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0          SUBROUTINE PURE JOY
1 (Z,KX,KY,IDIM,CAMLOC,XYLIM,JBEAM,ISCALE,MARPLOT,KFRAME,NUMGRID)
000016     DIMENSION CAMLOC(32),XYLIM(2,6),NUMGRID(4)

C
C     CDE PACKAGE
000016     DIMENSION Z(IDIM,10)
000016     COMMON/COM3DP/XMIN,XMAX,YMIN,YMAX,ZMIN,ZMAX,ZLIM(2),PLOTX,PLOTY
1PLOTORG(2),CAMXYZ(3),MX,NY,FMX,FNY,KBEAM,ZETA,CAMWKG(32),XORG(
2GX(3),FX(2),KSCALE,ZORG,NOUT,CENTER(2),PQLIMIT
000016     DIMENSION LIMIT(2),FLIM(2),AMTX(3,3),KCAMWKG(32)
000016     EQUIVALENCE(U,CAMXYZ),(V,CAMXYZ(2)),(W,CAMXYZ(3)),(MX,LIMIT),
1(FMX,FLIM),(AMTX,CAMWKG(17)),(CAMWKG,KCAMWKG)
C     END CDE
C
C     LOCAL CDE
000016     DIMENSION XS(3),XC(3),XMINA(2,6)
000016     EQUIVALENCE(XMIN,XMINA)
C
C     LABELLED COMMON IN HALF-STEP CALCOMP PACKAGE
000016     COMMON/HALF/KSTEP1
000016     COMMON/CRTPLT/ICRT
000016     EQUIVALENCE(ISTEP1,STEP1)
000016     DATA STEP1/200,0/
C
C     PRINT OUT STARTING AND ENDING TIME
C
000016     CALL SECOND(H)
000017     PRINT 501,H
C     PICK UP XY LIMITS, BOX SIZES, ETC.
000025     DO9J=1,12
000032     9 XMINA(J)=XYLIM(J)
000042     PRINT 504,XMINA
C     SET TOLERANCE FOR VISIBILITY TESTS = HALF PLOTTER STEP SIZE
000047     PQLIMIT=0.005
C     IF HALF-STEP PKG NOT IN USE, KSTEP1 WILL HAVE RANDOM JUNK IN IT
000051     IF(KSTEP1.EQ.1STEP1)PQLIMIT=PQLIMIT/2.0
C
C     PICK UP BEAM INTENSITY
000060     ICRT=JBEAM
000062     KBEAM=IABS(ICRT)
000063     IF(KBEAM.LT.10)KBEAM=16
C     PICK UP CAMERA DATA
000066     DO3J=1,32
000070     3 CAMWKG(J)=CAMLOC(J)
000074     CALL CAMERGT
000075     MX=KX $ FMX=FLOAT(KX) $ NY=KY $ FNY=FLOAT(NY)
C     OPTION FOR SCALING Z
000105     KSCALE=IABS(ISCALE)
000107     IF(KSCALE.LT.1.OR.KSCALE.GT.6)KSCALE=2
000120     PRINT 505,ISCALE,KBEAM
C     SCALE FACTORS TO CONVERT INDICES TO INCHES
000130     GX(1)=(XMAX-XMIN)/(FMX=1.0)
000140     GX(2)=(YMAX-YMIN)/(FNY=1.0)
C
C     FIND Z SCALE FACTOR

