MCM TAPE TAPE-22.TXT

TAPE LABEL/ANNOTATIONS: "D
Copy from #3
2 July/75"

DATE CREATED: July 2, 1975

GROUPS:
0 1 2 3 6 10 11 13 14 20 21
50 51 100 101

NAMES IN GROUP 0:
FMT EDI PRI ΔCR DXΔ RLΔ ANΔ ΔLD Z INS ΔEX ΔCP
CHK CS

```
    ∇FMT I
[1]   A[;1]←46ρ'0'∘A←46 81ρ' '∘⍞XS 0
[2]   (1↑I) ⍞XW'A'
[3]   →(0<ρ,I←1↓I)/2
[4]   ⍞EX'A'
    ∇
```

```
    ∇EDIT;L;X;LI
[1]   L←⍎6↓⍞'LINE: '∘⍞XS ⍎7↓⍞'GROUP: '
[2]   LI←⍎4↑X←6⍞((3 0 0⍕L),' '),A[L;]
[3]   →((LI=0,L),1)/E,U,C
[4]   C:→2∘L←LI
[5]   U:A[L;]←4↓⍞←X
[6]   →(46≥L←L+1)/2
[7]   →1
[8]   E:⍞XS 0
    ∇
```

```
    ∇PRI G;L;CC;XL;PLΔ;PSΔ;SC
[1]   PSΔ←48 51+PLΔ←0∘⍞PW←130∘⍞PP←8∘⍞OU 1
[2]   ⍞XS 1↑G∘L←0
[3]   CC←⍎1↑XL←A[L;]∘L←L+1+SC←0
[4]   →(P,S1P,S2P,S3P,NO,P,S1P,S2P,S3P,NP,3)[1+CC]
[5]   P:→PL∘RLΔ 1+CC∈5 6 7 8
[6]   S3P:SC←SC←1
[7]   S2P:SC←SC+1
[8]   S1P:⍞←(SC,1)ρ' '∘RLΔ (CC∈5 6 7 8)+1+SC←SC+1
[9]   PL:→(~CC∈5 6 7 8)/3∘⍞←1↓XL
[10]   →3∘⍞←((ρXL)-(⌽XL=' ')⍳0)ρ'¯'
[11]   NO:→(0≠ρG←,1↓G)/2
[12]   NP:→(CC=9)/P∘RLΔ 1+(1↑PSΔ)-PLΔ
[13]   ⍞XS 0
    ∇
```

```
    ∇ΔCR GNΔ;IΔ;GΔ;NMΔ;PLΔ;PSΔ
[1]   PSΔ←48 51∘⎕PW←95∘⎕OU 1 16∘PLΔ←0
[2]   →L3Δ∘GNΔ←1∘NMΔ←ANΔ GNΔ∘→(0=0\0ρGNΔ)/L0Δ
[3]   L0Δ:GNΔ←GNΔ[⍋GNΔ←((GNΔ⍳GNΔ)=⍳ρGNΔ)/GNΔ←,GNΔ]
[4]   L1Δ:→EΔ⌈⍳0=ρGNΔ
[5]   ⎕XS GΔ∘NMΔ←⎕XN GΔ←''ρGNΔ
[6]   RLΔ 2∘⎕←''∘⎕←'LISTING GROUP: ',(⍕GΔ),(60ρ' '),⍪(2 2 2 0 0=⎕NC'DAT')/'DAT'''''
[7]   L3Δ:IΔ←⎕IO-1∘⎕←''∘RLΔ 1+1↑ρ⎕←(([(×/ρNMΔ)÷80),80)ρNMΔ⌿20 4ρ' '
[8]   L2Δ:→E1Δ⌈⍳IΔ=⎕IO+¯1+1↑ρNMΔ
[9]   →L2Δ∘DXΔ NMΔ[IΔ←IΔ+1;]
[10]   E1Δ:PLΔ←0∘RLΔ 1+(1↑PSΔ)-PLΔ
[11]   →L1Δ∘GNΔ←1↓GNΔ
[12]   EΔ:⎕OFF∘→0
    ∇


    ∇DXΔ XΔ;DΔ;NΔ;NMΔ;HΔ
[1]   →(VΔΔ,VΔ,VΔ,FΔΔ,VΔ,A2Δ)[⎕IO+⎕NC XΔ]
[2]   FΔΔ:RLΔ 2+NΔ←1↑ρDΔ←⎕CR XΔ
[3]   HΔ←6 1 0⍕(NΔ,1)ρ(⍳NΔ)-⎕IO
[4]   HΔ[NΔ←⎕IO;]←' '∘HΔ[;⎕IO+5 4,3-ρ⍕NΔ-1]←(NΔ,3)ρ' ']['
[5]   FΔ:⎕←HΔ[NΔ;],DΔ[NΔ;]
[6]   →EΔ∘⎕←'      ∇'∘→(((⎕IO+¯1+1↑ρHΔ)⩾NΔ←NΔ+1)/FΔ
[7]   VΔ:NMΔ←'(',(⍕ρDΔ),')',((6ρ0)≠0\0ρDΔ←⍪XΔ)/' ALPHA'
[8]   NMΔ[(' '=NMΔ)/⍳ρNMΔ]←',' '
[9]   →EΔ∘⎕←XΔ,':  ',NMΔ∘RLΔ 2
[10]   A2Δ:→EΔ∘⎕←XΔ,'  α2'∘RLΔ 2
[11]   VΔΔ:⎕←XΔ,' NO VALUE'∘RLΔ 2
[12]   EΔ:⎕←'' N
    ∇


    ∇RLΔ N
[1]   →0×⍳(1↑PSΔ)⩾PLΔ←PLΔ+N
[2]   PLΔ←N∘⎕←((((¯1↑PSΔ)-(¯1↑PSΔ)|PLΔ-N)-4×¯1+⌊PLΔ÷1↑PSΔ),1)ρ' '
    ∇


    ∇ZΔ←ANΔ XΔ;JΔ
[1]   ZΔ←0 4ρ''∘→(2=ρρZΔ←XΔ)/0
[2]   →0×⍳0=ρXΔ←(((XΔ=' ')⍳0)-⎕IO)↓XΔ
[3]   ZΔ←ZΔ⌿1 4ρ((JΔ←(XΔ⍳' ')-⎕IO)↑XΔ),'   '
[4]   →2∘XΔ←JΔ↓XΔ
    ∇


    ∇ΔLD X;G;I;PLΔ;PSΔ
[1]   ⎕←'TAPE:  ',(⍕X),(60ρ' '),⍪3↑((0≠⎕NC'DAT')/'DAT'),''' '''∘⎕PW←130∘⎕OU 1 16∘PSΔ←48 51
[2]   ⎕←'ACTIVE GROUPS ARE: ',⍕G←⎕XN⍳0×I←1∘⎕←''
[3]   PLΔ←5∘⎕←'GROUP NAMES'∘⎕←''
[4]   X←((1,(¯1+1↑ρX)ρ0)⍀1 6ρ(4 0 0⍕G[I]),'  '),X←(([(×/ρX)÷80),80)ρ(X←⎕XN G[I])⌿20 4ρ' '
[5]   →((I←I+1)⩽ρG)/4∘⎕←X∘RLΔ 1↑ρX
[6]   RLΔ 1+(1↑PSΔ)-PLΔ∘⎕XF⍳0
    ∇
```

```
    ∇R←Z;X
[1]   ⎕←''∘⎕←1↓XL∘R←10∘RL∆ 2
[2]   ⎕←''∘⎕←X∘RL∆1+1↑(ρX←⍎1↓XL),1
    ∇


    ∇INS;L;I
[1]   L←⍎12↓⍞'AFTER LINE: '∘⎕XS ⍎7↓⍞'GROUP: '
[2]   I←('4'=A[;1])/⍳1↑ρA R
[3]   A[I+1;]←A[I;]
[4]   →(L<I←I-1)/3
[5]   A[L+1;1]←'0'∘A[L+1;]←81ρ' ' Z
    ∇


    ∇∆EX N;I;T∆
[1]   I←1↑N∘→(0≠I←1↓N←2↑N,0)/5
[2]   →4∘⎕←⍎T∆∘⎕←''∘→('→←'∈⎕←T∆←1⍞'')/8 3
[3]   ∘⍎T∆
[4]   →2∘⍎('L',2⍕9+I←I+1),'←T∆'∘→(0=1↑N)/2∘⎕←''
[5]   →7∘⎕←⍎T∆∘⎕←''∘→('→←'∈⎕←T∆←⍎'L',2⍕9+I←I+1)/0 6
[6]   ∘⍎T∆
[7]   →5∘⎕←''
[8]   ∘⍎('L',2⍕9+I←I+1),'←T∆'
[9]   ⍝N=0 INPUT FROM KB, LINES NOT SAVES
[10]   ⍝N≠0 INPUT FROM KB, LINES SAVED STARTING AT N
[11]   (0=1↑N)∧0≠1↓N INPUT FROM L,2⍕1↓N
    ∇


    ∇∆CP;∆G;∆GN
[1]   ∆G←⎕XN⍳0∘⎕PT←10
[2]   'GROUP ';1↑∆G∘⎕XS 1↑∆G∘∆GN←⎕XN 1↑∆G
[3]   ⍎'(1↑∆G) ⎕X','WC'[⎕IO+0=⎕NC 1 4↑∆GN],'[2] 1 4↑∆GN'
[4]   →(0≠ρ∆GN←1 0↓∆GN)/3 5
[5]   →(0<ρ∆G←1↓∆G)/2
[6]   ⎕XS 0∘⎕XF[2]⍳0
[7]   'COPY DONE'∘⎕PT←0
    ∇


    ∇CHK;X;Y
[1]   X←⎕_1 (⍳19)+1-⎕IO
[2]   Y←176733 173599 165295 175999 221948 163253 154356 166212 172482 175298 171720 160461
[3]   Y←Y,250427 171199 233973 221551 522240 522240 522240
[4]   →(0=×/ρX←⍲(Y≠X)/2 19ρ'MMMBBBBBBBBBBBBBBBB0120123456789ABCDEF')/GOOD
[5]   'MEMORY BAD'
[6]   X
[7]   →0
[8]   GOOD:'MEMORY OK'
    ∇

CS    [numeric vector of length 19; element size 3 byte(s)]
176733 173599 165295 175999 221948 163253 154356 166212 172482 175298 171720
160461 250427 171199 233973 221551 522240 522240 522240
```

