
    }
    if (int(fdv.fdv[1].revents) & int(C.POLLIN)) != 0 {
        //fprintf(stderr,"--De-- got Event\n");
        return uintptr(EventFdOffset + fdv.fdv[1].fd)
    }
    if (int(fdv.fdv[0].revents) & int(C.POLLIN)) != 0 {
        return uintptr(NormalFdOffset + fdv.fdv[0].fd)
    }
    return 0
}

const (
    NAME = "gsh"
    VERSION = "0.6.4"
    DATE = "2020-10-09"
    AUTHOR = "SatoxITS(^-^)//"
)
var (
    GSH_HOME = ".gsh"   // under home directory
    GSH_PORT = 9999
    MaxStreamSize = int64(128*1024*1024*1024) // 128GiB is too large?
    PROMPT = "> "
    LINESIZE = (8*1024)
    PATHSEP = ":"   // should be ";" in Windows
    DIRSEP = "/"    // canbe \ in Windows
)

// -xX logging control
// --A-- all
// --I-- info.
// --D-- debug
// --T-- time and resource usage
// --W-- warning
// --E-- error
// --F-- fatal error
// --Xn- network

// <a name="struct">Structures</a>
type GCommandHistory struct {
    StartAt     time.Time // command line execution started at
    EndAt       time.Time // command line execution ended at
    ResCode     int       // exit code of (external command)
    CmdError    error     // error string
    OutData     *os.File  // output of the command
    FoundFile   []string  // output - result of ufind
    Rusagev     [2]syscall.Rusage // Resource consumption, CPU time or so
    CmdId       int       // maybe with identified with arguments or impact
                      // redireciton commands should not be the CmdId
    WorkDir     string    // working directory at start
    WorkDirX    int       // index in ChdirHistory
    CmdLine     string    // command line
}
type GChdirHistory struct {
    Dir     string
    MovedAt     time.Time
    CmdIndex    int
}
type CmdMode struct {
    BackGround  bool
}
type Event struct {
    when        time.Time
    event       int
    evarg       int64
    CmdIndex    int
}
var CmdIndex int
var Events []Event
type PluginInfo struct {
    Spec        *plugin.Plugin
    Addr        plugin.Symbol
    Name        string // maybe relative
    Path        string // this is in Plugin but hidden
}
type GServer struct {
    host        string
    port        string
}

// <a href="https://tools.ietf.org/html/rfc3230">Digest</a>
const ( // SumType
    SUM_ITEMS   = 0x000001 // items count
    SUM_SIZE    = 0x000002 // data length (simplly added)
    SUM_SIZEHASH    = 0x000004 // data length (hashed sequence)
    SUM_DATEHASH    = 0x000008 // date of data (hashed sequence)
    // also envelope attributes like time stamp can be a part of digest
    // hashed value of sizes or mod-date of files will be useful to detect changes

    SUM_WORDS   = 0x000010 // word count is a kind of digest
    SUM_LINES   = 0x000020 // line count is a kind of digest
    SUM_SUM64   = 0x000040 // simple add of bytes, useful for human too

    SUM_SUM32_BITS  = 0x000100 // the number of true bits
    SUM_SUM32_2BYTE = 0x000200 // 16bits words
    SUM_SUM32_4BYTE = 0x000400 // 32bits words
    SUM_SUM32_8BYTE = 0x000800 // 64bits words

```

```
    SUM_SUM16_BSD   = 0x001000 // UNIXsum -sum -bsd
    SUM_SUM16_SYSV  = 0x002000 // UNIXsum -sum -sysv
    SUM_UNIXFILE    = 0x004000
    SUM_CRCIEEE = 0x008000
)
type CheckSum struct {
    Files       int64   // the number of files (or data)
    Size        int64   // content size
    Words       int64   // word count
    Lines       int64   // line count
    SumType     int
    Sum64       uint64
    Crc32Table  crc32.Table
    Crc32Val    uint32
    Sum16       int
    Ctime       time.Time
    Atime       time.Time
    Mtime       time.Time
    Start       time.Time
    Done        time.Time
    RusgAtStart [2]syscall.Rusage
    RusgAtEnd   [2]syscall.Rusage
}
type ValueStack [][]string
type GshContext struct {
    StartDir    string  // the current directory at the start
    GetLine     string  // gsh-getline command as a input line editor
    ChdirHistory    []GChdirHistory // the 1st entry is wd at the start
    gshPA       syscall.ProcAttr
    CommandHistory  []GCommandHistory
    CmdCurrent  GCommandHistory
    BackGround  bool
    BackGroundJobs  []int
    LastRusage  syscall.Rusage
    GshHomeDir  string
    TerminalId  int
    CmdTrace    bool // should be [map]
    CmdTime     bool // should be [map]
    PluginFuncs []PluginInfo
    iValues     []string
    iDelimiter  string // field sepearater of print out
    iFormat     string // default print format (of integer)
    iValStack   ValueStack
    LastServer  GServer
    RSERV       string // [gsh://]host[:port]
    RWD     string // remote (target, there) working directory
    lastCheckSum    CheckSum
}

func nsleep(ns time.Duration){
    time.Sleep(ns)
}
func usleep(ns time.Duration){
    nsleep(ns*1000)
}
func msleep(ns time.Duration){
    nsleep(ns*1000000)
}
func sleep(ns time.Duration){
    nsleep(ns*1000000000)
}

func strBegins(str, pat string)(bool){
    if len(pat) <= len(str){
        yes := str[0:len(pat)] == pat
        //fmt.Printf("--D-- strBegins(%v,%v)=%v\n",str,pat,yes)
        return yes
    }
    //fmt.Printf("--D-- strBegins(%v,%v)=%v\n",str,pat,false)
    return false
}
func isin(what string, list []string) bool {
    for _, v := range list  {
        if v == what {
            return true
        }
    }
    return false
}
func isinX(what string,list[]string)(int){
    for i,v := range list {
        if v == what {
            return i
        }
    }
    return -1
}

func env(opts []string) {
    env := os.Environ()
    if isin("-s", opts){
        sort.Slice(env, func(i,j int) bool {
            return env[i] < env[j]
        })
    }
    for _, v := range env {
        fmt.Printf("%v\n",v)
    }
}

// - rewriting should be context dependent
// - should postpone until the real point of evaluation
// - should rewrite only known notation of symobl
func scanInt(str string)(val int,leng int){
    leng = -1
    for i,ch := range str {
        if '0' <= ch && ch <= '9' {
            leng = i+1
        }else{
            break
        }
    }
    if 0 < leng {
        ival,_ := strconv.Atoi(str[0:leng])
        return ival,leng
    }else{
        return 0,0
    }
}
func substHistory(gshCtx *GshContext,str string,i int,rstr string)(leng int,rst string){
    if len(str[i+1:]) == 0 {
        return 0,rstr
    }
    hi := 0
```

```
    histlen := len(gshCtx.CommandHistory)
    if str[i+1] == '!' {
        hi = histlen - 1
        leng = 1
    }else{
        hi,leng = scanInt(str[i+1:])
        if leng == 0 {
            return 0,rstr
        }
        if hi < 0 {
            hi = histlen + hi
        }
    }
    if 0 <= hi && hi < histlen {
        var ext byte
        if 1 < len(str[i+leng:]) {
            ext = str[i+leng:][1]
        }
        //fmt.Printf("--D-- %v(%c)\n",str[i+leng:],str[i+leng])
        if ext == 'f' {
            leng += 1
            xlist := []string{}
            list := gshCtx.CommandHistory[hi].FoundFile
            for _,v := range list {
                //list[i] = escapeWhiteSP(v)
                xlist = append(xlist,escapeWhiteSP(v))
            }
            //rstr += strings.Join(list," ")
            rstr += strings.Join(xlist," ")
        }else
        if ext == '@' || ext == 'd' {
            // !N@ .. workdir at the start of the command
            leng += 1
            rstr += gshCtx.CommandHistory[hi].WorkDir
        }else{
            rstr += gshCtx.CommandHistory[hi].CmdLine
        }
    }else{
        leng = 0
    }
    return leng,rstr
}
func escapeWhiteSP(str string)(string){
    if len(str) == 0 {
        return "\\z" // empty, to be ignored
    }
    rstr := ""
    for _,ch := range str {
        switch ch {
            case '\\': rstr += "\\\\"
            case ' ': rstr += "\\s"
            case '\t': rstr += "\\t"
            case '\r': rstr += "\\r"
            case '\n': rstr += "\\n"
            default: rstr += string(ch)
        }
    }
    return rstr
}
func unescapeWhiteSP(str string)(string){ // strip original escapes
    rstr := ""
    for i := 0; i < len(str); i++ {
        ch := str[i]
        if ch == '\\' {
            if i+1 < len(str) {
                switch str[i+1] {
                    case 'z':
                        continue;
                }
            }
        }
        rstr += string(ch)
    }
    return rstr
}
func unescapeWhiteSPV(strv []string)([]string){ // strip original escapes
    ustrv := []string{}
    for _,v := range strv {
        ustrv = append(ustrv,unescapeWhiteSP(v))
    }
    return ustrv
}

// <a name="comexpansion">str-expansion</a>
// - this should be a macro processor
func strsubst(gshCtx *GshContext,str string,histonly bool) string {
    rbuff := []byte{}
    if false {
        //@@U Unicode should be cared as a character
        return str
    }
    //rstr := ""
    inEsc := 0 // escape characer mode
    for i := 0; i < len(str); i++ {
        //fmt.Printf("--D--Subst %v:%v\n",i,str[i:])
        ch := str[i]
        if inEsc == 0 {
            if ch == '!' {
                //leng,xrstr := substHistory(gshCtx,str,i,rstr)
                leng,rs := substHistory(gshCtx,str,i,"")
                if 0 < leng {
    //_,rs := substHistory(gshCtx,str,i,"")
    rbuff = append(rbuff,[]byte(rs)...)
                    i += leng
                    //rstr = xrstr
                    continue
                }
            }
            switch ch {
                case '\\': inEsc = '\\'; continue
                //case '%':  inEsc = '%';  continue
                case '$':
            }
        }
        switch inEsc {
        case '\\':
            switch ch {
                case '\\': ch = '\\'
                case 's': ch = ' '
                case 't': ch = '\t'
                case 'r': ch = '\r'
                case 'n': ch = '\n'
                case 'z': inEsc = 0; continue // empty, to be ignored
            }
```

```
            inEsc = 0
        case '%':
            switch {
                case ch == '%': ch = '%'
                case ch == 'T':
                    //rstr = rstr + time.Now().Format(time.Stamp)
    rs := time.Now().Format(time.Stamp)
    rbuff = append(rbuff,[]byte(rs)...)
                    inEsc = 0
                    continue;
                default:
                    // postpone the interpretation
                    //rstr = rstr + "%" + string(ch)
    rbuff = append(rbuff,ch)
                    inEsc = 0
                    continue;
            }
            inEsc = 0
        }
        //rstr = rstr + string(ch)
        rbuff = append(rbuff,ch)
    }
    //fmt.Printf("--D--subst(%s)(%s)\n",str,string(rbuff))
    return string(rbuff)
    //return rstr
}
func showFileInfo(path string, opts []string) {
    if isin("-l",opts) || isin("-ls",opts) {
        fi, err := os.Stat(path)
        if err != nil {
            fmt.Printf("---------- ((%v))",err)
        }else{
            mod := fi.ModTime()
            date := mod.Format(time.Stamp)
            fmt.Printf("%v %8v %s ",fi.Mode(),fi.Size(),date)
        }
    }
    fmt.Printf("%s",path)
    if isin("-sp",opts) {
        fmt.Printf(" ")
    }else
    if ! isin("-n",opts) {
        fmt.Printf("\n")
    }
}
func userHomeDir()(string,bool){
    /*
    homedir,_ = os.UserHomeDir() // not implemented in older Golang
    */
    homedir,found := os.LookupEnv("HOME")
    //fmt.Printf("--I-- HOME=%v(%v)\n",homedir,found)
    if !found {
        return "/tmp",found
    }
    return homedir,found
}

func toFullpath(path string) (fullpath string) {
    if path[0] == '/' {
        return path
    }
    pathv := strings.Split(path,DIRSEP)
    switch {
    case pathv[0] == ".":
        pathv[0], _ = os.Getwd()
    case pathv[0] == "..": // all ones should be interpreted
        cwd, _ := os.Getwd()
        ppathv := strings.Split(cwd,DIRSEP)
        pathv[0] = strings.Join(ppathv,DIRSEP)
    case pathv[0] == "~":
        pathv[0],_ = userHomeDir()
    default:
        cwd, _ := os.Getwd()
        pathv[0] = cwd + DIRSEP + pathv[0]
    }
    return strings.Join(pathv,DIRSEP)
}

func IsRegFile(path string)(bool){
    fi, err := os.Stat(path)
    if err == nil {
        fm := fi.Mode()
        return fm.IsRegular();
    }
    return false
}

// <a name="encode">Encode / Decode</a>
// <a href="https://golang.org/pkg/encoding/base64/#example_NewEncoder">Encoder</a>
func (gshCtx *GshContext)Enc(argv[]string){
    file := os.Stdin
    buff := make([]byte,LINESIZE)
    li := 0
    encoder := base64.NewEncoder(base64.StdEncoding,os.Stdout)
    for li = 0; ; li++ {
        count, err := file.Read(buff)
        if count <= 0 {
            break
        }
        if err != nil {
            break
        }
        encoder.Write(buff[0:count])
    }
    encoder.Close()
}
func (gshCtx *GshContext)Dec(argv[]string){
    decoder := base64.NewDecoder(base64.StdEncoding,os.Stdin)
    li := 0
    buff := make([]byte,LINESIZE)
    for li = 0; ; li++ {
        count, err := decoder.Read(buff)
        if count <= 0 {
            break
        }
        if err != nil {
            break
        }
        os.Stdout.Write(buff[0:count])
    }
}
// lnsp [N] [-crlf][-C \\]
func (gshCtx *GshContext)SplitLine(argv[]string){
    strRep := isin("-str",argv) // "..."+
```

```
    reader := bufio.NewReaderSize(os.Stdin,64*1024)
    ni := 0
    toi := 0
    for ni = 0; ; ni++ {
        line, err := reader.ReadString('\n')
        if len(line) <= 0 {
            if err != nil {
            fmt.Fprintf(os.Stderr,"--I-- lnsp %d to %d (%v)\n",ni,toi,err)
            break
            }
        }
        off := 0
        ilen := len(line)
        remlen := len(line)
        if strRep { os.Stdout.Write([]byte("\"")) }
        for oi := 0; 0 < remlen; oi++ {
            olen := remlen
            addnl := false
            if 72 < olen {
                olen = 72
                addnl = true
            }
            fmt.Fprintf(os.Stderr,"--D-- write %d [%d.%d] %d %d/%d/%d\n",
                toi,ni,oi,off,olen,remlen,ilen)
            toi += 1
            os.Stdout.Write([]byte(line[0:olen]))
            if addnl {
                if strRep {
                    os.Stdout.Write([]byte("\"+\n\""))
                }else{
                    //os.Stdout.Write([]byte("\r\n"))
                    os.Stdout.Write([]byte("\\"))
                    os.Stdout.Write([]byte("\n"))
                }
            }
            line = line[olen:]
            off += olen
            remlen -= olen
        }
        if strRep { os.Stdout.Write([]byte("\"\n")) }
    }
    fmt.Fprintf(os.Stderr,"--I-- lnsp %d to %d\n",ni,toi)
}

// CRC32 <a href="http://golang.jp/pkg/hash-crc32">crc32</a>
// 1 0000 0100 1100 0001 0001 1101 1011 0111
var CRC32UNIX uint32 = uint32(0x04C11DB7) // Unix cksum
var CRC32IEEE uint32 = uint32(0xEDB88320)
func byteCRC32add(crc uint32,str[]byte,len uint64)(uint32){
    var oi uint64
    for oi = 0; oi < len; oi++ {
        var oct = str[oi]
        for bi := 0; bi < 8; bi++ {
            //fprintf(stderr,"--CRC32 %d %X (%d.%d)\n",crc,oct,oi,bi)
            ovf1 := (crc & 0x80000000) != 0
            ovf2 := (oct & 0x80) != 0
            ovf := (ovf1 && !ovf2) || (!ovf1 && ovf2)
            oct <<= 1
            crc <<= 1
            if ovf { crc ^= CRC32UNIX }
        }
    }
    //fprintf(stderr,"--CRC32 return %d %d\n",crc,len)
    return crc;
}
func byteCRC32end(crc uint32, len uint64)(uint32){
    var slen = make([]byte,4)
    var li = 0
        for li = 0; li < 4; {
                slen[li] = byte(len)
        li += 1
                len >>= 8
                if( len == 0 ){
                        break
        }
        }
        crc = byteCRC32add(crc,slen,uint64(li))
        crc ^= 0xFFFFFFFF
        return crc
}
func strCRC32(str string,len uint64)(crc uint32){
    crc = byteCRC32add(0,[]byte(str),len)
    crc = byteCRC32end(crc,len)
    //fprintf(stderr,"--CRC32 %d %d\n",crc,len)
    return crc
}
func CRC32Finish(crc uint32, table *crc32.Table, len uint64)(uint32){
    var slen = make([]byte,4)
    var li = 0
        for li = 0; li < 4; {
                slen[li] = byte(len & 0xFF)
        li += 1
                len >>= 8
                if( len == 0 ){
                        break
        }
        }
    crc = crc32.Update(crc,table,slen)
        crc ^= 0xFFFFFFFF
        return crc
}

func (gsh*GshContext)xCksum(path string,argv[]string, sum*CheckSum)(int64){
    if isin("-type/f",argv) && !IsRegFile(path){
        return 0
    }
    if isin("-type/d",argv) && IsRegFile(path){
        return 0
    }
    file, err := os.OpenFile(path,os.O_RDONLY,0)
    if err != nil {
        fmt.Printf("--E-- cksum %v (%v)\n",path,err)
        return -1
    }
    defer file.Close()
    if gsh.CmdTrace { fmt.Printf("--I-- cksum %v %v\n",path,argv) }

    bi := 0
    var buff = make([]byte,32*1024)
    var total int64 = 0
    var initTime = time.Time{}
    if sum.Start == initTime {
        sum.Start = time.Now()
    }
```

```
    for bi = 0; ; bi++ {
        count,err := file.Read(buff)
        if count <= 0 || err != nil {
            break
        }
        if (sum.SumType & SUM_SUM64) != 0 {
            s := sum.Sum64
            for _,c := range buff[0:count] {
                s += uint64(c)
            }
            sum.Sum64 = s
        }
        if (sum.SumType & SUM_UNIXFILE) != 0 {
            sum.Crc32Val = byteCRC32add(sum.Crc32Val,buff,uint64(count))
        }
        if (sum.SumType & SUM_CRCIEEE) != 0 {
            sum.Crc32Val = crc32.Update(sum.Crc32Val,&sum.Crc32Table,buff[0:count])
        }
        // <a href="https://en.wikipedia.org/wiki/BSD_checksum">BSD checksum</a>
        if (sum.SumType & SUM_SUM16_BSD) != 0 {
            s := sum.Sum16
            for _,c := range buff[0:count] {
                s = (s >> 1) + ((s & 1) << 15)
                s += int(c)
                s &= 0xFFFF
                //fmt.Printf("BSDsum: %d[%d] %d\n",sum.Size+int64(i),i,s)
            }
            sum.Sum16 = s
        }
        if (sum.SumType & SUM_SUM16_SYSV) != 0 {
            for bj := 0; bj < count; bj++ {
                sum.Sum16 += int(buff[bj])
            }
        }
        total += int64(count)
    }
    sum.Done = time.Now()
    sum.Files += 1
    sum.Size += total
    if !isin("-s",argv) {
        fmt.Printf("%v ",total)
    }
    return 0
}

// <a name="grep">grep</a>
// "lines", "lin" or "lnp" for "(text) line processor" or "scanner"
// a*,!ab,c, ... sequentioal combination of patterns
// what "LINE" is should be definable
// generic line-by-line processing
// grep [-v]
// cat -n -v
// uniq [-c]
// tail -f
// sed s/x/y/ or awk
// grep with line count like wc
// rewrite contents if specified
func (gsh*GshContext)xGrep(path string,rexpv[]string)(int){
    file, err := os.OpenFile(path,os.O_RDONLY,0)
    if err != nil {
        fmt.Printf("--E-- grep %v (%v)\n",path,err)
        return -1
    }
    defer file.Close()
    if gsh.CmdTrace { fmt.Printf("--I-- grep %v %v\n",path,rexpv) }
    //reader := bufio.NewReaderSize(file,LINESIZE)
    reader := bufio.NewReaderSize(file,80)
    li := 0
    found := 0
    for li = 0; ; li++ {
        line, err := reader.ReadString('\n')
        if len(line) <= 0 {
            break
        }
        if 150 < len(line) {
            // maybe binary
            break;
        }
        if err != nil {
            break
        }
        if 0 <= strings.Index(string(line),rexpv[0]) {
            found += 1
            fmt.Printf("%s:%d: %s",path,li,line)
        }
    }
        //fmt.Printf("total %d lines %s\n",li,path)
    //if( 0 < found ){ fmt.Printf("((found %d lines %s))\n",found,path); }
    return found
}

// <a name="finder">Finder</a>
// finding files with it name and contents
// file names are ORed
// show the content with %x fmt list
// ls -R
// tar command by adding output
type fileSum struct {
    Err int64   // access error or so
    Size    int64   // content size
    DupSize int64   // content size from hard links
    Blocks  int64   // number of blocks (of 512 bytes)
    DupBlocks int64 // Blocks pointed from hard links
    HLinks  int64   // hard links
    Words   int64
    Lines   int64
    Files   int64
    Dirs    int64   // the num. of directories
    SymLink int64
    Flats   int64   // the num. of flat files
    MaxDepth    int64
    MaxNamlen   int64   // max. name length
    nextRepo    time.Time
}
func showFusage(dir string,fusage *fileSum){
    bsume := float64(((fusage.Blocks-fusage.DupBlocks)/2)*1024)/1000000.0
    //bsumdup := float64((fusage.Blocks/2)*1024)/1000000.0

    fmt.Printf("%v: %v files (%vd %vs %vh) %.6f MB (%.2f MBK)\n",
        dir,
        fusage.Files,
        fusage.Dirs,
        fusage.SymLink,
        fusage.HLinks,
```

```
        float64(fusage.Size)/1000000.0,bsume);
}
const (
    S_IFMT    = 0170000
    S_IFCHR   = 0020000
    S_IFDIR   = 0040000
    S_IFREG   = 0100000
    S_IFLNK   = 0120000
    S_IFSOCK  = 0140000
)
func cumFinfo(fsum *fileSum, path string, staterr error, fstat syscall.Stat_t, argv[]string,verb bool)(*fileSum){
    now := time.Now()
    if time.Second <= now.Sub(fsum.nextRepo) {
        if !fsum.nextRepo.IsZero(){
            tstmp := now.Format(time.Stamp)
            showFusage(tstmp,fsum)
        }
        fsum.nextRepo = now.Add(time.Second)
    }
    if staterr != nil {
        fsum.Err += 1
        return fsum
    }
    fsum.Files += 1
    if 1 < fstat.Nlink {
        // must count only once...
        // at least ignore ones in the same directory
        //if finfo.Mode().IsRegular() {
        if (fstat.Mode & S_IFMT) == S_IFREG {
            fsum.HLinks += 1
            fsum.DupBlocks += int64(fstat.Blocks)
            //fmt.Printf("---Dup HardLink %v %s\n",fstat.Nlink,path)
        }
    }
    //fsum.Size += finfo.Size()
    fsum.Size += fstat.Size
    fsum.Blocks += int64(fstat.Blocks)
    //if verb { fmt.Printf("(%8dBlk) %s",fstat.Blocks/2,path) }
    if isin("-ls",argv){
        //if verb { fmt.Printf("%4d %8d ",fstat.Blksize,fstat.Blocks) }
//      fmt.Printf("%d\t",fstat.Blocks/2)
    }
    //if finfo.IsDir()
    if (fstat.Mode & S_IFMT) == S_IFDIR {
        fsum.Dirs += 1
    }
    //if (finfo.Mode() & os.ModeSymlink) != 0
    if (fstat.Mode & S_IFMT) == S_IFLNK {
        //if verb { fmt.Printf("symlink(%v,%s)\n",fstat.Mode,finfo.Name()) }
        //{ fmt.Printf("symlink(%o,%s)\n",fstat.Mode,finfo.Name()) }
        fsum.SymLink += 1
    }
    return fsum
}
func (gsh*GshContext)xxFindEntv(depth int,total *fileSum,dir string, dstat syscall.Stat_t, ei int, entv []string,npatv[]string,argv[]string)(*fileSum){
    nols := isin("-grep",argv)
    // sort entv
    /*
    if isin("-t",argv){
        sort.Slice(filev, func(i,j int) bool {
            return 0 < filev[i].ModTime().Sub(filev[j].ModTime())
        })
    }
    */
        /*
        if isin("-u",argv){
            sort.Slice(filev, func(i,j int) bool {
                return 0 < filev[i].AccTime().Sub(filev[j].AccTime())
            })
        }
        if isin("-U",argv){
            sort.Slice(filev, func(i,j int) bool {
                return 0 < filev[i].CreatTime().Sub(filev[j].CreatTime())
            })
        }
        */
    /*
    if isin("-S",argv){
        sort.Slice(filev, func(i,j int) bool {
            return filev[j].Size() < filev[i].Size()
        })
    }
    */
    for _,filename := range entv {
        for _,npat := range npatv {
            match := true
            if npat == "*" {
                match = true
            }else{
                match, _ = filepath.Match(npat,filename)
            }
            path := dir + DIRSEP + filename
            if !match {
                continue
            }
            var fstat syscall.Stat_t
            staterr := syscall.Lstat(path,&fstat)
            if staterr != nil {
                if !isin("-w",argv){fmt.Printf("ufind: %v\n",staterr) }
                continue;
            }
            if isin("-du",argv) && (fstat.Mode & S_IFMT) == S_IFDIR {
                // should not show size of directory in "-du" mode ...
            }else
            if !nols && !isin("-s",argv) && (!isin("-du",argv) || isin("-a",argv)) {
                if isin("-du",argv) {
                    fmt.Printf("%d\t",fstat.Blocks/2)
                }
                showFileInfo(path,argv)
            }
            if true { // && isin("-du",argv)
                total = cumFinfo(total,path,staterr,fstat,argv,false)
            }
            /*
            if isin("-wc",argv) {
            }
            */
            if gsh.lastCheckSum.SumType != 0 {
                gsh.xCksum(path,argv,&gsh.lastCheckSum);
            }
            x := isinX("-grep",argv); // -grep will be convenient like -ls
            if 0 <= x && x+1 <= len(argv) { // -grep will be convenient like -ls
                if IsRegFile(path){
                    found := gsh.xGrep(path,argv[x+1:])
```

```
                    if 0 < found {
                        foundv := gsh.CmdCurrent.FoundFile
                        if len(foundv) < 10 {
                            gsh.CmdCurrent.FoundFile =
                            append(gsh.CmdCurrent.FoundFile,path)
                        }
                    }
                }
            }
            if !isin("-r0",argv) { // -d 0 in du, -depth n in find
                //total.Depth += 1
                if (fstat.Mode & S_IFMT) == S_IFLNK {
                    continue
                }
                if dstat.Rdev != fstat.Rdev {
                    fmt.Printf("--I-- don't follow differnet device %v(%v) %v(%v)\n",
                        dir,dstat.Rdev,path,fstat.Rdev)
                }
                if (fstat.Mode & S_IFMT) == S_IFDIR {
                    total = gsh.xxFind(depth+1,total,path,npatv,argv)
                }
            }
        }
    }
    return total
}
func (gsh*GshContext)xxFind(depth int,total *fileSum,dir string,npatv[]string,argv[]string)(*fileSum){
    nols := isin("-grep",argv)
    dirfile,oerr := os.OpenFile(dir,os.O_RDONLY,0)
    if oerr == nil {
        //fmt.Printf("--I-- %v(%v)[%d]\n",dir,dirfile,dirfile.Fd())
        defer dirfile.Close()
    }else{
    }

    prev := *total
    var dstat syscall.Stat_t
    staterr := syscall.Lstat(dir,&dstat) // should be flstat

    if staterr != nil {
        if !isin("-w",argv){ fmt.Printf("ufind: %v\n",staterr) }
        return total
    }
        //filev,err := ioutil.ReadDir(dir)
        //_,err := ioutil.ReadDir(dir) // ReadDir() heavy and bad for huge directory
        /*
        if err != nil {
            if !isin("-w",argv){ fmt.Printf("ufind: %v\n",err) }
            return total
        }
        */
    if depth == 0 {
        total = cumFinfo(total,dir,staterr,dstat,argv,true)
        if !nols && !isin("-s",argv) && (!isin("-du",argv) || isin("-a",argv)) {
            showFileInfo(dir,argv)
        }
    }
    // it it is not a directory, just scan it and finish

    for ei := 0; ; ei++ {
        entv,rderr := dirfile.Readdirnames(8*1024)
        if len(entv) == 0 || rderr != nil {
            //if rderr != nil { fmt.Printf("[%d] len=%d (%v)\n",ei,len(entv),rderr) }
            break
        }
        if 0 < ei {
            fmt.Printf("--I-- xxFind[%d] %d large-dir: %s\n",ei,len(entv),dir)
        }
        total = gsh.xxFindEntv(depth,total,dir,dstat,ei,entv,npatv,argv)
    }
    if isin("-du",argv) {
        // if in "du" mode
        fmt.Printf("%d\t%s\n",(total.Blocks-prev.Blocks)/2,dir)
    }
    return total
}

// {ufind|fu|ls} [Files] [// Names] [-- Expressions]
//  Files is "." by default
//  Names is "*" by default
//  Expressions is "-print" by default for "ufind", or -du for "fu" command
func (gsh*GshContext)xFind(argv[]string){
    if 0 < len(argv) && strBegins(argv[0],"?"){
        showFound(gsh,argv)
        return
    }
    if isin("-cksum",argv) || isin("-sum",argv) {
        gsh.lastCheckSum = CheckSum{}
        if isin("-sum",argv) && isin("-add",argv) {
            gsh.lastCheckSum.SumType |= SUM_SUM64
        }else
        if isin("-sum",argv) && isin("-size",argv) {
            gsh.lastCheckSum.SumType |= SUM_SIZE
        }else
        if isin("-sum",argv) && isin("-bsd",argv) {
            gsh.lastCheckSum.SumType |= SUM_SUM16_BSD
        }else
        if isin("-sum",argv) && isin("-sysv",argv) {
            gsh.lastCheckSum.SumType |= SUM_SUM16_SYSV
        }else
        if isin("-sum",argv) {
            gsh.lastCheckSum.SumType |= SUM_SUM64
        }
        if isin("-unix",argv) {
            gsh.lastCheckSum.SumType |= SUM_UNIXFILE
            gsh.lastCheckSum.Crc32Table = *crc32.MakeTable(CRC32UNIX)
        }
        if isin("-ieee",argv){
            gsh.lastCheckSum.SumType |= SUM_CRCIEEE
            gsh.lastCheckSum.Crc32Table = *crc32.MakeTable(CRC32IEEE)
        }
        gsh.lastCheckSum.RusgAtStart = Getrusagev()
    }
    var total = fileSum{}
    npats := []string{}
    for _,v := range argv {
        if 0 < len(v) && v[0] != '-' {
            npats = append(npats,v)
        }
        if v == "//" { break }
        if v == "--" { break }
        if v == "-grep" { break }
        if v == "-ls" { break }
    }
```

```
    if len(npats) == 0 {
        npats = []string{"*"}
    }
    cwd := "."
    // if to be fullpath ::: cwd, _ := os.Getwd()
    if len(npats) == 0 { npats = []string{"*"} }
    fusage := gsh.xxFind(0,&total,cwd,npats,argv)
    if gsh.lastCheckSum.SumType != 0 {
        var sumi uint64 = 0
        sum := &gsh.lastCheckSum
        if (sum.SumType & SUM_SIZE) != 0 {
            sumi = uint64(sum.Size)
        }
        if (sum.SumType & SUM_SUM64) != 0 {
            sumi = sum.Sum64
        }
        if (sum.SumType & SUM_SUM16_SYSV) != 0 {
            s := uint32(sum.Sum16)
            r := (s & 0xFFFF) + ((s & 0xFFFFFFFF) >> 16)
            s = (r & 0xFFFF) + (r >> 16)
            sum.Crc32Val = uint32(s)
            sumi = uint64(s)
        }
        if (sum.SumType & SUM_SUM16_BSD) != 0 {
            sum.Crc32Val = uint32(sum.Sum16)
            sumi = uint64(sum.Sum16)
        }
        if (sum.SumType & SUM_UNIXFILE) != 0 {
            sum.Crc32Val = byteCRC32end(sum.Crc32Val,uint64(sum.Size))
            sumi = uint64(byteCRC32end(sum.Crc32Val,uint64(sum.Size)))
        }
        if 1 < sum.Files {
            fmt.Printf("%v %v // %v / %v files, %v/file\r\n",
                sumi,sum.Size,
                abssize(sum.Size),sum.Files,
                abssize(sum.Size/sum.Files))
        }else{
            fmt.Printf("%v %v %v\n",
                sumi,sum.Size,npats[0])
        }
    }
    if !isin("-grep",argv) {
        showFusage("total",fusage)
    }
    if !isin("-s",argv){
        hits := len(gsh.CmdCurrent.FoundFile)
        if 0 < hits {
            fmt.Printf("--I-- %d files hits // can be refered with !%df\n",
                hits,len(gsh.CommandHistory))
        }
    }
    if gsh.lastCheckSum.SumType != 0 {
        if isin("-ru",argv) {
            sum := &gsh.lastCheckSum
            sum.Done = time.Now()
            gsh.lastCheckSum.RusgAtEnd = Getrusagev()
            elps := sum.Done.Sub(sum.Start)
            fmt.Printf("--cksum-size: %v (%v) / %v files, %v/file\r\n",
                sum.Size,abssize(sum.Size),sum.Files,abssize(sum.Size/sum.Files))
            nanos := int64(elps)
            fmt.Printf("--cksum-time: %v/total, %v/file, %.1f files/s, %v\r\n",
                abbtime(nanos),
                abbtime(nanos/sum.Files),
                (float64(sum.Files)*1000000000.0)/float64(nanos),
                abbspeed(sum.Size,nanos))
            diff := RusageSubv(sum.RusgAtEnd,sum.RusgAtStart)
            fmt.Printf("--cksum-rusg: %v\n",sRusagef("",argv,diff))
        }
    }
    return
}

func showFiles(files[]string){
    sp := ""
    for i,file := range files {
        if 0 < i { sp = " " } else { sp = "" }
        fmt.Printf(sp+"%s",escapeWhiteSP(file))
    }
}
func showFound(gshCtx *GshContext, argv[]string){
    for i,v := range gshCtx.CommandHistory {
        if 0 < len(v.FoundFile) {
            fmt.Printf("!%d (%d) ",i,len(v.FoundFile))
            if isin("-ls",argv){
                fmt.Printf("\n")
                for _,file := range v.FoundFile {
                    fmt.Printf("") //sub number?
                    showFileInfo(file,argv)
                }
            }else{
                showFiles(v.FoundFile)
                fmt.Printf("\n")
            }
        }
    }
}

func showMatchFile(filev []os.FileInfo, npat,dir string, argv[]string)(string,bool){
    fname := ""
    found := false
    for _,v := range filev {
        match, _ := filepath.Match(npat,(v.Name()))
        if match {
            fname = v.Name()
            found = true
            //fmt.Printf("[%d] %s\n",i,v.Name())
            showIfExecutable(fname,dir,argv)
        }
    }
    return fname,found
}
func showIfExecutable(name,dir string,argv[]string)(ffullpath string,ffound bool){
    var fullpath string
    if strBegins(name,DIRSEP){
        fullpath = name
    }else{
        fullpath = dir + DIRSEP + name
    }
    fi, err := os.Stat(fullpath)
    if err != nil {
        fullpath = dir + DIRSEP + name + ".go"
        fi, err = os.Stat(fullpath)
    }
    if err == nil {
```

```
        fm := fi.Mode()
        if fm.IsRegular() {
          // R_OK=4, W_OK=2, X_OK=1, F_OK=0
          if syscall.Access(fullpath,5) == nil {
            ffullpath = fullpath
            ffound = true
            if ! isin("-s", argv) {
                showFileInfo(fullpath,argv)
            }
          }
        }
    }
    return ffullpath, ffound
}
func which(list string, argv []string) (fullpathv []string, itis bool){
    if len(argv) <= 1 {
        fmt.Printf("Usage: which comand [-s] [-a] [-ls]\n")
        return []string{""}, false
    }
    path := argv[1]
    if strBegins(path,"/") {
        // should check if excecutable?
        _,exOK := showIfExecutable(path,"/",argv)
        fmt.Printf("--D-- %v exOK=%v\n",path,exOK)
        return []string{path},exOK
    }
    pathenv, efound := os.LookupEnv(list)
    if ! efound {
        fmt.Printf("--E-- which: no \"%s\" environment\n",list)
        return []string{""}, false
    }
    showall := isin("-a",argv) || 0 <= strings.Index(path,"*")
    dirv := strings.Split(pathenv,PATHSEP)
    ffound := false
    ffullpath := path
    for _, dir := range dirv {
        if 0 <= strings.Index(path,"*") { // by wild-card
            list,_ := ioutil.ReadDir(dir)
            ffullpath, ffound = showMatchFile(list,path,dir,argv)
        }else{
            ffullpath, ffound = showIfExecutable(path,dir,argv)
        }
        //if ffound && !isin("-a", argv) {
        if ffound && !showall {
            break;
        }
    }
    return []string{ffullpath}, ffound
}

func stripLeadingWSParg(argv[]string)([]string){
    for ; 0 < len(argv); {
        if len(argv[0]) == 0 {
            argv = argv[1:]
        }else{
            break
        }
    }
    return argv
}
func xEval(argv []string, nlend bool){
    argv = stripLeadingWSParg(argv)
    if len(argv) == 0 {
        fmt.Printf("eval [%%format] [Go-expression]\n")
        return
    }
    pfmt := "%v"
    if argv[0][0] == '%' {
        pfmt = argv[0]
        argv = argv[1:]
    }
    if len(argv) == 0 {
        return
    }
    gocode := strings.Join(argv," ");
    //fmt.Printf("eval [%v] [%v]\n",pfmt,gocode)
    fset := token.NewFileSet()
    rval, _ := types.Eval(fset,nil,token.NoPos,gocode)
    fmt.Printf(pfmt,rval.Value)
    if nlend { fmt.Printf("\n") }
}

func getval(name string) (found bool, val int) {
    /* should expand the name here */
    if name == "gsh.pid" {
        return true, os.Getpid()
    }else
    if name == "gsh.ppid" {
        return true, os.Getppid()
    }
    return false, 0
}

func echo(argv []string, nlend bool){
    for ai := 1; ai < len(argv); ai++ {
        if 1 < ai {
            fmt.Printf(" ");
        }
        arg := argv[ai]
        found, val := getval(arg)
        if found {
            fmt.Printf("%d",val)
        }else{
            fmt.Printf("%s",arg)
        }
    }
    if nlend {
        fmt.Printf("\n");
    }
}

func resfile() string {
    return "gsh.tmp"
}
//var resF *File
func resmap() {
    //_ , err := os.OpenFile(resfile(), os.O_RDWR|os.O_CREATE, os.ModeAppend)
    // https://developpaper.com/solution-to-golang-bad-file-descriptor-problem/
    _ , err := os.OpenFile(resfile(), os.O_RDWR|os.O_CREATE, 0600)
    if err != nil {
        fmt.Printf("refF could not open: %s\n",err)
    }else{
        fmt.Printf("refF opened\n")
    }
```

```
}

// @@2020-0821
func gshScanArg(str string,strip int)(argv []string){
    var si = 0
    var sb = 0
    var inBracket = 0
    var arg1 = make([]byte,LINESIZE)
    var ax = 0
    debug := false

    for ; si < len(str); si++ {
        if str[si] != ' ' {
            break
        }
    }
    sb = si
    for ; si < len(str); si++ {
        if sb <= si {
            if debug {
                fmt.Printf("--Da- +%d %2d-%2d %s ... %s\n",
                    inBracket,sb,si,arg1[0:ax],str[si:])
            }
        }
        ch := str[si]
        if ch  == '{' {
            inBracket += 1
            if 0 < strip && inBracket <= strip {
                //fmt.Printf("stripLEV %d <= %d?\n",inBracket,strip)
                continue
            }
        }
        if 0 < inBracket {
            if ch == '}' {
                inBracket -= 1
                if 0 < strip && inBracket < strip {
                    //fmt.Printf("stripLEV %d <  %d?\n",inBracket,strip)
                    continue
                }
            }
            arg1[ax] = ch
            ax += 1
            continue
        }
        if str[si] == ' ' {
            argv = append(argv,string(arg1[0:ax]))
            if debug {
                fmt.Printf("--Da- [%v][%v-%v] %s ... %s\n",
                    -1+len(argv),sb,si,str[sb:si],string(str[si:]))
            }
            sb = si+1
            ax = 0
            continue
        }
        arg1[ax] = ch
        ax += 1
    }
    if sb < si {
        argv = append(argv,string(arg1[0:ax]))
        if debug {
            fmt.Printf("--Da- [%v][%v-%v] %s ... %s\n",
                -1+len(argv),sb,si,string(arg1[0:ax]),string(str[si:]))
        }
    }
    if debug {
        fmt.Printf("--Da- %d [%s] => [%d]%v\n",strip,str,len(argv),argv)
    }
    return argv
}

// should get stderr (into tmpfile ?) and return
func (gsh*GshContext)Popen(name,mode string)(pin*os.File,pout*os.File,err bool){
    var pv = []int{-1,-1}
    syscall.Pipe(pv)

    xarg := gshScanArg(name,1)
    name = strings.Join(xarg," ")

    pin = os.NewFile(uintptr(pv[0]),"StdoutOf-{"+name+"}")
    pout = os.NewFile(uintptr(pv[1]),"StdinOf-{"+name+"}")
    fdix := 0
    dir := "?"
    if mode == "r" {
        dir = "<"
        fdix = 1 // read from the stdout of the process
    }else{
        dir = ">"
        fdix = 0 // write to the stdin of the process
    }
    gshPA := gsh.gshPA
    savfd := gshPA.Files[fdix]

    var fd uintptr = 0
    if mode == "r" {
        fd = pout.Fd()
        gshPA.Files[fdix] = pout.Fd()
    }else{
        fd = pin.Fd()
        gshPA.Files[fdix] = pin.Fd()
    }
        // should do this by Goroutine?
        if false {
            fmt.Printf("--Ip- Opened fd[%v] %s %v\n",fd,dir,name)
            fmt.Printf("--RED1 [%d,%d,%d]->[%d,%d,%d]\n",
                os.Stdin.Fd(),os.Stdout.Fd(),os.Stderr.Fd(),
                pin.Fd(),pout.Fd(),pout.Fd())
        }
            savi := os.Stdin
            savo := os.Stdout
            save := os.Stderr
            os.Stdin  = pin
            os.Stdout = pout
            os.Stderr = pout
        gsh.BackGround = true
        gsh.gshelllh(name)
        gsh.BackGround = false
            os.Stdin  = savi
            os.Stdout = savo
            os.Stderr = save

    gshPA.Files[fdix] = savfd
    return pin,pout,false
}
```

```
// <a name="ex-commands">External commands</a>
func (gsh*GshContext)excommand(exec bool, argv []string) (notf bool,exit bool) {
    if gsh.CmdTrace { fmt.Printf("--I-- excommand[%v](%v)\n",exec,argv) }

    gshPA := gsh.gshPA
    fullpathv, itis := which("PATH",[]string{"which",argv[0],"-s"})
    if itis == false {
        return true,false
    }
    fullpath := fullpathv[0]
    argv = unescapeWhiteSPV(argv)
    if 0 < strings.Index(fullpath,".go") {
        nargv := argv // []string{}
        gofullpathv, itis := which("PATH",[]string{"which","go","-s"})
        if itis == false {
            fmt.Printf("--F-- Go not found\n")
            return false,true
        }
        gofullpath := gofullpathv[0]
        nargv = []string{ gofullpath, "run", fullpath }
        fmt.Printf("--I-- %s {%s %s %s}\n",gofullpath,
            nargv[0],nargv[1],nargv[2])
        if exec {
            syscall.Exec(gofullpath,nargv,os.Environ())
        }else{
            pid, _ := syscall.ForkExec(gofullpath,nargv,&gshPA)
            if gsh.BackGround {
                fmt.Fprintf(stderr,"--Ip- in Background pid[%d]%d(%v)\n",pid,len(argv),nargv)
                gsh.BackGroundJobs = append(gsh.BackGroundJobs,pid)
            }else{
                rusage := syscall.Rusage {}
                syscall.Wait4(pid,nil,0,&rusage)
                gsh.LastRusage = rusage
                gsh.CmdCurrent.Rusagev[1] = rusage
            }
        }
    }else{
        if exec {
            syscall.Exec(fullpath,argv,os.Environ())
        }else{
            pid, _ := syscall.ForkExec(fullpath,argv,&gshPA)
            //fmt.Printf("[%d]\n",pid); // '&' to be background
            if gsh.BackGround {
                fmt.Fprintf(stderr,"--Ip- in Background pid[%d]%d(%v)\n",pid,len(argv),argv)
                gsh.BackGroundJobs = append(gsh.BackGroundJobs,pid)
            }else{
                rusage := syscall.Rusage {}
                syscall.Wait4(pid,nil,0,&rusage);
                gsh.LastRusage = rusage
                gsh.CmdCurrent.Rusagev[1] = rusage
            }
        }
    }
    return false,false
}

