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10 REM *****
20 REM * PLANETS POSITIONS *
30 REM *****
100 MODE 0
110 LOCATE 3,6:PRINT"PLANETS POSITIONS"
120 LOCATE 9,9:PRINT CHR$(64);" by"
130 LOCATE 6,12:PRINT"D.T.Webber"
140 FOR n=1 TO 2500:NEXT n
150 MODE 2:BORDER 18:INK 1,0:INK 0,18
160 hs=" P L A N E T S   P O S I T I O N S "
170 ps=CHR$(143):FOR u=25 TO 57:LOCATE u,1:PR
INT ps:NEXT
180 LOCATE 40-(LEN(HS)/2),2:PEN 0:PAPER 1:PR
INT HS:PEN 1:PAPER 0
190 ps=CHR$(143):FOR u=25 TO 57:LOCATE u,3:PR
INT ps:NEXT
200 LOCATE 1,5:PRINT"   This Program will cal
culate the positions of the planets between 1
/1/75      and 31/12/99 and contains the f
ollowings:"
210 PRINT
220 PRINT TAB(6)"Planets Longitude and Latitu
de":PRINT
230 PRINT TAB(6)"Planets Right Ascension and
Declination":PRINT
240 PRINT TAB(6)"Moon's position":PRINT
250 PRINT TAB(6)"Star charts showing position
s of Planets.":PRINT
260 PRINT TAB(6)"Each Planet is located on th
e Star charts at the top left corner of the"
270 PRINT TAB(6)"capital letter representing
the Planet as follows":PRINT
280 PRINT TAB(6)"Mo = Moon":TAB(30)"Me = Merc
ury":TAB(60)"V = Venus"
290 PRINT TAB(6)"Ma = Mars":TAB(30)"J = Jupi
ter":TAB(60)"S = Saturn"
300 PRINT TAB(6)"U = Uranus":TAB(30)"N = Ne
ptune":TAB(60)"P = Pluto"
310 LOCATE 6,25:PRINT"Press to continue"
320 IF INKEY="" THEN GOTO 320
400 REM -----
410 REM  CALCULATION OF DATE
420 REM -----
430 CLS:DEG
440 MODE 2
450 DIM k(12)
460 FOR j=1 TO 12:READ k(j):NEXT j
470 q=27393
480 LOCATE 1,5:PRINT"Enter date required eg.0
1.11.75"
490 PRINT:INPUT"Day   "d
500 INPUT"Month  "m
510 INPUT"Year   "y:IF y<75 OR y>99 THEN PRIN
T"Year out of range should be between 75 and
99":GOTO 510:PRINT:PRINT
520 z=y*365+INT(y/4):IF y/4=INT(y/4) AND m<3
THEN z=z-1
530 z=z+k(m)+30*(m-2)+d
540 z=z-7*INT(z/7)+1
550 as="SunMonTueWedThuFriSat"
560 PRINT:PRINT "Date   ": MID$(as,3*z-2,3):" "

