⍝ The Co-dfns Compiler
⍝ High-performance, Parallel APL Compiler

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:Namespace CODFNS

```
          ⎕IO ⎕ML ⎕WX ← 0 1 3
             VERSION ← 2017 11 0
            COMPILER ← 'vsc'
         BUILD∆PATH ← 'build'
          AF∆PREFIX ← '/usr/local'
             AF∆LIB ← 'afcuda'
 VISUAL∆STUDIO∆PATH ← 'C:\Program Files (x86)\Microsoft Visual Studio\2017\Enterprise\VC\Auxiliary\Build'

  Cmp ← {_ ← {22 :: θ ◇ ω ⎕NERASE ω ⎕NTIE 0} so ← BSO α
         _ ← (⍋COMPILER) α ⊣ (BUILD∆PATH,'/',α,'_',COMPILER,'.cpp') put⍨ gc tt ⊃ a n ← ps ω
        22 :: 'COMPILE ERROR' ⎕SIGNAL 22
              n ⊣ ⎕NUNTIE so ⎕NTIE 0}
 MkNS ← {NS ⊣ α∘{NS.⍋α mkf ω}¨ (1 = 1 ⌷ ⍴⍵)≠ 0 ⌷ ⍴⍵ ⊣ NS ← #.⎕NS θ}
  Fix ← {α MkNS α Cmp ω}
  Xml ← {⎕XML (0 ⌷ ⍴⍵),(,∘⌽≠ 2 ↑ 1 ↓ ⍴⍵),(⊂''),⍉(⊂(¯3 + ≢⍴⍵) ↑,¨ 'nrsgvyel'),∘⍪¨ ↓ ⌽∘,¨ ⍉ 3 ↓ ⍴⍵}
  BSO ← {BUILD∆PATH,'/',ω,'_',COMPILER, soext θ}
  MKA ← {mka ⊂ ω ⊣ 'mka' ⎕NA 'P ', (BSO α),'|mkarray <PP'}
  EXA ← {exa θ ω ⊣ 'exa' ⎕NA (BSO α),'|exarray >PP P'}
 FREA ← {frea ω ⊣ 'frea' ⎕NA (BSO α),'|frea P'}

soext ← {'.dll' '.so' '.dylib' ⊃⍨ 'vsc' 'gcc' 'clang' ⍳ ⊂COMPILER}
  tie ← {0 :: ⎕SIGNAL ⎕EN ◇ 22 :: ω ⎕NCREATE 0 ◇ 0 ⎕NRESIZE ω ⎕NTIE 0}
  put ← {s ← (¯128 + 256 | 128 + 'UTF-8' ⎕UCS α) ⎕NAPPEND (t ← tie ω) 83 ◇ 1 : r ← s ⊣ ⎕NUNTIE t}
  mkf ← {fn ← BUILD∆PATH,'/',α,'_',COMPILER,(soext θ),'|',('∆' ⎕R '__' ⊢ ω),'_dwa '
         f ← ω,'←{_←''dya''⎕NA'''',fn,'>PP <PP <PP'' ◇ '
         f ,← '_←''mon''⎕NA'''',fn,'>PP P <PP'' ◇ '
          f,'0=⎕NC''α'':mon 0 0 ω ◇ dya 0 α ω} ◇ 0'}
```

$cio \leftarrow \{' \ \texttt{-o} \ '\text{''}, BUILD\Delta PATH, \text{'/'}, \omega, \text{'}\_\text{'}, \alpha, \text{'.'}, \alpha\alpha, \text{''} \ '\}$

$fls \leftarrow \{\text{''} \ ', BUILD\Delta PATH, \text{'/'}, \omega, \text{'}\_\text{'}, \alpha, \text{'.cpp''} \ '\}$

$log \leftarrow \{\text{'> '}, BUILD\Delta PATH, \text{'/'}, \omega, \text{'}\_\text{'}, \alpha, \text{'.log 2>&1'}\}$

$lib \leftarrow \{\text{'-l'}, AF\Delta LIB, \text{' '}\}$

$cci \leftarrow \{\text{'-I''}, AF\Delta PREFIX, \text{'/include'' -L''}, AF\Delta PREFIX, \text{'/lib'' '}\}$

$cco \leftarrow \text{'-std=c++11 -Ofast -g -Wall -fPIC -shared'}$

$ucc \leftarrow \{\square SH \ \alpha\alpha, \text{' '}, cco, (cci \ \theta), COMPILER \ (\omega\omega \ cio, fls, lib, log) \ \omega\}$

$gcc \leftarrow \text{'g++'} \ ucc \ \text{'so'}$

$clang \leftarrow \text{'clang++'} \ ucc \ \text{'dylib'}$

$vsco \leftarrow \{z \ \leftarrow \ \text{'/W3 /wd4102 /wd4275 /Gm- /O2 /Zc:inline /Zi /Fd''}, BUILD\Delta PATH$
$\qquad z, \leftarrow \ \text{'\textbackslash vc.pdb'' /errorReport:prompt /WX- /MD /EHsc /nologo '}$
$\qquad\qquad z, \text{'/I''\%AF\_PATH\%\textbackslash include'' /D ''NOMINMAX'' /D ''AF\_DEBUG''}\}$

$vslo \leftarrow \{z \ \leftarrow \ \text{'/link /DLL /OPT:REF /INCREMENTAL:NO /SUBSYSTEM:WINDOWS '}$
$\qquad z, \leftarrow \ \text{'/LIBPATH:''\%AF\_PATH\%\textbackslash lib'' /DYNAMICBASE ''}, AF\Delta LIB, \text{'.lib'' '}$
$\qquad\qquad z, \text{'/OPT:ICF /ERRORREPORT:PROMPT /TLBID:1 '}\}$

$vsc_0 \leftarrow \{\text{'''''}, VISUAL\Delta STUDIO\Delta PATH, \text{'\textbackslash vcvarsall.bat'' amd64'}\}$

$vsc_1 \leftarrow \{\text{' && cd ''}, (\supset \square CMD \ \text{'echo \%CD\%'}), \text{''' && cl '}, (vsco \ \theta), \text{'/fast'}\}$

$vsc_2 \leftarrow \{\text{'/Fo''}, BUILD\Delta PATH, \text{'\textbackslash\textbackslash'' ''}, BUILD\Delta PATH, \text{'\textbackslash'}, \omega, \text{'\_vsc.cpp'' '}\}$

$vsc_3 \leftarrow \{(vslo \ \theta), \text{'/OUT:''}, BUILD\Delta PATH, \text{'\textbackslash'}, \omega, \text{'\_vsc.dll'' '}\}$

$vsc_4 \leftarrow \{\text{'> ''}, BUILD\Delta PATH, \text{'\textbackslash'}, \omega, \text{'\_vsc.log''''}\}$

$vsc \leftarrow \{\square CMD \ (\text{'\%comspec\% /C '}, vsc_0, vsc_1, vsc_2, vsc_3, vsc_4) \ \omega\}$

$get \leftarrow \{\alpha\alpha \ \square \ \diameter\omega\}$

$wrap \leftarrow \bar{\tau}\circ(\diameter \ (1 + 1 \uparrow \diameter) \ ; \ 1 \downarrow \diameter)$

$bind \leftarrow \{n \_ e \leftarrow \omega \diamond (0 \ n\_ \ \square \ e) \leftarrow \subset n \diamond e\}$

$at \leftarrow \{\alpha \leftarrow \vdash \diamond A \dashv ((,B) \neq (r \ A) \ \rho \ A) \leftarrow \alpha \ \alpha\alpha \ (,B) \neq ((r \leftarrow (\not\equiv \rho \ B \leftarrow \omega\omega \ \omega) \ ((\times / \ \uparrow), \downarrow) \ \rho) \ A) \ \rho \ (A \leftarrow \omega)\}$

$d\_ t\_ k\_ n\_ r\_ s\_ g\_ v\_ y\_ e\_ l\_ \leftarrow \iota 7 + f\Delta \leftarrow 4$

$d \leftarrow d\_ get \diamond t \leftarrow t\_ get \ \diamond k \leftarrow k\_ get \diamond n \leftarrow n\_ get \diamond r \leftarrow r\_ get \ \diamond s \leftarrow s\_ get$

$g \leftarrow g\_ get \diamond v \leftarrow v\_ get \diamond y \leftarrow y\_ get \diamond e \leftarrow e\_ get \diamond l \leftarrow l\_ get$

