MCM TAPE TAPE-19.TXT

TAPE LABEL/ANNOTATIONS: "0+2 amalgamated, Oct. 3
                         2"
DATE CREATED: 1975

GROUPS:
```
    0    1    2    5    6    7    9   10   11   12   13
   79   80  100  105  106  110  112  116  118  119  120
  121  123  124  126  127  129  141  145  150  205
```

NAMES IN GROUP 0:
```
SAL  FAT  RAM  ROM  TAP  ERR  RA2  RCS  TBL  SU   ETP  ERO
ERA  N    WUD  PCT  PCS  PCL  PJT  ΔCP  NAM  PJN  WEA  T
ΔTT  A    DAT  RD   HSL  WEN
```

SAL -- object erased from tape

```
    ∇FAT;MOD;T;K;X;Y;Z;RE
[1]   SU
[2]   TAP∘→(1⩾T)/3
[3]   RAM∘→(0=K)/4
[4]   →2∘⍞PT←0∘ERR∘⍞PT←20∘I←I+1∘ROM
    ∇


    ∇RAM;R
[1]   R←256 256 65536⊤X ⍞ZZ RA2
[2]   →(R[3]=Y)/0 U
[3]   →((1↑⍴RAE)<X←((R[3]⩽Z)/⍳3)[1])/6
[4]   RAE[X;]←(≠/(8⍴2)⊤2↑R)+RAE[X;]
[5]   →1∘X←1+R[3]
[6]   'MEMORY SIZE WRONG IN ''MODEL'''
[7]   →
    ∇

    ∇ROM;U
[1]   U←1
[2]   ROE[U]←ROE[U]+TBL[U]≠U ⍞ZZ RCS
[3]   →(19>U←U+1)/2
    ∇


    ∇TAP;G;U
[1]   ⍞←'MOUNT SCRATCH TAPE ON DRIVE 2'∘→(0≠I)/3
[2]   (⍳0)⍞XI[2]'Y'≠(18⍞'LONG INITIALIZE? YES')[18]
[3]   1 ⍞XW'ROE RAE TPE I'∘→(0≠10|I)/4
[4]   B←A←(?10)⍴.1×10?30000∘G←1+?100
[5]   G ⍞XW[2]'A'
[6]   G ⍞XR[2]'A'
[7]   ⍞EX'A B'∘TPE[2]←TPE[2]+0≠+/A≠B
    ∇
```

```
    ∇ERR;E
[1]   E←(+/TPE),(+/ROE),+/+/RAE
[2]   ⎕←(3×0≠+/E)↓'NO ERRORS AFTER ','0123456789'[1+10 10 10 10⊤I],' PASSES:'
[3]   ETP∘→(0=E[1])/4
[4]   ERO∘→(0=E[2])/5
[5]   ERA∘→(0=E[3])/0
    ∇

RA2   [vector of type char of length 41; element size 2 byte(s)]
2506 3D2D 1E20 2621 0E15 4653 0046 3207 46F6 0746 E007 4657 0846 C800 3C02 48A2
0B2E 2036 07C7 30F7 E846 2120 FADD E62E 2036 05F9 30F8 30FB 30FC 4470 08D7 0E00
F9C7 B90B 0848 2420 FA15 3D46 3002 3544 2120

RCS   [vector of type char of length 48; element size 2 byte(s)]
253D 4642 1546 3207 46F6 0746 E007 46CD 0948 BB0B 46B2 0E35 25EA 3D25 0630 2D1E
2026 210E 3046 5300 352E 1814 0444 2120 402B 2004 0302 0202 E8A8 0202 0202 51A8
C8D0 F087 6204 006A 0600 D8C5 15AD 24F8 C368 3420 2E20 3606 FA30 F930 F844 7008

TBL   [numeric vector of length 19; element size 3 byte(s)]
180341 173599 165295 175999 221880 162807 155750 166212 172482 174713 171720
522240 522240 522240 522240 522240 522240 522240 522240 522240


    ∇SU
[1]   MOD←5↑6↓9⍕'MODEL 722EF   '
[2]   TBL[12 13 14]←522240∘→('EF'∧.=¯2↑MOD)/3∘5 ⎕XR'TBL'
[3]   TBL[5 6 10]←221948 163253 175298∘→(70>⍟¯2↑11⍕'SERIAL NO:  ')/4
[4]   RAE←((K←('0248'=MOD[2])/0 2 4 8),8)⍴0∘ROE←19⍴0∘TPE←0,I←0
[5]   T←¯1+'012'⍳MOD[3]∘RE←9 2⍴'2024282C3034383C40'
[6]   Y←8192+1024×K∘Z←7168+1024×1 2 9∘X←8246
    ∇


    ∇ETP
[1]   ⎕←'TAPE ERRORS: UNIT 1 AND 2'
[2]   ⎕←TPE
    ∇


    ∇ERO
[1]   ⎕←'ROM NO.,ERRORS'
[2]   ⎕←(0≠ROE)⌿⍳2 19⍴(⍳19),ROE
    ∇


    ∇ERA;N
[1]   N←1
[2]   →(0=+/RAE[N;])/5 0
[3]   ⎕←'RAM ADDRESS ',RE[N;],'00,'
[4]   ⎕←RAE[N;]
[5]   →(K⩾N←N+1)/2
    ∇
```

```
    ∇N;I;X
[1]   I←1
[2]   PJN[I;]←X∘→(' 'A.=X←8ρ7⍞X)/0
[3]   PJT[I;]←26ρ1⍞'                                    '
[4]   →(43≥I←I+1)/2
    ∇


    ∇WUD;N;T
[1]   →(WEA∧.=T←(20⍴'WEEK ENDING: MONTH ',(4↑WEA),' DAY ',¯2↑WEA)[20 21 22 23 24 29 30])/3
[2]   WEN←WEN+1∘WEA←T
[3]   ⎕XS N←100+⍋T∘→('X'∧.=T←¯2↑15⍴'EMPLOYEE NO.: XX')/0∘⎕XS 0
[4]   ⎕XS N∘N ⎕XW'JN H WK'∘JN←0 8ρ''∘H←WK←⍳0∘⎕XS 0∘→(0≠⎕NC'WK')/5
[5]   JN[(ρJN←(((1↑ρJN)ρ1),0)⍳JN)[1];]←T∘→('X'∧.=T←¯8↑¯1↓13⍴'JOB NUMBER: XXXXXXXX ')/3
[6]   H←H,⌈60×⍋7↓8⍴'HOURS:  '
[7]   WK←WK,WEN
[8]   →5
    ∇


    ∇PCT
[1]   LC←LC+4∘⎕←''∘→(TH∧.=0)/4
[2]   ⎕←''∘⎕←'     TOTAL HOURS:  ',9 2 0⍕TH
[3]   ⎕←'     TOTAL DOLLARS:',9 2 0⍕TD
[4]   ⎕←((51-LC),1)ρ' '∘→(LC≥51)/5
[5]   ⎕←''∘⎕←'                 PROJECT COST SUMMARY'
[6]   ⎕←''∘⎕←'PROJECT NUMBER: ',PN,'           REPORT DATE: ',DATE
[7]   ⎕←''∘⎕←' FOR THE WEEKS OF:   ',RD
[8]   LC←6∘TD←TH←5ρ0
    ∇


    ∇PCS;I;IG;G;PN;EN;LC;TD;TH
[1]   I←0∘G←(100<G)/G←⎕XN⍳0∘TH←TD←5ρ0
[2]   PCT∘PN←PJN[I←I+1;]∘IG←0
[3]   ⎕XS 100+EN←¯100+G[IG←IG+1]
[4]   PCL
[5]   →(IG<ρG)/3
[6]   →(I<1↑ρPJN)/2
    ∇


    ∇PCL;WT;M
[1]   WT[;8]←' '∘→('G'=1↑PN)/2∘WT←JN
[2]   WT←4ρ0∘→(0=+/M←WT∧.=PN)/0∘WK[]←1
[3]   TH←TH+WT←WT,+/WT[WK]←⌊(.005+M/H)÷60 =
[4]   LC←LC+2∘⎕←''∘⎕←(4⍕EN),'  ',(,(EN=EPN)≠NAM),9 2 0⍕WT
[5]   TD←TD+WT×(EN=EPN)/HSL
    ∇

PJT   [26 by 43 array of type char; element size 1 byte(s)]
SECRETARIAL
ADMINISTRATION
PURCHASING
SICK
HOLIDAY
```

```
PERSONAL
SALES
TRAINING
TRAVEL
MCM/70 CPU
MAIN MEMORY
MEMORY
I/O
TAPE CASSETTES
KEYBORAD
BATTERIES
CARD STACK
POWER SUPPLY
DISPLAY
CABLES
OVERALL ASSEMBLY
GPI-1
GPI-2
GPI CABLES
77 CPU
70 MAINTENANCE
COMMUNICATIONS SUBSYSTEM
FLOPPY DISK/70
POWER SUPPLY MARK 2
MCM/77 SYSTEM DESIGN
MCM/170 SYSTEM DESIGN
DEVELOPMENT MAINTENANCE
GPI-3 (CARD READER)
MCM/70 CASE DEVELOPMENT
GPI-2 (HYTYPE)
GPI-1
POWER SUPPLY TESTER
I/O TESTER
ROM/RAM TESTER
DISPLAY/KEYBOARD TESTER
MAIN MEMORY COMPARITOR
MFE DECK TESTER
GPI TESTER



    ∇ΔCP;ΔG;ΔGC;ΔGN;ΔT
[1]   ΔG←⎕XN⍳0∘⎕PT←10
[2]   'GROUP ';ΔG∘⎕XS ΔGC∘ΔGN←⎕XN ΔGC←1↑ΔG
[3]   ΔGC ⎕XC[2](ΔT←0=⎕NC ΔGN)≠ΔGN
[4]   ΔGC ⎕XW[2](~ΔT)≠ΔGN
[5]   →(0<ρΔG←1↓ΔG)/2
[6]   ⎕XS 0∘⎕XF[2]⍳0
[7]   'COPY DONE'∘⎕PT←0
    ∇

NAM   [13 by 20 array of type char; element size 1 byte(s)]
CASHIN
WOLFE
RAMER
WALLACE
```

LARAYA
COPELAND
ARPIN
EDWARDS
SEEDS
SWANSON
MOFFATT
FARNELL
QUINTANA
RAMOS
RIVINGTON
JONES
BROWN
MABEE
PRESTIGIACOMO
BERG

