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MCM TAPE TAPE-26.TXT

TAPE LABEL/ANNOTATIONS: "TMBERG
                         LIB/70
                         0"


DATE CREATED: May 25, 1976



GROUPS:
    0    5    6    7   101


NAMES IN GROUP 0:
ΔGΔ   ΔSΔ   ΔDΔ   ΔCΔ   ΔFΔ   ΔNΔ   Δ0Δ   ΔUΔ   ΔIΔ   ΔAΔ   ΔYΔ   ΔTΔ
ΔXΔ   ΔWΔ   ΔJΔ   ΔΔΔ   Δ_Δ


      ∇ΔGΔ Δ0Δ;Δ1Δ
[1]    →0∘⎕'NO! FN ACTIVE'∘→2⌈ι1=ρ⎕LC
[2]    1 ⎕XC ⎕FN∘1 ⎕XC ⎕VA∘⎕XS 0
[3]    1 ⎕XD Δ1Δ∘1 ⎕XC Δ1Δ←⎕XN 0
[4]    1 ⎕XD Δ1Δ←⎕XN 1∘1 ⎕XD'Δ0Δ Δ9Δ'
[5]    →0×ι0=ρΔ0Δ←,Δ0Δ∘⎕EX Δ1Δ
[6]    →0∘⎕XS Δ0Δ∘→Δ9Δ⌈ι1≠ρΔ0Δ←ΔFΔ Δ0Δ
[7]    Δ9Δ:→0∘⎕'NOT FOUND'
      ∇


      ∇ΔSΔ Δ1Δ;Δ0Δ;Δ2Δ
[1]    →0∘⎕'NO! FN ACTIVE'∘→2⌈ι(1=ρ⎕LC)∨0=⎕XV
[2]    →Δ9Δ⌈ι0=0\0ρΔ1Δ←,Δ1Δ
[3]    →Δ5Δ⌈ι1=1↑ρΔ0Δ←ΔYΔ Δ1Δ,(0=ρΔ1Δ)/⎕XV
[4]    →Δ8Δ⌈ι0≠¯1↑ρΔ0Δ
[5]    Δ0Δ←4++/Δ2Δ←Δ2Δ=(ιρΔ2Δ←2↓Δ_Δ[;⎕IO])+4-⎕IO
[6]    Δ2Δ←1 1,(Δ2Δ,0)∨0,~Δ2Δ∘→Δ7Δ⌈ι99<Δ0Δ
[7]    Δ2Δ←Δ2Δι0∘ΔΔΔ←Δ2Δ≒ΔΔΔ∘Δ_Δ←Δ2Δ≒Δ_Δ
[8]    Δ0Δ←Δ0Δ,0,Δ_Δ[⎕IO;⎕IO],11,Δ2Δ
[9]    Δ_Δ[Δ2Δ;]←4↑Δ0Δ∘ΔΔΔ[Δ2Δ;]←7↑Δ1Δ,7ρ' '
[10]   ¯Δ5Δ:→Δ8Δ⌈ι⎕XV∧.≠0,1↑Δ0Δ←,Δ0Δ
[11]   →Δ6Δ⌈ι~2|1↑3↓Δ0Δ∘→Δ8Δ⌈ι(1↑Δ0Δ)∈0 1 2 3 100 101
[12]   →0×ι7≠8|Δ_Δ[¯1↑Δ0Δ;3+⎕IO]∘ΔJΔ Δ0Δ
[13]   →0∘⎕'UPDATE RECOMENDED'
[14]   Δ8Δ:→0∘⎕'NOT SAVED-THIS IS ',,1 0↓ΔΔΔ[1,¯1↑,ΔYΔ ⎕XV;]
[15]   Δ9Δ:→0∘⎕'ILLEGAL NAME'
[16]   Δ7Δ:→0∘⎕'NOT SAVED-DIRECTORY FULL'
[17]   Δ6Δ:→0∘⎕'NO! WS NOT ON WORKING TAPE' N
      ∇


      ∇ΔDΔ Δ0Δ;Δ1Δ
[1]    →0∘⎕'NO! FN ACTIVE'∘→2⌈ι1=ρ⎕LC
[2]    →Δ9Δ⌈ι0=0\0ρΔ0Δ
[3]    →0×ι1≠1↑ρΔ0Δ←ΔYΔ Δ0Δ
[4]    →Δ9Δ⌈ι(1↑Δ0Δ←,Δ0Δ)∈0 100
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[5]     →0×ι'Y'≠1↑⎕IO⎕'Y=>DROP ',,ΔΔΔ[¯1↑Δ0Δ;]
[6]     Δ1Δ[¯1↑Δ0Δ]←0∘Δ1Δ←(1↑ρΔ_Δ)ρ1
[7]     ΔΔΔ←Δ1Δ≠ΔΔΔ∘Δ_Δ←Δ1Δ≠Δ_Δ
[8]     ∘⍕(⎕XV=Δ0Δ←1↑Δ0Δ)/'⎕XS 0'
[9]     →0∘⎕EX ΔNΔ 2 3∘Δ0Δ ⎕XD ⎕XN Δ0Δ
[10]     Δ9Δ:→0∘⎕'INVALID NAME'
     ∇