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1d1:"/"!m1:"/"!y:y1=y
570 PRINT
580 DATA 30,31,29,30,30,31,31,32,33,33,34,34
590 m=m-a
600 PRINT"Enter time required eg.hour(24 hour
clock) and minute"
610 PRINT"Deduct 1 hour for BST"
620 PRINT:INPUT"Hour   "h
630 INPUT"Minute  "mm
640 h=h-a0:mm=h-mm+pmm/1440
650 m=h+p
660 LOCATE 5,25:PRINT"Is this information cor
rect? Y/N"
670 as=INKEY$:IF as="" THEN GOTO 670
680 IF as="Y" OR as="y" THEN CLS:GOTO 630
690 IF as="N" OR as="n" THEN CLS:GOTO 470
700 IF as<>"Y" OR as<>"y" OR as<>"N" OR as<>"n"
GOTO 660
800 REM -----
810 REM  SET UP TABLES
820 REM -----
830 CLS
840 PRINT TAB(24)"P L A N E T S   P O S I T I
O N S"
850 PRINT TAB(24)STRING$(33,45)
860 PRINT TAB(30)"on   ":MID$(as,3*z-2,3):" "
870 d1:"/"!m1:"/"!y
880 LOCATE 16,6:PRINT"Ecliptic Co-ords":TAB(4
9)"Equatorial Co-ords"
890 LOCATE 16,8:PRINT "Long":TAB(30)"Lat":TAB
(49)"R.A.":TAB(62)"Decl"
890 LOCATE 16,9:PRINT"deg":TAB(30)"deg":TAB(4
9)"hr,min":TAB(60)"deg,min"
900 LOCATE 9,22:PRINT"Wait for full printout"
910 PRINT
920 GOSUB 1000
930 GOSUB 1200
940 GOSUB 1600
1000 REM -----
1010 REM POSITION OF SUN
1020 REM -----
1030 INK 1,0
1040 s=360*(z/365.25
1050 WHILE s>360:IF s>360 THEN s=s-360:WEND
1060 IF s<0 THEN s=s+360
1070 g=279.04147:h=282.510396:j=0.91672
1080 ma=s+g-h
1090 IF ma<0 THEN ma=ma+360
1100 e=360*(1/P1)*SIN(ma)
1110 k=s+e+g
1120 WHILE k>360:IF k>360 THEN k=k-360:WEND
1130 IF k<0 THEN k=k+360
1140 k=ROUND(k,2)
1150 l=k+vg=0
1160 GOSUB 3700
1170 LOCATE 1,11:PRINT"Sun           "t:GOSUB 390
0
1180 RETURN

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1200 REM -----
1210 REM POSITION OF MOON
1220 REM -----
1230 m1=124.8756:m2=145.9601:m3=248.6441:m4=5
.1453:m5=0.0547
1240 GOSUB 1000
1250 l2=360*(d/27.3217)+m1
1260 WHILE l2>360:IF l2>360 THEN l2=l2-360:
WEND
1270 m2=l2-(360/365.25)*(z/18.61)+m2
1280 WHILE m2<0:IF m2<0 THEN m2=m2+360:WEND
1290 n2=m2-(360/365.25)*(z/18.61)
1300 WHILE n2<0:IF n2<0 THEN n2=n2+360:WEND
1310 v2=1.274*SIN(2*(l2-k)-m2)
1320 w2=0.186*SIN(ma)
1330 x2=0.37*SIN(ma)
1340 y2=m2+v2-w2-x2
1350 ec=6.289*SIN(y2)
1360 l1=l2+v2-w2+ec
1370 v=0.658*SIN(2*(l1-k))
1380 la=v+l1
1390 WHILE la<0:IF la<0 THEN la=la+360:WEND
1400 WHILE la>360:IF la>360 THEN la=la-360:
WEND
1410 la=ROUND(la,2)
1420 na=n2-0.16*SIN(ma)
1430 ba=SIN(l1-na)*SIN(m1)
1440 DEF FNp(x)=(ATN(x)/SQRT(1+x*x+1))
1450 bm=FNp(ba)
1460 bm=ROUND(bm,2)
1470 l3=l2+vg+bm
1480 GOSUB 3700
1490 ta=t1:da=d1
1500 PRINT"Moon           "t:GOSUB 3900
1510 RETURN
1600 REM -----
1610 REM MERCURY
1620 REM -----
1630 tp=0.24085:ep=320.66305:rw=77.06645:re=0.2
05629:a=0.387099
1640 io=7.00427:nd=48.63493
1650 GOSUB 2600:GOSUB 3000:GOSUB 3400
1660 tb=t1:db=d1
1670 PRINT"mercury       "t:GOSUB 3900
1700 REM -----
1710 REM VENUS
1720 REM -----
1730 tp=0.61521:ep=310.97453:rw=131.21928:a=0.
006785:a=0.723332
1740 io=3.39438:nd=76.45475
1750 GOSUB 2600:GOSUB 3000:GOSUB 3400
1760 tc=t1:dc=d1
1770 PRINT"Venus         "t:GOSUB 3900
1800 REM -----
1810 REM MARS
1820 REM -----
1830 tp=1.86089:ep=249.62919:rw=335.59881:a=0.
093382:a=1.523691
1840 io=1.64983:nd=49.34666
1850 GOSUB 2600:GOSUB 3200:GOSUB 3400
1860 td=t1:dd=d1