PJN   [8 by 43 array of type char; element size 1 byte(s)]
G0000001
G0000002
G0000003
G0000004
G0000005
G0000006
G0000007
G0000008
G0000009
P047500
P047501
P047502
P047503
P047504
P047505
P047506
P047507
P047508
P047509
P047510
P047511
P047512
P047513
P047514
D047501
D047502
D047503
D047504
D047505
D047506
D047507
D047508
D047509
D047510
D047511
D047512
D047513

```
D057501
D057502
D057503
D057504
D057505
D057506


WEA   [vector of type char of length 7; element size 1 byte(s)]
MAY  05

T     [vector of type char of length 2; element size 1 byte(s)]
XX


    ∇ΔTT ΔT;ΔG;ΔGC;ΔGN
[1]   ΔG←⎕XN[ΔT]⍳0∘⎕PT←10
[2]   'GROUP ';ΔGC∘ΔGN←⎕XN[ΔT]ΔGC←1↑ΔG
[3]   ⎕EX 1 4↑ΔGN∘ΔGC ⎕XR[ΔT]⎕←1 4↑ΔGN
[4]   →(0≠1↑ρΔGN←1 0↓ΔGN)/3
[5]   →(0<ρΔG←1↓ΔG)/2
[6]   'TEST DONE'∘⎕PT←0
    ∇

A     [numeric vector of length 16; element size 2 byte(s)]
106 110 112 114 116 118 119 120 121 123 126 127 129 141 145 150

DAT   [vector of type char of length 10; element size 1 byte(s)]
MAY  28/75

RD    [vector of type char of length 46; element size 1 byte(s)]
MAY  05  MAY  12  MAY  19  MAY  26  YEAR TOTAL

HSL   [numeric vector of length 20; element size 8 byte(s)]
140141505838B6BE 9F1D41A16BFA1399 086B41A4EE52FDC3 50EF41414971C637
0327418BE629E7BD 3423415AFA3BED79 35C2418E846533E4 A6BF41C3EF3CE784
BDEF41858B1B4110 39FE4154D8248C86 3902416A0E0D6C1A 5723414990461 2B7
2F8E413E3ACB193C D7624133E7AD125E 75C7418C4EC4EC4E C4EC4E0000000000
0000412199999999 999A412C5FA84857 77224E0000000000 00004E0000000000

WEN   [numeric scalar: element size=1 byte(s)]
30



NAMES IN GROUP 1:
TBL  RAN  ROE  RAE  TPE  I

TBL   [numeric vector of length 19; element size 3 byte(s)]
180341 173599 165295 175999 221880 162807 155750 166212 172482 174713 171720
129846 522240 173475 522240 522240 522240 522240 522240


    ∇R←RAN B
[1]   I←0∘TT←16*¯4
[2]   LOOP:→8×⍳SEE=RL←32768|R←65536|251+RL×15625
```

```
[3]   R←⎕IO+⌊B×R×TT
[4]   'PASS: ';I←I+1
[5]   →LOOP⌈⍳(?B)=R
[6]   'ERROR ANDRE U BLOW IT'∘⎕PT←0
[7]   →0
[8]   'RL=SEED'∘⎕PT←0
    ∇

ROE   [numeric vector of length 19; element size 1 byte(s)]
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

RAE   [8 by 2 numeric array; element size 1 byte(s)]
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0


TPE   [numeric vector of length 2; element size 1 byte(s)]
0 0

I     [numeric scalar: element size=1 byte(s)]
6



NAMES IN GROUP 2:
CH   HTN  SSS  T    TN   F    L    A    SST  HSS

CH    [52 by 1 array of type char; element size 2 byte(s)]
0658 C084 F006 00C0 8BE8 C497 FCE0 15C3 9FFB D815 C784 F815 C8C7 8BF8 D6F1 CDE8
C784 F815 C78B F8E9 F215 C715 B71D B048 B022 46C8 001A 40AC 0B46 9B00 1D16 00CF
081D 0968 ED22 C2B7 1A60 DD22 F810 44DD 2211 48BB 0B3E 1207 9C22 CC22 E022 E622
EB22 0000 0559 5959



    ∇R←HTN X
[1]   R←(×128-R)×128|R←16⊥⍉((.5×⍴X),2)⍴¯1+'0123456789ABCDEF'⍳X
    ∇

SSS   [numeric vector of length 70; element size 1 byte(s)]
37 6 48 45 205 214 6 8 45 221 230 6 6 45 252 21 251 6 5 45 250 21 249 70 200 0 60
17 72 172 11 70 219 10 43 192 60 33 64 187 11 216 70 33 2 70 192 2 46 32 54 33 198
215 54 255 49 207 250 209 190 72 0 0 70 48 2 68 0 0

T     [vector of type char of length 130; element size 1 byte(s)]
253D46C8003C1148AC0B46DB0A2BC03C2140BB0BD846210246C00235062B2D1E2026000E1646530044
00202E203621C6D70EFFCFFAD131BE480820463002440020

TN    [vector of type char of length 140; element size 1 byte(s)]
2506302DCDD606082DDDE606062DFC15FB06052DFA15F946C8003C1148AC0B46DB0A2BC03C2140BB0B
D846210246C0022E203621C6D736FF31CFFAD1BE480000463002440000


    ∇F
[1]   ⎕XF⍳0∘2 ⎕XW'SSS TN F'
[2]   ⎕EX'SST'
```

```
[3]   SST←SSS,(2|ρSSS)/0
[4]   SST ⎕ZZ CH
    ∇


    ∇L
[1]   ∘⎕OU 1
[2]   ⎕←9 16ρTN,'0000000000000000'
[3]   ⎕←' '
[4]   ⎕←⍕9 8ρSSS,0 0 0 0 0 0 0 0
    ∇

A     [vector of type char of length 32; element size 1 byte(s)]
MOVE IT MOVE IT MOVE IT MOVE IT

SST   [vector of type char of length 35; element size 2 byte(s)]
2506 302D CDD6 0608 2DDD E606 062D FC15 FB06 052D FA15 F946 C800 3C11 48AC 0B46
DB0A 2BC0 3C21 40BB 0BD8 4621 0246 C002 2E20 3621 C6D7 36FF 31CF FAD1 BE48 9F25
4630 0244 9725


    ∇HSS
[1]   ⎕←'SELF SCAN TESTER  (SST)'
[2]   ⎕←' '
[3]   ⎕←'TO OPERATE TYPE:  A ⎕ZZ SST'
[4]   ⎕←'A IS THE CHARACTER STRING WHICH IS SHIFTED'
[5]   ⎕←'TO THE LEFT BY SST:  0<(ρA)≤32'
[6]   ⎕←'TO STOP THE DISPLAY PRESS CTRL.'
[7]   ⎕←'TO RESTART, PRESS ANY KEY.'
[8]   ⎕←'TO INTERUPT SST PRESS CTRL+SHIFT+→.'
    ∇




NAMES IN GROUP 5:
FAT  TAP  ROM  RAM  TBL  ERR  RA2  RCS  HF   ADD  DAY  MG4
MAG  AGG


    ∇FAT;MOD;I;T;K
[1]   ⎕XFι0∘5 ⎕XR'RAM ROM TAP ERR RA2 RCS TBL'
[2]   MOD←5↑6↓8⍞'MODEL 782EF   '
[3]   TBL[12 13 14]←522240∘→('EF'∧.=¯2↑MOD)/4
[4]   TBL[5 6 10]←221948 163253 175298∘→(70>⍋¯2↑11⍞'SERIAL NO:  ')/5
[5]   RAE←((K←('0248'=MOD[2])/0 2 4 8),8)ρ0∘ROE←19ρ0∘TPE←0 0
[6]   →(0=T←¯1+'012'ιMOD[3])/NOT
[7]   ⎕←'MOUNT ',MOD[3],' SCRATCH TAP',T↑'ES'
[8]   I←'Y'≠(18⍞'LONG INITIALIZE? YES')[18]
[9]   (ι0)⎕XI[2]I∘→(0=T)/NOT∘⎕XS 0∘(ι0)⎕XI I
[10]   NOT:I←0
[11]   NT:→NT∘⎕PT←0∘ERR∘⎕PT←20∘I←I+1∘ROM∘RAM∘TAP
    ∇
```

```
    ∇TAP;G;U
[1]   1 ⎕XW'ROE RAE TPE I'∘→(0≠10|I)/2∘U←1∘→(T=0)/0
[2]   B←A←(?20)ρ.1×10?30000∘G←1+?100
[3]   G ⎕XW[U]'A'
[4]   G ⎕XR[U]'A'
[5]   TPE[U]←TPE[U]+0≠+/A≠B
[6]   →((T=U←U+1),1)/2 0∘⎕EX'A B'
    ∇


    ∇ROM;U
[1]   U←1
[2]   ROE[U]←ROE[U]+TBL[U]≠U ⎕ZZ RCS
[3]   →(19>U←U+1)/2
    ∇


    ∇RAM;X;Y;R;Z
[1]   Y←8192+K×1024∘→(0=K)/0
[2]   Z←7168+1024×⍳9∘X←8246
[3]   RL:R←256 256 65536⊤X ⎕ZZ RA2
[4]   →(R[3]=Y)/0
[5]   →((1↑ρRAE)<X←((R[3]⩽Z)/⍳9)[1])/ER
[6]   RAE[X;]←(≠/(8ρ2)⊤2↑R)+RAE[X;]
[7]   →RL∘X←1+R[3]
[8]   ER:'MEMORY SIZE WRONG IN ''MODEL'''
[9]   →
    ∇


TBL   [numeric vector of length 19; element size 3 byte(s)]
180341 173599 165295 175999 221880 162807 155750 166212 172482 174713 171720
131857 244870 257444 522240 522240 522240 522240 522240



    ∇ERR;X;E;N;RE
[1]   X←'0123456789'∘E←0
[2]   ⎕←'AFTER ',X[1+10 10 10 10⊤I],' PASSES:'
[3]   →(0=+/TPE)/R1
[4]   ⎕←'TAPE ERRORS: UNIT 1: ',X[1+10 10 10⊤TPE[1]]
[5]   E←1∘⎕←'UNIT 2: ',X[1+10 10 10⊤TPE[2]]
[6]   R1:→(0=+/ROE)/R2
[7]   RE←(0≠ROE)⌿⍉2 19ρ(⍳19),ROE
[8]   ⎕←'ROM NO.,ERRORS:'
[9]   E←2∘⎕←RE
[10]   R2:→(0=+/+/RAE)/R4
[11]   RE←9 2ρ'2024282C3034383C40'∘E←2+N←1
[12]   RL:→(0=+/RAE[N;])/R3
[13]   ⎕←'RAM ADDRESS ',RE[N;],'00,'
[14]   ⎕←RAE[N;]
[15]   R3:→(K⩾N←N+1)/RL
[16]   R4:⎕←'NO ERRORS'∘→(0≠E)/0
    ∇
```

```
RA2   [vector of type char of length 41; element size 2 byte(s)]
2506 3D2D 1E20 2621 0E15 4653 0046 3207 46F6 0746 E007 4657 0846 C800 3C02 48A2
0B2E 2036 07C7 30F7 E846 2120 FADD E62E 2036 05F9 30F8 30FB 30FC 4470 08D7 0E00
F9C7 B90B 0848 2420 FA15 3D46 3002 3544 2120


RCS   [vector of type char of length 48; element size 2 byte(s)]
253D 4642 1546 3207 46F6 0746 E007 46CD 0948 BB0B 46B2 0E35 25EA 3D25 0630 2D1E
2026 210E 3046 5300 352E 1814 0444 2120 402B 2004 0302 0202 E8A8 0202 0202 51A8
C8D0 F087 6204 006A 0600 D8C5 15AD 24F8 C368 3420 2E20 3606 FA30 F930 F844 7008



    ∇HF
[1]   □←'        FINAL ACCEPTANCE TEST          MAY 20/75'∘□OU 1 16
[2]   □←'        ─────────────────────'
[3]   □←''
[4]   □←'EXECUTE THE FUNCTION ''FAT'' FROM GROUP 5'
[5]   □←''
[6]   □←'INSTRUCTIONS:'
[7]   □←''
[8]   □←'WHEN ''MODEL'' IS REQUESTED:  (PROMPTED WITH ''782EF'')' ,
[9]   □←'ACTION                  EFFECTS'
[10]   □←'──────                  ───────'
[11]   □←'DELETING ''EF''          ROMS 12, 13, 14 (BANKS 8, 9, A) ARE ASSUMED BLANK' ED
[12]   □←''
[13]   □←'CHANGING ''2'' TO 0       NO TAPE CHECKING'
[14]   □←'                 1       CHECKS DRIVE 0 ONLY'
[15]   □←'                 2       CHECKS BOTH DRIVES'
[16]   □←''
[17]   □←'CHANGING ''8'' TO 0       NO RAM CHECK PERFORMED' 0
[18]   □←'                 2       CHECKS FOR VALID 2K MEMORY'
[19]   □←'                 4       CHECKS FOR VALID 4K MEMORY'
[20]   □←'                 8       CHECKS FOR VALID 8K MEMORY'
[21]   □←''
[22]   □←'WHEN ''SERIAL '' IS REQUESTED:'
[23]   □←'' K
[24]   □←'IF THE LAST TWO DIGITS OF THE SERIAL NUMBER'
[25]   □←'ARE GREATER THAN OR EQUAL TO 70,'
[26]   □←'THE SYSTEM ASSUMES NEW ROMS INSTALLED IN'