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000144      GO TO (21,22,22,23,23,28),KSCALE
      C
      C      OPTION 6, TAKE XYLIM(K,4) AS GIVEN SCALE FACTORS
000156      28      ZORG=ZLIM(1)
000160      GX(3)=ZLIM(2)
      C      BOX LIMITS FOR Z
000161      ZLIM(1)=(ZMIN-ZORG)/GX(3)
000164      ZLIM(2)=(ZMAX-ZORG)/GX(3)
000167      GO TO 12
      C
      C      OPTION 1, SCALE SO GIVEN LIMITS FIT IN BOX,
      C      (SOME Z COULD OF COURSE BE OUTSIDE BOX IN THIS CASE)
000167      21      GX(3)=(ZMAX-ZMIN)/(ZLIM(2)-ZLIM(1))
000173      ZORG=(ZMIN+ZLIM(2)-ZMAX*ZLIM(1))/(ZLIM(2)-ZLIM(1))
000201      GO TO 12
      C      OPTION 2,3, SCALE GIVEN DATA TO FIT BOX,
000201      22      ZLIM(1)=-1.0E30
000203      ZLIM(2)=1.0E30
      C      (HERE FOR OPTIONS 4,5, APPLY CUTOFF - THIS CHANGES Z ARRAY CON'
000204      23      TOP=-1.0E30
000206      BOT=1.0E30
000207      DO24J=1,MX
000211      DO24K=1,NY
000212      ZWKG=AMIN1(ZLIM(2),AMAX1(ZLIM(1),Z(J,K)))
000225      TOP=AMAX1(TOP,ZWKG)
000231      BOT=AMIN1(BOT,ZWKG)
000234      24      Z(J,K)=ZWKG
      C      CHECK IF Z LIES IN A LEVEL PLANE, NO PLOT IF SO,
000245      IF(TOP,EQ,BOT)GO TO 60
      C      NOW RESET LIMITS FOR LATER CHECKS,
000247      ZLIM(1)=BOT
000250      ZLIM(2)=TOP
      C      NOW CALCULATE SCALE FACTOR GX(3) + INCREMENT ZORG
000251      GO TO(21,21,25,21,25),KSCALE
      C      OPTIONS 3 OR 5, SCALE Z=0 INTO Z=0
      C      * * LOWER BOX LIMIT HAS TO BE NEGATIVE IF NEGATIVE Z OCCURS *
000262      25      ZORG=0.0
      C      TAKE MINIMUM SCALE FACTOR ON EITHER SIDE
      C      BUT CHECK IF ONLY 1-SIDED EXCURSIONS FROM ZERO
000263      IF(BOT,GE,0.0)GO TO 26
000265      IF(TOP,LE,0.0)GO TO 27
000266      GX(3)=AMIN1(ZMIN/BOT, ZMAX/TOP)
000274      GO TO 12
      C      POSITIVE EXCURSIONS ONLY
000275      26      GX(3)=ZMAX/TOP
000277      GO TO 12
      C      NEGATIVE EXCURSIONS ONLY
000300      27      GX(3)=ZMIN/BOT
      C
      C      FIND SCALE FACTORS FOR PLOT
      C
000302      12      XA=1.0E30
000304      XB=-1.0E30
000305      YA=1.0E30
000307      YB=-1.0E30
      C      KEEP COUNT OF POINT WITH Z OUT OF BOX
000310      NZOUT=0
000311      IF(ISCAL,GT,0)GO TO 10