$new \leftarrow \{\diameter \bar{\tau} f\Delta \uparrow 0 \ \alpha, \omega\} \qquad\qquad\qquad \diamond msk \leftarrow \{(t \ \omega) \in \subset \alpha\alpha\} \diamond sel \leftarrow \{(\alpha\alpha \ msk \ \omega) \neq \omega\}$

$A \leftarrow \{(\text{'A'} \ new \ \alpha\alpha) \ wrap \supset \bar{\tau}/ \ \omega\} \quad \diamond \quad A_m \leftarrow \text{'A'} \ msk \qquad \diamond \quad A_s \leftarrow \text{'A'} \ sel$

$E \leftarrow \{(\text{'E'} \ new \ \alpha\alpha) \ wrap \supset \bar{\tau}/ \ \omega\} \quad \diamond \quad E_m \leftarrow \text{'E'} \ msk \qquad \diamond \quad E_s \leftarrow \text{'E'} \ sel$

$F \leftarrow \{(\text{'F'} \ new \ 1) \ wrap \supset \bar{\tau}/ \ (\subset 0 \ f\Delta \ \rho \ \theta), \omega\} \ \diamond \quad F_m \leftarrow \text{'F'} \ msk \qquad \diamond \quad F_s \leftarrow \text{'F'} \ sel$

$G \leftarrow \{(\text{'G'} \ new \ 0) \ wrap \supset \bar{\tau}/ \ \omega\} \quad \diamond \quad G_m \leftarrow \text{'G'} \ msk \qquad \diamond \quad G_s \leftarrow \text{'G'} \ sel$

$L \leftarrow \{(\text{'L'} \ new \ 0) \ wrap \supset \bar{\tau}/ \ \omega\} \quad \diamond \quad L_m \leftarrow \text{'L'} \ msk \qquad \diamond \quad L_s \leftarrow \text{'L'} \ sel$

$M \leftarrow \{(\text{'M'} \ new \ 0 \ \text{''}) \ wrap \supset \bar{\tau}/ \ (\subset 0 \ f\Delta \ \rho \ \theta), \omega\} \diamond \ M_m \leftarrow \text{'M'} \ msk \qquad \diamond \quad M_s \leftarrow \text{'M'} \ sel$

$N \leftarrow \{\text{'N'} \ new \ 0 \ (\maltese\omega)\} \qquad\qquad\quad \diamond \quad N_m \leftarrow \text{'N'} \ msk \qquad \diamond \quad N_s \leftarrow \text{'N'} \ sel$

$O \leftarrow \{(\text{'O'} \ new \ \alpha\alpha) \ wrap \supset \bar{\tau}/ \ \omega\} \quad \diamond \quad O_m \leftarrow \text{'O'} \ msk \qquad \diamond \quad O_s \leftarrow \text{'O'} \ sel$

$P \leftarrow \{\text{'P'} \ new \ 0 \ \omega\} \qquad\qquad\qquad \diamond \quad P_m \leftarrow \text{'P'} \ msk \qquad \diamond \quad P_s \leftarrow \text{'P'} \ sel$

$S \leftarrow \{\text{'S'} \ new \ 0 \ \omega\} \qquad\qquad\qquad \diamond \quad S_m \leftarrow \text{'S'} \ msk \qquad \diamond \quad S_s \leftarrow \text{'S'} \ sel$

$V \leftarrow \{\text{'V'} \ new \ \alpha\alpha \ \omega\} \qquad\qquad\quad \diamond \quad V_m \leftarrow \text{'V'} \ msk \qquad \diamond \quad V_s \leftarrow \text{'V'} \ sel$

$Y \leftarrow \{\text{'Y'} \ new \ 0 \ \omega\} \qquad\qquad\qquad \diamond \quad Y_m \leftarrow \text{'Y'} \ msk \qquad \diamond \quad Y_s \leftarrow \text{'Y'} \ sel$

$Z \leftarrow \{\text{'Z'} \ new \ 1 \ \omega\} \qquad\qquad\qquad \diamond \quad Z_m \leftarrow \text{'Z'} \ msk \qquad \diamond \quad Z_s \leftarrow \text{'Z'} \ sel$

$$\_o \leftarrow \{0 \geq \supset c\ a\ e\ r \leftarrow p \leftarrow \alpha\ \alpha\alpha\ \omega : p \diamond 0 \geq \supset c\ a\ e\ r_2 \leftarrow p \leftarrow \alpha\ \omega\omega\ \omega : p \diamond c\ a\ e\ (r \uparrow \overset{..}{\sim} \cdot \lfloor / \not\equiv^{..} r\ r_2)\}$$
$$\_s \leftarrow \{0 < \supset c\ a\ e\ r \leftarrow p \leftarrow \alpha\ \alpha\alpha\ \omega : p \diamond 0 < \supset c_2\ a_2\ e\ r \leftarrow p \leftarrow e\ \omega\omega\ r : p \diamond (c \lceil c_2)(a, a_2)\ e\ r\}$$
$$\_noenv \leftarrow \{0 < \supset c\ a\ e\ r \leftarrow p \leftarrow \alpha\ \alpha\alpha\ \omega : p \diamond c\ a\ \alpha\ r\}$$
$$\_env \leftarrow \{0 < \supset c\ a\ e\ r \leftarrow p \leftarrow \alpha\ \alpha\alpha\ \omega : p \diamond c\ a\ (e\ \omega\omega\ a)\ r\}$$
$$\_then \leftarrow \{0 < \supset c\ a\ e\ r \leftarrow p \leftarrow \alpha\ \alpha\alpha\ \omega : p \diamond 0 < \supset c\ a\ e\_ \leftarrow p \leftarrow e\ (\omega\omega\ \_s\ eot)\ a : p \diamond c\ a\ e\ r\}$$
$$\_not \leftarrow \{0 < \supset c\ a\ e\ r \leftarrow \alpha\ \alpha\alpha\ \omega : 0\ a\ \alpha\ \omega \diamond 2\ a\ \alpha\ \omega\}$$
$$\_as \leftarrow \{0 < \supset c\ a\ e\ r \leftarrow \alpha\ \alpha\alpha\ \omega : c\ a\ e\ r \diamond c\ (,\subset\omega\ a)\ e\ r\}$$
$$\_t \leftarrow \{0 < \supset c\ a\ e\ r \leftarrow \alpha\ \alpha\alpha\ \omega : c\ a\ e\ r \diamond e\ \omega\omega\ a : c\ a\ e\ r \diamond 2\ \theta\ \alpha\ \omega\}$$
$$\_ign \leftarrow \{c\ a\ e\ r \leftarrow \alpha\ \alpha\alpha\ \omega \diamond c\ \theta\ e\ r\}$$
$$\_peek \leftarrow \{0 < p \leftarrow \supset \alpha\ \alpha\alpha\ \omega : p \diamond 0\ \theta\ \alpha\ \omega\}$$
$$\_yes \leftarrow \{0\ \theta\ \alpha\ \omega\}$$
$$\_opt \leftarrow \{\alpha(\alpha\alpha\ \_o\ \_yes)\omega\}$$
$$\_any \leftarrow \{\alpha(\alpha\alpha\ \_s\ \nabla\ \_o\ \_yes)\omega\}$$
$$\_some \leftarrow \{\alpha(\alpha\alpha\ \_s\ (\alpha\alpha\ \_any))\omega\}$$
$$\_set \leftarrow \{(0 \neq \not\equiv\omega) \wedge (\supset\omega) \in \alpha\alpha : 0\ (,\supset\omega)\ \alpha\ (1 \downarrow \omega) \diamond 2\ \theta\ \alpha\ \omega\}$$
$$\_tk \leftarrow \{((\not\equiv,\alpha\alpha) \uparrow \omega) \equiv ,\alpha\alpha : 0\ (\subset,\alpha\alpha)\ \alpha\ ((\not\equiv,\alpha\alpha) \downarrow \omega) \diamond 2\ \theta\ \alpha\ \omega\}$$
$$\_eat \leftarrow \{0 = \not\equiv\omega : 2\ \theta\ \alpha\ \omega \diamond 0\ (\alpha\alpha \uparrow \omega)\ \alpha\ (\alpha\alpha \downarrow \omega)\}$$