[27]   □←'LOCATIONS 5, 6, 10(BANKS 1, 2, 6)'
[28]   □←''
[29]   □←'WHEN TESTING TAPES, THE SYSTEM REQUESTS THE MOUNTING'
[30]   □←'OF 1 OR 2 SCRATCH TAPES, THEN ASKS IF A'
[31]   □←'''LONG'' INITIALIZE IS REQUIRED. IF THE ANSWER IS'
[32]   □←'''NO'' A SHORT INITIALIZE IS PERFORMED,'
[33]   □←'THEN AVS IS TURNED ON.  EVERY 10TH PASS THE VARIABLES USED TO ACCUMULATE'
[34]   □←'ERRORS (RAE FOR RAM ERRORS, ROE FOR ROM ERRORS, TPE FOR TAPE ERRORS,' R
[35]   □←'AND I FOR THE NUMBER OF PASSES) ARE WRITTEN IN GROUP 1 ON THE AVS TAPE.'
[36]   □←'IF THE MACHINE DIES UNDER TEST, THESE VARIABLES, ALONG WITH THE'
[37]   □←'FUNCTION ''ERR'' CAN BE LOADED AND EXECUTED ON'
[38]   □←'ANOTHER MACHINE TO CHECK FOR POSSIBLE ERRORS BEFORE THE MACHINE FAILED.'
    ∇
```

```
    ∇ADD;A
[1]   LN←LN,ρA←,⍞''
[2]   ST←ST,ST[ρST]+ρA
[3]   STR←STR,A
    ∇


    ∇R←DAY;D;M;Y
[1]   D←⍎20↓⍞'ENTER DAY OF MONTH: '
[2]   M←⍎21↓⍞'ENTER MONTH OF YEAR: '
[3]   M←M,⍎12↓⍞'ENTER YEAR: '
[4]   →((0 12⊥1752 9)⩾0 12⊥⌽M)/8
[5]   Y←100|1↓M←1 0+⌽0 12⍴¯3+0 12⊥⌽M∘⎕PT←0 Δ
[6]   Y← 1+7|D+Y+(⌊¯0.2+2.6×M[1])+(⌊Y÷4)-⌈1.75×⌊M[2]÷100
[7]   →0∘R←(7 3ρ'SUNMONTUEWEDTHUFRISAT')[Y;]
[8]   →1∘⎕←'DATE MUST BE ⩾ OCT. 1752'∘⎕PT←20
    ∇


    ∇Z←MG4 N;M;T
[1]   →3×⍳0=4|N
[2]   →0∘⎕←'NOT FORM 4×N'
[3]   M←(N,N)⍴(⍳N)∈(1+N-T),T←(N÷4)?N÷2
[4]   Z←((~M)×⊖Z)+M×Z←(N,N)⍴⍳N*2
[5]   M←⍉(N,N)⍴(⍳N)∈(1+N-T),T←(N÷4)?N÷2
[6]   Z←((~M)×⌽Z)+M×Z
    ∇


    ∇Z←MAGICSQ X;M
[1]   →(0≠2⍴X)/3
[2]   →0∘⎕←'NOT ODD ORDER'
[3]   M←(X,X)⍴⍳X×X
[4]   Z←(⌈X÷2)⌽(¯1+⍳X)⊖(¯1+⍳X)⌽M
    ∇


    ∇AGG;A
[1]   LN←LN,ρA←,⍞''
[2]   ST←ST,ST[ρST]+ρA
[3]   STR←STR,A
    ∇



NAMES IN GROUP 6:
LIΔ  DXΔ  RLΔ  CGΔ  DTΔ


    ∇LIΔST GNΔ;FVΔ;IΔ;GΔ;NΔ;NMΔ;NΔΔ;TΔ;PLΔ;PSΔ;MΔ
[1]   →L5Δ⌈⍳MΔ←0≠ρGNΔ←,GNΔ
[2]   ⎕EX'ΔMΔ'∘GNΔ←,ΔMΔ∘0 ⎕XR'ΔMΔ'
[3]   L5Δ:GNΔ←GNΔ[⍋GNΔ←((GNΔ⍳GNΔ)=⍳ρGNΔ)/GNΔ]
[4]    PSΔ←48 51,⎕PW←80∘⎕OU 1 16∘PLΔ←⎕IO←0
[5]   L1Δ:→EΔ⌈⍳0=ρGNΔ
[6]    NMΔ←⎕XN GΔ←GNΔ[0]
```

```
[7]    RLΔ 1+FVΔ←2+⌈(×/ρNMΔ)÷80
[8]    □←' '∘□←'LISTING GROUP: ',⍕GΔ∘IΔ←¯1
[9]    →L2Δ∘□←' '∘□←(((⌈(×/ρNMΔ)÷80),80)ρNMΔ⍪40 4ρ' '∘→L4Δ⌈⍳3=FVΔ
[10]   L4Δ:□←' '∘□←,NMΔ
[11]   L2Δ:→E1Δ⌈⍳(IΔ←IΔ+1)=1↑ρNMΔ
[12]    →L3Δ⌈⍳0=(NΔΔ←NΔ←NMΔ[IΔ;])□ZZ DTΔ
[13]    →L3Δ⌈⍳GΔ=CGΔ∘NΔΔ←''
[14]    →L2Δ∘DXΔ NΔ∘□←''∘□←'***CONFLICT: ',NΔ∘RLΔ 1
[15]   L3Δ:→L2Δ∘□EX NΔΔ∘DXΔ NΔ∘GΔ □XR NΔΔ
[16]   E1Δ:PLΔ←0∘RLΔ 1+PSΔ[□IO]-PLΔ
[17]    →L1Δ∘GNΔ←1↓GNΔ
[18]   EΔ:0 □XW'ΔMΔ'∘ΔMΔ←⍳0∘→E2Δ⌈⍳MΔ
[19]   E2Δ:□OFF∘→0
    ∇


    ∇DXΔ XΔ;DΔ;NΔ;NMΔ;OΔ
[1]    →(VΔΔ,FΔΔ,VΔ,VΔ,VΔ,A2Δ)[XΔ □ZZ DTΔ]
[2]    FΔΔ:□EX NΔΔ∘RLΔ 2+NΔ←1↑ρDΔ←□CR XΔ
[3]    DΔ←(6 1 0⍕(NΔ,1)ρ⍳NΔ),DΔ
[4]    DΔ[;(3-ρ⍕¯1+NΔ),4 5]←(NΔ,3)ρ'[] '
[5]    DΔ[0;⍳7]←'     ∇ '
[6]    □←DΔ
[7]    FΔ:→EΔ∘□←'     ∇'
[8]    VΔ:RLΔ 2+1⌈×/¯1↓ρDΔ←⍋XΔ
[9]    NMΔ←'(',(⍕ρDΔ),((0≠0\0ρDΔ)/''''),')'
[10]    NMΔ[(' '=NMΔ)/⍳ρNMΔ]←','
[11]    →EΔ∘□←⍕DΔ∘□←XΔ,':  ',NMΔ
[12]    A2Δ:→EΔ∘□←XΔ,'  α2'∘RLΔ 2
[13]    VΔΔ:□←XΔ,' NO VALUE'∘RLΔ 2
[14]    EΔ:□←''
    ∇


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

CGΔ   [numeric scalar: element size=1 byte(s)]
81

DTΔ   [vector of type char of length 52; element size 2 byte(s)]
0630 5146 E01B 70A2 0B46 7B00 2546 7500 CF30 D725 C7F9 30CF FAD0 25F9 31FA 46EB
07B0 2B46 CE00 3C11 48AC 0B2E 0036 013D 1E01 4634 073D 3E00 4601 1D2E 2036 300E
0246 ED03 2BDF 15E7 0D3E 0211 2B3E 01C3 B033 3E04 2546 D100 2410 2BD7 353E 03C2
2402 2B3E 0507 0066



NAMES IN GROUP 7:
HF
```

```
    ∇HF
[1]   ⎕←'        FINAL ACCEPTANCE TEST          MAY 20/75'∘⎕OU 1 16
[2]   ⎕←'                              '
[3]   ⎕←''
[4]   ⎕←'EXECUTE THE FUNCTION ''FAT'' FROM GROUP 5'
[5]   ⎕←''
[6]   ⎕←'INSTRUCTIONS:'
[7]   ⎕←''
[8]   ⎕←'WHEN ''MODEL'' IS REQUESTED:  (PROMPTED WITH ''782EF'')' ,
[9]   ⎕←'ACTION                  EFFECTS'
[10]   ⎕←'                                '
[11]   ⎕←'DELETING ''EF''          ROMS 12, 13, 14 (BANKS 8, 9, A) ARE ASSUMED BLANK' ED
[12]   ⎕←''
[13]   ⎕←'CHANGING ''2'' TO 0       NO TAPE CHECKING'
[14]   ⎕←'                 1       CHECKS DRIVE 0 ONLY'
[15]   ⎕←'                 2       CHECKS BOTH DRIVES'
[16]   ⎕←''
[17]   ⎕←'CHANGING ''8'' TO 0       NO RAM CHECK PERFORMED' 0
[18]   ⎕←'                 2       CHECKS FOR VALID 2K MEMORY'
[19]   ⎕←'                 4       CHECKS FOR VALID 4K MEMORY'
[20]   ⎕←'                 8       CHECKS FOR VALID 8K MEMORY'
[21]   ⎕←''
[22]   ⎕←'WHEN ''SERIAL '' IS REQUESTED:'
[23]   ⎕←'' K
[24]   ⎕←'IF THE LAST TWO DIGITS OF THE SERIAL NUMBER'
[25]   ⎕←'ARE GREATER THAN OR EQUAL TO 70,'
[26]   ⎕←'THE SYSTEM ASSUMES NEW ROMS INSTALLED IN'
[27]   ⎕←'LOCATIONS 5, 6, 10(BANKS 1, 2, 6)'
[28]   ⎕←''
[29]   ⎕←'WHEN TESTING TAPES, THE SYSTEM REQUESTS THE MOUNTING'
[30]   ⎕←'OF 1 OR 2 SCRATCH TAPES, THEN ASKS IF A'
[31]   ⎕←'''LONG'' INITIALIZE IS REQUIRED. IF THE ANSWER IS'
[32]   ⎕←'''NO'' A SHORT INITIALIZE IS PERFORMED,'
[33]   ⎕←'THEN AVS IS TURNED ON.  EVERY 10TH PASS THE VARIABLES USED TO ACCUMULATE'
[34]   ⎕←'ERRORS (RAE FOR RAM ERRORS, ROE FOR ROM ERRORS, TPE FOR TAPE ERRORS,' R
[35]   ⎕←'AND I FOR THE NUMBER OF PASSES) ARE WRITTEN IN GROUP 1 ON THE AVS TAPE.'
[36]   ⎕←'IF THE MACHINE DIES UNDER TEST, THESE VARIABLES, ALONG WITH THE'
[37]   ⎕←'FUNCTION ''ERR'' CAN BE LOADED AND EXECUTED ON'
[38]   ⎕←'ANOTHER MACHINE TO CHECK FOR POSSIBLE ERRORS BEFORE THE MACHINE FAILED.'
    ∇



NAMES IN GROUP 9:
SEE  RAN  RM   RD   EDI

SEE   [numeric scalar: element size=2 byte(s)]
7179


    ∇R←RAN B
[1]   RL←32768|R←65536|251+RL×15625
[2]    R←⎕IO+|B×R×16*¯4
    ∇
```

```
    ∇R←RM B;B1;BS
[1]   B←1,,B∘R←⍳0∘BS←⍴B
[2]   →(0=⍴B←1↓B)/5
[3]   →(~(B1>0)∧(32768>B1)∧B1=⌊B1←1↑B)/DOM
[4]   →2∘R←R, RAN B1
[5]   →0∘R←BS⍴R
[6]   DOM:'DOMAIN ERROR'
[7]   →
    ∇


    ∇R←A RD B;I
[1]   →(1≠⍴,A)/RNK
[2]   →(1≠⍴,B)/RNK
[3]   →(~(B>0)∧(32768>B)∧B=⌊B)/DOM
[4]   →(~(A⩾0)∧(A<256)∧A⩽B)/DOM
[5]   →(A=0)/0∘R←A⍴¯1+I←⎕IO
[6]   RLP:R[I]←RAN B
[7]   →(2=+/R=R[I])/RLP
[8]   →((A⩾I←I+1),1)/RLP,0
[9]   DOM:'DOMAIN ERROR'
[10]   →
[11]   RNK:'RANK ERROR'
[12]   →
    ∇


    ∇EDIT;A
[1]   ⎕←'   ',A←⍞''
[2]   ⎕←⍎A
[3]   →1∘⎕←' '
    ∇



NAMES IN GROUP 10:
X    BET  ACT  BEF  ACF  BEN  ACN  STA  LTD  NAM  SAL  N
PLD


X - object erased from the tape

BET   [numeric vector of length 9; element size 1 byte(s)]
10 8 50 24 49 77 19 17 5

ACT   [numeric vector of length 9; element size 2 byte(s)]
75 80 116 67 89 135 98 75 53

BEF   [numeric vector of length 9; element size 1 byte(s)]
4 8 16 15 30 3 16 7 9

ACF   [numeric vector of length 9; element size 1 byte(s)]
13 12 21 20 27 6 20 10 13

BEN   [numeric vector of length 9; element size 2 byte(s)]
32883 32903 32808 32881 6 32828 26 16 152
```

```
ACN   [numeric vector of length 9; element size 2 byte(s)]
32842 32860 5 32835 36 32787 74 80 185


    ∇STAT X
[1]   'NUMBER OF ELEMENTS'
[2]   □←N←ρX
[3]   'VALUES'
[4]   X
[5]   'AVERAGE'
[6]   (+/X)÷N
[7]   'LARGEST VALUE'
[8]   ⌈/X
[9]   'SMALLEST VALUE'
[10]   ⌊/X
[11]   'RANGE'
[12]   (⌈/X)-⌊/X
[13]   'MEAN SQUARE'
[14]   (+/(X*2))÷N
    ∇


    ∇T←LTD S
[1]   SW←500⌊0⌈S-1500 1000 500 0
[2]   T←.0064×1700⌊+/.40 .50 .55 .65×SW
    ∇

NAM   [10 by 20 array of type char; element size 1 byte(s)]
CASHIN
WOLFE
RAMER
WALLACE
LARAYA
COPELAND
ARPIN
EDWARDS
SEEDS
SWANSON
MOFFATT
FARNELL
QUINTANA
RAMOS
RIVINGTON
JONES
BROWN
MABEE



SAL   [numeric vector of length 20; element size 8 byte(s)]
14014E0000000000 03304366770A3D70 A3D84368B147AE14 7AE04329711EB851
EB804358CD999999 99984339BFD70A3D 70A0435A770A3D70 A3D8437C5F5C28F5
C2904354C4CCCCCC CCD04335DB333333 3330434351EB851E B850432EB2147AE1
47B043278051EB85 1EB84320F28F5C28 F5C34E0000000000 05914E0000000000
```

```
0000431554000000 0000431C2AB851EB 851F4E0000000000 00004E0000000000


    ∇N;I
[1]   I←1
[2]   NAM[I;]←X∘→(' '∧.=X←10ρ1⍞20ρ' ')/0
[3]   →((1↑ρNAM)≥I←I+1)/2
    ∇


    ∇PLD;I;T;TL
[1]   ⍞←'LONG TERM DISIBILITY DEDUCTIONS       MAY 23/75'
[2]   ⍞←''
[3]   ⍞←'NAME        SALARY    LTD DEDUCTION' v
[4]   ⍞←''
[5]   I←1+TL←0
[6]   ⍞←NAM[I;],10⍕SAL[I],T∘TL←TL+T←LTD SAL[I]
[7]   →((ρSAL)≥I←I+1)/6
[8]   ⍞←''
[9]   ⍞←'TOTALS    '10⍕(+/SAL),TL Z
    ∇



NAMES IN GROUP 11:
DMD  MMD  ERR