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C SCALE SO BOX FITS PICTURE
000314 D015L=1,2
000315 XS(3)=XMINA(L,3)-CAMWKG(3)
000320 D015K=1,2
000321 XS(2)=XMINA(K,2)-CAMWKG(2)
000324 D015J=1,2
000325 XS(1)=XMINA(J,1)-CAMWKG(1)
000330 CALL ROTATE(XS,AMTX,XC)
C QUIT IF POINT IS BEHIND CAMERA
000332 IF(XC(3),LE,0,0)GO TO 50
000337 XC(1)=XC(1)/XC(3)
000341 XC(2)=XC(2)/XC(3)
000342 XA=AMIN1(XA,XC(1))
000345 XB=AMAX1(XB,XC(1))
000350 YA=AMIN1(YA,XC(2))
000353 YB=AMAX1(YB,XC(2))
000356 15 CONTINUE
000364 GO TO 16
C FIND MAXIMUM XY ON FILM WITH FOCAL LGTH OF 1.0
000364 10 D04J=1,MX
000366 XS(1)=XMIN+FLOAT(J-1)*GX(1)-CAMWKG(1)
000374 D05K=1,NY
000375 XS(2)=YMIN+FLOAT(K-1)*GX(2)-CAMWKG(2)
000403 IF((Z(J,K)=ZLIM(1))*(Z(J,K)=ZLIM(2)),GT,0,0)GO TO 6
000414 XS(3)=Z(J,K)*GX(3)+ZORG-CAMWKG(3)
000423 CALL ROTATE(XS,AMTX,XC)
C QUIT IF POINT IS BEHIND CAMERA
000425 IF(XC(3),LE,0,0)GO TO 50
000432 XC(1)=XC(1)/XC(3)
000434 XC(2)=XC(2)/XC(3)
000435 XA=AMIN1(XA,XC(1))
000440 XB=AMAX1(XB,XC(1))
000443 YA=AMIN1(YA,XC(2))
000446 YB=AMAX1(YB,XC(2))
000451 GO TO 5
C Z OUT OF BOX, COUNT (JUST FOR USERS INFORMATION)
000451 6 NZOUT=NZOUT+1
000453 5 CONTINUE
000456 4 CONTINUE
C SCALE X, Y RANGES TO FIT ON PLOT
000460 16 PRINT 503,GX(3),ZORG
000473 FX(1)=PLOTX/(XB-XA)
000502 FX(2)=PLOTY/(YB-YA)
C CHOOSE MINIMUM FOCAL LENGTH OF THE TWO
000505 CAMWKG(4)=AMIN1(FX(1),FX(2))
C SET X,Y ORIGINS (BEFORE SCALING TO FOCAL LGTH)
000511 XORG(1)=XA
000513 XORG(2)=YA
C SIZES IN X,Y (NOT INCLUDING OUT-OF-BOX POINTS THAT GET IN PIC)
000514 XB=(XB-XA)*CAMWKG(4)
000516 YB=(YB-YA)*CAMWKG(4)
C CENTER FOR NOW, BUT LATER MAKE OPTIONAL
000520 CENTER(1)=(PLOTX-XB)/2,0
000523 CENTER(2)=(PLOTY-YB)/2,0
000526 PRINT 602,FX,XB,YB,PLOTX,PLOTY,NZOUT
C CAMERA LOCATION EXPRESSED AS XY INDICES
000545 U=1,0+(FMX-1,0)*(CAMWKG(1)-XMIN)/(XMAX-XMIN)

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000560      V=1.0+(FNY-1.0)*(CAMWKG(2)-YMIN)/(YMAX-YMIN)
C          FOR VISIBILITY CHECKING, SCALE CAMERA Z COORDINATE OPPOSITE TO
C          WAY Z WILL BE SCALED FOR PLOTTING - RATHER THAN SCALING ALL THE
C          Z=S ON THE SURFACE WHEN CHECKING
000570      W=(CAMWKG(3)-ZORG)/GX(3)
C          CALCULATE VISIBILITIES
C
C          IF MARPLOT IS ZERO, DECLARE ALL POINTS VISIBLE, DRAW ALL LINES
000573      IF(MARPLOT,NE,0)GO TO 7
000574      D08K=1,NY
000576      D08J=1,MX
000577      8      Z(J,K)=Z(J,K).AND,777777777777777777770B
000612      PRINT 605
000615      GO TO 40
000621      7      D01K=1,NY
000623      ETA=FLOAT(K)
000624      D01J=1,MX
000626      L=IVIS(FLOAT(J),ETA,Z(J,K),Z,IDIM)+1
000646      1      Z(J,K)=Z(J,K).AND,777777777777777777770B,OR,L
C
C          NOW PLOT
000660      40      CALL DRAW3D(Z,IDIM)
C          IF KFRAME ZERO, DO NOT DRAW FRAME AROUND PIC
000662      IF(KFRAME,EQ,0)GO TO 70
000667      PRINT 606
000673      CALL DRAWBOX(PLOTORG(1),PLOTORG(2),XYLIM(1,5),XYLIM(2,5),KBEAM,
C
C          DRAW COORDINATE GRIDS IF CALLED FOR IN NUMGRID
000714      70      IF(NUMGRID(1),GT,0)CALL GAUFFRE(NUMGRID,Z,IDIM)
C          PRINT FINISHING TIME
000730      CALL SECOND(H2)
000732      H=H2-H
C          TIME PER POINT
000734      HP=H/(FMX*FNY)
000737      PRINT 502,H2,H,HP
000750      RETURN
C
C          POINT ON THE SURFACE IS BEHIND THE CAMERA, QUIT.
000751      50      PRINT 603
000755      RETURN
C
C          Z IS A FLAT PLANE, DO NOT DRAW (FOR NOW)
000756      60      PRINT 604
000762      RETURN
C
000763      501      FORMAT(*1BEGIN PURE JOY, CP TIME USED SO FAR*,F9,2,* SECONDS,*
000763      502      0FORMAT(*0END PURE JOY, CP TIME*,F9,2,* SECONDS, TIME IN PURE JOY
1 F9,2,* SECONDS,*/*0TIME PER POINT*,E15,6,* SECONDS,*)
000763      503      FORMAT(*0Z MULTIPLIER*,E15,6,*, Z ORIGIN SHIFT*,E15,6)
000763      504      0FORMAT(*0X LIMITS*,2F10,3/* Y LIMITS*,2F10,3/* Z LIMITS*,2F10,
1* Z CUTOFF*,2E15,6/
2          * PLOT SIZE*,2F10,3/* PLOT ORIGIN*,2F10,3)
000763      505      FORMAT(*0Z SCALING METHOD*,I3/*0CRT INTENSITY*,I4)
000763      602      0FORMAT(*0FOCAL LENGTHS TO FILL X,Y PLOTTER SPACE*,2E15,6,
1 *, LESSER VALUE CHOSEN*/*0PICTURE SIZE IN X, Y =*,2F9,3,
2*, REQUESTED SIZES*,2F9,3/*0NUMBER OF POINTS WITH Z OUTSIDE BO

