

Tool Talk 2

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Notes

To add UCMSREX.SF to your user command files path:

```
]UFILE [1.5] UCMSREX
```

If you have UCMSREX.SF from the last year's conference, just replace it with this one; the tools from last year are all here too.

These tools require:

```
)EVLEVEL 2
```

Help:

```
]foo ?
```

Font: You may edit in your APLW.INI file; the defaults are:

```
[UCMSREX]  
FontName=APLFONT  
FontSize=11  
FontStyle=0  
FontCharset=default
```

Before using `fnreplx`, copy file `APL_PCRE.DLL` into your APLW directory.

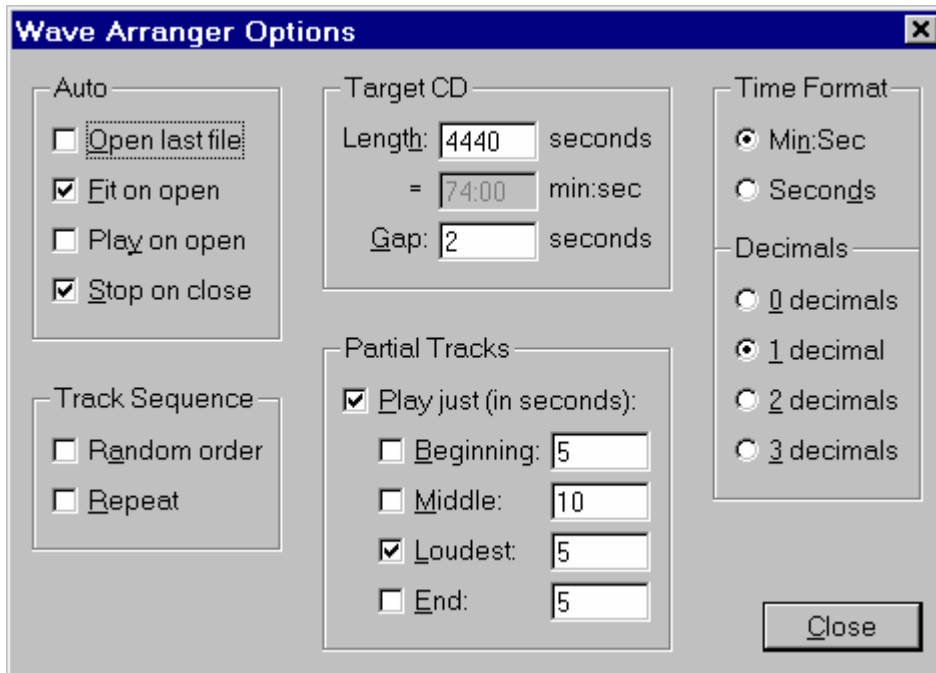
`fnreplx` is not a user command; load it into your active ws:

```
]uload fnreplx /f=ucmsrex
```

An excellent book on regular expressions:

Mastering Regular Expressions (2nd edition) by Jeffrey Friedl (O'Reilly, 2002)

Shortcut Keys:



!shortkeys fmWVopts

Shortcut Keys in: fmWVopts [Form]:

Alt+0	Option	fmWVopts.fDec.op0d	&0 decimals
Alt+1	Option	fmWVopts.fDec.op1d	&1 decimal
Alt+2	Option	fmWVopts.fDec.op2d	&2 decimals
Alt+3	Option	fmWVopts.fDec.op3d	&3 decimals
Alt+A	Check	fmWVopts.fTracks.ckRandom	R&andom order
Alt+B	Check	fmWVopts.fPartial.ckSeg1	&Beginning:
Alt+C	Button	fmWVopts.bnClose	&Close
Alt+D	Option	fmWVopts.fTime.opSec	Secon&ds
Alt+E	Check	fmWVopts.fPartial.ckSeg4	&End:
Alt+F	Check	fmWVopts.fAuto.ckFit	&Fit on open
Alt+L	Check	fmWVopts.fPartial.ckSeg3	&Loudest:
Alt+M	Check	fmWVopts.fPartial.ckSeg2	&Middle:
Alt+N	Option	fmWVopts.fTime.opMin	Mi&n:Sec
Alt+O	Check	fmWVopts.fAuto.ckOpen	&Open last file
Alt+P	Check	fmWVopts.fPartial.ckPartial	&Play just (in seconds):
Alt+R	Check	fmWVopts.fTracks.ckRepeat	&Repeat
Alt+S	Check	fmWVopts.fAuto.ckStop	&Stop on close
Alt+Y	Check	fmWVopts.fAuto.ckPlay	Pla&y on open
Ctrl+K	SubMenu	fmWVopts.mSegs	mSegs
Ctrl+T	SubMenu	fmWVopts.mOpts	mOpts
Available: Ctrl+ A B C D E F G H I J L M N O P Q R S U V W X Y Z			
Available: Alt+ G H I J K Q T U V W X Z			