    ∇Z←A DMD B;IO;FUZZ;P;LA2;LB2;F;I;J;M2;I2;M1;I1;SIGMA;ALFA;U
[1]   ⎕IO←1∘IO←⎕IO
[2]   'DOMAIN' ERROR 0≠0\0ρA
[3]   'DOMAIN' ERROR 0≠0\0ρB
[4]   'RANK' ERROR 2≠ρρB
[5]   'RANK' ERROR~(ρρA)∈ 1 2
[6]   'LENGTH' ERROR(1↑ρA)≠1↑ρB
[7]   'LENGTH' ERROR(1↑ρB)<1↓ρB
[8]   FUZZ←2*-56-⎕CT
[9]   LA2←((ρA),1)[2]
[10]   ON:LB2←1↓ρB
[11]   →AHEAD IF (0≠LA2)∧0≠LB2
[12]   Z←(LB2,LA2)ρ0
[13]   →FIN
[14]   AHEAD:P←⍳1↑ρB
[15]   F←÷⌈/[1]B÷⍉(⌽ρB)ρ⌈/|B
[16]   B←B×(ρB)ρF
[17]   B←B,(2↑(ρA),1)ρA F
[18]   I←0
[19]   LOOP:J←I
[20]   I←I+1
[21]   →END IF LB2<I
[22]   M2←⌈/[⎕IO]|(0,-LA2)↓(J,J)↓B
[23]   'DOMAIN' ERROR FUZZ≥⌈/M2
[24]   I2←J+M2⍳⌈/M2
[25]   P[I,I2]←P[I2,I]
[26]   B[;I,I2]←B[;I2,I]
[27]   M1←|J↓B[;I]
```

```
[28]   I1←J+M1ι⌈/M1
[29]   B[I,I1;]←B[I1,I;]
[30]   SIGMA←+/(J↓B[;I])*2
[31]   ALFA←(¯1*0≤B[I;I])×SIGMA*0.5
[32]   U←B[I;I]-ALFA
[33]   T←(U,I↓B[;I])+.×(J,I)↓B
[34]   T←T×÷SIGMA-B[I;I]×ALFA
[35]   B[J↓ι1↑ρB;I↓ι1↓ρB]←((J,I)↓B)-(U,I↓B[;I])∘.×T
[36]   B[I;I]←ALFA
[37]   →LOOP
[38]   END:Z←(LB2,LA2)ρ0
[39]   I←(ι0)ρ1+LB2 ⎕RG
[40]   QBACK:I←I-1
[41]   →RE IF 0=I
[42]   Z[I;]←((LB2↓B[I;])-(LB2↑B[I;])+.×Z)÷B[I;I]
[43]   →QBACK
[44]   RE:Z←Z[⍋P;]×⍉(⌽ρZ)ρF
[45]   FIN:→EXIT IF 1≠ρρA
[46]   Z←,Z
[47]   EXIT:⎕IO←IO
    ∇


    ∇Z←MMD B
[1]   Z←((ι1↑ρB)∘.=ι1↑ρB)DMD B
    ∇


    ∇A ERROR B
[1]   A,' ERROR'∘→0×ι~∨/B
[2]   ⎕IO←IO
[3]   →
    ∇



NAMES IN GROUP 12:
DMD


    ∇Z←A DMD B;IO;FUZZ;P;LA2;LB2;F;I;J;M2;I2;M1;I1;SIGMA;ALFA;U
[1]   ⎕IO←1∘IO←⎕IO
[2]   'DOMAIN' ERROR 0≠0\0ρA
[3]   'DOMAIN' ERROR 0≠0\0ρB
[4]   'RANK' ERROR 2≠ρρB
[5]   'RANK' ERROR~(ρρA)∈ 1 2
[6]   'LENGTH' ERROR(1↑ρA)≠1↑ρB
[7]   'LENGTH' ERROR(1↑ρB)<1↓ρB
[8]   FUZZ←2*-56-⎕CT
[9]   LA2←((ρA),1)[2]
[10]   LB2←1↓ρB
[11]   →((0≠LA2)∧0≠LB2)/AHEAD
[12]   →FIN∘Z←(LB2,LA2)ρ0
[13]   AHEAD:P←ι1↑ρB∘I←0
[14]   F←÷⌈⍀B÷⌽(⌽ρB)ρ⌈/|B
[15]   B←(B×(ρB)ρF),(2↑(ρA),1)ρA
```

```
[16]   LOOP:→(LB2<I←1+J←I)/END
[17]   M2←⌈⌿|(0,-LA2)↓(J,J)↓B
[18]   'DOMAIN' ERROR FUZZ≥⌈/M2
[19]   I2←J+M2⍳⌈/M2
[20]   P[I,I2]←P[I2,I]
[21]   B[;I,I2]←B[;I2,I]
[22]   I1←J+M1⍳⌈/M1←|J↓B[;I]
[23]   B[I,I1;]←B[I1,I;]
[24]   SIGMA←+/(J↓B[;I])*2
[25]   U←B[I;I]-ALFA←(¯1*0≤B[I;I])×SIGMA*0.5
[26]   T←((U,I↓B[;I])+.×(J,I)↓B)×÷SIGMA-B[I;I]×ALFA
[27]   B[J↓⍳1↑⍴B;I↓⍳1↓⍴B]←((J,I)↓B)-(U,I↓B[;I])∘.×T
[28]   →LOOP∘B[I;I]←ALFA
[29]   END:Z←(LB2,LA2)⍴0×I←(⍳0)⍴1+LB2
[30]   QBACK:→(0=I←I-1)/RE
[31]   →QBACK∘Z[I;]←((LB2↓B[I;])-(LB2↑B[I;])+.×Z)÷B[I;I]
[32]   RE:Z←Z[⍋P;]×⍉(⌽⍴Z)⍴F
[33]   FIN:→(1≠⍴⍴A)/0∘⎕IO←IO
[34]   Z←,Z
    ∇


NAMES IN GROUP 13:
DMD  IF   ERR  MMD  N_   K_   Y_   ROM  F    DCT  CTD  APL
RAM  X    R    TBL  ADD  RM1


    ∇Z←A DMD B;IO;FUZZ;P;LA2;LB2;F;I;J;M2;I2;M1;I1;SIGMA;ALFA;U
[1]   ⎕IO←1∘IO←⎕IO
[2]   'DOMAIN' ERROR 0≠0\0⍴A
[3]   'DOMAIN' ERROR 0≠0\0⍴B
[4]   'RANK' ERROR 2≠⍴⍴B
[5]   'RANK' ERROR~(⍴⍴A)∈ 1 2
[6]   'LENGTH' ERROR(1↑⍴A)≠1↑⍴B
[7]   'LENGTH' ERROR(1↑⍴B)<1↓⍴B
[8]   FUZZ←2*-56-⎕CT
[9]   LA2←((⍴A),1)[2]
[10]   ON:LB2←1↓⍴B
[11]   →AHEAD IF (0≠LA2)∧0≠LB2
[12]   Z←(LB2,LA2)⍴0
[13]   →FIN
[14]   AHEAD:P←⍳1↑⍴B
[15]   F←÷⌈/[1]B÷⍉(⌽⍴B)⍴⌈/|B
[16]   B←B×(⍴B)⍴F
[17]   B←B,(2↑(⍴A),1)⍴A F
[18]   I←0
[19]   LOOP:J←I
[20]   I←I+1
[21]   →END IF LB2<I
[22]   M2←⌈/[⎕IO]|(0,-LA2)↓(J,J)↓B
[23]   'DOMAIN' ERROR FUZZ≥⌈/M2
[24]   I2←J+M2⍳⌈/M2
[25]   P[I,I2]←P[I2,I]
[26]   B[;I,I2]←B[;I2,I]
[27]   M1←|J↓B[;I]
```

```
[28]   I1←J+M1ι⌈/M1
[29]   B[I,I1;]←B[I1,I;]
[30]   SIGMA←+/(J↓B[;I])*2
[31]   ALFA←(¯1*0≤B[I;I])×SIGMA*0.5
[32]   U←B[I;I]-ALFA
[33]   T←(U,I↓B[;I])+.×(J,I)↓B
[34]   T←T×÷SIGMA-B[I;I]×ALFA
[35]   B[J↓ι1↑ρB;I↓ι1↓ρB]←((J,I)↓B)-(U,I↓B[;I])∘.×T
[36]   B[I;I]←ALFA
[37]   →LOOP
[38]   END:Z←(LB2,LA2)ρ0
[39]   I←(ι0)ρ1+LB2 ⎕RG
[40]   QBACK:I←I-1
[41]   →RE IF 0=I
[42]   Z[I;]←((LB2↓B[I;])-(LB2↑B[I;])+.×Z)÷B[I;I]
[43]   →QBACK
[44]   RE:Z←Z[⍋P;]×⍉(⌽ρZ)ρF
[45]   FIN:→EXIT IF 1≠ρρA
[46]   Z←,Z
[47]   EXIT:⎕IO←IO
    ∇


    ∇R←A IF B
[1]   R←B/A
    ∇


    ∇A ERROR B
[1]   A,' ERROR'∘→0×ι~∨/B R
[2]   ⎕IO←IO
[3]   →
    ∇


    ∇Z←MMD B
[1]   Z←((ι1↑ρB)∘.=ι1↑ρB)DMD B
    ∇

N_    [3 by 2 array of type char; element size 1 byte(s)]
MMD
DMD


K_    [numeric vector of length 2; element size 1 byte(s)]
2 5

Y_    [16 by 5 array of type char; element size 1 byte(s)]
MONADIC DIVIDE
MATRIX INVERSION
DIADIC DIVIDE
A ⌹ B
B IS THE MATRIX
```

```
    ∇ROM;X
[1]   →2×TBL⍳v.≠X∘(X←,ADDR) ⎕ZZ RM1
[2]   'ROM ERROR IN CHIP ';(TBL=X)⍳0∘⎕PT←0
    ∇


    ∇F
[1]   →1∘⎕←'RAM OK'∘RAM∘⎕←'ROM OK'∘ROM∘⎕PT←4
    ∇


    ∇DCT;N
[1]   I←~'N'∈13⍕'REPT. MODE? N'
[2]   'PASS ';I∘⎕PT←15
[3]   RAM∘ROM∘APL∘CTD∘⎕PT←0
[4]   →2∘I←I+1∘→5×⍳I=0
[5]   'DONE'
    ∇


    ∇CTD;A;B;C;D;N
[1]   A←B←⍳10∘C←D←⍳100∘(⍳0)⎕XI[2]1∘⎕XF[2]⍳0
[2]   N ⎕XW[2]'A C'∘(N←200+23|I) ⎕XW'B D'
[3]   N ⎕XR[2]'A C'∘N ⎕XR'B D'
[4]   N ⎕XD[2]'A C'∘N ⎕XD'B D'
[5]   →0×⍳(A∧.=B)∧C∧.=D
[6]   'CST ERROR'
    ∇


    ∇APL;G;H;Z
[1]   G←.1∘H←1.1
[2]   Z←(.1=○/(,(⌽⍋⍒1 1 1 0 1 1 1/2↓⍳9)∘.×¯1 1),.1)∧0=(!2)-10∗10⍟!5|2
[3]   →5×⍳((Z⍲0=G-.1×G∗⍟×~~G÷÷÷-1×1.1-H+G)⍱¯4○1=4○0○1)⍲(×|¯1)≠G⩾G⩽G<G>○.1÷○G|H
[4]   'APL TEST ERROR'
    ∇


    ∇RAM;V;HV
[1]   HV←'0123456789ABCDEF'[1+16 16 16 16⊤|V←⎕ZZ R]
[2]   'RAM ERROR :LOCATION  ',HV∘⎕PT←0∘→4×⍳0<V
    ∇

X     [numeric vector of length 19; element size 4 byte(s)]
13010002 C0750002 A61F0002 85AF0002 AF7F0003 62B80002 7BF70002 60660002 89440002
A1C20002 AA790002 9EC80007 F8000007 F8000007 F8000007 F8000007 F8000007 F8000007
F8000007

R     [vector of type char of length 34; element size 2 byte(s)]
2506 1F2D 1E20 2621 0E25 4653 0046 3207 46F6 0746 B20E 2E20 3627 16FF 4421 2015
CFC2 A9F8 C7F9 B968 3A20 AAB9 6821 2025 2E20 3601 3ECE 2515 1D25 2E20 3607 FB30
FC44 7008

TBL   [numeric vector of length 19; element size 3 byte(s)]
180341 173599 165295 175999 221880 162807 155750 166212 172482 174713 171720
522240 522240 522240 522240 522240 522240 522240 522240 522240
```

```
ADD   [numeric vector of length 19; element size 4 byte(s)]
13010000 00000000 08000000 10000000 18000010 18000020 18000030 18000040 18000050
18000060 18000070 18000080 18000090 180000A0 180000B0 180000C0 180000D0 180000E0
180000F0

RM1   [vector of type char of length 50; element size 2 byte(s)]
2506 282D DDE6 0630 2DFC 15FB 2506 122D DDE6 060F 2DFC 15FB 469B 0025 4682 00FB
15FC 46E0 0746 F607 4657 082E 2036 06C7 5130 C730 F7E8 1600 DAE2 C784 E062 1400
6A06 0015 C524 07B6 48A5 232E 2036 06FA 30FB 30FC 4670 0848 9323 4682 003E 0030
3E00 0700



NAMES IN GROUP 79:
FO2  EPR  INC  REP  HOM  DOW  POS  RIG  FO1  UP   TΔΔ  V
U    QTY  CAT  T    TMP  RO   ROP  Q    R1   R1P  S    R
R2   R2P  X    W    L0   L1   L2   L3   L4   L5   L6   L7



    ∇FO2 X
[1]   □←'|',6 2 0 ⍕X∘POS
    ∇


    ∇EPR;N
[1]   QTY←⍎22↓⍞'ENTER NUMBER OF ITEMS:'∘□OU 1∘□PW←132∘□PP←6
[2]   CAT←(QTY,7)⍴' '∘N←1
[3]   →(QTY≥N←N+1)/3∘CAT[N;]←7↑8↓9⍞'CAT NO.:        '  :
[4]   'ENTER ESTIMATED COST'
[5]   RO←INCHECK
[6]   'ENTER CURRENT COST'
[7]   Q←-RO-ROP←INCHECK
[8]   'ENTER NET SALES ESTIMATES'
[9]   R1←INCHECK
[10]   'ENTER NET SALES CURRENT'
[11]   R←RO÷R1∘S←ROP÷R1P←INCHECK
[12]   'ENTER EST''D THOUSANDS OF PCS'
[13]   R2←INCHECK
[14]   'ENTER CURRENT THOUSANDS OF PCS'
[15]   R2P←INCHECK
[16]   T←R2×RO×.001∘U←R2P×ROP×.001∘V←R2×R1×.001∘W←R2P×R1P×.001∘X←-(RO-ROP)×R2P×.001
[17]   REPORT
    ∇


    ∇RSL←INCHECK
[1]   TMP←□
[2]   →0∘RSL←(QTY,1)⍴TMP∘→ERR×⍳QTY≠⍴,TMP
[3]   ERR:'NUMBER OF ITEMS DON''T AGREE    WITH CAT NO''S PLEASE CORRECT' OF
[4]   →2∘TMP←⍎⍞⍕,TMP
    ∇
```

```
    ∇REPORT
[1]   ⎕←L1∘⎕←3 1ρ' '∘⎕←L0∘⎕OU 1∘⎕PW←132
[2]   ⎕←L2
[3]   ⎕←L3∘DOWN 16
[4]   ⎕←L4
[5]   ⎕←L5
[6]   ⎕←L6∘DOWN 16
[7]   ⎕←L7
[8]   ⎕←L3∘DOWN 16
[9]   ⎕←'|',CAT
[10]   FO1 R1P∘FO1 R1∘FO1 Q∘FO1 ROP∘FO1 RO
[11]   FO1 R2P∘FO1 R2∘FO2 S∘FO2 R
[12]   FO2 X∘FO2 W∘FO2 V∘FO2 U∘FO2 T
[13]   HOME∘⎕←(QTY,1)ρ'|'∘POS
[14]   ⎕←L3∘DOWN 16
[15]   ⎕←9 1ρ' '
    ∇


    ∇HOME
[1]   ∘⎕OU 1,224
    ∇


    ∇DOWN X
[1]   ∘⎕OU 1,136∘⎕BO X
    ∇


    ∇POS
[1]   DOWN 16×(ρCAT)[1]∘RIGHT 96
    ∇


    ∇RIGHT X
[1]   ∘⎕OU 1,64∘⎕BO X
    ∇


    ∇FO1 X
[1]   ⎕←'|',6 0 0⍕X∘POS
    ∇


    ∇UP X
[1]   ∘⎕OU 1 128∘⎕BO X
    ∇

TΔΔ   [1 by 6 numeric array; element size 2 byte(s)]
345
345
345
345
345
345
```