// <a name="builtin">Builtin Commands</a>
func (gshCtx *GshContext) sleep(argv []string) {
    if len(argv) < 2 {
        fmt.Printf("Sleep 100ms, 100us, 100ns, ...\n")
        return
    }
    duration := argv[1];
    d, err := time.ParseDuration(duration)
    if err != nil {
        d, err = time.ParseDuration(duration+"s")
        if err != nil {
            fmt.Printf("duration ? %s (%s)\n",duration,err)
            return
        }
    }
    //fmt.Printf("Sleep %v\n",duration)
    time.Sleep(d)
    if 0 < len(argv[2:]) {
        gshCtx.gshellv(argv[2:])
    }
}
func (gshCtx *GshContext)repeat(argv []string) {
    if len(argv) < 2 {
        return
    }
    start0 := time.Now()
    for ri,_ := strconv.Atoi(argv[1]); 0 < ri; ri-- {
        if 0 < len(argv[2:]) {
            //start := time.Now()
            gshCtx.gshellv(argv[2:])
            end := time.Now()
            elps := end.Sub(start0);
            if( 1000000000 < elps ){
                fmt.Printf("(repeat#%d %v)\n",ri,elps);
            }
        }
    }
}

func (gshCtx *GshContext)gen(argv []string) {
    gshPA := gshCtx.gshPA
    if len(argv) < 2 {
        fmt.Printf("Usage: %s N\n",argv[0])
        return
    }
    // should br repeated by "repeat" command
    count, _ := strconv.Atoi(argv[1])
    fd := gshPA.Files[1] // Stdout
    file := os.NewFile(fd,"internalStdOut")
    fmt.Printf("--I-- Gen. Count=%d to [%d]\n",count,file.Fd())
    //buf := []byte{}
    outdata := "0123 5678 0123 5678 0123 5678 0123 5678\r"
    for gi := 0; gi < count; gi++ {
        file.WriteString(outdata)
    }
    //file.WriteString("\n")
    fmt.Printf("\n(%d B)\n",count*len(outdata));
    //file.Close()
}

// <a name="rexec">Remote Execution</a> // 2020-0820
func Elapsed(from time.Time)(string){
    elps := time.Now().Sub(from)
    if 1000000000 < elps {
        return fmt.Sprintf("[%5d.%02ds]",elps/1000000000,(elps%1000000000)/10000000)
    }else
    if 1000000 < elps {
        return fmt.Sprintf("[%3d.%03dms]",elps/1000000,(elps%1000000)/1000)
```

```
    }else{
        return fmt.Sprintf("[%3d.%03dus]",elps/1000,(elps%1000))
    }
}
func abbtime(nanos int64)(string){
    if 1000000000 < nanos {
        return fmt.Sprintf("%d.%02ds",nanos/1000000000,(nanos%1000000000)/10000000)
    }else
    if 1000000 < nanos {
        return fmt.Sprintf("%d.%03dms",nanos/1000000,(nanos%1000000)/1000)
    }else{
        return fmt.Sprintf("%d.%03dus",nanos/1000,(nanos%1000))
    }
}
func abssize(size int64)(string){
    fsize := float64(size)
    if 1024*1024*1024 < size {
        return fmt.Sprintf("%.2fGiB",fsize/(1024*1024*1024))
    }else
    if 1024*1024 < size {
        return fmt.Sprintf("%.3fMiB",fsize/(1024*1024))
    }else{
        return fmt.Sprintf("%.3fKiB",fsize/1024)
    }
}
func absize(size int64)(string){
    fsize := float64(size)
    if 1024*1024*1024 < size {
        return fmt.Sprintf("%8.2fGiB",fsize/(1024*1024*1024))
    }else
    if 1024*1024 < size {
        return fmt.Sprintf("%8.3fMiB",fsize/(1024*1024))
    }else{
        return fmt.Sprintf("%8.3fKiB",fsize/1024)
    }
}
func abbspeed(totalB int64,ns int64)(string){
    MBs := (float64(totalB)/1000000) / (float64(ns)/1000000000)
    if 1000 <= MBs {
        return fmt.Sprintf("%6.3fGB/s",MBs/1000)
    }
    if 1 <= MBs {
        return fmt.Sprintf("%6.3fMB/s",MBs)
    }else{
        return fmt.Sprintf("%6.3fKB/s",MBs*1000)
    }
}
func abspeed(totalB int64,ns time.Duration)(string){
    MBs := (float64(totalB)/1000000) / (float64(ns)/1000000000)
    if 1000 <= MBs {
        return fmt.Sprintf("%6.3fGBps",MBs/1000)
    }
    if 1 <= MBs {
        return fmt.Sprintf("%6.3fMBps",MBs)
    }else{
        return fmt.Sprintf("%6.3fKBps",MBs*1000)
    }
}
func fileRelay(what string,in*os.File,out*os.File,size int64,bsiz int)(wcount int64){
    Start := time.Now()
    buff := make([]byte,bsiz)
    var total int64 = 0
    var rem int64 = size
    nio := 0
    Prev := time.Now()
    var PrevSize int64 = 0

    fmt.Printf(Elapsed(Start)+"--In- X: %s (%v/%v/%v) START\n",
        what,absize(total),size,nio)

    for i:= 0; ; i++ {
        var len = bsiz
        if int(rem) < len {
            len = int(rem)
        }
        Now := time.Now()
        Elps := Now.Sub(Prev);
        if 1000000000 < Now.Sub(Prev) {
            fmt.Printf(Elapsed(Start)+"--In- X: %s (%v/%v/%v) %s\n",
                what,absize(total),size,nio,
                abspeed((total-PrevSize),Elps))
            Prev = Now;
            PrevSize = total
        }
        rlen := len
        if in != nil {
            // should watch the disconnection of out
            rcc,err := in.Read(buff[0:rlen])
            if err != nil {
                fmt.Printf(Elapsed(Start)+"--En- X: %s read(%v,%v)<%v\n",
                    what,rcc,err,in.Name())
                break
            }
            rlen = rcc
            if string(buff[0:10]) == "((SoftEOF " {
                var ecc int64 = 0
                fmt.Sscanf(string(buff),"((SoftEOF %v",&ecc)
                fmt.Printf(Elapsed(Start)+"--En- X: %s Recv ((SoftEOF %v))/%v\n",
                    what,ecc,total)
                if ecc == total {
                    break
                }
            }
        }

        wlen := rlen
        if out != nil {
            wcc,err := out.Write(buff[0:rlen])
            if err != nil {
                fmt.Printf(Elapsed(Start)+"-En-- X: %s write(%v,%v)>%v\n",
                    what,wcc,err,out.Name())
                break
            }
            wlen = wcc
        }
        if wlen < rlen {
            fmt.Printf(Elapsed(Start)+"--En- X: %s incomplete write (%v/%v)\n",
                what,wlen,rlen)
            break;
        }

        nio += 1
        total += int64(rlen)
        rem -= int64(rlen)
```

```
        if rem <= 0 {
            break
        }
    }
    Done := time.Now()
    Elps := float64(Done.Sub(Start))/1000000000 //Seconds
    TotalMB := float64(total)/1000000 //MB
    MBps := TotalMB / Elps
    fmt.Printf(Elapsed(Start)+"--In- X: %s (%v/%v/%v) %v %.3fMB/s\n",
        what,total,size,nio,absize(total),MBps)
    return total
}
func tcpPush(clnt *os.File){
    // shrink socket buffer and recover
    usleep(100);
}
func (gsh*GshContext)RexecServer(argv[]string){
    debug := true
    Start0 := time.Now()
    Start := Start0
//  if local == ":" { local = "0.0.0.0:9999" }
    local := "0.0.0.0:9999"

    if 0 < len(argv) {
        if argv[0] == "-s" {
            debug = false
            argv = argv[1:]
        }
    }
    if 0 < len(argv) {
        argv = argv[1:]
    }
    port, err := net.ResolveTCPAddr("tcp",local);
    if err != nil {
        fmt.Printf("--En- S: Address error: %s (%s)\n",local,err)
        return
    }
    fmt.Printf(Elapsed(Start)+"--In- S: Listening at %s...\n",local);
    sconn, err := net.ListenTCP("tcp", port)
    if err != nil {
        fmt.Printf(Elapsed(Start)+"--En- S: Listen error: %s (%s)\n",local,err)
        return
    }

    reqbuf := make([]byte,LINESIZE)
    res := ""
    for {
        fmt.Printf(Elapsed(Start0)+"--In- S: Listening at %s...\n",local);
        aconn, err := sconn.AcceptTCP()
        Start = time.Now()
        if err != nil {
            fmt.Printf(Elapsed(Start)+"--En- S: Accept error: %s (%s)\n",local,err)
            return
        }
        clnt, _ := aconn.File()
        fd := clnt.Fd()
        ar := aconn.RemoteAddr()
        if debug { fmt.Printf(Elapsed(Start0)+"--In- S: Accepted TCP at %s [%d] <- %v\n",
            local,fd,ar) }
        res = fmt.Sprintf("220 GShell/%s Server\r\n",VERSION)
        fmt.Fprintf(clnt,"%s",res)
        if debug { fmt.Printf(Elapsed(Start)+"--In- S: %s",res) }
        count, err := clnt.Read(reqbuf)
        if err != nil {
            fmt.Printf(Elapsed(Start)+"--En- C: (%v %v) %v",
                count,err,string(reqbuf))
        }
        req := string(reqbuf[:count])
        if debug { fmt.Printf(Elapsed(Start)+"--In- C: %v",string(req)) }
        reqv := strings.Split(string(req),"\r")
        cmdv := gshScanArg(reqv[0],0)
        //cmdv := strings.Split(reqv[0]," ")
        switch cmdv[0] {
            case "HELO":
                res = fmt.Sprintf("250 %v",req)
            case "GET":
                // download {remotefile|-zN} [localfile]
                var dsize int64 = 32*1024*1024
                var bsize int = 64*1024
                var fname string = ""
                var in *os.File = nil
                var pseudoEOF = false
                if 1 < len(cmdv) {
                    fname = cmdv[1]
                    if strBegins(fname,"-z") {
                        fmt.Sscanf(fname[2:],"%d",&dsize)
                    }else
                    if strBegins(fname,"{") {
                        xin,xout,err := gsh.Popen(fname,"r")
                        if err {
                        }else{
                            xout.Close()
                            defer xin.Close()
                            in = xin
                            dsize = MaxStreamSize
                            pseudoEOF = true
                        }
                    }else{
                        xin,err := os.Open(fname)
                        if err != nil {
                            fmt.Printf("--En- GET (%v)\n",err)
                        }else{
                            defer xin.Close()
                            in = xin
                            fi,_ := xin.Stat()
                            dsize = fi.Size()
                        }
                    }
                }
                //fmt.Printf(Elapsed(Start)+"--In- GET %v:%v\n",dsize,bsize)
                res = fmt.Sprintf("200 %v\r\n",dsize)
                fmt.Fprintf(clnt,"%v",res)
                tcpPush(clnt); // should be separated as line in receiver
                fmt.Printf(Elapsed(Start)+"--In- S: %v",res)
                wcount := fileRelay("SendGET",in,clnt,dsize,bsize)
                if pseudoEOF {
                    in.Close() // pipe from the command
                    // show end of stream data (its size) by OOB?
                    SoftEOF := fmt.Sprintf("((SoftEOF %v))",wcount)
                    fmt.Printf(Elapsed(Start)+"--In- S: Send %v\n",SoftEOF)

                    tcpPush(clnt); // to let SoftEOF data apper at the top of recevied data
                    fmt.Fprintf(clnt,"%v\r\n",SoftEOF)
                    tcpPush(clnt); // to let SoftEOF alone in a packet (separate with 200 OK)
```

```
                        // with client generated random?
                    //fmt.Printf("--In- L: close %v (%v)\n",in.Fd(),in.Name())
                }
                res = fmt.Sprintf("200 GET done\r\n")
            case "PUT":
                // upload {srcfile|-zN} [dstfile]
                var dsize int64 = 32*1024*1024
                var bsize int = 64*1024
                var fname string = ""
                var out *os.File = nil
                if 1 < len(cmdv) { // localfile
                    fmt.Sscanf(cmdv[1],"%d",&dsize)
                }
                if 2 < len(cmdv) {
                    fname = cmdv[2]
                    if fname == "-" {
                        // nul dev
                    }else
                    if strBegins(fname,"{") {
                        xin,xout,err := gsh.Popen(fname,"w")
                        if err {
                        }else{
                            xin.Close()
                            defer xout.Close()
                            out = xout
                        }
                    }else{
                    // should write to temporary file
                    // should suppress ^C on tty
            xout,err := os.OpenFile(fname,os.O_CREATE|os.O_RDWR|os.O_TRUNC,0600)
            //fmt.Printf("--In- S: open(%v) out(%v) err(%v)\n",fname,xout,err)
                        if err != nil {
                            fmt.Printf("--En- PUT (%v)\n",err)
                        }else{
                            out = xout
                        }
                    }
                fmt.Printf(Elapsed(Start)+"--In- L: open(%v,w) %v (%v)\n",
                    fname,local,err)
                }
                fmt.Printf(Elapsed(Start)+"--In- PUT %v (/%v)\n",dsize,bsize)
                fmt.Printf(Elapsed(Start)+"--In- S: 200 %v OK\r\n",dsize)
                fmt.Fprintf(clnt,"200 %v OK\r\n",dsize)
                fileRelay("RecvPUT",clnt,out,dsize,bsize)
                res = fmt.Sprintf("200 PUT done\r\n")
            default:
                res = fmt.Sprintf("400 What? %v",req)
        }
        swcc,serr := clnt.Write([]byte(res))
        if serr != nil {
            fmt.Printf(Elapsed(Start)+"--In- S: (wc=%v er=%v) %v",swcc,serr,res)
        }else{
            fmt.Printf(Elapsed(Start)+"--In- S: %v",res)
        }
        aconn.Close();
        clnt.Close();
    }
    sconn.Close();
}
func (gsh*GshContext)RexecClient(argv[]string)(int,string){
    debug := true
    Start := time.Now()
    if len(argv) == 1 {
        return -1,"EmptyARG"
    }
    argv = argv[1:]
    if argv[0] == "-serv" {
        gsh.RexecServer(argv[1:])
        return 0,"Server"
    }
    remote := "0.0.0.0:9999"
    if argv[0][0] == '@' {
        remote = argv[0][1:]
        argv = argv[1:]
    }
    if argv[0] == "-s" {
        debug = false
        argv = argv[1:]
    }
    dport, err := net.ResolveTCPAddr("tcp",remote);
    if err != nil {
        fmt.Printf(Elapsed(Start)+"Address error: %s (%s)\n",remote,err)
        return -1,"AddressError"
    }
    fmt.Printf(Elapsed(Start)+"--In- C: Connecting to %s\n",remote)
    serv, err := net.DialTCP("tcp",nil,dport)
    if err != nil {
        fmt.Printf(Elapsed(Start)+"Connection error: %s (%s)\n",remote,err)
        return -1,"CannotConnect"
    }
    if debug {
        al := serv.LocalAddr()
        fmt.Printf(Elapsed(Start)+"--In- C: Connected to %v <- %v\n",remote,al)
    }

    req := ""
    res := make([]byte,LINESIZE)
    count,err := serv.Read(res)
    if err != nil {
        fmt.Printf("--En- S: (%3d,%v) %v",count,err,string(res))
    }
    if debug { fmt.Printf(Elapsed(Start)+"--In- S: %v",string(res)) }

    if argv[0] == "GET" {
        savPA := gsh.gshPA
        var bsize int = 64*1024
        req = fmt.Sprintf("%v\r\n",strings.Join(argv," "))
        fmt.Printf(Elapsed(Start)+"--In- C: %v",req)
        fmt.Fprintf(serv,req)
        count,err = serv.Read(res)
        if err != nil {
        }else{
            var dsize int64 = 0
            var out *os.File = nil
            var out_tobeclosed *os.File = nil
            var fname string = ""
            var rcode int = 0
            var pid int = -1
            fmt.Sscanf(string(res),"%d %d",&rcode,&dsize)
            fmt.Printf(Elapsed(Start)+"--In- S: %v",string(res[0:count]))
            if 3 <= len(argv) {
                fname = argv[2]
                if strBegins(fname,"{") {
                    xin,xout,err := gsh.Popen(fname,"w")
```

```
                    if err {
                    }else{
                        xin.Close()
                        defer xout.Close()
                        out = xout
                        out_tobeclosed = xout
                        pid = 0 // should be its pid
                    }
                }else{
                    // should write to temporary file
                    // should suppress ^C on tty
                    xout,err := os.OpenFile(fname,os.O_CREATE|os.O_RDWR|os.O_TRUNC,0600)
                    if err != nil {
                        fmt.Print("--En- %v\n",err)
                    }
                    out = xout
                    //fmt.Printf("--In-- %d > %s\n",out.Fd(),fname)
                }
            }
            in,_ := serv.File()
            fileRelay("RecvGET",in,out,dsize,bsize)
            if 0 <= pid {
                gsh.gshPA = savPA // recovery of Fd(), and more?
                fmt.Printf(Elapsed(Start)+"--In- L: close Pipe > %v\n",fname)
                out_tobeclosed.Close()
                //syscall.Wait4(pid,nil,0,nil) //@@
            }
        }
    }else
    if argv[0] == "PUT" {
        remote, _ := serv.File()
        var local *os.File = nil
        var dsize int64 = 32*1024*1024
        var bsize int = 64*1024
        var ofile string = "-"
        //fmt.Printf("--I-- Rex %v\n",argv)
        if 1 < len(argv) {
            fname := argv[1]
            if strBegins(fname,"-z") {
                fmt.Sscanf(fname[2:],"%d",&dsize)
            }else
            if strBegins(fname,"{") {
                xin,xout,err := gsh.Popen(fname,"r")
                if err {
                }else{
                    xout.Close()
                    defer xin.Close()
                    //in = xin
                    local = xin
                    fmt.Printf("--In- [%d] < Upload output of %v\n",
                        local.Fd(),fname)
                    ofile = "-from."+fname
                    dsize = MaxStreamSize
                }
            }else{
                xlocal,err := os.Open(fname)
                if err != nil {
                    fmt.Printf("--En- (%s)\n",err)
                    local = nil
                }else{
                    local = xlocal
                    fi,_ := local.Stat()
                    dsize = fi.Size()
                    defer local.Close()
                    //fmt.Printf("--I-- Rex in(%v / %v)\n",ofile,dsize)
                }
                ofile = fname
                fmt.Printf(Elapsed(Start)+"--In- L: open(%v,r)=%v %v (%v)\n",
                    fname,dsize,local,err)
            }
        }
        if 2 < len(argv) && argv[2] != "" {
            ofile = argv[2]
            //fmt.Printf("(%d)%v B.ofile=%v\n",len(argv),argv,ofile)
        }
        //fmt.Printf(Elapsed(Start)+"--I-- Rex out(%v)\n",ofile)
        fmt.Printf(Elapsed(Start)+"--In- PUT %v (/%v)\n",dsize,bsize)
        req = fmt.Sprintf("PUT %v %v \r\n",dsize,ofile)
        if debug { fmt.Printf(Elapsed(Start)+"--In- C: %v",req) }
        fmt.Fprintf(serv,"%v",req)
        count,err = serv.Read(res)
        if debug { fmt.Printf(Elapsed(Start)+"--In- S: %v",string(res[0:count])) }
        fileRelay("SendPUT",local,remote,dsize,bsize)
    }else{
        req = fmt.Sprintf("%v\r\n",strings.Join(argv," "))
        if debug { fmt.Printf(Elapsed(Start)+"--In- C: %v",req) }
        fmt.Fprintf(serv,"%v",req)
        //fmt.Printf("--In- sending RexRequest(%v)\n",len(req))
    }
    //fmt.Printf(Elapsed(Start)+"--In- waiting RexResponse...\n")
    count,err = serv.Read(res)
    ress := ""
    if count == 0 {
        ress = "(nil)\r\n"
    }else{
        ress = string(res[:count])
    }
    if err != nil {
        fmt.Printf(Elapsed(Start)+"--En- S: (%d,%v) %v",count,err,ress)
    }else{
        fmt.Printf(Elapsed(Start)+"--In- S: %v",ress)
    }
    serv.Close()
    //conn.Close()

    var stat string
    var rcode int
    fmt.Sscanf(ress,"%d %s",&rcode,&stat)
    //fmt.Printf("--D-- Client: %v (%v)",rcode,stat)
    return rcode,ress
}

// <a name="remote-sh">Remote Shell</a>
// gcp file [...] { [host]:[port:][dir] | dir } // -p | -no-p
func (gsh*GshContext)FileCopy(argv[]string){
    var host = ""
    var port = ""
    var upload = false
    var download = false
    var xargv = []string{"rex-gcp"}
    var srcv = []string{}
    var dstv = []string{}
    argv = argv[1:]

```

```
    for _,v := range argv {
        /*
        if v[0] == '-' { // might be a pseudo file (generated date)
            continue
        }
        */
        obj := strings.Split(v,":")
        //fmt.Printf("%d %v %v\n",len(obj),v,obj)
        if 1 < len(obj) {
            host = obj[0]
            file := ""
            if 0 < len(host) {
                gsh.LastServer.host = host
            }else{
                host = gsh.LastServer.host
                port = gsh.LastServer.port
            }
            if 2 < len(obj) {
                port = obj[1]
                if 0 < len(port) {
                    gsh.LastServer.port = port
                }else{
                    port = gsh.LastServer.port
                }
                file = obj[2]
            }else{
                file = obj[1]
            }
            if len(srcv) == 0 {
                download = true
                srcv = append(srcv,file)
                continue
            }
            upload = true
            dstv = append(dstv,file)
            continue
        }
        /*
        idx := strings.Index(v,":")
        if 0 <= idx {
            remote = v[0:idx]
            if len(srcv) == 0 {
                download = true
                srcv = append(srcv,v[idx+1:])
                continue
            }
            upload = true
            dstv = append(dstv,v[idx+1:])
            continue
        }
        */
        if download {
            dstv = append(dstv,v)
        }else{
            srcv = append(srcv,v)
        }
    }
    hostport := "@" + host + ":" + port
    if upload {
        if host != "" { xargv = append(xargv,hostport) }
        xargv = append(xargv,"PUT")
        xargv = append(xargv,srcv[0:]...)
        xargv = append(xargv,dstv[0:]...)
    //fmt.Printf("--I-- FileCopy PUT gsh://%s/%v < %v // %v\n",hostport,dstv,srcv,xargv)
    fmt.Printf("--I-- FileCopy PUT gsh://%s/%v < %v\n",hostport,dstv,srcv)
        gsh.RexecClient(xargv)
    }else
    if download {
        if host != "" { xargv = append(xargv,hostport) }
        xargv = append(xargv,"GET")
        xargv = append(xargv,srcv[0:]...)
        xargv = append(xargv,dstv[0:]...)
    //fmt.Printf("--I-- FileCopy GET gsh://%v/%v > %v // %v\n",hostport,srcv,dstv,xargv)
    fmt.Printf("--I-- FileCopy GET gsh://%v/%v > %v\n",hostport,srcv,dstv)
        gsh.RexecClient(xargv)
    }else{
    }
}

// target
func (gsh*GshContext)Trelpath(rloc string)(string){
    cwd, _ := os.Getwd()
    os.Chdir(gsh.RWD)
    os.Chdir(rloc)
    twd, _ := os.Getwd()
    os.Chdir(cwd)

    tpath := twd + "/" + rloc
    return tpath
}
// join to rmote GShell - [user@]host[:port] or cd host:[port]:path
func (gsh*GshContext)Rjoin(argv[]string){
    if len(argv) <= 1 {
        fmt.Printf("--I-- current server = %v\n",gsh.RSERV)
        return
    }
    serv := argv[1]
    servv := strings.Split(serv,":")
    if 1 <= len(servv) {
        if servv[0] == "lo" {
            servv[0] = "localhost"
        }
    }
    switch len(servv) {
        case 1:
            //if strings.Index(serv,":") < 0 {
            serv = servv[0] + ":" + fmt.Sprintf("%d",GSH_PORT)
            //}
        case 2: // host:port
            serv = strings.Join(servv,":")
    }
    xargv := []string{"rex-join","@"+serv,"HELO"}
    rcode,stat := gsh.RexecClient(xargv)
    if (rcode / 100) == 2 {
        fmt.Printf("--I-- OK Joined (%v) %v\n",rcode,stat)
        gsh.RSERV = serv
    }else{
        fmt.Printf("--I-- NG, could not joined (%v) %v\n",rcode,stat)
    }
}
func (gsh*GshContext)Rexec(argv[]string){
    if len(argv) <= 1 {
        fmt.Printf("--I-- rexec command [ | {file || {command} ]\n",gsh.RSERV)
        return
```

```
    }

    /*
    nargv := gshScanArg(strings.Join(argv," "),0)
    fmt.Printf("--D-- nargc=%d [%v]\n",len(nargv),nargv)
    if nargv[1][0] != '{' {
        nargv[1] = "{" + nargv[1] + "}"
        fmt.Printf("--D-- nargc=%d [%v]\n",len(nargv),nargv)
    }
    argv = nargv
    */
    nargv := []string{}
    nargv = append(nargv,"{"+strings.Join(argv[1:]," ")+"}")
    fmt.Printf("--D-- nargc=%d %v\n",len(nargv),nargv)
    argv = nargv

    xargv := []string{"rex-exec","@"+gsh.RSERV,"GET"}
    xargv = append(xargv,argv...)
    xargv = append(xargv,"/dev/tty")
    rcode,stat := gsh.RexecClient(xargv)
    if (rcode / 100) == 2 {
        fmt.Printf("--I-- OK Rexec (%v) %v\n",rcode,stat)
    }else{
        fmt.Printf("--I-- NG Rexec (%v) %v\n",rcode,stat)
    }
}
func (gsh*GshContext)Rchdir(argv[]string){
    if len(argv) <= 1 {
        return
    }
    cwd, _ := os.Getwd()
    os.Chdir(gsh.RWD)
    os.Chdir(argv[1])
    twd, _ := os.Getwd()
    gsh.RWD = twd
    fmt.Printf("--I-- JWD=%v\n",twd)
    os.Chdir(cwd)
}
func (gsh*GshContext)Rpwd(argv[]string){
    fmt.Printf("%v\n",gsh.RWD)
}
func (gsh*GshContext)Rls(argv[]string){
    cwd, _ := os.Getwd()
    os.Chdir(gsh.RWD)
    argv[0] = "-ls"
    gsh.xFind(argv)
    os.Chdir(cwd)
}
func (gsh*GshContext)Rput(argv[]string){
    var local string = ""
    var remote string = ""
    if 1 < len(argv) {
        local = argv[1]
        remote = local // base name
    }
    if 2 < len(argv) {
        remote = argv[2]
    }
    fmt.Printf("--I-- jput from=%v to=%v\n",local,gsh.Trelpath(remote))
}
func (gsh*GshContext)Rget(argv[]string){
    var remote string = ""
    var local string = ""
    if 1 < len(argv) {
        remote = argv[1]
        local = remote // base name
    }
    if 2 < len(argv) {
        local = argv[2]
    }
    fmt.Printf("--I-- jget from=%v to=%v\n",gsh.Trelpath(remote),local)
}

// <a name="network">network</a>
// -s, -si, -so // bi-directional, source, sync (maybe socket)
func (gshCtx*GshContext)sconnect(inTCP bool, argv []string) {
    gshPA := gshCtx.gshPA
    if len(argv) < 2 {
        fmt.Printf("Usage: -s [host]:[port[.udp]]\n")
        return
    }
    remote := argv[1]
    if remote == ":" { remote = "0.0.0.0:9999" }

    if inTCP { // TCP
        dport, err := net.ResolveTCPAddr("tcp",remote);
        if err != nil {
            fmt.Printf("Address error: %s (%s)\n",remote,err)
            return
        }
        conn, err := net.DialTCP("tcp",nil,dport)
        if err != nil {
            fmt.Printf("Connection error: %s (%s)\n",remote,err)
            return
        }
        file, _ := conn.File();
        fd := file.Fd()
        fmt.Printf("Socket: connected to %s, socket[%d]\n",remote,fd)

        savfd := gshPA.Files[1]
        gshPA.Files[1] = fd;
        gshCtx.gshellv(argv[2:])
        gshPA.Files[1] = savfd
        file.Close()
        conn.Close()
    }else{
        //dport, err := net.ResolveUDPAddr("udp4",remote);
        dport, err := net.ResolveUDPAddr("udp",remote);
        if err != nil {
            fmt.Printf("Address error: %s (%s)\n",remote,err)
            return
        }
        //conn, err := net.DialUDP("udp4",nil,dport)
        conn, err := net.DialUDP("udp",nil,dport)
        if err != nil {
            fmt.Printf("Connection error: %s (%s)\n",remote,err)
            return
        }
        file, _ := conn.File();
        fd := file.Fd()

        ar := conn.RemoteAddr()
        //al := conn.LocalAddr()
        fmt.Printf("Socket: connected to %s [%s], socket[%d]\n",
```

```
            remote,ar.String(),fd)

        savfd := gshPA.Files[1]
        gshPA.Files[1] = fd;
        gshCtx.gshellv(argv[2:])
        gshPA.Files[1] = savfd
        file.Close()
        conn.Close()
    }
}
func (gshCtx*GshContext)saccept(inTCP bool, argv []string) {
    gshPA := gshCtx.gshPA
    if len(argv) < 2 {
        fmt.Printf("Usage: -ac [host]:[port[.udp]]\n")
        return
    }
    local := argv[1]
    if local == ":" { local = "0.0.0.0:9999" }
    if inTCP { // TCP
        port, err := net.ResolveTCPAddr("tcp",local);
        if err != nil {
            fmt.Printf("Address error: %s (%s)\n",local,err)
            return
        }
        //fmt.Printf("Listen at %s...\n",local);
        sconn, err := net.ListenTCP("tcp", port)
        if err != nil {
            fmt.Printf("Listen error: %s (%s)\n",local,err)
            return
        }
        //fmt.Printf("Accepting at %s...\n",local);
        aconn, err := sconn.AcceptTCP()
        if err != nil {
            fmt.Printf("Accept error: %s (%s)\n",local,err)
            return
        }
        file, _ := aconn.File()
        fd := file.Fd()
        fmt.Printf("Accepted TCP at %s [%d]\n",local,fd)

        savfd := gshPA.Files[0]
        gshPA.Files[0] = fd;
        gshCtx.gshellv(argv[2:])
        gshPA.Files[0] = savfd

        sconn.Close();
        aconn.Close();
        file.Close();
    }else{
        //port, err := net.ResolveUDPAddr("udp4",local);
        port, err := net.ResolveUDPAddr("udp",local);
        if err != nil {
            fmt.Printf("Address error: %s (%s)\n",local,err)
            return
        }
        fmt.Printf("Listen UDP at %s...\n",local);
        //uconn, err := net.ListenUDP("udp4", port)
        uconn, err := net.ListenUDP("udp", port)
        if err != nil {
            fmt.Printf("Listen error: %s (%s)\n",local,err)
            return
        }
        file, _ := uconn.File()
        fd := file.Fd()
        ar := uconn.RemoteAddr()
        remote := ""
        if ar != nil { remote = ar.String() }
        if remote == "" { remote = "?" }

        // not yet received
        //fmt.Printf("Accepted at %s [%d] <- %s\n",local,fd,"")

        savfd := gshPA.Files[0]
        gshPA.Files[0] = fd;
        savenv := gshPA.Env
        gshPA.Env = append(savenv, "REMOTE_HOST="+remote)
        gshCtx.gshellv(argv[2:])
        gshPA.Env = savenv
        gshPA.Files[0] = savfd

        uconn.Close();
        file.Close();
    }
}

// empty line command
func (gshCtx*GshContext)xPwd(argv[]string){
    // execute context command, pwd + date
    // context notation, representation scheme, to be resumed at re-login
    cwd, _ := os.Getwd()
    switch {
    case isin("-a",argv):
        gshCtx.ShowChdirHistory(argv)
    case isin("-ls",argv):
        showFileInfo(cwd,argv)
    default:
        fmt.Printf("%s\n",cwd)
    case isin("-v",argv): // obsolete emtpy command
        t := time.Now()
        date := t.Format(time.UnixDate)
        exe, _ := os.Executable()
        host, _ := os.Hostname()
        fmt.Printf("{PWD=\"%s\"",cwd)
        fmt.Printf(" HOST=\"%s\"",host)
        fmt.Printf(" DATE=\"%s\"",date)
        fmt.Printf(" TIME=\"%s\"",t.String())
        fmt.Printf(" PID=\"%d\"",os.Getpid())
        fmt.Printf(" EXE=\"%s\"",exe)
        fmt.Printf("}\n")
    }
}

// <a name="history">History</a>
// these should be browsed and edited by HTTP browser
// show the time of command with -t and direcotry with -ls
// openfile-history, sort by -a -m -c
// sort by elapsed time by -t -s
// search by "more" like interface
// edit history
// sort history, and wc or uniq
// CPU and other resource consumptions
// limit showing range (by time or so)
// export / import history
func (gshCtx *GshContext)xHistory(argv []string){
```

```
2853    atWorkDirX := -1
2854    if 1 < len(argv) && strBegins(argv[1],"@") {
2855        atWorkDirX,_ = strconv.Atoi(argv[1][1:])
2856    }
2857    //fmt.Printf("--D-- showHistory(%v)\n",argv)
2858    for i, v := range gshCtx.CommandHistory {
2859        // exclude commands not to be listed by default
2860        // internal commands may be suppressed by default
2861        if v.CmdLine == "" && !isin("-a",argv) {
2862            continue;
2863        }
2864        if 0 <= atWorkDirX {
2865            if v.WorkDirX != atWorkDirX {
2866                continue
2867            }
2868        }
2869        if !isin("-n",argv){ // like "fc"
2870            fmt.Printf("!%-2d ",i)
2871        }
2872        if isin("-v",argv){
2873            fmt.Println(v) // should be with it date
2874        }else{
2875            if isin("-l",argv) || isin("-l0",argv) {
2876                elps := v.EndAt.Sub(v.StartAt);
2877                start := v.StartAt.Format(time.Stamp)
2878                fmt.Printf("@%d ",v.WorkDirX)
2879                fmt.Printf("[%v] %11v/t ",start,elps)
2880            }
2881            if isin("-l",argv) && !isin("-l0",argv){
2882                fmt.Printf("%v",Rusagef("%t %u\t// %s",argv,v.Rusagev))
2883            }
2884            if isin("-at",argv) { // isin("-ls",argv){
2885                dhi := v.WorkDirX // workdir history index
2886                fmt.Printf("@%d %s\t",dhi,v.WorkDir)
2887                // show the FileInfo of the output command??
2888            }
2889            fmt.Printf("%s",v.CmdLine)
2890            fmt.Printf("\n")
2891        }
2892    }
2893 }
2894 // !n - history index
2895 func searchHistory(gshCtx GshContext, gline string) (string, bool, bool){
2896    if gline[0] == '!' {
2897        hix, err := strconv.Atoi(gline[1:])
2898        if err != nil {
2899            fmt.Printf("--E-- (%s : range)\n",hix)
2900            return "", false, true
2901        }
2902        if hix < 0 || len(gshCtx.CommandHistory) <= hix {
2903            fmt.Printf("--E-- (%d : out of range)\n",hix)
2904            return "", false, true
2905        }
2906        return gshCtx.CommandHistory[hix].CmdLine, false, false
2907    }
2908    // search
2909    //for i, v := range gshCtx.CommandHistory {
2910    //}
2911    return gline, false, false
2912 }
2913 func (gsh*GshContext)cmdStringInHistory(hix int)(cmd string, ok bool){
2914    if 0 <= hix && hix < len(gsh.CommandHistory) {
2915        return gsh.CommandHistory[hix].CmdLine,true
2916    }
2917    return "",false
2918 }
2919
2920 // temporary adding to PATH environment
2921 // cd name -lib for LD_LIBRARY_PATH
2922 // chdir with directory history (date + full-path)
2923 // -s for sort option (by visit date or so)
2924 func (gsh*GshContext)ShowChdirHistory1(i int,v GChdirHistory, argv []string){
2925    fmt.Printf("!%-2d ",v.CmdIndex) // the first command at this WorkDir
2926    fmt.Printf("@%d ",i)
2927    fmt.Printf("[%v] ",v.MovedAt.Format(time.Stamp))
2928    showFileInfo(v.Dir,argv)
2929 }
2930 func (gsh*GshContext)ShowChdirHistory(argv []string){
2931    for i, v := range gsh.ChdirHistory {
2932        gsh.ShowChdirHistory1(i,v,argv)
2933    }
2934 }
2935 func skipOpts(argv[]string)(int){
2936    for i,v := range argv {
2937        if strBegins(v,"-") {
2938        }else{
2939            return i
2940        }
2941    }
2942    return -1
2943 }
2944 func (gshCtx*GshContext)xChdir(argv []string){
2945    cdhist := gshCtx.ChdirHistory
2946    if isin("?",argv ) || isin("-t",argv) || isin("-a",argv) {
2947        gshCtx.ShowChdirHistory(argv)
2948        return
2949    }
2950    pwd, _ := os.Getwd()
2951    dir := ""
2952    if len(argv) <= 1 {
2953        dir = toFullpath("~")
2954    }else{
2955        i := skipOpts(argv[1:])
2956        if i < 0 {
2957            dir = toFullpath("~")
2958        }else{
2959            dir = argv[1+i]
2960        }
2961    }
2962    if strBegins(dir,"@") {
2963        if dir == "@0" { // obsolete
2964            dir = gshCtx.StartDir
2965        }else
2966        if dir == "@!" {
2967            index := len(cdhist) - 1
2968            if 0 < index { index -= 1 }
2969            dir = cdhist[index].Dir
2970        }else{
2971            index, err := strconv.Atoi(dir[1:])
2972            if err != nil {
2973                fmt.Printf("--E-- xChdir(%v)\n",err)
2974                dir = "?"
2975            }else
2976            if len(gshCtx.ChdirHistory) <= index {
```

```
                fmt.Printf("--E-- xChdir(history range error)\n")
                dir = "?"
            }else{
                dir = cdhist[index].Dir
            }
        }
    }
    if dir != "?" {
        err := os.Chdir(dir)
        if err != nil {
            fmt.Printf("--E-- xChdir(%s)(%v)\n",argv[1],err)
        }else{
            cwd, _ := os.Getwd()
            if cwd != pwd {
                hist1 := GChdirHistory { }
                hist1.Dir = cwd
                hist1.MovedAt = time.Now()
                hist1.CmdIndex = len(gshCtx.CommandHistory)+1
                gshCtx.ChdirHistory = append(cdhist,hist1)
                if !isin("-s",argv){
                    //cwd, _ := os.Getwd()
                    //fmt.Printf("%s\n",cwd)
                    ix := len(gshCtx.ChdirHistory)-1
                    gshCtx.ShowChdirHistory1(ix,hist1,argv)
                }
            }
        }
    }
    if isin("-ls",argv){
        cwd, _ := os.Getwd()
        showFileInfo(cwd,argv);
    }
}
func TimeValSub(tv1 *syscall.Timeval, tv2 *syscall.Timeval){
    *tv1 = syscall.NsecToTimeval(tv1.Nano() - tv2.Nano())
}
func RusageSubv(ru1, ru2 [2]syscall.Rusage)([2]syscall.Rusage){
    TimeValSub(&ru1[0].Utime,&ru2[0].Utime)
    TimeValSub(&ru1[0].Stime,&ru2[0].Stime)
    TimeValSub(&ru1[1].Utime,&ru2[1].Utime)
    TimeValSub(&ru1[1].Stime,&ru2[1].Stime)
    return ru1
}
func TimeValAdd(tv1 syscall.Timeval, tv2 syscall.Timeval)(syscall.Timeval){
    tvs := syscall.NsecToTimeval(tv1.Nano() + tv2.Nano())
    return tvs
}
/*
func RusageAddv(ru1, ru2 [2]syscall.Rusage)([2]syscall.Rusage){
    TimeValAdd(ru1[0].Utime,ru2[0].Utime)
    TimeValAdd(ru1[0].Stime,ru2[0].Stime)
    TimeValAdd(ru1[1].Utime,ru2[1].Utime)
    TimeValAdd(ru1[1].Stime,ru2[1].Stime)
    return ru1
}
*/

// <a name="rusage">Resource Usage</a>
func sRusagef(fmtspec string, argv []string, ru [2]syscall.Rusage)(string){
    // ru[0] self , ru[1] children
    ut := TimeValAdd(ru[0].Utime,ru[1].Utime)
    st := TimeValAdd(ru[0].Stime,ru[1].Stime)
    uu := (ut.Sec*1000000 + int64(ut.Usec)) * 1000
    su := (st.Sec*1000000 + int64(st.Usec)) * 1000
    tu := uu + su
    ret := fmt.Sprintf("%v/sum",abbtime(tu))
    ret += fmt.Sprintf(", %v/usr",abbtime(uu))
    ret += fmt.Sprintf(", %v/sys",abbtime(su))
    return ret
}
func Rusagef(fmtspec string, argv []string, ru [2]syscall.Rusage)(string){
    ut := TimeValAdd(ru[0].Utime,ru[1].Utime)
    st := TimeValAdd(ru[0].Stime,ru[1].Stime)
    fmt.Printf("%d.%06ds/u ",ut.Sec,ut.Usec) //ru[1].Utime.Sec,ru[1].Utime.Usec)
    fmt.Printf("%d.%06ds/s ",st.Sec,st.Usec) //ru[1].Stime.Sec,ru[1].Stime.Usec)
    return ""
}
func Getrusagev()([2]syscall.Rusage){
    var ruv = [2]syscall.Rusage{}
    syscall.Getrusage(syscall.RUSAGE_SELF,&ruv[0])
    syscall.Getrusage(syscall.RUSAGE_CHILDREN,&ruv[1])
    return ruv
}
func showRusage(what string,argv []string, ru *syscall.Rusage){
    fmt.Printf("%s: ",what);
    fmt.Printf("Usr=%d.%06ds",ru.Utime.Sec,ru.Utime.Usec)
    fmt.Printf(" Sys=%d.%06ds",ru.Stime.Sec,ru.Stime.Usec)
    fmt.Printf(" Rss=%vB",ru.Maxrss)
    if isin("-l",argv) {
        fmt.Printf(" MinFlt=%v",ru.Minflt)
        fmt.Printf(" MajFlt=%v",ru.Majflt)
        fmt.Printf(" IxRSS=%vB",ru.Ixrss)
        fmt.Printf(" IdRSS=%vB",ru.Idrss)
        fmt.Printf(" Nswap=%vB",ru.Nswap)
    fmt.Printf(" Read=%v",ru.Inblock)
    fmt.Printf(" Write=%v",ru.Oublock)
    }
    fmt.Printf(" Snd=%v",ru.Msgsnd)
    fmt.Printf(" Rcv=%v",ru.Msgrcv)
    //if isin("-l",argv) {
        fmt.Printf(" Sig=%v",ru.Nsignals)
    //}
    fmt.Printf("\n");
}
func (gshCtx *GshContext)xTime(argv[]string)(bool){
    if 2 <= len(argv){
        gshCtx.LastRusage = syscall.Rusage{}
        rusagev1 := Getrusagev()
        fin := gshCtx.gshellv(argv[1:])
        rusagev2 := Getrusagev()
        showRusage(argv[1],argv,&gshCtx.LastRusage)
        rusagev := RusageSubv(rusagev2,rusagev1)
        showRusage("self",argv,&rusagev[0])
        showRusage("chld",argv,&rusagev[1])
        return fin
    }else{
        rusage:= syscall.Rusage {}
        syscall.Getrusage(syscall.RUSAGE_SELF,&rusage)
        showRusage("self",argv, &rusage)
        syscall.Getrusage(syscall.RUSAGE_CHILDREN,&rusage)
        showRusage("chld",argv, &rusage)
        return false
    }
}
```