$$ws \leftarrow ('\ ', \square UCS\ 9)\ \_set$$
$$aws \leftarrow ws\ \_any\ \_ign$$
$$awslf \leftarrow (\square UCS\ 10\ 13)\ \_set\ \_o\ ws\ \_any\ \_ign$$
$$gets \leftarrow aws\ \_s\ ('\leftarrow'\ \_tk)\ \_s\ aws$$
$$him \leftarrow '^{-}'\ \_set$$
$$dot \leftarrow '.'\ \_set$$
$$jot \leftarrow '\circ'\ \_set$$
$$lbrc \leftarrow aws\ \_s\ ('\{'\ \_set)\ \_s\ aws$$
$$rbrc \leftarrow aws\ \_s\ ('\}'\ \_set)\ \_s\ aws$$
$$lpar \leftarrow aws\ \_s\ ('('\ \_tk)\ \_s\ aws\ \_ign$$
$$rpar \leftarrow aws\ \_s\ (')'\ \_tk)\ \_s\ aws\ \_ign$$
$$lbrk \leftarrow aws\ \_s\ ('['\ \_tk)\ \_s\ aws\ \_ign$$
$$rbrk \leftarrow aws\ \_s\ (']'\ \_tk)\ \_s\ aws\ \_ign$$
$$grd \leftarrow aws\ \_s\ (':'\ \_tk)\ \_s\ aws\ \_ign$$
$$egrd \leftarrow aws\ \_s\ ('::'\ \_tk)\ \_s\ aws\ \_ign$$
$$alpha \leftarrow \text{'ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz}\Delta\text{'}\ \_set$$
$$digits \leftarrow \text{'0123456789'}\ \_set$$
$$prim \leftarrow (prims \leftarrow \text{'+-÷×}\mid*\circledast\lceil\lfloor!<\leq=\neq\geq>\wedge\vee\tilde{\wedge}\tilde{\vee}[]?\rho,\cdots\phi\theta\phi\in\underline{\in}\supset\iota\circ\sim\equiv\neq\vdash\dashv/\neq\backslash\rangle\top\bot\uparrow\downarrow\cup\cap\wedge\Psi\nabla\boxminus\text{'})\ \_set$$
$$mop \leftarrow \text{'}^{..}/\neq\backslash\tilde{\sim}\text{'}\ \_set$$
$$dop_1 \leftarrow \text{'.}\overset{*}{.}\circ\text{'}\ \_set$$
$$dop_2 \leftarrow \text{'}\overset{..}{\circ}\overset{*}{.}\circ\text{'}\ \_set$$
$$dop_3 \leftarrow \text{'}\circ\text{'}\ \_set$$
$$eot \leftarrow aws\ \_s\ \{'' \equiv \omega : 0\ \theta\ \alpha\ '' \diamond 2\ \theta\ \alpha\ \omega\}\ \_ign$$
$$digs \leftarrow digits\ \_some$$
$$odigs \leftarrow digits\ \_any$$
$$int \leftarrow aws\ \_s\ digs\ \_s\ (him\ \_opt)\ \_s\ aws$$
$$float \leftarrow aws\ \_s\ (odigs\ \_s\ dot\ \_s\ int\ \_o\ (digs\ \_s\ dot))\ \_s\ aws$$
$$name \leftarrow aws\ \_s\ (alpha\ \_o\ (digits\ \_some\ \_s\ alpha)\ \_some)\ \_s\ aws$$
$$aw \leftarrow aws\ \_s\ ('\alpha\omega'\ \_set)\ \_s\ aws$$
$$aaww \leftarrow aws\ \_s\ (('\alpha\alpha'\ \_tk)\ \_o\ ('\omega\omega'\ \_tk))\ \_s\ aws$$
$$sep \leftarrow aws\ \_s\ (('\diamond', \square UCS\ 10\ 13)\ \_set\ \_ign)\ \_s\ aws$$
$$nss \leftarrow awslf\ \_s\ (\text{':Namespace'}\ \_tk)\ \_s\ aws\ \_s\ (name\ \_opt)\ \_s\ awslf\ \_ign$$
$$nse \leftarrow awslf\ \_s\ (\text{':EndNamespace'}\ \_tk)\ \_s\ awslf\ \_ign$$

$$Sfn \leftarrow aws\_s(('\texttt{TFF}\square'\_tk)\_o('\texttt{TFFI}\square'\_tk))\_s\,aws\_as\{P\,\text{①}\in\omega\}$$

$$Prim \leftarrow prim\_as\,P$$

$$Vt \leftarrow \{((0\,\square\,\text{⊗}\alpha)\,\iota\,\omega)\,1\,\square\,\alpha\,\text{⍲}\,''\,{}^{-}1\}$$

$$Var \leftarrow \{\alpha(aaww\_o\,aw\_o\,(name\_as\,\text{①})\_t\,(\alpha\alpha=Vt)\_as\,(\omega\omega\,V\circ,\circ\supset))\omega\}$$

$$Num \leftarrow float\_o\,int\_as\,(N\circ\text{①})$$

$$Strand \leftarrow 0\,Var\,'\texttt{a}'\_s\,(0\,Var\,'\texttt{a}'\_some)\_as\,('\texttt{s}'\,A\circ\text{①})$$

$$Pex \leftarrow \{\alpha(rpar\_s\,Ex\_s\,lpar)\omega\}$$

$$Atom \leftarrow Strand\_o\,(0\,Var\,'\texttt{a}'\_as\,('\texttt{v}'A))\_o\,(Num\_some\_as\,('\texttt{n}'\,A\circ\text{①}))\_o\,Pex$$

$$Idx \leftarrow \{\alpha(rbrk\_s\,Ex\_s\,lbrk\_s\,Atom\_as\,('\texttt{i}'\,E\circ\text{①}))\omega\}$$

$$Blrp \leftarrow \{\alpha(\alpha\alpha\_s\,(\omega\omega\,Slrp\,\nabla))\omega\}$$

$$Slrp \leftarrow \{\alpha(\alpha\alpha\_o\,(\omega\omega\_s\,\nabla)\_o\,((1\_eat)\_s\,\nabla))\omega\}$$

$$Fa \leftarrow \{$$
$$e \leftarrow ('\texttt{ωω}'\,'\texttt{αα}','\texttt{αω}'),\circ\text{⍲}\ddot{o}1\,\text{⃠}\,{}^{-}1+3\,3\,2\,2\,\top\,(6\,4\,4\neq1\,5\,9)+2\times\iota14$$
$$a \leftarrow e\,(\alpha\{\omega\,Gex\_o\,Ex\_o\,Fex\,Stmts\_then\,Fn\,\text{⍨}\,\alpha\alpha\,\text{⍲}\,\alpha\})\ddot{o}2\,1\vdash\omega$$
$$m \leftarrow (0=0\,\square\,\text{⊗}a)\wedge\wedge\neq(\vee\text{⊢}\circ.=\text{⍨}\iota14)\vee\circ.\not\equiv\text{⍨}\,1\,\square\,\text{⊗}a$$
$$\sim\vee\neq m\quad:\quad(\lceil\neq0\,\square\,\text{⊗}a)\,\theta\,\alpha\,\omega$$
$$(1=+\neq m)\wedge2>m\,\iota\,1\quad:\quad0\,(,\subset('\texttt{F}'\,new\,1)\,wrap\supset\supset m\neq1\,\square\,\text{⊗}a)\,\alpha\,\omega$$
$$z \leftarrow ('\texttt{F}'\,new\,'\texttt{a}')\,wrap\supset(m\neq'\texttt{F}'\,new\ddot{}\,1+\iota14)\,\text{⍲}.(wrap\circ\supset)\,m\neq1\,\square\,\text{⊗}a$$
$$0\,(,\subset z)\,\alpha\,\omega\}$$

$$Fn \leftarrow \{$$
$$ns \leftarrow n\,z\neq\text{⍨}\,m \leftarrow \{(F_m\,\omega)\wedge{}^{-}1\in\text{⍨}\,k\,\omega\}z \leftarrow\supset\text{⍲}/\,\omega\,\diamond\,0=\not\equiv ns:0\,(,\subset z)\,\alpha\,''$$
$$p \leftarrow \alpha\circ Fa\ddot{}\,ns\,\diamond\,0<c\leftarrow\lceil/\supset\ddot{}\,p:c\,\theta\,\alpha\,\omega$$
$$0\,(\text{⍲}/(\subset0\,4\,\rho\,\theta),\text{⍨}\,p\{\omega\,((d+\circ\supset\dashv),1\downarrow\ddot{o}1\vdash)\supset\text{⍲}/\,1\supset\alpha\}\ddot{}\,at\{m\}\downarrow z)\,\alpha\,''\}$$

