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

: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 ⎕ ◌⍀ω)≠ 0 ⎕ ◌⍀ω ⊣ NS ← #.⎕NS θ}
  Fix ← {α MkNS α Cmp ω}
  Xml ← {⎕XML (0 ⎕ ◌⍀ω), (,∘�≠ 2 ↑ 1 ↓ ◌⍀ω), (⊂''), ⊣(⊂(¯3 + ≢◌⍀ω) ↑ ,¨ 'nrsgvyel') ,∘�;¨ ↓ �∘,¨ ◌ 3 ↓ ◌⍀ω}
  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'}
```

```apl
       cio ← {' -o ''',BUILD∆PATH,'/',ω,'_',α,'.',αα,''' '}
       fls ← {''' ',BUILD∆PATH,'/',ω,'_',α,'.cpp'' '}
       log ← {'> ',BUILD∆PATH,'/',ω,'_',α,'.log 2>&1'}
       lib ← {'-l',AF∆LIB,' '}
       cci ← {'-I''',AF∆PREFIX,'/include'' -L''',AF∆PREFIX,'/lib'' '}
       cco ← '-std=c++11 -Ofast -g -Wall -fPIC -shared'
       ucc ← {⎕SH αα,' ', cco, (cci ⍬), COMPILER (ωω cio, fls, lib, log) ω}
       gcc ← 'g++' ucc 'so'
     clang ← 'clang++' ucc 'dylib'
      vsco ← {z ← '/W3 /wd4102 /wd4275 /Gm- /O2 /Zc:inline /Zi /Fd"',BUILD∆PATH
              z ,← '\vc.pdb" /errorReport:prompt /WX- /MD /EHsc /nologo '
                 z,'/I"%AF_PATH%\include" /D "NOMINMAX" /D "AF_DEBUG"}
      vslo ← {z ← '/link /DLL /OPT:REF /INCREMENTAL:NO /SUBSYSTEM:WINDOWS '
              z ,← '/LIBPATH:"%AF_PATH%\lib" /DYNAMICBASE "',AF∆LIB,'.lib" '
                 z,'/OPT:ICF /ERRORREPORT:PROMPT /TLBID:1 '}
     vsc₀ ← {'"''',VISUAL∆STUDIO∆PATH,'\vcvarsall.bat" amd64'}
     vsc₁ ← {' && cd "',(⊃ ⎕CMD 'echo %CD%'),'" && cl ',(vsco ⍬),'/fast '}
     vsc₂ ← {'/Fo"',BUILD∆PATH,'\\" "',BUILD∆PATH,'\',ω,'_vsc.cpp" '}
     vsc₃ ← {(vslo ⍬),'/OUT:"',BUILD∆PATH,'\',ω,'_vsc.dll" '}
     vsc₄ ← {'> "',BUILD∆PATH,'\',ω,'_vsc.log"''"'}
      vsc ← {⎕CMD ('%comspec% /C ', vsc₀, vsc₁, vsc₂, vsc₃, vsc₄) ω}

       get ← {αα ⎕ ⍒ω}
      wrap ← �-∘(⍉ (1 + 1 ↑ ⍉) ⍺ 1 ↓ ⍉)
      bind ← {n _ e ← ω ◇ (0 n_ ⎕ e) ← ⊂n ◇ e}
        at ← {α ← ⊢ ◇ A ⊣ ((,B) ≠ (r A) ρ A) ← α αα (,B) ≠ ((r ← (≢ρ B ← ωω ω) ((×/ ↑), ↓) ρ) A) ρ (A ← ω)}

d_ t_ k_ n_ r_ s_ g_ v_ y_ e_ l_ ← ι7 + f∆ ← 4
d ← d_ get ◇ t ← t_ get  ◇ k ← k_ get ◇ n ← n_ get ◇ r ← r_ get ◇ s ← s_ get
g ← g_ get ◇ v ← v_ get ◇ y ← y_ get ◇ e ← e_ get ◇ l ← l_ get

 new ← {⍉⍺ f∆ ↑ 0 α, ω}            ◇ msk ← {(t ω) ∈ ⊂αα} ◇ sel ← {(αα msk ω) ≠ ω}
   A ← {('A' new αα) wrap ⊃⍺/ ω}   ◇  A_m ← 'A' msk    ◇  A_s ← 'A' sel
   E ← {('E' new αα) wrap ⊃⍺/ ω}   ◇  E_m ← 'E' msk    ◇  E_s ← 'E' sel
   F ← {('F' new 1) wrap ⊃⍺/ (⊂ 0 f∆ ρ ⍬), ω} ◇ F_m ← 'F' msk ◇ F_s ← 'F' sel
   G ← {('G' new 0) wrap ⊃⍺/ ω}    ◇  G_m ← 'G' msk    ◇  G_s ← 'G' sel
   L ← {('L' new 0) wrap ⊃⍺/ ω}    ◇  L_m ← 'L' msk    ◇  L_s ← 'L' sel
   M ← {('M' new 0 '') wrap ⊃⍺/ (⊂ 0 f∆ ρ ⍬), ω} ◇ M_m ← 'M' msk ◇ M_s ← 'M' sel
   N ← {'N' new 0 (⍀ω)}            ◇  N_m ← 'N' msk    ◇  N_s ← 'N' sel
   O ← {('O' new αα) wrap ⊃⍺/ ω}   ◇  O_m ← 'O' msk    ◇  O_s ← 'O' sel
   P ← {'P' new 0 ω}               ◇  P_m ← 'P' msk    ◇  P_s ← 'P' sel
   S ← {'S' new 0 ω}               ◇  S_m ← 'S' msk    ◇  S_s ← 'S' sel