     ∇Δ0Δ ΔCΔ Δ1Δ 1
[1]     →0×ι1≠ρΔ0Δ←ΔFΔ Δ0Δ
[2]     Δ1Δ←⎕XN Δ0Δ∘→Δ9Δ⌈ι0≠ρΔ1Δ
[3]     Δ9Δ:Δ0Δ ⎕XR Δ1Δ  0
     ∇


     ∇Δ4Δ←ΔFΔ Δ0Δ;Δ1Δ;Δ2Δ;Δ3Δ;ΔPΔ;ΔQΔ
[1]     →0×ι0=1↑ρΔ0Δ←ΔYΔ Δ0Δ∘Δ4Δ←ι0
[2]     Δ4Δ←(Δ1Δ←2|Δ0Δ[;3+⎕IO])/Δ0Δ[;⎕IO]
[3]     →0×ι0=1↑ρΔ0Δ←(~Δ1Δ)≠Δ0Δ
[4]     →Δ9Δ⌈ι∨/(Δ1Δ←8|Δ0Δ[;3+⎕IO])∈2 6 ∈1
[5]     Δ7Δ:→0×ι0=Δ1Δ←|ΔTΔ-Δ0Δ[⎕IO;1+⎕IO]
[6]     Δ1Δ←Δ1Δ=Δ0Δ[;1+⎕IO]
[7]     Δ4Δ←Δ4Δ,Δ2Δ←Δ1Δ/Δ0Δ[;⎕IO]
[8]     Δ8Δ:Δ3Δ←⎕XN[1+⎕IO]1↑Δ2Δ
[9]     (1↑Δ2Δ)⎕XR[1+⎕IO]Δ3Δ←(ΔXΔ Δ3Δ)≠Δ3Δ
[10]     →Δ8Δ⌈ι0≠ρΔ2Δ←1↓Δ2Δ∘⎕EX Δ3Δ∘(1↑Δ2Δ)⎕XW Δ3Δ
[11]     Δ2Δ←Δ1Δ/Δ0Δ[;4+⎕IO]∘⎕XF[1+⎕IO]ι0
[12]     Δ_Δ[Δ2Δ;3+⎕IO]←Δ_Δ[Δ2Δ;3+⎕IO]+1
[13]     →Δ7Δ∘→0×ι0=1↑ρΔ0Δ←(~Δ1Δ)≠Δ0Δ
[14]     Δ9Δ:2 12ρ'LIB/70 ERRORGROUP ERROR '∘⎕PT←0
[15]     5 0 0⍕(Δ1Δ∈2 6)≠Δ0Δ[;,⎕IO],Δ1Δ∘.÷,2
     ∇


     ∇Δ1Δ←ΔNΔ Δ2Δ
[1]     1 ⎕XC ⎕FN∘→2⌈ι~3∈Δ2Δ∘1 ⎕XC ⎕XN 0
[2]     1 ⎕XC Δ2Δ←(ΔXΔ Δ2Δ)≠Δ2Δ←⎕VA∘→3⌈ι~2∈Δ2Δ
[3]     1 ⎕XD Δ1Δ←⎕XN 1∘1 ⎕XD ⎕XN 0
     ∇


     ∇Δ0Δ;A
[1]     ⎕OFF
[2]     ∘32⎕'MCM/APL - LIB/70 -',ΔΔΔ[⎕IO;]
[3]     A←(8ρ1 1 0)\6 0 0⍕,1 1↑Δ_Δ
[4]     A←100⊥⍕6↓(⎕IO+13)⎕'DATE: ¯',A
[5]     Δ_Δ[⎕IO;⎕IO]←⌊1E6|A
     ∇


     ∇ΔUΔ;Δ0Δ;Δ1Δ;Δ2Δ;Δ3Δ;Δ4Δ;ΔPΔ;ΔQΔ
[1]     →0∘⎕'NO! FN ACTIVE'∘→2⌈ι1=1↑ρ⎕SI
[2]     →0∘⎕'NO! GROUP ACTIVE'∘→3⌈ι0=⎕XV∘Δ3Δ←0
[3]     Δ6Δ:Δ0Δ←0 0,1=8|2↓Δ_Δ[;3+⎕IO]
[4]     Δ_Δ[;3+⎕IO]←Δ_Δ[;3+⎕IO]-Δ0Δ
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[5]     →Δ9Δ⌈ι0=ρΔ0Δ←Δ0Δ/Δ_Δ[;⎕IO]
[6]     →⎕LC⌈ι0≠ρΔ0Δ←¯1↓Δ0Δ∘(1↑Δ0Δ)⎕XD ⎕XN 1↑Δ0Δ
[7]     Δ9Δ:Δ2Δ←0 0,2↓Δ_Δ[;1+⎕IO]∘Δ1Δ←Δ_Δ[;3+⎕IO]
[8]     Δ3Δ←⌊/(Δ0Δ∧Δ2Δ>1E3|Δ3Δ)/Δ2Δ∘Δ0Δ←0≠8|Δ1Δ
[9]     →Δ5Δ⌈ι~∨/Δ2Δ←Δ2Δ=Δ3Δ
[10]    Δ1Δ←Δ2Δ∧5=8|Δ1Δ∘Δ0Δ←Δ2Δ∧3=4|Δ1Δ
[11]    Δ7Δ:→Δ8Δ⌈ι0≠ΔTΔ Δ3Δ
[12]    →Δ9Δ∘→Δ5Δ⌈ι'Y'≠1↑⎕IO⎕'Y=>NEXT TAPE'
[13]    Δ8Δ:ΔWΔ Δ0Δ/Δ_Δ[;⎕IO]
[14]    →2+⎕LC⌈ι1E3<Δ3Δ∘Δ4Δ←Δ0Δ/ιρΔ0Δ←Δ0Δ∨Δ1Δ
[15]    Δ_Δ[Δ4Δ;3+⎕IO]←(8×8≤Δ_Δ[Δ4Δ;3+⎕IO])+Δ0Δ/5-Δ1Δ
[16]    ∘⍕(1E3<Δ3Δ)/'Δ_Δ[Δ4Δ;3+⎕IO]←Δ_Δ[Δ4Δ;3+⎕IO]-4'
[17]    ΔPΔ←(1,1↓Δ2Δ)≠¯ΔΔΔ∘ΔQΔ←(1,1↓Δ2Δ)≠Δ_Δ
[18]    0 ⎕XW[1+⎕IO]'ΔPΔ ΔQΔ'∘ΔQΔ[⎕IO;1+⎕IO]←Δ3Δ
[19]    ∘⍕(1E3>Δ3Δ)/'ΔFΔ Δ1Δ/Δ_Δ[;⎕IO]'
[20]    Δ4Δ←(Δ4Δ=4⌈199|Δ4Δ)/Δ4Δ←⎕XN[⎕IO+1]ι0
[21]    →3+⎕LC⌈ι0=ρΔ4Δ←(~Δ4Δ∈ΔQΔ[;⎕IO])/Δ4Δ
[22]    (1↑Δ4Δ)⎕XD[1+⎕IO]⎕XN[1+⎕IO]1↑Δ4Δ
[23]    →¯1+⎕LC⌈ι0≠ρΔ4Δ←1↓Δ4Δ
[24]    ⎕XF[1+⎕IO]ι0
[25]    →Δ6Δ∘→Δ7Δ⌈ι1E3<Δ3Δ←⌊2E3|1E3+Δ3Δ
[26]    Δ5Δ:→3+⎕LC⌈ι~∨/Δ1Δ←(8|2↓Δ_Δ[;3+⎕IO])∈2 4 6
[27]    'LIB/70 ERROR'∘⎕PT←0
[28]    7 0 0⍕(1 1,Δ1Δ)≠Δ_Δ
[29]    →0×ι~∨/Δ1Δ←0=2↓Δ_Δ[;1+⎕IO]
[30]    ∘⎕'GROUPS ONLY ON TAPE 0:'
[31]    ∘⎕0 0 0⍕Δ1Δ/2↓Δ_Δ[;⎕IO]
      ∇