Properties, Events, and Methods:

lpem fmWVopts.fAuto.ckFit

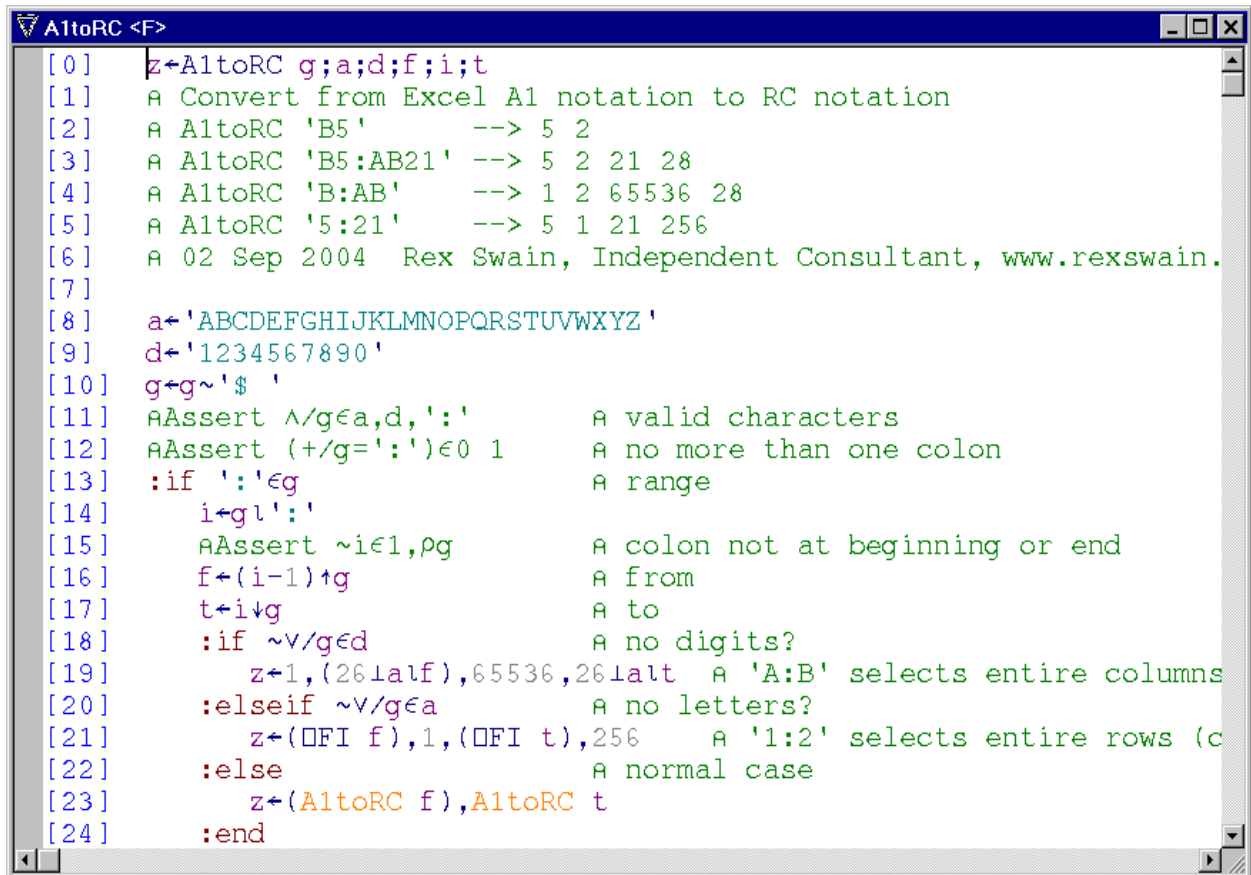
Object: fmWVopts.fAuto.ckFit
 Class: Check
 Properties: border caption children class color data def deferexit
 edge enabled events extent font help helpcontext hwnd
 instance keys links methods mode modified modifystop name
 noredraw opened order place pointer prompt properties
 scale scrollaccel scrollmargin self size state style
 suppress tabgroup tabparent tabstop targetformats tooltip
 tooltipwidth translate value visible where ++ Hwnd Self
 _data dragimage limitwhere nograychildren onAction
 siblings sourceformats transparent wedProps xdef
 Events: Action Click Close Delete Destroy DragEnter DragLeave
 DragOver Drop Exit ExitError Focus Help Hide KeyDown KeyUp
 Modified MouseDouble MouseDown MouseDrag MouseEnter
 MouseLeave MouseMove MouseUp Move Open Paint Reopen Resize
 Send Show Unfocus ++ onDragContinue onDragEnd
 onDragFeedback onDragStart onPreCreate onWindowPosChanged
 onWindowPosChanging
 Methods: Close Create Defer Delete Draw Event Exec Focus Help Hide
 Info Modify New Open Paint Popup Ref Resize Send Set
 SetLinks Show ++ Layout Msg