NAMES IN GROUP 1:
A

A   [81 by 46 array of type char; element size 1 byte(s)]
5DIFFERENCES BETWEEN MCM/APL AND APL/360
6PRIMITIVE OPERATOR DIFFERENCES
11. QUAD QUOTE INPUT (⍞) IS IMPLEMENTED AS A MONADIC OR DYADIC FUNCTION. THE
0   RIGHT ARGUMENT IS A PROMPT DISPLAYED WHEN THE KEYBOARD IS UNLOCKED. THE
0   LEFT ARGUMENT IS USED TO POSITION THE CURSOR. IF IT IS ABSENT, THE
0   CURSOR IS POSITIONED AFTER THE PROMPT. ⍞'' IS EQUIVALENT TO APL\360 ⍞.
1   EXAMPLE: 3⍞'1+ =5'   THE KEYBOARD UNLOCKS WITH THE CURSOR IN POSITION 3,
0   THE BLANK. THE RESULT IS THE ENTIRE CHARACTER STRING.
12. DYADIC FORMAT IS EXTENDED. IN A⍕B, THE ELEMENTS OF A FORM TRIPLETS
0   REPRESENTING WIDTH, DIGITS AND EXPONENT INTERVAL (E) FOR EACH COLUMN OF B.
0   IF E=0, F - FORMAT IS IMPLIED. IF E>0, THE EXPONENTS FOR THIS COLUMN WILL
0   BE MULTIPLES OF E. IF E<0, F - FORMATTING IS ATTEMPTED. IF THIS FAILS, E
0   FORMATTING IS APPLIED AS ABOVE.
13. EXECUTE (R←⍎C) IS IMPLEMENTED. BRANCH (→) IS NOT ALLOWED WITHIN C.
14. THE NULL OPERATOR (R←A∘B) IS EQUIVALENT TO R←A. THEREFORE NULL CAN BE
0   USED TO GROUP INDEPENDENT CALCULATIONS ON A SINGLE LINE.
15. SCAN EXECUTES FROM RIGHT TO LEFT. FOR EXAMPLE, +\1 2 3 PRODUCES 6 5 3.
0   ⌽+\⌽N (GENERAL CASE ⌽[I]+\[I]⌽[I]N) IS EQUIVALENT TO APL.SV +\N.
16. MATRIX DIVISION / INVERSE (⌹) IS NOT IMPLEMENTED AS A PRIMITIVE OPERATOR.
17. TAKE(↑) WITH A RESULT LARGER THAN THE ORIGINAL ARGUMENT IS NOT IMPLEMENTED.
18. IN FACTORIAL (!B) AND COMBINATIONS (A!B), A AND B MUST BE INTEGERS.
19. THE MAXIMUM RANGE OF QUERY (?A) IS 32767.
110. 0÷0 AND 0*0 PRODUCE DOMAIN ERRORS.
111. NEGATIVE VALUES CANNOT BE RAISED TO NON INTEGER POWERS.
112. LAMINATE (A,[1.1]B) IS NOT IMPLEMETED.
113. ONE ELEMENT LITERAL CONSTANTS AND ⍞ RETURN ONE ELEMENT VECTORS.
4
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0

```
NAMES IN GROUP 2:
A

A     [81 by 46 array of type char; element size 1 byte(s)]
7SYSTEM DIFFERENCES
11.  SYSTEM COMMANDS ARE REPLACED BY SYSTEM VARIABLES AND FUNCTIONS SIMILAR
0    TO THOSE IN APL.SV.  NOTE: THE DEFAULT VALUE FOR □PP IS 5.
12.  A FILE SUBSYSTEM, EXTERNAL ALLOCATION SYSTEM (EASY) ALLOWS THE USER TO
0    READ AND WRITE DATA AND FUNCTIONS ON THE FILES.
13.  A VIRTUAL SYSTEM (AVS) EXTENDS THE AVAILABLE MEMORY BY AUTOMATICALLY
0    ROLLING DATA AND FUNCTIONS IN AND OUT OF MEMORY.  IT ALSO ENABLES
0    AUTOMATIC POWER FAIL AND RESTART.
14.  A COMMUNICATIONS SUBSYSTEM IS IMPLEMENTED TO HANDLE ALL EXPLICIT INPUT
0    AND OUTPUT (□ AND ⍞) FOR THE APL SYSTEM.  SIMPLE COMMANDS ARE USED TO
0    DIVERT THE INPUT AND/OR OUTPUT TO ANY DEVICE EQUIPED WITH AN RS-232C
0    INTERFACE. OUTPUT CAN ALSO BE DIVERTED TO THE MCP132 PRINTER OR
0    OTHER MCM DIRECTLY SUPPORTED DEVICES.
15.  EACH DIMENSION IS LIMITED TO 255 ELEMETS. RANK IS LIMITED TO 32.
0    BECAUSE OF THIS, THE DOMAIN OF INDEXING PRIMITIVES (⍳,↑ ETC) IS FROM
0    0 TO 255.
16.  THE SYSTEM WILL GENERATE VARIABLES AND FUNCTIONS WHICH CONTAIN MORE
0    THEN 3968 BYTES. HOWEVER AVS AND EASY CANNOT WRITE ITEMS CONTAINING
0    MORE THAN 3968 BYTES.
17.  FUNCTION EDITING IS ENHANCED BY THE USE OF INSERT (CONTROL SPACE) AND
0    DELETE (CONTROL BACKSPACE).  FUNCTION DEFINITION CAN BE OPENED IN QUAD
0    INPUT.  FUNCTION LINES CAN BE DELETED BY INTERUPT (CONTROL SHIFT ARROW).
0    NOTE:  CONTROL (AND SHIFT) KEYS MUST BE PRESSED SIMULTANEOUSLY WITH THE
0   SPACE, BACKSPACE OR ARROW (→) KEY.
18.  NAMES CAN BE OF ANY LENGTH BUT THE SYSTEM RECOGNIZES ONLY THE FIRST
0    THREE CHARACTERS.
4
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
```

```
NAMES IN GROUP 3:
A

A     [81 by 46 array of type char; element size 1 byte(s)]
5SYSTEM WATCH-OUTS
6MCM/APL RELEASE 1.1
11.  IF AN ARRAY A IS CREATED SUCH THAT (×/ρA)>8191, A DAMAGED WORKSPACE MAY
0    RESULT.
12.  IF A FUNCTION IS INTERRUPTED AT THE END OF A LINE, THE LINE NUMBER
0    DISPLAYED IS THE NUMBER OF THE FOLLOWING LINE.
13.  VALUES REPLACED INTO SYSTEM VARIABLES (IE. ⎕PP, ⎕PT) ARE NOT CHECKED
0    CORRECTLY WITH RESPECT TO SHAPE AND DOMAIN.
14.  WHEN A REQUEST FOR QUAD PRIME INPUT (⍞) IS INTERRUPTED, IF THE '→' KEY
0    IS RELEASED BEFORE THE CONTROL KEY, THE SYSTEM WILL WAIT FOR ANOTHER
0    KEY TO BE PRESSED BEFORE CONTINUING.  RETURN MUST BE PRESSED TWICE
0    IN RESPONSE TO THIS INTERRUPT.
15.  FUNCTION LINE LABELS MAY NOT HAVE SPACES BETWEEN THE NAME AND THE COLON.
0    DUPLICATE LINE LABELS DO NOT PRODUCE A DEFINITION ERROR.
16.  IF THE RESULT OF A FLOATING POINT CALCULATION IS MUCH GREATER THEN
0    7E75, A RANGE ERROR IS NOT ISSUED AND THE RESULT IS ZERO.
17.  IN INDEXED REPLACE (A[B]←C), AVAILABLE WORKSPACE IS REDUCED IF: 1. A AND
0    B ARE VECTORS AND C IS A SCALAR.  2. AN INTERRUPT OR ERROR OCCUR
0    DURING EXECUTION.
18.  WHEN AVS IS ACTIVE AND A FUNCTION F IS CURRENTLY NOT IN THE WORKSPACE,
0    F←X DOES NOT PRODUCE A SYNTAX ERROR.  THE FUNCTION F IS REPLACED BY X.
19.  IF AVS IS ACTIVE AND AN ITEM WHOSE NAME IS IN THE ACTIVE GROUP IS READ
0    EXPLICITILY FROM ANOTHER GROUP, THE AVAILABLE WORKSPACE IS REDUCED.
110. THE STATEMENT  N ⎕XR'N' PRODUCES UNPREDICTABLE RESULTS.  THE WORKSPACE
0    COULD BE DAMAGED.
111. IF A WORKSPACE FULL ERROR OCCURS DURING STARTUP OF FUNCTION EXECUTION,
0    A ZERO MAY BE INSERTED IN THE ⎕LC LIST.
112. IN THE SEQUENCE  A F B ,IN EVALUATING A, IF AVS ROLLS F OUT OR F IS
0    MOVED BY GARBAGE COLLECT, THE RESULT IS UNPREDICTABLE AND WORKSPACE
0    DAMAGE MAY OCCUR.
113. WHEN A WORKSPACE FULL ERROR OCCURS, TRY RESUMING EXECUTION (→⎕LC)
0    BEFORE OTHER CORRECTIVE ACTION.
114. IF A COMMENT IS EXECUTED (⍎'⍝XXXXX'), THE KEYBOARD IS UNLOCKED FOR INPUT.
115. WHEN EDITING A SUSPENDED FUNCTION, THE HEADER LINE CAN BE DISPLAYED BUT IT
0    CANNOT BE ALTERED IN ANY WAY.  TO ESCAPE FROM THE LINE 0 DISPLAY, ENTER [N]
0    TO DISPLAY ANY OTHER LINE.
4
0
0
0
0
0
0
0
0
0
```

```
NAMES IN GROUP 6:
COM  XM   SET


    ∇COM
[1]   SETUP∘⎕PT←10
[2]   WAIT:'PHONE 1-416-678-6900'
[3]   →WAIT⌈⍳2>4|⍣¯1↑⎕OU⍳0
[4]   XM'*'∘⎕DL 2
[5]   XM'900JMS'
[6]   XM'37'
[7]   XM''
[8]   XM'APL'
[9]   ⎕PT←0
[10]   L0:XM ⍞''∘⎕IN 0
[11]   →L0
    ∇


    ∇R←XM X
[1]   ∘⎕IN  ⎕YA 1 31
[2]   R←⍞''∘⎕←X
[3]   R←(BC≠R)/R
    ∇


    ∇SETUP;INT;A
[1]   ⎕IO←0∘'I'⎕YX⍳0∘'O'⎕YX⍳0∘⎕OU(A←⎕YA 1 31),1
[2]   ∘⎕OU A,0∘YCO ⎕YO[0]⍳11
[3]   YO ⎕YO[2]ALF
[4]   →SI⌈⍳~INT←32≤64|1↑1↓⎕IN A∘⎕OU A,6
[5]   YO ⎕YI[2]ALF
[6]   SI:YCI ⎕YI[0]⍳11
[7]   YI ⎕YI[1]⍳128
[8]   ∘⎕OU A,0∘⎕BO 52
    ∇



NAMES IN GROUP 10:
SET  SIG  MON  ALF  BI   APL  XFE  PΔY  PPΔ  CTL  WID  MΔO
NVE  MΔI  VOU  FMT  X    A    PT   ΔC   QSO  OSO


    ∇SETUP;INT
[1]   ⎕IO←0∘'I'⎕YX⍳0∘'O'⎕YX⍳0∘⎕OU(A←⎕YA 1 31),1
[2]   ⎕←''∘YCO ⎕YO[0]⍳11
[3]   YO ⎕YO[2]ALF
[4]   →SI⌈⍳~INT←32≤64|1↑1↓⎕IN A∘⎕OU A,6
[5]   YO ⎕YI[2]ALF
[6]   SI:YCI ⎕YI[0]⍳11
[7]   YI ⎕YI[1]⍳128
[8]   ⎕←''∘⎕BO 52
    ∇
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    ∇SIGNON;N;P
[1]   N←'4620840'
[2]   ∘⎕IN ⎕YA 1 31∘P←8↓9⍞'PASSWORD:PASSAPL'∘⎕IN 0
[3]   LP1:→LP1⌈⍳2>4|¯1↑⎕OU⍳0
[4]   XFER''∘⎕DL 10
[5]   XFER'CAPLPLUS'∘⎕BO 29
[6]   XFER'PASSAPL'
[7]   XFER')'
[8]   XFER')',N,P J
    ∇


    ∇MONITOR
[1]   L1←⎕IO⍞'⍞'∘⎕IN 0
[2]   L2←⍞''∘⎕←L1∘⎕IN 1↑⎕OU ⎕YA 1 31
[3]   ⎕←L2∘⎕OU 0
[4]   →1⌈⍳0<⍴L1
    ∇

ALF   [vector of type char of length 109; element size 1 byte(s)]
0123456789_ABCDEFGHIJKLMNOPQRSTUVWXYZ∆⎕ .¯<≤=≥>≠∨∧⍱⍲+-
×÷*⍟⌊⌈|!○~?≁/\⍀↑↓⊥⊤∊⍳,⍴⌽⊖⍉←;→⍋⍒[]()∘⍝':∇⍺⍵∩∪⊃⊂"⍎⍕⌹⍞▯$⍕▯

BI    [numeric vector of length 128; element size 1 byte(s)]
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57
58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84
85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108
109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127


    ∇APL
[1]   L←' '∘BC←⎕Y 108
[2]   IN:L1←(⍴L)↓⍞L∘⎕IN 0
[3]   L←L2←XFER L1
[4]   DLP:→IN⌈⍳(¯1+⍴L)≤N←(L⍳BC)-⎕IO
[5]   N↑L
[6]   N←((BC≠L←N↓L)⍳1)-⎕IO
[7]   →DLP∘L←N↓L
[8]   →IN
    ∇