   V ← {'V' new αα ω}              ◇  V_m ← 'V' msk    ◇  V_s ← 'V' sel
   Y ← {'Y' new 0 ω}               ◇  Y_m ← 'Y' msk    ◇  Y_s ← 'Y' sel
   Z ← {'Z' new 1 ω}               ◇  Z_m ← 'Z' msk    ◇  Z_s ← 'Z' sel
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  _o ← {0 ≥ ⊃ c a e r ← p ← α αα ω : p ◇ 0 ≥ ⊃ c a e r₂ ← p ← α ωω ω : p ◇ c a e (r ↑ ≚ - ⌊/ ≢¨ r r₂)}
  _s ← {0 < ⊃ c a e r ← p ← α αα ω : p ◇ 0 < ⊃ c₂ a₂ e r ← p ← e ωω r : p ◇ (c ⌈ c₂)(a, a₂) e r}
_noenv ← {0 < ⊃ c a e r ← p ← α αα ω : p ◇ c a α r}
 _env ← {0 < ⊃ c a e r ← p ← α αα ω : p ◇ c a (e ωω a) r}
_then ← {0 < ⊃ c a e r ← p ← α αα ω : p ◇ 0 < ⊃ c a e _ ← p ← e (ωω _s eot) a : p ◇ c a e r}
 _not ← {0 < ⊃ c a e r ← α αα ω : 0 a α ω ◇ 2 a α ω}
  _as ← {0 < ⊃ c a e r ← α αα ω : c a e r ◇ c (,⊂ωω a) e r}
   _t ← {0 < ⊃ c a e r ← α αα ω : c a e r ◇ e ωω a : c a e r ◇ 2 θ α ω}
 _ign ← {c a e r ← α αα ω ◇ c θ e r}
_peek ← {0 < p ← ⊃ α αα ω : p ◇ 0 θ α ω}
 _yes ← {0 θ α ω}
 _opt ← {α(αα _o _yes)ω}
 _any ← {α(αα _s ∇ _o _yes)ω}
_some ← {α(αα _s (αα _any))ω}
 _set ← {(0 ≠ ≢ω) ∧ (⊃ω) ∈ αα : 0 (,⊃ω) α (1 ↓ ω) ◇ 2 θ α ω}
  _tk ← {((≢,αα) ↑ ω) ≡,αα : 0 (⊂,αα) α ((≢,αα) ↓ ω) ◇ 2 θ α ω}
 _eat ← {0 = ≢ω : 2 θ α ω ◇ 0 (αα ↑ ω) α (αα ↓ ω)}

   ws ← (' ', ⎕UCS 9) _set
  aws ← ws _any _ign
awslf ← (⎕UCS 10 13) _set _o ws _any _ign
 gets ← aws _s ('←' _tk) _s aws
  him ← '¯' _set
  dot ← '.' _set
  jot ← '∘' _set
 lbrc ← aws _s ('{' _set) _s aws
 rbrc ← aws _s ('}' _set) _s aws
 lpar ← aws _s ('(' _tk) _s aws _ign
 rpar ← aws _s (')' _tk) _s aws _ign
 lbrk ← aws _s ('[' _tk) _s aws _ign
 rbrk ← aws _s (']' _tk) _s aws _ign
  grd ← aws _s (':' _tk) _s aws _ign
 egrd ← aws _s ('::' _tk) _s aws _ign
alpha ← 'ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyzΔ' _set
digits ← '0123456789' _set
 prim ← (prims ← '+-÷×|*⍟⌈⌊!<≤=≠≥>∧∨⍲⍱⊣⊢?⍴,⍪⌽⊖⍉∊⍷⊃⍳○~⍕≢⊢⊣/⌿\⍀⍠⊤⊥↑↓∪∩⍋⍒∇⌹') _set
  mop ← '¨⍨/⌿\⍀⍣˜' _set
 dop₁ ← '.⍤⍥∘' _set
 dop₂ ← '⍤⍥∘' _set
 dop₃ ← '∘' _set
  eot ← aws _s {'"' ≡ ω : 0 θ α '"' ◇ 2 θ α ω} _ign
 digs ← digits _some
odigs ← digits _any
  int ← aws _s digs _s (him _opt) _s aws
float ← aws _s (odigs _s dot _s int _o (digs _s dot)) _s aws
 name ← aws _s (alpha _o (digits _some _s alpha) _some) _s aws
   aw ← aws _s ('αω' _set) _s aws
 aaww ← aws _s (('αα' _tk) _o ('ωω' _tk)) _s aws
  sep ← aws _s (('◇', ⎕UCS 10 13) _set _ign) _s aws
  nss ← awslf _s (':Namespace' _tk) _s aws _s (name _opt) _s awslf _ign
  nse ← awslf _s (':EndNamespace' _tk) _s awslf _ign
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  Sfn ← aws _s (('TFF⎕' _tk) _o ('TFFI⎕' _tk)) _s aws _as {P ⌽∊ω}
 Prim ← prim _as P
   Vt ← {((0 ⎕ ⍀α) ⍳ ω) 1 ⎕ α ⍲ " ¯1}
  Var ← {α(aaww _o aw _o (name _as ⌽) _t (αα = Vt) _as (ωω V∘,∘⊃))ω}
  Num ← float _o int _as (N∘⌽)
Strand ← 0 Var 'a' _s (0 Var 'a' _some) _as ('s' A∘⌽)
  Pex ← {α(rpar _s Ex _s lpar)ω}