lpem Button /p

Class: Button
 Properties: border caption children class color data def deferexit
 edge enabled events extent font help helpcontext hwnd
 imageindex imagelist imagespace instance keys links
 methods mode modified modifystop name noredraw opened
 order place pointer prompt properties scale scrollaccel
 scrollmargin self size state style suppress tabgroup
 tabparent tabstop targetformats tooltip tooltipwidth
 translate value visible where ++ Hwnd Self _data dragimage
 limitwhere nograychildren onAction siblings sourceformats
 transparent wedProps xdef

Peek Into Workspace:

```
lpeek 5 xl AltoRC
```



```

AltoRC <F>
[0] z←AltoRC g;a;d;f;i;t
[1] A Convert from Excel A1 notation to RC notation
[2] A AltoRC 'B5' --> 5 2
[3] A AltoRC 'B5:AB21' --> 5 2 21 28
[4] A AltoRC 'B:AB' --> 1 2 65536 28
[5] A AltoRC '5:21' --> 5 1 21 256
[6] A 02 Sep 2004 Rex Swain, Independent Consultant, www.rexswain.
[7]
[8] a←'ABCDEFGHJKLMNOPQRSTUVWXYZ'
[9] d←'1234567890'
[10] g←g~'$ '
[11] AAssert ^/g∈a,d,':' A valid characters
[12] AAssert (+/g=':')∈0 1 A no more than one colon
[13] :if ':'∈g A range
[14] i←gl ':'
[15] AAssert ~i∈1,pg A colon not at beginning or end
[16] f←(i-1)↑g A from
[17] t←i↓g A to
[18] :if ~v/g∈d A no digits?
[19] z←1,(26↓a|f),65536,26↓alt A 'A:B' selects entire columns
[20] :elseif ~v/g∈a A no letters?
[21] z←(⊞f),1,(⊞t),256 A '1:2' selects entire rows (c
[22] :else A normal case
[23] z←(AltoRC f),AltoRC t
[24] :end

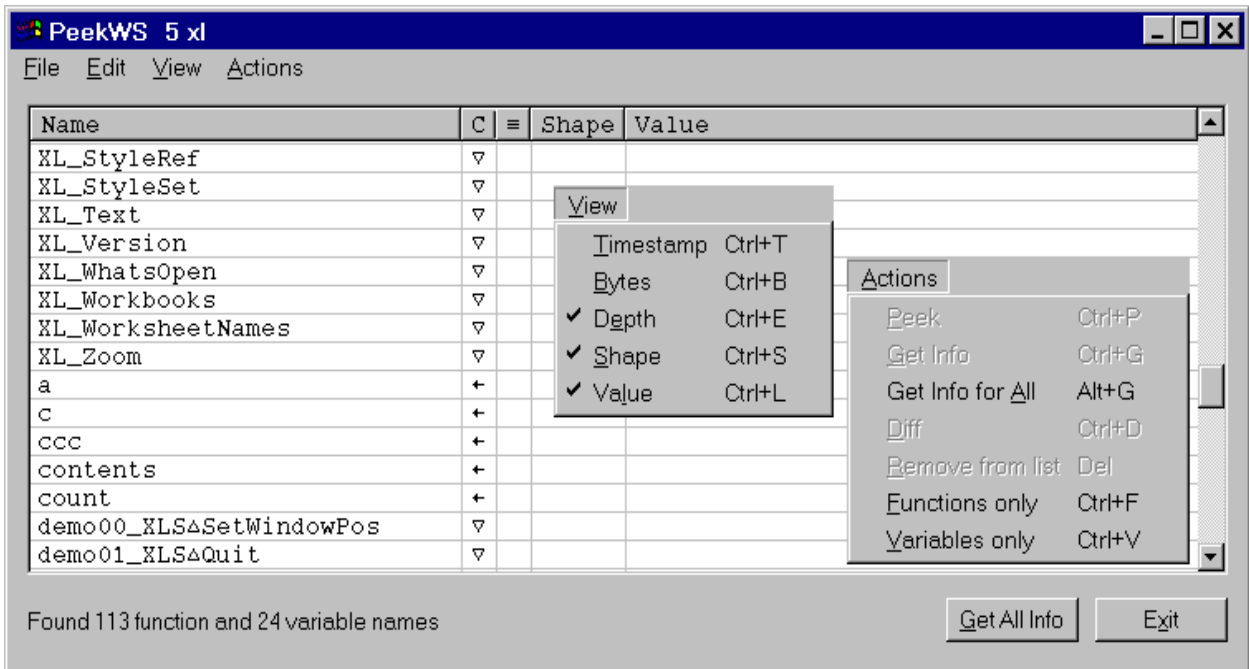
```