```
func (gshCtx *GshContext)xJobs(argv[]string){
    fmt.Printf("%d Jobs\n",len(gshCtx.BackGroundJobs))
    for ji, pid := range gshCtx.BackGroundJobs {
        //wstat := syscall.WaitStatus {0}
        rusage := syscall.Rusage {}
        //wpid, err := syscall.Wait4(pid,&wstat,syscall.WNOHANG,&rusage);
        wpid, err := syscall.Wait4(pid,nil,syscall.WNOHANG,&rusage);
        if err != nil {
            fmt.Printf("--E-- %%%d [%d] (%v)\n",ji,pid,err)
        }else{
            fmt.Printf("%%%d[%d](%d)\n",ji,pid,wpid)
            showRusage("chld",argv,&rusage)
        }
    }
}
func (gsh*GshContext)inBackground(argv[]string)(bool){
    if gsh.CmdTrace { fmt.Printf("--I-- inBackground(%v)\n",argv) }
    gsh.BackGround = true // set background option
    xfin := false
    xfin = gsh.gshellv(argv)
    gsh.BackGround = false
    return xfin
}
// -o file without command means just opening it and refer by #N
// should be listed by "files" comnmand
func (gshCtx*GshContext)xOpen(argv[]string){
    var pv = []int{-1,-1}
    err := syscall.Pipe(pv)
    fmt.Printf("--I-- pipe()=[#%d,#%d](%v)\n",pv[0],pv[1],err)
}
func (gshCtx*GshContext)fromPipe(argv[]string){
}
func (gshCtx*GshContext)xClose(argv[]string){
}

// <a name="redirect">redirect</a>
func (gshCtx*GshContext)redirect(argv[]string)(bool){
    if len(argv) < 2 {
        return false
    }

    cmd := argv[0]
    fname := argv[1]
    var file *os.File = nil

    fdix := 0
    mode := os.O_RDONLY

    switch {
    case cmd == "-i" || cmd == "<":
        fdix = 0
        mode = os.O_RDONLY
    case cmd == "-o" || cmd == ">":
        fdix = 1
        mode = os.O_RDWR | os.O_CREATE
    case cmd == "-a" || cmd == ">>":
        fdix = 1
        mode = os.O_RDWR | os.O_CREATE | os.O_APPEND
    }
    if fname[0] == '#' {
        fd, err := strconv.Atoi(fname[1:])
        if err != nil {
            fmt.Printf("--E-- (%v)\n",err)
            return false
        }
        file = os.NewFile(uintptr(fd),"MaybePipe")
    }else{
        xfile, err := os.OpenFile(argv[1], mode, 0600)
        if err != nil {
            fmt.Printf("--E-- (%s)\n",err)
            return false
        }
        file = xfile
    }
    gshPA := gshCtx.gshPA
    savfd := gshPA.Files[fdix]
    gshPA.Files[fdix] = file.Fd()
    fmt.Printf("--I-- Opened [%d] %s\n",file.Fd(),argv[1])
    gshCtx.gshellv(argv[2:])
    gshPA.Files[fdix] = savfd

    return false
}

//fmt.Fprintf(res, "GShell Status: %q", html.EscapeString(req.URL.Path))
func httpHandler(res http.ResponseWriter, req *http.Request){
    path := req.URL.Path
    fmt.Printf("--I-- Got HTTP Request(%s)\n",path)
    {
        gshCtxBuf, _ :=  setupGshContext()
        gshCtx := &gshCtxBuf
        fmt.Printf("--I-- %s\n",path[1:])
        gshCtx.tgshelll(path[1:])
    }
    fmt.Fprintf(res, "Hello(^-^)//\n%s\n",path)
}
func (gshCtx *GshContext) httpServer(argv []string){
    http.HandleFunc("/", httpHandler)
    accport := "localhost:9999"
    fmt.Printf("--I-- HTTP Server Start at [%s]\n",accport)
    http.ListenAndServe(accport,nil)
}
func (gshCtx *GshContext)xGo(argv[]string){
    go gshCtx.gshellv(argv[1:]);
}
func (gshCtx *GshContext) xPs(argv[]string)(){
}

// <a name="plugin">Plugin</a>
// plugin [-ls [names]] to list plugins
// Reference: <a href="https://golang.org/src/plugin/">plugin</a> source code
func (gshCtx *GshContext) whichPlugin(name string,argv[]string)(pi *PluginInfo){
    pi = nil
    for _,p := range gshCtx.PluginFuncs {
        if p.Name == name && pi == nil {
            pi = &p
        }
        if !isin("-s",argv){
            //fmt.Printf("%v %v ",i,p)
            if isin("-ls",argv){
                showFileInfo(p.Path,argv)
            }else{
                fmt.Printf("%s\n",p.Name)
            }
```

```
        }
    }
    return pi
}
func (gshCtx *GshContext) xPlugin(argv[]string) (error) {
    if len(argv) == 0 || argv[0] == "-ls" {
        gshCtx.whichPlugin("",argv)
        return  nil
    }
    name := argv[0]
    Pin := gshCtx.whichPlugin(name,[]string{"-s"})
    if Pin != nil {
        os.Args = argv // should be recovered?
        Pin.Addr.(func())()
        return nil
    }
    sofile := toFullpath(argv[0] + ".so") // or find it by which($PATH)

    p, err := plugin.Open(sofile)
    if err != nil {
        fmt.Printf("--E-- plugin.Open(%s)(%v)\n",sofile,err)
        return err
    }
    fname := "Main"
    f, err := p.Lookup(fname)
    if( err != nil ){
        fmt.Printf("--E-- plugin.Lookup(%s)(%v)\n",fname,err)
        return err
    }
    pin := PluginInfo {p,f,name,sofile}
    gshCtx.PluginFuncs = append(gshCtx.PluginFuncs,pin)
    fmt.Printf("--I-- added (%d)\n",len(gshCtx.PluginFuncs))

    //fmt.Printf("--I-- first call(%s:%s)%v\n",sofile,fname,argv)
    os.Args = argv
    f.(func())()
    return err
}
func (gshCtx*GshContext)Args(argv[]string){
    for i,v := range os.Args {
        fmt.Printf("[%v] %v\n",i,v)
    }
}
func (gshCtx *GshContext) showVersion(argv[]string){
    if isin("-l",argv) {
        fmt.Printf("%v/%v (%v)",NAME,VERSION,DATE);
    }else{
        fmt.Printf("%v",VERSION);
    }
    if isin("-a",argv) {
        fmt.Printf(" %s",AUTHOR)
    }
    if !isin("-n",argv) {
        fmt.Printf("\n")
    }
}

// <a name="scanf">Scanf</a> // string decomposer
// scanf [format] [input]
func scanv(sstr string)(strv[]string){
    strv = strings.Split(sstr," ")
    return strv
}
func scanUntil(src,end string)(rstr string,leng int){
    idx := strings.Index(src,end)
    if 0 <= idx {
        rstr = src[0:idx]
        return rstr,idx+len(end)
    }
    return src,0
}

// -bn -- display base-name part only // can be in some %fmt, for sed rewriting
func (gsh*GshContext)printVal(fmts string, vstr string, optv[]string){
    //vint,err := strconv.Atoi(vstr)
    var ival int64 = 0
    n := 0
    err := error(nil)
    if strBegins(vstr,"_") {
        vx,_ := strconv.Atoi(vstr[1:])
        if vx < len(gsh.iValues) {
            vstr = gsh.iValues[vx]
        }else{
        }
    }
    // should use Eval()
    if strBegins(vstr,"0x") {
        n,err = fmt.Sscanf(vstr[2:],"%x",&ival)
    }else{
        n,err = fmt.Sscanf(vstr,"%d",&ival)
//fmt.Printf("--D-- n=%d err=(%v) {%s}=%v\n",n,err,vstr, ival)
    }
    if n == 1 && err == nil {
        //fmt.Printf("--D-- formatn(%v) ival(%v)\n",fmts,ival)
        fmt.Printf("%"+fmts,ival)
    }else{
        if isin("-bn",optv){
            fmt.Printf("%"+fmts,filepath.Base(vstr))
        }else{
            fmt.Printf("%"+fmts,vstr)
        }
    }
}
func (gsh*GshContext)printfv(fmts,div string,argv[]string,optv[]string,list[]string){
    //fmt.Printf("{%d}",len(list))
    //curfmt := "v"
    outlen := 0
    curfmt := gsh.iFormat

    if 0 < len(fmts) {
        for xi := 0; xi < len(fmts); xi++ {
            fch := fmts[xi]
            if fch == '%' {
                if xi+1 < len(fmts) {
                    curfmt = string(fmts[xi+1])
 gsh.iFormat = curfmt
                    xi += 1
    if xi+1 < len(fmts) && fmts[xi+1] == '(' {
        vals,leng := scanUntil(fmts[xi+2:],")")
        //fmt.Printf("--D-- show fmt(%v) val(%v) next(%v)\n",curfmt,vals,leng)
        gsh.printVal(curfmt,vals,optv)
        xi += 2+leng-1
        outlen += 1
    }
```

```
                    continue
                }
            }
            if fch == '_' {
                hi,leng := scanInt(fmts[xi+1:])
                if 0 < leng {
                    if hi < len(gsh.iValues) {
                        gsh.printVal(curfmt,gsh.iValues[hi],optv)
                        outlen += 1 // should be the real length
                    }else{
                        fmt.Printf("((out-range))")
                    }
                    xi += leng
                    continue;
                }
            }
            fmt.Printf("%c",fch)
            outlen += 1
        }
    }else{
        //fmt.Printf("--D-- print {%s}\n")
        for i,v := range list {
            if 0 < i {
                fmt.Printf(div)
            }
            gsh.printVal(curfmt,v,optv)
            outlen += 1
        }
    }
    if 0 < outlen {
        fmt.Printf("\n")
    }
}
func (gsh*GshContext)Scanv(argv[]string){
    //fmt.Printf("--D-- Scanv(%v)\n",argv)
    if len(argv) == 1 {
        return
    }
    argv = argv[1:]
    fmts := ""
    if strBegins(argv[0],"-F") {
        fmts = argv[0]
        gsh.iDelimiter = fmts
        argv = argv[1:]
    }
    input := strings.Join(argv," ")
    if fmts == "" { // simple decomposition
        v := scanv(input)
        gsh.iValues = v
        //fmt.Printf("%v\n",strings.Join(v,","))
    }else{
        v := make([]string,8)
        n,err := fmt.Sscanf(input,fmts,&v[0],&v[1],&v[2],&v[3])
        fmt.Printf("--D-- Scanf ->(%v) n=%d err=(%v)\n",v,n,err)
        gsh.iValues = v
    }
}
func (gsh*GshContext)Printv(argv[]string){
    if false { //@@U
        fmt.Printf("%v\n",strings.Join(argv[1:]," "))
        return
    }
    //fmt.Printf("--D-- Printv(%v)\n",argv)
    //fmt.Printf("%v\n",strings.Join(gsh.iValues,","))
    div := gsh.iDelimiter
    fmts := ""
    argv = argv[1:]
    if 0 < len(argv) {
        if strBegins(argv[0],"-F") {
            div = argv[0][2:]
            argv = argv[1:]
        }
    }

    optv := []string{}
    for _,v := range argv {
        if strBegins(v,"-"){
            optv = append(optv,v)
            argv = argv[1:]
        }else{
            break;
        }
    }
    if 0 < len(argv) {
        fmts = strings.Join(argv," ")
    }
    gsh.printfv(fmts,div,argv,optv,gsh.iValues)
}
func (gsh*GshContext)Basename(argv[]string){
    for i,v := range gsh.iValues {
        gsh.iValues[i] = filepath.Base(v)
    }
}
func (gsh*GshContext)Sortv(argv[]string){
    sv := gsh.iValues
    sort.Slice(sv , func(i,j int) bool {
        return sv[i] < sv[j]
    })
}
func (gsh*GshContext)Shiftv(argv[]string){
    vi := len(gsh.iValues)
    if 0 < vi {
        if isin("-r",argv) {
            top := gsh.iValues[0]
            gsh.iValues = append(gsh.iValues[1:],top)
        }else{
            gsh.iValues = gsh.iValues[1:]
        }
    }
}

func (gsh*GshContext)Enq(argv[]string){
}
func (gsh*GshContext)Deq(argv[]string){
}
func (gsh*GshContext)Push(argv[]string){
    gsh.iValStack = append(gsh.iValStack,argv[1:])
    fmt.Printf("depth=%d\n",len(gsh.iValStack))
}
func (gsh*GshContext)Dump(argv[]string){
    for i,v := range gsh.iValStack {
        fmt.Printf("%d %v\n",i,v)
    }
}
```

```
3473 func (gsh*GshContext)Pop(argv[]string){
3474     depth := len(gsh.iValStack)
3475     if 0 < depth {
3476         v := gsh.iValStack[depth-1]
3477         if isin("-cat",argv){
3478             gsh.iValues = append(gsh.iValues,v...)
3479         }else{
3480             gsh.iValues = v
3481         }
3482         gsh.iValStack = gsh.iValStack[0:depth-1]
3483         fmt.Printf("depth=%d %s\n",len(gsh.iValStack),gsh.iValues)
3484     }else{
3485         fmt.Printf("depth=%d\n",depth)
3486     }
3487 }
3488
3489 // <a name="interpreter">Command Interpreter</a>
3490 func (gshCtx*GshContext)gshellv(argv []string) (fin bool) {
3491     fin = false
3492
3493     if gshCtx.CmdTrace { fmt.Fprintf(os.Stderr,"--I-- gshellv((%d))\n",len(argv)) }
3494     if len(argv) <= 0 {
3495         return false
3496     }
3497     xargv := []string{}
3498     for ai := 0; ai < len(argv); ai++ {
3499         xargv = append(xargv,strsubst(gshCtx,argv[ai],false))
3500     }
3501     argv = xargv
3502     if false {
3503         for ai := 0; ai < len(argv); ai++ {
3504             fmt.Printf("[%d] %s [%d]%T\n",
3505                 ai,argv[ai],len(argv[ai]),argv[ai])
3506         }
3507     }
3508     cmd := argv[0]
3509     if gshCtx.CmdTrace { fmt.Fprintf(os.Stderr,"--I-- gshellv(%d)%v\n",len(argv),argv) }
3510     switch { // https://tour.golang.org/flowcontrol/11
3511     case cmd == "":
3512         gshCtx.xPwd([]string{}); // emtpy command
3513     case cmd == "-x":
3514         gshCtx.CmdTrace = ! gshCtx.CmdTrace
3515     case cmd == "-xt":
3516         gshCtx.CmdTime = ! gshCtx.CmdTime
3517     case cmd == "-ot":
3518         gshCtx.sconnect(true, argv)
3519     case cmd == "-ou":
3520         gshCtx.sconnect(false, argv)
3521     case cmd == "-it":
3522         gshCtx.saccept(true , argv)
3523     case cmd == "-iu":
3524         gshCtx.saccept(false, argv)
3525     case cmd == "-i" || cmd == "<" || cmd == "-o" || cmd == ">" || cmd == "-a" || cmd == ">>" || cmd == "-s" || cmd == "><":
3526         gshCtx.redirect(argv)
3527     case cmd == "|":
3528         gshCtx.fromPipe(argv)
3529     case cmd == "args":
3530         gshCtx.Args(argv)
3531     case cmd == "bg" || cmd == "-bg":
3532         rfin := gshCtx.inBackground(argv[1:])
3533         return rfin
3534     case cmd == "-bn":
3535         gshCtx.Basename(argv)
3536     case cmd == "call":
3537         _,_ = gshCtx.excommand(false,argv[1:])
3538     case cmd == "cd" || cmd == "chdir":
3539         gshCtx.xChdir(argv);
3540     case cmd == "-cksum":
3541         gshCtx.xFind(argv)
3542     case cmd == "-sum":
3543         gshCtx.xFind(argv)
3544     case cmd == "-sumtest":
3545         str := ""
3546         if 1 < len(argv) { str = argv[1] }
3547         crc := strCRC32(str,uint64(len(str)))
3548         fprintf(stderr,"%v %v\n",crc,len(str))
3549     case cmd == "close":
3550         gshCtx.xClose(argv)
3551     case cmd == "gcp":
3552         gshCtx.FileCopy(argv)
3553     case cmd == "dec" || cmd == "decode":
3554         gshCtx.Dec(argv)
3555     case cmd == "#define":
3556     case cmd == "dic" || cmd == "d":
3557         xDic(argv)
3558     case cmd == "dump":
3559         gshCtx.Dump(argv)
3560     case cmd == "echo" || cmd == "e":
3561         echo(argv,true)
3562     case cmd == "enc" || cmd == "encode":
3563         gshCtx.Enc(argv)
3564     case cmd == "env":
3565         env(argv)
3566     case cmd == "eval":
3567         xEval(argv[1:],true)
3568     case cmd == "ev" || cmd == "events":
3569         dumpEvents(argv)
3570     case cmd == "exec":
3571         _,_ = gshCtx.excommand(true,argv[1:])
3572         // should not return here
3573     case cmd == "exit" || cmd == "quit":
3574         // write Result code EXIT to 3>
3575         return true
3576     case cmd == "fdls":
3577         // dump the attributes of fds (of other process)
3578     case cmd == "-find" || cmd == "fin" || cmd == "ufind" || cmd == "uf":
3579         gshCtx.xFind(argv[1:])
3580     case cmd == "fu":
3581         gshCtx.xFind(argv[1:])
3582     case cmd == "fork":
3583         // mainly for a server
3584     case cmd == "-gen":
3585         gshCtx.gen(argv)
3586     case cmd == "-go":
3587         gshCtx.xGo(argv)
3588     case cmd == "-grep":
3589         gshCtx.xFind(argv)
3590     case cmd == "gdeq":
3591         gshCtx.Deq(argv)
3592     case cmd == "genq":
3593         gshCtx.Enq(argv)
3594     case cmd == "gpop":
3595         gshCtx.Pop(argv)
3596     case cmd == "gpush":
```

```
3597        gshCtx.Push(argv)
3598    case cmd == "history" || cmd == "hi": // hi should be alias
3599        gshCtx.xHistory(argv)
3600    case cmd == "jobs":
3601        gshCtx.xJobs(argv)
3602    case cmd == "lnsp" || cmd == "nlsp":
3603        gshCtx.SplitLine(argv)
3604    case cmd == "-ls":
3605        gshCtx.xFind(argv)
3606    case cmd == "nop":
3607        // do nothing
3608    case cmd == "pipe":
3609        gshCtx.xOpen(argv)
3610    case cmd == "plug" || cmd == "plugin" || cmd == "pin":
3611        gshCtx.xPlugin(argv[1:])
3612    case cmd == "print" || cmd == "-pr":
3613        // output internal slice // also sprintf should be
3614        gshCtx.Printv(argv)
3615    case cmd == "ps":
3616        gshCtx.xPs(argv)
3617    case cmd == "pstitle":
3618        // to be gsh.title
3619    case cmd == "rexecd" || cmd == "rexd":
3620        gshCtx.RexecServer(argv)
3621    case cmd == "rexec" || cmd == "rex":
3622        gshCtx.RexecClient(argv)
3623    case cmd == "repeat" || cmd == "rep": // repeat cond command
3624        gshCtx.repeat(argv)
3625    case cmd == "replay":
3626        gshCtx.xReplay(argv)
3627    case cmd == "scan":
3628        // scan input (or so in fscanf) to internal slice (like Files or map)
3629        gshCtx.Scanv(argv)
3630    case cmd == "set":
3631        // set name ...
3632    case cmd == "serv":
3633        gshCtx.httpServer(argv)
3634    case cmd == "shift":
3635        gshCtx.Shiftv(argv)
3636    case cmd == "sleep":
3637        gshCtx.sleep(argv)
3638    case cmd == "-sort":
3639        gshCtx.Sortv(argv)
3640
3641    case cmd == "j" || cmd == "join":
3642        gshCtx.Rjoin(argv)
3643    case cmd == "a" || cmd == "alpa":
3644        gshCtx.Rexec(argv)
3645    case cmd == "jcd" || cmd == "jchdir":
3646        gshCtx.Rchdir(argv)
3647    case cmd == "jget":
3648        gshCtx.Rget(argv)
3649    case cmd == "jls":
3650        gshCtx.Rls(argv)
3651    case cmd == "jput":
3652        gshCtx.Rput(argv)
3653    case cmd == "jpwd":
3654        gshCtx.Rpwd(argv)
3655
3656    case cmd == "time":
3657        fin = gshCtx.xTime(argv)
3658    case cmd == "ungets":
3659        if 1 < len(argv) {
3660            ungets(argv[1]+"\n")
3661        }else{
3662        }
3663    case cmd == "pwd":
3664        gshCtx.xPwd(argv);
3665    case cmd == "ver" || cmd == "-ver" || cmd == "version":
3666        gshCtx.showVersion(argv)
3667    case cmd == "where":
3668        // data file or so?
3669    case cmd == "which":
3670        which("PATH",argv);
3671    case cmd == "gj" && 1 < len(argv) && argv[1] == "listen":
3672        go gj_server(argv[1:]);
3673    case cmd == "gj" && 1 < len(argv) && argv[1] == "serve":
3674        go gj_server(argv[1:]);
3675    case cmd == "gj" && 1 < len(argv) && argv[1] == "join":
3676        go gj_client(argv[1:]);
3677    case cmd == "gj":
3678        jsend(argv);
3679    case cmd == "jsend":
3680        jsend(argv);
3681    default:
3682        if gshCtx.whichPlugin(cmd,[]string{"-s"}) != nil {
3683            gshCtx.xPlugin(argv)
3684        }else{
3685            notfound,_ := gshCtx.excommand(false,argv)
3686            if notfound {
3687                fmt.Printf("--E-- command not found (%v)\n",cmd)
3688            }
3689        }
3690    }
3691    return fin
3692 }
3693
3694 func (gsh*GshContext)gshelll(gline string) (rfin bool) {
3695    argv := strings.Split(string(gline)," ")
3696    fin := gsh.gshellv(argv)
3697    return fin
3698 }
3699 func (gsh*GshContext)tgshelll(gline string)(xfin bool){
3700    start := time.Now()
3701    fin := gsh.gshelll(gline)
3702    end := time.Now()
3703    elps := end.Sub(start);
3704    if gsh.CmdTime {
3705        fmt.Printf("--T-- " + time.Now().Format(time.Stamp) + "(%d.%09ds)\n",
3706            elps/1000000000,elps%1000000000)
3707    }
3708    return fin
3709 }
3710 func Ttyid() (int) {
3711    fi, err := os.Stdin.Stat()
3712    if err != nil {
3713        return 0;
3714    }
3715    //fmt.Printf("Stdin: %v Dev=%d\n",
3716    //  fi.Mode(),fi.Mode()&os.ModeDevice)
3717    if (fi.Mode() & os.ModeDevice) != 0 {
3718        stat := syscall.Stat_t{};
3719        err := syscall.Fstat(0,&stat)
3720        if err != nil {
```

```
            //fmt.Printf("--I-- Stdin: (%v)\n",err)
        }else{
            //fmt.Printf("--I-- Stdin: rdev=%d %d\n",
            //  stat.Rdev&0xFF,stat.Rdev);
            //fmt.Printf("--I-- Stdin: tty%d\n",stat.Rdev&0xFF);
            return int(stat.Rdev & 0xFF)
        }
    }
    return 0
}
func (gshCtx *GshContext) ttyfile() string {
    //fmt.Printf("--I-- GSH_HOME=%s\n",gshCtx.GshHomeDir)
    ttyfile := gshCtx.GshHomeDir + "/" + "gsh-tty" +
         fmt.Sprintf("%02d",gshCtx.TerminalId)
         //strconv.Itoa(gshCtx.TerminalId)
    //fmt.Printf("--I-- ttyfile=%s\n",ttyfile)
    return ttyfile
}
func (gshCtx *GshContext) ttyline()(*os.File){
    file, err := os.OpenFile(gshCtx.ttyfile(),os.O_RDWR|os.O_CREATE|os.O_TRUNC,0600)
    if err != nil {
        fmt.Printf("--F-- cannot open %s (%s)\n",gshCtx.ttyfile(),err)
        return file;
    }
    return file
}
func (gshCtx *GshContext)getline(hix int, skipping bool, prevline string) (string) {
    if( skipping ){
        reader := bufio.NewReaderSize(os.Stdin,LINESIZE)
        line, _, _ := reader.ReadLine()
        return string(line)
    }else
    if true {
        return xgetline(hix,prevline,gshCtx)
    }
    /*
    else
    if( with_exgetline && gshCtx.GetLine != "" ){
        //var xhix int64 = int64(hix); // cast
        newenv := os.Environ()
        newenv = append(newenv, "GSH_LINENO="+strconv.FormatInt(int64(hix),10) )

        tty := gshCtx.ttyline()
        tty.WriteString(prevline)
        Pa := os.ProcAttr {
            "", // start dir
            newenv, //os.Environ(),
            []*os.File{os.Stdin,os.Stdout,os.Stderr,tty},
            nil,
        }
//fmt.Printf("--I-- getline=%s // %s\n",gsh_getlinev[0],gshCtx.GetLine)
proc, err := os.StartProcess(gsh_getlinev[0],[]string{"getline","getline"},&Pa)
        if err != nil {
            fmt.Printf("--F-- getline process error (%v)\n",err)
            // for ; ; { }
            return "exit (getline program failed)"
        }
        //stat, err := proc.Wait()
        proc.Wait()
        buff := make([]byte,LINESIZE)
        count, err := tty.Read(buff)
        //_, err = tty.Read(buff)
        //fmt.Printf("--D-- getline (%d)\n",count)
        if err != nil {
            if ! (count == 0) { // && err.String() == "EOF" ) {
                fmt.Printf("--E-- getline error (%s)\n",err)
            }
        }else{
            //fmt.Printf("--I-- getline OK \"%s\"\n",buff)
        }
        tty.Close()
        gline := string(buff[0:count])
        return gline
    }else
    */
    {
        // if isatty {
            fmt.Printf("!%d",hix)
            fmt.Print(PROMPT)
        // }
        reader := bufio.NewReaderSize(os.Stdin,LINESIZE)
        line, _, _ := reader.ReadLine()
        return string(line)
    }
}

//== begin ========================================================= getline
/*
 * getline.c
 * 2020-0819 extracted from dog.c
 * getline.go
 * 2020-0822 ported to Go
 */
/*
package main // getline main
import (
    "fmt"       // <a href="https://golang.org/pkg/fmt/">fmt</a>
    "strings"   // <a href="https://golang.org/pkg/strings/">strings</a>
    "os"        // <a href="https://golang.org/pkg/os/">os</a>
    "syscall"   // <a href="https://golang.org/pkg/syscall/">syscall</a>
    //"bytes"       // <a href="https://golang.org/pkg/os/">os</a>
    //"os/exec" // <a href="https://golang.org/pkg/os/">os</a>
)
*/

// C language compatibility functions
var errno = 0
var stdin  *os.File = os.Stdin
var stdout *os.File = os.Stdout
var stderr *os.File = os.Stderr
var EOF = -1
var NULL = 0
type FILE os.File
type StrBuff []byte
var NULL_FP *os.File = nil
var NULLSP = 0
//var LINESIZE = 1024

func system(cmdstr string)(int){
    PA := syscall.ProcAttr {
        "", // the starting directory
        os.Environ(),
        []uintptr{os.Stdin.Fd(),os.Stdout.Fd(),os.Stderr.Fd()},
        nil,
```

```
    }
    argv := strings.Split(cmdstr," ")
    pid,err := syscall.ForkExec(argv[0],argv,&PA)
    if( err != nil ){
        fmt.Printf("--E-- syscall(%v) err(%v)\n",cmdstr,err)
    }
    syscall.Wait4(pid,nil,0,nil)

    /*
    argv := strings.Split(cmdstr," ")
    fmt.Fprintf(os.Stderr,"--I-- system(%v)\n",argv)
    //cmd := exec.Command(argv[0:]...)
    cmd := exec.Command(argv[0],argv[1],argv[2])
    cmd.Stdin = strings.NewReader("output of system")
    var out bytes.Buffer
    cmd.Stdout = &out
    var serr bytes.Buffer
    cmd.Stderr = &serr
    err := cmd.Run()
    if err != nil {
        fmt.Fprintf(os.Stderr,"--E-- system(%v)err(%v)\n",argv,err)
        fmt.Printf("ERR:%s\n",serr.String())
    }else{
        fmt.Printf("%s",out.String())
    }
    */
    return 0
}
func atoi(str string)(ret int){
    ret,err := fmt.Sscanf(str,"%d",ret)
    if err == nil {
        return ret
    }else{
        // should set errno
        return 0
    }
}
func getenv(name string)(string){
    val,got := os.LookupEnv(name)
    if got {
        return val
    }else{
        return "?"
    }
}
func strcpy(dst StrBuff, src string){
    var i int
    srcb := []byte(src)
    for i = 0; i < len(src) && srcb[i] != 0; i++ {
        dst[i] = srcb[i]
    }
    dst[i] = 0
}
func xstrcpy(dst StrBuff, src StrBuff){
    dst = src
}
func strcat(dst StrBuff, src StrBuff){
    dst = append(dst,src...)
}
func strdup(str StrBuff)(string){
    return string(str[0:strlen(str)])
}
func sstrlen(str string)(int){
    return len(str)
}
func strlen(str StrBuff)(int){
    var i int
    for i = 0; i < len(str) && str[i] != 0; i++ {
    }
    return i
}
func sizeof(data StrBuff)(int){
    return len(data)
}
func isatty(fd int)(ret int){
    return 1
}

func fopen(file string,mode string)(fp*os.File){
    if mode == "r" {
        fp,err := os.Open(file)
        if( err != nil ){
            fmt.Printf("--E-- fopen(%s,%s)=(%v)\n",file,mode,err)
            return NULL_FP;
        }
        return fp;
    }else{
        fp,err := os.OpenFile(file,os.O_RDWR|os.O_CREATE|os.O_TRUNC,0600)
        if( err != nil ){
            return NULL_FP;
        }
        return fp;
    }
}
func fclose(fp*os.File){
    fp.Close()
}
func fflush(fp *os.File)(int){
    return 0
}
func fgetc(fp*os.File)(int){
    var buf [1]byte
    _,err := fp.Read(buf[0:1])
    if( err != nil ){
        return EOF;
    }else{
        return int(buf[0])
    }
}
func sfgets(str*string, size int, fp*os.File)(int){
    buf := make(StrBuff,size)
    var ch int
    var i int
    for i = 0; i < len(buf)-1; i++ {
        ch = fgetc(fp)
        //fprintf(stderr,"--fgets %d/%d %X\n",i,len(buf),ch)
        if( ch == EOF ){
            break;
        }
        buf[i] = byte(ch);
        if( ch == '\n' ){
            break;
        }
    }
```

```
    buf[i] = 0
    //fprintf(stderr,"--fgets %d/%d (%s)\n",i,len(buf),buf[0:i])
    return i
}
func fgets(buf StrBuff, size int, fp*os.File)(int){
    var ch int
    var i int
    for i = 0; i < len(buf)-1; i++ {
        ch = fgetc(fp)
        //fprintf(stderr,"--fgets %d/%d %X\n",i,len(buf),ch)
        if( ch == EOF ){
            break;
        }
        buf[i] = byte(ch);
        if( ch == '\n' ){
            break;
        }
    }
    buf[i] = 0
    //fprintf(stderr,"--fgets %d/%d (%s)\n",i,len(buf),buf[0:i])
    return i
}
func fputc(ch int , fp*os.File)(int){
    var buf [1]byte
    buf[0] = byte(ch)
    fp.Write(buf[0:1])
    return 0
}
func fputs(buf StrBuff, fp*os.File)(int){
    fp.Write(buf)
    return 0
}
func xfputss(str string, fp*os.File)(int){
    return fputs([]byte(str),fp)
}
func sscanf(str StrBuff,fmts string, params ...interface{})(int){
    fmt.Sscanf(string(str[0:strlen(str)]),fmts,params...)
    return 0
}
func fprintf(fp*os.File,fmts string, params ...interface{})(int){
    fmt.Fprintf(fp,fmts,params...)
    return 0
}

// <a name="IME">Command Line IME</a>
//--------------------------------------------------------------------------- MyIME
var MyIMEVER = "MyIME/0.0.2";
type RomKana struct {
    dic string  // dictionaly ID
    pat string  // input pattern
    out string  // output pattern
    hit int64   // count of hit and used
}
var dicents = 0
var romkana [1024]RomKana
var Romkan []RomKana

func isinDic(str string)(int){
    for i,v := range Romkan {
        if v.pat == str {
            return i
        }
    }
    return -1
}
const (
    DIC_COM_LOAD = "im"
    DIC_COM_DUMP = "s"
    DIC_COM_LIST = "ls"
    DIC_COM_ENA  = "en"
    DIC_COM_DIS  = "di"
)
func helpDic(argv []string){
    out := stderr
    cmd := ""
    if 0 < len(argv) { cmd = argv[0] }
    fprintf(out,"--- %v Usage\n",cmd)
    fprintf(out,"... Commands\n")
    fprintf(out,"...    %v %-3v [dicName] [dicURL ] -- Import dictionary\n",cmd,DIC_COM_LOAD)
    fprintf(out,"...    %v %-3v [pattern] -- Search in dictionary\n",cmd,DIC_COM_DUMP)
    fprintf(out,"...    %v %-3v [dicName] -- List dictionaries\n",cmd,DIC_COM_LIST)
    fprintf(out,"...    %v %-3v [dicName] -- Disable dictionaries\n",cmd,DIC_COM_DIS)
    fprintf(out,"...    %v %-3v [dicName] -- Enable dictionaries\n",cmd,DIC_COM_ENA)
    fprintf(out,"... Keys ... %v\n","ESC can be used for '\\'")
    fprintf(out,"...    \\c -- Reverse the case of the last character\n",)
    fprintf(out,"...    \\i -- Replace input with translated text\n",)
    fprintf(out,"...    \\j -- On/Off translation mode\n",)
    fprintf(out,"...    \\l -- Force Lower Case\n",)
    fprintf(out,"...    \\u -- Force Upper Case (software CapsLock)\n",)
    fprintf(out,"...    \\v -- Show translation actions\n",)
    fprintf(out,"...    \\x -- Replace the last input character with it Hexa-Decimal\n",)
}
func xDic(argv[]string){
    if len(argv) <= 1 {
        helpDic(argv)
        return
    }
    argv = argv[1:]
    var debug = false
    var info = false
    var silent = false
    var dump = false
    var builtin = false
    cmd := argv[0]
    argv = argv[1:]
    opt := ""
    arg := ""

    if 0 < len(argv) {
        arg1 := argv[0]
        if arg1[0] == '-' {
            switch arg1 {
                default: fmt.Printf("--Ed-- Unknown option(%v)\n",arg1)
                    return
                case "-b": builtin = true
                case "-d": debug = true
                case "-s": silent = true
                case "-v": info = true
            }
            opt = arg1
            argv = argv[1:]
        }
    }

```

```
    dicName := ""
    dicURL := ""
    if 0 < len(argv) {
        arg = argv[0]
        dicName = arg
        argv = argv[1:]
    }
    if 0 < len(argv) {
        dicURL = argv[0]
        argv = argv[1:]
    }
    if false {
        fprintf(stderr,"--Dd-- com(%v) opt(%v) arg(%v)\n",cmd,opt,arg)
    }
    if cmd == DIC_COM_LOAD {
        //dicType := ""
        dicBody := ""
        if !builtin && dicName != "" && dicURL == "" {
            f,err := os.Open(dicName)
            if err == nil {
                dicURL = dicName
            }else{
                f,err = os.Open(dicName+".html")
                if err == nil {
                    dicURL = dicName+".html"
                }else{
                    f,err = os.Open("gshdic-"+dicName+".html")
                    if err == nil {
                        dicURL = "gshdic-"+dicName+".html"
                    }
                }
            }
            if err == nil {
                var buf = make([]byte,128*1024)
                count,err := f.Read(buf)
                f.Close()
                if info {
                    fprintf(stderr,"--Id-- ReadDic(%v,%v)\n",count,err)
                }
                dicBody = string(buf[0:count])
            }
        }
        if dicBody == "" {
            switch arg {
                default:
                    dicName = "WorldDic"
                    dicURL = WorldDic
                    if info {
                    fprintf(stderr,"--Id-- default dictionary \"%v\"\n",
                        dicName);
                    }
                case "wnn":
                    dicName = "WnnDic"
                    dicURL = WnnDic
                case "sumomo":
                    dicName = "SumomoDic"
                    dicURL = SumomoDic
                case "sijimi":
                    dicName = "SijimiDic"
                    dicURL = SijimiDic
                case "jkl":
                    dicName = "JKLJaDic"
                    dicURL = JA_JKLDic
            }
            if debug {
                fprintf(stderr,"--Id-- %v URL=%v\n\n",dicName,dicURL);
            }
            dicv := strings.Split(dicURL,",")
            if debug {
                fprintf(stderr,"--Id-- %v encoded data...\n",dicName)
                fprintf(stderr,"Type: %v\n",dicv[0])
                fprintf(stderr,"Body: %v\n",dicv[1])
                fprintf(stderr,"\n")
            }
            body,_ := base64.StdEncoding.DecodeString(dicv[1])
            dicBody = string(body)
        }
        if info {
            fmt.Printf("--Id-- %v %v\n",dicName,dicURL)
            fmt.Printf("%s\n",dicBody)
        }
        if debug {
            fprintf(stderr,"--Id-- dicName %v text...\n",dicName)
            fprintf(stderr,"%v\n",string(dicBody))
        }
        entv := strings.Split(dicBody,"\n");
        if info {
            fprintf(stderr,"--Id-- %v scan...\n",dicName);
        }
        var added int = 0
        var dup int = 0
        for i,v := range entv {
            var pat string
            var out string
            fmt.Sscanf(v,"%s %s",&pat,&out)
            if len(pat) <= 0 {
            }else{
                if 0 <= isinDic(pat) {
                    dup += 1
                    continue
                }
                romkana[dicents] = RomKana{dicName,pat,out,0}
                dicents += 1
                added += 1
                Romkan = append(Romkan,RomKana{dicName,pat,out,0})
                if debug {
                    fmt.Printf("[%3v]:[%2v]%-8v [%2v]%v\n",
                        i,len(pat),pat,len(out),out)
                }
            }
        }
        if !silent {
            url := dicURL
            if strBegins(url,"data:") {
                url = "builtin"
            }
            fprintf(stderr,"--Id-- %v scan... %v added, %v dup. / %v total (%v)\n",
                dicName,added,dup,len(Romkan),url);
        }
        // should sort by pattern length for conclete match, for performance
        if debug {
            arg = "" // search pattern
            dump = true
        }
```

```
    }
    if cmd == DIC_COM_DUMP || dump {
        fprintf(stderr,"--Id-- %v dump... %v entries:\n",dicName,len(Romkan));
        var match = 0
        for i := 0; i < len(Romkan); i++ {
            dic := Romkan[i].dic
            pat := Romkan[i].pat
            out := Romkan[i].out
            if arg == "" || 0 <= strings.Index(pat,arg)||0 <= strings.Index(out,arg) {
                fmt.Printf("\\\\%v\t%v [%2v]%-8v [%2v]%v\n",
                    i,dic,len(pat),pat,len(out),out)
                match += 1
            }
        }
        fprintf(stderr,"--Id-- %v matched %v / %v entries:\n",arg,match,len(Romkan));
    }
}
func loadDefaultDic(dic int){
    if( 0 < len(Romkan) ){
        return
    }
    //fprintf(stderr,"\r\n")
    xDic([]string{"dic",DIC_COM_LOAD});

    var info = false
    if info {
        fprintf(stderr,"--Id-- Conguraturations!! WorldDic is now activated.\r\n")
        fprintf(stderr,"--Id-- enter \"dic\" command for help.\r\n")
    }
}
func readDic()(int){
    /*
    var rk *os.File;
    var dic = "MyIME-dic.txt";
    //rk = fopen("romkana.txt","r");
    //rk = fopen("JK-JA-morse-dic.txt","r");
    rk = fopen(dic,"r");
    if( rk == NULL_FP ){
        if( true ){
            fprintf(stderr,"--%s-- Could not load %s\n",MyIMEVER,dic);
        }
        return -1;
    }
    if( true ){
        var di int;
        var line = make(StrBuff,1024);
        var pat string
        var out string
        for di = 0; di < 1024; di++ {
            if( fgets(line,sizeof(line),rk) == NULLSP ){
                break;
            }
            fmt.Sscanf(string(line[0:strlen(line)]),"%s %s",&pat,&out);
            //sscanf(line,"%s %[^\r\n]",&pat,&out);
            romkana[di].pat = pat;
            romkana[di].out = out;
            //fprintf(stderr,"--Dd- %-10s %s\n",pat,out)
        }
        dicents += di
        if( false ){
            fprintf(stderr,"--%s-- loaded romkana.txt [%d]\n",MyIMEVER,di);
            for di = 0; di < dicents; di++ {
                fprintf(stderr,
                    "%s %s\n",romkana[di].pat,romkana[di].out);
            }
        }
    }
    fclose(rk);

    //romkana[dicents].pat = "//ddump"
    //romkana[dicents].pat = "//ddump" // dump the dic. and clean the command input
    */
    return 0;
}
func matchlen(stri string, pati string)(int){
    if strBegins(stri,pati) {
        return len(pati)
    }else{
        return 0
    }
}
func convs(src string)(string){
    var si int;
    var sx = len(src);
    var di int;
    var mi int;
    var dstb []byte

    for si = 0; si < sx; { // search max. match from the position
        if strBegins(src[si:],"%x/") {
            // %x/integer/ // s/a/b/
            ix := strings.Index(src[si+3:],"/")
            if 0 < ix {
                var iv int = 0
                //fmt.Sscanf(src[si+3:si+3+ix],"%d",&iv)
                fmt.Sscanf(src[si+3:si+3+ix],"%v",&iv)
                sval := fmt.Sprintf("%x",iv)
                bval := []byte(sval)
                dstb = append(dstb,bval...)
                si = si+3+ix+1
                continue
            }
        }
        if strBegins(src[si:],"%d/") {
            // %d/integer/ // s/a/b/
            ix := strings.Index(src[si+3:],"/")
            if 0 < ix {
                var iv int = 0
                fmt.Sscanf(src[si+3:si+3+ix],"%v",&iv)
                sval := fmt.Sprintf("%d",iv)
                bval := []byte(sval)
                dstb = append(dstb,bval...)
                si = si+3+ix+1
                continue
            }
        }
        if strBegins(src[si:],"%t") {
            now := time.Now()
            if true {
                date := now.Format(time.Stamp)
                dstb = append(dstb,[]byte(date)...)
                si = si+3
            }
            continue
```

```
        }
        var maxlen int = 0;
        var len int;
        mi = -1;
        for di = 0; di < dicents; di++ {
            len = matchlen(src[si:],romkana[di].pat);
            if( maxlen < len ){
                maxlen = len;
                mi = di;
            }
        }
        if( 0 < maxlen ){
            out := romkana[mi].out;
            dstb = append(dstb,[]byte(out)...);
            si += maxlen;
        }else{
            dstb = append(dstb,src[si])
            si += 1;
        }
    }
    return string(dstb)
}
func trans(src string)(int){
    dst := convs(src);
    xfputss(dst,stderr);
    return 0;
}

//------------------------------------------------------------ LINEEDIT
// "?" at the top of the line means searching history

// should be compatilbe with Telnet
const (
    EV_MODE     = 255
    EV_IDLE     = 254
    EV_TIMEOUT  = 253

    GO_UP       = 252   // k
    GO_DOWN     = 251   // j
    GO_RIGHT    = 250   // l
    GO_LEFT     = 249   // h
    DEL_RIGHT   = 248   // x
    GO_TOPL     = 'A'-0x40  // 0
    GO_ENDL     = 'E'-0x40  // $

    GO_TOPW     = 239   // b
    GO_ENDW     = 238   // e
    GO_NEXTW    = 237   // w

    GO_FORWCH   = 229   // f
    GO_PAIRCH   = 228   // %

    GO_DEL      = 219   // d

    HI_SRCH_FW  = 209   // /
    HI_SRCH_BK  = 208   // ?
    HI_SRCH_RFW = 207   // n
    HI_SRCH_RBK = 206   // N
)