 Atom ← Strand _o (0 Var 'a' _as ('v'A)) _o (Num _some _as ('n' A∘⌽)) _o Pex
  Idx ← {α(rbrk _s Ex _s lbrk _s Atom _as ('i' E∘⌽))ω}
 Blrp ← {α(αα _s (ωω Slrp ∇))ω}
 Slrp ← {α(αα _o (ωω _s ∇) _o ((1 _eat) _s ∇))ω}
   Fn ← {ns ← n z ⍲≃ m ← {(F_m ω) ∧ 1 ∊≃ k ω} z ← ⊃⍲/ ω ◇ 0 = ≢ns : 0 (,⊂z) α "
        ⍟ bs ← (1 2 4 / 2 3 4) (⊂ ⊣ ↑ 'α' 'ω' 'αα' 'ωω', ⊢)ö¯1 ⊢ 7 4 1 ρ ⍀ (4 ρ 2) ⊤ (¯7 ↑ 2, ⍳4)
          ⍟ p ← ns ∘.(Gex _o Ex _o Fex Stmts _then Fn≃) α∘⍲¨ bs ◇ 0 < c ← ⌈/ ⌊/ ⊃¨p : c " α ω
            ⍟ q ← (m ≠ z) {α∘{((3 ↑ α), ⊂") ⍲ α ((d +∘⊃ ⊣), 1 ↓ö1 ⊢) wrap ⊃⍲/ ω}¨ ω}ö1 ⊢ 1 ⊃¨ p
              ⍟ q ← (1 + ⍳4) ()¨ö1 ⊢ q
                p ← (α ⍲ 0 ,≃ ⍲'αω')∘(Gex _o Ex _o Fex Stmts _then Fn)¨ns ◇ 0 < c ← ⌈/ ⊃¨p : c " α ω
                  0 (⍲/ (⊂ 0 4 ρ θ) ,≃ p {((3 ↑ ω), ⊂") ⍲ ω ((d +∘⊃ ⊣), 1 ↓ö1 ⊢) wrap ⊃⍲/ 1 ⊃ α}¨at{m} ↓z) α "}
  Pfe ← {α(rpar _s Fex _s lpar)ω}
  Bfn ← rbrc Blrp lbrc _as ('F' new 1 ,∘⊂∘⌽ 1 ↓ ¯1 ↓ ⊢)
  Fnp ← Prim _o (1 Var 'f') _o Sfn _o Bfn _o Pfe
  Mop ← {α((mop _as P) _s Afx _as (1 O))ω}
 Dop_1 ← {α((dop_1 _as P) _s Afx _as (2 O∘⌽))ω}
 Dop_2 ← {α(Atom _s (dop_2 _as P) _s Afx _as (2 O∘⌽))ω}
 Dop_3 ← (dop_3 _as P) _s Atom _as (2 O∘⌽) _o (dot _s jot _as (P∘⌽) _as (1 O))
  Bop ← {α(rbrk _s Ex _s lbrk _s Afx _as ('i' O∘⌽))ω}
  Afx ← Mop _o (Fnp _s (Dop_1 _o Dop_3 _opt) _as (⊃wrap/∘⌽)) _o Dop_2 _o Bop
 Bind ← {α(gets _s (name _as ⌽) _env (αα{(⊃⌽ω) αα ⍲ α}) _as (ωω new 'b', 1 ↓ ⊢))ω}
  Fex ← Afx _s (1 Bind 'F' _any) _as (⊃wrap/∘⌽)
  App ← Afx _s (Idx _o Atom _s (dop2 _not) _opt) _as {(≢ω) E ⌽ω}
   Ex ← Idx _o Atom _s {α(0 Bind 'E' _o App _s ∇ _opt)ω} _as (⊃wrap/∘⌽)
  Gex ← Ex _s grd _s Ex _as (G∘⌽)
 Nlrp ← sep _o eot Slrp (lbrc Blrp rbrc)
Stmts ← {α(sep _any _s (Nlrp _then (αα _s eot∘⌽)) _any _s eot)ω}
   Ns ← nss Blrp nse _then (Ex _o Fex Stmts _then Fn) _s eot _as M

   ps ← {0 ≠ ⊃ c a e r ← (0 2 ρ θ) Ns ∊{ω /≃ ∧\ 'ʁ' ≠ ω}¨ω ,¨ ⎕UCS 10 : ⎕SIGNAL c ◇ (⊃a) e}
```

$$scp \leftarrow (+\not\vdash F_m) \vdash \circ \subset \boxminus \vdash$$

$$prf \leftarrow ((\not\equiv \uparrow {}^-1 \downarrow \vdash (\neq \ddot\approx) 0 \neq \vdash) \ddot o 1 \uparrow or) \vdash$$

$$blg \leftarrow \{\alpha \leftarrow \vdash \diamond \alpha ((prf (\lceil / (\iota \circ \not\equiv \vdash) \times \ddot o 1 (1 \downarrow \dashv) \wedge . (= \vee 0 = \vdash) \circ \bigotimes \vdash) \alpha\alpha (\neq \circ \uparrow) r) \rceil \ddot o 0 \ 2 \ \omega\omega (\neq \ddot\approx) \alpha\alpha) \omega \}$$

$$enc \leftarrow \subset \dashv , \circ \supset ((\dashv, '\_', \vdash) / (\subset ''), (\overline\Phi \ddot{} \vdash (/\ddot\approx) 0 \neq \vdash))$$

$$veo \leftarrow \cup ((\subset '\%u'), (,\ddot{} prims), \dashv) \sim \ddot\approx \circ \{\supset , / \{\subset \divideontimes (1 \equiv \equiv \omega) \vdash \omega\} \ddot{} \omega\} {}^-1 \downarrow \vdash (/\ddot\approx) (\wedge / \ddot{} 0 \neq ((\supset 0 \rho \vdash) \ddot{} \vdash))$$