    ∇ΔIΔ Δ0Δ;Δ1Δ
[1]     →Δ9Δ⌈ι0=ρΔ0Δ←,Δ0Δ
[2]     Δ1Δ←(ΔYΔ Δ0Δ)[;4+⎕IO]
[3]     →0∘⎕←ΔΔΔ[Δ1Δ;],(4 5 8 3∘.×1 0 0)⍕Δ_Δ[Δ1Δ;]
[4]     Δ9Δ:⎕←'MCM/APL  -  LIB/70      ',(8ρ1 1 0)\6 0 0⍕,1 1↑Δ_Δ
[5]     ⎕←'INDEX TO LIBRARY: ',ΔΔΔ[⎕IO;]∘⎕←''
[6]     ⎕←' NAME  GROUP TAPE  DATE STATUS'∘⎕←''
[7]     ⎕←''∘⎕←(25ρ' '),'3210'
[8]     ⎕←(1 0↓ΔΔΔ),((4 5 8∘.×1 0 0)⍕1 ¯1↓Δ_Δ),(4 1ρ2 1 1 1)⍕⍉(4ρ2)⊤,1 3↓Δ_Δ 1
[9]     ⎕←'BIT           STATUS'∘⎕←''
[10]     ⎕←' 0  WS PRESENT ON VOL. 0'
[11]     ⎕←' 1  LIB VERSION NOT CURRENT'
[12]     ⎕←' 2  LIB VERSION ≠ BACK-UP VERSION'
[13]     ⎕←' 3  WS NOT LISTED SINCE LAST SAVE'
      ∇


    ∇Δ4Δ ΔAΔ Δ0Δ;Δ1Δ;Δ2Δ;Δ3Δ
[1]     →0∘⎕'NO! FN ACTIVE'∘→2⌈ι1=ρ⎕LC
[2]     →0∘⎕'NO! GROUP ACTIVE'∘→3⌈ι0=⎕XV
[3]     →2+⎕LC⌈ι(ρΔ4Δ←,Δ4Δ)∨.=1,ρΔ0Δ←,Δ0Δ
[4]     →0∘⎕'LENGTH ERROR'
[5]     →Δ6Δ⌈ι~∨/Δ1Δ←~Δ0Δ∈⎕XN[1+⎕IO]ι0
[6]     →0∘⎕'GROUPS ',(⍕Δ1Δ/Δ0Δ),' MISSING'
[7]     Δ6Δ:→Δ9Δ⌈ι0≠0\0ρΔ0Δ∘→0×ι0=ρΔ0Δ
[8]     Δ2Δ←⎕IO∘⎕'ENTER WS NAMES'
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[9]     Δ1Δ←((ρΔ0Δ),7)ρ' '∘Δ4Δ←(ρΔ0Δ)ρΔ4Δ
[10]    Δ8Δ:Δ1Δ[Δ2Δ;]←7↑(4↓▯(3 0 0⍥Δ0Δ[Δ2Δ]),':'),7ρ' ' '
[11]    →Δ5Δ⌈ι0=+/ρΔYΔ Δ1Δ[Δ2Δ;]
[12]    →Δ8Δ∘▯'DUPLICATE OR ILLEGAL NAME'
[13]    Δ5Δ:→Δ8Δ⌈ι(Δ2Δ←¯1+Δ2Δ)≤▯IO+¯1+ρΔ0Δ
[14]    Δ7Δ:Δ2Δ←4++/Δ3Δ←Δ3Δ=(ιρΔ3Δ←¯2↓Δ_Δ[;▯IO])+4-▯IO
[15]    Δ3Δ←1 1,(Δ3Δ,0)∨0,~Δ3Δ∘→Δ5Δ⌈ι99<Δ2Δ
[16]    Δ3Δ←Δ3Δι0∘ΔΔΔ←Δ3Δ÷ΔΔΔ∘Δ_Δ←Δ3Δ÷Δ_Δ
[17]    Δ_Δ[Δ3Δ;]←Δ2Δ,(1↑Δ4Δ),Δ_Δ[▯IO;▯IO],15∘ΔΔΔ[Δ3Δ;]←,1 7↑Δ1Δ
[18]    Δ3̄Δ←(ΔXΔ Δ3Δ)≠Δ3Δ←▯XN[1+▯IO]1↑Δ0Δ∘▯XS 0
[19]    ▯XS Δ2Δ∘Δ2Δ ▯XC Δ3Δ
[20]    ▯XS 0∘(1↑Δ0Δ)▯XR[1+▯IO]Δ3Δ
[21]    →Δ7Δ⌈ι0≠ρΔ0Δ←¯1↓Δ0Δ∘Δ1Δ←1 0↓Δ1Δ∘Δ4Δ←¯1↓Δ4Δ
[22]    →0∘▯XF[1+▯IO]ι0
[23]    Δ9Δ:→0∘▯'NOT IMPLEMENTED'
[24]    Δ5Δ:→0∘▯'NOT SAVED-DIRECTORY FULL'
     ∇