// should return number of octets ready to be read immediately
//fprintf(stderr,"\n--Select(%v %v)\n",err,r.Bits[0])


var EventRecvFd = -1 // file descriptor
var EventSendFd = -1
const EventFdOffset = 1000000
const NormalFdOffset = 100

func putEvent(event int, evarg int){
    if true {
        if EventRecvFd < 0 {
            var pv = []int{-1,-1}
            syscall.Pipe(pv)
            EventRecvFd = pv[0]
            EventSendFd = pv[1]
            //fmt.Printf("--De-- EventPipe created[%v,%v]\n",EventRecvFd,EventSendFd)
        }
    }else{
        if EventRecvFd < 0 {
            // the document differs from this spec
            // https://golang.org/src/syscall/syscall_unix.go?s=8096:8158#L340
            sv,err := syscall.Socketpair(syscall.AF_UNIX,syscall.SOCK_STREAM,0)
            EventRecvFd = sv[0]
            EventSendFd = sv[1]
            if err != nil {
                fmt.Printf("--De-- EventSock created[%v,%v](%v)\n",
                    EventRecvFd,EventSendFd,err)
            }
        }
    }
    var buf = []byte{ byte(event)}
    n,err := syscall.Write(EventSendFd,buf)
    if err != nil {
        fmt.Printf("--De-- putEvent[%v](%3v)(%v %v)\n",EventSendFd,event,n,err)
    }
}
func ungets(str string){
    for _,ch := range str {
        putEvent(int(ch),0)
    }
}
func (gsh*GshContext)xReplay(argv[]string){
    hix := 0
    tempo := 1.0
    xtempo := 1.0
    repeat := 1

    for _,a := range argv { // tempo
        if strBegins(a,"x") {
            fmt.Sscanf(a[1:],"%f",&xtempo)
            tempo = 1 / xtempo
            //fprintf(stderr,"--Dr-- tempo=[%v]%v\n",a[2:],tempo);
        }else
        if strBegins(a,"r") { // repeat
            fmt.Sscanf(a[1:],"%v",&repeat)
        }else
        if strBegins(a,"!") {
            fmt.Sscanf(a[1:],"%d",&hix)
        }else{
            fmt.Sscanf(a,"%d",&hix)
        }
    }
    if hix == 0 || len(argv) <= 1 {
```

```
        hix = len(gsh.CommandHistory)-1
    }
    fmt.Printf("--Ir-- Replay(!%v x%v r%v)\n",hix,xtempo,repeat)
        //dumpEvents(hix)
    //gsh.xScanReplay(hix,false,repeat,tempo,argv)
    go gsh.xScanReplay(hix,true,repeat,tempo,argv)
}

// <a href="https://golang.org/pkg/syscall/#FdSet">syscall.Select</a>
// 2020-0827 GShell-0.2.3
/*
func FpollIn1(fp *os.File,usec int)(uintptr){
    nfd := 1

    rdv := syscall.FdSet {}
    fd1 := fp.Fd()
    bank1 := fd1/32
    mask1 := int32(1 << fd1)
    rdv.Bits[bank1] = mask1

    fd2 := -1
    bank2 := -1
    var mask2 int32 = 0

    if 0 <= EventRecvFd {
        fd2 = EventRecvFd
        nfd = fd2 + 1
        bank2 = fd2/32
        mask2 = int32(1 << fd2)
        rdv.Bits[bank2] |= mask2
        //fmt.Printf("--De-- EventPoll mask added [%d][%v][%v]\n",fd2,bank2,mask2)
    }

    tout := syscall.NsecToTimeval(int64(usec*1000))
    //n,err := syscall.Select(nfd,&rdv,nil,nil,&tout) // spec. mismatch
    err := syscall.Select(nfd,&rdv,nil,nil,&tout)
    if err != nil {
        //fmt.Printf("--De-- select() err(%v)\n",err)
    }
    if err == nil {
        if 0 <= fd2 && (rdv.Bits[bank2] & mask2) != 0 {
            if false {
                fmt.Printf("--De-- got Event\n")
            }
            return uintptr(EventFdOffset + fd2)
        }else
        if (rdv.Bits[bank1] & mask1) != 0 {
            return uintptr(NormalFdOffset + fd1)
        }else{
            return 1
        }
    }else{
        return 0
    }
}
*/
func fgetcTimeout1(fp *os.File,usec int)(int){
  READ1:
    //readyFd := FpollIn1(fp,usec)
    readyFd := CFpollIn1(fp,usec)
    if readyFd < 100 {
        return EV_TIMEOUT
    }

    var buf [1]byte

    if EventFdOffset <= readyFd {
        fd := int(readyFd-EventFdOffset)
        _,err := syscall.Read(fd,buf[0:1])
        if( err != nil ){
            return EOF;
        }else{
            if buf[0] == EV_MODE {
                recvEvent(fd)
                goto READ1
            }
            return int(buf[0])
        }
    }

    _,err := fp.Read(buf[0:1])
    if( err != nil ){
        return EOF;
    }else{
        return int(buf[0])
    }
}

func visibleChar(ch int)(string){
    switch {
        case '!' <= ch && ch <= '~':
            return string(ch)
    }
    switch ch {
        case ' ': return "\\s"
        case '\n': return "\\n"
        case '\r': return "\\r"
        case '\t': return "\\t"
    }
    switch ch {
        case 0x00: return "NUL"
        case 0x07: return "BEL"
        case 0x08: return "BS"
        case 0x0E: return "SO"
        case 0x0F: return "SI"
        case 0x1B: return "ESC"
        case 0x7F: return "DEL"
    }
    switch ch {
        case EV_IDLE: return fmt.Sprintf("IDLE")
        case EV_MODE: return fmt.Sprintf("MODE")
    }
    return fmt.Sprintf("%X",ch)
}
func recvEvent(fd int){
    var buf = make([]byte,1)
    _,_ = syscall.Read(fd,buf[0:1])
    if( buf[0] != 0 ){
        romkanmode = true
    }else{
        romkanmode = false
    }
}
func (gsh*GshContext)xScanReplay(hix int,replay bool,repeat int,tempo float64,argv[]string){
```

```
    var Start time.Time
    var events = []Event{}
    for _,e := range Events {
        if hix == 0 || e.CmdIndex == hix {
            events = append(events,e)
        }
    }
    elen := len(events)
    if 0 < elen {
        if events[elen-1].event == EV_IDLE {
            events = events[0:elen-1]
        }
    }
    for r := 0; r < repeat; r++ {
        for i,e := range events {
            nano := e.when.Nanosecond()
            micro := nano / 1000
            if Start.Second() == 0 {
                Start = time.Now()
            }
            diff := time.Now().Sub(Start)
            if replay {
                if e.event != EV_IDLE {
                    putEvent(e.event,0)
                    if e.event == EV_MODE { // event with arg
                        putEvent(int(e.evarg),0)
                    }
                }
            }else{
            fmt.Printf("%7.3fms #%-3v !%-3v [%v.%06d] %3v %02X %-4v %10.3fms\n",
                    float64(diff)/1000000.0,
                    i,
                    e.CmdIndex,
                    e.when.Format(time.Stamp),micro,
                    e.event,e.event,visibleChar(e.event),
                    float64(e.evarg)/1000000.0)
            }
            if e.event == EV_IDLE {
                d := time.Duration(float64(time.Duration(e.evarg)) * tempo)
                //nsleep(time.Duration(e.evarg))
                nsleep(d)
            }
        }
    }
}
func dumpEvents(arg[]string){
    hix := 0
    if 1 < len(arg) {
        fmt.Sscanf(arg[1],"%d",&hix)
    }
    for i,e := range Events {
        nano := e.when.Nanosecond()
        micro := nano / 1000
        //if e.event != EV_TIMEOUT {
        if hix == 0 || e.CmdIndex == hix {
            fmt.Printf("#%-3v !%-3v [%v.%06d] %3v %02X %-4v %10.3fms\n",i,
                e.CmdIndex,
                e.when.Format(time.Stamp),micro,
                e.event,e.event,visibleChar(e.event),float64(e.evarg)/1000000.0)
        }
        //}
    }
}
func fgetcTimeout(fp *os.File,usec int)(int){
    ch := fgetcTimeout1(fp,usec)
    if ch != EV_TIMEOUT {
        now := time.Now()
        if 0 < len(Events) {
            last := Events[len(Events)-1]
            dura := int64(now.Sub(last.when))
            Events = append(Events,Event{last.when,EV_IDLE,dura,last.CmdIndex})
        }
        Events = append(Events,Event{time.Now(),ch,0,CmdIndex})
    }
    return ch
}

var AtConsoleLineTop = true
var TtyMaxCol = 72 // to be obtained by ioctl?
var EscTimeout = (100*1000)
var (
    MODE_VicMode    bool    // vi compatible command mode
    MODE_ShowMode   bool
    romkanmode  bool    // shown translation mode, the mode to be retained
    MODE_Recursive  bool    // recursive translation
    MODE_CapsLock   bool    // software CapsLock
    MODE_LowerLock  bool    // force lower-case character lock
    MODE_ViInsert   int // visible insert mode, should be like "I" icon in X Window
    MODE_ViTrace    bool    // output newline before translation
)
type IInput struct {
    lno     int
    lastlno     int
    pch     []int   // input queue
    prompt      string
    line        string
    right       string
    inJmode     bool
    pinJmode    bool
    waitingMeta string  // waiting meta character
    LastCmd     string
}
func (iin*IInput)Getc(timeoutUs int)(int){
    ch1 := EOF
    ch2 := EOF
    ch3 := EOF
    if( 0 < len(iin.pch) ){ // deQ
        ch1 = iin.pch[0]
        iin.pch = iin.pch[1:]
    }else{
        ch1 = fgetcTimeout(stdin,timeoutUs);
    }
    if( ch1 == 033 ){ /// escape sequence
        ch2 = fgetcTimeout(stdin,EscTimeout);
        if( ch2 == EV_TIMEOUT ){
        }else{
            ch3 = fgetcTimeout(stdin,EscTimeout);
            if( ch3 == EV_TIMEOUT ){
                iin.pch = append(iin.pch,ch2) // enQ
            }else{
                switch( ch2 ){
                    default:
                        iin.pch = append(iin.pch,ch2) // enQ
                        iin.pch = append(iin.pch,ch3) // enQ
```

```
                    case '[':
                        switch( ch3 ){
                            case 'A': ch1 = GO_UP; // ^
                            case 'B': ch1 = GO_DOWN; // v
                            case 'C': ch1 = GO_RIGHT; // >
                            case 'D': ch1 = GO_LEFT; // <
                            case '3':
                ch4 := fgetcTimeout(stdin,EscTimeout);
                                if( ch4 == '~' ){
                //fprintf(stderr,"x[%02X %02X %02X %02X]\n",ch1,ch2,ch3,ch4);
                                    ch1 = DEL_RIGHT
                                }
                        }
                    case '\\':
                //ch4 := fgetcTimeout(stdin,EscTimeout);
                //fprintf(stderr,"y[%02X %02X %02X %02X]\n",ch1,ch2,ch3,ch4);
                        switch( ch3 ){
                            case '~': ch1 = DEL_RIGHT
                        }
                }
            }
        }
    }
    return ch1
}
func (inn*IInput)clearline(){
    var i int
    fprintf(stderr,"\r");
    // should be ANSI ESC sequence
    for i = 0; i < TtyMaxCol; i++ { // to the max. position in this input action
        fputc(' ',os.Stderr);
    }
    fprintf(stderr,"\r");
}
func (iin*IInput)Redraw(){
    redraw(iin,iin.lno,iin.line,iin.right)
}
func redraw(iin *IInput,lno int,line string,right string){
    inMeta := false
    showMode := ""
    showMeta := "" // visible Meta mode on the cursor position
    showLino := fmt.Sprintf("!%d! ",lno)
    InsertMark := "" // in visible insert mode

    if MODE_VicMode {
    }else
    if 0 < len(iin.right) {
        InsertMark = " "
    }

    if( 0 < len(iin.waitingMeta) ){
        inMeta = true
        if iin.waitingMeta[0] != 033 {
            showMeta = iin.waitingMeta
        }
    }
    if( romkanmode ){
        //romkanmark = " *";
    }else{
        //romkanmark = "";
    }
    if MODE_ShowMode {
        romkan := "--"
        inmeta := "-"
        inveri := ""
        if MODE_CapsLock {
            inmeta = "A"
        }
        if MODE_LowerLock {
            inmeta = "a"
        }
        if MODE_ViTrace {
            inveri = "v"
        }
        if MODE_VicMode {
            inveri = ":"
        }
        if romkanmode {
            romkan = "\343\201\202"
            if MODE_CapsLock {
                inmeta = "R"
            }else{
                inmeta = "r"
            }
        }
        if inMeta {
            inmeta = "\\"
        }
        showMode = "["+romkan+inmeta+inveri+"]";
    }
    Pre := "\r" + showMode + showLino
    Output := ""
    Left := ""
    Right := ""
    if romkanmode {
        Left = convs(line)
        Right = InsertMark+convs(right)
    }else{
        Left = line
        Right = InsertMark+right
    }
    Output = Pre+Left
    if MODE_ViTrace {
        Output += iin.LastCmd
    }
    Output += showMeta+Right
    for len(Output) < TtyMaxCol { // to the max. position that may be dirty
        Output += " "
        // should be ANSI ESC sequence
        // not necessary just after newline
    }
    Output += Pre+Left+showMeta // to set the cursor to the current input position
    fprintf(stderr,"%s",Output)

    if MODE_ViTrace {
        if 0 < len(iin.LastCmd) {
            iin.LastCmd = ""
            fprintf(stderr,"\r\n")
        }
    }
    AtConsoleLineTop  = false
}
// <a href="https://golang.org/pkg/unicode/utf8/">utf8</a>
func delHeadChar(str string)(rline string,head string){
```

```
    _,clen := utf8.DecodeRune([]byte(str))
    head = string(str[0:clen])
    return str[clen:],head
}
func delTailChar(str string)(rline string, last string){
    var i = 0
    var clen = 0
    for {
        _,siz := utf8.DecodeRune([]byte(str)[i:])
        if siz <= 0 { break }
        clen = siz
        i += siz
    }
    last = str[len(str)-clen:]
    return str[0:len(str)-clen],last
}

// 3> for output and history
// 4> for keylog?
// <a name="getline">Command Line Editor</a>
func xgetline(lno int, prevline string, gsh*GshContext)(string){
    var iin IInput
    iin.lastlno = lno
    iin.lno = lno

    CmdIndex = len(gsh.CommandHistory)
    if( isatty(0) == 0 ){
        if( sfgets(&iin.line,LINESIZE,stdin) == NULL ){
            iin.line = "exit\n";
        }else{
        }
        return iin.line
    }
    if( true ){
        //var pts string;
        //pts = ptsname(0);
        //pts = ttyname(0);
        //fprintf(stderr,"--pts[0] = %s\n",pts?pts:"?");
    }
    if( false ){
        fprintf(stderr,"! ");
        fflush(stderr);
        sfgets(&iin.line,LINESIZE,stdin);
        return iin.line
    }
    system("/bin/stty -echo -icanon");
    xline := iin.xgetline1(prevline,gsh)
    system("/bin/stty echo sane");
    return xline
}
func (iin*IInput)Translate(cmdch int){
    romkanmode = !romkanmode;
    if MODE_ViTrace {
        fprintf(stderr,"%v\r\n",string(cmdch));
    }else
    if( cmdch == 'J' ){
        fprintf(stderr,"J\r\n");
        iin.inJmode = true
    }
    iin.Redraw();
    loadDefaultDic(cmdch);
    iin.Redraw();
}
func (iin*IInput)Replace(cmdch int){
    iin.LastCmd = fmt.Sprintf("\\%v",string(cmdch))
    iin.Redraw();
    loadDefaultDic(cmdch);
    dst := convs(iin.line+iin.right);
    iin.line = dst
    iin.right = ""
    if( cmdch == 'I' ){
        fprintf(stderr,"I\r\n");
        iin.inJmode = true
    }
    iin.Redraw();
}
// aa 12 ala1
func isAlpha(ch rune)(bool){
    if 'a' <= ch && ch <= 'z' || 'A' <= ch && ch <= 'Z' {
        return true
    }
    return false
}
func isAlnum(ch rune)(bool){
    if 'a' <= ch && ch <= 'z' || 'A' <= ch && ch <= 'Z' {
        return true
    }
    if '0' <= ch && ch <= '9' {
        return true
    }
    return false
}

// 0.2.8 2020-0901 created
// <a href="https://golang.org/pkg/unicode/utf8/#DecodeRuneInString">DecodeRuneInString</a>
func (iin*IInput)GotoTOPW(){
    str := iin.line
    i := len(str)
    if i <= 0 {
        return
    }
    //i0 := i
    i -= 1
    lastSize := 0
    var lastRune rune
    var found = -1
    for 0 < i { // skip preamble spaces
        lastRune,lastSize = utf8.DecodeRuneInString(str[i:])
        if !isAlnum(lastRune) { // character, type, or string to be searched
            i -= lastSize
            continue
        }
        break
    }
    for 0 < i {
        lastRune,lastSize = utf8.DecodeRuneInString(str[i:])
        if lastSize <= 0 { continue } // not the character top
        if !isAlnum(lastRune) { // character, type, or string to be searched
            found = i
            break
        }
        i -= lastSize
    }
    if found < 0 && i == 0 {
```

```
        found = 0
    }
    if 0 <= found {
        if isAlnum(lastRune) { // or non-kana character
        }else{ // when positioning to the top o the word
            i += lastSize
        }
        iin.right = str[i:] + iin.right
        if 0 < i {
            iin.line = str[0:i]
        }else{
            iin.line = ""
        }
    }
    //fmt.Printf("\n(%d,%d,%d)[%s][%s]\n",i0,i,found,iin.line,iin.right)
    //fmt.Printf("") // set debug messae at the end of line
}
// 0.2.8 2020-0901 created
func (iin*IInput)GotoENDW(){
    str := iin.right
    if len(str) <= 0 {
        return
    }
    lastSize := 0
    var lastRune rune
    var lastW = 0
    i := 0
    inWord := false

    lastRune,lastSize = utf8.DecodeRuneInString(str[0:])
    if isAlnum(lastRune) {
        r,z := utf8.DecodeRuneInString(str[lastSize:])
        if 0 < z && isAlnum(r) {
            inWord = true
        }
    }
    for i < len(str) {
        lastRune,lastSize = utf8.DecodeRuneInString(str[i:])
        if lastSize <= 0 { break } // broken data?
        if !isAlnum(lastRune) { // character, type, or string to be searched
            break
        }
        lastW = i // the last alnum if in alnum word
        i += lastSize
    }
    if inWord {
        goto DISP
    }
    for i < len(str) {
        lastRune,lastSize = utf8.DecodeRuneInString(str[i:])
        if lastSize <= 0 { break } // broken data?
        if isAlnum(lastRune) { // character, type, or string to be searched
            break
        }
        i += lastSize
    }
    for i < len(str) {
        lastRune,lastSize = utf8.DecodeRuneInString(str[i:])
        if lastSize <= 0 { break } // broken data?
        if !isAlnum(lastRune) { // character, type, or string to be searched
            break
        }
        lastW = i
        i += lastSize
    }
DISP:
    if 0 < lastW {
        iin.line = iin.line + str[0:lastW]
        iin.right = str[lastW:]
    }
    //fmt.Printf("\n(%d)[%s][%s]\n",i,iin.line,iin.right)
    //fmt.Printf("") // set debug messae at the end of line
}
// 0.2.8 2020-0901 created
func (iin*IInput)GotoNEXTW(){
    str := iin.right
    if len(str) <= 0 {
        return
    }
    lastSize := 0
    var lastRune rune
    var found = -1
    i := 1
    for i < len(str) {
        lastRune,lastSize = utf8.DecodeRuneInString(str[i:])
        if lastSize <= 0 { break } // broken data?
        if !isAlnum(lastRune) { // character, type, or string to be searched
            found = i
            break
        }
        i += lastSize
    }
    if 0 < found {
        if isAlnum(lastRune) { // or non-kana character
        }else{ // when positioning to the top o the word
            found += lastSize
        }
        iin.line = iin.line + str[0:found]
        if 0 < found {
            iin.right = str[found:]
        }else{
            iin.right = ""
        }
    }
    //fmt.Printf("\n(%d)[%s][%s]\n",i,iin.line,iin.right)
    //fmt.Printf("") // set debug messae at the end of line
}
// 0.2.8 2020-0902 created
func (iin*IInput)GotoPAIRCH(){
    str := iin.right
    if len(str) <= 0 {
        return
    }
    lastRune,lastSize := utf8.DecodeRuneInString(str[0:])
    if lastSize <= 0 {
        return
    }
    forw := false
    back := false
    pair := ""
    switch string(lastRune){
        case "{": pair = "}"; forw = true
        case "}": pair = "{"; back = true
        case "(": pair = ")"; forw = true
```

```
        case ")": pair = "("; back = true
        case "[": pair = "]"; forw = true
        case "]": pair = "["; back = true
        case "<": pair = ">"; forw = true
        case ">": pair = "<"; back = true
        case "\"": pair = "\""; // context depednet, can be f" or back-double quote
        case "'": pair = "'"; // context depednet, can be f' or back-quote
        // case Japanese Kakkos
    }
    if forw {
        iin.SearchForward(pair)
    }
    if back {
        iin.SearchBackward(pair)
    }
}
// 0.2.8 2020-0902 created
func (iin*IInput)SearchForward(pat string)(bool){
    right := iin.right
    found := -1
    i := 0
    if strBegins(right,pat) {
        _,z := utf8.DecodeRuneInString(right[i:])
        if 0 < z {
            i += z
        }
    }
    for i < len(right) {
        if strBegins(right[i:],pat) {
            found = i
            break
        }
        _,z := utf8.DecodeRuneInString(right[i:])
        if z <= 0 { break }
        i += z
    }
    if 0 <= found {
        iin.line = iin.line + right[0:found]
        iin.right = iin.right[found:]
        return true
    }else{
        return false
    }
}
// 0.2.8 2020-0902 created
func (iin*IInput)SearchBackward(pat string)(bool){
    line := iin.line
    found := -1
    i := len(line)-1
    for i = i; 0 <= i; i-- {
        _,z := utf8.DecodeRuneInString(line[i:])
        if z <= 0 {
            continue
        }
        //fprintf(stderr,"-- %v %v\n",pat,line[i:])
        if strBegins(line[i:],pat) {
            found = i
            break
        }
    }
    //fprintf(stderr,"--%d\n",found)
    if 0 <= found {
        iin.right = line[found:] + iin.right
        iin.line = line[0:found]
        return true
    }else{
        return false
    }
}
// 0.2.8 2020-0902 created
// search from top, end, or current position
func (gsh*GshContext)SearchHistory(pat string, forw bool)(bool,string){
    if forw {
        for _,v := range gsh.CommandHistory {
            if 0 <= strings.Index(v.CmdLine,pat) {
                //fprintf(stderr,"\n--De-- found !%v [%v]%v\n",i,pat,v.CmdLine)
                return true,v.CmdLine
            }
        }
    }else{
        hlen := len(gsh.CommandHistory)
        for i := hlen-1; 0 < i ; i-- {
            v := gsh.CommandHistory[i]
            if 0 <= strings.Index(v.CmdLine,pat) {
                //fprintf(stderr,"\n--De-- found !%v [%v]%v\n",i,pat,v.CmdLine)
                return true,v.CmdLine
            }
        }
    }
    //fprintf(stderr,"\n--De-- not-found(%v)\n",pat)
    return false,"(Not Found in History)"
}
// 0.2.8 2020-0902 created
func (iin*IInput)GotoFORWSTR(pat string,gsh*GshContext){
    found := false
    if 0 < len(iin.right) {
        found = iin.SearchForward(pat)
    }
    if !found {
        found,line := gsh.SearchHistory(pat,true)
        if found {
            iin.line = line
            iin.right = ""
        }
    }
}
func (iin*IInput)GotoBACKSTR(pat string, gsh*GshContext){
    found := false
    if 0 < len(iin.line) {
        found = iin.SearchBackward(pat)
    }
    if !found {
        found,line := gsh.SearchHistory(pat,false)
        if found {
            iin.line = line
            iin.right = ""
        }
    }
}
func (iin*IInput)getstring1(prompt string)(string){ // should be editable
    iin.clearline();
    fprintf(stderr,"\r%v",prompt)
    str := ""
    for {
```

```
        ch := iin.Getc(10*1000*1000)
        if ch == '\n' || ch == '\r' {
            break
        }
        sch := string(ch)
        str += sch
        fprintf(stderr,"%s",sch)
    }
    return str
}

// search pattern must be an array and selectable with ^N/^P
var SearchPat = ""
var SearchForw = true

func (iin*IInput)xgetline1(prevline string, gsh*GshContext)(string){
    var ch int;

    MODE_ShowMode = false
    MODE_VicMode = false
    iin.Redraw();
    first := true

    for cix := 0; ; cix++ {
        iin.pinJmode = iin.inJmode
        iin.inJmode = false

        ch = iin.Getc(1000*1000)

        if ch != EV_TIMEOUT && first {
            first = false
            mode := 0
            if romkanmode {
                mode = 1
            }
            now := time.Now()
            Events = append(Events,Event{now,EV_MODE,int64(mode),CmdIndex})
        }
        if ch == 033 {
            MODE_ShowMode = true
            MODE_VicMode = !MODE_VicMode
            iin.Redraw();
            continue
        }
        if MODE_VicMode {
            switch ch {
                case '0': ch = GO_TOPL
                case '$': ch = GO_ENDL
                case 'b': ch = GO_TOPW
                case 'e': ch = GO_ENDW
                case 'w': ch = GO_NEXTW
                case '%': ch = GO_PAIRCH

                case 'j': ch = GO_DOWN
                case 'k': ch = GO_UP
                case 'h': ch = GO_LEFT
                case 'l': ch = GO_RIGHT
                case 'x': ch = DEL_RIGHT
                case 'a': MODE_VicMode = !MODE_VicMode
                    ch = GO_RIGHT
                case 'i': MODE_VicMode = !MODE_VicMode
                    iin.Redraw();
                    continue
                case '~':
                    right,head := delHeadChar(iin.right)
                    if len([]byte(head)) == 1 {
                        ch = int(head[0])
                        if( 'a' <= ch && ch <= 'z' ){
                            ch = ch + 'A'-'a'
                        }else
                        if( 'A' <= ch && ch <= 'Z' ){
                            ch = ch + 'a'-'A'
                        }
                        iin.right = string(ch) + right
                    }
                    iin.Redraw();
                    continue
                case 'f': // GO_FORWCH
                    iin.Redraw();
                    ch = iin.Getc(3*1000*1000)
                    if ch == EV_TIMEOUT {
                        iin.Redraw();
                        continue
                    }
                    SearchPat = string(ch)
                    SearchForw = true
                    iin.GotoFORWSTR(SearchPat,gsh)
                    iin.Redraw();
                    continue
                case '/':
                    SearchPat = iin.getstring1("/") // should be editable
                    SearchForw = true
                    iin.GotoFORWSTR(SearchPat,gsh)
                    iin.Redraw();
                    continue
                case '?':
                    SearchPat = iin.getstring1("?") // should be editable
                    SearchForw = false
                    iin.GotoBACKSTR(SearchPat,gsh)
                    iin.Redraw();
                    continue
                case 'n':
                    if SearchForw {
                        iin.GotoFORWSTR(SearchPat,gsh)
                    }else{
                        iin.GotoBACKSTR(SearchPat,gsh)
                    }
                    iin.Redraw();
                    continue
                case 'N':
                    if !SearchForw {
                        iin.GotoFORWSTR(SearchPat,gsh)
                    }else{
                        iin.GotoBACKSTR(SearchPat,gsh)
                    }
                    iin.Redraw();
                    continue
            }
        }
        switch ch {
            case GO_TOPW:
                iin.GotoTOPW()
                iin.Redraw();
                continue
```

```
            case GO_ENDW:
                iin.GotoENDW()
                iin.Redraw();
                continue
            case GO_NEXTW:
                // to next space then
                iin.GotoNEXTW()
                iin.Redraw();
                continue
            case GO_PAIRCH:
                iin.GotoPAIRCH()
                iin.Redraw();
                continue
        }

        //fprintf(stderr,"A[%02X]\n",ch);
        if( ch == '\\' || ch == 033 ){
            MODE_ShowMode = true
            metach := ch
            iin.waitingMeta = string(ch)
            iin.Redraw();
                // set cursor //fprintf(stderr,"???\b\b\b")
            ch = fgetcTimeout(stdin,2000*1000)
                // reset cursor
            iin.waitingMeta = ""

            cmdch := ch
            if( ch == EV_TIMEOUT ){
                if metach == 033 {
                    continue
                }
                ch = metach
            }else
            /*
            if( ch == 'm' || ch == 'M' ){
                mch := fgetcTimeout(stdin,1000*1000)
                if mch == 'r' {
                    romkanmode = true
                }else{
                    romkanmode = false
                }
                continue
            }else
            */
            if( ch == 'k' || ch == 'K' ){
                MODE_Recursive = !MODE_Recursive
                iin.Translate(cmdch);
                continue
            }else
            if( ch == 'j' || ch == 'J' ){
                iin.Translate(cmdch);
                continue
            }else
            if( ch == 'i' || ch == 'I' ){
                iin.Replace(cmdch);
                continue
            }else
            if( ch == 'l' || ch == 'L' ){
                MODE_LowerLock = !MODE_LowerLock
                MODE_CapsLock = false
                if MODE_ViTrace {
                    fprintf(stderr,"%v\r\n",string(cmdch));
                }
                iin.Redraw();
                continue
            }else
            if( ch == 'u' || ch == 'U' ){
                MODE_CapsLock = !MODE_CapsLock
                MODE_LowerLock = false
                if MODE_ViTrace {
                    fprintf(stderr,"%v\r\n",string(cmdch));
                }
                iin.Redraw();
                continue
            }else
            if( ch == 'v' || ch == 'V' ){
                MODE_ViTrace = !MODE_ViTrace
                if MODE_ViTrace {
                    fprintf(stderr,"%v\r\n",string(cmdch));
                }
                iin.Redraw();
                continue
            }else
            if( ch == 'c' || ch == 'C' ){
                if 0 < len(iin.line) {
                    xline,tail := delTailChar(iin.line)
                    if len([]byte(tail)) == 1 {
                        ch = int(tail[0])
                        if( 'a' <= ch && ch <= 'z' ){
                            ch = ch + 'A'-'a'
                        }else
                        if( 'A' <= ch && ch <= 'Z' ){
                            ch = ch + 'a'-'A'
                        }
                        iin.line = xline + string(ch)
                    }
                }
                if MODE_ViTrace {
                    fprintf(stderr,"%v\r\n",string(cmdch));
                }
                iin.Redraw();
                continue
            }else{
                iin.pch = append(iin.pch,ch) // push
                ch = '\\'
            }
        }
        switch( ch ){
            case 'P'-0x40: ch = GO_UP
            case 'N'-0x40: ch = GO_DOWN
            case 'B'-0x40: ch = GO_LEFT
            case 'F'-0x40: ch = GO_RIGHT
        }
        //fprintf(stderr,"B[%02X]\n",ch);
        switch( ch ){
            case 0:
                continue;

            case '\t':
                iin.Replace('j');
                continue
            case 'X'-0x40:
                iin.Replace('j');
                continue
```

```
5457
5458            case EV_TIMEOUT:
5459                iin.Redraw();
5460                if iin.pinJmode {
5461                    fprintf(stderr,"\\J\r\n")
5462                    iin.inJmode = true
5463                }
5464                continue
5465            case GO_UP:
5466                if iin.lno == 1 {
5467                    continue
5468                }
5469                cmd,ok := gsh.cmdStringInHistory(iin.lno-1)
5470                if ok {
5471                    iin.line = cmd
5472                    iin.right = ""
5473                    iin.lno = iin.lno - 1
5474                }
5475                iin.Redraw();
5476                continue
5477            case GO_DOWN:
5478                cmd,ok := gsh.cmdStringInHistory(iin.lno+1)
5479                if ok {
5480                    iin.line = cmd
5481                    iin.right = ""
5482                    iin.lno = iin.lno + 1
5483                }else{
5484                    iin.line = ""
5485                    iin.right = ""
5486                    if iin.lno == iin.lastlno-1 {
5487                        iin.lno = iin.lno + 1
5488                    }
5489                }
5490                iin.Redraw();
5491                continue
5492            case GO_LEFT:
5493                if 0 < len(iin.line) {
5494                    xline,tail := delTailChar(iin.line)
5495                    iin.line = xline
5496                    iin.right = tail + iin.right
5497                }
5498                iin.Redraw();
5499                continue;
5500            case GO_RIGHT:
5501                if( 0 < len(iin.right) && iin.right[0] != 0 ){
5502                    xright,head := delHeadChar(iin.right)
5503                    iin.right = xright
5504                    iin.line += head
5505                }
5506                iin.Redraw();
5507                continue;
5508            case EOF:
5509                goto EXIT;
5510            case 'R'-0x40: // replace
5511                dst := convs(iin.line+iin.right);
5512                iin.line = dst
5513                iin.right = ""
5514                iin.Redraw();
5515                continue;
5516            case 'T'-0x40: // just show the result
5517                readDic();
5518                romkanmode = !romkanmode;
5519                iin.Redraw();
5520                continue;
5521            case 'L'-0x40:
5522                iin.Redraw();
5523                continue
5524            case 'K'-0x40:
5525                iin.right = ""
5526                iin.Redraw();
5527                continue
5528            case 'E'-0x40:
5529                iin.line += iin.right
5530                iin.right = ""
5531                iin.Redraw();
5532                continue
5533            case 'A'-0x40:
5534                iin.right = iin.line + iin.right
5535                iin.line = ""
5536                iin.Redraw();
5537                continue
5538            case 'U'-0x40:
5539                iin.line = ""
5540                iin.right = ""
5541                iin.clearline();
5542                iin.Redraw();
5543                continue;
5544            case DEL_RIGHT:
5545                if( 0 < len(iin.right) ){
5546                    iin.right,_ = delHeadChar(iin.right)
5547                    iin.Redraw();
5548                }
5549                continue;
5550            case 0x7F: // BS? not DEL
5551                if( 0 < len(iin.line) ){
5552                    iin.line,_ = delTailChar(iin.line)
5553                    iin.Redraw();
5554                }
5555                /*
5556                else
5557                if( 0 < len(iin.right) ){
5558                    iin.right,_ = delHeadChar(iin.right)
5559                    iin.Redraw();
5560                }
5561                */
5562                continue;
5563            case 'H'-0x40:
5564                if( 0 < len(iin.line) ){
5565                    iin.line,_ = delTailChar(iin.line)
5566                    iin.Redraw();
5567                }
5568                continue;
5569        }
5570        if( ch == '\n' || ch == '\r' ){
5571            iin.line += iin.right;
5572            iin.right = ""
5573            iin.Redraw();
5574            fputc(ch,stderr);
5575            AtConsoleLineTop  = true
5576            break;
5577        }
5578        if MODE_CapsLock {
5579            if 'a' <= ch && ch <= 'z' {
5580                ch = ch+'A'-'a'
```

```
            }
        }
        if MODE_LowerLock {
            if 'A' <= ch && ch <= 'Z' {
                ch = ch+'a'-'A'
            }
        }
        iin.line += string(ch);
        iin.Redraw();
    }
EXIT:
    return iin.line + iin.right;
}

func getline_main(){
    line := xgetline(0,"",nil)
    fprintf(stderr,"%s\n",line);
/*
    dp = strpbrk(line,"\r\n");
    if( dp != NULL ){
        *dp = 0;
    }

    if( 0 ){
        fprintf(stderr,"\n(%d)\n",int(strlen(line)));
    }
    if( lseek(3,0,0) == 0 ){
        if( romkanmode ){
            var buf [8*1024]byte;
            convs(line,buff);
            strcpy(line,buff);
        }
        write(3,line,strlen(line));
        ftruncate(3,lseek(3,0,SEEK_CUR));
        //fprintf(stderr,"outsize=%d\n",(int)lseek(3,0,SEEK_END));
        lseek(3,0,SEEK_SET);
        close(3);
    }else{
        fprintf(stderr,"\r\ngotline: ");
        trans(line);
        //printf("%s\n",line);
        printf("\n");
    }
*/
}
//== end ========================================================== getline

//
// $USERHOME/.gsh/
//      gsh-rc.txt, or gsh-configure.txt
//              gsh-history.txt
//              gsh-aliases.txt // should be conditional?
//
func (gshCtx *GshContext)gshSetupHomedir()(bool) {
    homedir,found := userHomeDir()
    if !found {
        fmt.Printf("--E-- You have no UserHomeDir\n")
        return true
    }
    gshhome := homedir + "/" + GSH_HOME
    _, err2 := os.Stat(gshhome)
    if err2 != nil {
        err3 := os.Mkdir(gshhome,0700)
        if err3 != nil {
            fmt.Printf("--E-- Could not Create %s (%s)\n",
                gshhome,err3)
            return true
        }
        fmt.Printf("--I-- Created %s\n",gshhome)
    }
    gshCtx.GshHomeDir = gshhome
    return false
}
func setupGshContext()(GshContext,bool){
    gshPA := syscall.ProcAttr {
        "", // the staring directory
        os.Environ(), // environ[]
        []uintptr{os.Stdin.Fd(),os.Stdout.Fd(),os.Stderr.Fd()},
        nil, // OS specific
    }
    cwd, _ := os.Getwd()
    gshCtx := GshContext {
        cwd, // StartDir
        "", // GetLine
        []GChdirHistory { {cwd,time.Now(),0} }, // ChdirHistory
        gshPA,
        []GCommandHistory{}, //something for invokation?
        GCommandHistory{}, // CmdCurrent
        false,
        []int{},
        syscall.Rusage{},
        "", // GshHomeDir
        Ttyid(),
        false,
        false,
        []PluginInfo{},
        []string{},
        " ",
        "v",
        ValueStack{},
        GServer{"",""}, // LastServer
        "", // RSERV
        cwd, // RWD
        CheckSum{},
    }
    err := gshCtx.gshSetupHomedir()
    return gshCtx, err
}
func (gsh*GshContext)gshelllh(gline string)(bool){
    ghist := gsh.CmdCurrent
    ghist.WorkDir,_ = os.Getwd()
    ghist.WorkDirX = len(gsh.ChdirHistory)-1
    //fmt.Printf("--D--ChdirHistory(@%d)\n",len(gsh.ChdirHistory))
    ghist.StartAt = time.Now()
    rusagev1 := Getrusagev()
    gsh.CmdCurrent.FoundFile = []string{}
    fin := gsh.tgshelll(gline)
    rusagev2 := Getrusagev()
    ghist.Rusagev = RusageSubv(rusagev2,rusagev1)
    ghist.EndAt = time.Now()
    ghist.CmdLine = gline
    ghist.FoundFile = gsh.CmdCurrent.FoundFile

    /* record it but not show in list by default
```

```
    if len(gline) == 0 {
        continue
    }
    if gline == "hi" || gline == "history" { // don't record it
        continue
    }
    */
    gsh.CommandHistory = append(gsh.CommandHistory, ghist)
    return fin
}
// <a name="main">Main loop</a>
func script(gshCtxGiven *GshContext) (_ GshContext) {
    gshCtxBuf,err0 := setupGshContext()
    if err0 {
        return gshCtxBuf;
    }
    gshCtx := &gshCtxBuf

    //fmt.Printf("--I-- GSH_HOME=%s\n",gshCtx.GshHomeDir)
    //resmap()

    /*
    if false {
        gsh_getlinev, with_exgetline :=
            which("PATH",[]string{"which","gsh-getline","-s"})
        if with_exgetline {
            gsh_getlinev[0] = toFullpath(gsh_getlinev[0])
            gshCtx.GetLine = toFullpath(gsh_getlinev[0])
        }else{
        fmt.Printf("--W-- No gsh-getline found. Using internal getline.\n");
        }
    }
    */

    ghist0 := gshCtx.CmdCurrent // something special, or gshrc script, or permanent history
    gshCtx.CommandHistory = append(gshCtx.CommandHistory,ghist0)

    prevline := ""
    skipping := false
    for hix := len(gshCtx.CommandHistory); ; {
        gline := gshCtx.getline(hix,skipping,prevline)
        if skipping {
            if strings.Index(gline,"fi") == 0 {
                fmt.Printf("fi\n");
                skipping = false;
            }else{
                //fmt.Printf("%s\n",gline);
            }
            continue
        }
        if strings.Index(gline,"if") == 0 {
            //fmt.Printf("--D-- if start: %s\n",gline);
            skipping = true;
            continue
        }
        if false {
            os.Stdout.Write([]byte("gotline:"))
            os.Stdout.Write([]byte(gline))
            os.Stdout.Write([]byte("\n"))
        }
        gline = strsubst(gshCtx,gline,true)
        if false {
            fmt.Printf("fmt.Printf %%v - %v\n",gline)
            fmt.Printf("fmt.Printf %%s - %s\n",gline)
            fmt.Printf("fmt.Printf %%x - %s\n",gline)
            fmt.Printf("fmt.Printf %%U - %s\n",gline)
            fmt.Printf("Stouut.Write -")
            os.Stdout.Write([]byte(gline))
            fmt.Printf("\n")
        }
        /*
        // should be cared in substitution ?
        if 0 < len(gline) && gline[0] == '!' {
            xgline, set, err := searchHistory(gshCtx,gline)
            if err {
                continue
            }
            if set {
                // set the line in command line editor
            }
            gline = xgline
        }
        */
        fin := gshCtx.gshelllh(gline)
        if fin {
            break;
        }
        prevline = gline;
        hix++;
    }
    return *gshCtx
}
func main() {
    gshCtxBuf := GshContext{}
    gsh := &gshCtxBuf
    argv := os.Args

    if( isin("wss",argv) ){
        gj_server(argv[1:]);
        return;
    }
    if( isin("wsc",argv) ){
        gj_client(argv[1:]);
        return;
    }
    if 1 < len(argv) {
        if isin("version",argv){
            gsh.showVersion(argv)
            return
        }
        if argv[1] == "gj" {
            if argv[2] == "listen" { go gj_server(argv[2:]); }
            if argv[2] == "server" { go gj_server(argv[2:]); }
            if argv[2] == "serve"  { go gj_server(argv[2:]); }
            if argv[2] == "client" { go gj_client(argv[2:]); }
            if argv[2] == "join"   { go gj_client(argv[2:]); }
        }
        comx := isinX("-c",argv)
        if 0 < comx {
            gshCtxBuf,err := setupGshContext()
            gsh := &gshCtxBuf
            if !err {
                gsh.gshellv(argv[comx+1:])
            }
```

```
            return
        }
    }
    if 1 < len(argv) && isin("-s",argv) {
    }else{
        gsh.showVersion(append(argv,[]string{"-l","-a"}...))
    }
    script(nil)
    //gshCtx := script(nil)
    //gshelll(gshCtx,"time")
}

//</div></details>
//<details id="gsh-todo"><summary>Considerations</summary><div class="gsh-src">
// - inter gsh communication, possibly running in remote hosts -- to be remote shell
// - merged histories of multiple parallel gsh sessions
// - alias as a function or macro
// - instant alias end environ export to the permanent > ~/.gsh/gsh-alias and gsh-environ
// - retrieval PATH of files by its type
// - gsh as an IME with completion using history and file names as dictionaies
// - gsh a scheduler in precise time of within a millisecond
// - all commands have its subucomand after "---" symbol
// - filename expansion by "-find" command
// - history of ext code and output of each commoand
// - "script" output for each command by pty-tee or telnet-tee
// - $BUILTIN command in PATH to show the priority
// - "?" symbol in the command (not as in arguments) shows help request
// - searching command with wild card like: which ssh-*
// - longformat prompt after long idle time (should dismiss by BS)
// - customizing by building plugin and dynamically linking it
// - generating syntactic element like "if" by macro expansion (like CPP) >> alias
// - "!" symbol should be used for negation, don't wast it just for job control
// - don't put too long output to tty, record it into GSH_HOME/session-id/comand-id.log
// - making canonical form of command at the start adding quatation or white spaces
// - name(a,b,c) ... use "(" and ")" to show both delimiter and realm
// - name? or name! might be useful
// - htar format - packing directory contents into a single html file using data scheme
// - filepath substitution shold be done by each command, expecially in case of builtins
// - @N substition for the history of working directory, and @spec for more generic ones
// - @dir prefix to do the command at there, that means like (chdir @dir; command)
// - GSH_PATH for plugins
// - standard command output: list of data with name, size, resouce usage, modified time
// - generic sort key option -nm name, -sz size, -ru rusage, -ts start-time, -tm mod-time
//   -wc word-count, grep match line count, ...
// - standard command execution result: a list of string, -tm, -ts, -ru, -sz, ...
// - -tailf-filename like tail -f filename, repeat close and open before read
// - max. size and max. duration and timeout of (generated) data transfer
// - auto. numbering, aliasing, IME completion of file name (especially rm of quieer name)
// - IME "?" at the top of the command line means searching history
// - IME %d/0x10000/ %x/ffff/
// - IME ESC to go the edit mode like in vi, and use :command as :s/x/y/g to edit history
// - gsh in WebAssembly
// - gsh as a HTTP server of online-manual
//---END--- (^-^)//ITS more</div></details>