    ∇R←XFER X
[1]   ∘⎕IN 1↑⎕OU ⎕YA 1 31
[2]   R←⍞''∘⎕←X
[3]   ∘'IN CASE ATTENTION'
    ∇


    ∇P∆YTABS;∆IO;M;MI;CI;T
[1]   ⎕IO←0∘∆IO←⎕IO
[2]   'SUPPORT FOR:'PP∆ TERM
[3]   M←CTL,':',(4⍕YCI),':',4⍕YCO
[4]   T←(10⍴' '),'YCI:',(12⍴' '),'YCO:'
[5]   T PP∆ M
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```
[6]   MI←128 1ρ⍳128
[7]   M←(3⍕MI),':',(⎕Y YI[MI]),128 3ρ' '
[8]   T←,(YI⩾128)≠MI
[9]   M[T;4+⍳3]←CTL[YI[T]-128;]
[10]   M←16 64ρ1 0 2⍉8 16 8ρM
[11]   'YI:'PPΔ M
[12]   MI←109 1↑MI
[13]   M←(109 2ρ' '),(⎕Y MI),':',(3⍕YO[MI]),' '
[14]   M←16 64ρ1 0 2⍉8 16 8ρM⌿19 8ρ' '
[15]   'YO:'PPΔ M
[16]   ⎕IO←ΔIO
    ∇


    ∇P1 PPΔ P2
[1]   ⎕←P2∘⎕←P1
    ∇

CTL   [3 by 11 array of type char; element size 1 byte(s)]
--
CO
NL
BS
IDL
CRR
FF
SO
SI
EOT
BOT



    ∇R←WIDTH
[1]   R←⎕PW
    ∇


    ∇R←MΔOUT X;I;N
[1]   →R←0×⍳(' '≠0\0ρX)∨(2≠ρρX)∨WIDTH<¯1↑1,ρX
[2]   →R←VOUT FMT ρX
[3]   →END⌈⍳0=×/ρX
[4]   N←1↑ρX∘I←1∘'ORIGIN 1'
[5]   LP:→R←VOUT X[I;]
[6]   →LP⌈⍳N⩾I←I+1
[7]   END:R←⍳0
    ∇


    ∇R←NVEVAL X
[1]   R←⍎X
[2]   →0×⍳(0=0\0ρR)∧1=ρρR
[3]   R←(0=ρρR)/,R
    ∇
```

```
    ∇R←MΔIN X;I;N;L;E
[1]   →R←0×ι2≠ρN←NVEVAL L←XFER X
[2]   →0×ι0=×/ρR←Nρ' '∘I←1∘'ORIGIN 1'
[3]   LP:→ERR⌈ι(N[2]<ρL)∨0=ρL←XFER L
[4]   R[I;]←N[2]↑L
[5]   →LP⌈ιN[1]≥I←I+1
[6]   →0×ι0=ρL←XFER L T
[7]   ERR:→LP⌈ι(N[1]≥I)∧0<ρL←XFER''
[8]   R←(1,ρR)ρR
    ∇


    ∇R←VOUT X;Y
[1]   Y←XFER X
[2]   →R←0×ι(ρY)≠ρX
[3]   R←0×ιY∨.≠X
    ∇


    ∇R←FMT X
[1]   R←⍕X
    ∇

X     [numeric scalar: element size=8 byte(s)]
3D27C5101FC1

A     [numeric scalar: element size=1 byte(s)]
93


    ∇PT;PX;PY
[1]   ∘⎕OU 1∘'O'⎕YXι0∘PX←⎕YO[2]ALF∘PY←⎕YO[0]ι11∘⎕IO←0
[2]   ⎕←'ROW            IN                        OUT'∘⎕←''∘⎕←'CONTROL TABLE'
[3]   ⎕←(9 1ρ3 8 4 4 4 14 4 4 4)⍕(11 1ρι11),(⎕YI[0]ι11),PY
[4]   ⎕←''∘⎕←'INPUT TABLE'∘⎕←''
[5]   ⎕←4⍕8 16ρ⎕YI[1]ι128
[6]   ⎕←''∘⎕←'OUTPUT TABLE'∘⎕←''
[7]   ⎕←4⍕7 16ρPX,0 0 0
[8]   ⎕IO←1
    ∇


    ∇ΔC;L;BC;L1;N
[1]   BC←⎕Y 108∘⎕OU 1 Y
[2]   IN:∘⎕IN 1↑⎕OU 2∘L1←5↓⎕←⍞'      '∘⎕IN 0
[3]   ∘YCO ⎕YO[0](ι11)-⎕IO∘YO ⎕YO[2]ALF
[4]   L←⍞''∘⎕←L1
[5]   ∘⎕OU 1
[6]   →(0≠ρL←(2+ρ⎕←((LιBC)-⎕IO)↑L)↓L)/6
[7]   →IN
    ∇


    ∇QSO E
[1]   ∘⎕IN 1↑⎕OU ⎕YA 1 31
[2]   ∘YCO ⎕YO[0](ι11)-⎕IO∘YO ⎕YO[2]ALF
```

```
[3]   'PHONE 547-6650,PRESS RETURN.'
[4]   XFER '\APL'
[5]   XFER ')ON 061952[COMSYS]
    ∇


    ∇OSO
[1]   ∘⎕IN 1↑⎕OU ⎕YA 1 31∘⎕IO←0
[2]   ∘YCO ⎕YO[0](⍳11)-⎕IO∘YO ⎕YO[2]ALF
[3]   'PHONE 1-231-5000,PRESS RETURN.'
[4]   WAIT:→WAIT⌈⍳2>4|¯1↑⎕OU⍳0
[5]   XFER ')PPP '
[6]   XFER ')9060:9060'
    ∇



NAMES IN GROUP 11:
YI   YO   YCI  YCO  MNE  OVS  TER

YI    [numeric vector of length 128; element size 2 byte(s)]
132 108 108 108 137 108 108 108 131 108 108 108 108 130 108 108 108 108 108 108
108 108 108 108 108 108 108 108 108 108 108 108 39 61 100 47 106 108 73 91 87 88
56 52 75 53 40 66 0 1 2 3 4 5 6 7 8 9 92 81 42 44 46 64 108 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 85 67 86 69 53 108 108
108 108 108 108 108 108 108 108 108 108 108 108 108 108 108 108 108 108 108 108
108 108 108 108 108 108 108 108 108 132


    ∇ΔEX N;I;TΔ
[1]   I←1↑N∘→(0≠I←1↓N←2↑N,0)/5
[2]   →4∘⎕←⍎TΔ∘⎕←''∘→('→←'∈⎕←TΔ←1⍕'')/8 3
[3]   ∘⍎TΔ
[4]   →2∘⍎('L',2⍕9+I←I+1),'←TΔ'∘→(0=1↑N)/2∘⎕←''
[5]   →7∘⎕←⍎TΔ∘⎕←''∘→('→←'∈⎕←TΔ←⍎'L',2⍕9+I←I+1)/0 6
[6]   ∘⍎TΔ
[7]   →5∘⎕←''
[8]   ∘⍎('L',2⍕9+I←I+1),'←TΔ'
[9]   ⍝N=0 INPUT FROM KB, LINES NOT SAVES
[10]   ⍝N≠0 INPUT FROM KB, LINES SAVED STARTING AT N
[11]   (0=1↑N)∧0≠1↓N INPUT FROM L,2⍕1↓N
    ∇

YCI   [4 by 11 numeric array; element size 2 byte(s)]
39 176 70 226
72 129 6 0
0 13 10 0
8 0 0 0
0 0 0 0
0 0 0 0
0 0 10 0
128 0 0 0
128 0 0 0
0 7 7 0
0 0 0 0
```

```
YCO   [4 by 11 numeric array; element size 2 byte(s)]
39 176 70 226
72 129 6 0
0 13 10 0
8 0 0 0
0 0 0 0
0 0 0 0
0 0 10 0
128 0 0 0
128 0 0 0
0 7 7 0
0 0 0 0


MNE   [numeric scalar: element size=1 byte(s)]
1

OVS   [numeric vector of length 1; element size 1 byte(s)]
130

TER   [vector of type char of length 4; element size 1 byte(s)]
TY33



NAMES IN GROUP 13:
YCI  TER  YI   YO   YCO  YYI  YYO

YCI   [4 by 11 numeric array; element size 2 byte(s)]
39 65 1 184
120 130 6 0
0 8 45 31
29 0 0 0
61 0 0 0
0 61 0 0
48 3 46 61
31 0 0 0
28 0 0 0
60 128 0 0
52 128 0 0


TER   [vector of type char of length 10; element size 1 byte(s)]
2741/APL/C


YI    [numeric vector of length 128; element size 1 byte(s)]
39 80 30 20 4 25 22 66 5 86 15 26 108 108 108 108 2 40 24 54 36 108 108 108 6 19
21 27 136 131 108 135 1 23 34 17 0 29 18 35 7 28 14 85 108 130 108 108 3 32 31 16
9 33 12 52 8 11 13 75 137 132 108 108 39 82 63 89 43 62 38 67 44 88 73 56 108 108
108 108 41 92 72 55 99 108 108 108 45 74 91 64 136 131 108 135 100 60 98 93 49 59
37 69 46 76 58 87 108 130 108 108 42 97 70 10 48 95 71 53 47 94 96 81 137 132 108
108
```

```
YO    [numeric vector of length 109; element size 1 byte(s)]
36 32 16 48 4 8 24 40 56 52 115 57 54 58 42 10 51 35 38 25 3 26 6 33 18 5 11 27 41
37 2 50 49 53 34 39 20 102 70 0 17 80 112 68 72 88 104 120 116 100 130 130 55 119
19 83 75 130 106 101 97 130 69 66 91 130 7 71 130 103 114 118 82 74 89 59 105 130
130 130 1 123 65 130 130 43 9 107 73 67 130 90 81 99 121 117 122 113 98 84 96 130
130 130 130 130 130 130 130

YCO   [4 by 11 numeric array; element size 2 byte(s)]
39 65 1 184
120 130 6 0
0 8 45 31
29 0 0 0
61 0 0 0
0 61 0 0
48 3 46 61
31 0 0 0
28 0 0 0
60 128 0 0
52 128 0 0


YYI   [18 by 1 array of type char; element size 8 byte(s)]
41000000274101B8 78820600082D1F1D 3D003D30032E3D1F 1C3C803480242010
3004081828383473 39363A2A0A332326 19031A062112050B 1B29250232313522
2714664600115070 4448586878746482 82377713534B826A 65618245425B8207
4782677276524A59 3B69828282017B41 82822B096B494382 5A516379757A7162
5460828282827F82 8282000000000000


YYO   [18 by 1 array of type char; element size 8 byte(s)]
41000000274101B8 78820600082D1F1D 3D003D30032E3D1F 1C3C803480242010
3004081828383473 39363A2A0A332326 19031A062112050B 1B29250232313522
2714664600115070 4448586878746482 82377713534B826A 65618245425B8207
4782677276524A59 3B69828282017B41 82822B096B494382 5A516379757A7162
5460828282827F82 8282000000000000




NAMES IN GROUP 14:
YCI  TER  YI   YO   YCO  YYI  YYO

YCI   [4 by 11 numeric array; element size 2 byte(s)]
7 66 1 184
120 130 6 0
0 8 45 31
29 0 0 0
61 0 0 0
0 61 0 0
0 3 46 61
31 0 0 0
28 0 0 0
45 60 0 0
52 128 0 0
```

```
TER   [vector of type char of length 20; element size 1 byte(s)]
BURROUGHS APL/2741/C

YI    [numeric vector of length 128; element size 1 byte(s)]
39 80 30 20 4 25 22 66 5 86 15 26 108 108 108 108 2 40 24 54 36 108 108 108 6 19
21 27 136 131 108 135 1 23 34 17 0 29 18 35 7 28 14 85 108 108 108 108 3 32 31 16
9 33 12 52 8 11 13 75 130 132 108 108 39 82 63 89 43 62 38 67 44 88 73 56 108 108
108 108 41 92 72 55 99 108 108 108 45 74 91 64 136 131 108 135 100 60 98 93 49 59
37 69 46 76 58 87 108 108 108 108 42 97 70 10 48 95 71 53 47 94 96 81 130 132 108
108

YO    [numeric vector of length 109; element size 1 byte(s)]
36 32 16 48 4 8 24 40 56 52 115 57 54 58 42 10 51 35 38 25 3 26 6 33 18 5 11 27 41
37 2 50 49 53 34 39 20 102 70 0 17 80 112 68 72 88 104 120 116 100 130 130 55 119
19 83 75 130 106 101 97 130 69 66 91 130 7 71 130 103 114 118 82 74 89 59 105 130
130 130 1 123 65 130 130 43 9 107 73 67 130 90 81 99 121 117 122 113 98 84 96 130
130 130 130 130 130 130 130

YCO   [4 by 11 numeric array; element size 2 byte(s)]
7 65 1 184
120 130 6 0
0 8 128 31
29 0 0 0
61 0 0 0
0 61 0 0
0 3 46 61
31 0 0 0
28 0 0 0
128 128 0 0
128 128 0 0


YYI   [18 by 1 array of type char; element size 8 byte(s)]
41000000074101B8 7882060008801F1D 3D003D00032E3D1F 1C80808080242010
3004081828383473 39363A2A0A332326 19031A062112050B 1B29250232313522
2714664600115070 4448586878746482 82377713534B826A 65618245425B8207
4782677276524A59 3B69828282017B41 82822B096B494382 5A516379757A7162
5460828282827F82 8282000000000000