     ∇R←ΔYΔ X
[1]     →N⌈ι0=0\0ρX←,X
[2]     →E1⌈ι(4=▯NC X)∨' '=1↑X←(2⌈7⌊ρX)↑X,7ρ' '
[3]     →E⌈ι0=ρR←R/ιρR←ΔΔΔ[;▯IO]=1↑X
[4]     R←(ΔΔΔ[R;1+ιρX]∧.=X←¯1↓X)/R
[5]     →0∘R←Δ_Δ[R;],R∘.+,0∘→E⌈ι1≠ρR
[6]     E:→ρR←(0,2⌊ρR)ρ0
[7]     E1:→ρR←0 4ρ0
[8]     N:R←1+Rι(X∈R←¯1↓Δ_Δ[;▯IO])/X
[9]     R←(1 0↓Δ_Δ[1,R;]),R∘.+,0
[10]    R←0 1ρ0∘→0×ι(ρX)=1↑ρR
     ∇


     ∇R←ΔTΔ X;O
[1]     R←4 1≥8|¯1↑▯OU 201∘O←1↑▯OUι0
[2]     →M⌈ι0=R←¯1 2+.×R∘▯OU O
[3]     R←R×∨/(▯XN[1+▯IO]0)∧.='ΔPΔ '
[4]     0 ▯XR[1+▯IO]'ΔPΔ ΔQΔ'∘→M⌈ι0=R
[5]     O←2 7ρΔΔΔ[▯IO;],' MCM    '
[6]     R←R×∨/O∧.=ΔPΔ[▯IO;]
[7]     R←R×ΔQΔ[▯IO;1+▯IO]
[8]     M:→0×ι0≠R←R×(R∧.=X)∨R∧.=|X
[9]     →0×ι0=×/ρX∘▯XF[1+▯IO]ι0
[10]    O←(⍒|X),(X>0)/' WRITE ENABLED'
[11]    →1⌈ι'Y'=1↑▯IO▯'Y=>MOUNT VOL ',O
     ∇


     ∇R←ΔXΔ N
[1]     →0×ι∧/R←N[;▯IO+0 2]∨.≠'Δ'
[2]     R←R∨~N[;▯IO+1]∈'0123456789',¯1↓▯SI[;▯IO+1]
     ∇
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      ∇ΔWΔ Δ2Δ;Δ1Δ;Δ3Δ;Δ4Δ
[1]     □XS 0∘Δ3Δ←□IO∘→0×ι0=ρΔ2Δ←(0≠Δ2Δ)/Δ2Δ
[2]     Δ9Δ:Δ1Δ←(ΔXΔ Δ1Δ)≠Δ1Δ←□XN Δ2Δ[Δ3Δ]
[3]     Δ4Δ←□IO∘□XS 1∘1 □XC Δ1Δ∘→Δ7Δ[ι0=1↑ρΔ1Δ
[4]     Δ8Δ:Δ2Δ[Δ3Δ]□XR Δ1Δ[Δ4Δ;]
[5]     Δ2Δ[Δ3Δ]□XW[1+□IO]Δ1Δ[Δ4Δ;]
[6]     →Δ8Δ[ι(Δ4Δ←1+Δ4Δ)≤□IO+¯1+1↑ρΔ1Δ∘□EX Δ1Δ[Δ4Δ;]
[7]     Δ7Δ:1 □XC □XN[1+□IO]Δ2Δ[Δ3Δ]∘□XS 0
[8]     1 □XD Δ1Δ←□XN 1∘1 □XD Δ1Δ
[9]     Δ2Δ[Δ3Δ]□XD[1+□IO]Δ1Δ
[10]     →Δ9Δ[ι(Δ3Δ←1+Δ3Δ)≤□IO+¯1+ρΔ2Δ
      ∇


      ∇ΔJΔ Δ0Δ;Δ1Δ;Δ2Δ;ΔPΔ;ΔQΔ
[1]     Δ1Δ←(0≠□XV)≠(0=□NC Δ1Δ)≠Δ1Δ←□XN □XV
[2]     1 □XC □XN □XV∘1 □XC □FN∘1 □XC □VA
[3]     1 □XD □XN 0∘1 □XC □XN 0∘1 □XD □XN □XV
[4]     Δ2Δ←(ΔXΔ Δ2Δ)≠Δ2Δ∘1 □XD Δ2Δ←□XN 1
[5]     (1↑Δ0Δ)□XD Δ1Δ∘□XS 0∘→Δ9Δ[ι0=1↑(ρΔ1Δ)+ρΔ2Δ
[6]     □XS 1↑Δ0Δ∘(1↑Δ0Δ)□XW Δ2Δ
[7]     Δ9Δ:Δ0Δ[2 3+□IO]←Δ_Δ[□IO;□IO],11+4×4≤8|1↑3↓Δ0Δ
[8]     Δ_Δ[¯1↑Δ0Δ;]←1 4ρΔ0Δ
[9]     ΔWΔ 1↑Δ0Δ∘→Δ8Δ[ι1 1E3=.>Δ1Δ←ΔTΔι0
[10]    Δ0Δ[1+□IO]←Δ1Δ
[11]    Δ2Δ←1,(1↑Δ0Δ)≠1↓ΔQΔ[;□IO]
[12]    ΔPΔ←Δ2Δ≠ΔPΔ∘ΔQΔ←Δ2Δ≠ΔQΔ
[13]    ΔQΔ←ΔQΔ⌿1 4ρΔ0Δ∘Δ0Δ[3+□IO]←13
[14]    ΔPΔ←ΔPΔ⌿ΔΔΔ[¯1↑Δ0Δ;]∘ΔPΔ[□IO;]←ΔΔΔ[□IO;]
[15]    0 □XW[1+□IO]'ΔPΔ ΔQΔ'
[16]    Δ_Δ[¯1↑Δ0Δ;]←1 4ρΔ0Δ
[17]    Δ8Δ:□XS 1↑Δ0Δ∘□XF[1+□IO]ι0
      ∇