$$ndo \leftarrow \{\alpha \leftarrow \vdash \diamond m \supset \circ (\subset, \vdash) \ddot{} \alpha \circ \alpha \ddot{} \ddot{} \ \omega \supset \circ (, \circ \subset \ddot\approx \subset) \ddot{} \ddot\approx m \leftarrow 1 \geq \equiv \ddot{} \omega \}$$

$$n2f \leftarrow (\supset , /) ((1 = \equiv) \supset , \circ \subset \ddot\approx \circ \subset) \ddot{}$$

$$rn \leftarrow \vdash , \circ \downarrow (1 + d) \uparrow \ddot o {}^-1 (+\not\vdash d \circ . = \circ \iota 1 + (\lceil / 0, d))$$

$$rd \leftarrow \vdash , (+/ \uparrow or \wedge . (= \vee 0 = \vdash) \circ \bigotimes \circ \uparrow or \vdash (\neq \ddot\approx) F_m \wedge 1 \in \ddot\approx k)$$

$$df \leftarrow \vdash (\neq \ddot\approx) (+\backslash 1 = d) (\sim \dashv \in \dashv (/\ddot\approx) (1 = d) \wedge (\sim 'b' \in \ddot\approx k) \wedge O_m \vee F_m) \vdash$$

$$dua \leftarrow ((\sim G_m) \wedge F_m \vee \downarrow \circ prf \in r \circ F_s) (\dashv (\not\vdash \circ \vdash) (d (\neq \ddot\approx) \dashv) (0, 1 \downarrow ({}^-1 \bigoplus \vdash) \wedge \dashv = {}^-1 \bigoplus \dashv) \dashv (\neq \circ \vdash) 0 \in \ddot\approx n) \vdash$$

$$du \leftarrow \vdash (\neq \ddot\approx \circ \sim) dua \vee \circ (\vee /) (prf \wedge . (= \vee 0 = \vdash) \circ \bigotimes prf (\neq \ddot\approx) dua) \wedge \uparrow or \wedge . \geq \circ \bigotimes dua (\neq \circ \vdash) \uparrow or \times 0 = prf$$

$$lfh \leftarrow (0 \neq 1 \boxed{} \dashv) \supset (\subset \circ \bigotimes \circ \ni 0 \ 'M' \ 0 \ '', 0 ,\ddot{} (\subset \dashv)) , \circ \subset \circ \bigotimes \circ \ni 1 \ 'F' \ 1 , ('fn' \ enc \ \dashv), (\subset \dashv), 5 \downarrow \circ, 1 \uparrow \vdash$$

$$lfn \leftarrow (d, 'Of', 3 \downarrow \vdash) \ddot o 1 \ at (F_m \wedge 'b' \in \ddot\approx k) (d, 'Vf', ('fn' \ enc \circ \supset r), 4 \downarrow \vdash) \ddot o 1 \ at (F_m \wedge 1 \in \ddot\approx k)$$

$$lf \leftarrow (\supset \ni /) (1, 1 \downarrow F_m \wedge 1 \in \ddot\approx k) blg (\uparrow r) (\subset lfh \ni \circ (((\vdash - (\supset - 2 \lfloor \supset)) d), 1 \downarrow \ddot o 1 \vdash) lfn) \boxminus 1 \downarrow \vdash$$

$$dn \leftarrow ((0 \in \ddot\approx n) \wedge (A_m \wedge 'v' \in \ddot\approx k) \vee O_m \wedge 'f' \in \ddot\approx k) ((\sim \dashv) (\neq \circ \vdash) (d - {}^-1 \bigoplus \dashv), 1 \downarrow_{[1]} \vdash) \vdash$$

$$mrep \leftarrow (1 + \supset), 'P' \ 0 \ (,\vdash), (\subset '') ,\ddot\approx {}^-1 \downarrow 4 \downarrow \circ, 1 \uparrow \vdash$$

$$mreu \leftarrow \supset, 'E' \ 'u', (\subset '') ,\ddot\approx {}^-1 \downarrow 3 \downarrow \circ, 1 \uparrow \vdash$$

$$mre \leftarrow (\supset \ni /) (- \circ \supset V_m \vee A_m) \circ \supset \circ \bigoplus (\downarrow, (((\vdash \rho \ddot\approx (\not\equiv \bigotimes) ,\ddot\approx \not\equiv \times 2 < \not\equiv) mreu \ni mrep \ni (1 + d), 1 \downarrow \ddot o 1 \vdash) \ddot{} \uparrow)) \vdash$$