V   [1 by 8 numeric array; element size 8 byte(s)]
40E66666666666A0
40999999999999C0
411A3D70A3D70A44
41511EB851EB8533
40999999999999C0
413828F5C28F5C37
411C147AE147AE1C
4140000000000010

U   [1 by 8 numeric array; element size 8 byte(s)]
41399999999999A8
4126666666666670
41A978D4FDF3B670
4214B22D0E56041E
4166666666666680
41D5E353F7CED94C
416AF1A9FBE76CA6
41D0000000000034

QTY   [numeric scalar: element size=1 byte(s)]
16

CAT   [7 by 8 array of type char; element size 1 byte(s)]
AFP050
AFP055
AFP060
AFP065
AFP070
AFP075
AFP080
AFP085

T   [1 by 8 numeric array; element size 8 byte(s)]
41399999999999A8
4126666666666670
41B99999999999C8
4214CCCCCCCCCCD2
4176666666666684
41D3333333333368
41699999999999B4
41C4000000000031

TMP   [numeric vector of length 8; element size 1 byte(s)]
12 8 32 52 16 24 12 20

RO   [1 by 8 numeric array; element size 2 byte(s)]
240
240
290
320

370
440
440
490

ROP   [1 by 8 numeric array; element size 2 byte(s)]
300
300
331
398
400
557
557
650

Q   [1 by 8 numeric array; element size 2 byte(s)]
60
60
41
78
30
117
117
160

R1   [1 by 8 numeric array; element size 2 byte(s)]
60
60
41
78
30
117
117
160

R1P   [1 by 8 numeric array; element size 2 byte(s)]
751
751
835
1092
1466
1708
1708
1771

S   [1 by 8 numeric array; element size 8 byte(s)]
4066437E774EBE40
4066437E774EBE40
40657AF0FA2CC300
405D4DD4DD4DD4E0
4045D995212DC068

40537C1A611FC678
40537C1A611FC678
405DF54D9FBA9D90

R   [1 by 8 numeric array; element size 8 byte(s)]
4E00000000000004
4E00000000000004
41712BB512BB5130
4141A41A41A41A40
41C5555555555560
413C2BC2BC2BC2C0
413C2BC2BC2BC2C0
4131000000000000