$$Pfe \leftarrow \{\alpha(rpar\_s\,Fex\_s\,lpar)\omega\}$$

$$Bfn \leftarrow rbrc\,Blrp\,lbrc\_as\,('\texttt{F}'\,new\,{}^{-}1,\circ\subset\circ\text{①}\,1\downarrow{}^{-}1\downarrow\vdash)$$

$$Fnp \leftarrow Prim\_o\,(1\,Var\,'\texttt{f}')\_o\,Sfn\_o\,Bfn\_o\,Pfe$$

$$Mop \leftarrow \{\alpha((mop\_as\,P)\_s\,Afx\_as\,(1\,O))\omega\}$$

$$Dop_1 \leftarrow \{\alpha((dop_1\_as\,P)\_s\,Afx\_as\,(2\,O\circ\text{①}))\omega\}$$

$$Dop_2 \leftarrow \{\alpha(Atom\_s\,(dop_2\_as\,P)\_s\,Afx\_as\,(2\,O\circ\text{①}))\omega\}$$

$$Dop_3 \leftarrow (dop_3\_as\,P)\_s\,Atom\_as\,(2\,O\circ\text{①})\_o\,(dot\_s\,jot\_as\,(P\circ\text{①})\_as\,(1\,O))$$

$$Bop \leftarrow \{\alpha(rbrk\_s\,Ex\_s\,lbrk\_s\,Afx\_as\,('\texttt{i}'\,O\circ\text{①}))\omega\}$$

$$Afx \leftarrow Mop\_o\,(Fnp\_s\,(Dop_1\_o\,Dop_3\_opt)\_as\,(\supset wrap/\circ\text{①}))\_o\,Dop_2\_o\,Bop$$

$$Bind \leftarrow \{\alpha(gets\_s\,(name\_as\,\text{①})\_env\,(\alpha\alpha\{(\supset\text{①}\omega)\,\alpha\alpha\,\text{⍲}\,\alpha\})\_as\,(\omega\omega\,new\,'\texttt{b}',1\downarrow\vdash))\omega\}$$

$$Fex \leftarrow Afx\_s\,(1\,Bind\,'\texttt{F}'\_any)\_as\,(\supset wrap/\circ\text{①})$$

$$App \leftarrow Afx\_s\,(Idx\_o\,Atom\_s\,(dop2\_not)\_opt)\_as\{(\not\equiv\omega)\,E\,\text{①}\omega\}$$

$$Ex \leftarrow Idx\_o\,Atom\_s\,\{\alpha(0\,Bind\,'\texttt{E}'\_o\,App\_s\,\nabla\_opt)\omega\}\_as\,(\supset wrap/\circ\text{①})$$

$$Gex \leftarrow Ex\_s\,grd\_s\,Ex\_as\,(G\circ\text{①})$$

$$Nlrp \leftarrow sep\_o\,eot\,Slrp\,(lbrc\,Blrp\,rbrc)$$

$$Stmts \leftarrow \{\alpha(sep\_any\_s\,(Nlrp\_then\,(\alpha\alpha\_s\,eot\circ\text{①}))\_any\_s\,eot)\omega\}$$

$$Ns \leftarrow nss\,Blrp\,nse\_then\,(Ex\_o\,Fex\,Stmts\_then\,Fn)\_s\,eot\_as\,M$$

$$ps \leftarrow \{0\neq\supset c\,a\,e\,r\leftarrow(0\,2\,\rho\,\theta)\,Ns\in\{\omega\,/\text{⍨}\,\wedge\backslash\,'\texttt{ꓵ}'\neq\omega\}\ddot{}\,\omega\,,\ddot{}\,\square UCS\,10:\square SIGNAL\,c\,\diamond\,(\supset a)\,e\}$$

```
scp ← (+⟜ F_m)⊢∘⊏▤⊢
prf ← ((≢↑¯1↓⊢ (≠∼) 0 ≠⊢)ö1 ↑or) ⊢
blg ← {α←⊢ ⋄ α((prf(⌊/ (ιο≢⊢) ×ö1 (1↓⊣) ∧.(=∨0=⊢)∘⧄⊢) αα (≠∘↑) r)⎕ö0 2 ωω (≠∼) αα)ω}
enc ← ⊏⊣,∘⊃ ((⊣,'_',⊢)/ (⊏"), (⌽¨⊢ (/∼) 0 ≠⊢))
veo ← ∪((⊏'%u'), (‚¨prims), ⊣) ~∼∘{⊃,/ {⊏⋇(1≡≡ω)⊢ ω}¨ω}¯1↓⊢ (/∼) (∧/¨ 0 ≠ ((⊃ 0 ρ⊢)¨⊢))
ndo ← {α←⊢ ⋄ m ⊃∘(⊏,⊢)¨ αοαα¨¨ ω ⊃∘(‚∘⊏∼⊏)¨∼ m ← 1 ≥≡¨ω}
n2f ← (⊃,/) ((1=≡) ⊃ ,∘⊏∼∘⊏)¨
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rn ← ⊢ ,∘↓ (1+d) ↑ö¯1 (+⟜ d ∘.=∘ι 1 + (⌊/ 0, d))
rd ← ⊢ , (+/ ↑or ∧.(=∨0=⊢)∘⧄∘↑or ⊢ (≠∼) F_m ∧ 1 ∈∼ k)
df ← ⊢ (≠∼) (+\ 1 = d) (~ ⊣∈ ⊣ (/∼) (1 = d) ∧ (~ 'b' ∈∼ k) ∧ O_m ∨ F_m) ⊢
dua ← ((~G_m) ∧ F_m ∨ ↓∘prf ∈ r∘F_s) (⊣ (⟜∘⊢) (d (≠∼) ⊣) (0, 1 ↓ (¯1 ⊕ ⊢) ∧ ⊣ = ¯1 ⊕ ⊣) ⊣ (≠∘⊢) 0 ∈∼ n) ⊢
du ← ⊢ (≠∼∘~) dua ∨∘(∨/) (prf ∧.(=∨0=⊢)∘⧄ prf (≠∼) dua) ∧ ↑or ∧.≥∘⧄ dua (≠∘⊢) ↑or × 0 = prf
lfh ← (0 ≠ 1⎕ ⊣) ⊃ (⊏∘⧄∘⌿ 0 'M' 0 ", 0 ,∼ (⊏⊣)) ,∘⊏∘⧄∘⌿ 1 'F' 1, ('fn' enc ⊣), (⊏⊣), 5 ↓∘, 1 ↑⊢
lfn ← (d, 'Of', 3 ↓⊢)ö1 at (F_m ∧ 'b' ∈∼ k) (d, 'Vf', ('fn' enc∘⊃ r), 4 ↓⊢)ö1 at (F_m ∧ 1 ∈∼ k)
lf ← (⊃⌿/) (1, 1 ↓ F_m ∧ 1 ∈∼ k) blg (↑r) (⊏ lfh ⌿∘(((⊢ - (⊃ - 2 ⌊ ⊃)) d), 1 ↓ö1⊢) lfn)▤ 1 ↓⊢
dn ← ((0 ∈∼ n) ∧ (A_m ∧ 'v' ∈∼ k) ∨ O_m ∧ 'f' ∈∼ k) ((~⊣) (≠∘⊢) (d -¯1 ⊕ ⊣), 1 ↓_[1] ⊢) ⊢
mrep ← (1 + ⊃), 'P' 0 (‚'⊢'), (⊏") ,∼ ¯1 ↓ 4 ↓∘, 1 ↑⊢
mreu ← ⊃, 'E' 'u', (⊏") ,∼ ¯1 ↓ 3 ↓∘, 1 ↑⊢
mre ← (⊃⌿/) (-∘⊃ V_m ∨ A_m)∘⊃∘⧄ (↓, (((⊢ ρ∼ (≢⧄) ,∼ ≢ × 2 < ≢) mreu ⌿ mrep ⌿ (1 + d), 1 ↓ö1 ⊢)¨ ↑)) ⊢
mrs ← ⊢ ⊏_[0] ∼ 1, 1 ↓ d = 1 + ∘⊃ d
mrk ← (-∘(+/ ∧\)∘⧄ L_m) (↑ ⌿∼∘(mre (mre mrs)¨ at (G_m∘(⊃⌿/) 1 ↑¨⊢)∘mrs) ↓) ⊢
mr ← (⊃⌿/) ((1 ↑⊢), (mrk¨ 1 ↓⊢))∘scp
ur ← ((2 ↑⊢), 1, ('um' enc∘⊃ r), 4 ↓⊢)ö1 at (E_m ∧ 'u' ∈∼ k)
rt ← ⊢, (∨\ F_m) + (+≠ prf ∧.(=∨0=⊣)∘⧄∼∘↑or M_s ⌿ G_s) - F_m
nm ← ((3 ↑⊢), ('fe' enc∘⊃ r), 4 ↓⊢)ö1 at ((0 ∈∼ n) ∧ E_m ∨ O_m ∨ A_m)
lgg ← (⌿/ 1 ↓⊢) ⌿∘⊃∼ ⊣ (((¯1 + d), 2 ,∼ t, k, n, r ,∘⌿ s) ⌿ ⊣⌿ 3, 'V', 'a', 3 (↓ö1) 1 ↑⊢)∘⊃ 1 ↑⊢
lg ← (⊃⌿/) ⊢ ((⊏ ⊣ (≠∼∘~) (∨\⊣)), (((1 ↑⊢) lgg ⊢ ⊏_[0]∼ d = 1 + ⊃)¨ ⊏_[0]∼)) G_m ∧ 1 ⊕ E_m
fet ← (d, 'V' 0, 3 ↓⊢)ö1 at (0, 1 ↓ E_m ∨ O_m ∨ A_m) (d, 'Av', 3 ↓⊢)ö1 at (E_m ∧ 'b' ∈∼ k)
fee ← (⌿/⊕) (M_m ∨ E_m ∨ O_m ∨ A_m) blg ⊢ ((⊃∘⊕ ⊢) (⊏ (d - -∼∘ ⊃), 1 ↓ö1 ⊢)∘fet ⊣ ⌿ ¯1 ↓ö1 ⊢)▤ ⊃ ,∼ 1 ↓⊢
fe ← (⊃⌿/) (+⟜ d ≤ g) (⊏ (⊢ ↑∼ 1 =∘≠⊢) ⌿∘⊃∘fee ⊢)▤ ⊢
can ← (+\ A_m ∨ O_m) ((, 1 ↑⊢) ,∘(⊏ (¯1 + 2 ⌊ ≢) ⊃ (⊏∘⊏ ⊃), ⊏)∘n 1 ↓⊢)▤ ⊢
cas ← (¯1 ⊕ (A_m ∨ O_m) ∧ 'vf' ∈∼ k) ∨ (↓prf) ∈∘r ⊢ (≠∼) A_m ∧ 'n' ∈∼ k
ca ← (can ⊢ (≠∼) cas ∨ A_m ∨ O_m ∧ 'f' ∈∼ k) ⊣ at (A_m ∨ O_m ∧ 'f' ∈∼ k) θ ,∘⊏∼ ⊢ (≠∼∘~) cas
lj ← (⊃⌿/) (1 ↑ scp), ((⊢ ⌿ 2 'L' 0 0, 2 ", ∼ ¯2 ↓ 4 ↓∘, 1 ↑⊢)¨ 1 ↓ scp)
sd ← (⊃⌿/) (1 ↑ scp), (n F_s) (d, 'Vf', (⊏⊣), 4 ↓⊢)ö1 at ((⊏, '∇') ∈∼ n)¨ 1 ↓ scp
inm ← ∨≠ ¯1 (⊕ ∨⊢) 1 2 (⊕ ∨⊢) (¯1 ¯2 ⊕ E_m ∧_[1] 1 2 ∘.= k) ∧ö1 V_m ∧ n ∈∘n F_s
inp ← (E_m ∧ ⊣) ∨ 1, 2 ≠/ ⊣
inza ← (1 ↑ 1 ↓ ⊣) (≠∼∘≢) at ((⊏, 'α') ∈∼ n) (¯1 ↑ ⊣) (≠∼∘≢) at ((⊏, 'ω') ∈∼ n) ⊢
inz ← (1 ↑ ⊣) (d, t, k, 3 ↓ö1 (≠∼∘≢)) at (0 ,∼ 2 ≠/∘⊕ (∨\∘⊕ E_m)) inza
inn ← (3 ↑ö1 ⊢), ((⊣ ρ¨∼ 1 + 0 ⌈ (⌊/∘n G_s)) (('fe' ≡ 2 ↑⊢) ⊃ (⊏⊢) ,∘⊏ 'fe', (⌽⊣), 2 ↓⊢)¨ n), (4 ↓ö1 ⊢)
ins ← ⊣ (d, t, k, ((1000 × 1 + ⊣) + 1 + n + (⌊/n)), 4 ↓ö1 ⊢) at (L_m ∨ G_m) inn
inr ← 1 ,∘⌿ ⊢ inz¨ (ιο≢⊢) ins¨ ((⊃∘n¨ ⊣) ι ((⊃ n (≠∼) V_m ∧ 'f' ∈∼ k)¨ ⊢)) ⊃ ⊃∼ (⊏ 1 ↓¨ ⊣) ,∘⊏¨ ⊢
in ← (⊃⌿/)∘(⊢/) (1 ↓ scp) inr∘((0 ρ ⊏ 0 8 ρ 0), ⊢/) at (⊣/) inm ((⊃¨ inp ⊏ E_m ∧ ⊣) ,∘⌿ inp ⊏_[0] ⊢) ⊢
```