YYO   [18 by 1 array of type char; element size 8 byte(s)]
41000000074101B8 7882060008801F1D 3D003D00032E3D1F 1C80808080242010
3004081828383473 39363A2A0A332326 19031A062112050B 1B29250232313522
2714664600115070 4448586878746482 82377713534B826A 65618245425B8207
4782677276524A59 3B69828282017B41 82822B096B494382 5A516379757A7162
5460828282827F82 8282000000000000




NAMES IN GROUP 20:
COM  XM   WHO  T    BC   SET  YCI  YCO  YI   YO   ALF  YYI
YYO
```

```
    ∇COMSHARE;X;A
[1]   ∘'I'⎕YW'YYI'∘'O'⎕YW'YYO'∘'O'⎕YXι0∘⎕IN A←1↑⎕OU ⎕YA 193
[2]   WAIT:'PHONE 1-416-678-6900'∘⎕PT←10
[3]    →WAIT⌈ι2>4|¯1↑⎕OUι0
[4]    XM'∗'∘⎕DL 2
[5]    XM '900JMS'
[6]    XM '37'
[7]    XM''
[8]   X←XM'APL'
[9]    ⎕PT←0
[10]   L0:X←⎕←⍞''∘⎕IN 0∘⎕←X∘'O'⎕YXι0∘⎕OU 1
[11]   →L0∘X←XM X∘'O'⎕YW'YYO'∘⎕OU A
    ∇


    ∇R←XM X
[1]   ∘⎕IN  ⎕YA 1 31
[2]   R←⍞''∘⎕←X
[3]   R←(BC≠R)/R
    ∇

WHO   [vector of type char of length 8; element size 1 byte(s)]
COMSHARE


    ∇T;AΔ
[1]   →((∧/' '=AΔ←⍞''),1)/0 2
[2]   AΔ←⍋AΔ
[3]   →X⌈ι2>ρρAΔ
[4]   →Y⌈ι2=ρρAΔ
[5]   AΔ←((×/¯1↓ρAΔ),¯1↑ρAΔ)ρAΔ
[6]   Y:⎕←AΔ[⎕IO;]
[7]   AΔ←1 0↓AΔ
[8]   →Y⌈ι0<1↑ρAΔ
[9]   →1
[10]   X:⎕←AΔ
[11]   →1
    ∇

BC    [scalar of type char: element size=1 byte(s)]
∇


    ∇SETUP;INT;A
[1]   ⎕IO←0∘'I'⎕YXι0∘'O'⎕YXι0∘⎕OU(A←⎕YA 1 31),1
[2]   ∘⎕OU A,0∘YCO ⎕YO[0]ι11
[3]   YO ⎕YO[2]ALF
[4]   →SI⌈ι~INT←32≤64|1↑1↓⎕IN A∘⎕OU A,6
[5]   YO ⎕YI[2]ALF
[6]   SI:YCI ⎕YI[0]ι11
[7]   YI ⎕YI[1]ι128
[8]   ∘⎕OU A,0∘⎕BO 52
    ∇
```

```
YCI   [4 by 11 numeric array; element size 2 byte(s)]
7 68 1 181
120 130 6 0
0 0 45 31
29 0 0 0
61 0 0 0
0 61 0 0
0 3 46 61
31 0 0 0
28 0 0 0
45 60 0 0
52 31 0 0

YCO   [4 by 11 numeric array; element size 2 byte(s)]
7 65 1 181
120 130 6 0
0 0 128 31
29 0 0 0
61 0 0 0
0 61 0 0
0 3 46 61
31 0 0 0
28 0 0 0
128 128 0 0
128 128 0 0


YI    [numeric vector of length 128; element size 1 byte(s)]
39 80 30 20 4 25 22 66 5 86 15 26 108 108 108 108 2 40 24 54 36 108 108 108 6 19
21 27 136 131 108 135 1 23 34 17 0 29 18 35 7 28 14 85 108 108 108 108 3 32 31 16
9 33 12 52 8 11 13 75 130 132 108 108 39 82 63 89 43 62 38 67 44 88 73 56 108 108
108 108 41 92 72 55 99 108 108 108 45 74 91 64 136 131 108 135 100 60 98 93 49 59
37 69 46 76 58 87 108 108 108 108 42 97 70 10 48 95 71 53 47 94 96 81 130 132 108
108

YO    [numeric vector of length 109; element size 1 byte(s)]
36 32 16 48 4 8 24 40 56 52 115 57 54 58 42 10 51 35 38 25 3 26 6 33 18 5 11 27 41
37 2 50 49 53 34 39 20 102 70 0 17 80 112 68 72 88 104 120 116 100 130 130 55 119
19 83 75 130 106 101 97 130 69 66 91 130 7 71 130 103 114 118 82 74 89 59 105 130
130 130 1 123 65 130 130 43 9 107 73 67 130 90 81 99 121 117 122 113 98 84 96 130
130 130 130 130 130 130 130

ALF   [vector of type char of length 109; element size 1 byte(s)]
0123456789_ABCDEFGHIJKLMNOPQRSTUVWXYZ∆⎕ .¯<≤=≥>≠∨∧⍱⍲+-
×÷*⍟⌊⌈|!○~?⍻/\⍀↑↓⊥⊤∊⍳,⍴⌽⊖⍉←;→⍋⍒[]()∘⍝':∇⍺⍵∩∪⊃⊂"⍎⍕⌹⍞▯$⍫▯

YYI   [34 by 1 array of type char; element size 8 byte(s)]
81000000074401B5 78820600002D1F1D 3D003D00032E3D1F 1C2D3C341F27501E
140419164205560F 1A6C6C6C6C022818 36246C6C6C061315 1B88836C87011722
11001D1223071C0E 556C6C6C6C03201F 1009210C34080B0D 4B82846C6C27523F
592B3E26432C5849 386C6C6C6C295C48 37636C6C6C2D4A5B 4088836C87643C62
5D313B25452E4C3A 576C6C6C6C2A6146 0A305F47352F5E60 5182846C6C000000
070008FF214900CD 070102FF0C410145 264D01BF200105DD 000100FF0C41207F
B28000FB00D200DF 20D020F0329820F0 20D030D00040B0FB 00D0209230D078D0
06CF001D264D001D 000D045F0001224D 240504CF008504C5 054804BF2305076D
9AD0A2D02050BAFC 32D822FFBAD022D2
```

```
YYO   [18 by 1 array of type char; element size 8 byte(s)]
41000000074101B5 7882060000801F1D 3D003D00032E3D1F 1C80808080242010
3004081828383473 39363A2A0A332326 19031A062112050B 1B29250232313522
2714664600115070 4448586878746482 82377713534B826A 65618245425B8207
4782677276524A59 3B69828282017B41 82822B096B494382 5A516379757A7162
5460828282827F82 8282000000000000



NAMES IN GROUP 21:
STS  XM   TI   TO   BC   SET  YCI  YCO  YI   YO   ALF  T
XMX  YYI  YYO


    ∇STSC;P
[1]   P←⍞')4620840:'∘⎕IN 0
[2]   'I'⎕YW'YYI'∘'O'⎕YW'YYO'∘⎕IN 1↑⎕OU ⎕YA 193
[3]   WAIT:'PHONE 1-416-360-8864'∘⎕PT←10
[4]   →WAIT⌈⍳2>4|⍨1↑⎕OU⍳0
[5]   XMX''∘⎕DL 5
[6]   XMX'CAPLPLUS'∘⎕BO 29
[7]   XMX'PASSAPL'
[8]   XMX')'
[9]   XMX P←''∘⎕←P
[10]   ⎕PT←0
[11]   L0:XMX ⍞''∘⎕IN 0
[12]   →L0
    ∇


    ∇R←XM X
[1]   ∘⎕IN  ⎕YA 1 31
[2]   R←⍞''∘⎕←X
[3]   R←(BC≠R)/R
    ∇


    ∇SAX←SGL
[1]   ⍝ESTABLIST SALARY MATRIX ELEMENT BY ELEMENT
[2]   ⎕←'ENTER SALARY MATRIX.'
[3]   SAX←GXN
    ∇

0xE50xE50xE5   [229 by 229 by 229] numeric array;  element size 5 byte(s)]


BC    [scalar of type char: element size=1 byte(s)]
∇


    ∇SETUP;INT;A
[1]   ⎕IO←0∘'I'⎕YX⍳0∘'O'⎕YX⍳0∘⎕OU(A←⎕YA 1 31),1
[2]   ∘⎕OU A,0∘YCO ⎕YO[0]⍳11
```

```
[3]    YO ⎕YO[2]ALF
[4]    →SI⌈ι~INT←32≤64|1↑1↓⎕IN A∘⎕OU A,6
[5]    YO ⎕YI[2]ALF
[6]    SI:YCI ⎕YI[0]ι11
[7]    YI ⎕YI[1]ι128
[8]    ∘⎕OU A,0∘⎕BO 52
    ∇

YCI    [4 by 11 numeric array; element size 2 byte(s)]
7 67 1 181
120 130 6 0
0 0 45 31
29 0 0 0
61 0 0 0
0 61 0 0
0 3 46 61
31 0 0 0
28 0 0 0
45 60 0 0
52 31 0 0


YCO    [4 by 11 numeric array; element size 2 byte(s)]
7 65 1 181
120 130 6 0
0 0 128 31
29 0 0 0
61 0 0 0
0 61 0 0
0 3 46 61
31 0 0 0
28 0 0 0
128 128 0 0
128 128 0 0


YI     [numeric vector of length 128; element size 1 byte(s)]
39 80 30 20 4 25 22 66 5 86 15 26 108 108 108 108 2 40 24 54 36 108 108 108 6 19
21 27 136 131 108 135 1 23 34 17 0 29 18 35 7 28 14 85 108 108 108 108 3 32 31 16
9 33 12 52 8 11 13 75 130 132 108 108 39 82 63 89 43 62 38 67 44 88 73 56 108 108
108 108 41 92 72 55 99 108 108 108 45 74 91 64 136 131 108 135 100 60 98 93 49 59
37 69 46 76 58 87 108 108 108 108 42 97 70 10 48 95 71 53 47 94 96 81 130 132 108
108

YO     [numeric vector of length 109; element size 1 byte(s)]
36 32 16 48 4 8 24 40 56 52 115 57 54 58 42 10 51 35 38 25 3 26 6 33 18 5 11 27 41
37 2 50 49 53 34 39 20 102 70 0 17 80 112 68 72 88 104 120 116 100 130 130 55 119
19 83 75 130 106 101 97 130 69 66 91 130 7 71 130 103 114 118 82 74 89 59 105 130
130 130 1 123 65 130 130 43 9 107 73 67 130 90 81 99 121 117 122 113 98 84 96 130
130 130 130 130 130 130 130

ALF    [vector of type char of length 109; element size 1 byte(s)]
0123456789_ABCDEFGHIJKLMNOPQRSTUVWXYZΔ⍙ .¯<≤=≥>≠∨∧⍱⍲+-
×÷*⍟⌊⌈|!○~?≁/\⍀↑↓⊥⊤∊ι,ρ⌽⊖⍉←;→⍋⍒[]()∘⍝':∇αω∩∪⊃⊂"⍎⍪⌹⍞▯$⍕▯
```

```
    ∇T;AΔ
[1]   →((∧/' '=AΔ←⍞''),1)/0 2
[2]   AΔ←⍋AΔ
[3]   →X⌈⍳2>ρρAΔ
[4]   →Y⌈⍳2=ρρAΔ
[5]   AΔ←((×/¯1↓ρAΔ),¯1↑ρAΔ)ρAΔ
[6]   Y:⍞←AΔ[⎕IO;]
[7]   AΔ←1 0↓AΔ
[8]   →Y⌈⍳0<1↑ρAΔ
[9]   →1
[10]   X:⍞←AΔ
[11]   →1
    ∇


    ∇SAX←SGL
[1]   ⍝ESTABLIST SALARY MATRIX ELEMENT BY ELEMENT
[2]   ⍞←'ENTER SALARY MATRIX.'
[3]   SAX←GXN
    ∇

YYI   [34 by 1 array of type char; element size 8 byte(s)]
81000000074101B5 78820600002D1F1D 3D003D00032E3D1F 1C2D3C341F27501E
140419164205560F 1A6C6C6C6C022818 36246C6C6C061315 1B88836C87011722
11001D1223071C0E 556C6C6C6C03201F 1009210C34080B0D 4B82846C6C27523F
592B3E26432C5849 386C6C6C6C295C48 37636C6C6C2D4A5B 4088836C87643C62
5D313B25452E4C3A 576C6C6C6C2A6146 0A305F47352F5E60 5182846C6C000000
08CFC8C708C308CF C84300DFE0C700CF D88248CF0843004B 444788C328533023
2853000338030043 3A03387338422003 3803205B3803301B 2803202BC84300DF
584B08CFF8C788FF E84308CF68C7ECCF FCCFC8FFEC4308DF FC47CCDF00030003
0001200300032003 2001204300010003


YYO   [18 by 1 array of type char; element size 8 byte(s)]
41000000074101B5 7882060000801F1D 3D003D00032E3D1F 1C80808080242010
3004081828383473 39363A2A0A332326 19031A062112050B 1B29250232313522
2714664600115070 4448586878746482 82377713534B826A 65618245425B8207
4782677276524A59 3B69828282017B41 82822B096B494382 5A516379757A7162
5460828282827F82 8282000000000000




NAMES IN GROUP 50:
CW   N    PLT  YAV  XAV  CIR  PLO  DEL  YAX  XAX  CEN  EQU
SQ

CW    [2 by 102 numeric array; element size 2 byte(s)]
360 0
460 10
500 22
530 34
554 46
576 56
592 68
608 80
```