ΔΔΔ   [7 by 10 array of type char; element size 1 byte(s)]
 TMBERG
CLEAR
UTILITY
COMPLEX
LTDES
CORES1
CORES2
MORTGAG
LIB/70
LISTER


Δ_Δ   [4 by 10 numeric array; element size 3 byte(s)]
760525 0 750530 0
0 0 750529 1
4 1 750530 8
5 1 750530 9
6 1 750530 9
7 1 750530 9
8 1 750530 8
9 1 750530 8
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100 100 750529 0
101 100 750528 1




NAMES IN GROUP 5:
ADD  ARG  RS   IM   PWR  EXP  RKΔ  CON  ABS  MUL  MTΔ  LOG
RE   POL  EVA  DIV  PJ   XY


     ∇R←X ADD Y
[1]    →RKΔ
[2]    R←X+Y
     ∇


     ∇R←ARG X;A
[1]    →MTΔ
[2]    R←¯2○(A↑X)÷(A←1,1↓ρX)ρ(+⌿X×X)*.5
[3]    R←1 0⍀(○2)|R×¯1*0>(-A)↑X
     ∇


     ∇R←RS X
[1]    →MTΔ
[2]    R←(1↓ρX)ρX
     ∇


     ∇R←IM X R
[1]    →MTΔ
[2]    R←1 0⍀0 1⌿X
     ∇


     ∇R←X PWR Y;A
[1]    →RKΔ
[2]    R←(A←1,1↓ρX)ρ(+⌿X×X)*.5
[3]    X←(⍟R+R=0)⌿(○2)|(¯1*0>(-A)↑X)×¯2○(A↑X)÷R
[4]    X←(Aρ-⌿X×Y)⌿Aρ+⌿X×⊖Y
[5]    Y←(×/ρX)ρ(R≠0)∨Aρ∧⌿Y=0
[6]    R←(2,1↓ρX)ρY\Y/(,X×2○R),,(X←*A↑X)×1○R←(-A)↑X
     ∇


     ∇R←EXP X
[1]    →MTΔ
[2]    R←(X×2○R)⌿(X←*1 0⌿X)×1○R←0 1⌿X
     ∇


     ∇R←RKΔ;RX;RY;L
[1]    →ER1⌈⍳1≠×/ρY∘→L1⌈⍳2=1↑(ρY),0
[2]    →L1∘Y←(,Y),0
[3]    ER1:'CMPLX STRUCTURE ERROR-2ND ARG'
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[4]      →R←0
[5]      L1:→ER2⌈ι1≠×/ρX∘→L2⌈ι2=1↑(ρX),0
[6]      →L2∘X←(,X),0
[7]      ER2:'CMPLX STRUCTURE ERROR-1ST ARG'
[8]      →R←0
[9]      L2:→L3⌈ιL←(ρRX←ρX)≠ρRY←ρY∘R←ι0
[10]      →0×ι∧/RX=RY
[11]      L3:→(2=(×/RX),×/RY)/L5,L6
[12]      →LρL4
[13]      'COMPLEX LENGTH ERROR'
[14]      →R←0 H
[15]      L4:'COMPLEX RANK ERROR'
[16]      →R←0
[17]      L5:→0∘X←(1⌽ιρRY)⍉(1⌽RY)ρX
[18]      L6:Y←(1⌽ιρRX)⍉(1⌽RX)ρY
       ▽


       ▽R←CONJ X
[1]      →MT∆
[2]      R←(R↑X)⊤-(-R←1,1↓ρX)↑X
       ▽


       ▽R←ABS X
[1]      →MT∆
[2]      R←1 0⍱(1,1↓ρX)ρ(+⌿X×X)*.5
       ▽


       ▽R←X MUL Y
[1]      →RK∆
[2]      R←(Rρ-⌿X×Y)⊤(R←1,1↓ρX)ρ+⌿X×⊖Y
       ▽


       ▽R←MT∆
[1]      →ER⌈ι1≠×/ρX∘→0×ι2=1↑(ρX),0∘R←ι0
[2]      →0∘X←(,X),0
[3]      ER:'COMPLEX STRUCTURE ERROR'∘R←0
       ▽


       ▽R←LOG X;A;S
[1]      →MT∆
[2]      →ER⌈ι∨/,0=S←(A←1,1↓ρX)ρ(+⌿X×X)*.5
[3]      →0∘R←(⍟S)⊤(○2)|(1-2×0>(-A)↑X)×¯2○¯1⌈1⌊(A↑X)÷S
[4]      ER:'COMPLEX DOMAIN ERROR'
       ▽


       ▽R←RE X
[1]      →MT∆
[2]      R←1 0⍱1 0⌿X
       ▽
```

```
      ∇R←POLAR X;A
[1]    →MTΔ
[2]    R←(A←1,1↓ρX)ρ(+⌿X×X)*.5
[3]    R←R⍪(○2)|(¯1*0>(-A)↑X)×¯2○(A↑X)÷R+0=R
      ∇


      ∇R←Z EVAL H;N
[1]    N←⌽(⍳¯1↑ρH)-⎕IO
[2]    Z←POLAR Z
[3]    Z←XY((1 0⌿Z)∘.*N)⍪(0 1⌿Z)∘.×N
[4]    Z←Z+.×(1⌽⍳ρρH)⍉H
[5]    R←+/(1 0/Z)DIV 0 1/Z
      ∇