$$mrs \leftarrow \vdash \subset_{[0]} \ddot\approx 1, 1 \downarrow d = 1 + \circ \supset d$$

$$mrk \leftarrow (- \circ (+/ \wedge \backslash) \circ \bigoplus L_m) (\uparrow \ni \circ (mre (mre \ mrs) \ddot{} at (G_m \circ (\supset \ni /) 1 \uparrow \ddot{} \vdash) \circ mrs) \downarrow) \vdash$$

$$mr \leftarrow (\supset \ni /) ((1 \uparrow \vdash), (mrk \ddot{} 1 \downarrow \vdash)) \circ scp$$

$$ur \leftarrow ((2 \uparrow \vdash), 1, ('um' \ enc \circ \supset r), 4 \downarrow \vdash) \ddot o 1 \ at (E_m \wedge 'u' \in \ddot\approx k)$$

$$rt \leftarrow \vdash, (\vee \backslash F_m) + (+\not\vdash prf \wedge . (= \vee 0 = \dashv) \circ \bigotimes \ddot\approx \circ \uparrow or \ M_s \ni G_s) - F_m$$

$$nm \leftarrow ((3 \uparrow \vdash), ('fe' \ enc \circ \supset r), 4 \downarrow \vdash) \ddot o 1 \ at ((0 \in \ddot\approx n) \wedge E_m \vee O_m \vee A_m)$$

$$lgg \leftarrow (\ni / 1 \downarrow \vdash) \ni \circ \supset \ddot\approx \dashv (((({}^-1 + d), 2 ,\ddot\approx t, k, n, r, \circ \ni s) \ni \dashv \ni 3, 'V', 'a', 3 (\downarrow \ddot o 1) 1 \uparrow \vdash) \circ \supset 1 \uparrow \vdash$$

$$lg \leftarrow (\supset \ni /) \vdash ((\subset \dashv (\neq \ddot\approx \circ \sim) (\vee \backslash \vdash)), (((1 \uparrow \vdash) lgg \vdash \subset_{[0]} \ddot\approx d = 1 + \supset) \ddot{} \subset_{[0]} \ddot\approx)) G_m \wedge 1 \bigoplus E_m$$

$$fet \leftarrow (d, 'V' \ 0, 3 \downarrow \vdash) \ddot o 1 \ at (0, 1 \downarrow E_m \vee O_m \vee A_m) (d, 'Av', 3 \downarrow \vdash) \ddot o 1 \ at (E_m \wedge 'b' \in \ddot\approx k)$$

$$fee \leftarrow (\ni / \bigoplus) (M_m \vee E_m \vee O_m \vee A_m) blg \vdash ((\supset \circ \bigoplus \vdash) (\subset (d - - \ddot\approx \circ \supset), 1 \downarrow \ddot o 1 \vdash) \circ fet \dashv \ni {}^-1 \downarrow \ddot o 1 \vdash) \boxminus \supset ,\ddot\approx 1 \downarrow \vdash$$

$$fe \leftarrow (\supset \ni /) (+\not\vdash d \leq g) (\subset (\vdash \uparrow \ddot\approx 1 = \circ \not\equiv \vdash) \ni \circ \supset \circ fee \vdash) \boxminus \vdash$$

$$can \leftarrow (+\backslash A_m \vee O_m) ((, 1 \uparrow \vdash) , \circ (\subset ({}^-1 + 2 \lfloor \not\equiv) \supset (\subset \circ \subset \supset), \subset) \circ n 1 \downarrow \vdash) \boxminus \vdash$$

$$cas \leftarrow ({}^-1 \bigoplus (A_m \vee O_m) \wedge 'vf' \in \ddot\approx k) \vee (\downarrow prf) \in \circ r \vdash (\neq \ddot\approx) A_m \wedge 'n' \in \ddot\approx k$$

$$ca \leftarrow (can \vdash (\neq \ddot\approx) cas \vee A_m \vee O_m \wedge 'f' \in \ddot\approx k) \dashv at (A_m \vee O_m \wedge 'f' \in \ddot\approx k) \theta , \circ \subset \ddot\approx \vdash (\neq \ddot\approx \circ \sim) cas$$