622 92
636 102
648 114
658 126
666 138
674 148
682 160
688 172
694 184
700 194
704 206
708 218
712 230
714 240
716 252
718 264
718 276
720 288
718 298
718 310
716 322
714 334
712 344
708 356
704 368
700 380
694 390
688 402
682 414
674 426
666 436
658 448
648 460
636 472
622 482
608 494
592 506
576 518
554 528
530 540
500 552
460 564
360 576
360 0
258 10
218 22
188 34
164 46
144 56
126 68
110 80
96 92
82 102
72 114
60 126
52 138

```
44 148
36 160
30 172
24 184
18 194
14 206
10 218
6 230
4 240
2 252
0 264
0 276
0 288
0 298
0 310
2 322
4 334
6 344
10 356
14 368
18 380
24 390
30 402
36 414
44 426
52 436
60 448
72 460
82 472
96 482
110 494
126 506
144 518
164 528
188 540
218 552
258 564
360 576


N     [2 by 20 numeric array; element size 8 byte(s)]
CE00000000000004 C041A41A41A41A20
CE00000000000003 C058469EE5846A00
CE00000000000002 C086BCA1AF286BE0
CE00000000000001 C111C71C71C71C70
4E00000000000000 4E0000000000000A
4E00000000000001 40E8BA2E8BA2E8C0
4E00000000000002 4079E79E79E79EC0
4E00000000000003 405294A5294A5280
4E00000000000004 403E7063E7063E78
4E00000000000005 4032323232323230
4E00000000000006 4029F79B47582198
4E00000000000007 40240E6C2B4481C0
4E00000000000008 401F9ADD3C0CA458
4E00000000000009 401C21C21C21C20C
4E0000000000000A 401958B67EBB9080
```

```
4E0000000000000B 40171024E6A17100
4E0000000000000C 40152832C6E043AC
4E0000000000000D 40138ABF82EE6988
4E0000000000000E 401227F179A5384C
4E0000000000000F 4010F421E843D080


PLT   [4 by 65 array of type char; element size 2 byte(s)]
F4EB 0668 2D06 4E84
F815 0600 8BF8 46C8
003C 0340 AC0B 46AD
0028 0638 2D1E 2026
210E 3F46 5300 2E21
3633 C753 453C 4248
5720 4621 2046 AD00
0688 2D1E 2026 210E
B046 5300 46E0 07B0
2B2E 00F5 3D3D 4657
0868 9D20 1640 4659
2046 5708 1688 6859
2046 5920 4621 2044
8A22 071A 1C13 181E
0F1C 1513 1820 0B16
130E 2719 1F1E 1A1F
1E27 0E0F 2013 0D0F
2E20 3614 C73C 6C60
2D20 0627 D046 AD00
2806 772D C22D C7B0
504E 20D0 46AD 0028
06E3 2DC2 247F 2DC7
464E 2015 C7D0 46A9
20C2 0257 0620 5507
3525 3525 3D46 8B20
3DC6 94F0 C59B E840
7620 C22C 08D0 A896
F006 009D E846 A920
C657 C524 07B2 5507
C0C0 C0C0 C0C0 C0C0
C0C0 2E20 3600 C7B0
70A3 2036 08C7 24FE
31EF F007 06E0 5544
BB0B 06E0 5544 BB0B
45C8 2403 2C01 44B9
20C0 C0C0 C0C0 C0C0
48C5 20C1 24E0 3CE0
2B44 A920 06E0 5546
AD00 066A 2D44 C40B
45C8 2403 2C01 484E
20C1 24E0 3CE0 4821
2046 FF09 2E20 3614
D048 4020 3E59 0725
2E21 362C C7B0 484B
2011 25FA 0746 AD00
066A 2D44 C40B 46AD
0006 722D 44C4 0B30
3132 3334 3536 3738
```

```
3946 6162 6364 6566
6768 696A 6B6C 6D6E
6F70 7172 7374 7576
7778 797A 484C 202E
4023 2425 5E26 2A28
2900 822D 5F3D 2B50
8444 534D 864F 5451
882F 3F8A 5955 424E
4549 2C52 8C8E 905B
3C5D 9294 3B27 3A22
4A96 4B3E 4741 5743
5658 5A21 989A 9C9E
3EB0 A028 5429 5450
4F2E 4B2F 5F3F 5F4F
4D4F 5F4F 3F48 4D47
4D43 4A42 4A2C 5F4C
2B4C 4B4E 4A4B 4E4A


YAV   [2 by 172 numeric array; element size 2 byte(s)]
0 2040
0 2028
0 2016
0 2004
0 1992
0 1980
0 1968
0 1956
0 1944
0 1932
0 1920
0 1908
0 1896
0 1884
0 1872
0 1860
0 1848
0 1836
0 1824
0 1812
0 1800
0 1788
0 1776
0 1764
0 1752
0 1740
0 1728
0 1716
0 1704
0 1692
0 1680
0 1668
0 1656
0 1644
0 1632
0 1620
```