      ∇R←X DIV Y;A
[1]    →RKΔ
[2]    →4⌈⍳∧/,∨≠0≠Y
[3]    →0∘⎕←'COMPLEX DOMAIN ERROR'
[4]    R←(Aρ(+⌿X×Y)÷R)⍪(A←1,ρR)ρ(-⌿Y×⊖X)÷R←+⌿Y*2
      ∇


      ∇R←X PJ Y;RX;RY;L
[1]    →L1⌈⍳L←(ρRX←ρX)≠ρRY←ρY
[2]    →L2⌈⍳∧/RX=RY
[3]    L1:→(1=(×/RX),×/RY)/L3,L4
[4]    →LρL5
[5]    'COMPLEX LENGTH ERROR'
[6]    →0
[7]    L5:'COMPLEX RANK ERROR'
[8]    →0
[9]    L3:→L2∘X←RYρX
[10]    L4:Y←RXρY
[11]    L2:R←(RρX)⍪(R←1,ρY)ρY
      ∇


      ∇R←XY X
[1]    →MTΔ
[2]    R←(X×2○R)⍪(X←1 0⌿X)×1○R←0 1⌿X
      ∇


NAMES IN GROUP 6:
DAT  TPV  FRE  WFT  WFL  RNG  CTT  NL   CLO  IND  WDE  RES
TDE  B    TLO  TSH  TRA  FIL  LSH  LDE  GAP  WSZ  ARE  FDE


      ∇DATA X
[1]    →GET⌈⍳0=⎕NC'CT'
[2]    →0×⍳CT=X
[3]    GET:('CORES',1⌽1+X)ΔCΔ⍳0
      ∇
```

```
    ∇N←TPV
[1]    N←÷AC×BM×F×4E¯8
    ∇


FRE    [numeric scalar: element size=2 byte(s)]
9762

WFT    [numeric scalar: element size=8 byte(s)]
1B8F72CE9FF2EA2

WFL    [numeric scalar: element size=8 byte(s)]
618F75101FC51

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

CTT    [10 by 2 array of type char; element size 1 byte(s)]
1:3B7    P
2:3E2A   E



    ∇N←L NL IM
[1]    N←.5+⌊.5+L×IM÷AC×BMM×1E¯8
    ∇


    ∇PC←CLOSS
[1]    PC←CV×(F∗1.5)×LF×BM∗2.5
    ∇


    ∇L←LG IND N
[1]    LG←2.54E¯3×LG
[2]    L←(N∗2)×AC×1E¯8×○.4÷LG+MPL÷MUA
    ∇


    ∇WDES
[1]    NP←EP×TPV
[2]    AWG←WSZ WFT×AW÷NP
[3]    RP←AWG RES NP×MLT
[4]    PC←CLOSS
[5]    IP←(EP÷4×RP)×1-(.2⌈1-8×RP×(PO+PC)÷EP∗2)∗.5
[6]    PW←2×RP×IP∗2
    ∇


    ∇R←AWG RES X
[1]    R←3.281×X×10∗¯6+AWG÷10
    ∇
```

```apl
      ∇TDES Y;PW;PC;PO
[1]    PO←+/|ES×IS
[2]    WDES∘BM←BMM∘DATA Y∘F←FREQ
[3]    WDES∘BM←BMM⌊BM×(PW÷PC)*÷3.5
[4]    WDES∘BM←BMM⌊BM×(PW÷PC)*÷3.5 Z
[5]    BM←EP B NP←.5×⌊.5+2×NP
[6]    NS←|ES∘.×NP÷EP÷1+PW÷PO
[7]    NS←.5×⌊.5+2×NS
[8]    AS←WSZ WFT÷NS÷(ρNS)ρAW
[9]    RS←AS RES NS×(ρNS)ρMLT
[10]   ESA←(NS÷(ρNS)ρNP÷EP-IP×RP)-RS×IS∘.+NP×0
[11]   LOSS←100×(PW+PC)÷PO+PW+PC←CLOSS SZ
[12]   REG←200×RP×IP÷EP
      ∇


      ∇BM←E B N
[1]    BM←E÷AC×F×4E¯8×N
      ∇


      ∇TLOSS
[1]    BM←EP B NP
[2]    AWG←WSZ WFT×AW÷NP
[3]    RP←AWG RES NP×MLT
[4]    PW←2×RP×IP*2
[5]    PC←CLOSS
[6]    PT←PW+PC
      ∇


      ∇TSHOW KK;HD;K;PP;TA K
[1]    ⎕PP←3∘PP←⎕PP∘KK←(,KK∈⍳ρSIZE)/,KK
[2]    LP:K←1↑KK∘→0×⍳0=ρKK
[3]    ⎕←(⍕SIZE[K]),' MM ',(2 4ρ'POT   E-')[CT+⎕IO;],'CORE TRANSFORMER'
[4]    ⎕←(⍕F÷1E3),' KHZ ',(⍕EP×IP[K]),' W IN ',(0 1 0⍕LOSS[K]),' PCNT LOSS'
[5]    ⎕←'BM=',(5 0 0⍕BM[K]),', REG=',(5 1 0⍕REG[K]),' PCNT'
[6]    ⎕←'       VOLTS  AMPS   TURNS  AWG'∘⎕←''
[7]    HD←((1+ρES),5)ρ'PRI: SEC: ',(5×ρES)ρ' '
[8]    TA←(2 3ρ6 1 0 5 0 0)⍕(NP[K]⍪NS[;K]),AWG[K]⍪AS[;K]
[9]    ⎕←HD,(6 1 0⍕(EP,,ESA[;K])∘.+,0),(8⍕(IP[K],IS)∘.+,0),TA
[10]    →LP∘KK←1↓KK∘⎕←2 1ρ' '
[11]   DN:⎕PP←PP
      ∇