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1870 PRINT "Mars"      "":GOSUB 3900
1900 REM -----
1910 REM JUPITER
1920 REM -----
1930 tp=11.86224:ep=355.21414:w=13.91992:e=0
.04846:a=5.202804
1940 io=1.3045:nd=100.19608
1950 GOSUB 2600:GOSUB 3200:GOSUB 3400
1960 ti=t1:df=d1
1970 PRINT "Jupiter"  "":GOSUB 3900
2000 REM -----
2010 REM SATURN
2020 REM -----
2030 tp=29.45771:ep=104.17278:w=92.55833:e=0
.05563:a=9.538844
2040 io=2.48933:nd=113.43842
2050 GOSUB 2600:GOSUB 3200:GOSUB 3400
2060 tg=t1:dg=d1
2070 PRINT "Saturn"   "":GOSUB 3900
2100 REM -----
2110 REM URANUS
2120 REM -----
2130 tp=84.01247:ep=205.78286:w=170.25472:e=0
.04725:a=19.181854
2140 io=0.77316:nd=73.87283
2150 GOSUB 2600:GOSUB 3200:GOSUB 3400
2160 th=t1:dh=d1
2170 PRINT "Uranus"  "":GOSUB 3900
2200 REM -----
2210 REM NEPTUNE
2220 REM -----
2230 tp=164.79558:ep=249.91462:w=44.40592:e=0
.00858:a=10.05796
2240 io=1.77236:nd=131.50506
2250 GOSUB 2600:GOSUB 3200:GOSUB 3400
2260 tj=t1:dj=d1
2270 PRINT "Neptune" "":GOSUB 3900
2300 REM -----
2310 REM PLUTO
2320 REM -----
2330 tp=248.378:ep=202.3345:w=224.258:e=0.246
115:a=39.29976
2340 io=17.14451:nd=109.9965
2350 GOSUB 2600:GOSUB 3200:GOSUB 3400

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2360 th=t1:dk=d1
2370 PRINT "Pluto"    "":GOSUB 3900
2400 REM -----
2410 LOCATE 9,22:PRINT STRING$(22,32)
2420 LOCATE 9,22:PRINT "PRINTOUT COMPLETE"
2430 LOCATE 9,24:PRINT "Do you wish to see sta
r charts? Y/N"
2440 as=INKEY$:IF as="" GOTO 2440
2450 IF as="Y" OR as="y" THEN CLS:GOTO 4000
2460 IF as="N" OR as="n" THEN CLS:GOTO 2480
2470 IF as<>"Y" OR as<>"y" OR as<>"N" OR as<>"n" GOTO 2430
2480 LOCATE 29,12:PRINT "END OF PROGRAM"
2490 LOCATE 27,14:PRINT "Type RUN to restart":
END
2600 REM -----
2610 REM CALCULATION FOR PLANET
2620 REM -----
2630 np=360*pi/365.25/tp
2640 WHILE np>=360:IF np>=360 THEN np=np-360:
WEND
2650 WHILE np<0:IF np<0 THEN np=np+360:WEND
2660 l=np+(360*pi/P1)*SIN(np*ep-w)+ep
2670 WHILE l>=360:IF l>360 THEN l=l-360:WEND
2680 WHILE l<0:IF l<0 THEN l=l+360:WEND
2690 vp=l-w
2700 rp=a*(1-e^2)/(1+e*COS(vp))
2800 REM -----
2810 REM CALCULATION FOR EARTH
2820 REM -----
2830 te=1.00004:pe=99.53431:we=102.51044:ee=0
.01672
2840 ne=360*pi/365.25/te
2850 WHILE ne>=360:IF ne>=360 THEN ne=ne-360:
WEND
2860 WHILE ne<0:IF ne<0 THEN ne=ne+360:WEND
2870 le=ne+(360/P1)*ee*SIN(ne+pe-we)+pe
2880 ve=l-e-we
2890 re=(1-ee^2)/(1+ee*COS(ve))
2900 RETURN
3000 REM -----
3010 REM INFERIOR PLANETS POSITIONS
3020 REM -----
3030 REM -----