0 1608
0 1596
0 1584
0 1572
0 1560
0 1548
0 1536
0 1524
0 1512
0 1500
0 1488
0 1476
0 1464
0 1452
0 1440
0 1428
0 1416
0 1404
0 1392
0 1380
0 1368
0 1356
0 1344
0 1332
0 1320
0 1308
0 1296
0 1284
0 1272
0 1260
0 1248
0 1236
0 1224
0 1212
0 1200
0 1188
0 1176
0 1164
0 1152
0 1140
0 1128
0 1116
0 1104
0 1092
0 1080
0 1068
0 1056
0 1044
0 1032
0 1020
0 1008
0 996
0 984
0 972
0 960
0 948

0 936
0 924
0 912
0 900
0 888
0 876
0 864
0 852
0 840
0 828
0 816
0 804
0 792
0 780
0 768
0 756
0 744
0 732
0 720
0 708
0 696
0 684
0 672
0 660
0 648
0 636
0 624
0 612
0 600
0 588
0 576
0 564
0 552
0 540
0 528
0 516
0 504
0 492
0 480
0 468
0 456
0 444
0 432
0 420
0 408
0 396
0 384
0 372
0 360
0 348
0 336
0 324
0 312
0 300
0 288
0 276

0 264
0 252
0 240
0 228
0 216
0 204
0 192
0 180
0 168
0 156
0 144
0 132
0 120
0 108
0 96
0 84
0 72
0 60
0 48
0 36
0 24
0 12
0 0
0 0

XAV   [2 by 255 numeric array; element size 2 byte(s)]
1518 0
1512 0
1506 0
1500 0
1494 0
1488 0
1482 0
1476 0
1470 0
1464 0
1458 0
1452 0
1446 0
1440 0
1434 0
1428 0
1422 0
1416 0
1410 0
1404 0
1398 0
1392 0
1386 0
1380 0
1374 0
1368 0
1362 0
1356 0
1350 0

1344 0
1338 0
1332 0
1326 0
1320 0
1314 0
1308 0
1302 0
1296 0
1290 0
1284 0
1278 0
1272 0
1266 0
1260 0
1254 0
1248 0
1242 0
1236 0
1230 0
1224 0
1218 0
1212 0
1206 0
1200 0
1194 0
1188 0
1182 0
1176 0
1170 0
1164 0
1158 0
1152 0
1146 0
1140 0
1134 0
1128 0
1122 0
1116 0
1110 0
1104 0
1098 0
1092 0
1086 0
1080 0
1074 0
1068 0
1062 0
1056 0
1050 0
1044 0
1038 0
1032 0
1026 0
1020 0
1014 0

1008 0
1002 0
996 0
990 0
984 0
978 0
972 0
966 0
960 0
954 0
948 0
942 0
936 0
930 0
924 0
918 0
912 0
906 0
900 0
894 0
888 0
882 0
876 0
870 0
864 0
858 0
852 0
846 0
840 0
834 0
828 0
822 0
816 0
810 0
804 0
798 0
792 0
786 0
780 0
774 0
768 0
762 0
756 0
750 0
744 0
738 0
732 0
726 0
720 0
714 0
708 0
702 0
696 0
690 0
684 0
678 0

672 0
666 0
660 0
654 0
648 0
642 0
636 0
630 0
624 0
618 0
612 0
606 0
600 0
594 0
588 0
582 0
576 0
570 0
564 0
558 0
552 0
546 0
540 0
534 0
528 0
522 0
516 0
510 0
504 0
498 0
492 0
486 0
480 0
474 0
468 0
462 0
456 0
450 0
444 0
438 0
432 0
426 0
420 0
414 0
408 0
402 0
396 0
390 0
384 0
378 0
372 0
366 0
360 0
354 0
348 0
342 0

336 0
330 0
324 0
318 0
312 0
306 0
300 0
294 0
288 0
282 0
276 0
270 0
264 0
258 0
252 0
246 0
240 0
234 0
228 0
222 0
216 0
210 0
204 0
198 0
192 0
186 0
180 0
174 0
168 0
162 0
156 0
150 0
144 0
138 0
132 0
126 0
120 0
114 0
108 0
102 0
96 0
90 0
84 0
78 0
72 0
66 0
60 0
54 0
48 0
42 0
36 0
30 0
24 0
18 0
12 0
6 0

0 0
0 0

CIR   [2 by 102 numeric array; element size 8 byte(s)]
4E00000000000000 CE00000000000005
411666666666666A C14CCCCCCCCCCCD
411F5A7CECDB684D C14999999999999A
4125FF7606911A01 C146666666666666
412B682B60B48038 C143333333333333
4130000000000001 CE00000000000004
4133FE6CAD7BE68E C13CCCCCCCCCCCC
41378496BC27AEBF C139999999999999
413AA82F1D1061AB C136666666666666
413D785170B330CE C133333333333333
4140000000000002 C12FFFFFFFFFFFF
4142478751E1C4D3 C12CCCCCCCCCCCC
4144555333BB911D C129999999999999
41462E7569064E48 C126666666666666
4147D6FE902D64B4 C123333333333332
4149523AE4547A0D C11FFFFFFFFFFFF
414AA2DCF8A53ECF C11CCCCCCCCCCCC
414BCB1C7C5523DB C119999999999999
414CCCCCCCCCCC4 C116666666666665
414DA96DC242DA3E C113333333333332
414E6238502484BB C0FFFFFFFFFFFF0
414EF8280D59523A C0CCCCCCCCCCCC0
414F6C026196CEF6 C099999999999980
414FBE5BDAAD8026 C066666666666650
414FEF9C0455D81E C033333333333320
4E00000000000005 3410000000000000
414FEF9C0455D81E 4033333333333350
414FBE5BDAAD8026 4066666666666680
414F6C026196CEF6 40999999999999B0
414EF8280D59523A 40CCCCCCCCCCCCE0
414E6238502484BB 4110000000000002
414DA96DC242DA3A 4113333333333335
414CCCCCCCCCCC4 4116666666666668
414BCB1C7C5523DB 411999999999999B
414AA2DCF8A53ECF 411CCCCCCCCCCCF
4149523AE4547A0D 4120000000000002
4147D6FE902D64B2 4123333333333335
41462E7569064E40 4126666666666668
4144555333BB9119 412999999999999C
4142478751E1C4D1 412CCCCCCCCCCCF
413FFFFFFFFFFFF 4130000000000002
413D785170B330CC 4133333333333335
413AA82F1D1061A8 4136666666666669
41378496BC27AEBB 413999999999999C
4133FE6CAD7BE68A 413CCCCCCCCCCCF
412FFFFFFFFFFFE 4140000000000002
412B682B60B48035 4143333333333336
4125FF76069119FC 4146666666666669
411F5A7CECDB6848 414999999999999C
411666666666665F 414CCCCCCCCCCCF
4E00000000000000 4E00000000000005