      ∇TRANS
[1]    EP←⍒13↓⎕'PRI. VOLTAGE: '
[2]    ES←,⍒14↓⎕'SEC. VOLTAGES: '
[3]    IS←,⍒14↓⎕'SEC. CURRENTS: '
[4]    FREQ←⍒10↓12⎕'FREQUENCY: 20E3'
[5]    TDES 'E'∈14↓⎕'E OR POT CORE? '
[6]    TSHOW RNG+K←1↑⍋|LOSS-3
[7]    FREQ←20E3
      ∇
```

```apl
      ∇FILTER
[1]    EF←,⍕8↓⎕'VOLTAGE: '
[2]    →1⌈ι(ρEF)≠ρIF←,⍕8↓⎕'CURRENT: '
[3]    EF FDES IF
      ∇


      ∇LSHOW KK;K;PP
[1]    ⎕PP←3∘PP←⎕PP∘KK←(,KK∈ιρSIZE)/,KK
[2]    LP:K←1↑KK∘→DN⌈ι0=ρKK
[3]    ⎕←'FILTER FOR: ',(⍕E),'V, ',(⍕IC),' TO ',(⍕I),' A, ',(⍕F÷1E3),' KHZ'
[4]    ⎕←(⍕L×1E3),' MHY, ',(⍕C×1E6),' UFD'
[5]    ⎕←'LOSS: ',(0 1 0⍕LOSS[K]),' PCNT, (',(0 2 0⍕V[K]),' V)'
[6]    ⎕←(⍕N[K]),' T NO. ',(⍕AWG[K]),' ON ',(⍕SIZE[K]),' MM CORE'
[7]    ⎕←'WITH ',(0 2 0⍕5×LG[K]),' MM SHIM'
[8]    ⎕←'AL = ',5 0 0⍕L×1E9÷N[K]*2
[9]    →LP∘KK←1↓KK∘⎕←3 1ρ' '
[10]    DN:⎕PP←PP
      ∇


      ∇LDES;ΔT;ΔE
[1]    IC←.1×I∘ΔT←÷F∘ΔE←.01×E
[2]    L←E×ΔT÷IC×2
[3]    N←L NL I+IC
[4]    AWG←WSZ WFL×AW÷N
[5]    R←AWG RES N×MLT
[6]    LOSS←100×V÷E+V←I×R
[7]    LG←N GAP I+IC
[8]    C←IC÷2×F×ΔE
      ∇


      ∇LG←N GAP IM
[1]    LG←(○.4×N×IM÷BMM)-MPL÷MUA
[2]    ⍝TOTAL GAP IN CM
      ∇


      ∇AWG←WSZ WA
[1]    AWG←2×⌈5×10⊕.516÷WA
[2]    ⍝WA IN CM*2
      ∇


      ∇A←AREA AWG
[1]    A←.516×10*-AWG÷10∘'CM*2'
      ∇


      ∇EF FDES IF
[1]    F←2×FREQ
[2]    DATA 0∘VF←ι0∘EF←|,EF
[3]    NX:E←1↑EF∘I←1↑IF∘→0×ι0=ρEF
[4]    VF←VF,V[K←1↑⍋|LOSS-2]∘LDES
```

```
[5]    LSHOW RNG+K
[6]      →NX∘EF←1↓EF∘IF←1↓IF
    ∇




NAMES IN GROUP 7:
MLT CT   MPL CV   AW   AC   SIZ LF   LFB MUA  BMM

MLT   [numeric vector of length 7; element size 8 byte(s)]
0701412E66666666 6668413B33333333 3334414666666666 66684154CCCCCCCC
CCD0416333333333 333441AB33333333 3334421233333333

CT    [numeric scalar: element size=1 byte(s)]
174

MPL   [numeric vector of length 7; element size 8 byte(s)]
0701411FAE147AE1 47AE412947AE147A E148413266666666 6668413C28F5C28F
5C28414851EB851E B85041551EB851EB 8520416CF5C28F5C

CV    [numeric vector of length 7; element size 8 byte(s)]
0701407EB851EB85 1EC04111EB851EB8 51EC4E0000000000 000241387AE147AE
148041630A3D70A3 D70841AB33333333 3334421233333333

AW    [numeric vector of length 7; element size 8 byte(s)]
07014018D4FDF3B6 45A2402FDF3B645A 1CAC404C083126E9 78E04067EF9DB22D
0E60409645A1CAC0 831040BF7CED9168 72C0411666666666

AC    [numeric vector of length 7; element size 8 byte(s)]
070140404189374B C6A8406ED916872B 020040A28F5C28F5 C29040F2B020C49B
A5F04116147AE147 AE15412051EB851E B852412A8F5C28F5

SIZ   [numeric vector of length 7; element size 8 byte(s)]
07014E0000000000 000E4E0000000000 00124E0000000000 00164E0000000000
001A4E0000000000 001E4E0000000000 00244E0000000000

LF    [numeric scalar: element size=8 byte(s)]
3827680337ED2

LFB   [numeric scalar: element size=8 byte(s)]
3850804E00

MUA   [numeric scalar: element size=8 byte(s)]
C4289804E00

BMM   [numeric scalar: element size=8 byte(s)]
C422982F55FFFE16




NAMES IN GROUP 101:
EJΔ RLΔ  MMΔ PPΔ HQ   ΔLΔ  PRΔ DIΔ
```

```
      ∇EJΔCT
[1]    PLΔ[⎕IO]←0∘⎕←((PSΔ[1+⎕IO]-1↑PLΔ),1)ρ' '
      ∇


      ∇RLΔ N
[1]    →NT⌈ι0≠1↑PLΔ
[2]    PT:⎕←TTΔ,((ρTTΔ)-⎕PW)↑(⎕PWρ' '),' PAGE ',0 0 0⍕1↓PLΔ
[3]    PLΔ←PLΔ+2 1∘⎕←''
[4]    NT:→(PSΔ[⎕IO]<N+2,1↑PLΔ)/0,NP
[5]     →0∘PLΔ←PLΔ+N,0
[6]    NP:→PT∘N←0∘PLΔ[⎕IO]←N∘EJΔCT
      ∇