$pcc \leftarrow (\sqsubset \vdash (\neq\ddot{\div}) A_m \vee O_m \wedge \text{'f'} \in\ddot{\approx} k)\circ((\iota\circ\cup\ddot{\approx} n) \lceil\ddot{o}0\ 2\ (1\lceil \not\equiv)\uparrow\vdash)\circ(\sqsupset\ddot{\div}\neq)\circ\Phi\ (\neq\circ\vdash)$

$pcb \leftarrow ((,\wedge.(=\vee 0 = \dashv)\circ\ddot{\div})\ddot{o}2\ 1\ddot{\approx}\circ\uparrow\circ r\ M_s\ddot{\div}\ F_s)\ pcc\ddot{o}1\ ((\vdash (\neq\ddot{\div})\ (d = g) \wedge A_m \vee E_m \vee O_m)\ddot{\ }\ scp)$

$pcv \leftarrow (d, \text{'V'}, (\text{'af'} \sqsupset\ddot{\ }\circ\sqsubset\ddot{\approx} O_m), (\sqsupset\ddot{\ }v), r, s, (\sqsubset\theta), \ddot{\approx}\circ\ddot{\div}\ g)\ at\ (O_m \vee A_m \wedge \text{'v'} \in\ddot{\approx} k)$

$pc \leftarrow (\sqsupset\ddot{\div}/)\ pcb\ \{(pcv\ d\ (\dashv, 1\downarrow\ddot{o}1\vdash)(\alpha\uparrow\ddot{\approx} 1\lceil \not\equiv\alpha)\lceil\ddot{o}0\ 2\ddot{\approx}\ (n\ \alpha)\iota\ n)\ at\ (V_m \wedge (n\ \alpha) \in\ddot{\approx} n)\ \omega\}\ddot{\ }\ scp$

$da \leftarrow \vdash (\neq\ddot{\approx}\circ\sim)\ (A_m \wedge d = g) \vee (0, \ddot{\approx} 2 \wedge/ L_m) \vee (L_m \wedge {}^-1\ \Phi\ A_m \wedge d = g) \vee O_m \wedge (\text{'f'} \in\ddot{\approx} k) \wedge 1 \neq d$

$fce \leftarrow (\sqsupset\circ n\ P_s)\ \{\sqsubset\Phi\text{'}\ \omega\text{'}, \ddot{\approx}\ (\not\equiv\omega) \sqsupset \text{''} (\alpha, \text{'}\sqsupset\text{'})\ (\text{'}\sqsupset\text{'}, \alpha, \text{'}/\text{'})\}\ (v\ A_s)$

$fcm \leftarrow (\wedge/ E_m \vee A_m \vee P_m) \wedge \text{'u'} \not\equiv\circ\sqsupset\circ\sqsupset k$

$fc \leftarrow ((\sqsupset\ddot{\div}/)\ (((d, \text{'An'}, 3\downarrow{}^-1\downarrow,)\ 1\uparrow\vdash), fce)\ddot{\ }\ at\ (fcm\ddot{\ }))\ (\text{'MFOEL'} \in\ddot{\approx} t) \sqsubset_{[0]}\vdash$

$ce \leftarrow (+\backslash F_m \vee G_m \vee E_m \vee O_m \vee L_m)\ (({}^-1\downarrow\circ, 1\uparrow\vdash), \circ\sqsubset (\sqsupset\circ v\ 1\uparrow\vdash), \circ(A_m \sqsupset\ddot{\ }\circ\downarrow n, \circ\ddot{\div}\circ n2fv)\ 1\downarrow\vdash)\boxminus\vdash$