4E00000000000000 CE00000000000005
C11666666666666A C14CCCCCCCCCCCD
C11F5A7CECDB684D C14999999999999A
C125FF7606911A01 C146666666666666
C12B682B60B48038 C143333333333333
C130000000000001 CE00000000000004
C133FE6CAD7BE68E C13CCCCCCCCCCCC
C1378496BC27AEBF C139999999999999
C13AA82F1D1061AB C136666666666666
C13D785170B330CE C133333333333333
C140000000000002 C12FFFFFFFFFFFF
C142478751E1C4D3 C12CCCCCCCCCCCC
C144555333BB911D C129999999999999
C1462E7569064E48 C126666666666666
C147D6FE902D64B4 C123333333333332
C149523AE4547A0D C11FFFFFFFFFFFF
C14AA2DCF8A53ECF C11CCCCCCCCCCCC
C14BCB1C7C5523DB C119999999999999
C14CCCCCCCCCCC4 C116666666666665
C14DA96DC242DA3E C113333333333332
C14E6238502484BB C0FFFFFFFFFFFF0
C14EF8280D59523A C0CCCCCCCCCCCC0
C14F6C026196CEF6 C099999999999980
C14FBE5BDAAD8026 C066666666666650
C14FEF9C0455D81E C033333333333320
CE00000000000005 3410000000000000
C14FEF9C0455D81E 4033333333333350
C14FBE5BDAAD8026 4066666666666680
C14F6C026196CEF6 40999999999999B0
C14EF8280D59523A 40CCCCCCCCCCCCE0
C14E6238502484BB 4110000000000002
C14DA96DC242DA3A 4113333333333335
C14CCCCCCCCCCC4 4116666666666668
C14BCB1C7C5523DB 411999999999999B
C14AA2DCF8A53ECF 411CCCCCCCCCCCF
C149523AE4547A0D 4120000000000002
C147D6FE902D64B2 4123333333333335
C1462E7569064E40 4126666666666668
C144555333BB9119 412999999999999C
C142478751E1C4D1 412CCCCCCCCCCCF
C13FFFFFFFFFFFF 4130000000000002
C13D785170B330CC 4133333333333335
C13AA82F1D1061A8 4136666666666669
C1378496BC27AEBB 413999999999999C
C133FE6CAD7BE68A 413CCCCCCCCCCCF
C12FFFFFFFFFFFE 4140000000000002
C12B682B60B48035 4143333333333336
C125FF76069119FC 4146666666666669
C11F5A7CECDB6848 414999999999999C
C11666666666665F 414CCCCCCCCCCCF
4E00000000000000 4E00000000000005

```
    ∇PLOT W;C;S;TX;TY;A
[1]   C←18↓19⍞'PLOT CHARACTER(S):∘'
[2]   S←⍎22↓⍞'WIDTH,HEIGHT (INCHES): '
[3]   TX←14↓⍞'X AXIS TITLE: '
[4]   TY←((ρTY),1)ρTY←14↓⍞'Y AXIS TITLE: '
[5]   A←1↑⎕OUT 1∘'⎕YA 66'
[6]   ' 'DEL 24 0∘⎕←(1↓S)CENTRE TY
[7]   W←W-(ρW)ρ⌊⌿W←W-2|W←⌊W×(ρW)ρS×120 96÷(⌈⌿W)-⌊⌿W
[8]   XAX 1↑S∘YAX 1↓S
[9]   C DEL W⌿0
[10]   ⎕←(1↑S)CENTRE TX∘⎕←' '
[11]   ∘⎕OU A,224∘'RESET'
    ∇


    ∇C DEL A
[1]   A ⎕ZZ[C]PLT 0
[2]   →2⌈⍳241≠¯1↑⎕OU⍳0∘'WAIT'
    ∇


    ∇YAX N
[1]   →0∘'|'DEL (-N∘→(∨/(ρYAV)<N←2+⌊8×N,0)/2)↑YAV
[2]   'RANGE ERROR'
[3]   →
    ∇


    ∇SAX←SGL
[1]   ⍝ESTABLIST SALARY MATRIX ELEMENT BY ELEMENT
[2]   ⎕←'ENTER SALARY MATRIX.'
[3]   SAX←GXN
    ∇


    ∇PEX←PEO
[1]   ⎕←'ENTER PEOPLE MATRIX.'
[2]   ⍝ELEMENT BY ELEMENT
[3]   PEX←GXN
    ∇


    ∇ΔR←EQU
[1]   ΔX←9↓⍞'EQUATION: '
[2]   ΔR←⍎29↓⍞'DEFINE INDEPENDENT VARIABLE: '
[3]   ΔR←(((ρΔR),1)ρ⍎ΔX),((ρΔR),1)ρΔR
    ∇

SQ    [2 by 40 numeric array; element size 1 byte(s)]
1 10
2 9
3 8
4 7
5 6
6 5
7 4
```

```
8 3
9 2
10 1
11 1
12 2
13 3
14 4
15 5
16 6
17 7
18 8
19 9
20 10
20 11
19 12
18 13
17 14
16 15
15 16
14 17
13 18
12 19
11 20
10 20
9 19
8 18
7 17
6 16
5 15
4 14
3 13
2 12
1 11
```

```
NAMES IN GROUP 51:
PLO  DEL  AXE  PLT  CIR  CW
```

```
    ∇S PLOT W;C;L;O;H;YY;YA;XA;YX;VV;V
[1]   C←¯1↑15⍞'PLOT CHARACTER:∘'∘⎕IO←0
[2]   L←1↑⍴W∘⎕IO←O←H←0∘⎕OUT 1∘⎕PW←132
[3]   W←W-2|W←⌊W×(L,2)⍴S×120 96÷(⌈⌿W)-⌊⌿W
[4]   YA←AXE W[;0]∘XA←4+AXE W[;1]
[5]   VV←V←⌈/(W←W-(L,2)⍴⌊⌿W)[;1]
[6]   YA←YA-2|YA∘→NYA⌈⍳0>YA
[7]   ⎕←YY←(((⌊6×S[1]),1)⍴'|'∘⎕←'Y'∘DEL YA,V
[8]   ∘⎕OUT 1,72+⌊YA÷256∘⎕BO 256|YA←YA+6∘⎕←YY∘DEL 0,V-4
[9]   NYA:XA←XA-2|XA∘→LOOP⌈⍳0>XA
[10]   ⎕←'X'∘DEL(V←4+⌈/W[;0]),XA
[11]   ∘⎕OUT 1,72+⌊V÷256∘⎕BO 256|V←0⌈V←V-2|V+4
[12]   YX←⎕←(⌊10×S[0])⍴'-'∘DEL 0,16
[13]   ∘⎕OUT 1,128+⌊XA÷256∘⎕BO 256|XA←0⌈XA-20∘⎕←YX∘DEL 6,16
[14]   LOOP:DEL W⌿0
    ∇
```

```
    ∇DEL A
[1]   A ⍞ZZ[C]PLT
[2]   →2⌈⍳241≠¯1↑⍞OU⍳0
    ∇


    ∇R←AXE B;HV;LV
[1]   R←¯1∘→⍳0⩾LV×⌈/B∘R←|LV←⌊/B
    ∇

PLT   [4 by 65 array of type char; element size 2 byte(s)]
F4EB 0668 2D06 4E84
F815 0600 8BF8 46C8
003C 0340 AC0B 46AD
0028 0638 2D1E 2026
210E 3F46 5300 2E21
3633 C753 453C 4248
5720 4621 2046 AD00
0688 2D1E 2026 210E
B046 5300 46E0 07B0
2B2E 00F5 3D3D 4657
0868 9D20 1640 4659
2046 5708 1688 6859
2046 5920 4621 2044
8A22 071A 1C13 181E
0F1C 1513 1820 0B16
130E 2719 1F1E 1A1F
1E27 0E0F 2013 0D0F
2E20 3614 C73C 6C60
2D20 0627 D046 AD00
2806 772D C22D C7B0
504E 20D0 46AD 0028
06E3 2DC2 247F 2DC7
464E 2015 C7D0 46A9
20C2 0257 0620 5507
3525 3525 3D46 8B20
3DC6 94F0 C59B E840
7620 C22C 08D0 A896
F006 009D E846 A920
C657 C524 07B2 5507
C0C0 C0C0 C0C0 C0C0
C0C0 2E20 3600 C7B0
70A3 2036 08C7 24FE
31EF F007 06E0 5544
BB0B 06E0 5544 BB0B
45C8 2403 2C01 44B9
20C0 C0C0 C0C0 C0C0
48C5 20C1 24E0 3CE0
2B44 A920 06E0 5546
AD00 066A 2D44 C40B
45C8 2403 2C01 484E
20C1 24E0 3CE0 4821
2046 FF09 2E20 3614
D048 4020 3E59 0725
```

2E21 362C C7B0 484B
2011 25FA 0746 AD00
066A 2D44 C40B 46AD
0006 722D 44C4 0B30
3132 3334 3536 3738
3946 6162 6364 6566
6768 696A 6B6C 6D6E
6F70 7172 7374 7576
7778 797A 484C 202E
4023 2425 5E26 2A28
2900 822D 5F3D 2B50
8444 534D 864F 5451
882F 3F8A 5955 424E
4549 2C52 8C8E 905B
3C5D 9294 3B27 3A22
4A96 4B3E 4741 5743
5658 5A21 989A 9C9E
3EB0 A028 5429 5450
4F2E 4B2F 5F3F 5F4F
4D4F 5F4F 3F48 4D47
4D43 4A42 4A2C 5F4C
2B4C 4B4E 4A4B 4E4A