R2   [1 by 8 numeric array; element size 1 byte(s)]
15
10
40
65
20
30
15
25

R2P   [1 by 8 numeric array; element size 1 byte(s)]
12
8
32
52
16
24
12
20

X   [1 by 8 numeric array; element size 8 byte(s)]
40B851EB851EB880
407AE147AE147B00
4114FDF3B645A1D0
4140E5604189375C
407AE147AE147B00
412CED916872B02C
411676C8B4395816
4133333333333340

W   [1 by 8 numeric array; element size 8 byte(s)]
41903126E978D522
416020C49BA5E36C
421AB851EB851EBF
4238C8B439581071
421774BC6A7EF9E1
4228FDF3B645A1D5

```
42147EF9DB22D0EB
42236B851EB851F5


L0    [vector of type char of length 84; element size 1 byte(s)]
                             E N G I N E E R I N G    P R O D U C T   R E P O R
T

L1    [vector of type char of length 112; element size 1 byte(s)]
                                                                  _______________
_____________________________

L2    [vector of type char of length 113; element size 1 byte(s)]
                                                                 |
VOLUME                     |

L3    [vector of type char of length 120; element size 1 byte(s)]
 ____________________________________________________________________________________
_____________________________________________

L4    [vector of type char of length 121; element size 1 byte(s)]
|CAT NO.|     FACTORY COST      |NET SALES PRICE|     C.O.G.    | THOUSANDS OF  |
THOUSANDS OF $| THOUSANDS OF $|THOUSND|

L5    [vector of type char of length 121; element size 1 byte(s)]
|       |       $/THOUSAND      |  $/THOUSAND   |     RATIO     |      PCS      |
COST      |     SALES     |  OF $ |

L6    [vector of type char of length 120; element size 1 byte(s)]
        ____________________________________________________________________________
_____________________________________________

L7    [vector of type char of length 121; element size 1 byte(s)]
|       |  EST  |  CURR |SAVINGS|  EST  |  CURR |  EST  |  CURR |  EST  |  CURR |
EST  |  CURR |  EST  |  CURR |SAVINGS|



NAMES IN GROUP 80:
J3   CLE  SL   GUN  RD   RN   MOO  CRA  RL   HOR  F    MΔ
C    X3   HIT  FΔ   CD   DΔ   HΔ   PLA  PAY  TOT  LN   N
STR  ST   ALP  HAN  WOR  GO   ADD  DAY  MG4  MAG  AGG


J3 - object erased from the tape

CLE - object erased from the tape



    ∇SL;F;T;Z;V;N;NEW;P;HIT;J;K;IX
[1]   F←15 49 42 61 88 58 75 94 97 3 6 14 37 41 69 79 89 99
[2]   T←9 12 17 22 36 45 47 64 65 37 16 32 56 85 87 98 91 77
[3]   'ENTER PLAYERS'' NAMES 1 PER LINE'∘□IO←~□PT←0
[4]   'TO END THE LIST'
[5]   'DEPRESS RETURN ONLY'
```

```
[6]   N←(1,ρN)ρN←⍞''
[7]   NXT:→PL⌈⍳0=ρNEW←⍞''
[8]   →NXT∘N←N⌿⍨(1,1↓ρN)ρNEW,((1↓ρN)-ρNEW)ρ' '∘→FN⌈⍳(ρNEW)>1↓ρN
[9]   FN:→NXT∘N←(N,(('')ρρN),(ρNEW)-1↓ρN)ρ' ')⌿⍨(1,ρNEW)ρNEW
[10]   PL:⎕RL←⎕∘⎕←'INPUT RANDOM SEED ''MAX: 32767'''
[11]   'PLAYERS SELECTED RANDOMLY'∘P←(J←''ρρN)ρ0∘K←3 2ρ9 8 7
[12]   'WHEN YOUR NAME IS SELECTED'
[13]   'KEY DIGIT 1 2 OR 3.'
[14]   LP:IX←?J
[15]   →LP⌈⍳V≠3⌊1⌈⌈V∘→⎕LC⌈⍳0=V←''ρ⌽¯1↑⍞N[IX;],':'∘⎕PT←9
[16]   'THROWN: ';V←?((?3)⊖K)[V;]
[17]   →WIN⌈⍳99<V←P[IX]+V←+/V
[18]   N[IX;];' HAS HIT AT: ';V∘→TST⌈⍳~V∈F
[19]   31ρ('↓↑'[1+F[HIT]<V←T[HIT←F⍳V]]),' '
[20]   TST:→STB⌈⍳V∈P
[21]   DONE:N[IX;];' IS AT: ';P[IX]←V
[22]   '∘∘∘ ';P;' ∘∘∘'∘⎕PT←5×ρP
[23]   →LP∘K←3⌈K-1∘→LP⌈⍳50⩾⌊/P∘→LP⌈⍳1≠?5
[24]   STB:N[IX;];' HAS STUMBLED ON: ';N[Z;]∘⎕PT←30∘→DONE⌈⍳IX=Z←P⍳V
[25]   'SORRY, ';N[Z;];' YOU ARE AT 0' .
[26]   →DONE∘P[Z]←0
[27]   WIN:'CONGRATULATIONS ';N[IX;]∘⎕PT←30∘→MIS⌈⍳100≠V
[28]   Z←'0123456789'∘⎕IO←⎕PT←0∘P[IX]←100∘⎕←'POSITIONS:'
[29]   Z[1+(10⊤⍳ρP)∘.+,0],' ',N[PP;],' ',Z[⍒10 10 10⊤P[PP←⍒P]] ?
[30]   →0
[31]   MISS:'PAST 100 LAST TROW IGNORED'
[32]   →DONE∘V←P[IX]
    ∇


    ∇GUN ;A;M;S;TM;TR
[1]   S←0 0∘⎕RL←RL
[2]   S[1]←1+S[1]∘⎕PT←30
[3]   'EST''D TARGET RANGE ';RD(.9×TR)+?⌊.2×TR←4000+?8000;' YDS.'
[4]   →0×⍳'S'∧.=A←25↓⍞'ENTER EST''D GUN ELEVATION '
[5]   S[2]←S[2]+1∘A←⌽A
[6]   M←(.9×|TM)+?⌈.2×|TM←TR-TM+.002×RN×TM←12000×1○2×○A÷180
[7]   →(50⩾|TM)/10
[8]   6ρ(6×TM>0)⌽' OVER SHORT ';RD M;' YDS. TRY AGAIN.'
[9]   →4
[10]   'GOOD SHOT!'∘⎕PT←5
[11]   'YOU HAVE SUNK ';S[1];' TARGET';(1≠1↑S)/'S'∘⎕PT←20
[12]   'IN ';S[2];' SHOT',((1≠1↓S)/'S'),'.'
[13]   'AVERAGE ';TM;' SHOT',((1≠TM←÷/⌽S)/'S'),'/TARGET.'
[14]   →2×⍳'Y'∈¯5↑⍞'LIKE ANOTHER? '
[15]   RL←⎕RL
    ∇



    ∇T←RD X
[1]   T←((X⩽100),((X>100)∧X⩽1000),X>1000)/10 50 100
[2]   T←T×⌊(÷T)×X+.5×T
    ∇
```

```
    ∇T←RN
[1]   T←.01×¯612++/?12⍴101
    ∇


    ∇MOO;B;C;G;NG;X;Y
[1]   NG←×⎕RL←RL
[2]   →5⌈⍳~NG◦⎕PT←10
[3]   'NEW GAME'◦⎕PT←10◦G←NG←0
[4]   Y←'1234567890'[(10=1↑X)⌽X←3?10]
[5]   →((∧/X∈'1234567890'),'S'∨.=X←¯3↑⍞'ENTER GUESS: ')/7 15
[6]   →5◦⎕←'3-DIGIT NUMBER PLEASE '
[7]   →8+1∧.=+/X◦.=X
[8]   →5◦⎕←'NO REPETITIONS PLEASE'
[9]   C←(+/Y∈X)-B←Y+.=X
[10]   B;' BULL';((B≠1)/'S');',';C;' COW';(C≠1)/'S'
[11]   →2⌈⍳~NG←3=B◦G←G+1
[12]   'GAME OVER'
[13]   'YOU USED ';G;' GUESSES'
[14]   →2
[15]   ⎕PT←0◦RL←⎕RL
    ∇


    ∇CRAPS;B;D;S
[1]   ⎕RL←32000⌊|⌊S←⌸21↓⍞'WHAT ARE YOUR STAKES? '
[2]   'YOUR STAKE IS NOW $';S◦⎕PT←15
[3]   →18×⍳0=B←|⌸22↓⍞'PLACE YOUR BET PLEASE. '
[4]   →16×⍳B>S
[5]   S←S-B
[6]   →18×⍳∨/'OSQ'∈20↓⍞'ROLL FOR YOUR POINT.'
[7]   →12×⍳(D←+/⎕←?6 6)∈2 3 12
[8]   →13×⍳D∈7 11
[9]   'YOUR POINT IS ';D
[10]   →18×⍳∨/'OQS'∈5↓⍞'ROLL.'
[11]   →10◦→((D,7)=X←+/⎕←?6 6)/14,⎕PT←15
[12]   →15◦⎕←'YOU HAVE CRAPS.'
[13]   'YOU HAVE A NATURAL.'
[14]   →2◦S←S+2×B◦⎕←'YOU WIN.'
[15]   →2◦→17×⍳S⩽0◦⎕←'YOU LOSE.'
[16]   →3◦⎕←'BET CAN''T EXCEED STAKE.'
[17]   →⎕PT←0◦⎕←'GAME OVER.  YOU ARE BROKE.'
[18]   'GAME OVER.'
[19]   'YOUR STAKE IS $';S
[20]   ⎕PT←0
    ∇

RL    [numeric scalar: element size=2 byte(s)]
65


    ∇HORSE;P;R;W
[1]   'THEY''RE AT THE POST.'◦⎕PT←2×⍴P←5⍴0
[2]   5 1⍴⍳5◦⎕PT←4
[3]   'THEY''RE OFF!!!!'◦⎕PT←8
[4]   ((1↑P←30⌊P+?9 9 9 9 9)⍴' ');1
```

```
[5]   (P[2]⍴' ');2
[6]   (P[3]⍴' ');3
[7]   (P[4]⍴' ');4
[8]   (P[5]⍴' ');5
[9]   →4×⍳30>⌈/P
[10]   W←,(P=30)/⍳5
[11]   R←-/2↑P←P[⍒P]
[12]   P←((R=0)/'A NOSE'),((R>0)/('0123456789'[1+R]),' LENGTH'),((1<R)/'S'),' IS NO. '
[13]   'AND THE WINNER'∘□PT←10
[14]   'BY ',P;W[?⍴W]∘□PT←0
    ∇

F     [vector of type char of length 3; element size 1 byte(s)]


MΔ    [4 by 3 array of type char; element size 1 byte(s)]
LOSE
PUSH
WIN


C     [3 by 13 array of type char; element size 1 byte(s)]
  A
  2
  3
  4
  5
  6
  7
  8
  9
 10
  J
  Q
  K


X3    [6 by 2 array of type char; element size 1 byte(s)]
 UP
DOWN



    ∇Z←HIT Y
[1]   DΔ Z←Y,CD
    ∇


    ∇K FΔ Z;B;Y
[1]   B←1↑Z
[2]   →7 6[(1+0≠1↑Y←1↓Z)×⍳K=2]
[3]   →6⌈⍳21≠TOT Y
[4]   'WIN 'PAY ¯1.5×B
[5]   →0∘U←U,Y
[6]   →7 11 9 14 6['SHDP'⍳J←1↑12↓□'S,H,D OR P? ']
[7]   T←T,B,TOT Y
```

```
[8]   →0∘S←S,Y
[9]   →6⌈⍳2≠⍴Y
[10]   B←B+B
[11]   →6 7[('HD'⍳J)×⍳21⩾TOT Y←HIT Y]
[12]   'LOSE' PAY B
[13]   →0
[14]   →6⌈⍳~(K=1)∧(2=⍴Y)∧=/Y
[15]   'YOU: ',DΔ Y←Z,CD
[16]   2 FΔ B,Y
[17]   'YOU: ',DΔ Y←Z,CD
[18]   2 FΔ B,Y
    ∇


    ∇C←CD
[1]   →4⌈⍳0<⍴D
[2]   ⎕PT←0∘⎕←'SHUFFLE'∘⎕PT←7
[3]   U←0⍴D←U[(⍴U)?⍴U]
[4]   C←1↑D
[5]   D←1↓D
    ∇


    ∇Y←DΔ M
[1]   Y←,C[1+M;]
    ∇


    ∇HΔ
[1]   M←CD
[2]   'DEALER SHOWS: ',DΔ M
[3]   M←M,CD
[4]   'YOU: ',DΔ Y←CD,CD
    ∇


    ∇PLAY;S;B;D;DB;J;K;M;SI;U;Y;Z
[1]   U←13|⍳52∘D←⍳DB←0∘⎕RL←RL
[2]   B←1000⌊0⌈⍎Z∘→16⌈⍳'S'∈Z←20↓⍞'NEW HAND PLACE BET  '
[3]   HΔ
[4]   →6⌈⍳0≠1↑M
[5]   →10 10 6['IY'⍳11↓⍞'INSURANCE? ']
[6]   →14⌈⍳21≠TOT M
[7]   'DEALER:  ',DΔ M
[8]   MΔ[2-K;] PAY B×K←21≠TOT Y
[9]   →2∘U←U,Y,M
[10]   →13⌈⍳21≠TOT M
[11]   'WIN INSURANCE'
[12]   →7∘DB←DB-B
[13]   DB←DB+B÷2∘⎕←'LOSE INSURANCE'
[14]   J3
[15]   →2∘U←U,S,M
[16]   RL←⎕RL
    ∇
```

```
    ∇A PAY B
[1]   A,': YOU''RE ',,X3[1+0⌈×DB;];|DB←DB+B
    ∇


    ∇T←TOT X;I
[1]   X←1+X
[2]   →0×⍳21≥T←+/11 2 3 4 5 6 7 8 9 10 10 10 10 1 [X]
[3]   →0×⍳(⍴X)<I←X⍳1
[4]   →2∘X[I]←X[I]+13
    ∇

LN    [numeric vector of length 8; element size 1 byte(s)]
3 5 8 5 6 8 5 10

N     [numeric scalar: element size=1 byte(s)]
8

STR   [vector of type char of length 50; element size 1 byte(s)]
DOGAPPLEFEBRUARYHOUSESHOWERCUCUMBEREXTRABATH HOUSE

ST    [numeric vector of length 9; element size 1 byte(s)]
0 3 8 16 21 27 35 40 50

ALP   [vector of type char of length 26; element size 1 byte(s)]
ABCDEFGHIJKLMNOPQRSTUVWXYZ


    ∇HANG;F;U;T;P;I;W;R;E;S;M;L;G;Q;F∆∆ R
[1]   INIT:→(((E←T←0)=R←⍴W←WORD N←N+1),N=0)/DONE,LIST∘F←'   '∘U←'_'
[2]   F;'NEW MESSAGE '
[3]   LIST:F;P←(,⍉S⍴(~M),M←(W≠W[1])∧(W≠W[R])∧W∈ALPH)/,⍉(S←2,R)⍴W,R⍴U
[4]   L←L[⍳M-1],((⍴L)⌊M←L⍳W[1])↓L←L[⍳M-0],((⍴L)⌊M←L⍳W[R]) ↓ L←ALPH
[5]   READ:→((I=0),(I=1),2=I←⍴G←,⍞'')/READ,LTR,SPEC
[6]   FULL:→(R≠I)/LENE
[7]   →(∨/(M/G)≠(M←P≠U)/W)/TYPO
[8]   →(((∧/W=G),T←T+1)[1])/WIN
[9]   MISS:→(M,~M←10=⍴□←F,'HANGMAN'[⍳E←E+1])/LOSE,READ
[10]   LTR:→((~G∈ALPH),~G∈L)/LTE,USED
[11]   →(((~G∈W),T←T+1)[1])/(MISS,⍴L←L[⍳M-1],(M←L⍳G)↓L)[1] |
[12]   F;P←(,⍉S⍴M,~M←(G=W)∨P≠U)/,⍉S⍴W,P
[13]   →(M,~M←∧/P≠U)/WIN,READ
[14]   LENE:→READ,⍴□←F;'YOUR GUESS IS NOT THE SAME LENGHT AS THE MESSAGE'
[15]   SPEC:→((Q='S'),(Q='M'),(Q='P'),'L'≠Q←G[2])/SCR,END,PAT,FULL ⍀
[16]   →READ,⍴□←F,'YOU HAVEN''T TRIED: ',L =
[17]   SCR:→(E=0)/NONE N
[18]   →READ,⍴□←F,'YOU HAVE ACCUMULATED: ','HANGMAN'[⍳E]
[19]   NONE:→READ,⍴□←F,'NO ERRORS.'
[20]   LOSE:F;'YOU LOSE.'
[21]   END:→INIT,⍴□←F,'THE MESSAGE WAS: ',W
[22]   TYPO:→READ,⍴□←F,'YOU MUST HAVE MADEA TYPO ERROR.'
[23]   LTE:→READ,⍴□←F;'THAT''S NOT A LETTER.'
[24]   WIN:'YOU WIN IN ';T;' GUESS';' ES '[(T≠1)+⍳1+2×T≠1]
[25]   'WITH ';E;' ERROR';'.S.'[(E≠1)+⍳1+E≠1]
[26]   →INIT
[27]   PAT:→READ,⍴□←F,'THE PATTERN IS: ',P
```

```
[28]   USED:→READ,ρ□←F,'''',G,'''ALREADY ','FAILWORK'[(⍳4)+4×G∈W],'ED.'
[29]   DONE:'SORRY NO MORE MESSAGES.'
    ∇


    ∇W←WORD N
[1]    →2×N<ρST,W←''
[2]   W←STR[ST[N]+⍳LN[N]]
    ∇


    ∇GO
[1]   N←N-1
[2]   HANG
    ∇


    ∇ADD;A
[1]   LN←LN,ρA←,⍞''
[2]   ST←ST,ST[ρST]+ρA
[3]   STR←STR,A
    ∇


    ∇R←DAY;D;M;Y
[1]   D←⍎20↓⍞'ENTER DAY OF MONTH: '
[2]   M←⍎21↓⍞'ENTER MONTH OF YEAR: '
[3]   M←M,⍎12↓⍞'ENTER YEAR: '
[4]   →((0 12⊥1752 9)≥0 12⊥⌽M)/8
[5]   Y←100|1↓M←1 0+⌽0 12⍴¯3+0 12⊥⌽M◦□PT←0 Δ
[6]   Y← 1+7|D+Y+(⌊¯0.2+2.6×M[1])+(⌊Y÷4)-⌈1.75×⌊M[2]÷100
[7]   →0◦R←(7 3ρ'SUNMONTUEWEDTHUFRISAT')[Y;]
[8]   →1◦□←'DATE MUST BE ≥ OCT. 1752'◦□PT←20
    ∇


    ∇Z←MG4 N;M;T
[1]   →3×⍳0=4|N
[2]   →0◦□←'NOT FORM 4×N'
[3]   M←(N,N)ρ(⍳N)∈(1+N-T),T←(N÷4)?N÷2
[4]   Z←((~M)×⊖Z)+M×Z←(N,N)ρ⍳N*2
[5]   M←⍉(N,N)ρ(⍳N)∈(1+N-T),T←(N÷4)?N÷2
[6]   Z←((~M)×⌽Z)+M×Z
    ∇



    ∇Z←MAGICSQ X;M
[1]   →(0≠2⍴X)/3
[2]   →0◦□←'NOT ODD ORDER'
[3]   M←(X,X)ρ⍳X×X
[4]   Z←(⌈X÷2)⌽(¯1+⍳X)⊖(¯1+⍳X)⌽M
    ∇
```

```
    ∇AGG;A
[1]   LN←LN,ρA←,⍞''
[2]   ST←ST,ST[ρST]+ρA
[3]   STR←STR,A
    ∇



NAMES IN GROUP 100:
PJT  PJN  NAM  SAL  PCS  PCL  PCT  EPN

PJT   [26 by 43 array of type char; element size 1 byte(s)]
SECRETARIAL
ADMINISTRATION
PURCHASING
SICK
HOLIDAY
PERSONAL
SALES
TRAINING
TRAVEL
MCM/70 CPU
MAIN MEMORY
MEMORY
I/O
TAPE CASSETTES
KEYBORAD
BATTERIES
CARD STACK
POWER SUPPLY
DISPLAY
CABLES
OVERALL ASSEMBLY
GPI-1
GPI-2
GPI CABLES
77 CPU
70 MAINTENANCE
COMMUNICATIONS SUBSYSTEM
FLOPPY DISK/70
POWER SUPPLY MARK 2
MCM/77 SYSTEM DESIGN
MCM/170 SYSTEM DESIGN
DEVELOPMENT MAINTENANCE
GPI-3 (CARD READER)
MCM/70 CASE DEVELOPMENT
GPI-2 (HYTYPE)
GPI-1
POWER SUPPLY TESTER
I/O TESTER
ROM/RAM TESTER
DISPLAY/KEYBOARD TESTER
MAIN MEMORY COMPARITOR
MFE DECK TESTER
GPI TESTER
```