Ctrl+Q to quit -- function was localized and will disappear from active ws

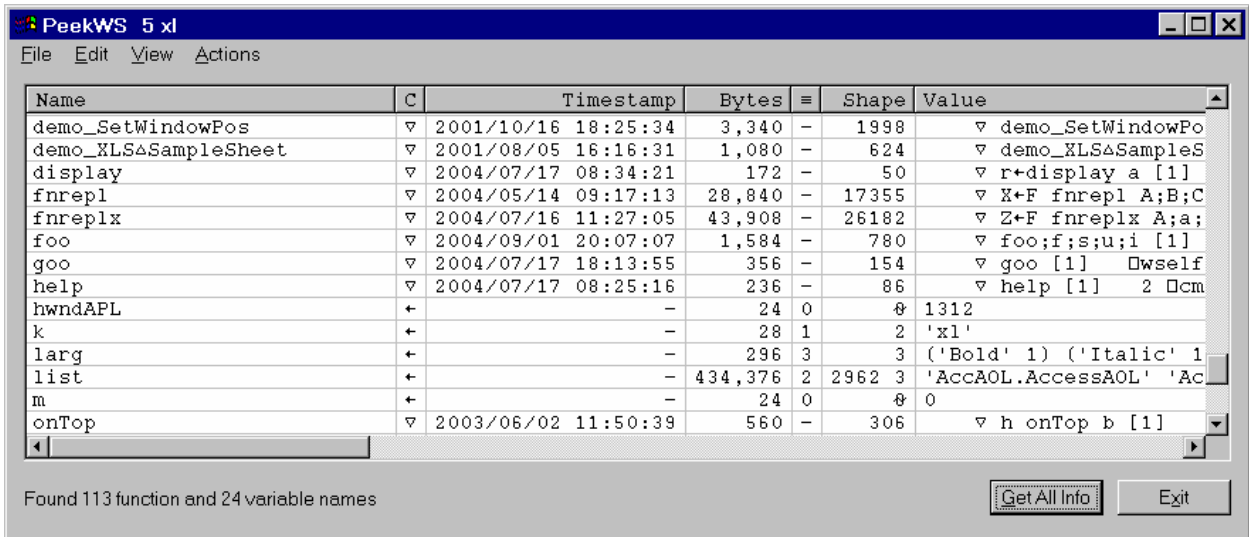
Ctrl+E to define in active ws

Peek At Workspace:

lpeekws 5 xl



Click Get All Info button; view Timestamps and Bytes



What's In My Clipboard?