//<span class="gsh-golang-data">

var WorldDic = //<span id="gsh-world-dic">
"data:text/dic;base64,"+
"Ly8gTXlJTUUvMC4wLjEg6L6e5pu4ICgyMDIwLTA4MTlhKQpzZWthaSDkuJbnlYwKa28g44GT"+
"Cm5uIOOCkwpuaSDjgasKY2hpIOOBoQp0aSDjgaEKaGEg44GvCnNlIOOBmwprYSDjgYsKaSDj"+
"gYQK";
//</span>

var WnnDic = //<span id="gsh-wnn-dic">
"data:text/dic;base64,"+
"PG1ldGEgY2hhcnNldD0iVVRGLTgiPgo8dGV4dGFyZWEgY29scz04MCByb3dzPTQwPgovL2Rp"+
"Y3JlcglHU2hlbGxcc0lNRVxzZGljdGlvbmFyeVxzZm9yXHNXbm5ccy8vXHMyMDIwLTA4MzAK"+
"RlNoZWxsCUdTaGVsbArjgo/jgZ/jgZcJ56eBCndhdGFzaGkJ56eBCndhdGFzaQnnp4EK44Gq"+
"44G+44GICeWQjeWJjQpuYWlhZQnlkI3liY0K44Gq44GL44GuCeS4remHjgpuYWthbm8J5Lit"+
"6YeOCndhCeOCjwp0YQnjgZ8Kc2kJ44GXCnNoaQnjgZcKbm8J44GuCm5hCeOBqgptYQnjgb4K"+
"ZQnjgYgKaGEJ44GvCm5hCeOBqgprYQnjgYsKbm8J44GuCmRlCeOBpwpzdQnjgZkKZVxzCWVj"+
"aG8KZGljCWRpYwplY2hvCWVjaG8KcmVwbGF5CXJlcGxheQpyZXBlYXQJcmVwZWF0CmR0CWRh"+
"dGVccysnJVklbSVkLSVIOiVNOiVTJwp0aW9uCXRpb24KJXQJJXQJLy8gdG8gYmUgYW4gYWN0"+
"aW9uCjwvdGV4dGFyZWE+Cg=="
//</span>

var SumomoDic = //<span id="gsh-sumomo-dic">
"data:text/dic;base64,"+
"PG1ldGEgY2hhcnNldD0iVVRGLTgiPgo8dGV4dGFyZWEgY29scz04MCByb3dzPTQwPgovL3Zl"+
"cglHU2hlbGxcc0lNRVxzZGljdGlvbmFyeVxzZm9yXHNTdWlvbW9ccy8vXHMyMDIwLTA4MzAK"+
"c3UJ44GZCm1vCeOCggpubwnjga4KdQnjgYYKY2hpCeOBoQp0aQnjgaEKdWNoaQnlhoUKdXRp"+
"CeWGhQpzdW1vbW8J44GZ44KC44KCCnN1bW9tb21vCeOBmeOCguOCguOCggptb21vCeahgwpt"+
"b21vbW8J5qGD44KCCiwsCeOAgQouLgnjgIIKPC90ZXh0YXJlYT4K"
//</span>

var SijimiDic = //<span id="gsh-sijimi-dic">
"data:text/dic;base64,"+
"PG1ldGEgY2hhcnNldD0iVVRGLTgiPgo8dGV4dGFyZWEgY29scz04MCByb3dzPTQwPgovL3Zl"+
"cglHU2hlbGxcc0lNRVxzZGljdGlvbmFyeVxzZm9yXHNTaGlqaW1pXHMvL1xzMjAyMC0wODMw"+
"CnNpCeOBlwpzaGkJ44GXCmppCeOBmApqnjgb8KbmBJ44GqCmplCeOBmOOChQp4eXUJ44KF"+
"CnUJ44GGCm5pCeOBqwprbwnjgZMKYnUJ44G2Cm5uCeOCkwpubwnjga4KY2hpCeOBoQp0aQnj"+
"gaEKa2EJ44GLCnJhCeOCiQosLanjgIEKLi4J44CCCnhuYW5hCeS4gwp4anV1CeWNgQp4bmkJ"+
"5LqMCmtveAnlgIsKa29xCeWAiwprb3gJ5YCLCm5hbmFqdXVuaXgJNzIKbmFuYWp1dW5peHgJ"+
"77yX77ySCm5hbmFqdXVuaVgJ77yX77ySCuS4g+WNgeS6jHgJNzIKa29idW5uCeWAi+WIhgp0"+
"aWthcmFxCeOBoeOBi+OCiQp0aWthcmEJ5YqbCmNoaWthcmEJ5YqbCjwvdGV4dGFyZWE+Cg="
//</span>

var JA_JKLDic = //<span id="gsh-ja-jkl-dic">
"data:text/dic;base64,"+
"Ly92ZXJsCU15SU1FamRpY2ptb3JzZWpKQWpKS0woMjAyMGowODE5KSheLV4pL1NhdG94SVRT"+
"CmtqamprbGtqa2tsa2psIOS4lueVjApqamtqamwJ44GCCmtqbAnjgYQKa2tqbAnjgYYKamtq"+
"amwJ44GICmtqa2trbAnjgYoKa2pra2wJ44GLCmpramtrbAnjgY0Ka2tramwJ44GPCmpramps"+
"CeOBkQpqampqbAnjgZMKamtqa2psCeOBlQpqamtqa2wJ44GXCmpqamtqbAnjgZkKa2pqamts"+
"CeOBmwpqamprbAnjgZ0KamtsCeOBnwpra2prbAnjgaEKa2pqa2wJ44GkCmtqa2pqbAnjgaYK"+
"a2tqa2tsCeOBqApramtsCeOBqgpqa2prbAnjgasKa2tra2wJ44GsCmpqa2psCeOBrQpra2pq"+
"bAnjga4Kamtra2wJ44GvCmpqa2tqbAnjgbIKampra2wJ44G1CmtsCeOBuApqa2tsCeOBuwpq"+
"a2tqbAnjgb4Ka2tqa2psCeOBvwpqbAnjgoAKamtra2psCeOCgQpqa2tqa2wJ44KCCmtqamwJ"+
"44KECmpra2pqbAnjgoYKampsCeOCiApra2tsCeOCiQpqamtsCeOCigpqa2pqa2wJ44KLCmpq"+
"amwJ44KMCmtqa2psCeOCjQpqa2psCeOCjwpramtramwJ44KQCmtqamtrbAnjgpEKa2pqamwJ"+
"44KSCmtqa2prbAnjgpMKa2pqa2psCeODvApra2wJ44KbCmtramprbAnjgpwKa2pramtqbAnj"+
"gIEK";
//</span>

//</span>
/*
<style id="gsh-references-style">
#references details { font-family:Georgia; }
#references a { font-family:Georgia; }
.wrap { white-space:normal; }
</style>
<details id="references"><summary>References</summary><div class="gsh-src">
Web technology
  <a href="https://html.spec.whatwg.org">HTML: The Living Standard</a> (September 2020)
```

```
    <a href="https://html.spec.whatwg.org/dev/">Developer Version</a>

  <a href="https://drafts.csswg.org">CSS Working Group Editor Drafts</a> (September 2020)

  <a href="https://developer.mozilla.org/ja/docs/Web">MDN web docs</a>
    <a href="https://developer.mozilla.org/ja/docs/Web/HTML/Element">HTML</a>
    <a href="https://developer.mozilla.org/en-US/docs/Web/CSS">CSS</a> : <span class="wrap">
     <a href="https://developer.mozilla.org/en-US/docs/Web/CSS/CSS_Selectors">selectors</a>
     <a href="https://developer.mozilla.org/en-US/docs/Web/CSS/background-repeat">repeat</a></span>
    <a href="https://developer.mozilla.org/en-US/docs/Web/JavaScript">JavaScript</a>
    <a href="https://developer.mozilla.org/en-US/docs/Web/HTTP">HTTP</a>
    <a href="https://mdn-web-dna.s3-us-west-2.amazonaws.com/MDN-Browser-Compatibility-Report-2020.pdf">MDN Browser Compatibility Report (2020)</a>

Go language (August 2020 / Go 1.15)
  <a href="https://golang.org">The Go Programming Language</a>
    <a href="https://golang.org/pkg/">Packages</a>
      <a href="https://godoc.org/golang.org/x/net/websocket">WebSocket</a>

<a href="https://stackoverflow.com/">Stackoverflow</a>
<!--
<iframe src="https://golang.org" width="100%" height="300"></iframe>
-->
</div></details>
*/
/*
<details id="html-src" onclick="frame_open();"><summary>Raw Source</summary><div>

<!-- h2>The full of this HTML including the Go code is here.</h2 -->
<details id="gsh-whole-view"><summary>Whole file</summary>
 <a name="whole-src-view"></a>
 <span id="src-frame"></span><!-- a window to show source code -->
</details>

<details id="gsh-style-frame" onclick="fill_CSSView()"><summary>CSS part</summary>
 <a name="style-src-view"></a>
 <span id="gsh-style-view"></span>
</details>

<details id="gsh-script-frame" onclick="fill_JavaScriptView()"><summary>JavaScript part</summary>
 <a name="script-src-view"></a>
 <span id="gsh-script-view"></span>
</details>

<details id="gsh-data-frame" onclick="fill_DataView()"><summary>Builtin data part</summary>
 <a name="gsh-data-frame"></a>
 <span id="gsh-data-view"></span>
</details>

</div></details>
*/

/*
<div id="GshFooter0"></div>
<!-- 2020-09-17 SatoxITS, visible script { -- >
<details><summary>GJScript</summary>
<style>.gjscript { font-family:Georgia; }</style>
<pre id="gjscript_1" class="gjscript"> function gjtest1(){ alert('Hello GJScript!'); }
  gjtest1()
</pre>
<script>
  gjs = document.getElementById('gjscript_1');
  //eval(gjs.innerHTML);
  //gjs.outerHTML = ""
</script>
</details><!-- ---------- END-OF-VISIBLE-PART ---------- } -->

<!--
// 2020-0906 added,
https://developer.mozilla.org/en-US/docs/Web/CSS/z-index
https://developer.mozilla.org/en-US/docs/Web/CSS/position
-->
<span id="GshGrid">(^_^)//<small>{Hit j k l h}</small></span>

<span id="GStat"><br>
</span>
<span id="GMenu" onclick="GShellMenu(this)"></span>
<span id="GTop"></span>
<div id="GShellPlane" onclick="showGShellPlane();"></div>
<div id="RawTextViewer"></div>
<div id="RawTextViewerClose" onclick="hideRawTextViewer()"> CLOSE </div>

<style id="GshStyleDef">
 #LineNumbered table,tr,td {
   margin:0;
   padding:4px;
   spacing:0;
   border:12px;
 }
 textarea.LineNumber {
   font-size:12px;
   font-family:monospace,Courier New;
   color:#282;
   padding:4px;
   text-align:right;
 }
 textarea.LineNumbered {
   font-size:12px;
   font-family:monospace,Courier New;
   padding:4px;
   wrap:off;
 }
 #RawTextViewer{
   z-index:0;
   position:fixed; top:0px; left:0px;
   width:100%; xxxheight:50px; xheight:0px;
   overflow:auto;
   color:#fff; background-color:rgba(128,128,256,0.2);
   font-size:12px;
   spellcheck:false;
 }
 #RawTextViewerClose{
   z-index:0;
   position:fixed; top:-100px; left:-100px;
   color:#fff; background-color:rgba(128,128,256,0.2);
   font-size:20px; font-family:Georgia;
   white-space:pre;
 }
 #xxxGShellPlane{
   z-index:0;
   position:fixed; top:0px; left:0px;
   width:100%; height:50px;
   overflow:auto;
   color:#fff; background-color:rgba(128,128,256,0.3);
   font-size:12px;
```

```
 }
 #xxxGTop{
   z-index:9;
   opacity:1.0;
   position:fixed; top:0px; left:0px;
   width:320px; height:20px;
   color:#fff; background-color:rgba(32,32,160,0.15);
   color:#fff; font-size:12px;
 }
 #xxxGPos{
   z-index:12;
   position:fixed; top:0px; left:0px;
   opacity:1.0;
   width:640px; height:30px;
   color:#fff; background-color:rgba(0,0,0,0.2);
   color:#fff; font-size:12px;
 }
 #GMenu{
   z-index:2000;
   position:fixed; top:250px; left:0px;
   opacity:1.0;
   width:100px; height:100px;
   color:#fff;
   color:#fff; background-color:rgba(0,0,0,0.0);
   color:#fff; font-size:16px; font-family:Georgia;
   background-repeat:no-repeat;
 }
 #xxxGStat{
   z-index:8;
   xopacity:0.0;
   position:fixed; top:20px; left:0px;
   xwidth:640px;
   width:100%; height:90px;
   color:#fff; background-color:rgba(0,0,128,0.04);
   font-size:20px; font-family:Georgia;
 }
 #GLog{
   z-index:10;
   position:fixed; top:50px; left:0px;
   opacity:1.0;
   width:640px; height:60px;
   color:#fff; background-color:rgba(0,0,128,0.10);
   font-size:12px;
 }
 #GshGrid {
   z-index:11;
   xopacity:0.0;
   position:fixed; top:0px; left:0px;
   width:320px; height:30px;
   color:#9f9; font-size:16px;
 }
 xbody {display:none;}
 .gsh-link{color:green;}
 #gsh {border-width:1;margin:0;padding:0;}
 #gsh {font-family:monospace,Courier New;color:#ddf;font-size:8px;}
 #gsh header{height:100px;}
 #xgsh header{height:100px;background-image:url(GShell-Logo00.png);}
 #GshMenu{font-size:14pt;color:#c44;}
 .GshMenu1{
    font-size:14pt;color:#2a2;padding:4px; text-align:right;
 }
 .GshMenu1:hover{
    font-size:14pt;color:#fff;font-wait:bold;background-color:#2a2;
 }
 #GshFooter{height:100px;background-size:80px;background-repeat:no-repeat;}
 #gsh note{color:#000;font-size:10pt;}
 #gsh h2{color:#24a;font-family:Georgia;font-size:18pt;}
 #gsh h3{color:#24a;font-family:Georgia;font-size:16pt;}
 #gsh details{color:#888;background-color:#fff;font-family:monospace;}
 #gsh summary{font-size:16pt;color:#fff;background-color:#8af;height:30px;}
 #gsh summary{font-size:16pt;color:#fff;
    xxx-background-color:#8af;
    background-color:#6881AD;xxx-PBlue;
    height:30px;
 }
 #gsh pre{font-size:11pt;color:#223;background-color:#faffff;}
 #gsh a{color:#24a;}
 #gsh a[name]{color:#24a;font-size:16pt;}
 #gsh .gsh-src{white-space:pre;font-family:monospace,Courier New;font-size:11pt;}
 #gsh .gsh-src{background-color:#faffff;color:#223;}
 #gsh-src-src{spellcheck:false}
 #SrcTextarea{white-space:pre;font-family:Courier New;font-size:10pt;}
 #SrcTextarea{background-color:#faffff;color:#223;}
 .gsh-code {white-space:pre;font-family:Courier New !important;}
 .gsh-code {color:#024;font-size:11pt; background-color:#fafaff;}
 .gsh-golang-data {display:none;}
 #gsh-WinId {color:#000;font-size:14pt;}

 .gsh-document {font-size:11pt;background-color:#fff;font-family:Georgia;}
 .gsh-document {color:#000;background-color:#fff !important;}
 .gsh-document > h2{color:#000;background-color:#fff !important;}
 .gsh-document details{color:#000;background-color:#fff;font-family:Georgia;}
 .gsh-document p{max-width:550pt;color:#000;background-color:#fff;font-family:Georgia;}
 .gsh-document address{width:500pt;color:#000;background-color:#fff;font-family:Georgia;}

 @media print {
  #gsh pre{font-size:11pt !important;}
 }
</style>

<!--
// Logo image should be drawn by JavaScript from a meta-font.
// CSS seems not follow line-splitted URL
-->
<script id="gsh-data">
//GSellLogo="QR-ITS-more.jp.png"
GSellLogo="\
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</script>

<div id="GJFactory_1" class="xxxGJFactory" style=""></div>
<!--
https://developer.mozilla.org/en-US/docs/Web/CSS/line-height
-->
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  .GJFactory{
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    position:static;
    border:1.2px dashed #282; xborder-radius:2px;
    margin:0px; padding:10px !important;
    width:340px; height:340px;
    flex-wrap: wrap;
    color:#fff; background-color:rgba(0,0,0,0.0);
    line-height:0.0;
    xxxcolor:#22a !important;
    text-shadow:2px 2px #ddf;
  }
  .GJFactory h1,h2,h3,h4 {
    xxxcolor:#22a !important;
  }
  xxxinput {
    border:1px dashed #0f0; border-radius:0px;
  }
  .GJWin:hover{
    color:#df8 !important;
    background-color:rgba(32,32,160,0.8) !important;
    line-height:0.0;
  }
  .GJWin:active{
    color:#df8 !important;
    background-color:rgba(224,32,32,0.8) !important;
    line-height:0.0;
  }
  .GJWin:focus{
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    background-color:rgba(32,32,32,1.0) !important;
    line-height:0.0;
  }
  .GJWin{
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    display:inline;
    position:relative;
    flex-wrap: wrap;
    top:0; left:0px;
    width:285px !important; height:205px !important;
    border:1px solid #eea; border-radius:2px;
    margin:0px; padding:0px;
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    line-height:0.0;
    color:#fff; background-color:rgba(0,0,64,0.1) !important;
  }
  .GJTab{
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    margin:0px; padding:2px;
    border:0px solid #000; border-radius:2px;
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    white-space:nowrap;
    color:#fff; background-color:rgba(0,0,64,0.7);
    text-align:center;
    vertical-align:middle;
  }
  .GJStat:focus{
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  }
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    line-height:1.0;
    color:#fff; background-color:rgba(0,0,64,0.2);
    text-align:center;
    vertical-align:middle;
  }
  .GJIcon{
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  }
  .GJText:focus{
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    line-height:1.0;
  }
  .GJText{
    display:inline;
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    border:0px;
    font-family:Courier New,monospace !important;
    font-size:8pt;
    line-height:1.0;
    white-space:pre;
    color:#fff; xbackground-color:rgba(0,0,64,0.5);
    background-color:rgba(32,32,128,0.8) !important;
  }
  .GJMode{
    display:inline;
    position:relative;
    top:0px; left:0px;
    border:0px solid #000; border-radius:0px;
    margin:0px; padding:0px;
    width:280px; height:20px;
    font-size:9pt;
    line-height:1.0;
    white-space:nowrap;
    color:#fff; background-color:rgba(0,0,64,0.7);
    text-align:left;
    vertical-align:middle;
  }
</style>

<script id="gsh-script">
  // 2020-0909 added, permanet local storage
  // https://developer.mozilla.org/en-US/docs/Web/API/Window/localStorage
  var MyHistory = ""
  Permanent = localStorage;
  MyHistory = Permanent.getItem('MyHistory')
  if( MyHistory == null ){ MyHistory = "" }
  d = new Date()
  MyHistory = d.getTime()/1000+" "+document.URL+"\n" + MyHistory
  Permanent.setItem('MyHistory',MyHistory)
  //Permanent.setItem('MyWindow',window)

  var GJLog_Win = null
  var GJLog_Tab = null
  var GJLog_Stat = null
  var GJLog_Text = null
  var GJWin_Mode = null
  var FProductInterval = 0

  var GJ_FactoryID = -1
  var GJFactory = null
  if( e = document.getElementById('GJFactory_0') ){
    GJFactory_1.height = 0
    GJFactory = e
    e.setAttribute('class','GJFactory')
    var GJ_FactoryID = 0
  }else{
    GJFactory = GJFactory_1
    var GJ_FactoryID = 1
  }

  function GJFactory_Destroy(){
    gjf = GJFactory
    //gjf = document.getElementById('GJFactory')
    //alert('gfj='+gjf)
    if( gjf != null ){
        if( gjf.childNodes != null ){
            for( i = 0; i < gjf.childNodes.length; i++ ){
                gjf.removeChild(gjf.childNodes[i])
            }
        }
        gjf.innerHTML = ''
        gjf.style.width = 0
        gjf.style.height = 0
        gjf.removeAttribute('style')
        GJLog_Win = GJLog_Tab = GJLog_Stat = GJLog_Text = GJWin_Mode = null
        window.clearInterval(FProductInterval)
        return '-- Destroy: work product destroyed'
    }else{
        return '-- Destroy: work product not exist'
    }
  }

  var TransMode = false
  var onKeyControl = false
  var OnKeyShift = false
  var OnKeyAlt = false
  var OnKeyJ = false
  var OnKeyK = false
  var OnKeyL = false

  function GJWin_OnKeyUp(ev){
    keycode = ev.code;
    if( keycode == 'ShiftLeft' ){
        OnKeyShift = false
    }else
    if( keycode == 'ControlLeft' ){
        onKeyControl = false
    }else
    if( keycode == 'AltLeft' ){
        OnKeyAlt = false
    }else
    if( keycode == 'KeyJ' ){ OnKeyJ = false }else
    if( keycode == 'KeyK' ){ OnKeyK = false }else
    if( keycode == 'KeyL' ){ OnKeyL = false }else
    {
    }
    ev.preventDefault()
  }
  function and(a,b){ if(a){ if(b){ return true; } return false; } }
  function GJWin_OnKeyDown(ev){
    keycode = ev.code;
    mode = ''
    key = ''
    if( keycode == 'ControlLeft' ){
        onKeyControl = true
        ev.preventDefault()
        return;
    }else
    if( keycode == 'ShiftLeft' ){
        OnKeyShift = true
        ev.preventDefault()
        return;
    }else
    if( keycode == 'AltLeft' ){
        ev.preventDefault()
```

```
        OnKeyAlt = true
        return;
    }else
    if( keycode == 'Backquote' ){
        TransMode = !TransMode
        ev.preventDefault()
    }else
    if( and(keycode == 'Space', OnKeyShift) ){
        TransMode = !TransMode
        ev.preventDefault()
    }else
    if( keycode == 'ShiftRight' ){
        TransMode = !TransMode
    }else
    if( keycode == 'Escape' ){
        TransMode = true
        ev.preventDefault()
    }else
    if( keycode == 'Enter' ){
        TransMode = false
        //ev.preventDefault()
    }
    if( keycode == 'KeyJ' ){ OnKeyJ = true }else
    if( keycode == 'KeyK' ){ OnKeyK = true }else
    if( keycode == 'KeyL' ){ OnKeyL = true }else
    {
    }

    if( ev.altKey    ){ key += 'Alt+' }
    if( onKeyControl ){ key += 'Ctrl+' }
    if( OnKeyShift   ){ key += 'Shift+' }
    if( and(keycode != 'KeyJ', OnKeyJ) ){ key += 'J+' }
    if( and(keycode != 'KeyK', OnKeyK) ){ key += 'K+' }
    if( and(keycode != 'KeyL', OnKeyL) ){ key += 'L+' }
    key += keycode

    if( TransMode ){
        //mode = "[\343\201\202r]"
        mode = "[あr]"
    }else{
        mode = '[---]'
    }
    ////  /gjmode.innerHTML = "[---]"
    GJWin_Mode.innerHTML = mode + ' ' + key
    //alert('Key:'+keycode)
    ev.stopPropagation()
    //ev.preventDefault()
}
function GJWin_OnScroll(ev){
  x = DragStartX = gsh.getBoundingClientRect().left.toFixed(0)
  y = DragStatty = gsh.getBoundingClientRect().top.toFixed(0)
  GJLog_append('OnScroll: x='+x+',y='+y)
}
document.addEventListener('scroll',GJWin_OnScroll)
function GJWin_OnResize(ev){
  w = window.innerWidth
  h = window.innerHeight
  GJLog_append('OnResize: w='+w+',h='+h)
}
window.addEventListener('resize',GJWin_OnResize)

var DragStartX = 0
var DragStartY = 0
function GJWin_DragStart(ev){
  // maybe this is the grabbing position
  this.style.position = 'fixed'
  x = DragStartX = this.getBoundingClientRect().left.toFixed(0)
  y = DragStatty = this.getBoundingClientRect().top.toFixed(0)
  GJLog_Stat.value = 'DragStart: x='+x+',y='+y
}
function GJWin_Drag(ev){
  x = ev.clientX; y = ev.clientY // x = ev.pageX; y = ev.pageY
  this.style.left = x - DragStartX
  this.style.top = y - DragStartY
  this.style.zIndex = '30000'
  this.style.position = 'fixed'
  x = this.getBoundingClientRect().left.toFixed(0)
  y = this.getBoundingClientRect().top.toFixed(0)
  GJLog_Stat.value = 'x='+x+',y='+y
  ev.preventDefault()
  ev.stopPropagation()
}
function GJWin_DragEnd(ev){
  x = ev.clientX; y = ev.clientY
  //x = ev.pageX; y = ev.pageY
  this.style.left = x - DragStartX
  this.style.top = y - DragStartY
  this.style.zIndex = '30000'
  this.style.position = 'fixed'
  if( true ){
      console.log("Dropped: "+this.nodeName+'#'+this.id+' x='+x+' y='+y
          +' parent='+this.parentNode.id)
  }
  x = this.getBoundingClientRect().left.toFixed(0)
  y = this.getBoundingClientRect().top.toFixed(0)
  GJLog_Stat.value = 'x='+x+',y='+y
  ev.preventDefault()
  ev.stopPropagation()
}
function GJWin_DragIgnore(ev){
  ev.preventDefault()
  ev.stopPropagation()
}
// 2020-09-15 let every object have console view!
var GJ_ConsoleID = 0
var PrevReport = new Date()
function GJLog_StatUpdate(){
  txa = GJLog_Stat;
  if( txa == null ){
      return;
  }
  tmLap0 = new Date();
  p = txa.parentNode;
  pw = txa.getBoundingClientRect().width;
  ph = txa.getBoundingClientRect().height;
  //txa.value += '#'+p.id+' pw='+pw+', ph='+ph+'\n';
  tx1 = '#'+p.id+' pw='+pw+', ph='+ph+'\n';

  w = txa.getBoundingClientRect().width;
  h = txa.getBoundingClientRect().height;
  //txa.value += 'w='+w+', h='+h+'\n';
  tx1 += 'w='+w+', h='+h+'\n';

  //txa.value += '\n';
```

```
    //txa.value += DateShort() + '\n';
    tx1 += '\n';
    tx1 += DateShort() + '\n';
    tmLap1 = new Date();

    txa.value += tx1;
    tmLap2 = new Date();

    // vertical centering of the last line
    sHeight = txa.scrollHeight - 30; // depends on the font-size
    tmLap3 = new Date();

    txa.scrollTop = sHeight; // depends on the font-size
    tmLap4 = new Date();

    now = tmLap0.getTime();
    if( PrevReport == 0 || 10000 <= now-PrevReport ){
        PrevReport = now;
        console.log('StatBarUpdate:'
            + 'leng=' + txa.value.length + ' byte, '
            + 'time='  + (tmLap4 -tmLap0) + 'ms {'
            + 'tadd=' + (tmLap2 -tmLap1) + ', '
            + 'hcal=' + (tmLap3 -tmLap2) + ', '
            + 'scrl=' + (tmLap4 -tmLap3) + '}'
        );
    }
}
GJWin_StatUpdate = GJLog_StatUpdate;
function GJ_showTime1(wid){
    //e = document.getElementById(wid);
    //console.log(wid.id+'.value.length='+wid.value.length)
    if( e != null ){
        //e.value = DateShort();
    }else{
        // should remove the Listener
    }
}
function GJWin_OnResizeTextarea(ev){
    this.value += 'resized:' + '\n'
}
function GJ_NewConsole(wname){
    wid = wname + '_' + GJ_ConsoleID
    GJ_ConsoleID += 1

    GJFactory.style.setProperty('width',360+'px'); //GJFsize
    GJFactory.style.setProperty('height',320+'px')
    e = GJFactory;
    console.log('GJFa #'+e.id+' from w='+e.style.width+', h='+e.style.height)

    if( GJFactory.innerHTML == "" ){
        GJFactory.innerHTML = '<'+'H3>GJ Factory_'+ GJ_FactoryID +'<'+'/H3><'+'hr>\n'
    }else{
        GJFactory.innerHTML += '<'+'hr>\n'
    }

    gjwin = GJLog_Win = document.createElement('span')
    gjwin.id = wid
    gjwin.setAttribute('class','GJWin')
    gjwin.setAttribute('draggable','true')
    gjwin.addEventListener('dragstart',GJWin_DragStart)
    gjwin.addEventListener('drag',GJWin_Drag)
    gjwin.addEventListener('dragend',GJWin_Drag)
    gjwin.addEventListener('dragover',GJWin_DragIgnore)
    gjwin.addEventListener('dragenter',GJWin_DragIgnore)
    gjwin.addEventListener('dragleave',GJWin_DragIgnore)
    gjwin.addEventListener('dragexit',GJWin_DragIgnore)
    gjwin.addEventListener('drop',GJWin_DragIgnore)
    gjwin.addEventListener('keydown',GJWin_OnKeyDown)

    gjtab = GJLog_Tab = document.createElement('textarea')
    gjtab.addEventListener('keydown',GJWin_OnKeyDown)
    gjtab.style.readonly = true
    gjtab.contenteditable = false
    gjtab.value = wid
    gjtab.id = wid + '_Tab'
    gjtab.setAttribute('class','GJTab')
    gjtab.setAttribute('spellcheck','false')
    gjwin.appendChild(gjtab)

    gjstat = GJLog_Stat = document.createElement('textarea')
    gjstat.addEventListener('keydown',GJWin_OnKeyDown)
    gjstat.id = wid + '_Stat'
    gjstat.value = DateShort()
    gjstat.setAttribute('class','GJStat')
    gjstat.setAttribute('spellcheck','false')
    gjwin.appendChild(gjstat)

    gjicon = document.createElement('span')
    gjicon.addEventListener('keydown',GJWin_OnKeyDown)
    gjicon.id = wid + '_Icon'
    gjicon.innerHTML = 'G<font color="#f44">J</font>'
    gjicon.setAttribute('class','GJIcon')
    gjicon.setAttribute('spellcheck','false')
    gjwin.appendChild(gjicon)

    gjtext = GJLog_Text = document.createElement('textarea')
    gjtext.addEventListener('keydown',GJWin_OnKeyDown)
    gjtext.addEventListener('keyup',GJWin_OnKeyUp)
    gjtext.addEventListener('resize',GJWin_OnResizeTextarea)
    gjtext.id = wid + '_Text'
    gjtext.setAttribute('class','GJText')
    gjtext.setAttribute('spellcheck','false')
    gjwin.appendChild(gjtext)


    // user's mode as of IME
    gjmode = GJWin_Mode = document.createElement('textarea')
    gjmode.addEventListener('keydown',GJWin_OnKeyDown)
    gjmode.addEventListener('keydown',GJWin_OnKeyDown)
    gjmode.id = wid + '_Mode'
    gjmode.setAttribute('class','GJMode')
    gjmode.setAttribute('spellcheck','false')
    gjmode.innerHTML = '[---]'
    gjwin.appendChild(gjmode)

    gjwin.zIndex = 30000
    GJFactory.appendChild(gjwin)

    gjtab.scrollTop = 0
    gjstat.scrollTop = 0

    //x = gjwin.getBoundingClientRect().left.toFixed(0)
    //y = gjwin.getBoundingClientRect().top.toFixed(0)
    //gjwin.style.position = 'static'
```

```
    //gjwin.style.left = 0
    //gjwin.style.top = 0

    //update = '{'+wid+'.value=DateShort()}',
    update = '{GJ_showTime1('+wid+');}',
    // 2020-09-19 this causes memory leaks
    //FProductInterval = window.setInterval(update,200)
    //FProductInterval = window.setInterval(GJWin_StatUpdate,200)
    //FProductInterval = window.setInterval(GJ_showTime1,200,wid);
    FProductInterval = window.setInterval(GJ_showTime1,200,gjstat);
    return update
  }
  function xxxGJF_StripClass(){
    GJLog_Win.style.removeProperty('width')
    GJLog_Tab.style.removeProperty('width')
    GJLog_Stat.style.removeProperty('width')
    GJLog_Text.style.removeProperty('width')
    return "Stripped classes"
  }
  function isElem(id){
    return document.getElementById(id) != null
  }
  function GJLog_append(...args){
    txt = GJLog_Text;
    if( txt == null ){
        return; // maybe GJLog element is removed
    }
    logs = args.join(' ')
    txt.value += logs + '\n'
    txt.scrollTop = txt.scrollHeight
    //GJLog_Stat.value = DateShort()
  }
  //window.addEventListener('time',GJLog_StatUpdate)
  function test_GJ_Console(){
    window.setInterval(GJLog_StatUpdate,1000);
    GJ_NewConsole('GJ_Console')
    e = GJFactory;
    console.log('GJF0 #'+e.id+' from w='+e.style.width+', h='+e.style.height)
    e.style.width = 360; //GJFsize
    e.style.height = 320;
    console.log('GJF0 #'+e.id+' to w='+e.style.width+', h='+e.style.height)
  }
  /// test_GJ_Console();

  var StopConsoleLog = true
  // 2020-09-15 added,
  // log should be saved to permanet memory
  // const px = new Proxy(console.log,{ alert() })
  __console_log = console.log
  __console_info = console.info
  __console_warn = console.warn
  __console_error = console.error
  __console_exception = console.exception
  // should pop callstack info.
  console.exception = function(...args){
    __console_exception(...args)
    alert('-- got console.exception("'+args+'")')
  }
  console.error = function(...args){
    __console_error(...args)
    alert('-- got console.error("'+args+'")')
  }
  console.warn = function(...args){
    __console_warn(...args)
    alert('-- got console.warn("'+args+'")')
  }
  console.info = function(...args){
    alert('-- got console.info("'+args+'")')
    __console_info(...args)
  }
  console.xxxlog = function(...args){ // rewrite xxxlog to log to enalbe it
    __console_log(...args)
    if( StopConsoleLog ){
        return;
    }
    if( 0 <= args[0].indexOf('!') ){
        //alert('-- got console.log("'+args+'")')
    }
    GJLog_append(...args)
  }

//document.getElementById('GshFaviconURL').href = GShellFavicon
    //document.getElementById('GshFaviconURL').href = GShellInsideIcon
//document.getElementById('GshFaviconURL').href = ITSmoreQR
//document.getElementById('GshFaviconURL').href = GSellLogo

// id of GShell HTML elemets
var E_BANNER = "GshBanner" // banner element in HTML
var E_FOOTER = "GshFooter" // footer element in HTML
var E_GINDEX = "gsh-gindex" // index of Golang code of GShell
var E_GOCODE = "gsh-gocode" // Golang code of GSHell
var E_TODO   = "gsh-todo"   // TODO of GSHell
var E_DICT   = "gsh-dict"   // Dictionaly of GSHell

function bannerElem(){ return document.getElementById(E_BANNER); }
function bannerStyleFunc(){ return bannerElem().style; }
var bannerStyle = bannerStyleFunc()
function GshSetImages(){
    document.getElementById('GshFaviconURL').href = GShellInsideIcon
    bannerStyle.backgroundImage = "url("+GSellLogo+")";
    //bannerStyle.backgroundImage = "url("+GShellInsideIcon+")";
    //bannerStyle.backgroundImage = "url("+GShellFavicon+")";
    GMenu.style.backgroundImage = "url("+GShellInsideIcon+")";
    showFooter();
}

function footerElem(){ return document.getElementById(E_FOOTER); }
function footerStyle(){ return footerElem().sytle; }
//footerElem().style.backgroundImage="url("+ITSmoreQR+")";
//footerStyle().backgroundImage = "url("+ITSmoreQR+")";

function html_fold(e){
    if( e.innerHTML == "Fold" ){
        e.innerHTML = "Unfold"
        document.getElementById('gsh-menu-exit').innerHTML=""
        document.getElementById('GshStatement').open=false
        GshFeatures.open = false
        document.getElementById('html-src').open=false
        document.getElementById(E_GINDEX).open=false
        document.getElementById(E_GOCODE).open=false
        document.getElementById(E_TODO).open=false
        document.getElementById('references').open=false
    }else{
        e.innerHTML = "Fold"
```

```
        document.getElementById('GshStatement').open=true
        GshFeatures.open = true
        document.getElementById(E_GINDEX).open=true
        document.getElementById(E_GOCODE).open=true
        document.getElementById(E_TODO).open=true
        document.getElementById('references').open=true
    }
}
function html_pure(e){
    if( e.innerHTML == "Pure" ){
        document.getElementById('gsh').style.display=true
        //document.style.display = false
        e.innerHTML = "Unpure"
    }else{
        document.getElementById('gsh').style.display=false
        //document.style.display = true
        e.innerHTML = "Pure"
    }
}

var bannerIsStopping = false
//NOTE: .com/JSREF/prop_style_backgroundposition.asp
function shiftBG(){
    bannerIsStopping = !bannerIsStopping
    bannerStyle.backgroundPosition = "0 0";
}
// status should be inherited on Window Fork(), so use the status in DOM
function html_stop(e,toggle){
    if( toggle ){
        if( e.innerHTML == "Stop" ){
            bannerIsStopping = true
            e.innerHTML = "Start"
        }else{
            bannerIsStopping = false
            e.innerHTML = "Stop"
        }
    }else{
        // update JavaScript variable from DOM status
        if( e.innerHTML == "Stop" ){ // shown if it's running
            bannerIsStopping = false
        }else{
            bannerIsStopping = true
        }
    }
}
html_stop(document.getElementById('GshMenuStop'),false) // onInit.
//html_stop(bannerElem(),false) // onInit.

//https://www.w3schools.com/jsref/met_win_setinterval.asp
function shiftBanner(){
    var now = new Date().getTime();
    //"console.log("now="+(now%10))
    if( !bannerIsStopping ){
        bannerStyle.backgroundPosition = ((now/10)%100000)+" 0";
    }
}
function Banner_init(){
    window.setInterval(shiftBanner,10); // onInit.
}

//  <a href="https://developer.mozilla.org/ja/docs/Web/API/Window/open">window.open()</a>
// from embedded html to standalone page
var MyChildren = 0
function html_fork(){
    GJFactory_Destroy()
    MyChildren += 1
    WinId = document.getElementById('gsh-WinId').innerHTML + "." + MyChildren;
    newwin = window.open("",WinId,"");
    src = document.getElementById("gsh");
    srchtml = src.outerHTML
    newwin.document.write("/*<"+"html>\n");
    newwin.document.write(srchtml);
    newwin.document.write("<"+"/html>\n");
    newwin.document.getElementById('gsh-menu-exit').innerHTML = "Close";
    newwin.document.getElementById('gsh-WinId').innerHTML = WinId;
    newwin.document.close();
    newwin.focus();
}
function html_close(){
    window.close()
}
function win_jump(win){
    //win = window.top;
    win = window.openner; // https://developer.mozilla.org/ja/docs/Web/API/window.opener
    if( win == null ){
        console.log("jump to window.opener("+win+")(Error)\n")
    }else{
        console.log("jump to window.opener("+win+")\n")
        win.focus();
    }
}

// 0.2.9 2020-0902 created chekcsum of HTML
CRC32UNIX = 0x04C11DB7 // Unix cksum
function byteCRC32add(bigcrc,octstr,octlen){
    var crc = new Int32Array(1)
    crc[0] = bigcrc

    let oi = 0
    for( ; oi < octlen; oi++ ){
        var oct = new Int8Array(1)
        oct[0] = octstr[oi]
        for( bi = 0; bi < 8; bi++ ){
            //console.log("--CRC32 "+crc[0]+" "+oct[0].toString(16)+" ["+oi+"."+bi+"]\n")
            ovf1 = crc[0] < 0 ? 1 : 0
            ovf2 = oct[0] < 0 ? 1 : 0
            ovf = ovf1 ^ ovf2
            oct[0] <<= 1
            crc[0] <<= 1
            if( ovf ){ crc[0] ^= CRC32UNIX }
        }
    }
    //console.log("--CRC32 byteAdd return crc="+crc[0]+","+oi+"/"+octlen+"\n")
    return crc[0];
}
function strCRC32add(bigcrc,stri,strlen){
    var crc = new Uint32Array(1)
    crc[0] = bigcrc
    var code = new Uint8Array(strlen);
    for( i = 0; i < strlen; i++){
        code[i] = stri.charCodeAt(i) // not charAt() !!!!
        //console.log("=== "+code[i].toString(16)+" <<== "+stri[i]+"\n")
    }
    crc[0] = byteCRC32add(crc,code,strlen)
```

```
    //console.log("--CRC32 strAdd return crc="+crc[0]+"\n")
    return crc[0]
}
function byteCRC32end(bigcrc,len){
    var crc = new Uint32Array(1)
    crc[0] = bigcrc
    var slen = new Uint8Array(4)
    let li = 0
        for( ; li < 4; ){
                slen[li] = len
        li += 1
                len >>= 8
                if( len == 0 ){
                        break
        }
        }
        crc[0] = byteCRC32add(crc[0],slen,li)
        crc[0] ^= 0xFFFFFFFF
        return crc[0]
}
function strCRC32(stri,len){
    var crc = new Uint32Array(1)
    crc[0] = 0
    crc[0] = strCRC32add(0,stri,len)
    crc[0] = byteCRC32end(crc[0],len)
    //console.log("--CRC32 "+crc[0]+" "+len+"\n")
    return crc[0]
}

DestroyGJLink = null; // to be replaced
DestroyFooter = null; // to be defined
DestroyEventSharingCodeview = function dummy(){}
Destroy_WirtualDesktop = function(){}
DestroyNaviButtons = function(){}

function getSourceText(){
    if( DestroyFooter != null ) DestroyFooter();
    version = document.getElementById('GshVersion').innerHTML
    sfavico = document.getElementById('GshFaviconURL').href;
    sbanner = document.getElementById('GshBanner').style.backgroundImage;
    spositi = document.getElementById('GshBanner').style.backgroundPosition;

    if( document.getElementById('GJC_1') != null ){ GJC_1.remove() }
    if( DestroyGJLink != null ) DestroyGJLink();
    DestroyEventSharingCodeview();
    Destroy_WirtualDesktop();
    GshTopbar.innerHTML = "";
    DestroyIndexBar();
    DestroyNaviButtons();

    // these should be removed by CSS selector or class, after sevaed to non-printed attribute
    GshBanner.removeAttribute('style');
    document.getElementById('GshMenuSign').removeAttribute("style");
    styleGMenu = GMenu.getAttribute("style")
    GMenu.removeAttribute("style");
    styleGStat = GStat.getAttribute("style")
    GStat.removeAttribute("style");
    styleGTop = GTop.getAttribute("style")
    GTop.removeAttribute("style");
    styleGshGrid = GshGrid.getAttribute("style")
    GshGrid.removeAttribute("style");
    //styleGPos = GPos.getAttribute("style");
    //GPos.removeAttribute("style");
    //GPos.innerHTML = "";
    //styleGLog = GLog.getAttribute("style");
    //GLog.removeAttribute("style");
    //GLog.innerHTML = "";
    styleGShellPlane = GShellPlane.getAttribute("style")
    GShellPlane.removeAttribute("style")
    styleRawTextViewer = RawTextViewer.getAttribute("style")
    RawTextViewer.removeAttribute("style")
    styleRawTextViewerClose = RawTextViewerClose.getAttribute("style")
    RawTextViewerClose.removeAttribute("style")

    GshFaviconURL.href = "";
    if( iselem('ConfigIcon') ) ConfigIcon.src = "";

    //it seems that interHTML and outerHTML generate style="" for these (??)
    //GshBanner.removeAttribute('style');
    //GshFooter.removeAttribute('style');
    //GshMenuSign.removeAttribute('style');
    GshBanner.style=""
    GshMenuSign.style=""

    textarea = document.createElement("textarea")
    srchtml = document.getElementById("gsh").outerHTML;
        //textarea = document.createElement("textarea")
        // 2020-0910 ?? ... this causes inserting style="" to Banner and Footer,
        // with Chromium?/ after reloading from file:///
        textarea.innerHTML = srchtml
    // <a href="https://stackoverflow.com/questions/5796718/html-entity-decode">Thanks</a>
        var rawtext = textarea.value
        //textarea.destroy()
        //rawtext = gsh.textContent // this removes #include <FILENAME> too
        var orgtext = ""
         + "/*<"+"html>\n"  // lost preamble text
         + rawtext
         + "<"+"/html>\n"   // lost trail text
        ;

    tlen = orgtext.length
    //console.log("getSourceText: length="+tlen+"\n")
    document.getElementById('GshFaviconURL').href                = sfavico;

    document.getElementById('GshBanner').style.backgroundImage    = sbanner;
    document.getElementById('GshBanner').style.backgroundPosition = spositi;

    GStat.setAttribute("style",styleGStat)
    GMenu.setAttribute("style",styleGMenu)
    GTop.setAttribute("style",styleGTop)
    //GLog.setAttribute("style",styleGLog)
    //GPos.setAttribute("style",styleGPos)
    GshGrid.setAttribute("style",styleGshGrid)
    GShellPlane.setAttribute("style",styleGShellPlane)
    RawTextViewer.setAttribute("style",styleRawTextViewer)
    RawTextViewerClose.setAttribute("style",styleRawTextViewerClose)
    canontext = orgtext.replace(' style=""','')
    // open="" too
    return canontext
}
function getDigest(){
    var text = ""
    text = getSourceText()
    var digest = ""
```