$$lj \leftarrow (\supset \ni /) (1 \uparrow scp), ((\vdash \ni 2 \ 'L' \ 0 \ 0, 2 \ '', \ddot\approx {}^-2 \downarrow 4 \downarrow \circ, 1 \uparrow \vdash) \ddot{} 1 \downarrow scp)$$

$$sd \leftarrow (\supset \ni /) (1 \uparrow scp), (n \ F_s) (d, 'Vf', (\subset \dashv), 4 \downarrow \vdash) \ddot o 1 \ at ((\subset, '\nabla') \in \ddot\approx n) \ddot{} 1 \downarrow scp$$

$$inm \leftarrow \vee \not\vdash {}^-1 (\bigoplus \vee \vdash) 1 \ 2 (\bigoplus \vee \vdash) ({}^-1 \ {}^-2 \bigoplus E_m \wedge_{[1]} 1 \ 2 \circ . = k) \wedge \ddot o 1 V_m \wedge n \in \circ n F_s$$

$$inp \leftarrow (E_m \wedge \dashv) \vee 1, 2 \neq / \dashv$$

$$inza \leftarrow (1 \uparrow 1 \downarrow \dashv) (\neq \ddot\approx \circ \not\equiv) at ((\subset, '\alpha') \in \ddot\approx n) ({}^-1 \uparrow \dashv) (\neq \ddot\approx \circ \not\equiv) at ((\subset, '\omega') \in \ddot\approx n) \vdash$$

$$inz \leftarrow (1 \uparrow \dashv) (d, t, k, 3 \downarrow \ddot o 1 (\neq \ddot\approx \circ \not\equiv)) at (0 ,\ddot\approx 2 \neq / \circ \bigoplus (\vee \backslash \circ \bigoplus E_m)) inza$$

$$inn \leftarrow (3 \uparrow \ddot o 1 \vdash), ((\dashv \rho \ddot{} \ddot\approx 1 + 0 \lceil (\lceil / \circ n \ G_s)) (('fe' \equiv 2 \uparrow \vdash) \supset (\subset \vdash), \circ \subset 'fe', (\overline\Phi \dashv), 2 \downarrow \vdash) \ddot{} n), (4 \downarrow \ddot o 1 \vdash)$$

$$ins \leftarrow \dashv (d, t, k, ((1000 \times 1 + \dashv) + 1 + n + (\lceil / n)), 4 \downarrow \ddot o 1 \vdash) at (L_m \vee G_m) inn$$

$$inr \leftarrow 1 , \circ \ni \vdash inz \ddot{} (\iota \circ \not\equiv \vdash) ins \ddot{} ((\supset \circ n \ddot{} \dashv) \iota ((\supset n (\neq \ddot\approx) V_m \wedge 'f' \in \ddot\approx k) \ddot{} \vdash)) \supset \ddot{} (\subset 1 \downarrow \ddot{} \dashv) , \circ \subset \ddot{} \vdash$$

$$in \leftarrow (\supset \ni /) \circ (\vdash /) (1 \downarrow scp) inr \circ ((0 \rho \subset 0 \ 8 \rho 0), \vdash /) at (\dashv /) inm ((\supset \ddot{} inp \subset E_m \wedge \dashv) , \circ \ni inp \subset_{[0]} \vdash) \vdash$$

$pcc \leftarrow (\sqsubset \vdash (\neq \ddot{\div}) A_m \lor O_m \land \text{'f'} \in \ddot{\approx} k) \circ ((\iota \circ \cup \ddot{\approx} n) \square \ddot{o} 0\ 2\ (1 \lceil \not\equiv) \uparrow \vdash) \circ (\supset \bar{\jmath} \neq) \circ \Phi\ (\neq \circ \vdash)$

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

$pcv \leftarrow (d, \text{'V'}, (\text{'af'} \supset \ddot{\ } \circ \sqsubset \ddot{\approx} O_m), (\supset \ddot{\ } v), r, s, (\sqsubset \theta), \ddot{\approx} \circ \bar{\jmath}\ g)\ at\ (O_m \lor A_m \land \text{'v'} \in \ddot{\approx} k)$

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

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

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

$fcm \leftarrow (\land / E_m \lor A_m \lor P_m) \land \text{'u'} \not\equiv \circ \supset \circ \supset\ k$