PJN   [8 by 43 array of type char; element size 1 byte(s)]
G0000001
G0000002
G0000003
G0000004
G0000005
G0000006
G0000007
G0000008
G0000009
P047500
P047501
P047502
P047503
P047504
P047505
P047506
P047507
P047508
P047509
P047510
P047511
P047512
P047513
P047514
D047501
D047502
D047503
D047504
D047505
D047506
D047507
D047508
D047509
D047510
D047511
D047512
D047513
D057501
D057502
D057503
D057504
D057505
D057506

NAM   [13 by 20 array of type char; element size 1 byte(s)]
CASHIN
WOLFE
RAMER
WALLACE
LARAYA
COPELAND
ARPIN
EDWARDS

```
SEEDS
SWANSON
MOFFATT
FARNELL
QUINTANA
RAMOS
RIVINGTON
JONES
BROWN
MABEE
PRESTIGIACOMO
BERG


SAL   [numeric vector of length 20; element size 8 byte(s)]
14014E0000000000 03304366770A3D70 A3D84368B147AE14 7AE04329711EB851
EB804358CD999999 99984339BFD70A3D 70A0435A770A3D70 A3D8437C5F5C28F5
C2904354C4CCCCCC CCD04335DB333333 3330434351EB851E B850432EB2147AE1
47B043278051EB85 1EB84320F28F5C28 F5C34E0000000000 05914E0000000000
0000431554000000 0000431C2AB851EB 851F4E0000000000 00004E0000000000


    ∇PCS;I;IG;G;PN;EN;M;LC;TT
[1]   I←IG←0∘G←(100<G)/G←⍞XN⍳TT←0
[2]   PCT∘PN←PJN[I←I+1;]
[3]   ⍞XS 100+EN←¯100+G[IG←IG+1]
[4]   →(0=+/M←JN∧.=PN)/3
[5]   PCL
[6]   →(IG<⍴G)/3
[7]   →(I<1↑⍴PJN)/2
    ∇


    ∇PCL;WT
[1]   TT←TT+WT←(.005+(WEN=WK)/M/H)÷60
[2]   ⍞←(4⍕EN),((EN=EPN)≠NAM),6 2 0⍕WT 6
[3]   LC←LC+2
    ∇


    ∇PCT
[1]   →(TT=0)/3
[2]   ⍞←'                TOTALS: ',10⍕TT
[3]   ⍞←''
[4]   ⍞←'                 PROJECT COST SUMMARY'
[5]   ⍞←''
[6]   ⍞←'                             FOR WEEK ENDING: ',WEA
[7]   ⍞←''
[8]   LC←4+TT←0
    ∇

EPN   [numeric vector of length 20; element size 1 byte(s)]
12 14 3 5 6 10 16 18 19 20 21 23 26 27 29 41 45 50 0 0
```