      ∇R←MMΔ X
[1]     →TE⌈ι2=ρρR←X
[2]     R←((×/¯1↓ρX),¯1↑1,ρX)ρX
[3]    TE:→0×ι0≠¯1↑ρR
[4]     R←R,0\0ρX
      ∇


      ∇N PPΔ X;I;M;NR;P
[1]     I←0∘N←1↑N∘M←¯1↑N∘P←1↑PSΔ
[2]    LP:→0×ι0=NR←(N-I)⌊⌊(P-P|1↑PLΔ)÷M
[3]     ⎕←X[I+ιNR;]∘RLΔ NR×M
[4]     →LP∘I←I+NR 4]
      ∇


      ∇R←HQ
[1]    R←1
[2]    LP:→OK⌈ι66=1↑1↓⎕OU R
[3]    →0∘⎕OU 0∘→LP⌈ι0≠R←10|R+1
[4]    OK:∘⎕OU R,16
      ∇


      ∇RΔ←ΔLΔ GNΔ;EΔ;GΔ;IΔ;MΔ;NΔ;NMΔ;PLΔ;PSΔ;TTΔ
[1]    GNΔ←GNΔ,(0=×/ρGNΔ)/(8≤2↓Δ_Δ[;3+⎕IO])/2↓Δ_Δ[;⎕IO]
[2]    →EXΔ⌈ι0=ρGNΔ←ΔFΔ GNΔ
[3]    →0×ι0=IΔ←HQ
[4]    →0×ι~2|¯1↑⎕OU IΔ,64∘⎕BO 120
[5]     'POSITION PAPER'∘⎕PT←200∘PSΔ←48 51,⎕PW←80
[6]    LGΔ:NΔ←×/ρNMΔ←⎕XN GΔ←1↑GNΔ∘PLΔ←0 1
[7]    TTΔ←6 0 0⍕Δ_Δ[MΔ←''ρφΔYΔ GΔ;2+⎕IO]
[8]    TTΔ←' (',(⍕GΔ),')   SAVED:',(9ρ0 1 1)\TTΔ
[9]    TTΔ←'GROUP: ',ΔΔΔ[⎕IO;],' ',ΔΔΔ[MΔ;],TTΔ
[10]    IΔ←⎕IO∘'CONTENTS:'PRΔNT(1,NΔ)ρNMΔ
[11]   LNΔ:EΔ←(~GΔ∊0,⎕XV)/NΔ←NMΔ[IΔ;]
[12]    →DNΔ⌈ι(⎕NC EΔ)∊0 4
[13]    →ENΔ∘(NΔ,':')PRΔNT '*** CONFLICT ***'
[14]   DNΔ:⎕EX EΔ∘DIΔSP NΔ∘GΔ ⎕XR EΔ
[15]   ENΔ:→LNΔ⌈ι(⎕IO+1↑ρNMΔ)>IΔ←IΔ+1
[16]   Δ_Δ[MΔ;3+⎕IO]←8|Δ_Δ[MΔ;3+⎕IO]
```

```
[17]      →LGΔ⌈ι0<ρGNΔ←1↓GNΔ∘EJΔCT
[18]     EXΔ:RΔ←'END OF LIST'
[19]     ⎕PT←0∘⎕OU(1↑⎕OUι0),7×32
      ∇


      ∇P1 PRΔNT P2;N;R1;R2
[1]      R1←⌈(ρP1←MMΔ P1)÷1,⎕PW
[2]      R2←⌈(ρP2←MMΔ P2)÷1,⎕PW SP
[3]      →SP⌈ιPSΔ[⎕IO]<N←1+(×/R1)+×/R2
[4]      →0∘⎕←''∘⎕←P2∘⎕←P1∘RLΔ N
[5]    SP:RLΔ ¯5∘RLΔ 5
[6]     R2 PPΔ P2∘R1 PPΔ P1
[7]      ⎕←''∘RLΔ 1
      ∇


      ∇DIΔSP XΔ;DΔ;NΔ;TΔ
[1]       →ERΔ⌈ι1≠¯1↑1,¯1↓ρXΔ
[2]       →(NVΔ,VAΔ,VAΔ,FNΔ,ERΔ,A2Δ)[⎕IO+⎕NC XΔ]
[3]     ERΔ:+'INVALID NAME'
[4]     NVΔ:→0∘(XΔ,':') PRΔNT '** NO VALUE **'
[5]     A2Δ:→0∘(XΔ,':') PRΔNT '** α2 **'
[6]     VAΔ:TΔ←'(',(⍕ρDΔ),((0≠0\0ρDΔ←⍕XΔ)/',''') ,')'
[7]      →0∘(XΔ,TΔ,':') PRΔNT DΔ←⍕DΔ
[8]     FNΔ:NΔ←1↑ρDΔ←⎕CR XΔ
[9]     TΔ[;⎕IO]←']'∘TΔ←5 0 0⍕(ιNΔ)∘.-,⎕IO
[10]     TΔ[;⎕IO]←'['∘TΔ←(5-(TΔ≠' ')⊥1)⌽TΔ
[11]     TΔ[⎕IO;]←'    ∇'∘DΔ[⎕IO;⎕IO]←' '
[12]    ∘⍕NΔ←'TΔ←(1 0×ρDΔ)ρ''''∘DΔ←TΔ,DΔ'
[13]    DΔ PRΔNT '    ∇ '
      ∇
```