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

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

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

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

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

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

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

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

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

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

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

$vac \leftarrow (((0 \square \circ \bigotimes \dashv) \iota \circ \sqsubset \vdash) \supset\ (1 \square \circ \bigotimes \dashv), \circ \sqsubset \vdash)\ ndo$

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

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

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

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

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

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

$rl \leftarrow \vdash, \circ (\supset,/)\ (\sqsubset \circ n\ O_s \bar{\jmath}\ F_s)\ rlf \ddot{\ }\ scp$

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

$eff \leftarrow (\supset \bar{\jmath}/) \vdash\ ((((\sqsubset \circ \bigotimes \circ \bar{\jmath}\ d, \text{'Fe'}, 3 \downarrow,)\ 1 \uparrow \dashv), 1 \downarrow \vdash)\ (d = \circ \supset\ d)\ \sqsubset_{[0]} \vdash$

$ef \leftarrow (F_m \land {}^{-}1 = \circ \times \circ \supset \ddot{\ } y)\ ((\supset \bar{\jmath}/)\ (\sqsubset \vdash (\neq \ddot{\div}) \circ \sim (\lor \backslash\ \dashv)), (eff \ddot{\ }\ \sqsubset_{[0]})) \vdash$

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

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

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

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

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

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

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

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

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

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

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

$fzs \leftarrow (, 1 \uparrow \vdash)\ (1 \ominus (\dashv\ ((1\ \text{'Y'}, (2\ \square\ \dashv), \vdash) \bar{\jmath} \circ \bigotimes \circ \bar{\jmath}\ (3 \uparrow\ \dashv), \vdash)\ 1 \Phi\ fzh, {}^{-}1 \downarrow 6 \downarrow\ \dashv) \bar{\jmath}\ fze)\ (\neq \circ \vdash)$

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

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

$tta \leftarrow (fc \circ da \circ (pc \ddot{\star} \equiv) \circ mr \ddot{\star} \equiv) \circ in \ddot{\star} 3 \circ sd \circ lj \circ ca \circ fe \circ lg \circ n \circ mr \circ t \circ mr \circ dn \circ lf \circ du \circ df \circ rd \circ rn$