Copy 8 characters 'cliptest' from APL session into clipboard

!clipboard

Format	Hex	Name	Bytes	Value
1	1	A CF_TEXT	12	'cliptest',␣TCNUL,␣TCNUL,␣TCNUL,␣TCNUL
16	10		4	␣TCHT,'␣',␣TCNUL,␣TCNUL
7	7	A CF_OEMTEXT	12	'cliptest',␣TCNUL,␣TCNUL,␣TCNUL,␣TCNUL
13	D	A CF_UNICODETEXT	24	'c',␣TCNUL,'l',␣TCNUL,'i',␣TCNUL,'p',␣TCNUL

Copy 8 characters 'cliptest' from Microsoft Word into clipboard

!clipboard

Format	Hex	Name	Bytes	Value
49161	C009	DataObject	4	'ó€',␣TCLF,␣TCNUL
49166	C00E	Object Descriptor	120	'x',␣TCNUL,␣TCNUL,␣TCNUL,␣TCNUL,'←',␣TCNUL
49303	C097	Rich Text Format	3,434	{\rtf1\ansi\ansicpg1252\uc1\de
49279	C07F	HTML Format	2,379	'Version:1.0',␣TCNL,␣TCLF,'Star
1	1	A CF_TEXT	9	'cliptest',␣TCNUL
13	D	A CF_UNICODETEXT	18	'c',␣TCNUL,'l',␣TCNUL,'i',␣TCNUL
14	E	A CF_ENHMETAFILE	0	(Could not get GlobalLock)
3	3	A CF_METAFILEPICT	16	␣TCBS,␣TCNUL,␣TCNUL,␣TCNUL,'`O'
49163	C00B	Embed Source	19,968	'-ÿæí␣→ß',16ρ␣TCNUL,'>',␣TCNUL
49156	C004	Native	19,968	'-ÿæí␣→ß',16ρ␣TCNUL,'>',␣TCNUL
49155	C003	OwnerLink	28	'Word.Document.8',␣TCNUL,'Docum
49165	C00D	Link Source	132	␣TCHT,'ε',6ρ␣TCNUL,'À',6ρ␣TCNUL
49167	C00F	Link Source Descriptor	140	'i',␣TCNUL,␣TCNUL,␣TCNUL,'←',␣TCNUL
49154	C002	ObjectLink	37	'Word.Document.8',␣TCNUL,'Docum
49171	C013	Ole Private Data	408	␣TCNUL,␣TCNUL,␣TCNUL,␣TCNUL,'␣§
16	10		4	␣TCHT,'␣',␣TCNUL,␣TCNUL
7	7	A CF_OEMTEXT	9	'cliptest',␣TCNUL

Press PrintScreen key

!clipboard

Format	Hex	Name	Bytes	Value
2	2	A CF_BITMAP	0	(Could not get GlobalLock)
8	8	A CF_DIB	9,437,236	'(',␣TCNUL,␣TCNUL,␣TCNUL,␣TCNUL,␣TCHT,␣TCNUL
17	11		9,437,320	'!',␣TCNUL,␣TCNUL,␣TCNUL,␣TCNUL,␣TCHT,␣TCNUL

Monitor

```
]mf /on
...
]mf
```

MF summary for wsid: 5 REXPLAY

File View Resolution (Milliseconds)