```
    tlen = text.length
    digest = strCRC32(text,tlen) + " " + tlen
    return { text, digest }
}
function html_digest(){
    version = document.getElementById('GshVersion').innerHTML
    let {text, digest} = getDigest()
    alert("cksum: " + digest + " " + version)
}
function charsin(stri,char){
    ln = 0;
    for( i = 0; i < stri.length; i++ ){
        if( stri.charCodeAt(i) == char.charCodeAt(0) )
            ln++;
    }
    return ln;
}

//class digestElement extends HTMLElement { }
//< script>customElements.define('digest',digestElement)< /script>
function showDigest(e){
    result = 'version=' + GshVersion.innerHTML + '\n'
    result += 'lines='   + e.dataset.lines   + '\n'
        + 'length='  + e.dataset.length  + '\n'
        + 'crc32u='  + e.dataset.crc32u  + '\n'
        + 'time='    + e.dataset.time    + '\n';

    alert(result)
}

function html_sign(e){
    if( RawTextViewer.style.zIndex == 1000 ){
        hideRawTextViewer()
        return
    }
    GshTopbar.innerHTML = "";
    DestroyIndexBar();
    DestroyNaviButtons();
    DestroyEventSharingCodeview();
    Destroy_WirtualDesktop();
    GJFactory_Destroy()
    if( DestroyGJLink != null ) DestroyGJLink();
    //gsh_digest_.innerHTML = "";
    text = getSourceText() // the original text
    tlen = text.length
    digest = strCRC32(text,tlen)
    //gsh_digest_.innerHTML = digest + " " + tlen
    //text = getSourceText() // the text with its digest
    Lines = charsin(text,'\n')

    name = "gsh"
    sid = name + "-digest"
    d = new Date()
    signedAt = d.getTime()

    sign = '/'+'*<'+'span\n'
        + ' id="' + sid + '"\n'
        + ' class="_digest_"\n'
        + ' data-target-id="'+name+'"\n'
        + ' data-crc32u="'  + digest    + '"\n'
        + ' data-length="'  + tlen      + '"\n'
        + ' data-lines="'   + Lines     + '"\n'
        + ' data-time="'    + signedAt  + '"\n'
        + ' ><' + '/span>\n*'+'/\n'

    text = sign + text

    txthtml = '<' + 'table id="LineNumbered"><' + 'tr><' + 'td>'
        + '<' + 'textarea cols=5 rows=' + Lines + ' class="LineNumber">'
    for( i = 1; i <= Lines; i++ ){
        txthtml += i.toString() + '\n'
    }
    txthtml += ""
        + '<' + '/textarea>'
        + '<' + '/td><' + 'td>'
        + '<' + 'textarea cols=150 rows=' + Lines + 'spellcheck="false"'
        + ' class="LineNumbered">'
        + text + '<'+'/textarea>'
        + '<' + '/td><' + '/tr><' + '/table>'

    for( i = 1; i <= 30; i++ ){
        txthtml += '<br>\n'
    }
    RawTextViewer.innerHTML = txthtml
    RawTextViewer.spellcheck = false // (spelcheck above seems ineffective)

    btn = e
    e.style.color = "rgba(128,128,255,0.9)";
    y = e.getBoundingClientRect().top.toFixed(0)
    //h = e.getBoundingClientRect().height.toFixed(0)
    RawTextViewer.style.top = Number(y) + 30
    RawTextViewer.style.left = 100;
    RawTextViewer.style.height = window.innerHeight - 20;
    //RawTextViewer.style.Opacity = 1.0;
    //RawTextViewer.style.backgroundColor = "rgba(0,0,0,0.0)";
    RawTextViewer.style.backgroundColor = "rgba(255,255,255,0.8)";
    RawTextViewer.style.zIndex = 1000;
    RawTextViewer.style.display = true;

    if( RawTextViewerClose.style == null ){
        RawTextViewerClose.style = "";
    }
    RawTextViewerClose.style.top = Number(y) + 10
    RawTextViewerClose.style.left = 100;
    RawTextViewerClose.style.zIndex = 1001;

    ScrollToElement(CurElement,RawTextViewerClose)
}
function hideRawTextViewer(){
    RawTextViewer.style.left = 10000;
    RawTextViewer.style.zIndex = -100;
    RawTextViewer.style.Opacity = 0.0;
    RawTextViewer.style = null
    RawTextViewer.innerHTML = "";

    GshMenuSign.style.color = "rgba(255,128,128,1.0)";
    RawTextViewerClose.style.top = 0;
    RawTextViewerClose.style = null
}

// source code viewr
function frame_close(){
    srcframe = document.getElementById("src-frame");
    srcframe.innterHTML = "";
```

```
    //srcframe.style.cols = 1;
    srcframe.style.rows = 1;
    srcframe.style.height = 0;
    srcframe.style.display = false;
    src = document.getElementById("SrcTextarea");
    src.innerHML = ""
    //src.cols = 0
    src.rows = 0
    src.display = false
    //alert("--closed--")
}
//<!-- | <span onclick="html_view();">Source</span> -->
//<!-- | <span onclick="frame_close();">SourceClose</span> -->
//<!--| <span>Download</span> -->
function frame_open(){
    GshTopbar.innerHTML = "";
    DestroyIndexBar();
    DestroyNaviButtons();
    if( DestroyFooter != null ) DestroyFooter();
    document.getElementById('GshFaviconURL').href = "";
    oldsrc = document.getElementById("GENSRC");
    if( oldsrc != null ){
        //alert("--I--(erasing old text)")
        oldsrc.innterHTML = "";
        return
    }else{
        //alert("--I--(no old text)")
    }
    styleBanner = GshBanner.getAttribute("style")
    GshBanner.removeAttribute("style")
    if( document.getElementById('GJC_1') ){ GJC_1.remove() }

    GshFaviconURL.href = "";
    if( iselem('ConfigIcon') ) ConfigIcon.src = "";
    GStat.removeAttribute('style')
    GshGrid.removeAttribute('style')
    GshMenuSign.removeAttribute('style')
    //GPos.removeAttribute('style')
    //GPos.innerHTML = "";
    //GLog.removeAttribute('style')
    //GLog.innerHTML = "";
    GMenu.removeAttribute('style')
    GTop.removeAttribute('style')
    GShellPlane.removeAttribute('style')
    RawTextViewer.removeAttribute('style')
    RawTextViewerClose.removeAttribute('style')

    if( DestroyGJLink != null ) DestroyGJLink();
    GJFactory_Destroy()
    Destroy_WirtualDesktop();
    DestroyEventSharingCodeview();

    src = document.getElementById("gsh");
    srchtml = src.outerHTML
    srcframe = document.getElementById("src-frame");
    srcframe.innerHTML = ""
     + "<"+"cite id=\"GENSRC\">\n"
     + "<"+"style>\n"
     + "#GENSRC textarea{tab-size:4;}\n"
     + "#GENSRC textarea{-o-tab-size:4;}\n"
     + "#GENSRC textarea{-moz-tab-size:4;}\n"
     + "#GENSRC textarea{spellcheck:false;}\n"
     + "</"+"style>\n"
     + "<"+'textarea id="SrcTextarea" cols=100 rows=20 class="gsh-code" spellcheck="false">'
     + "/*<"+"html>\n"  // lost preamble text
     + srchtml
     + "<"+"/html>\n"   // lost trail text
     + "</"+"textarea>\n"
     + "</"+"cite><!-- GENSRC -->\n";

    //srcframe.style.cols = 80;
    //srcframe.style.rows = 80;

    GshBanner.setAttribute('style',styleBanner)
}
function fill_CSSView(){
    part = document.getElementById('GshStyleDef')
    view = document.getElementById('gsh-style-view')
    view.innerHTML = ""
     + "<"+'textarea cols=100 rows=20 class="gsh-code">'
     + part.innerHTML
     + "<"+"/textarea>"
}
function fill_JavaScriptView(){
    jspart = document.getElementById('gsh-script')
    view = document.getElementById('gsh-script-view')
    view.innerHTML = ""
     + "<"+'textarea cols=100 rows=20 class="gsh-code">'
     + jspart.innerHTML
     + "<"+"/textarea>"
}
function fill_DataView(){
    part = document.getElementById('gsh-data')
    view = document.getElementById('gsh-data-view')
    view.innerHTML = ""
     + "<"+'textarea cols=100 rows=20 class="gsh-code">'
     + part.innerHTML
     + "<"+"/textarea>"
}
function jumpto_StyleView(){
    jsview = document.getElementById('html-src')
    jsview.open = true
    jsview = document.getElementById('gsh-style-frame')
    jsview.open = true
    fill_CSSView()
}
function jumpto_JavaScriptView(){
    jsview = document.getElementById('html-src')
    jsview.open = true
    jsview = document.getElementById('gsh-script-frame')
    jsview.open = true
    fill_JavaScriptView()
}
function jumpto_DataView(){
    jsview = document.getElementById('html-src')
    jsview.open = true
    jsview = document.getElementById('gsh-data-frame')
    jsview.open = true
    fill_DataView()
}
function jumpto_WholeView(){
    jsview = document.getElementById('html-src')
    jsview.open = true
    jsview = document.getElementById('gsh-whole-view')
```

```
    jsview.open = true
    frame_open()
}
function html_view(){
    html_stop();

    banner = document.getElementById('GshBanner').style.backgroundImage;
    footer = document.getElementById('GshFooter').style.backgroundImage;
    document.getElementById('GshBanner').style.backgroundImage = "";
    document.getElementById('GshBanner').style.backgroundPosition = "";
    document.getElementById('GshFooter').style.backgroundImage = "";

    //srcwin = window.open("","CodeView2","");
    srcwin = window.open("","","");
    srcwin.document.write("<span id=\"gsh\">\n");

    src = document.getElementById("gsh");
    srcwin.document.write("<"+"style>\n");
    srcwin.document.write("textarea{tab-size:4;}\n");
    srcwin.document.write("textarea{-o-tab-size:4;}\n");
    srcwin.document.write("textarea{-moz-tab-size:4;}\n");
    srcwin.document.write("</style>\n");
    srcwin.document.write("<h2>\n");
    srcwin.document.write("<"+"span onclick=\"window.close();\">Close</span> | \n");
    //srcwin.document.write("<"+"span onclick=\"html_stop();\">Run</span>\n");
    srcwin.document.write("</h2>\n");
    srcwin.document.write("<"+"textarea id=\"gsh-src-src\" cols=100 rows=60>");
    srcwin.document.write("/*<"+"html>\n");
    srcwin.document.write("<"+"span id=\"gsh\">");
    srcwin.document.write(src.innerHTML);
    srcwin.document.write("<"+"/span><"+"/html>\n");
    srcwin.document.write("</"+"textarea>\n");

    document.getElementById('GshBanner').style.backgroundImage = banner;
    document.getElementById('GshFooter').style.backgroundImage = footer

    sty = document.getElementById("GshStyleDef");
    srcwin.document.write("<"+"style>\n");
    srcwin.document.write(sty.innerHTML);
    srcwin.document.write("<"+"/style>\n");

    run = document.getElementById("gsh-script");
    srcwin.document.write("<"+"script>\n");
    srcwin.document.write(run.innerHTML);
    srcwin.document.write("<"+"/script>\n");

    srcwin.document.write("<"+"/span><"+"/html>\n"); // gsh span
    srcwin.document.close();
    srcwin.focus();
}
GSH = document.getElementById("gsh")

//GSH.onclick = "alert('Ouch!')"
//GSH.css = "{background-color:#eef;}"
//GSH.style = "background-color:#eef;"
//GSH.style.display = false;
//alert('Ouch0!')
//GSH.style.display = true;

// 2020-0904 created, tentative
document.addEventListener('keydown',jgshCommand);
//CurElement = GshStatement
CurElement = GshMenu
MemElement = GshMenu

function nextSib(e){
    n = e.nextSibling;
    for( i = 0; i < 100; i++ ){
        if( n == null ){
            break;
        }
        if( n.nodeName == "DETAILS" ){
            return n;
        }
        n = n.nextSibling;
    }
    return null;
}
function prevSib(e){
    n = e.previousSibling;
    for( i = 0; i < 100; i++ ){
        if( n == null ){
            break;
        }
        if( n.nodeName == "DETAILS" ){
            return n;
        }
        n = n.previousSibling;
    }
    return null;
}
function setColor(e,eName,eColor){
    if( e.hasChildNodes() ){
        s = e.childNodes;
        if( s != null ){
            for( ci = 0; ci < s.length; ci++ ){
                if( s[ci].nodeName == eName ){
                    s[ci].style.color = eColor;
                    //s[ci].style.backgroundColor = eColor;
                    break;
                }
            }
        }
    }
}

// https://docs.microsoft.com/en-us/previous-versions//hh781509(v=vs.85)
function showCurElementPosition(ev){
//  if( document.getElementById("GPos") == null ){
//      return;
//  }
//  if( GPos == null ){
//      return;
//  }
    e = CurElement
    y = e.getBoundingClientRect().top.toFixed(0)
    x = e.getBoundingClientRect().left.toFixed(0)

    h = ev + " "
    h += 'y='+y+", "+ 'x='+x+" -- "
    h += "w=" + window.innerWidth + ", h=" + window.innerHeight + " -- "
    //GPos.test = h
    //GPos.innerHTML = h
//  GPos.innerHTML = h
```

```
}

function zero2(n){
    if( n < 10 ){
        return '0' + n;
    }else{
        return n;
    }
}
function DateHourMin(){
    d = new Date();
    //return '%02d:%02d'.sprintf(d.getHours(),d.getMinutes())
    return zero2(d.getHours()) + ":" + zero2(d.getMinutes());
}
function DateShort0(d){
    return  d.getFullYear()
        + '/' + zero2(d.getMonth())
        + '/' + zero2(d.getDate())
        + ' ' + zero2(d.getHours())
        + ':' + zero2(d.getMinutes())
        + ':' + zero2(d.getSeconds())
}
function DateShort(){
    return DateShort0(new Date());
}
function DateLong0(ms){
    d = new Date();
    d.setTime(ms);
    return  DateShort0(d)
        + '.' + d.getMilliseconds()
        + ' ' + d.getTimezoneOffset()/60
        + ' ' + d.getTime()  + '.' + d.getMilliseconds()
}
function DateLong(){
    return DateLong0(new Date());
}
function GShellMenu(e){
    //GLog.innerHTML = "Hello, World! (" + DateLong() + ")"
    showGShellPlane()
}
// placements of planes
function GShellResizeX(ev){
    //if( document.getElementById("GMenu") != null ){
        GMenu.style.left = window.innerWidth - 100
        GMenu.style.top = window.innerHeight - 90 - 200
        //console.log("place GMENU "+GMenu.style.left+" "+GMenu.style.top)

    //}
    GStat.style.width = window.innerWidth
    //if( document.getElementById("GPos") != null ){
        //GPos.style.width = window.innerWidth
        //GPos.style.top = window.innerHeight - 30; //GPos.style.height
    //}
    //if( document.getElementById("GLog") != null ){
    //  GLog.style.width = window.innerWidth
        //GLog.innerHTML = ""
    //}
    //if( document.getElementById("GLog") != null ){
        //GLog.innerHTML = "Resize: w=" + window.innerWidth +
        //", h=" + window.innerHeight
    //}
    showCurElementPosition(ev)
}
function GShellResize(){
    GShellResizeX("[RESIZE]")
}
window.onresize = GShellResize
var prevNode = null
var LogMouseMoveOverElement = false;
function GJSH_OnMouseMove(ev){
    if( LogMouseMoveOverElement == false ){
        return;
    }
    x = ev.clientX
    y = ev.clientY
    d = new Date()
    t = d.getTime() / 1000
    if( document.elementFromPoint ){
        e = document.elementFromPoint(x,y)
        if( e != null ){
            if( e == prevNode ){
            }else{
                console.log('Mo-'+t+'('+x+','+y+') '
                    +e.nodeType+' '+e.tagName+'#'+e.id)
                prevNode = e
            }
        }else{
            console.log(t+'('+x+','+y+') no element')
        }
    }else{
        console.log(t+'('+x+','+y+') no elementFromPoint')
    }
}
window.addEventListener('mousemove',GJSH_OnMouseMove);

function GJSH_OnMouseMoveScreen(ev){
    x = ev.screenX
    y = ev.screenY
    d = new Date()
    t = d.getTime() / 1000
    console.log(t+'('+x+','+y+') no elementFromPoint')
}
//screen.addEventListener('mousemove',GJSH_OnMouseMoveScreen);

function ScrollToElement(oe,ne){
    ne.scrollIntoView()
    ny = ne.getBoundingClientRect().top.toFixed(0)
    nx = ne.getBoundingClientRect().left.toFixed(0)
    //GLog.innerHTML = "["+ny+","+nx+"]"
    //window.scrollTo(0,0)

    GTop.style.backgroundColor = "rgba(0,0,0,0.0)"
    GshGrid.style.left = '250px';
    GshGrid.style.zIndex = 0
    if( false ){
        oy = oe.getBoundingClientRect().top.toFixed(0)
        ox = oe.getBoundingClientRect().left.toFixed(0)
        y = e.getBoundingClientRect().top.toFixed(0)
        x = e.getBoundingClientRect().left.toFixed(0)
        window.scrollTo(x,y)
        ny = e.getBoundingClientRect().top.toFixed(0)
        nx = e.getBoundingClientRect().left.toFixed(0)
        //GLog.innerHTML = "["+oy+","+ox+"]->["+y+","+x+"]->["+ny+","+nx+"]"
    }
```

```
}
function showGShellPlane(){
    if( GShellPlane.style.zIndex == 0 ){
        GShellPlane.style.zIndex = 1000;
        GShellPlane.style.left = 30;
        GShellPlane.style.height = 320;
        GShellPlane.innerHTML = DateLong() + "<br>" +
            "-- History --<br>" + MyHistory;
    }else{
        GShellPlane.style.zIndex = 0;
        GShellPlane.style.left = 0;
        GShellPlane.style.height = 50;
        GShellPlane.innerHTML = "";
    }
}
var SuppressGJShell = false
function jgshCommand(kevent){
    if( SuppressGJShell ){
        return
    }
    key = kevent
    keycode = key.code
    //GStat.style.width = window.innerWidth
    GStat.style.backgroundColor = "rgba(0,0,0,0.4)"

    console.log("JSGsh-Key:"+keycode+"(^-^)//")
    if( keycode == "Slash" ){
        console.log('('+x+','+y+') ')
        e = document.elementFromPoint(x,y)
        console.log('('+x+','+y+') '+e.nodeType+' '+e.tagName+'#'+e.id)
    }else
    if( keycode == "Digit0" ){ // fold side-bar
        // "Zero page"
        showGShellPlane();
    }else
    if( keycode == "Digit1" ){ // fold side-bar
        primary.style.width = "94%"
        secondary.style.width = "0%"
        secondary.style.opacity = 0
        GStat.innerHTML = "[Single Column View]"
    }else
    if( keycode == "Digit2" ){ // unfold side-bar
        primary.style.width = "58%"
        secondary.style.width = "36%"
        secondary.style.opacity = 1
        GStat.innerHTML = "[Double Column View]"
    }else
    if( keycode == "KeyU" ){ // fold/unfold all
        html_fold(GshMenuFold);
        location.href = "#"+CurElement.id;
    }else
    if( keycode == "KeyO" || keycode == "ArrowRight" ){ // fold the element
        CurElement.open = !CurElement.open;
    }else
    if( keycode == "ArrowRight" ){ // unfold the element
        CurElement.open = true
    }else
    if( keycode == "ArrowLeft" ){ // unfold the element
        CurElement.open = false
    }else
    if( keycode == "KeyI" ){ // inspect the element
        e = CurElement
        //GLog.innerHTML =
        GJLog_append("Current Element: " + e + "<br>"
            + "name="+e.nodeName + ", "
            + "id="+e.id + ", "
            + "children="+e.childNodes.length + ", "
            + "parent="+e.parentNode.id + "<br>"
            + "text="+e.textContent)
        GStat.style.backgroundColor = "rgba(0,0,0,0.8)"
        return
    }else
    if( keycode == "KeyM" ){ // memory the position
        MemElement = CurElement
    }else
    if( keycode == "KeyN" || keycode == "ArrowDown" ){ // next element
        e = nextSib(CurElement)
        if( e != null ){
            setColor(CurElement,"SUMMARY","#fff")
            setColor(e,"SUMMARY","#8f8") // should be complement ?
            oe = CurElement
            CurElement = e
            //location.href = "#"+e.id;
            ScrollToElement(oe,e)
        }
    }else
    if( keycode == "KeyP" || keycode == "ArrowUp" ){ // previous element
        oe = CurElement
        e = prevSib(CurElement)
        if( e != null ){
            setColor(CurElement,"SUMMARY","#fff")
            setColor(e,"SUMMARY","#8f8") // should be complement ?
            CurElement = e
            //location.href = "#"+e.id;
            ScrollToElement(oe,e)
        }else{
            e = document.getElementById("GshBanner")
            if( e != null ){
                setColor(CurElement,"SUMMARY","#fff")
                CurElement = e
                ScrollToElement(oe,e)
            }else{
                e = document.getElementById("primary")
                if( e != null ){
                    setColor(CurElement,"SUMMARY","#fff")
                    CurElement = e
                    ScrollToElement(oe,e)
                }
            }
        }
    }else
    if( keycode == "KeyR" ){
        location.reload()
    }else
    if( keycode == "KeyJ" ){
        GshGrid.style.top = '120px';
        GshGrid.innerHTML = '(>_<){Down}';
    }else
    if( keycode == "KeyK" ){
        GshGrid.style.top = '0px';
        GshGrid.innerHTML = '(^-^){Up}';
    }else
    if( keycode == "KeyH" ){
        GshGrid.style.left = '0px';
```

```
        GshGrid.innerHTML = "('_'){Left}";
    }else
    if( keycode == "KeyL" ){
        //GLog.innerHTML +=
        GJLog_append(
            'screen='+screen.width+'px'+'<br>'+
            'window='+window.innerWidth+'px'+'<br>'
        )
        GshGrid.style.left = (document.documentElement.clientWidth-160).toString(10)+'px';
        GshGrid.innerHTML = '(@_@){Right}';
    }else
    if( keycode == "KeyS" ){
        html_stop(GshMenuStop,true)
    }else
    if( keycode == "KeyF" ){
        html_fork()
    }else
    if( keycode == "KeyC" ){
        window.close()
    }else
    if( keycode == "KeyD" ){
        html_digest()
    }else
    if( keycode == "KeyV" ){
        e = document.getElementById('gsh-digest')
        if( e != null ){
            showDigest(e)
        }
    }

    showCurElementPosition("["+key.code+"] --");
    //if( document.getElementById("GPos") != null ){
        //GPos.innerHTML += "["+key.code+"] --"
    //}
    //GShellResizeX("["+key.code+"] --");
}
var initGSKC = false;
function GShell_initKeyCommands(){
    if( initGSKC ){ return; } initGSKC = true;

    GShellResizeX("[INIT]");
    DisplaySize = '-- Display: '
        + 'screen='+screen.width+'px, '+'window='+window.innerWidth+'px';

    let {text, digest} = getDigest()
    //GLog.innerHTML +=
    GJLog_append(
        '-- GShell: ' + GshVersion.innerHTML + '\n' +
        '-- Digest: ' + digest + '\n' +
        DisplaySize
        //+ "<br>" + "-- LastVisit:<br>" + MyHistory
    )
    GShellResizeX(null);
}
//GShell_initKeyCommands();

// <a href="https://www.w3.org/TR/WebCryptoAPI/">Web Cryptography API</a>
//Convert a string into an ArrayBuffer
//from https://developers.google.com/web/updates/2012/06/How-to-convert-ArrayBuffer-to-and-from-String
function str2ab(str) {
    const buf = new ArrayBuffer(str.length);
    const bufView = new Uint8Array(buf);
    for (let i = 0, strLen = str.length; i < strLen; i++) {
        bufView[i] = str.charCodeAt(i);
    }
    return buf;
}
function importPrivateKey(pem) {
  const binaryDerString = window.atob(pemContents);
  const binaryDer = str2ab(binaryDerString);
  return window.crypto.subtle.importKey(
    "pkcs8",
    binaryDer,
    {
     name: "RSA-PSS",
     modulusLength: 2048,
     publicExponent: new Uint8Array([1, 0, 1]),
     hash: "SHA-256",
    },
    true,
    ["sign"]
  );
}
//importPrivateKey(ppem)

//key = {}
//buf = "abc"
//enc = "xyzxxxxxx"; //crypto.publicEncrypt(key,buf)
//b64 = btoa(enc)
//dec = atob(b64)
//GLog.innerHTML = "enc:" + b64 + ", dec:" + dec
</script>
*/

/*
<!-- ----- GJConsole BEGIN { ----- -->
<span id="gjc" data-title="GJConsole" data-author="sato@its-more.jp">
<details><summary>GJ Console</summary>
<p>
<span id="GJE_RootNode0"></span>
<span id="GJC1_Container"></span>
</p>
<style id="GJConsoleStyle">
  .GJConsole {
    z-index:1000;
    width:400; height:200px;
    margin:2px;
    color:#fff; background-color:#66a;
    font-size:12px; font-family:monospace,Courier New;
  }
</style>

<script id="GJConsoleScript" class="GJConsole">
  var PS1 = "% "
  function GJC_Keydown(keyevent){
    key = keyevent.code
    if( key == "Enter" ){
        GJC_Command(this)
        this.value += "\n" + PS1 // prompt
    }else
    if( key == "Escape"){
        SuppressGJShell = false
        GshMenu.focus() // should be previous focus
    }
```

```
}
var GJC_SessionId
function GJC_SetSessionId(){
  var xd = new Date()
  GJC_SessionId = xd.getTime() / 1000
}
GJC_SetSessionId()
function GJC_Memory(mem,args,text){
  argv = args.split(' ')
  cmd = argv[0]
  argv.shift()
  args = argv.join(' ')
  ret = ""

  if( cmd == 'clear' ){
      Permanent.setItem(mem,'')
  }else
  if( cmd == 'read' ){
      ret = Permanent.getItem(mem)
  }else
  if( cmd == 'save' ){
      val = Permanent.getItem(mem)
      if( val == null ){ val = "" }
      d = new Date()
      val += d.getTime()/1000+" "+GJC_SessionId+" "+document.URL+" "+args+"\n"
      val += text.value
      Permanent.setItem(mem,val)
  }else
  if( cmd == 'write' ){
      val = Permanent.getItem(mem)
      if( val == null ){ val = "" }
      d = new Date()
      val += d.getTime()/1000+" "+GJC_SessionId+" "+document.URL+" "+args+"\n"
      Permanent.setItem(mem,val)
  }else{
      ret = "Commands: write | read | save | clear"
  }
  return ret
}
// -- 2020-09-14 added TableEditor
var GJE_CurElement = null; //GJE_RootNode
GJE_NodeSaved = null
GJE_TableNo = 1
function GJE_StyleKeyCommand(kev){
  keycode = kev.code
  console.log('GJE-Key: '+keycode)
  if( keycode == 'Escape' ){
      GJE_SetStyle(this);
  }
  kev.stopPropagation()
  // https://developer.mozilla.org/en-US/docs/Web/API/Event/stopPropagation
}
var GJE_CommandMode = false
function GJE_TableKeyCommand(kev,tab){
  wasCmdMode = GJE_CommandMode
  key = kev.code
  if( key == 'Escape' ){
      console.log("To command mode: "+tab.nodeName+"#"+tab.id)
      //tab.setAttribute('contenteditable','false')
      tab.style.caretColor = "blue"
      GJE_CommandMode = true
  }else
  if( key == "KeyA" ){
      tab.style.caretColor = "red"
      GJE_CommandMode = false
  }else
  if( key == "KeyI" ){
      tab.style.caretColor = "red"
      GJE_CommandMode = false
  }else
  if( key == "KeyO" ){
      tab.style.caretColor = "red"
      GJE_CommandMode = false
  }else
  if( key == "KeyJ" ){
      console.log("ROW-DOWN")
  }else
  if( key == "KeyK" ){
      console.log("ROW-UP")
  }else
  if( key == "Keyw" ){
      console.log("COL-FORW")
  }else
  if( key == "Keyb" ){
      console.log("COL-BACK")
  }

  kev.stopPropagation()
  if( wasCmdMode ){
      kev.preventDefault()
  }
}
function GJE_DragEvent(ev,elem){
  x = ev.clientX
  y = ev.clientY
  console.log("Dragged: "+this.nodeName+'#'+this.id+' x='+x+' y='+y)
}
// https://developer.mozilla.org/en-US/docs/Web/API/DragEvent
// https://www.w3.org/TR/uievents/#events-mouseevents
function GJE_DropEvent(ev,elem){
  x = ev.clientX
  y = ev.clientY
  this.style.x = x
  this.style.y = y
  this.style.position = 'absolute' // 'fixed'
  this.parentNode = gsh // just for test
  console.log("Dropped: "+this.nodeName+'#'+this.id+' x='+x+' y='+y
      +' parent='+this.parentNode.id)
}
function GJE_SetTableStyle(ev){
  this.innerHTML = this.value; // sync. for external representation?
  if(false){
      stid = this.parentNode.id+this.id
          // and remove "_span" at the end
      e = document.getElementById(stid)
      //alert('SetTableStyle #'+e.id+'\n'+this.value)
      if( e != null ){
          e.innerHTML = this.value
      }else{
          console.log('Style Not found: '+stid)
      }
      //alert('event StopPropagetion: '+ev)
  }
}
```

```
  function setCSSofClass(cclass,cstyle){
    const ss = document.styleSheets[3]; // 0, 1, 2, 3, ... ?
    rlen = ss.cssRules.length;
    let tabrule = null;
    rulex = -1

    // should skip white space at the top of cstyle
    sel = cstyle.charAt(0);
    selector = sel+cclass;
    console.log('-- search style rule for '+selector)

    for(let i = 0; i < rlen; i++){
        cr = ss.cssRules[i];
        console.log('CSS rule ['+i+'/'+rlen+'] '+cr.selectorText);
        if( cr.selectorText  === selector ){ // css class selector
            tabrule = ss.cssRules[i];
            console.log('CSS rule found for:['+i+'/'+rlen+'] '+selector);
            ss.deleteRule(i);
            //rlen = ss.cssRules.length;
            rulex = i
            // should search and replace the property here
        }
    }
    // https://developer.mozilla.org/en-US/docs/Web/API/CSSStyleSheet/insertRule
    if( tabrule == null ){
        console.log('CSS rule NOT found for:['+rlen+'] '+selector);
        ss.insertRule(cstyle,rlen);
        ss.insertRule(cstyle,0); // override by 0?
        console.log('CSS rule inserted:['+(rlen+1)+']\n'+cstyle);
    }else{
        ss.insertRule(cstyle,rlen);
        ss.insertRule(cstyle,0);
        console.log('CSS rule replaced:['+(rlen+1)+']\n'+cstyle);
    }
  }
  function GJE_SetStyle(te){
    console.log('Apply the style to:'+te.id+'\n');
    console.log('Apply the style to:'+te.parentNode.id+'\n');
    console.log('Apply the style to:'+te.parentNode.class+'\n');
    cclass = te.parentNode.class;
    setCSSofClass(cclass,te.value); // should get selecter part from
                    // selector { rules }

    if(false){
    //console.log('Apply the style:')
    //stid = this.parentNode.id+this.id+"
    //stid = this.id+".style"
    css = te.value
    stid = te.parentNode.id+".style"
    e = document.getElementById(stid)
    if( e != null ){
        //console.log('Apply the style:'+e.id+'\n'+te.value);
        console.log('Apply the style:'+e.id+'\n'+css);
//      e.innerHTML = css; //te.value;
        //ncss = e.sheet;
        //ncss.insertRule(te.value,ncss.cssRules.length);
    }else{
        console.log('No element to Apply the style: '+stid)
    }
    tblid = te.parentNode.id+".table";
    e = document.getElementById(tblid);
    if( e != null ){
        //e.setAttribute('style',css);
        e.setProperty('style',css,'!impotant');
    }
    }
  }
  function makeTable(argv){
    //tid = ''
        //cwe = GJE_CurElement
        cwe = GJC1_Container;
        //cwd = GJFactory;
    tid = 'table_' + GJE_TableNo

    nt = new Text('\n')
    cwe.appendChild(nt)

    ne = document.createElement('span'); // the container
    cwe.appendChild(ne)
    ne.id = tid + '-span'
    ne.setAttribute('contenteditable',true)

    htspan = document.createElement('span'); // html part
    //htspan.id = tid + '-html'
    //ne.innerHTML = '\n'
    nt = new Text('\n')
    ne.appendChild(nt)
    ne.appendChild(htspan)

    htspan.id = tid
    htspan.setAttribute('class',tid)

    ne.setAttribute('draggable','true')
    ne.addEventListener('drag',GJE_DragEvent);
    ne.addEventListener('dragend',GJE_DropEvent);

    var col = 3
    var row = 2
    if( argv[0] != null ){
        col = argv[0]
        argv.shift()
    }
    if( argv[0] != null ){
        row = argv[0]
        argv.shift()
    }

    //ne.setAttribute('class',tid)
    ht = "\n"
    //ht += '<'+'table ' + 'id="'+tid+'"' + ' class="'+tid+'"'
    ht += '<'+'table '
        + ' onkeydown="GJE_TableKeyCommand(event,this)"'
        //+ ' ondrag="GJE_DragEvent(event,this)"\n'
        //+ ' ondragend="GJE_DropEvent(event,this)"\n'
        //+ ' draggable="true"\n'
        //+ ' contenteditable="true"'
        + '>\n'
    ht += '<'+'tbody>\n';
    for( r = 0; r < row; r++ ){
        ht += "<"+"tr>\n"
        for( c = 0; c < col; c++ ){
            ht += "<"+"td>"
            ht +=  "ABCDEFGHIJKLMNOPQRSTUVWXYZ".charAt(c) + r
            ht += "<"+"/td>\n"
```

```
        }
        ht += "<"+"/tr>\n"
    }
    ht += '<'+'/tbody>\n';
    ht += '<'+'/table>\n';
    htspan.innerHTML = ht;
    nt = new Text('\n')
    ne.appendChild(nt)

    st = '#'+tid+' *{\n' // # for instanse specific
        +'  '+'border:1px solid #aaa;\n'
        +'  '+'background-color:#efe;\n'
        +'  '+'color:#222;\n'
        +'  '+'font-size:#14pt !important;\n'
        +'  '+'font-family:monospace,Courier New !important;\n'
        +'} /'+'* hit ESC to apply *'+'/\n'

    // wish script to be incldued
    //nj = document.createElement('script')
    //ne.appendChild(nj)
    //ne.innerHTML = 'function SetStyle(e){}'

    // selector seems lost in dynamic style appending
    if(false){
     ns = document.createElement('style')
     ne.appendChild(ns)
     ns.id = tid + '.style'
     ns.innerHTML = '\n'+st
     nt = new Text('\n')
     ne.appendChild(nt)
    }
    setCSSofClass(tid,st); // should be in JavaScript script?

    nx = document.createElement('textarea')
    ne.appendChild(nx)
    nx.id = tid + '-style_def'
    nx.setAttribute('class','GJ_StyleEditor')
    nx.spellcheck = false
    nx.cols = 60
    nx.rows = 10
    nx.innerHTML = '\n'+st
    nx.addEventListener('change',GJE_SetTableStyle);
    nx.addEventListener('keydown',GJE_StyleKeyCommand);
    //nx.addEventListener('click',GJE_SetTableStyle);

    nt = new Text('\n')
    cwe.appendChild(nt)

    GJE_TableNo += 1
    return 'created TABLE id="'+tid+'"'
  }
  function GJE_NodeEdit(argv){
    cwe = GJE_CurElement
    cmd = argv[0]
    argv.shift()
    args = argv.join(' ')
    ret = ""

    if( cmd == '.u' || cmd == '.un' || cmd == 'undo' ){
        if( GJE_NodeSaved != null ){
            xn = GJE_RootNode
            GJE_RootNode = GJE_NodeSaved
            GJE_NodeSaved = xn
            ret = '-- did undo'
        }else{
            ret = '-- could not undo'
        }
        return ret
    }
    GJE_NodeSaved = GJE_RootNode.cloneNode()
    if( cmd == '.c' || cmd == '.cd' || cmd == 'cd' ){
        if( argv[0] == null ){
            ne = GJE_RootNode
        }else
        if( argv[0] == '..' ){
            ne = cwe.parentNode
        }else{
            ne = document.getElementById(argv[0])
        }
        if( ne != null ){
            GJE_CurElement = ne
            ret = "-- current node: " + ne.id
        }else{
            ret = "-- not found: " + argv[0]
        }
    }else
    if( cmd == '.mkt' || cmd == '.mktable' ){
        makeTable(argv)
    }else
    if( cmd == '.m' || cmd == '.mk' || cmd == 'mk' ){
        ne = document.createElement(argv[0])
        //ne.id = argv[0]
        ret = "-- created " + ne + " under " + cwe.tagName + "#" + cwe.id
        cwe.appendChild(ne)
        if( cmd == '.m' || cmd == '.mk' ){
            GJE_CurElement = ne
        }
    }else
    if( cmd == '.n' || cmd == '.nm' || cmd == 'nm' ){
        cwe.id = argv[0]
    }else
    if( cmd == '.r' || cmd == '.rm' || cmd == 'rm' ){
    }else
    if( cmd == '.h' || cmd == '.sh' || cmd == 'sh' ){
        s = argv.join(' ')
        cwe.innerHTML = s
    }else
    if( cmd == '.a' || cmd == '.sa' || cmd == 'sa' ){
        cwe.setAttribute(argv[0],argv[1])
    }else
    if( cmd == '.l' ){
    }else
    if( cmd == '.i' || cmd == '.ih' || cmd == 'ih' ){
        ret = cwe.innerHTML
    }else
    if( cmd == '.p' || cmd == '.pw' || cmd == 'pw' ){
        ret = cwe.nodeType + " " + cwe.tagName + " " + cwe.id
        for( we = cwe.parentNode; we != null; ){
            ret += "\n" + " " + we.nodeType + " " + we.tagName + " " + we.id
            we = we.parentNode
        }
    }else
    {
        ret = "Command: mk | rm \n"
```

```
        ret += "   pw -- print current node\n"
        ret += "   mk type -- make node with name and type\n"
        ret += "   nm name -- set the id #name of current node\n"
        ret += "   rm name -- remove named node\n"
        ret += "   cd name -- change current node\n"
    }
    //alert(ret)
    return ret
  }
  function GJC_Command(text){
    lines = text.value.split('\n')
    line = lines[lines.length-1]
    argv = line.split(' ')
    text.value += '\n'
    if( argv[0] == '%' ){ argv.shift() }
    args0 = argv.join(' ')
    cmd = argv[0]
    argv.shift()
    args = argv.join(' ')

    if( cmd == 'nolog' ){
        StopConsoleLog = true
    }else
    if( cmd == 'new' ){
        if( argv[0] == 'table' ){
            argv.shift()
            console.log('argv='+argv)
            text.value += makeTable(argv)
        }else
        if( argv[0] == 'console' ){
            text.value += GJ_NewConsole('GJ_Console')
        }else{
            text.value += '-- new { console | table }'
        }
    }else
    if( cmd == 'strip' ){
        //text.value += GJF_StripClass()
    }else
    if( cmd == 'css' ){
    sel = '#table_1'
    if(argv[0]=='0')
    rule1 = sel+'{color:#000 !important; background-color:#fff !important;}';
    else
    rule1 = sel+'{color:#f00 !important; background-color:#eef !important;}';
        document.styleSheets[3].deleteRule(0);
        document.styleSheets[3].insertRule(rule1,0);
        text.value += 'CSS rule added: '+rule1
    }else
    if( cmd == 'print' ){
        e = null;
        if( e == null ){
            e = document.getElementById('GJFactory_0')
        }
        if( e == null ){
            e = document.getElementById('GJFactory_1')
        }
        if( argv[0] != null ){
            id = argv[0]
            if( id  == 'f' ){
                //e = document.getElementById('GJE_RootNode');
            }else{
                e = document.getElementById(id)
            }
            if( e != null ){
                text.value += e.outerHTML
            }else{
                text.value += "Not found: " + id
            }
        }else{
            text.value += GJE_RootNode.outerHTML
            //text.value += e.innerHTML
        }
    }else
    if( cmd == 'destroy' ){
        text.value += GJFactory_Destroy()
    }else
    if( cmd == 'save' ){
        e = document.getElementById('GJFactory')
        Permanent.setItem('GJFactory-1',e.innerHTML)
        text.value += "-- Saved GJFactory"
    }else
    if( cmd == 'load' ){
        gjf = Permanent.getItem('GJFactory-1')
        e = document.getElementById('GJFactory')
        e.innerHTML = gjf
        // must restore EventListener
        text.value += "-- EventListener was not restored"
    }else
    if( cmd.charAt(0) == '.' ){
        argv0 = args0.split(' ')
        text.value += GJE_NodeEdit(argv0)
    }else
    if( cmd == 'cont' ){
        bannerIsStopping = false
        GshMenuStop.innerHTML = "Stop"
    }else
    if( cmd == 'date' ){
        text.value += DateLong()
    }else
    if( cmd == 'echo' ){
        text.value += args
    }else
    if( cmd == 'fork' ){
        html_fork()
    }else
    if( cmd == 'last' ){
        text.value += MyHistory
        //h = document.createElement("span")
        //h.innerHTML = MyHistory
        //text.value += h.innerHTML
        //tx = MyHistory.replace("\n","")
        //text.value += tx.replace("<"+"br>","\n") + "xxxx<"+"br>yyyy"
    }else
    if( cmd == 'ne' ){
        text.value += GJE_NodeEdit(argv)
    }else
    if( cmd == 'reload' ){
        location.reload()
    }else
    if( cmd == 'mem' ){
        text.value += GJC_Memory('GJC_Storage',args,text)
    }else
    if( cmd == 'stop' ){
        bannerIsStopping = true
```

```
        GshMenuStop.innerHTML = "Start"
    }else
    if( cmd == 'who' ){
        text.value += "SessionId="+GJC_SessionId+" "+document.URL
    }else
    if( cmd == 'wall' ){
        text.value += GJC_Memory('GJC_Wall','write',text)
    }else
    {
        text.value += "Commands: help | echo | date | last \n"
                + '          new  | save | load | mem  \n'
                + '          who  | wall | fork | nife'
    }
  }

  function GJC_Input(){
    if( this.value.endsWith("\n") ){ // remove NL added by textarea
        this.value = this.value.slice(0,this.value.length-1)
    }
  }

  var GCJ_Id = null
  function GJC_Resize(){
    GJC_Id.style.zIndex = 20000
    //GJC_Id.style.width = window.innerWidth - 16
    GJC_Id.style.width = '100%';
    GJC_Id.style.height = 300;
    GJC_Id.style.backgroundColor = "rgba(0,64,16,1.0)" // blackboard color
    GJC_Id.style.color = "rgba(255,255,255,1.0)"
  }
  function GJC_FocusIn(){
    this.spellcheck = false
    SuppressGJShell = true
    this.onkeydown = GJC_Keydown
    GJC_Resize()
  }
  function GJC_FocusOut(){
    SuppressGJShell = false
    this.removeEventListener('keydown',GJC_Keydown);
  }
  window.addEventListener('resize',GJC_Resize);

  function GJC_OnStorage(e){
    //alert('Got Message')
    //GJC.value += "\n(((ReceivedMessage)))\n"
  }
  window.addEventListener('storage',GJC_OnStorage);
  //window.addEventListener('storage',()=>{alert('GotMessage')})

  function GJC_Setup(gjcId){
    //gjcId.style.width = gsh.getBoundingClientRect().width
    gjcId.style.width = '100%';
    gjcId.value = "GJShell Console // " + GshVersion.innerHTML + "\n"
    //gjcId.value += "Date: " + DateLong() + "\n"
    gjcId.value += PS1
    gjcId.onfocus = GJC_FocusIn
    gjcId.addEventListener('input',GJC_Input);
    gjcId.addEventListener('focusout',GJC_FocusOut);
    GJC_Id = gjcId
  }
  function GJC_Clear(id){
  }
  function GJConsole_initConsole(){
      if( document.getElementById("GJC_0") != null ){
        GJC_Setup(GJC_0)
      }else{
        GJC1_Container.innerHTML = '<'
            +'textarea id="GJC_1" class="GJConsole"><'+'/textarea>';
        GJC_Setup(GJC_1)
        factory = document.createElement('span');
        gsh.appendChild(factory)
        GJE_RootNode = factory;
        GJE_CurElement = GJE_RootNode;
      }
  }
  var initGJCF = false;
  function GJConsole_initFactory(){
    if( initGJCF ){ return; } initGJCF = true;
    GShell_initKeyCommands();
    GJConsole_initConsole();
  }
  //GJConsole_initFactory();
  // TODO: focus handling
</script>
<style>
.GJ_StyleEditor {
  font-size:9pt !important;
  font-family:Courier New, monospace !important;
}
</style>