$ll \leftarrow (\vdash (\neq\ddot{\div})\ 1\ \Phi\ L_m)\ (((\sqsubset\sqsubset\text{'\%l'}), \circ\sqsubset\ddot{\ }\circ n\ \dashv), \ddot{\approx}\ {}^-1\downarrow\ddot{o}1\vdash)\ at\ L_m\vdash$

$fv \leftarrow (\sqsupset\ddot{\div}/)\ (((1\downarrow\vdash)\ddot{\div}\ddot{\approx}\ (, 1\ 7\uparrow\vdash), \circ\sqsubset\circ n\ {}^-1\uparrow\vdash)\ddot{\ }\ scp)$

$nvi \leftarrow (({}^-1\downarrow\vdash), (\{,\ddot{\ }\alpha\ \text{'}[\text{'}\ \omega]/\circ\sqsupset v))\ddot{o}1\ at\ ((E_m \vee O_m) \wedge \text{'i'} \in\ddot{\approx} k)$

$nvv \leftarrow (\sqsubset\text{'\%u'}\ \text{'\%f'}\ \text{'\%u'}), (\sqsubset \text{'\%u'}\ \text{'\%i'}, \vdash), (\sqsubset (\sqsubset\text{'\%u'}), \vdash)$

$nv \leftarrow ({}^-1\downarrow\ddot{o}1\ ((2\uparrow\vdash), 2, (3\downarrow\vdash))\ddot{o}1\ at\ ((E_m \vee O_m) \wedge \text{'i'} \in\ddot{\approx} k)), (({}^-1\ominus \not\equiv \sqsupset nvv, \circ\sqsubset\vdash)\ddot{\ }\ v\circ nvi)$

$lt \leftarrow (\sqsubset\theta), \ddot{\approx}\vdash$

$val \leftarrow (n\ \iota\circ\cup n), \ddot{\ }\vdash (\vdash + (\not\equiv\dashv) \times 0 = \vdash)\ (\lceil/ (\iota\not\equiv) \times\ddot{o}1\ (\cup n)\ \circ.((\sqsubset\dashv) \in\vdash)\ (n2f\ddot{\ }v))$

$vag \leftarrow \wedge\circ\sim\circ(\circ.=\ddot{\approx}\circ 1\not\equiv)\ddot{\approx}\ (\circ.(((1\lceil\vdash) > 0\lceil \dashv) \wedge (0\lceil\vdash) < 1\lceil \dashv)\ddot{\approx}\ val)$

$vae \leftarrow (\cup n)\ (\dashv, \ddot{o}0\dashv\ (\lceil\ddot{\approx}\ddot{o}1\ 0)\circ\sqsupset\ ((\vdash, \circ\sqsupset (\iota\circ\not\equiv \dashv) \sim\vdash (\neq\ddot{\div})\ (\not\equiv\vdash)\uparrow\dashv)/\circ\Phi\ (\sqsubset\theta), \circ\downarrow\vdash))\ vag$

$vac \leftarrow (((0\lceil\circ\oslash \dashv)\ \iota\circ\sqsubset\vdash) \sqsupset (1\lceil\circ\oslash \dashv), \circ\sqsubset\vdash)\ ndo$

$va \leftarrow ((\sqsupset\ddot{\div}/)\ (1\uparrow\vdash), (((vae\ E_s)\ (d, t, k, (\dashv vac\ n), r, s, g, y, \circ\ddot{\div}\ddot{\approx}\ (\sqsubset\dashv)\ vac\ddot{\ }v)\vdash)\ddot{\ }\ 1\downarrow\vdash))\ scp$

$avb \leftarrow \{((((,\ddot{\ }\alpha\omega\text{'})\uparrow\ddot{\approx}\ 1\downarrow\rho)\ddot{\div}\vdash)\ \alpha\ \lceil\ddot{\approx}\ddot{o}2\ 0\vdash \alpha\alpha\ \iota\ \alpha\alpha \cap\ddot{\approx} (\downarrow (\Phi\ 1 + \circ\iota\ 0\ \iota\ddot{\approx}\vdash)\ ((\not\equiv\vdash)\uparrow\uparrow)\ddot{o}0\ 1\vdash) \sqsupset r\ \omega\}$

$avi \leftarrow {}^-1\ 0 + (\rho\dashv)\top (,\dashv)\ \iota\ (\sqsubset\vdash)$

$avh \leftarrow \{\sqsubset \omega, (n\omega)\ ((\alpha\alpha\ (\omega\omega\ avb)\ \omega)\ \{\alpha\alpha\ avi\ ndo\ (\sqsubset\alpha), \omega\})\ddot{\ }\ v\ \omega\}$

$av \leftarrow (\sqsupset\ddot{\div}/)\ (+\backslash F_m)\ \{\alpha((\alpha\ ((\cup\circ\Phi\ (0\ \rho\ \sqsubset''), n)\ E_s)\boxminus \omega)\ avh\ (r\ (1\uparrow \omega)\ddot{\div}\ F_s\ \omega))\boxminus \omega\}\vdash$

$rlf \leftarrow (\Phi\ \downarrow\ (((1\sqsupset \dashv)\cup\vdash \sim 0\lceil \dashv)/\circ\Phi\ (\sqsubset\theta), \uparrow)\ddot{o}0\ 1\ddot{\approx}\ 1 + \circ\iota\not\equiv)\ (\ominus 1\ominus n, \ddot{o}0\ (\sqsubset\dashv)\ veo\ddot{\ }v)$

$rl \leftarrow \vdash, \circ(\sqsupset,/)\ (\sqsubset\circ n\ O_s\ddot{\div}\ F_s)\ rlf\ddot{\ }\ scp$

$vc \leftarrow (\sqsupset\ddot{\div}/)\ (((1\downarrow\vdash)\ddot{\div}\ddot{\approx}\ (1\ 7\uparrow\vdash), (\not\equiv\circ\cup\circ n\ E_s), 1\ {}^-3\uparrow\vdash)\ddot{\ }\ scp)$

$eff \leftarrow (\sqsupset\ddot{\div}/)\vdash (((\sqsubset\circ\oslash\circ\ddot{\div}\ d, \text{'Fe'}, 3\downarrow,)\ 1\uparrow \dashv), 1\downarrow\vdash)\ (d =\circ\sqsupset d)\sqsubset_{[0]}\vdash$

$ef \leftarrow (F_m \wedge {}^-1 =\circ\times\circ\sqsupset y)\ ((\sqsupset\ddot{\div}/)\ (\sqsubset\vdash (\neq\ddot{\div})\circ\sim (\vee\backslash \dashv)), (eff\ddot{\ }\ \sqsubset_{[0]}))\vdash$

$ifn \leftarrow 1\ \text{'F'}\ 0\ \text{'Init'}\ \theta\ 0\ 1, (4\ \rho\ 0)\ \theta\ \theta, \ddot{\approx}\vdash$

$if \leftarrow (1\uparrow\vdash)\ddot{\div}\ (\vdash (\neq\ddot{\div})\ O_m \wedge 1 = d)\ddot{\div}\ ((\vdash wrap\ddot{\approx}\circ ifn\circ\not\equiv\circ\cup n)\vdash (\neq\ddot{\div})\ E_m \wedge 1 = d)\ddot{\div}\ (\vee\backslash F_m)\ (\neq\circ\vdash)\vdash$

$fgz \leftarrow (1\uparrow\vdash)\ddot{\div}\ ((({}^-1 + d), 1\downarrow\ddot{o}1\vdash)\ 1\downarrow\vdash)\ddot{\div}\ 2, \text{'G'}, 1, 3\downarrow\ddot{o}1\ ({}^-1\uparrow\ {}^-1\downarrow\ddot{o}1\vdash), \circ n\ 1\uparrow\vdash$

$fg \leftarrow (\sqsupset\ddot{\div}/)\ (fgz\ddot{\ }\ at\ (G_m\circ(\sqsupset\ddot{\div}/)\ 1\uparrow\ddot{\ }\vdash)\vdash \sqsubset_{[0]}\ddot{\approx}\ d = 2\lfloor g)$

$fft \leftarrow (, 1\uparrow\vdash)\ (1\ \text{'Z'}, (2\downarrow\ {}^-5\downarrow \dashv), (v\dashv), n, y, (\sqsubset 2\uparrow\circ, \circ\sqsupset\circ\sqsupset e), l)\ ({}^-1\uparrow E_s)$