Function	Total	Here	Pct	r/It	Calls	Header
wavefile	1604.550	1603.667	34.03	42	42	r+m wavefile f;DELX
wvh	12082.189	1154.167	24.49	1733	1733	r+opt wvh event;a;b;c;d;
FFAW	1106.679	820.397	17.41	5284	5284	R+W FFAW A;D;E;F;K;N;P;S
TraceMe	1917.115	679.415	14.42	1742	1742	TraceMe;d;e;f;h;r;s;t;v;
wv	339.079	184.786	3.92	8	2	wv;b;d;g;h;i;lw;n;p;q;t;
wvfmtclock	124.662	83.412	1.77	1393	1393	r+wvfmtclock m;s;f;p
wvo	81.176	54.307	1.15	4	4	opt wvo event;f;fh;fw;fl
fexist	52.478	51.617	1.10	42	42	r+fexist f;t;DELX
Ini	48.269	45.802	0.97	126	126	r+v Ini a;d;e;f;s
fread	16.841	16.788	0.36	2	2	r+fread f;t;DELX
Parse	10.214	4.204	0.09	76	76	r+Parse a;q;i;w
workarea	4.125	2.962	0.06	7	7	a+workarea p;e;h;i;n;r;s
mrufiles	15.289	2.346	0.05	36	4	w mrufiles a;f;s;i;m;c;n
dlb	3.555	2.170	0.05	152	152	r+dlb v
TextWidth	1.552	1.362	0.03	16	16	w+o TextWidth t
AlwaysOnTop	1.397	1.312	0.03	2	2	!wself AlwaysOnTop b;h;v
trypath	1.281	1.204	0.03	4	4	r+trypath p;DELX
TextHeight	0.677	0.617	0.01	4	4	h+o TextHeight t
KeepOnScreen	15.796	0.538	0.01	5	5	KeepOnScreen;a;c;g;p;u;w
Assert	0.753	0.512	0.01	21	21	w Assert a
upper	0.820	0.450	0.01	38	38	r+upper a
Sink	1.739	0.430	0.01	172	172	Sink a

MF detail for function: TraceMe

File View Resolution (Milliseconds)

Line	Total	Here	Iter	Instruction
TraceMe	1917.115	679.415	1742	▽ TraceMe;d;e;f;h;r;s;t;v;w;x
TraceMe[1]	0.000	0.000	0	[1] A Trace callback function
TraceMe[2]	0.000	0.000	0	[2] A 11 Feb 2003 Rex Swain, Independ
TraceMe[3]	0.000	0.000	0	[3]
TraceMe[4]	11.213	11.213	1742	[4] +ΔRuntimep0 A only
TraceMe[5]	8.894	8.894	1742	[5] w+OPW
TraceMe[6]	797.545	47.452	1742	[6] r+'[' ,!wself, ' ' , (w FFAW !wevent)
TraceMe[7]	31.421	31.421	1742	[7] s+OSI A si s
TraceMe[8]	9.892	9.892	1742	[8] +(1=+ps)p0 A done
TraceMe[9]	5.008	5.008	1742	[9] t+''
TraceMe[10]	6.810	6.810	1742	[10] :if 1<+ps A if a
TraceMe[11]	27.970	27.970	1742	[11] f+s[2;] ◊ f+(^!f≠[' ')/f A call
TraceMe[12]	20.176	20.176	1742	[12] d++/s[;!1+pf]^.=f, '[' A recu
TraceMe[13]	4.723	4.723	1742	[13] e+f
TraceMe[14]	15.174	15.174	1742	[14] e+e, (d>1)/' [depth ' , (!d), ' ']
TraceMe[15]	5.690	5.690	1742	[15] e+e, ' ':
TraceMe[16]	14.506	14.506	1742	[16] (x v)+2p1 DAT f A expl
TraceMe[17]	5.968	5.968	1742	[17] :if v>0 A if a
TraceMe[18]	12.576	12.576	1737	[18] h+OCRL f, '[0]' A head
TraceMe[19]	15.661	15.661	1737	[19] h+(!1+h!';')+h A igno

Workspace Search/Replace with *Regular Expressions*

... fnreplx ...