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3 16)

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000763 603 0FORMAT(*UPART OF SURFACE IS BEHIND THE CAMERA, UNABLE TO PLOT,  
1RY,*)  
000763 604 0FORMAT(*0FUNCTION IS LEVEL PLANE, NO USE PLOTTING IT*)  
000763 605 0FORMAT(*0HIDDEN LINES WILL BE DRAWN*)  
000763 606 0FORMAT(*0FRAME WILL BE DRAWN AROUND PICTURE*)  
000763 END
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RUN VERSION 2,3 - CDC LEVEL 26 - NYU LEVEL 11

PUREJOY

SUBPROGRAM LENGTH
001242

FUNCTION ASSIGNMENTS

STATEMENT ASSIGNMENTS

3	=	000070	5	=	000453	6	=	000451	7	=	000621
8	=	000577	9	=	000032	10	=	000364	12	=	000302
16	=	000460	21	=	000167	22	=	000201	23	=	000204
25	=	000262	26	=	000275	27	=	000300	28	=	000156
40	=	000660	50	=	000751	60	=	000756	70	=	000714
501	=	001006	502	=	001015	503	=	001032	504	=	001040
505	=	001064	602	=	001072	603	=	001117	604	=	001127
605	=	001135	606	=	001142						

BLOCK NAMES AND LENGTHS

COM3DP = 000103 HALF = 000001 CRTPLT = 000001

VARIABLE ASSIGNMENTS

AMTX	=	000045C01	BOT	=	001226	CAMWKG	=	000025C01	CAMXYZ	=	000014C01
CENTER	=	000100C01	ETA	=	001237	FLIM	=	000021C01	FMX	=	000021C01
FNY	=	000022C01	FX	=	000073C01	GX	=	000070C01	H	=	001223
HP	=	001241	H2	=	001240	ICRT	=	000000C03	ISCALE	=	000001
ISTEP1	=	001214	J	=	001224	JEEAM	=	000000	K	=	001227
KBEAM	=	000023C01	KCAMWKG	=	000025C01	KFRAME	=	000003	KSCALE	=	000075C
KSTEP1	=	000000C02	L	=	001236	LIMIT	=	000017C01	MARPLOT	=	000002
MX	=	000017C01	NUMGRID	=	000004	NY	=	000020C01	NZOUT	=	001235
PLOTORG	=	000012C01	PLOTX	=	000010C01	PLOTY	=	000011C01	PQLIMIT	=	000102C
STEP1	=	001214	TOP	=	001225	U	=	000014C01	V	=	000015C
W	=	000016C01	XA	=	001231	XB	=	001232	XC	=	001220
XMAX	=	000001C01	XMIN	=	000000C01	XMINA	=	000000C01	XORG	=	000065C
XS	=	001215	YA	=	001233	YE	=	001234	YMAX	=	000003C
YMIN	=	000002C01	ZLIM	=	000006C01	ZMAX	=	000005C01	ZMIN	=	000004C
ZORG	=	000076C01	ZWKG	=	001230						

START OF CONSTANTS
000765

START OF TEMPORARIES
001150

START OF INDIRECTS
001210

UNUSED COMPILER SPACE
017600