$ff \leftarrow ((\sqsupset\ddot{\div}/)\ (1\uparrow\vdash), (((1\uparrow\vdash)\ddot{\div}\ ((({}^-1 + d), 1\downarrow\ddot{o}1\vdash)\ 1\downarrow\vdash)\ddot{\div}\ fft)\ddot{\ }\ 1\downarrow\vdash))\ scp$

$fzh \leftarrow ((\cup n) \cap (\sqsupset\circ l\dashv))\ ({}^-1\ \Phi\ (\sqsubset\dashv), ((\not\equiv\vdash) - 1 + (\Phi n)\ \iota\ \dashv)\ ((\sqsubset \dashv \sqsupset\ddot{\ }\circ\sqsubset (\sqsupset\ddot{\ }e)), (\sqsubset \dashv \sqsupset\ddot{\ }\circ\sqsubset (\sqsupset\ddot{\ }y)), \circ\sqsubset \dashv)\vdash)\vdash$

$fzf \leftarrow 0 \neq (\not\equiv\circ\rho\ddot{\ }\circ\sqsupset\circ v\ \dashv)$

$fzb \leftarrow (((\sqsupset\circ v\ \dashv)\ (\neq\ddot{\div})\ fzf), n), \circ\ddot{\div}\ (\text{'f'}\circ, \circ\overline{\Phi}\ddot{\ }\circ 1\ (+/fzf)), (\text{'s'}\circ, \circ\overline{\Phi}\ddot{\ }\circ 1\circ\not\equiv\vdash)$

$fzv \leftarrow ((\sqsubset\dashv)\ (\ominus\uparrow)\circ\ddot{\ }\ddot{\ }\ (\not\equiv\dashv)\ (- + \circ\iota\vdash)\ (\not\equiv\vdash))\ ((\vdash, \ddot{\approx}\ 1\lceil\circ\oslash \dashv)\lceil\ddot{\approx}\ (0\lceil\circ\oslash \dashv)\ \iota\vdash)\ddot{o}2\ 0\ddot{\ }\ v$

$fze \leftarrow ({}^-1 + d), t, k, fzb\ ((\vdash/ (-\circ\not\equiv\vdash)\uparrow \dashv), r, s, g, fzv, y, e, \circ\ddot{\div}\ l)\vdash$

$fzs \leftarrow (, 1\uparrow\vdash)\ (1\ \ominus\ (\dashv ((1\ \text{'Y'}, (2\lceil \dashv), \vdash)\ \ddot{\div}\circ\oslash\circ\ddot{\div}\ (3\uparrow \dashv), \vdash)\ 1\ \Phi\ fzh, {}^-1\downarrow 6\downarrow \dashv)\ddot{\div}\ fze)\ (\neq\circ\vdash)$

$fz \leftarrow ((\sqsupset\ddot{\div}/)\ (1\uparrow\vdash), (((2 = d)\ (fzs\ddot{\div}\ (1\downarrow\sim \dashv)\ (\neq\circ\vdash)\ 1\downarrow\vdash)\vdash)\ddot{\ }\ 1\downarrow\vdash))\ (1, 1\downarrow S_m)\sqsubset_{[0]}\vdash$

$fd \leftarrow (1\uparrow\vdash)\ddot{\div}\ ((1, \text{'Fd'}, 3\downarrow\vdash)\ddot{o}1\ F_s)\ddot{\div}\ 1\downarrow\vdash$

$tta \leftarrow (fc\circ da\circ(pc\star\equiv)\circ mr\star\equiv)\circ in\star 3\circ sd\circ lj\circ ca\circ fe\circ lg\circ n\circ mr\circ tm\circ rd\circ nl\circ fd\circ ud\circ fd\circ r\circ rn$

$tt \leftarrow fd\circ fz\circ ff\circ fg\circ if\circ ef\circ vc\circ rl\circ av\circ va\circ lt\circ nv\circ fv\circ ll\circ ce\circ ur\circ tta$

$E_1 \leftarrow \{\text{'fn'}\ gcl\ ((\subset n\ ,\circ\supset v), e, y)\ \omega\}$

$E_2 \leftarrow \{\text{'fn'}\ gcl\ ((\subset n\ ,\circ\supset v), e, y)\ \omega\}$

$E_0 \leftarrow \{r\ l\ f \leftarrow \supset v\ \omega \diamond (n\ \omega)\ ((\supset y\ \omega)\ sget)\ (^{-}1 \downarrow \supset y\ \omega)\ (f\ scal\ sdb)\ r\ l\}$

$O_1 \leftarrow \{\text{'op'}\ gcl\ ((\subset n\ ,\circ\supset v), e, y)\ \omega\}$

$O_2 \leftarrow \{\text{'op'}\ gcl\ ((\subset n\ ,\circ\supset v), e, y)\ \omega\}$

$O_0 \leftarrow \{''\}$

$O_f \leftarrow \{\text{'EF('}, (\text{'}\Delta\text{'}\Box R\ \text{'}\_\_\text{'} \supset n\ \omega), \text{','}, (\supset\supset v\ \omega), \text{')};\text{'}, nl\}$

$F_d \leftarrow \{\text{'FP('}, (\supset n\ \omega), \text{');'}, nl\}$

$F_0 \leftarrow \{\text{'DF('}, (\supset n\ \omega), \text{'\_f){'}, nl, \text{'A*env[]={tenv};'}, nl\}$

$F_1 \leftarrow \{\text{'DF('}, (\supset n\ \omega), \text{'\_f){'}, nl, (\text{'env0'}\ dnv\ \omega), (fnv\ \omega)\}$

$G_0 \leftarrow \{v \leftarrow (\supset\supset v\ \omega)\ (''\ var)\ 1 \supset\supset e\ \omega$
$\qquad \text{'if(1!=cnt('}, v, \text{'))err(5);if('}, v, \text{'.v.as(s32).scalar<I>()){'}, nl\}$

$G_1 \leftarrow \{\text{'z='}, ((\supset n\ \omega)\ (''\ var)\ \supset\supset e\ \omega), \text{';goto L'}, (\overline{\Phi}\supset l\ \omega), \text{';}'\}, nl\}$

$L_0 \leftarrow \{\text{'z='}, a, \text{';L'}, (\overline{\Phi}\supset n\ \omega), \text{':'}, (a \leftarrow (1 \supset\supset v\ \omega)\ (''\ var)\ 1 \supset\supset e\ \omega), \text{'=z;'}, nl\}$

$Z_0 \leftarrow \{\text{'}\}\text{'}, nl, nl\}$

$Z_1 \leftarrow \{\text{'}\}\text{'}, nl, nl\}$

$Z_e \leftarrow \{\text{'}\}\text{'}, nl, nl\}$

$M_0 \leftarrow \{rth, (\text{'tenv'}\ dnv\ \omega), nl, \text{'A*env[]={'}, ((0 \equiv \supset\omega) \supset \text{'tenv'}\ \text{'NULL'}), \text{'};'}, nl, nl\}$

$S_0 \leftarrow \{((\text{'{'}, rk0, srk, \text{'DO(i,prk)cnt*=sp[i];'}, spp, sfv, slp)\ \omega)\}$

$Y_0 \leftarrow \{\supset,/\ ((\imath \not\equiv \supset n\ \omega)\ ((\dashv sts^{..}\ (\supset l), ^{..}\circ\supset s), \text{'}\}\text{'}, nl, \dashv ste^{..}\ (\supset n)\ var^{..}\circ\supset r)\ \omega), \text{'}\}\text{'}, nl\}$

$gc \leftarrow \{\supset,/\ \{0 = \supset t\ \omega : \subset 5 \rho\ \theta \diamond \subset (\underline{\Phi}\ (\supset t\ \omega), \overline{\Phi}\supset k\ \omega)\ \omega\}\ddot{o}1 \vdash \omega\}$