CIR   [2 by 102 numeric array; element size 8 byte(s)]
4E00000000000000 CE00000000000005
411666666666666A C14CCCCCCCCCCD
411F5A7CECDB684D C14999999999999A
4125FF7606911A01 C146666666666666
412B682B60B48038 C143333333333333
4130000000000001 CE00000000000004
4133FE6CAD7BE68E C13CCCCCCCCCCCC
41378496BC27AEBF C139999999999999
413AA82F1D1061AB C136666666666666
413D785170B330CE C133333333333333
4140000000000002 C12FFFFFFFFFFFF
4142478751E1C4D3 C12CCCCCCCCCCCC
4144555333BB911D C129999999999999
41462E7569064E48 C126666666666666
4147D6FE902D64B4 C123333333333332
4149523AE4547A0D C11FFFFFFFFFFFF
414AA2DCF8A53ECF C11CCCCCCCCCCCC
414BCB1C7C5523DB C119999999999999
414CCCCCCCCCCC4 C116666666666665
414DA96DC242DA3E C113333333333332
414E6238502484BB C0FFFFFFFFFFFF0
414EF8280D59523A C0CCCCCCCCCCCC0
414F6C026196CEF6 C099999999999980
414FBE5BDAAD8026 C066666666666650
414FEF9C0455D81E C033333333333320
4E00000000000005 3410000000000000
414FEF9C0455D81E 4033333333333350
414FBE5BDAAD8026 4066666666666680
414F6C026196CEF6 40999999999999B0
414EF8280D59523A 40CCCCCCCCCCCE0
414E6238502484BB 4110000000000002

414DA96DC242DA3A 4113333333333335
414CCCCCCCCCCC4 4116666666666668
414BCB1C7C5523DB 411999999999999B
414AA2DCF8A53ECF 411CCCCCCCCCCCF
4149523AE4547A0D 4120000000000002
4147D6FE902D64B2 4123333333333335
41462E7569064E40 4126666666666668
4144555333BB9119 412999999999999C
4142478751E1C4D1 412CCCCCCCCCCCF
413FFFFFFFFFFFF 4130000000000002
413D785170B330CC 4133333333333335
413AA82F1D1061A8 4136666666666669
41378496BC27AEBB 413999999999999C
4133FE6CAD7BE68A 413CCCCCCCCCCCF
412FFFFFFFFFFFE 4140000000000002
412B682B60B48035 4143333333333336
4125FF76069119FC 4146666666666669
411F5A7CECDB6848 414999999999999C
411666666666665F 414CCCCCCCCCCCF
4E00000000000000 4E00000000000005
4E00000000000000 CE00000000000005
C11666666666666A C14CCCCCCCCCCCD
C11F5A7CECDB684D C149999999999A
C125FF7606911A01 C146666666666666
C12B682B60B48038 C143333333333333
C130000000000001 CE00000000000004
C133FE6CAD7BE68E C13CCCCCCCCCCCC
C1378496BC27AEBF C139999999999999
C13AA82F1D1061AB C136666666666666
C13D785170B330CE C133333333333333
C140000000000002 C12FFFFFFFFFFFF
C142478751E1C4D3 C12CCCCCCCCCCCC
C144555333BB911D C129999999999999
C1462E7569064E48 C126666666666666
C147D6FE902D64B4 C123333333333332
C149523AE4547A0D C11FFFFFFFFFFFF
C14AA2DCF8A53ECF C11CCCCCCCCCCCC
C14BCB1C7C5523DB C119999999999999
C14CCCCCCCCCCC4 C116666666666665
C14DA96DC242DA3E C113333333333332
C14E6238502484BB C0FFFFFFFFFFFF0
C14EF8280D59523A C0CCCCCCCCCCCC0
C14F6C026196CEF6 C099999999999980
C14FBE5BDAAD8026 C066666666666650
C14FEF9C0455D81E C033333333333320
CE00000000000005 3410000000000000
C14FEF9C0455D81E 4033333333333350
C14FBE5BDAAD8026 4066666666666680
C14F6C026196CEF6 40999999999999B0
C14EF8280D59523A 40CCCCCCCCCCCCE0
C14E6238502484BB 4110000000000002
C14DA96DC242DA3A 4113333333333335
C14CCCCCCCCCCC4 4116666666666668
C14BCB1C7C5523DB 411999999999999B
C14AA2DCF8A53ECF 411CCCCCCCCCCCF
C149523AE4547A0D 4120000000000002

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C147D6FE902D64B2 4123333333333335
C1462E7569064E40 4126666666666668
C144555333BB9119 412999999999999C
C142478751E1C4D1 412CCCCCCCCCCCF
C13FFFFFFFFFFFF 4130000000000002
C13D785170B330CC 4133333333333335
C13AA82F1D1061A8 4136666666666669
C1378496BC27AEBB 413999999999999C
C133FE6CAD7BE68A 413CCCCCCCCCCCF
C12FFFFFFFFFFFE 4140000000000002
C12B682B60B48035 4143333333333336
C125FF76069119FC 4146666666666669
C11F5A7CECDB6848 414999999999999C
C11666666666665F 414CCCCCCCCCCCF
4E00000000000000 4E00000000000005


CW    [2 by 102 numeric array; element size 2 byte(s)]
360 0
460 10
500 22
530 34
554 46
576 56
592 68
608 80
622 92
636 102
648 114
658 126
666 138
674 148
682 160
688 172
694 184
700 194
704 206
708 218
712 230
714 240
716 252
718 264
718 276
720 288
718 298
718 310
716 322
714 334
712 344
708 356
704 368
700 380
694 390
688 402
682 414
674 426
```

666 436
658 448
648 460
636 472
622 482
608 494
592 506
576 518
554 528
530 540
500 552
460 564
360 576
360 0
258 10
218 22
188 34
164 46
144 56
126 68
110 80
96 92
82 102
72 114
60 126
52 138
44 148
36 160
30 172
24 184
18 194
14 206
10 218
6 230
4 240
2 252
0 264
0 276
0 288
0 298
0 310
2 322
4 334
6 344
10 356
14 368
18 380
24 390
30 402
36 414
44 426
52 436
60 448
72 460
82 472
96 482

```
110 494
126 506
144 518
164 528
188 540
218 552
258 564
360 576



NAMES IN GROUP 100:
RES  COM  F    CAR  FF   PRI


    ∇RESTORE
[1]   ∘□OU (1↑□OUι0),224
    ∇


    ∇C COM D
[1]   ∘□OU (1↑□OUι0),8 32⊥C,1↑D∘□BO 1↓D←32 256⊤|2×D
    ∇


    ∇F;X
[1]   →1∘⍎((~'←'∈X)/'□←''''∘□←'),X∘□←''∘□←'  ',X∘→(0=ρX←□'')/1
    ∇


    ∇CAR N
[1]   2 COM (1024∗N<0)+60×|N
    ∇


    ∇FF N
[1]   4 COM(1024∗N<0)+48×|N
    ∇


    ∇PRI N
[1]   1 COM N
    ∇



NAMES IN GROUP 101:
SIZ  TIT  SST  GXN  SGL  PEO  TOT  ADV  COS  F


    ∇SIZE
[1]   L←⍎23↓□←□'ENTER NUMBER OF LANES: '
[2]   S←⍎23↓□←□'ENTER NUMBER OF STEPS: '
    ∇
```

```
    ∇TITLES;LI;X
[1]   ⍝ESTABLIST TITLES FOR LANES
[2]   ⍞←'ENTER LANE TITLES.'∘LI←1∘LT←(1+L,9)ρ' '
[3]   L0:LT[LI;⍳ρX]←X←9↓⍞←⍞'LANE ',(2∓LI),': '
[4]   →(L⩾LI←LI+1)/L0
[5]   LT[LI;]←'STEP TOTAL'
    ∇


    ∇SAX←SST;ACR;DOW;STA
[1]   ⍝ESTABLISH SALARY MATRIX VIA INCREMETS
[2]   STA←⍎27↓⍞←⍞'ENTER LANE 1-STEP 1 VALUE: '
[3]   ACR←⍉+\⍉Lρ0,⍎23↓⍞←⍞'INCREMENTS ACROSS IN $ '
[4]   DOW←⍉+\⍉Sρ0,⍎21↓⍞←⍞'INCREMENTS DOWN IN $ '
[5]   ⍝COMPUTE SALARY MATRIX
[6]   SAX←STA+DOW∘.+ACR
    ∇


    ∇R←GXN;X;LI
[1]   ⍝FILL ARRAYS LANE BY LANE
[2]   R←(S,L)ρ0∘LI←1∘X←''
[3]   L0:→(S<ρX←⍎9↓⍞←10⍞'LANE ',(2∓LI),': ',X)/ER
[4]   R[⍳ρX;LI]←X
[5]   →(L⩾(LI←LI+1),0)/L0,0∘X←''
[6]   ER:→L0∘⍞←'LANE TOO LONG, ENTER AGAIN.'∘X←∓X
    ∇


    ∇SAX←SGL
[1]   ⍝ESTABLIST SALARY MATRIX ELEMENT BY ELEMENT
[2]   ⍞←'ENTER SALARY MATRIX.'
[3]   SAX←GXN
    ∇


    ∇PEX←PEO
[1]   ⍞←'ENTER PEOPLE MATRIX.'
[2]   ⍝ELEMENT BY ELEMENT
[3]   PEX←GXN
    ∇


    ∇SAX TOTAL PEX
[1]   ⍝TOTAL SALARY, ALL CATAGORIES
[2]   ⍞←'TOTAL COST = $',10 2 0∓+/+/PEX×SAX
    ∇

    ∇R←ADVANCE PEX;T 1
[1]   ⍝ADD PEOPLE IN SECOND LAST ROW TO LAST ROW
[2]   R[T;]←R[T←S-1;]+R[S;]∘R←PEX
[3]   ⍝DELETE LAST ROW
[4]   R←((Tρ1),0)⌿R
[5]   ⍝ADD ZERO FIRST ROW
[6]   R←(0,Tρ1)⍀R
    ∇
```

```
    ∇SAX COST PEX;C;KT;A;PX
[1]   ⍞←'             TOTAL COST WITH MARGINALS.'
[2]   C←C,(S,1)ρA←+/C←PEX×SAX
[3]   KT←1∘⍞←''∘⍞←(11ρ' '),,LT∘⍞←''
[4]   L0:⍞←'STEP ',(4⍕KT),': ',10 2 0⍕C[KT;]
[5]   →((KT←KT+1)≤1↑ρC)/L0
[6]   ⍞←(11+10×L+1)ρ'¯'
[7]   ⍞←'TOTAL    : ',10 2 0⍕+⌿C
    ∇


    ∇F
[1]   →1∘⍎⍞←'   ',⍞''∘⍞←''
    ∇
```