</details>
</span>
<!-- ----- GJConsole END } ----- -->
*/

/*
<span id="BlinderText">
<style id="BlinderTextStyle">
 #GJLinkView {
    xxposition:absolute; z-index:5000;
    position:relative;
    display:block;
    left:8px;
    color:#fff;
    width:800px; height:300px; resize:both;
    margin:0px; padding:4px;
    background-color:rgba(200,200,200,0.5) !important;
 }
 .MssgText {
    width:578px !important;
    resize:both !important;
    color:#000 !important;
 }
 .GjNote {
    font-family:Georgia !important;
    font-size:13pt !important;
    color:#22a !important;
 }
 .textField  {
    display:inline;
    border:0.5px solid #444;
    border-radius:3px;
    color:#000; background-color:#fff;
```

```
    width:106pt; height:18pt;
    margin:2px;
    padding:2px;
    resize:none;
    vertical-align:middle;
    font-size:10pt; font-family:Courier New;
 }
 .textLabel {
    border:0px solid #000 !important;
    background-color:rgba(0,0,0,0);
 }
 .textURL {
    width:300pt !important;
    border:0px solid #000 !important;
    background-color:rgba(0,0,0,0);
}
 .VisibleText {
 }
 .BlinderText {
    color:#000; background-color:#eee;
 }
 .joinButton {
    font-family:Georgia !important;
    font-size:11pt;
    line-height:1.1;
    height:18pt;
    width:50pt;
    padding:3px !important;
    text-align:center !important;
    border-color:#aaa !important;
    border-radius:5px;
    color:#fff; background-color:#4a4 !important;
    vertical-align:middle !important;
 }
 .SendButton {
    vertical-align:top;
 }
 .ws0_log {
    font-size:10pt;
    color:#000 !important;
    line-height:1.0;
    background-color:rgba(255,255,255,0.7) !important;
    font-family:Courier New,monospace !important;
    width:99.3%;
    white-space:pre;
 }
</style>

<!-- Form autofill test
Location: <input id="xxserv" type="text" value="https://192.168.10.1/boafrm/formLogin" size="80">
<form method="POST" id="xxform" action="https://192.168.10.1/boafrm/formLogin">
dest?     <input id="XDS" name="dest" type="text" size="80" value="/index_contents.html">
-->
<details><summary>Form Auto. Filling</summary>
<style>
 .xxinput { width:260pt !important; line-height:1.1 !important; margin:1px;
    display:inline !important; font-size:10pt !important; padding:1px !important;
 }
</style>
<span style="font-family:Courier New;color:black;font-size:12pt;" onactive="">
 <form method="POST" id="xxform" action="https://192.168.10.1/" style="white-space:pre;">
 Location: <input id="xxserv" class="xxinput" type="text" value="https://192.168.10.1/" size="80">
 Username: <input id="xxuser" class="xxinput" name="user" type="text" autocomplete="on">
 Password: <input id="xxpass" class="xxinput" name="pass" type="password" autocomplete="on">
 SessionId:<input id="xxssid" class="xxinput" name="SESSION_ID" type="text" size="80">
           <input id="xxsubm" class="xxinput" type="submit" value="Submit"></form>
</span>
<script>
 function XXSetFormAction(){
    xxform.setAttribute('action',xxserv.value);
}
xxform.setAttribute('action',xxserv.value);
xxserv.addEventListener('change',XXSetFormAction);
//xxserv.value = location.href;
</script>
</details>
*/

/*
<details id="BlinderTextClass" class="gsh-src"><summary>BlinderText</summary>
<span id="BlinderTextScript">
// https://w3c.github.io/uievents/#event-type-keydown
//
// 2020-09-21 class BlinderText - textarea element not to be readable
//
// BlinderText attributes
//  bl_plainText - null
//  bl_hideChecksum - [false]
//  bl_showLength - [false]
//  bl_visible - [false]
//  data-bl_config - []
//   - min. length
//   - max. length
//   - acceptable charset in generete text
//
function BlinderChecksum(text){
    plain = text.bl_plainText;
    return strCRC32(plain,plain.length).toFixed(0);
}
function BlinderKeydown(ev){
    pass = ev.target
    if( ev.code == 'Enter' ){
        ev.preventDefault();
    }
    ev.stopPropagation()
}
function BlinderKeyup1(ev){
    blind = ev.target
    if( ev.code == 'Backspace'){
        blind.bl_plainText = blind.bl_plainText.slice(0,blind.bl_plainText.length-1)
    }else
    if( and(ev.code == 'KeyV', ev.ctrlKey) ){
        blind.bl_visible = !blind.bl_visible;
    }else
    if( and(ev.code == 'KeyL', ev.ctrlKey) ){
        blind.bl_showLength = !blind.bl_showLength;
    }else
    if( and(ev.code == 'KeyU', ev.ctrlKey) ){
        blind.bl_plainText = "";
    }else
    if( and(ev.code == 'KeyR', ev.ctrlKey) ){
        checksum = BlinderChecksum(blind);
        blind.bl_plainText = checksum; //.toString(32);
    }else
```

```
    if( ev.code == 'Enter' ){
        ev.stopPropagation();
        ev.preventDefault();
        return;
    }else
    if( ev.key.length != 1 ){
        console.log('KeyUp: '+ev.code+'/'+ev.key);
        return;
    }else{
        blind.bl_plainText += ev.key;
    }

    leng = blind.bl_plainText.length;
    //console.log('KeyUp: '+ev.code+'/'+blind.bl_plainText);
    checksum = BlinderChecksum(blind) % 10; // show last one digit only

    visual = '';
    if( !blind.bl_hideCheckSum || blind.bl_showLength ){
        visual += '[';
    }
    if( !blind.bl_hideCheckSum ){
        visual += '#'+checksum.toString(10);
    }
    if( blind.bl_showLength ){
        visual += '/' + leng;
    }
    if( !blind.bl_hideCheckSum || blind.bl_showLength ){
        visual += '] ';
    }
    if( blind.bl_visible ){
        visual += blind.bl_plainText;
    }else{
        visual += '*'.repeat(leng);
    }
    blind.value = visual;
}
function BlinderKeyup(ev){
    BlinderKeyup1(ev);
    ev.stopPropagation();
}
// https://w3c.github.io/uievents/#keyboardevent
// https://w3c.github.io/uievents/#uievent
// https://dom.spec.whatwg.org/#event
function BlinderTextEvent(){
    ev = event;
    blind = ev.target;
    console.log('Event '+ev.type+'@'+blind.nodeName+'#'+blind.id)
    if( ev.type == 'keyup' ){
        BlinderKeyup(ev);
    }else
    if( ev.type == 'keydown' ){
        BlinderKeydown(ev);
    }else{
        console.log('thru-event '+ev.type+'@'+blind.nodeName+'#'+blind.id)
    }
}
//< textarea hidden id="BlinderTextClassDef" class="textField""
// onkeydown="BlinderTextEvent()" onkeyup="BlinderTextEvent()"
// spellcheck="false">< /textarea>
//< textarea hidden id="gj_pass1"
//  class="textField BlinderText"
//  placeholder="PassWord1"
//  onkeydown="BlinderTextEvent()"
//  onkeyup="BlinderTextEvent()"
//  spellcheck="false"< /textarea>
function SetupBlinderText(parent,txa,phold){
    if( txa == null ){
        txa = document.createElement('textarea');
        //txa.id = id;
    }
    txa.setAttribute('class','textField BlinderText');
    txa.setAttribute('placeholder',phold);
    txa.setAttribute('onkeydown','BlinderTextEvent()');
    txa.setAttribute('onkeyup','BlinderTextEvent()');
    txa.setAttribute('spellcheck','false');
    //txa.setAttribute('bl_plainText','false');
    txa.bl_plainText = '';
    //parent.appendChild(txa);
}
function DestroyBlinderText(txa){
    txa.removeAttribute('class');
    txa.removeAttribute('placeholder');
    txa.removeAttribute('onkeydown');
    txa.removeAttribute('onkeyup');
    txa.removeAttribute('spellcheck');
    txa.bl_plainText = '';
}
//
// visible textarea like Username
//
function VisibleTextEvent(){
    if( event.code == 'Enter' ){
        if( event.target.NoEnter ){
            event.preventDefault();
        }
    }
    event.stopPropagation();
}
function SetupVisibleText(parent,txa,phold){
    if( false ){
        txa.setAttribute('class','textField VisibleText');
    }else{
        newclass = txa.getAttribute('class');
        if( and(newclass != null, newclass != '') ){
            newclass += ' ';
        }
        newclass += 'VisibleText';
        txa.setAttribute('class',newclass);
    }
    //console.log('SetupVisibleText class='+txa.class);
    txa.setAttribute('placeholder',phold);
    txa.setAttribute('onkeydown','VisibleTextEvent()');
    txa.setAttribute('onkeyup',  'VisibleTextEvent()');
    txa.setAttribute('spellcheck','false');
    cols = txa.getAttribute('cols');
    if( cols != null ){
        txa.style.width = '580px';
        //console.log('VisualText#'+txa.id+' cols='+cols)
    }else{
        //console.log('VisualText#'+txa.id+' NO cols')
    }
    rows = txa.getAttribute('rows');
    if( rows != null ){
        txa.style.height = '30px';
```

```
        txa.style.resize = 'both';
        txa.NoEnter = false;
    }else{
        txa.NoEnter = true;
    }
}
function DestroyVisibleText(txa){
    txa.removeAttribute('class');
    txa.removeAttribute('placeholder');
    txa.removeAttribute('onkeydown');
    txa.removeAttribute('onkeyup');
    txa.removeAttribute('spellcheck');
    cols = txa.removeAttribute('cols');
}
</span>
<script>
js = document.getElementById('BlinderTextScript');
eval(js.innerHTML);
//js.outerHTML = ""
</script>

</details>
</span>
*/

/*
<script id="GJLinkScript">
function gjkey_hash(text){
    return strCRC32(text,text.length) % 0x10000;
}
function gj_addlog(e,msg){
    now = (new Date().getTime() / 1000).toFixed(3);
    tstp = '['+now+'] '
    e.value += tstp + msg;
    e.scrollTop = e.scrollHeight;
}
function gj_addlog_cl(msg){
    ws0_log.value += '(console.log) ' + msg + '\n';
}
var GJ_Channel = null;
var GJ_Log = null;
var gjx; // the global variable
function GJ_Join(){
    target = gj_join;
    if( target.value == 'Leave' ){
        GJ_Channel.close();
        GJ_Channel = null;
        target.value = 'Join';
        return;
    }

    var ws0;
    var ws0_log;

    sav_console_log = console.error
    console.error = gj_addlog_cl
    ws0 = new WebSocket(gj_serv.innerHTML);
    console.error = sav_console_log

    GJ_Channel = ws0;
    ws0_log = document.getElementById('ws0_log');
    GJ_Log = ws0_log;

    now = (new Date().getTime() / 1000).toFixed(3);
    const wsstats = ["CONNECTING","OPEN","CLOSING","CLOSED"];
    cst = wsstats[ws0.readyState];
    gj_addlog(ws0_log,'stat '+ws0.readyState+'('+cst+') : GJ Linked\n');

    ws0.addEventListener('error', function(event){
        gj_addlog(ws0_log,'stat error : transport error?\n');
    });
    ws0.addEventListener('open', function(event){
        GJLinkView.style.zIndex = 10000;
        //console.log('#'+GJLinkView.id+'.zIndex='+GJLinkView.style.zIndex);
        date1 = new Date().getTime();
        date2 = (date1 / 1000).toFixed(3);
        seed = date1.toString(16);

        // user name and key
        user = document.getElementById('gj_user').value;
        if( user.length == 0 ){
            gj_user.value = 'nemo';
            user = 'nemo';
        }
        key1 = document.getElementById('gj_ukey').bl_plainText;
        ukey = gjkey_hash(seed+user+key1).toString(16);

        // session name and key
        chan = document.getElementById('gj_chan').value;
        if( chan.length == 0 ){
            gj_chan.value = 'main';
            chan = 'main';
        }
        key2 = document.getElementById('gj_ckey').bl_plainText;
        ckey = gjkey_hash(seed+chan+key2).toString(16);

        msg = date2 +' JOIN ' + user + '|' + chan + ' ' + ukey + ':' + ckey;
        gj_addlog(ws0_log,'send '+msg+'\n');
        ws0.send(msg);

        target.value = 'Leave';
        //console.log('['+date2+'] #'+target.id+' '+target.value+'\n');
        //gj_addlog(ws0_log,'label '+target.value+'\n');
    });
    ws0.addEventListener('message', function(event){
        now = (new Date().getTime() / 1000).toFixed(3);
        msg = event.data;
        gj_addlog(ws0_log,'recv '+msg+'\n');

        argv = msg.split(' ')
        tstamp = argv[0];
        argv.shift();
        if( argv[0] == 'reload' ){
            location.reload()
        }
        argv.shift(); // command
        argv.shift(); // from|to
        if( argv[0] == 'auth' ){
            // doing authorization required
        }
        if( argv[0] == 'echo' ){
            now = (new Date().getTime() / 1000).toFixed(3);
            msg = now+' '+'RESP '+argv.join(' ');
            gj_addlog(ws0_log,'send '+msg+'\n');
```

```
            ws0.send(msg);
        }
        if( argv[0] == 'eval' ){
            argv.shift();
            js = argv.join(' ');
            ret = eval(js); // <------------ eval()
            gj_addlog(ws0_log,'eval '+js+' = '+ret+'\n');
            now = (new Date().getTime() / 1000).toFixed(3);
            msg = now + ' ' + 'RESP ' + ret;
            ws0.send(msg);
            gj_addlog(ws0_log,'send '+msg+'\n')
        }
    });
    ws0.addEventListener('close', function(event){
        if( GJ_Channel == null ){
            gj_addlog(ws0_log,'stat OK : GJ UnLinked\n');
            return;
        }
        GJ_Channel.close();
        GJ_Channel = null;
        target.value = 'Join';
        gj_addlog(ws0_log,'stat error : close : GJ UnLinked unexpectedly\n');
    });
}
function GJ_SendMessageUserPass(user,chan,msgbody){
    now = (new Date().getTime() / 1000).toFixed(3);
    msg = now +' ISAY '+user+'|'+chan+' '+ msgbody;
    gj_addlog(GJ_Log,'send '+msg+'\n');
    GJ_Channel.send(msg);
}
function GJ_SendMessage(msgbody){
    if( GJ_Channel == null ){
        gj_addlog(ws0_log,'stat error : send : GJ not Linked\n');
        return;
    }
    //target = event.target;
    user = document.getElementById('gj_user').value;
    chan = document.getElementById('gj_chan').value;
    GJ_SendMessageUserPass(user,chan,msgbody);
}
function GJ_Send(){
    msgbody = gj_sendText.value;
    GJ_SendMessage(msgbody);
}
</script>

<!-- ------------------------- GJLINK ------------------ -->
<!--
    - User can subscribe to a channel
    - A channel will be broadcasted
    - A channel can be a pattern (regular expression)
    - User is like From:(me) and channel is like To: or Recipient:
    - like VIABUS
        - watch message with SENDME, WATCH, CATCH, HEAR, or so
        - routing with path expression or name pattern (with routing with DNS like system)
-->
*/

//<span id="GJLinkGolang">
// <details id="GshWebSocket" class="gsh-src"><summary>Golang / JavaScript Link</summary>
// 2020-0920 created
// <a href="https://pkg.go.dev/golang.org/x/net/websocket">WS</a>
// <a href="https://godoc.org/golang.org/x/net/websocket">WS</a>
// INSTALL: go get golang.org/x/net/websocket
// INSTALL: sudo {apt,yum} install git (if git is not instlled yet)
// import "golang.org/x/net/websocket"
const gshws_origin = "http://locahost:9999"
const gshws_server = "localhost:9999"
const gshws_port = 9999
const gshws_path = "gjlink1"
const gshws_url = "ws://"+gshws_server+"/"+gshws_path
const GSHWS_MSGSIZE = (8*1024)
func fmtstring(fmts string, params ...interface{})(string){
    return fmt.Sprintf(fmts,params...)
}
func GSHWS_MARK(what string)(string){
    now := time.Now()
    us := fmtstring("%06d",now.Nanosecond() / 1000)
    mark := ""
    if( !AtConsoleLineTop ){
        mark += "\n"
        AtConsoleLineTop = true
    }
    mark += "["+now.Format(time.Stamp)+"."+us+"] -GJ-" + what + ": "
    return mark
}
func gchk(what string,err error){
    if( err != nil ){
        panic(GSHWS_MARK(what)+err.Error())
    }
}
func glog(what string, fmts string, params ...interface{}){
    fmt.Print(GSHWS_MARK(what))
    fmt.Printf(fmts+"\n",params...)
}

var WSV = []*websocket.Conn{}
func jsend(argv []string){
    if len(argv) <= 1 {
        fmt.Printf("--Ij %v [-m] command arguments\n",argv[0])
        return
    }
    argv = argv[1:]
    if( len(WSV) == 0 ){
        fmt.Printf("--Ej-- No link now\n")
        return
    }
    if( 1 < len(WSV) ){
        fmt.Printf("--Ij-- multiple links (%v)\n",len(WSV))
    }

    multicast := false // should be filtered with regexp
    if( 0 < len(argv) && argv[0] == "-m" ){
        multicast = true
        argv = argv[1:]
    }
    args := strings.Join(argv," ")

        now := time.Now()
        msec := now.UnixNano() / 1000000;
        tstamp := fmtstring("%.3f",float64(msec)/1000.0)
        msg := fmtstring("%v SEND gshell|* %v",tstamp,args)

    if( multicast ){
```

```
        for i,ws := range WSV {
            wn,werr := ws.Write([]byte(msg))
            if( werr != nil ){
                fmt.Printf("[%v] wn=%v, werr=%v\n",i,wn,werr)
            }
            glog("SQ",fmtstring("(%v) %v",wn,msg))
        }
    }else{
        i := 0
            ws := WSV[i]
            wn,werr := ws.Write([]byte(msg))
            if( werr != nil ){
                fmt.Printf("[%v] wn=%v, werr=%v\n",i,wn,werr)
            }
            glog("SQ",fmtstring("(%v) %v",wn,msg))
    }
}
func serv1(ws *websocket.Conn) {
    WSV = append(WSV,ws)
    //fmt.Print("\n")
    glog("CO","accepted connections[%v]",len(WSV))
    //remoteAddr := ws.RemoteAddr
    //fmt.Printf("-- accepted %v\n",remoteAddr)
    //fmt.Printf("-- accepted %v\n",ws.Config())
    //fmt.Printf("-- accepted %v\n",ws.Config().Header)
    //fmt.Printf("-- accepted %v // %v\n",ws,serv1)

    var reqb = make([]byte,GSHWS_MSGSIZE)
    for {
        rn, rerr := ws.Read(reqb)
        if( rerr != nil || rn < 0 ){
            glog("SQ",fmtstring("(%v,%v)",rn,rerr))
            break
        }
        req := string(reqb[0:rn])
        glog("SQ",fmtstring("(%v) %v",rn,req))

        margv := strings.Split(req," ");
        margv = margv[1:]
        if( 0 < len(margv) ){
            if( margv[0] == "RESP" ){
                // should forward to the destination
                continue;
            }
        }
        now := time.Now()
        msec := now.UnixNano() / 1000000;
        tstamp := fmtstring("%.3f",float64(msec)/1000.0)
        res := fmtstring("%v "+"CAST"+" %v",tstamp,req)
        wn, werr := ws.Write([]byte(res))
        gchk("SE",werr)
        glog("SR",fmtstring("(%v) %v",wn,string(res)))
    }
    glog("SF","WS response finish")

    wsv := []*websocket.Conn{}
    wsx := 0
    for i,v := range WSV {
        if( v != ws ){
            wsx = i
            wsv = append(wsv,v)
        }
    }
    WSV = wsv
    //glog("CO","closed %v",ws)
    glog("CO","closed connection [%v/%v]",wsx+1,len(WSV)+1)
    ws.Close()
}
// url ::= [scheme://]host[:port][/path]
func decomp_URL(url string){
}
func full_wsURL(){
}
func gj_server(argv []string) {
    gjserv := gshws_url
    gjport := gshws_server
    gjpath := gshws_path
    gjscheme := "ws"

    //cmd := argv[0]
    argv = argv[1:]
    if( 1 <= len(argv) ){
        serv := argv[0]
        if( 0 < strings.Index(serv,"://") ){
            schemev := strings.Split(serv,"://")
            gjscheme = schemev[0]
            serv = schemev[1]
        }
        if( 0 < strings.Index(serv,"/") ){
            pathv := strings.Split(serv,"/")
            serv = pathv[0]
            gjpath = pathv[1]
        }
        servv := strings.Split(serv,":")
        host := "localhost"
        port := 9999
        if( servv[0] != "" ){
            host = servv[0]
        }
        if( len(servv) == 2 ){
            fmt.Sscanf(servv[1],"%d",&port)
        }
        //glog("LC","hostport=%v (%v : %v)",servv,host,port)
        gjport = fmt.Sprintf("%v:%v",host,port)
        gjserv = gjscheme + "://" + gjport + "/" + gjpath
    }
    glog("LS",fmtstring("listening at %v",gjserv))
    http.Handle("/"+gjpath,websocket.Handler(serv1))
    err := error(nil)
    if( gjscheme == "wss" ){
        // https://golang.org/pkg/net/http/#ListenAndServeTLS
        //err = http.ListenAndServeTLS(gjport,nil)
    }else{
        err = http.ListenAndServe(gjport,nil)
    }
    gchk("LE",err)
}

func gj_client(argv []string) {
    glog("CS",fmtstring("connecting to %v",gshws_url))
    ws, err := websocket.Dial(gshws_url,"",gshws_origin)
    gchk("C",err)

    var resb = make([]byte, GSHWS_MSGSIZE)
```

```
    for qi := 0; qi < 3; qi++ {
        req := fmtstring("Hello, GShell! (%v)",qi)
        wn, werr := ws.Write([]byte(req))
        glog("QM",fmtstring("(%v) %v",wn,req))
        gchk("QE",werr)
        rn, rerr := ws.Read(resb)
        gchk("RE",rerr)
        glog("RM",fmtstring("(%v) %v",rn,string(resb)))
    }
    glog("CF","WS request finish")
}
//</details></span>

/*
<details><summary>GJ Link</summary>
<span id="GJLinkView" class="GJLinkView">
 <p>
 <note class="GjNote">Execute command "gsh gj server" on the localhost and push the Join button:</note>
 </p>

 <span id="GJLink_1">
 <div id="GJLink_ServerSet"></div>

 <div>
 <input id="gj_join" type="button" class="joinButton" onclick="GJ_Join()" value="Join">
 <span id="GJLink_Account"></span>
 </div>

 <div>
 <input id="gj_sendButton" type="button" class="joinButton SendButton" onclick="GJ_Send()" value="Send" data-bodyid="gj_sendText">
 <span id="GJLink_SendArea"></span>
 </div>

 <div id="ws0_log_container"></div>
 </span>
</span>

<script>
function setupGJLinkArea(){
    GJLink_ServerSet.innerHTML = '<'+'span id="gj_serv_label"'
        + ' class="textField textLabel">Server: <'+'/span>'
        + '<'+'span id="gj_serv" class="textField textURL" contenteditable><'+'/span>';

    GJLink_Account.innerHTML = '<'+'textarea id="gj_user" class="textField"><'+'/textarea>'
        + '<'+'textarea id="gj_ukey" class="textField"><'+'/textarea>'
        + '<'+'textarea id="gj_chan" class="textField"><'+'/textarea>'
        + '<'+'textarea id="gj_ckey" class="textField"><'+'/textarea>';

    GJLink_SendArea.innerHTML =
    '<'+'textarea id="gj_sendText" class="textField MssgText" cols=60 rows=2><'+'/textarea>';

    ws0_log_container.innerHTML = '<'+'textarea id="ws0_log" class="ws0_log"'
        +' cols=100 rows=10 spellcheck="false"><'+'/textarea>';
}
function clearGJLinkArea(){
    GJLink_ServerSet.innerHTML = "";
    GJLink_Account.innerHTML = "";
    GJLink_SendArea.innerHTML = "";
    ws0_log_container.innerHTML = "";
}
</script>

<script>
function SetupGJLink(){
    setupGJLinkArea();
    SetupVisibleText(GJLink_1,gj_serv,'GJLinkSv');
    SetupVisibleText(GJLink_1,gj_user,'UserName');
    SetupBlinderText(GJLink_1,gj_ukey,'UserKey');
    SetupVisibleText(GJLink_1,gj_chan,'ChannelName');
    SetupBlinderText(GJLink_1,gj_ckey,'ChannelKey');
    SetupVisibleText(GJLink_1,gj_sendText,'Message');
    gj_serv.innerHTML = 'ws://localhost:9999/gjlink1'
}
function GJLink_init(){
    SetupGJLink();
}
function iselem(eid){
    return document.getElementById(eid);
}
function DestroyGJLink1(){
    clearGJLinkArea();
    if( !iselem('gj_user') ){
        return;
    }
    if( gj_serv_label.parentNode != gj_user ){
        return;
    }
    if( iselem('gj_serv_label') ) gj_user.parentNode.removeChild(gj_serv_label);
    if( iselem('gj_serv') ) gj_user.parentNode.removeChild(gj_serv);
    if( iselem('gj_user') ) gj_user.parentNode.removeChild(gj_user);
    if( iselem('gj_ukey') ) gj_ukey.parentNode.removeChild(gj_ukey);
    if( iselem('gj_chan') ) gj_chan.parentNode.removeChild(gj_chan);
    if( iselem('gj_ckey') ) gj_ckey.parentNode.removeChild(gj_ckey);
    if( iselem('gj_sendText') ) gj_sendText.parentNode.removeChild(gj_sendText);
    if( iselem('ws0_log') ) ws0_log.parentNode.removeChild(ws0_log);
}
DestroyGJLink = DestroyGJLink1;
</script>
</details>
*/

/*
<script id="HtmlCodeview-script">
  function showNodeAsHtmlSource(otxa,code){
    txa = document.createElement('textarea');
    txa.id = otxa.id;
    txa.setAttribute('class','HtmlCodeviewText');
    otxa.parentNode.replaceChild(txa,otxa);
    txa.setAttribute('spellcheck','false');
    //txa.value = code.innerHTML;
    //txa.innerHTML = code.innerHTML;
    txa.innerHTML = code.outerHTML;
    txa.style.display = "block";
    txa.style.width = "100%";
    txa.style.height = "300px";
  }
  function showHtmlCode(otxa,code){
    if( event.target.value == 'ShowCode' ){
        showNodeAsHtmlSource(otxa,code);
        event.target.value = 'HideCode';
    }else{
        otxa.style.display = "none";
        event.target.value = 'ShowCode';
    }
```

```
  }
</script>
<style id="HtmlCodeview-style">
  .HtmlCodeviewText {
    font-size:10pt;
    font-family:Courier New;
    white-space:pre;
  }
  .HtmlCodeViewButton {
    padding:2pt !important;
    line-height:1.1 !important;
    border:2px inset #bbb !important;
    font-size:11pt !important;
    font-weight:normal !important;
    font-family:Georgia !important;
    border-radius:3px !important;
    color:#ddd; background-color:#228 !important;
  }
</style>
*/

/*
<details><summary>Live HTML Snapshot</summary>
<span id="LiveHTML">
<!-- ---------- HTML SnapShot: Edit, save and load // 2020-0924 SatoxITS { -->
<input class="HtmlCodeViewButton" type="button" value="ShowCode" onclick="showLiveHTMLcode()">
<span id="LiveHTML_Codeview"></span>
<script id="LiveHtmlScript">
function showLiveHTMLcode(){
    showHtmlCode(LiveHTML_Codeview,LiveHTML);
}
var _editable = false;
var savSuppressGJShell = false;
function ToggleEditMode(){
    _editable = !_editable;
    if( _editable ){
        savSuppressGJShell = SuppressGJShell;
        SuppressGJShell = true;
        gsh.setAttribute('contenteditable','true');
        GshMenuEdit.innerHTML = 'Lock';
        GshMenuEdit.style.color = 'rgba(255,0,0,1)';
        GshMenuEdit.style.backgroundColor = 'rgba(255,255,255,1)';
    }else{
        SuppressGJShell = savSuppressGJShell;
        gsh.setAttribute('contenteditable','false');
        GshMenuEdit.innerHTML = 'Edit';
        GshMenuEdit.style.color = 'rgba(16,160,16,1)';
        GshMenuEdit.style.backgroundColor = 'rgba(255,255,255,1)';
    }
}
function html_edit(){
    ToggleEditMode();
}

// Live HTML (DOM) Snapshot onto browser's localStorage
// 2020-0923 SatoxITS
var htRoot = gsh // -- Element-ID, should be selectable
const snappedHTML = 'SnappedHTML'; // Item-ID of the HTML data in localStogate
                    // -- should be a [map] of URL
                    // -- should be with CSSOM as inline script
const htVersionTag = 'VersionTag'; // VesionTag Eelment-ID in the HTML (in DOM)
function showVersion(note,w,v,u,t){
    w.alert(note+': ' + v + '\n'
        + '-- URL:  ' + u + '\n'
        + '-- Time: ' + t + ' (' + DateLong0(t*1000) + ')'
    );
}
function html_save(){
    u = document.URL;
    t = new Date().getTime() / 1000;
    v = '<'+'span id="'+htVersionTag+'" data-url="'+u+'" data-time="'+t+'">';
    v += '<'+'/span>\n';
    h += v + htRoot.outerHTML;
    localStorage.setItem(snappedHTML,h);
    showVersion("Saved",window,v,u,t);
}
function html_load(){
    h = localStorage.getItem(snappedHTML);
    if( h == null ){
        alert('No snapshot taken yet');
        return;
    }
    w = window.open('','','');
    d = w.document;
    d.write(h);
    w.focus();
    html_ver1("Loaded",w,d);
}
function html_ver1(note,w,d){
    if( (v = d.getElementById(htVersionTag)) != null ){
        h = v.outerHTML;
        u = v.getAttribute('data-url');
        t = v.getAttribute('data-time');
    }else{
        h = 'No version info. in the page';
        u = '';
        t = 0;
    }
    showVersion(note,w,v,u,t);
}
function html_ver0(){
    html_ver1("Version",window,document);
}
</script>
<!-- LiveHTML } -->
</span>
</details>
*/

/*
<details><summary>Event sharing</summary>
<span id="EventSharingCodeSpan">

<!-- ---------- Event sharing // 2020-0925 SatoxITS { -->

<div id="iftestTemplate" class="iftest" hidden="">
<style> .iftestbody{ color:#f22;font-family:Georgia;font-size:10pt;} </style>
<span id="frameBody" class="iftestbody" onclick="frameClick()"><script>
  function docadd(txt){
    document.body.append(txt);
    window.scrollTo(0,100000);
  }
  function frameClick(){
    xy = '(x='+event.x + ' y='+event.y+')';
```

```
    //docadd('Got Click on #'+event.target.id+' '+xy+ '\n');
    docadd('Got Click on #'+Fid.value+', '+xy+ '\n');
    window.scrollTo(0,100000);
    window.parent.postMessage('OnClick: '+xy,'*');
  }
  function frameMousemove(){
    if( false ){
    document.body.append('Mousemove on #'+event.target.id+' '
        + 'x='+event.x + ' y='+event.y + '\n');
    peerWin = window.frames.iframe1;
    document.body.append('Send to peer #'+peerWin+' ' + '\n');
    window.scrollTo(0,100000);
    peerWin.postMessage('Hi!','*');
    }
  }
  function frameKeydown(){
    msg = 'Got Keydown: #'+Fid.value+', ('+event.code+')';
    docadd(msg+'\n');
    window.parent.postMessage(msg,'*');
  }
  function frameOnMessage(){
    docadd('Message ' + event.data + '\n');
    window.scrollTo(0,100000);
  }
  if( document.getElementById('Fid') ){
    frameBody.id = Fid.value;
    h = '';
    h += '<'+'style>*{';
    h += 'font-size:10pt;white-space:pre-wrap;';
    h += 'font-family:Courier New;';
    h += '}<'+'/style>';
    h += 'I am '+Fid.value+'\n';
    document.write(h);
    window.addEventListener('click',frameClick);
    window.addEventListener('keydown',frameKeydown);
    window.addEventListener('message',frameOnMessage);
    window.addEventListener('mousemove',frameMousemove);
    window.parent.postMessage('Hi parent, I am '+Fid.value,'*');
  }
</script></span></div>

<style>.iframeTest{margin:3px;resize:both;width:370px;height:120px;}</style>
<h2>Inter-window communicaiton</h2>
<note>
frame0 >>> frame1 and frame2<br>
frame1 >>> frame0 and frame2<br>
frame2 >>> frame0 and frame1<br>
</note>
<div id="iframe-test">
<pre id="iframeHost" style="border:1px;font-family:Courier New;font-size:10pt;"></pre>
<iframe id="iframe0" title="iframe0" class="iframeTest" style=""></iframe>
<iframe id="iframe1" title="iframe1" class="iframeTest"></iframe>
<iframe id="iframe2" title="iframe2" class="iframeTest"></iframe>
</div>

<script id="if0-test-script">
  function InterFrameComm_init(){
    setupFrames0();
    setupFrames12();
  }
  function setFrameSrcdoc(dst,src){
    if( true ){
        dst.contentWindow.document.write(src);
        // this makes browser waite close, and crash if accumulated !?
        // so it should be closed after write
        dst.contentWindow.document.close();
    }else{
        // to be erased before source dump
        // but shold be set for live snapshot
        dst.srcdoc = src;
    }
  }
  function setupFrames0(){
    ibody = iframe0.contentWindow.document.body;
    iframe0.style.width = "755px"
    //iframeHost.innerHTML = "Message exchange at iframes' host:\n";
    window.addEventListener('message',messageFromChild);

    if0 = '';
    if0 += '<'+'pre style="font-family:Courier New;">';
    if0 += '<input id="Fid" value="iframe0">';
    if0 += iftestTemplate.innerHTML;
    setFrameSrcdoc(iframe0,if0);

    function clickOnChild(){
        console.log('clickOn #'+this.id);
    }
    function moveOnChild(){
        console.log('moveOn #'+this.id);
    }
    iframe0.contentWindow.document.body.style.setProperty('white-space','pre');
    iframe0.contentWindow.document.body.style.setProperty('font-size','9pt');
  }
  function setupFrames12(){
    if1 = '<input id="Fid" value="iframe1">';
    if1 += iftestTemplate.innerHTML;
    setFrameSrcdoc(iframe1,if1);
    //iframe1.name = 'iframe1'; // this seems break contentWindow

    if2 = '<input id="Fid" value="iframe2">';
    if2 += iftestTemplate.innerHTML;
    setFrameSrcdoc(iframe2,if2);

    iframe1.addEventListener('message',messageFromChild);
        //iframe1.addEventListener('mouseover',moveOnChild);
    iframe2.addEventListener('message',messageFromChild);
        //iframe2.addEventListener('mouseover',moveOnChild);
    iframe1.contentWindow.postMessage('[parent0] Hi iframe1 -- from parent.','*');
    //iframe1.contentWindow.postMessage('Your peer is '+iframe2.contentWindow,'*');
    iframe2.contentWindow.postMessage('[parent0] Hi iframe2 -- from parent.','*');
    //iframe2.contentWindow.postMessage('Your peer is '+iframe1.contentWindow,'*');
  }
  function messageFromChild(){
    from = null;
    forw = null;
    if( event.source == iframe0.contentWindow ){
        from = '[iframe0] '
        forw = 'iframe12';
    }else
    if( event.source == iframe1.contentWindow ){
        from = '[iframe1] '
        forw = 'iframe2';
    }else
    if( event.source == iframe2.contentWindow ){
```

```
        from = '[iframe2] '
        forw = 'iframe1';
    }else
    {
        iframeHost.innerHTML += 'Message [unknown] '
        + ' orig=' + event.origin
        + ' data=' + event.data
        //+ ' from=' + event.source
        ;
    }
    msglog1 = from + event.data + ' -- '
        + ' from=' + event.source
        + ' orig=' + event.origin
        + ' name=' + event.source.name
        //+ ' port=' + event.ports
        //+ ' evid=' + event.lastEventId
        + '\n'
        ;
    if( true ){
        if( forw == 'iframe1' || forw == 'iframe12' ){
        iframe1.contentWindow.postMessage(from+event.data);
        }
        if( forw == 'iframe2' || forw == 'iframe12' ){
        iframe2.contentWindow.postMessage(from+event.data);
        }
    }
    txtadd0(msglog1);

    function txtadd0(txt){
        iframe0.contentWindow.document.body.append(txt);
        iframe0.contentWindow.scrollTo(0,100000);
    }
  }
  function es_ShowSelf(){
    iframe1.setAttribute('src',document.URL);
    iframe2.setAttribute('src',document.URL);
  }
</script>

<input class="HtmlCodeViewButton" type="button" value="ShowSelf" onclick="es_ShowSelf()">
<input class="HtmlCodeViewButton" type="button" value="ShowCode" onclick="es_showHtmlCode()">
<span id="EventSharingCodeview"></span>
<script id="EventShareingScript">
function es_showHtmlCode(){
    showHtmlCode(EventSharingCodeview,EventSharingCodeSpan);
}
DestroyEventSharingCodeview = function(){
    //EventSharingCodeview.parentNode.removeChild(EventSharingCodeview);
    EventSharingCodeview.innerHTML = "";
    iframe0.style = "";
    //iframe0.srcdoc = "erased";
    //iframe1.srcdoc = "erased";
    //iframe2.srcdoc = "erased";
}
</script>
<!-- EventSharing } -->
</span>
</details>
*/

/*
<!-- ---------- "GShell Inside" Nofitifaction { -->
<script id="script-gshell-inside">
var notices = 0;
function noticeGShellInside(){
    ver = '';
    if( ver = document.getElementById('GshVersion') ){
        ver = ver.innerHTML;
    }
    console.log('GJShell Inside (^-^)//'+ver);
    notices += 1;
    if( 2 <= notices ){
        document.removeEventListener('mousemove',noticeGShellInside);
    }
}
document.addEventListener('mousemove',noticeGShellInside);
noticeGShellInside();

const FooterName = 'GshFooter'
function DestroyFooter(){
    if( (footer = document.getElementById(FooterName)) != null ){
        //footer.parentNode.removeChild(footer);
        empty = document.createElement('div');
        empty.id = 'GshFooter0';
        footer.parentNode.replaceChild(empty,footer);
    }
}
function showFooter(){
    footer = document.createElement('div');
    footer.id = FooterName;
    footer.style.backgroundImage = "url("+ITSmoreQR+")";
    //GshFooter0.parentNode.appendChild(footer);
    GshFooter0.parentNode.replaceChild(footer,GshFooter0);
}
</script>
<!-- } -->

<!--
    border:20px inset #888;
-->

//<span id="WirtualDesktopCodeSpan">
/*
<details id="WirtualDesktopDetails"><summary>Wirtual Desktop</summary>
<!-- ---------- Web Wirtual Desktop // 2020-0927 SatoxITS { -->
<style>
.WirtualSpace {
    z-index:0;
    xwidth:1280px !important; xheight:720px !important;
    width:5120px; height:2880px;
    border-width:0px;
    xxbackground-color:rgba(32,32,160,0.8);
    xxbackground-image:url("WD-WallPaper03.png");
    xxbackground-size:100% 100%;
    color:#22a;xfont-family:Georgia;font-size:10pt;
    xxoverflow:scroll;
}
.WirtualGrid {
    z-index:0;
    position:absolute;
    width:800px; height:500px;
    border:1px inset #fff;
    color:rgba(192,255,192,0.8);
    font-family:Georgia, Courier New;
```

```
    text-align:right;
    vertical-align:middle;
    font-size:200px;
    text-shadow:4px 4px #ccf;
}
.WD_GridScroll {
    z-index:100000;
    background-color:rgba(200,200,200,0.1);
}
.WirtualDesktop {
    z-index:0;
    position:relative;
    resize:both !important;
    overflow:scroll;
    display:block;
    min-width:120px !important; min-height:60px !important;
    width:800px;
    height:500px;
    border:10px inset #228;
    border-width:30px; border-radius:20px;
    background-image:url("WD-WallPaper03.png");
    background-size:100% 100%;
    color:#22a;font-family:Georgia;font-size:10pt;
}
.comment {
    // overflow=scroll seems to bound childrens' view in the element span
    // specifying overflow seems fix the position of the element
}
.WirtualBrowserSpan {
    z-index:10;
    xxxborder:0.5px dashed #fff !important;
    border-color:rgba(255,255,255,0.5) !important;
    position:relative;
    left:100px;
    top:100px;
    display:block;
    resize:both !important;
    width:540px;
    height:320px;
    min-width:40px !important; min-height:20px !important;
    max-width:5120px !important; max-height:2880px !important;
    background-color:rgba(255,200,255,0.1);
    xoverflow:scroll;
}
.xWirtualBrowserLocationBar:focus {
    color:#f00;
    background-color:rgba(255,128,128,0.2);
}
.xWirtualBrowserLocationBar:active {
    color:#f00;
    background-color:rgba(128,255,128,0.2);
}
a.WirtualBrowserLocation {
    color:#ccc !important;
    text-decoration:none !important;
}
a.WirtualBrowserLocation:hover {
    color:#fff !important;
    text-decoration:underline;
}
.WirtualBrowserLocationBar {
    position:absolute;
    z-index:100000;
    display:block;
    width:400px;
    height:20px;
    padding-left:2px;
    line-height:1.1;
    vertical-align:middle;
    font-size:14px;
    color:#fff;
    background-color:rgba(128,128,128,0.2);
    font-family:Georgia;
}
.WirtualBrowserCommandBar {
    position:absolute;
    z-index:200000;
    xxxdisplay:inline;
    display:block;
    width:60px;
    height:20px;
    line-height:1.1;
    vertical-align:middle;
    font-size:14px;
    color:#fe4;
    background-color:rgba(128,128,128,0.1);
    font-family:Georgia;
    text-align:left;
    left:404px;
}
.WirtualBrowserFrame {
    xxposition:relative;
    position:absolute;
    xxdisplay:inline;
    display:block;
    z-index:10;
    resize:both !important;
    width:480px; height:240px;
    min-width:60px; min-height:30px;
    max-width:5120px; max-height:2880px;
    border-radius:6px;
    background-color:rgba(255,255,255,0.9);
    border-top:20px solid;
    border-right:4px solid;
    border-bottom:10px solid;
}
.WinFavicon {
    width:16px;
    height:16px;
    margin:1px;
    margin-right:3px;
    vertical-align:middle;
    background-color:rgba(255,255,255,1.0);
}
.WirtualDesktopMenuBar {
    xposition:absolute;
    color:#fff;
    font-size:7pt;
    text-align:right;
    padding-right:4px;
    background-color:rgba(128,128,128,0.7);
}
.WirtualDesktopCalender {
    color:#fff;
```

```
    font-size:22pt;
    text-align:right;
    padding-right:4px;
    xbackground-color:rgba(255,255,255,0.2);
}
.xxxxinput { width:260pt !important; line-height:1.1 !important; margin:1px;
    display:inline !important; font-size:10pt !important; padding:1px !important;
}
.WD_Config {
    display:inline !important;
    padding:2px !important;
    font-size:10pt !important;
    width:60pt !important;
    height:12pt !important;
    line-height:1.0pt !important;
    height:15pt !important;
}
.WD_Button {
    display:inline !important;
    padding:2px !important;
    color:#fff !important;
    background-color:#228 !important;
    font-size:10pt !important;
    width:60pt !important;
    height:12pt !important;
    line-height:1.0pt !important;
    height:16pt !important;
    border:2px inset #44a !important;
}
.WD_Href {
    display:inline !important;
    padding:2px !important;
    font-size:9pt !important;
    width:120pt !important;
    height:12pt !important;
    line-height:1.0pt !important;
    height:15pt !important;
}

.LiveHtmlCodeviewText {
    font-size:10pt;
    font-family:Courier New;
    xwhite-space:pre;
}

.WD_Panel {
    x-index:100 !important;
    color:#000 !important;
    margin-left:25px !important;
    width:800px !important;
    padding:4px !important;
    border:1px solid #888 !important;
    border-radius:6px !important;
    background-color:rgba(220,220,220,0.9) !important;
    font-size:9pt;
    font-family:Courier New;
}
.WD_Help {
    font-size:10pt !important;
    font-family:Courier New;
    line-height:1.2 !important;
    color:#000 !important;
    width:100% !important;
    background-color:rgba(240,240,255,0.8) !important;
}