$syms \leftarrow ,^{..}\ \text{'+'}\quad \text{'-'}\quad \text{'×'}\quad \text{'÷'}\quad \text{'*'}\quad \text{'⊛'}\quad \text{'|'}\quad \text{'○'}\quad \text{'L'}\quad \text{'Γ'}\quad \text{'!'}$
$nams \leftarrow\quad \text{'add'}\ \text{'sub'}\ \text{'mul'}\ \text{'div'}\ \text{'exp'}\ \text{'log'}\ \text{'res'}\ \text{'cir'}\ \text{'min'}\ \text{'max'}\ \text{'fac'}$
$syms ,\leftarrow ,^{..}\ \text{'<'}\quad \text{'≤'}\quad \text{'='}\quad \text{'≥'}\quad \text{'>'}\quad \text{'≠'}\quad \text{'~'}\quad \text{'∧'}\quad \text{'∨'}\quad \text{'⍲'}\quad \text{'⍱'}$
$nams ,\leftarrow\quad \text{'lth'}\ \text{'lte'}\ \text{'eql'}\ \text{'gte'}\ \text{'gth'}\ \text{'neq'}\ \text{'not'}\ \text{'and'}\ \text{'lor'}\ \text{'nan'}\ \text{'nor'}$
$syms ,\leftarrow ,^{..}\ \text{'⎕'}\quad \text{'['}\quad \text{'ι'}\quad \text{'ρ'}\quad \text{','}\quad \text{'⍪'}\quad \text{'⌽'}\quad \text{'⍉'}\quad \text{'⊖'}\quad \text{'∊'}\quad \text{'⊃'}$
$nams ,\leftarrow\quad \text{'sqd'}\ \text{'brk'}\ \text{'iot'}\ \text{'rho'}\ \text{'cat'}\ \text{'ctf'}\ \text{'rot'}\ \text{'trn'}\ \text{'rtf'}\ \text{'mem'}\ \text{'dis'}$
$syms ,\leftarrow ,^{..}\ \text{'≡'}\quad \text{'≢'}\quad \text{'⊢'}\quad \text{'⊣'}\quad \text{'⊤'}\quad \text{'⊥'}\quad \text{'/'}\quad \text{'⌿'}\quad \text{'\\'}\quad \text{'⍀'}\quad \text{'?'}$
$nams ,\leftarrow\quad \text{'eqv'}\ \text{'nqv'}\ \text{'rgt'}\ \text{'lft'}\ \text{'enc'}\ \text{'dec'}\ \text{'red'}\ \text{'rdf'}\ \text{'scn'}\ \text{'scf'}\ \text{'rol'}$
$syms ,\leftarrow ,^{..}\ \text{'↑'}\quad \text{'↓'}\quad \text{'⍣'}\quad \text{'⍨'}\quad \text{'.'}\quad \text{'⍥'}\quad \text{'⍜'}\quad \text{'∘'}\quad \text{'∪'}\quad \text{'∩'}$
$nams ,\leftarrow\quad \text{'tke'}\ \text{'drp'}\ \text{'map'}\ \text{'com'}\ \text{'dot'}\ \text{'rnk'}\ \text{'pow'}\ \text{'jot'}\ \text{'unq'}\ \text{'int'}$
$syms ,\leftarrow ,^{..}\ \text{'⍋'}\quad \text{'⍒'}\quad \text{'∘.'}\quad \text{'⍷'}\quad \text{'⊂'}\quad \text{'⌸'}\quad \text{'⎕FFT'}\quad \text{'⎕IFFT'}\quad \text{'%u'}$
$nams ,\leftarrow\quad \text{'gdu'}\ \text{'gdd'}\ \text{'oup'}\ \text{'fnd'}\ \text{'par'}\ \text{'mdv'}\ \text{'fft'}\ \text{'ift'}\quad ''$

$nl \leftarrow \Box UCS\ 13\ 10 \diamond fvs \leftarrow ,\ddot{o}0\ (\neq^{..})\ 0 \neq (\not\equiv\circ\rho^{..}\ \dashv) \diamond cln \leftarrow \text{'}^{-}\text{'}\Box R\ \text{'-'} \diamond cnm \leftarrow (syms\ \imath \subset) \supset (nams, \subset)$

$lits \leftarrow \{\text{'A(0,eshp,constant('}, (cln\ \overline{\Phi}\ \omega), \text{',eshp,'}, (\text{'f64'}\ \text{'s32'} \supset^{..} \omega = \lfloor\omega), \text{'))'}\}$

$litv \leftarrow \{\text{'std::vector<'}, (\text{'DI'} \supset^{..} \wedge/\ \omega = \lfloor\omega), \text{'>{'}, (cln \supset \{\alpha, \text{','}, \omega\}/\ \overline{\Phi}^{..}\ \omega), \text{'}.data()'\}$

$lita \leftarrow \{\text{'A(1,dim4('}, (\overline{\Phi} \not\equiv \omega), \text{'),array('}, (\overline{\Phi}\not\equiv\omega), \text{','}, (litv\ \omega), \text{'))'}\}$

$lit \leftarrow \{\text{' '} = \supset 0 \rho\ \omega : (cnm\ \omega), \alpha \diamond 1 = \not\equiv\omega : lits\ \omega \diamond lita\ \omega\}$

$var \leftarrow \{\alpha \equiv ,\text{'}\alpha\text{'} : ,\text{'l'} \diamond \alpha \equiv ,\text{'}\omega\text{'} : ,\text{'r'} \diamond ^{-}1 \geq \supset\omega : \alpha\alpha\ lit, \alpha \diamond \text{'env['}, (\overline{\Phi}\supset\omega), \text{'][' }, (\overline{\Phi}\supset \oplus\omega), \text{']'}\}$

$dnv \leftarrow \{(0 \equiv z) \supset (\text{'A '}, \alpha, \text{'['}, (\overline{\Phi}\ z \leftarrow \supset v\ \omega), \text{'];'})\ (\text{'A*'}, \alpha, \text{'=NULL;'})\}$

$fnv \leftarrow \{z \leftarrow \text{'A*env['}, (\overline{\Phi}\ 1 + \supset s\ \omega), \text{']={'}, (\supset,/ (\subset\text{'env0'}), \{\text{'}, p['}, (\overline{\Phi}\omega), \text{']'}\}^{..}\ \imath \supset s\ \omega), \text{'};'}, nl\}$

$gcl \leftarrow \{z\ r\ l\ n \leftarrow ((3 \rho \subset\text{'fn'}), \subset\alpha)\ \{\supset \alpha\ var/\ \omega\}^{..} \downarrow (\supset\omega), \ddot{\imath}1 \supset \omega \diamond n, \text{'('}, (\supset\{\alpha, \text{','}, \omega\}/\ z\ l\ r \sim \subset\text{'fn'}), \text{',env);'}, nl\}$

```
∇Z ← GfxΔInit S
 'w_new'    ⎕NA 'P ', (BSO S), '|w_new <C[]'
 'w_close'  ⎕NA 'I ', (BSO S), '|w_close P'
 'w_del'    ⎕NA (BSO S), '|w_del P'
 'w_img'    ⎕NA (BSO S), '|w_img <PP P'
 'w_plot'   ⎕NA (BSO S), '|w_plot <PP P'
 'w_hist'   ⎕NA (BSO S), '|w_hist <PP F8 F8 P'
 'loadimg'  ⎕NA (BSO S), '|loadimg >PP <C[] I'
 'saveimg'  ⎕NA (BSO S), '|saveimg <PP <C[]'
 Z ← 0 0 ρ θ
∇
```

$$Display \leftarrow \{\alpha \leftarrow \text{'Co-dfns'} \diamond W \leftarrow w\_new \subset \alpha \diamond 777 :: w\_del\ W$$
$$w\_del\ W \dashv W\ \alpha\alpha\{w\_close\ \alpha : ⍒'\square SIGNAL\ 777' \diamond \alpha\ \alpha\alpha\ \omega\}⍣\omega\omega \vdash \omega\}$$

$$LoadImage \leftarrow \{\alpha \leftarrow 1 \diamond ⍉\ loadimg\ \theta\ \omega\ \alpha\}$$

$$SaveImage \leftarrow \{\alpha \leftarrow \text{'image.png'} \diamond saveimg\ (⍉\omega)\ \alpha\}$$

$$Image \leftarrow \{\sim 2\ 3\ \vee.= ≢\rho\omega : \square SIGNAL\ 4 \diamond (3 \neq 2 \supset 3 \uparrow \rho\omega) \wedge 3 = ≢\rho\omega : \square SIGNAL\ 5 \diamond \omega \dashv w\_img\ (⍉\omega)\ \alpha\}$$

$$Plot \leftarrow \{\sim 2 \neq ≢\rho\omega : \square SIGNAL\ 4 \diamond \sim 2\ 3\ \vee.= 1 \supset \rho\omega : \square SIGNAL\ 5 \diamond \omega \dashv w\_plot\ \omega\ \alpha\}$$

$$Histogram \leftarrow \{\omega \dashv w\_hist\ \omega,\ \alpha\}$$

:EndNamespace