Right argument:

```
... fnreplx 'target'           A Search (if target begins with a letter)
... fnreplx 'target/options'  A Ditto, with options
Any non-alpha delimiter character may be used in place of the slashes shown below
... fnreplx '/target'        A Search (exactly 1 delimiter)
... fnreplx '/target/'      A Search (exactly 2 delimiters)
... fnreplx '/target/options' A Ditto, with options
... fnreplx '/target/replacement/' A Replace (exactly 3 delimiters)
... fnreplx '/target/replacement/options' A Ditto, with options
```

Regex options:

```
... fnreplx '.../i' A Case-insensitive matching
... fnreplx '.../m' A Multi-line
... fnreplx '.../x' A Extended syntax: un-escaped white space is ignored
... fnreplx '.../s' A Dot meta-character matches all characters including new-lines
```

Left argument:

```
fnreplx ... A Look in all functions
'F1 F2' fnreplx ... A Only look in named function(s)
'F*' fnreplx ... A Function names with wildcards (foo* *old fm*def etc.)
'~F1' fnreplx ... A Look in all but named function(s)
'?' fnreplx ... A Prompt for confirmation before each replacement
'-' fnreplx ... A Underline the hits as they are displayed ('-' okay too)
'+-' fnreplx ... A Suppress display; return fn names
'A' fnreplx ... A Match only in comments
'"' fnreplx ... A Match only in character constants ('"' okay too)
'α' fnreplx ... A Match only in APL (not comments/quotes)
```

Function line numbers in brackets are not considered part of the function
(I display the line numbers so you can double-click on "foo[6]" to start editor)

Function lines may have leading blanks, but never have trailing blanks
Use /^FOO/m to find FOO at the (very) beginning of a line
Use /\ *FOO/m to find FOO at the beginning of a possibly-indented line
Use /FOO\$/m to find FOO at the end of a line

Special regex characters that must be escaped in target: \ | ^ \$. ? * + [] () { }

PCRE comes from a Perl/Unix heritage, where linefeeds are used between lines of text
So when they say "newline" (\n) they are talking about □TCLF
So when they say "return" (\r) they are talking about □TCNL
To make the regex engine work, I put LF's (not NL's) between function lines

Examples

Find fns that contain aa followed by bb on the same line

```
'←' fnreplx '/aa.*bb/'
```

Use the /s regex option to have "." match even newline characters; e.g.,

Find fns that contain aa followed by bb, not necessarily on the same line

```
'←' fnreplx '/aa.*bb/s'
```

Find fns that contain aa and bb, in either order, anywhere in the function

```
'←' fnreplx '/aa.*bb|bb.*aa/s'
```

Use the /i regex option for case-insensitive matching; e.g.,

```
fnreplx '/πio/i'
```

For "syntactic" search, use the regex "word boundary" assertion \b

```
'-foo' fnreplx '/\bfoo\b/'
```

This works pretty well for APL, but... Note that the regex engine does not consider Δ and Δ to be letters. So that would match the "foo" in "Δfoo".

Match all APL identifier names:

```
'-foo' fnreplx '/[⊖A-Za-zΔΔ][A-Za-zΔΔ0-9_]*/'
```

Match integers: basically it's

```
fnreplx '/-?\d+/'
```

but we need to pay attention to what comes before and after; this is close

```
fnreplx '/(?![\.\w])-\d+(?![\.\w])/'
```

But since \w does not include the deltas, we should really use

```
fnreplx '/(?![\.\a-zA-Z0-9_ΔΔ])-\d+(?![\.\a-zA-Z0-9_ΔΔ])/'
```

The (?. . .) things are lookbehind and lookahead assertions

Delete the leading blank from lines that are indented by exactly one space

```
fnreplx '/^ (?! )//m'
```

Parenthesized subpatterns in the target string may be referred to with

\$1 \$2 \$3 in the replacement string; e.g.,

```
fnreplx ';\b(able|baker)\b;<I>$1</I>;'
```

wraps <I> and </I> html tags around words able and baker

Change a ⊖ss b to b⊖a where a and b are variable names

```
fnreplx '/([⊖A-Za-zΔΔ][A-Za-zΔΔ0-9_]*) *⊖ss +([⊖A-Za-zΔΔ][A-Za-zΔΔ0-9_]*)/$2⊖$1/i'
```

Break lines at diamonds (remember, newline to the Unix crowd is ⊖TCLF)

```
'foo' fnreplx '/\s◇\s/',⊖tclf,'/'
```

Find bare branches

```
fnreplx '/->[ ]*(R|◇|$)/m'
```

\1 \2 \3 . . . \9 may be used for "back references" --

to refer to strings matched in parenthesized subexpressions earlier in the target

Find repeated words

```
'-' fnreplx '/\b([A-Za-z]+) +(\1)\b/'
```