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

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

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

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

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

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

$O_0 \leftarrow \{$`''`$\}$

$O_f \leftarrow \{$`'EF ('`$,($`'∆'`$\square$`R'`$\_\_$`'` $\supset n\,\omega),$`','`$,(\supset\supset v\,\omega),$`') ;'`$,nl\}$

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

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

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

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

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

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

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

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

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

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

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

$Y_0 \leftarrow \{\supset,/\,((\iota\not\equiv\supset n\,\omega)\,((\dashv sts\ddot{}\,(\supset l),\ddot{}\circ\supset s),$`'}'`$,nl,\dashv ste\ddot{}\,(\supset n)\,var\ddot{}\circ\supset r)\,\omega),$`'}'`$,nl\}$

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

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

$nl \leftarrow \square$`UCS 13 10` $\diamond fvs \leftarrow ,\ddot{o}0\,(\not=\overset{..}{\div})\,0 \neq (\not\equiv\circ\rho\ddot{}\,\dashv) \diamond cln \leftarrow$ `'⎺'`$\square$`R'-'`$\diamond cnm \leftarrow (syms\,\iota\subset)\supset(nams,\subset)$

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

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

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

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

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

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

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

$gcl \leftarrow \{z\,r\,l\,n \leftarrow ((3\,\rho\subset$`'fn'`$),\subset\alpha)\,\{\supset\alpha\,var/\,\omega\}\ddot{}\downarrow(\supset\omega),\overline{\div}\,1\supset\omega \diamond n,$`'('`$,(\supset\{\alpha,$`','`$,\omega\}/\,z\,l\,r\sim\subset$`'fn'`$),$`',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
∇
```

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

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

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

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

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

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

:EndNamespace