NAMES IN GROUP 105:
JN   H   WK

JN   [8 by 9 array of type char; element size 1 byte(s)]
G0000002
G0000006
P047501R
P047501T
P047500T
P047503T
P047508R
P047509A
P047511A

H   [numeric vector of length 9; element size 2 byte(s)]
180 390 30 330 120 120 180 30 1050

WK   [numeric vector of length 9; element size 1 byte(s)]
1 1 1 1 1 1 1 1 1

NAMES IN GROUP 106:
JN   H   WK

JN   [8 by 8 array of type char; element size 1 byte(s)]
G0000008
D057502E
D047504E
P047510E
D057505H
D047507E
P047500E
D057505E

H   [numeric vector of length 8; element size 2 byte(s)]
300 720 240 60 600 60 180 240

WK   [numeric vector of length 8; element size 1 byte(s)]
2 2 2 2 2 2 2 2

NAMES IN GROUP 110:
JN   H   WK

JN   [8 by 5 array of type char; element size 1 byte(s)]
G0000002
G0000008
D047505E
D057502E
P047508R

```
H     [numeric vector of length 5; element size 2 byte(s)]
90 480 240 60 1530

WK    [numeric vector of length 5; element size 1 byte(s)]
1 1 1 1 1



NAMES IN GROUP 112:
JN   H    WK

JN    [8 by 2 array of type char; element size 1 byte(s)]
90000002
90000009


H     [numeric vector of length 2; element size 2 byte(s)]
2220 300

WK    [numeric vector of length 2; element size 1 byte(s)]
1 1



NAMES IN GROUP 116:
JN   H    WK

JN    [8 by 5 array of type char; element size 1 byte(s)]
D047508S
D047502S
G0000007
D047502S
D047502S


H     [numeric vector of length 5; element size 2 byte(s)]
840 240 480 660 180

WK    [numeric vector of length 5; element size 1 byte(s)]
1 1 1 1 1



NAMES IN GROUP 118:
JN   H    WK

JN    [8 by 4 array of type char; element size 1 byte(s)]
G0000004
P047508E
P047508T
D047505E


H     [numeric vector of length 4; element size 2 byte(s)]
960 480 480 480
```

```
WK    [numeric vector of length 4; element size 1 byte(s)]
1 1 1 1



NAMES IN GROUP 119:
JN   H    WK

JN    [8 by 4 array of type char; element size 1 byte(s)]
D047502S
D047502D
D047508E
D047513R


H     [numeric vector of length 4; element size 2 byte(s)]
1530 480 240 150

WK    [numeric vector of length 4; element size 1 byte(s)]
2 2 2 2



NAMES IN GROUP 120:
JN   H    WK

JN    [8 by 4 array of type char; element size 1 byte(s)]
G0000008
P047508R
P047508T
D047513F

H     [numeric vector of length 4; element size 2 byte(s)]
480 1200 690 30

WK    [numeric vector of length 4; element size 1 byte(s)]
2 2 2 2



NAMES IN GROUP 121:
JN   H    WK

JN    [8 by 12 array of type char; element size 1 byte(s)]
G0000008
D057503R
G0000002
D057505F
D057513D
P047509T
P047510A
P047503T
P047503R
P047501R
P047511S
P047504T
```

```
H     [numeric vector of length 12; element size 2 byte(s)]
570 60 120 330 30 180 30 480 12 540 300 30

WK    [numeric vector of length 12; element size 1 byte(s)]
1 1 1 1 1 1 1 1 1 1 1 1



NAMES IN GROUP 123:
JN   H    WK

JN    [8 by 1 array of type char; element size 1 byte(s)]
D047508S


H     [numeric vector of length 1; element size 2 byte(s)]
2730

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



NAMES IN GROUP 124:
SER  MOD  SPE  DAT  AGE  COM  STA  INV

SER   [numeric vector of length 19; element size 3 byte(s)]
1240024 1240025 1240026 1240027 1240028 1240029 1240030 1240031 1240032 1240033
1240034 1240035 1240036 1240037 1240038 1240039 1240040 1240041 1240042

MOD   [3 by 19 array of type char; element size 1 byte(s)]
782
782
782
782
782
782
782
782
782
782
782
782
782
782
782
782
782
742
742


SPE   [1 by 19 array of type char; element size 1 byte(s)]
O
```

O

DAT   [6 by 19 array of type char; element size 1 byte(s)]
180275
091274

270175

130175
060275

AGE   [8 by 19 array of type char; element size 1 byte(s)]
WOLFE
HARRIS

WOLFE
HANSWILL
BERG
WOLFE
WOLFE
WOLFE
GORKA

BERG
HANSWILL

WOLFE
WOLFE
WOLFE

WOLFE
WOLFE

COM   [30 by 19 array of type char; element size 1 byte(s)]
DEMO
DEMO
C.S.A. FOR EVALUATION
BASF GERMANY
DEMO
DEMO
FRANCE
FRANCE
FRANCE
DEMO
REPAIR

DEMO
DEMO
DALE BENT
FRANCE
REPAIR
FRANCE
FRANCE

STA   [1 by 19 array of type char; element size 1 byte(s)]
O
O
O
S
O
S
S
S
S
O
O
S
O
O
S
S
O
S
S

INV   [5 by 19 array of type char; element size 1 byte(s)]

1026

K5000
1027
1027
1027

1033

1036

1036
1036

NAMES IN GROUP 126:
JN   H   WK

JN   [8 by 5 array of type char; element size 1 byte(s)]
G0000001
G0000006
P047500E
P047513E
D047510H

H   [numeric vector of length 5; element size 2 byte(s)]
120 165 870 360 870

WK   [numeric vector of length 5; element size 1 byte(s)]
1 1 1 1 1

NAMES IN GROUP 127:
JN   H   WK

JN   [8 by 3 array of type char; element size 1 byte(s)]
G0000002
P047501A
P047506A

H   [numeric vector of length 3; element size 2 byte(s)]
1437 570 60

```
WK    [numeric vector of length 3; element size 1 byte(s)]
1 1 1



NAMES IN GROUP 129:
JN   H    WK

JN    [8 by 6 array of type char; element size 1 byte(s)]
P047508A
P047506A
P047502A
P047508R
P047510A
P047510R


H     [numeric vector of length 6; element size 2 byte(s)]
720 450 300 210 360 210

WK    [numeric vector of length 6; element size 1 byte(s)]
1 1 1 1 1 1



NAMES IN GROUP 141:
JN   H    WK

JN    [8 by 4 array of type char; element size 1 byte(s)]
G0000002
G0000003
G0000007
P047510A


H     [numeric vector of length 4; element size 2 byte(s)]
1590 690 120 90

WK    [numeric vector of length 4; element size 1 byte(s)]
1 1 1 1



NAMES IN GROUP 145:
JN   H    WK

JN    [8 by 1 array of type char; element size 1 byte(s)]
G0000001


H     [numeric vector of length 1; element size 2 byte(s)]
2040

WK    [numeric vector of length 1; element size 1 byte(s)]
1
```

```
NAMES IN GROUP 150:
JN   H    WK

JN    [8 by 7 array of type char; element size 1 byte(s)]
G0000008
P047501A
P047501T
P047608A
P047508E
P047509A
P047509T


H     [numeric vector of length 7; element size 2 byte(s)]
660 270 330 60 120 60 930

WK    [numeric vector of length 7; element size 1 byte(s)]
2 2 2 2 2 2 2



NAMES IN GROUP 205:
CHK  P    CS   HTN  COP  CHI  SET  RAM  TES  R


    ∇CHK ;A;B;X;Y
[1]   A←B←X←Y←0
[2]   →6×ι11<B←B+1∘→3×ι1≠A←1+8|Y
[3]   →5×ιCS[B;A]≠(X,Y)□ZZ P
[4]   →2∘X←X+1∘Y←24∘→2×ι31≥Y←Y+1
[5]   →4∘□←'PROM PCB DEFECTIVE'
[6]   RAM∘1 □XR 'RAM R'
    ∇

P     [vector of type char of length 37; element size 2 byte(s)]
EBF4 0638 C02D CDD6 0606 2DFA 15F9 4642 1546 3207 46F6 0746 E007 3C04 48BB 0B46
CD09 68BB 0BC2 0202 0202 5146 CD09 48BB 0B46 B20E EAA8 C8F0 8762 0400 3048 3832
2E20 3607 F930 F844 7008

CS    [8 by 11 numeric array; element size 2 byte(s)]
19571 23283 18907 19305 22968 22133 28883 25291
25659 22775 24541 21949 16665 20624 20462 20924
19660 21548 17993 20436 21637 21568 19597 22856
21789 23143 19063 23530 25252 19324 23635 20263
18797 20578 19958 19848 17750 19425 20881 19107
20490 23718 19431 18349 19954 21232 20961 18672
18945 19193 20259 18721 19382 18424 19869 20957
19166 20469 21667 20140 22993 19056 21619 21102
22021 21301 18324 20855 20379 20922 23301 25379
12492 21833 26332 23459 21701 23628 22661 22607
19959 18797 21234 19596 20200 21848 25580 24506
```

```
    ∇R←HTN X;A;B;C;D;E;F;I;J;V
[1]   F←1+E←1+D←1+C←1+B←1+A←10
[2]   R←(⌈(ρX)÷2)ρI←0∘J←1
[3]   L:R[I←I+1]←V-256××0⌈¯127+V←16 16⊥⍮X[J],',',X[J+1]
[4]   →L×ι(ρX)>J←J+2
    ∇


    ∇COPY G;N;GI;NI P
[1]   ⎕PT←10
[2]   N←,⎕XN GI∘G←1↓G∘GI←1↑G∘→TC×ι0=ρG
[3]   →5⌈ιv/(⎕SI[;ι3],' ')∧.=NI∘N←4↓N∘NI←4↑N∘→GC×ι0=ρN
[4]   →3∘⎕EX NI∘GI ⎕XW[2] NI∘GI ⎕XR NI
[5]   →3∘GI ⎕XW[2] NI
[6]   GC:'GROUP ';GI;' COPIED.'
[7]   →2
[8]   TC:'TAPE COPIED.'∘⎕PT←100∘⎕XFι0∘⎕XF[2]ι0
    ∇


    ∇R←CHIP X
[1]   →0∘(R←(HTN X)⎕ZZ P)∘→3×ι4≠ρX∘→2×ι2=ρX
[2]   →0∘R←X ⎕ZZ P
[3]   'LENGTH ERROR : CHIP X'
    ∇


    ∇SET ;A;B;X;Y
[1]   A←B←X←Y←0
[2]   L:→0×ι11<B←B+1∘→L1×ι1≠A←1+8|Y
[3]   L1:CS[B;A]←(X,Y)⎕ZZ P
[4]   →L∘X←X+1∘Y←24∘→L×ι31≥Y←Y+1
    ∇


    ∇RAM;V;HV
[1]   HV←'0123456789ABCDEF'[1+16 16 16 16⊤|V←⎕ZZ R]
[2]   'RAM ERROR LOCATION: ',HV∘→4×ι0<V
[3]   →0
[4]   2 4 8[10239 12287 16383ιV];'K RAM OK'
[5]   →0
    ∇


    ∇TEST
[1]   CHK∘⎕XF ι0∘1 ⎕XR 'CHK CS P'
    ∇

R     [vector of type char of length 34; element size 2 byte(s)]
2506 1F2D 1E20 2621 0E25 4653 0046 3207 46F6 0746 B20E 2E20 3627 16FF 4421 2015
CFC2 A9F8 C7F9 B968 3A20 AAB9 6821 2025 2E20 3601 3ECE 2515 1D25 2E20 3607 FB30
FC44 7008
```