.WB_Zoom {
}
</style>
<h2>CosmoScreen 0.0.8</h2>
<menu>
<span id="WD_Help_1" class="WD_Help"><b>ScopeControl command keys</b><br>
 g ... grid on/off<br>
 i ... zoom in<br>
 o ... zoom out<br>
 s ... save current scope<br>
 r ... restore saved scope<br>
</span>
</menu>
<div class="WD_Panel" draggable="true">
<p><!-- should be on the frame of the WD -->
Monitor <input id="WD_Resize_1" class="WD_Button" type="button" value="Resize">
 < <input id="WD_Width_1" class="WD_Config" type="text">
 x <input id="WD_Height_1" class="WD_Config" type="text">
 wall-paper: <a href="WD-WallPaper03.png" class="WD_Href" contenteditable="true">WD-WallPaler03.png</a>
</p>
<p>
Desktop <input id="WS_Resize_1" class="WD_Button" type="button" value="Resize">
 < <input id="WS_1_Width" class="WD_Config" type="text">
 x <input id="WS_1_Height" class="WD_Config" type="text">
</p>
<p>
Display <input id="WD_Zoom_1" class="WD_Button" type="button" value="Zoom">
 < <input id="WD_Zoom_1_XY" class="WD_Config" type="text" value="1.0">
 x <input id="WD_Zoom_1_MAG" class="WD_Config" type="text" value="1.41421356">
 < <input id="WD_Zoom_1_OUT" class="WD_Button" type="button" value="ZoomOut">
 < <input id="WD_Zoom_1_IN" class="WD_Button" type="button" value="ZoomIn">
</p>
<p>
Content <input id="WD_Scroll_1" class="WD_Button" type="button" value="Scroll">
 X <input id="WD_Left_1" class="WD_Config" type="text" value="0">
 Y <input id="WD_Top_1" class="WD_Config" type="text" value="0">
shift+wheel for horizontal scroll
</p>
<p>
Scopexx <input id="WD_Zoom_1_Restore" class="WD_Button" type="button" value="Restore">
 < <input id="WD_Zoom_1_RestoreScope" class="WD_Config" type="text" value="Scope0">
 | <input id="WD_Zoom_1_Save" class="WD_Button" type="button" value="Save">
 > <input id="WD_Zoom_1_SaveScope" class="WD_Config" type="text" value="Scope0">
</p>
<p>
Scopeyy <input id="WD_Zoom_1_Forw" class="WD_Button" type="button" value="Forw">
 < <input id="WD_Zoom_1_ForwScope" class="WD_Config" type="text" value="Scope0">
 | <input id="WD_Zoom_1_Back" class="WD_Button" type="button" value="Back">
 > <input id="WD_Zoom_1_BackScope" class="WD_Config" type="text" value="Scope0">
</p>
<p>
Scopezz <input id="WD_Zoom_1_Push" class="WD_Button" type="button" value="Push">
 < <input id="WD_Zoom_1_PushScope" class="WD_Config" type="text" value="Scope0">
 | <input id="WD_Zoom_1_Pop" class="WD_Button" type="button" value="Pop">
 > <input id="WD_Zoom_1_PopScope" class="WD_Config" type="text" value="Scope0">
</p>
<p>
Display <input id="WD_Grid_1" class="WD_Button" type="button" value="GridOn">
```

```
</p>
<p>
Overflo <input id="WD_Overflow_1" class="WD_Button" type="button" value="scroll">
"scroll" imprisons windows inside the display
</p>
</div>

<div id="WirtualDesktop_1" class="WirtualDesktop" draggable="true" contenteditable="true" style="">
<div id="WirtualDesktop_1_MenuBar" class="WirtualDesktopMenuBar" spellcheck="false">
<i>CosmoScreen 0.0.8</i><span id="WirtualDesktop_1_Clock"></span>
</div>
<div id="WirtualDesktop_1_Calender" class="WirtualDesktopCalender ">00:00</div>
<div align="right"><h1>WirtualSpace 1.</h1></div>
<div id="WirtualDesktop_1_Content" class="WirtualSpace">

<div id="WirtualBrowser_1" class="WirtualBrowserSpan" spellcheck="false" draggable="true">
<div id="WirtualBrowser_1_Location" class="WirtualBrowserLocationBar"></div>
<span id="WirtualBrowser_1_Command" class="WirtualBrowserCommandBar">Reload</span>
<iframe id="WirtualBrowser_1_Frame" class="WirtualBrowserFrame" style=""></iframe>
</div>

<div id="WirtualBrowser_2" class="WirtualBrowserSpan" spellcheck="false" draggable="true">
<div id="WirtualBrowser_2_Location" class="WirtualBrowserLocationBar"></div>
<span id="WirtualBrowser_2_Command" class="WirtualBrowserCommandBar">Reload</span>
<iframe id="WirtualBrowser_2_Frame" class="WirtualBrowserFrame" style=""></iframe>
</div>

<div id="WirtualBrowser_3" class="WirtualBrowserSpan" spellcheck="false" draggable="true">
<div id="WirtualBrowser_3_Location" class="WirtualBrowserLocationBar"></div>
<span id="WirtualBrowser_3_Command" class="WirtualBrowserCommandBar">Reload</span>
<iframe id="WirtualBrowser_3_Frame" class="WirtualBrowserFrame" style=""></iframe>
</div>

<div id="WirtualDesktop_1_GridPlane" class="WirtualSpace"></div>
</div>
</div>

<input class="HtmlCodeViewButton" type="button" value="ShowCode" onclick="vd_showHtmlCode()">
<span id="WirtualDesktopCodeview"></span>
<script id="WirutalDesktopScript">
function vd_showHtmlCode(){
    codespan = document.getElementById('WirtualDesktopCodeSpan');
    showHtmlCode(WirtualDesktopCodeview,codespan);
    WirtualDesktopCodeview.setAttribute('class','LiveHtmlCodeviewText');
}
DestroyEventSharingCodeview = function(){
    WirtualDesktopCodeview.innerHTML = "";
}

function wdlog(log){
    if( GJ_Channel != null ){
        GJ_SendMessage('WD '+log);
    }
    console.log(log);
}
var topMostWin = 10000;
function onEnterWin(e){
    t = e.target;
    oindex = t.style.zIndex;
    //if( oindex == '' ) oindex = 0;
    //t.saved_zIndex = oindex;
    //t.style.zIndex = 10000;
    topMostWin += 1;
    t.style.zIndex = topMostWin;
    nindex = t.style.zIndex;
    wdlog('Enter '+t+' #'+t.id+'('+oindex+'->'+nindex+')');
    e.stopPropagation();
    e.preventDefault();
}
function onClickWin(e){ // can detect click on the thick border?  t = e.target;
    oindex = t.style.zIndex;
    topMostWin += 1;
    t.style.zIndex = topMostWin;
    nindex = t.style.zIndex;
    wdlog('Click '+t+' #'+t.id+'('+oindex+'->'+nindex+')');
    //e.stopPropagation();
    //e.preventDefault();
}
function onLeaveWin(e){
    t = e.target;
    //oindex = t.style.zIndex;
    //nindex = t.saved_zIndex;
    //t.style.zIndex = nindex;
    //wdlog('Leave '+e.target+' #'+e.target.id+'('+oindex+'->'+nindex+')');
    e.stopPropagation();
    e.preventDefault();
}

var WinDragstartX; // event
var WinDragstartY;
var WinDragstartTX; // target
var WinDragstartTY;

function onWinDragstart(e){
    WinDragstartX = e.x;
    WinDragstartY = e.y;

    t = e.target;

    //WinDragstartTX = t.getBoundingClientRect().left.toFixed(0)
    //WinDragstartTY = t.getBoundingClientRect().top.toFixed(0)
    if( t.style.left == '' ){
        WinDragstartTX = x0 = 0;
        t.style.left = '0px';
    }else{
        //WinDragstartTX = x0 = Number(t.style.left);
        WinDragstartTX = x0 = parseInt(t.style.left);
    }
    if( t.style.top == '' ){
        WinDragstartTY = y0 = 0;
        t.style.top = '0px';
    }else{
        //WinDragstartTY = y0 = Number(t.style.top);
        WinDragstartTY = y0 = parseInt(t.style.top);
    }
    if( true ){ // to be undo
        t.wasAtX = WinDragstartTX;
        t.wasAtY = WinDragstartTY;
    }
    wdlog('DragSTA #'+t.id
        + ' event('+e.x+','+e.y+')'
        + ' position=' + t.style.position
        + ' style left,top('+t.style.left+','+t.style.top+')'
    );
```

```
    e.stopPropagation();
    //e.preventDefault();
    return true;
}
function onWinDragEvent(wh,e,set,dolog){
    t = e.target;
    dx = e.x - WinDragstartX;
    dy = e.y - WinDragstartY;
    nx = WinDragstartTX + dx;
    ny = WinDragstartTY + dy;
    log = 'Drag'+wh+' #'+t.id
        + ' event0('+WinDragstartX+','+WinDragstartY+')'
        + ' event('+e.x+','+e.y+')'
        + ' diff('+dx+','+dy+')'
        + ' (' + nx + ',' + ny + ')'
        + ' (' + t.style.left + ',' + t.style.top + ')'
        + ' wasAt(' + t.wasAtX + ',' + t.wasAtY + ')'
    ;
    if( e.x != 0 || e.y != 0 ){
        if( set == true ){
            //t.style.x = nx + 'px'; // not effective
            //t.style.y = ny + 'px'; // not effective
            t.style.left = nx + 'px';
            t.style.top  = ny + 'px';
            log += ' Set';
        }else{
            log += ' NotSet';
            if( !dolog ){
                log = '';
            }
        }
    }else{
        log += ' What?'; // the type is event start?
        if( !dolog ){
            log = '';
        }
    }
    if( and(dolog, log != '') ){
        wdlog(log);
    }
    if( true ){
        // should be propargeted to parent in FireFox ?
        e.stopPropagation();
    }
    e.preventDefault();
    return false;
}
function onWinDrag(e){
    return onWinDragEvent('Ing',e,true,false);
}
function onWinDragend(e){
    return onWinDragEvent('End',e,false,true);
}
function onWinDragexit(e){
    return onWinDragEvent('Exit',e,false,true);
}
function onWinDragover(e){
    return onWinDragEvent('Over',e,false,true);
}
function onWinDragenter(e){
    return onWinDragEvent('Enter',e,false,true);
}
function onWinDragleave(e){
    return onWinDragEvent('Leave',e,false,true);
}
function onWinDragdrop(e){
    return onWinDragEvent('Drop',e,false,true);
}
function onFaviconChange(e){
    wdlog('--Favicon #'+e.target.id+' href='+e.details.href);
}
var savedSuppressGJShell = false;
function stopGShell(e){
    //wdlog('enter Gsh STOP');
    savedSuppressGJShell = SuppressGJShell;
    SuppressGJShell = true;
    e.stopPropagation();
    e.preventDefault();
}
function contGShell(e){
    //wdlog('leave Gsh STOP');
    SuppressGJShell = savedSuppressGJShell;
    e.stopPropagation();
    e.preventDefault();
}

function WD_onKeydown(e){
    keycode = e.code;
    console.log('Keydown #'+e.target.id+' '+keycode);
    if( keycode == 'KeyG' ){
        WD_setGrid1(WD_Grid_1);
    }else
    if( keycode == 'KeyI' ){
        WD_doZoomIN();
    }else
    if( keycode == 'KeyO' ){
        WD_doZoomOUT();
    }else
    if( keycode == 'KeyR' ){
        WD_RestoreScope(null);
    }else
    if( keycode == 'KeyS' ){
        WD_SaveScope(null);
    }
    e.stopPropagation();
    e.preventDefault();
}
function WD_onKeyup(e){
    e.stopPropagation();
    e.preventDefault();
}
function WD_EventSetup1(){
    WirtualDesktop_1.addEventListener('keydown',    e => { WD_onKeydown(e); });
    WirtualDesktop_1_Content.addEventListener('keydown',    e => { WD_onKeydown(e); });
    WD_Help_1.addEventListener('keydown',   e => { WD_onKeydown(e); });
    WD_Help_1.addEventListener('keyup', e => { WD_onKeyup(e); });
}
function settleWin(s,l,cmd,f,u,w,h,x,y,c,scale){
    function WirtualBrowserCommand(e,s,l,cmd,f){
        command = cmd.innerHTML
        if( command == "Reload" ){
            href_id = e.target.href_id;
            d = document.getElementById(href_id);
            wdlog('href_tag=#'+href_id+'\n elem=#'+href_id+'\n href='+d);
```

```
10417           url = d.innerHTML;
10418           wdlog('---- Load href_tag=#'+href_id+'\n elem=#'+href_id+'\n href='+d
10419               +'\n url='+url);
10420           wdlog('---- Load target #'+f.id)+' with url='+url;
10421           f.src = url;
10422       }else{
10423           alert('unknown command"'+command+'" '+e.target.id+','+l.id+','+f.id);
10424       }
10425   }
10426   function onKeyDown(e){
10427       if( e.code == 'Enter' ){
10428           e.stopPropagation();
10429           e.preventDefault();
10430       }
10431   }
10432   function onKeyUp(e){
10433       if( e.code == 'Enter' ){
10434           e.stopPropagation();
10435           e.preventDefault();
10436           // should reload immediately ?
10437       }
10438   }
10439
10440   if( false ){
10441       wdlog('start settle WirtualBrowser url='+u +'\n'
10442           + 'id=' + s.id + '\n'
10443           + 'width=' + s.style.width + '\n'
10444           + 'height=' + s.style.height
10445       );
10446   }
10447   // very iportant for WordPress ??
10448   s.style.width = f.style.width = 501; // for WordPress ...??
10449   s.style.height = f.style.height = 271; // for WordPress ...??
10450   if( false ){
10451       wdlog('midway settle WirtualBrowser url='+u +'\n'
10452           + 'id=' + s.id + '\n'
10453           + 'width=' + s.style.width + '\n'
10454           + 'height=' + s.style.height
10455       );
10456   }
10457   s.width = 502; // for WordPress ...??
10458   s.height = 272; // for WordPress ...??
10459   if( false ){
10460       wdlog('midway-2 settle WirtualBrowser url='+u +'\n'
10461           + 'id=' + s.id + '\n'
10462           + 'span-width=' + s.width + '\n'
10463           + 'span-height=' + s.height
10464       );
10465   }
10466
10467   s.style.width = w + 'px';
10468   s.style.height = h + 'px';
10469   f.style.width = w + 'px';
10470   f.style.height = h + 'px';
10471   //f.style.setProperty('-webkit-transform','scale('+scale+')');
10472   f.style.setProperty('transform','scale('+scale+')');
10473
10474   //wdlog('--x1-- u='+u+' width s='+s.style.width+',f='+f.style.width);
10475   //wdlog('--x2-- u='+u+' width s='+s.style.width+',f='+f.style.width);
10476   s.setAttribute('draggable','true')
10477   f.setAttribute('draggable','false'); // why necessary?
10478   l.setAttribute('draggable','false'); // why necessary?
10479   cmd.setAttribute('draggable','false'); // why necessary?
10480   s.addEventListener('dragstart', e => { onWinDragstart(e); });
10481   s.addEventListener('drag',  e => { onWinDrag(e); });
10482   s.addEventListener('exit',  e => { onWinDragexit(e); });
10483   s.addEventListener('dragend',   e => { onWinDragend(e); });
10484   s.addEventListener('dragexit',  e => { onWinDragexit(e); });
10485   s.addEventListener('dragenter', e => { onWinDragenter(e); });
10486   s.addEventListener('dragover',  e => { onWinDragover(e); });
10487   s.addEventListener('dragleave', e => { onWinDragleave(e); });
10488   s.addEventListener('drop',  e => { onWinDragdrop(e); });
10489
10490   s.addEventListener('mouseenter',e => { onEnterWin(e); });
10491   s.addEventListener('mouseleave',e => { onLeaveWin(e); });
10492
10493   if( false ){
10494       s.style.position = "absolute";
10495       s.style.x = x+'px';
10496       s.style.left = x+'px';
10497       s.style.y = y+'px';
10498       s.style.top = y+'px';
10499   }else{
10500       s.style.setProperty('position','absolute','important');
10501       s.style.setProperty('x',x+'px','important');
10502       s.style.setProperty('left',x+'px','important');
10503       s.style.setProperty('y',y+'px','important');
10504       s.style.setProperty('top',y+'px','important');
10505   }
10506
10507   favicon = './favicon.ico';
10508   uv1 = u.split('://');
10509   if( 2 <= uv1.length ){
10510       uv2 = uv1[1].split('/');
10511       if( 2 <= uv2.length ){
10512           if( uv1[0] == 'file' ){
10513               //favicon = 'file://' + uv2.slice(0,uv2.length-1).join('/')
10514               //  + '/favicon.ico';
10515               favcion = './favicon.ico';
10516           }else{
10517               favicon = uv1[0] + '://' + uv2[0] + '/favicon.ico';
10518           }
10519       }
10520   }
10521   //wdlog("----- favicon-url="+favicon);
10522   href_id = l.id + '_href';
10523   l.innerHTML = '<img class="WinFavicon" src="'+favicon+'">'
10524       + '<a id="'+href_id+'" class="WirtualBrowserLocation" href="'+u+'">'+u+'</a>';
10525   //l.addEventListener('click',   e => { onClickWin(e); });
10526   l.addEventListener('mouseenter',e => { stopGShell(e); });
10527   l.addEventListener('mouseleave',e => { contGShell(e); });
10528   l.addEventListener('keydown',   e => { onKeyDown(e); });
10529   l.addEventListener('keyup', e => { onKeyUp(e); });
10530
10531   cmd.href_id = href_id;
10532   wdlog('(0)cmd=#'+cmd.id);
10533   wdlog('(1)href_id=#'+href_id);
10534   wdlog('(2)href_id=#'+cmd.href_id);
10535   cmd.addEventListener('click',   e => { WirtualBrowserCommand(e,s,l,cmd,f); });
10536
10537   f.style.borderColor = c;
10538   f.src = u;
10539   //f.addEventListener('mouseenter',e => { onEnterWin(e); });
10540   //f.addEventListener('mouseleave',e => { onLeaveWin(e); });
```

```
10541
10542     //s.addEventListener('click',   e => { onClickWin(e); });
10543     //f.addEventListener('click',   e => { wdlog('click wbl'); });
10544     f.addEventListener('mozbrowsericonchange',onFaviconChange);
10545
10546     wdlog('done settle WirtualBrowser url='+u +'\n'
10547         + 'id=' + s.id + ' '
10548         + 'width=' + s.style.width + ' '
10549         + 'height=' + s.style.height + ' '
10550         + 'cmd=' + cmd.id
10551     );
10552 }
10553
10554 function WD_EventSetup2(){
10555     dt = WirtualDesktop_1;
10556     dt.style.width = "800px";
10557     dt.style.height = "500px";
10558     dt.addEventListener('dragstart',e => { onWinDragstart(e); });
10559     dt.addEventListener('drag', e => { onWinDrag(e); });
10560     dt.addEventListener('exit', e => { onWinDragexit(e); });
10561 }
10562
10563 function GRonClick(){
10564     WD_SaveScope(null); // should be push
10565     t = event.target;
10566     x = t.getAttribute('data-leftx');
10567     y = t.getAttribute('data-topy');
10568     zoom = WD_Zoom_1_XY.value;
10569     x *= zoom;
10570     y *= zoom;
10571     WD_doScrollXY(event,x,y);
10572     //alert('scroll #'+t.id+' x='+x+', y='+y);
10573 }
10574 function WD_setGrid(e){
10575     t = e.target;
10576     WD_setGrid1(t);
10577 }
10578 function WD_setGrid1(t){
10579     //ds = WirtualDesktop_1_Content; // should be WirtualSpace_1
10580     ds = WirtualDesktop_1_GridPlane;
10581     if( t.value == 'GridOn' ){
10582         for( col = 0; col < 16; col++ ){
10583             for( row = 0; row < 16; row++ ){
10584                 g1 = document.createElement('span');
10585                 g1.setAttribute('class','WirtualGrid');
10586                 leftx = col * 800;
10587                 topy = row * 500;
10588                 gid = col + '.' + row
10589                 label = '<'+'span '
10590                     + 'id="'+gid+'" '+'class="WD_GridScroll" '
10591                     + 'contenteditable="false" onclick="GRonClick()" '
10592                     + 'data-leftx=' + leftx + ' ' + 'data-topy=' + topy + ' '
10593                     + '>'
10594                     + gid + '<'+'/span>';
10595                 console.log('grid '+label);
10596                 g1.innerHTML = label;
10597                 g1.position = 'relative';
10598                 g1.leftx = leftx;
10599                 g1.topy = topy;
10600                 g1.style.left = g1.leftx + 'px';
10601                 g1.style.top = g1.topy + 'px';
10602                 if( col % 2 == row % 2 ){
10603                     g1.style.backgroundColor = 'rgba(255,255,255,0.3)';
10604                 }
10605                 ds.appendChild(g1);
10606             }
10607         }
10608         t.value = 'GridOff';
10609     }else{
10610         ds.innerHTML = '';
10611         t.value = 'GridOn';
10612     }
10613 }
10614
10615 var sav_scrollLeft;
10616 var sav_scrollTop;
10617 var sav_nscale;
10618 function WD_SaveScope(e){
10619     sav_scrollLeft = WD_Left_1.value;
10620     sav_scrollTop = WD_Top_1.value;
10621     sav_nscale = WD_Zoom_1_XY.value;
10622     //console.log('saved zoom='+sav_oscale+','+sav_nscale);
10623 }
10624 function WD_RestoreScope(e){
10625     WD_Zoom_1_XY.value = sav_nscale;
10626     WD_doZoom();
10627
10628     WD_Left_1.value = sav_scrollLeft;
10629     WD_Top_1.value = sav_scrollTop;
10630     WD_doScroll(null);
10631 }
10632 function ignoreEvent(e){
10633     e.stopPropagation();
10634     //e.preventDefault();
10635 }
10636 function zoomMag(){
10637     return WD_Zoom_1_MAG.value;
10638 }
10639 function WD_EventSetup3(){
10640     WD_Grid_1.addEventListener('click', e => { WD_setGrid(e); });
10641     WD_Zoom_1_Save.addEventListener('click', e => { WD_SaveScope(e); });
10642     WD_Zoom_1_Restore.addEventListener('click', e => { WD_RestoreScope(e); });
10643     WD_Width_1.value = dt.style.width;
10644     WD_Width_1.addEventListener('keydown',ignoreEvent);
10645     WD_Width_1.addEventListener('keyup',ignoreEvent);
10646     WD_Height_1.value = dt.style.height;
10647     WD_Height_1.addEventListener('keydown',ignoreEvent);
10648     WD_Height_1.addEventListener('keyup',ignoreEvent);
10649     WD_Zoom_1_MAG.addEventListener('keydown',ignoreEvent);
10650     WD_Zoom_1_MAG.addEventListener('keyup',ignoreEvent);
10651 }
10652
10653 function escale1(e,oscale,nscale){
10654     e.style.setProperty('transform','scale('+nscale+')');
10655     rscale = oscale / nscale;
10656     w = parseInt(e.style.width);
10657     h = parseInt(e.style.height);
10658     w = w * rscale; //(oscale/nscale);
10659     h = h * rscale; //(oscale/nscale);
10660     e.style.width = w + 'px';
10661     e.style.height = h + 'px';
10662 }
10663 function scaleWD(ds,oscale,nscale){
10664     if( true ){
```

```
10665         escale1(WirtualBrowser_1,oscale,nscale);
10666         escale1(WirtualBrowser_1_Location,oscale,nscale);
10667         escale1(WirtualBrowser_1_Command,oscale,nscale);
10668         escale1(WirtualBrowser_1_Frame,oscale,nscale);
10669 
10670         escale1(WirtualBrowser_2,oscale,nscale);
10671         escale1(WirtualBrowser_2_Location,oscale,nscale);
10672         escale1(WirtualBrowser_2_Command,oscale,nscale);
10673         escale1(WirtualBrowser_2_Frame,oscale,nscale);
10674 
10675         escale1(WirtualBrowser_3,oscale,nscale);
10676         escale1(WirtualBrowser_3_Location,oscale,nscale);
10677         escale1(WirtualBrowser_3_Command,oscale,nscale);
10678         escale1(WirtualBrowser_3_Frame,oscale,nscale);
10679     }
10680 }
10681 function WD_doZoom(){
10682     ds = WirtualDesktop_1_Content; // should be WirtualSpace_1
10683     oscale = WD_Zoom_1_XY.ovalue; // hidden value for current zoom
10684     nscale = WD_Zoom_1_XY.value;
10685     ds.style.zoom = nscale;
10686     WD_Zoom_1_XY.value = ds.style.zoom;
10687     WD_Zoom_1_XY.ovalue = ds.style.zoom;
10688     scaleWD(ds,oscale,nscale);
10689 }
10690 function WD_EventSetup4(){
10691     WD_Zoom_1.addEventListener('click',WD_doZoom);
10692     WD_Zoom_1_XY.addEventListener('keydown',ignoreEvent);
10693     WD_Zoom_1_XY.addEventListener('keyup',ignoreEvent);
10694 }
10695 
10696 function WD_doZoomOUT(){
10697     ds = WirtualDesktop_1_Content; // should be WirtualSpace_1
10698     oscale = WD_Zoom_1_XY.value;
10699     if( oscale == 0 || oscale == '' ){
10700         oscale = 1;
10701     }
10702     nscale = oscale / zoomMag();
10703     ds.style.zoom = nscale;
10704     WD_Zoom_1_XY.value = ds.style.zoom;
10705     WD_Zoom_1_XY.ovalue = ds.style.zoom;
10706     scaleWD(ds,oscale,nscale);
10707 }
10708 function WD_doZoomIN(){
10709     ds = WirtualDesktop_1_Content; // should be WirtualSpace_1
10710     oscale = WD_Zoom_1_XY.value;
10711     if( oscale == 0 || oscale == '' ){
10712         oscale = 1;
10713     }
10714     nscale = oscale * zoomMag();
10715     if( 4 < nscale ){
10716         alert('maybe too large, zoom='+nscale);
10717         return;
10718     }
10719     ds.style.zoom = nscale;
10720     WD_Zoom_1_XY.value = ds.style.zoom;
10721     WD_Zoom_1_XY.ovalue = ds.style.zoom;
10722     scaleWD(ds,oscale,nscale);
10723 }
10724 function WD_EventSetup5(){
10725     WD_Zoom_1_OUT.addEventListener('click',WD_doZoomOUT);
10726     WD_Zoom_1_IN.addEventListener('click',WD_doZoomIN);
10727 }
10728 
10729 function WD_doResize(e){
10730     dt = WirtualDesktop_1;
10731     dt.style.width = WD_Width_1.value;
10732     dt.style.height = WD_Height_1.value;
10733     WD_Width_1.value = dt.style.width;
10734     WD_Height_1.value = dt.style.height;
10735 }
10736 WD_Resize_1.addEventListener('click',e => { WD_doResize(e); });
10737 
10738 
10739 function WD_doRSResize(e){
10740     //alert('Resize Space');
10741     ds = WirtualDesktop_1_Content; // should be WirtualSpace_1
10742     ds.style.width = WS_1_Width.value;
10743     ds.style.height = WS_1_Height.value;
10744     WS_1_Width.value = ds.style.width;
10745     WS_1_Height.value = ds.style.height;
10746 }
10747 function WD_EventSetup6(){
10748     ds = WirtualDesktop_1_Content; // should be WirtualSpace_1
10749     ds.style.width = '5120px';
10750     ds.style.height = '2880px';
10751     WS_1_Width.value = ds.style.width;
10752     WS_1_Height.value = ds.style.height;
10753     WS_1_Width.addEventListener('keydown',ignoreEvent);
10754     WS_1_Width.addEventListener('keyup',ignoreEvent);
10755     WS_1_Height.addEventListener('keydown',ignoreEvent);
10756     WS_1_Height.addEventListener('keyup',ignoreEvent);
10757     WS_Resize_1.addEventListener('click',e => { WD_doRSResize(e); });
10758 }
10759 
10760 function WD_doScrollXY(e,sleft,stop){
10761     dt = WirtualDesktop_1;
10762     dt.scrollLeft = sleft;
10763     dt.scrollTop = stop;
10764     WD_Left_1.value = dt.scrollLeft;
10765     WD_Top_1.value = dt.scrollTop;
10766     console.log('--Scroll #'+dt.id+' ('+sleft+','+stop+')');
10767 }
10768 function WD_doScroll(e){
10769     //dt = WirtualDesktop_1_Content;
10770     dt = WirtualDesktop_1;
10771     sleft = parseInt(WD_Left_1.value);
10772     stop = parseInt(WD_Top_1.value);
10773     dt.scrollLeft = sleft;
10774     dt.scrollTop = stop;
10775     WD_Left_1.value = dt.scrollLeft;
10776     WD_Top_1.value = dt.scrollTop;
10777     console.log('--Scroll #'+dt.id+' ('+sleft+','+stop+')');
10778 }
10779 function showScrollPosition(){
10780     if( false )
10781     console.log(
10782         'wstop=' + WirtualDesktop_1.style.top + ',' +
10783         'wsx=' + WirtualDesktop_1.style.y + ',' +
10784         'wss=' + WirtualDesktop_1.scrollTop + ',' +
10785         'wdtop=' + WirtualDesktop_1_Content.style.top +',' +
10786         'wdx=' + WirtualDesktop_1_Content.style.y +',' +
10787         'wds=' + WirtualDesktop_1_Content.scrollTop + ','
10788     );
```

```
    WD_Left_1.value = WirtualDesktop_1.scrollLeft;
    WD_Top_1.value = WirtualDesktop_1.scrollTop;
}
function WD_EventSetup7(){
    WD_Scroll_1.addEventListener('click',e => { WD_doScroll(e); });
    WD_Left_1.addEventListener('keydown',ignoreEvent);
    WD_Left_1.addEventListener('keyup',ignoreEvent);
    WD_Top_1.addEventListener('keydown',ignoreEvent);
    WD_Top_1.addEventListener('keyup',ignoreEvent);
}
function WD_EventSetup8(){
    WirtualDesktop_1.addEventListener('scroll',showScrollPosition);
    WirtualDesktop_1_Content.addEventListener('scroll',showScrollPosition);
}

if( false ){
w = 1000 + 'px';
dt.style.width = w;
dt.style.height = "300px";
dt.style.resize = 'both';
dt.style.borderWidth = 50 + 'px';
dt.style.borderRadius = 25 + 'px';
console.log('--2---------- #'+dt.id+' style=' +dt.style);
console.log('-------------- #'+dt.id+' width=' +dt.style.width);
console.log('-------------- #'+dt.id+' left='  +dt.style.left);
console.log('-------------- #'+dt.id+' border='+dt.style.border);
}
function onDTResize(e){
    dt = e.target;
    h = parseInt(dt.style.height);
    dt.style.borderWidth = (h * 0.075) + 'px';
    console.log('---------------- borderWidgh='+dt.style.borderWidth);
}

WirtualDesktopDetails.addEventListener('toggle',WirtualDesktop_init);
function WirtualDesktop_init(){
    if( !WirtualDesktopDetails.open ){
        return;
    }
    //GJ_Join();
    WirtualDesktop_1.addEventListener('resize', e => { onDTResize(e); });
    //console.log('-------------- #'+dt.id
    //  +' borderWidth='+dt.style.getProperty('border-width'));

    settleWin(
        WirtualBrowser_1,
        WirtualBrowser_1_Location,
        WirtualBrowser_1_Command,
        WirtualBrowser_1_Frame,
        document.URL,
        500,280,50,20,'#262',1.0);
    settleWin(
        WirtualBrowser_2,
        WirtualBrowser_2_Location,
        WirtualBrowser_2_Command,
        WirtualBrowser_2_Frame,
        'https://its-more.jp/ja_jp/',
        500,280,150,100,'#448',1.0);
    settleWin(
        WirtualBrowser_3,
        WirtualBrowser_3_Location,
        WirtualBrowser_3_Command,
        WirtualBrowser_3_Frame,
        //'../gshell/gsh.go.html',
            //'http://gshell.org/gshell/gsh.go.html',
        'https://golang.org',
        500,280,250,180,'#444',1.0);
        //1000,720,0,0,'#444',0.125);
        //1200,720,-100,-50,'#444',0.4);
    function WD_ClockUpdate(e){
        WirtualDesktop_1_Clock.innerHTML = DateShort();
        WirtualDesktop_1_Calender.innerHTML = DateHourMin();
    }
    window.setInterval(WD_ClockUpdate,500);

    WD_EventSetup1();
    WD_EventSetup2();
    WD_EventSetup3();
    WD_EventSetup4();
    WD_EventSetup5();
    WD_EventSetup6();
    WD_EventSetup7();
    WD_EventSetup8();
}
//WirtualDesktop_init();

Destroy_WirtualDesktop = function(){
    WirtualDesktop_1.style = "";

    WirtualBrowser_1.removeAttribute('style');
    WirtualBrowser_1_Location.innerHTML = '';
    WirtualBrowser_1_Frame.removeAttribute('src');
    WirtualBrowser_1_Frame.removeAttribute('style');
    WirtualBrowser_1_Frame.style="";

    WirtualBrowser_2.removeAttribute('style');
    WirtualBrowser_2_Location.innerHTML = '';
    WirtualBrowser_2_Frame.removeAttribute('src');
    WirtualBrowser_2_Frame.style="";

    WirtualBrowser_3.removeAttribute('style');
    WirtualBrowser_3_Location.innerHTML = '';
    WirtualBrowser_3_Frame.removeAttribute('src');
    WirtualBrowser_3_Frame.style="";

    GJFactory_1.style = "";
    iframe0.style = "";
    WirtualDesktop_1.style = "";
}

</script>
<!-- WirtualDesktop } -->
</details>
*/ //</span>

//<!-- ---------- Work { ---------- -->
//<span id="SBSidebar_WorkCodeSpan">
/*
<details><summary>SBSidebar</summary>
<!-- ---------- SBSidebar // 2020-0928 SatoxITS { -->
<h2>SBSidebar</h2>
<input id="SBSidebar_WorkOpenSnapshot" class="HtmlCodeViewButton" type="button" value="Snapshot">
<input id="SBSidebar_WorkCodeSignature" class="HtmlCodeViewButton" type="button" value="Signature">
<input id="SBSidebar_WorkCodeViewOpen" class="HtmlCodeViewButton" type="button" value="ShowCode">
```

```
<span id="SBSidebar_WorkCodeView"></span>
<script id="SBSidebar_WorkScript">
function SBSidebar_openWorkCodeView(){
    function SBSidebar_showWorkCode(){
        showHtmlCode(SBSidebar_WorkCodeView,SBSidebar_WorkCodeSpan);
    }
    SBSidebar_WorkCodeViewOpen.addEventListener('click',SBSidebar_showWorkCode);
}
SBSidebar_openWorkCodeView(); /// should be invoked by an event

console.log('-- SbSlider // 2020-1006-01 SatoxITS --');
function SetSidebar(){
    sidebar = document.getElementById('secondary');
//  console.log('primary='+primary+' + 'secondary='+sidebar+' + 'main='+main+' ');
    wrap = sidebar.parentNode;
    console.log('-- SbSlider parent is '+wrap+', #'+wrap.id+' .'+wrap.class);
//wwrap = wrap.parentNode;
//console.log('-- SbSlider parent is '+wwrap+', #'+wwrap.id+' .'+wwrap.class);
//wwwrap = wwrap.parentNode;
//console.log('-- SbSlider parent is '+wwwrap+', #'+wwwrap.id+' .'+wwwrap.class);
//nsb = sidebar.cloneNode();
    nsb = sidebar;
    nsb.style.width = '100%';
    slider = document.createElement('div');
    slider.id = 'SbSlider';
    slider.appendChild(nsb);
    slider.setAttribute('class','SbSlider');
    nsb.style.position = 'relative';
    slider.style.position = 'fixed';
    slider.style.display = 'block'; //'inline';
    slider.style.zIndex = 100000;
    // nsb.style.zIndex = 200000;
    nsb.style.position = 'absolute';
    nsb.style.minWidth = '80px';
    nsb.style.left = '0px';
    nsb.style.top = '0px';

    w = window.innerWidth;
    console.log('SliderWidth '+w+': ',(w/3)+'px');
    if( w < 640 ){
        slider.style.setProperty('width',(w/3) + 'px','important');
    }
    main.style.marginLeft = (parseInt(slider.style.width)/2 - 20) + 'px';

    slider.style.resize = "both";
    slider.draggable = "true";
    wrap.appendChild(slider);
    console.log('-- added SbSlider');
    //nsb.addEventListener('scroll',SbScrolled);

    buttons = document.createElement('div');
    buttons.id = 'NaviButtons';
    buttons.setAttribute('class','NaviButtons');
    buttons.align = "center";
    buttons.innerHTML += '<'+'p><a href="#TopOfPost" draggable="true">TOP<'+'/a><'+'/p>';
    buttons.innerHTML += '<'+'p><a href="#EndOfPost" draggable="true">END<'+'/p>';
    page.appendChild(buttons);
    buttons.style.position = 'fixed';
    buttons.style.zIndex = 30000;
    buttons.style.width = '180%';
    buttons.style.top = '320px';
    buttons.style.left = parseInt(w) * 1.0 + 'px';
    console.log('-- SbSlider installed (^-^)/ SatoxITS');
}
//window.addEventListener('load',SetSidebar); // after load
DestroyNaviButtons = function(){
    nb = document.getElementById('NaviButtons');
    if( nb != null ){
        nb.parentNode.removeChild(NaviButtons);
    }
}
</script>

// 2020-1006 its-more.jp-blog-60000-style.css
<!-- {
<style>
#NaviButtons {
    position:fixed;
    display:block;
    xwidth:100%;
    xxtop:100px;
    xxleft:10px;
    z-index:30000;
    font-size:10pt;
    color:#2ff !important;
    text-align:center;
    background-color:rgba(230,230,230,0.01);
}
#NaviButtons a {
    color:#2a2 !important;
    font-size:20px;
    text-align:center;
    xxtext-shadow:2px 2px #8ff;
    resize:both;
    padding:6px;
    margin:10px;
    border:1px solid #288 !important;
    border-radius:3px;
    background-color:rgba(160,160,160,0.05);
}
#SbSlider {
    overflow:auto;
    resize:both !important;
    xxoverflow-y:hidden !important;
    height:100px !important;
    display:inline !important;
    position:fixed !important;
    left:0px;
    top:0px;
    xxwidth:180px;
    width:24%;
    min-width:80px;
    height:100% !important;
    background-color:rgba(100,100,200,0.1);
}
#secondary {
    position:fixed;
    left:0px;
    top:0px;
    xxxz-index:60000;
    scroll-behavior: overflow !important;
    xxxxxxxxxxxxxxxxxxxxxxxxxxxwidth:18% !important;
    padding-left:4pt;
    color:#fff;
```

```
    font-size:0.5em;
    background-color:rgba(64,160,64,0.6) !important;
    white-space:nowrap;
}
#secondary a {
    color:#fff !important;
    text-decoration:disable !important;
}
#primary {
    position:relative;
    width:75% !important;
    left:25% !important;
}
#main {
    position:relative;
    width:75% !important;
    left:25% !important;
}
#site-navigation {
    position:relative;
    left:120px;
}
#adswsc_countertext {
    color:#4169e1;
    font-size:16pt !important;
    xxfont-size:10% !important;
    font-weight:bold;
}
#nowTime {
    color:#a0ffa0;
    font-size:16pt !important;
    xxfont-size:10% !important;
    font-weight:bold;
    text-shadow:1px 1px #fff;
}
.navigation-top {
    color:#22a !important;
    border:0px;
    background-color:rgba(220,220,220,0.1);
}

.visible-scrollbar, .invisible-scrollbar, .mostly-customized-scrollbar {
 display: block;
 xxwidth: 1em;
 xxoverflow: auto;
 xxheight: 1em;
}
.invisible-scrollbar ::-webkit-scrollbar {
 xxdisplay: none;
 width:1px !important;
 height:1px !important;
}
.mostly-customized-scrollbar ::-webkit-scrollbar {
 width: 2px;
 height: 2px;
 xxbackground-color: #aaa; xxx:or add it to the track;
}
.mostly-customized-scrollbar ::-webkit-scrollbar-thumb {
    background: #000;
}
</style>
} -->


</details>
<!-- SBSidebar_WorkCodeSpan } -->
*/ //</span>
//<!-- ---------- Work } ---------- -->



//<!-- ========== Work { ========== -->
//<span id="Template_WorkCodeSpan">
/*
<details><summary>Work Template</summary>
<!-- ---------- Template of Work// 2020-0928 SatoxITS { -->
<h2>Template of Work</h2>
<input id="Template_WorkCodeViewOpen" class="HtmlCodeViewButton" type="button" value="ShowCode">
<input id="Template_WorkOpenSnapshot" class="HtmlCodeViewButton" type="button" value="Snapshot">
<input id="Template_WorkCodeSignature" class="HtmlCodeViewButton" type="button" value="Signature">
<span id="Template_WorkCodeView"></span>
<script id="Template_WorkScript">
function Template_openWorkCodeView(){
    function Template_showWorkCode(){
        showHtmlCode(Template_WorkCodeView,Template_WorkCodeSpan);
    }
    Template_WorkCodeViewOpen.addEventListener('click',Template_showWorkCode);
}
Template_openWorkCodeView(); /// should be invoked by an event
</script>
</details>
<!-- Template_WorkCodeSpan } -->
*/ //</span>
//<!-- ========== Work } ========== -->



//<!-- ========== Work { ========== -->
//<span id="OriginalSource_WorkCodeSpan">
/*
<details open=""><summary>Original Source</summary>
<!-- ---------- OriginalSource // 2020-1009 SatoxITS { -->
<h2>Original Source of GShell</h2>
<input id="OriginalSource_WorkCodeViewOpen" class="HtmlCodeViewButton" type="button" value="ShowCode">
<input id="OriginalSource_WorkOpenSnapshot" class="HtmlCodeViewButton" type="button" value="Snapshot">
<input id="OriginalSource_WorkCodeSignature" class="HtmlCodeViewButton" type="button" value="Signature">
<span id="OriginalSourceTextElement"></span>
<span id="OriginalSource_WorkCodeView"></span>
<script id="OriginalSource_WorkScript">
function OriginalSource_openWorkCodeView(){
    function OriginalSource_showWorkCode(){
        //showHtmlCode(OriginalSource_WorkCodeView,OriginalSource_WorkCodeSpan);
        //OriginalSourceTextElement = OriginalSourceNode;
        //console.log('src3=\n'+OriginalSourceNode.outerHTML);
        showHtmlCode(OriginalSource_WorkCodeView,OriginalSourceNode);
    }
    OriginalSource_WorkCodeViewOpen.addEventListener('click',OriginalSource_showWorkCode);
}
//OriginalSourceNode = document.documentElement.cloneNode();
//OriginalSourceNode = gsh.cloneNode(true); //=======================
        //console.log('src0=\n'+document.documentElement.outerHTML);
        //console.log('src1=\n'+gsh.outerHTML);
        //console.log('src2=\n'+OriginalSourceNode.innerHTML);
OriginalSource_openWorkCodeView(); /// should be invoked by an event
```

```
        //showNodeAsHtmlSource(OriginalSource_WorkCodeView,OriginalSourceNode);
function SaveOriginalNode(){
    m0 = performance.memory;
    mu0 = m0.usedJSHeapSize;
    console.log('-- heap bef clone: '
        +m0.usedJSHeapSize+'/'+m0.totalHeapSize+'/'+m0.jsHeapSizeLimit);
    OriginalSourceNode = gsh.cloneNode(true);
    m1 = performance.memory;
    mu1 = m1.usedJSHeapSize;
    mu = mu1 - mu0;
    //alert('-- clone: used heap '+mu0+' -> '+mu1+' = '+mu+' bytes');
    console.log('-- heap aft clone: '
        +m1.usedJSHeapSize+'/'+m1.totalHeapSize+'/'+m1.jsHeapSizeLimit);
    //OriginalSourceNode = document.documentElement.cloneNode(true);
}

function Gsh_setupPage(){
    GshSetImages();
    //Indexer_afterLoaded();
        //GShell_initKeyCommands();
        //GJConsole_initConsole();
    GJConsole_initFactory();
    GJLink_init();
    InterFrameComm_init();
    Gshell_initTopbar();
    //WirtualDesktop_init();
    Banner_init();
    window.setInterval(ShowResourceUsage,1000);
}
function OnLoad(){
    SaveOriginalNode();
    Gsh_setupPage();
}
document.addEventListener('load',Gsh_setupPage);
</script>
</details>
<!-- OriginalSource_WorkCodeSpan } -->
*/ //</span>
//<!-- ========== Work } ========== -->

//</div>
//<br><script>OnLoad();</script></span></html>
```