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3040 ZA=LE-L
3050 WHILE ZA<0:IF ZA<0 THEN ZA=ZA+360:WEND
3060 WHILE ZA>=360:IF ZA>=360 THEN ZA=ZA-360:
WEND
3070 ZB=180+LE
3080 ZC=RP*SIN(ZA)
3090 ZD=RE-EP*COS(ZA)
3100 ze=zc/zd
3110 RETURN
3200 REM -----
3210 REM SUPERIOR PLANETS POSITION
3220 REM -----
3230 REM -----
3240 za=l-le
3250 WHILE za<0:IF za<0 THEN za=za+360:WEND
3260 WHILE za>=360:IF za>=360 THEN za=za-360:
WEND
3270 zb=l
3280 zc=re*SIN(za)
3290 zd=rp-re*COS(za)
3300 ze=zc/zd
3310 RETURN
3400 REM -----
3410 REM LONGITUDE CALCULATION
3420 REM -----
3430 zf=ATN(ze)
3440 la=zb+zf
3450 WHILE lm<0:IF lm<0 THEN lm=lm+360:WEND
3460 WHILE lm>=360:IF lm>=360 THEN lm=lm-360:
WEND
3470 la=ROUND(la,2)
3500 REM -----
3510 REM LATITUDE CALCULATION
3520 REM -----
3530 v=SIN(1-nd)*SIN(io)
3540 DEF FNm(x)=ATN(x/SQR(1-x*x+1))
3550 v=FNm(v)
3560 vd=lm-1:vb=l-le
3570 rq=rp*COS(v)
3580 vc=rq*TAN(v)*SIN(vd)
3590 ve=re*SIN(vb)
3600 vf=vc/vb
3610 vg=ATN(vf)
3620 vg=ROUND(vg,2)

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5030 ra=tj:dec=dj:GOSUB 5050:PRINT"N";
5040 ra=tk:dec=dk:GOSUB 5050:PRINT"P";GOTO 5
090
5050 ra=(360-ra)*4+100:dec=dec*4+220
5060 IF ra>580 AND ra<1060 THEN ra=ra-480 E
LSE ra=-100
5070 MOVE ra,dec
5080 RETURN
5090 MOVE 470,17:PRINT"Press for next chart";
:TAGOFF
5100 IF INKEY$="" GOTO 5100
5200 REM -----
5210 REM  S T A R   C H A R T   3
5220 REM -----
5230 CLS:GOSUB 5800
5240 y=24
5250 FOR x=152 TO 620 STEP 60:MOVE x,37:y=y-1
:PRINT y;NEXT
5260 MOVE 47,17:PRINT"Right Ascension - hours
Date -"t" "d:"m:"y"
5270 MOVE 36,37:PRINT 1:MOVE 96,37:PRINT 0;

5280 GOSUB 6000
5290 FOR x=1 TO 236:READ a,b:PLOT a,b:NEXT x
5300 DATA 53,378,62,340,93,333,90,278,55,250,
60,145,77,50,78,43
5310 DATA 195,388,213,372,210,367,162,330,184
,330,215,350,178,318,180,315
5320 DATA 218,321,232,323,241,323,161,278,180
,267,186,262,242,257,215,245
5330 DATA 272,257,275,259,264,246,268,240,287
,237,295,281,305,280,300,275
5340 DATA 308,273,310,274,310,270,311,261,305
,258,302,397,321,378,298,352
5350 DATA 270,339,328,330,107,247,128,242,138
,245,148,241,150,232,162,235
5360 DATA 140,225,125,227,332,215,198,225,190
,217,195,218,297,180,275,173
5370 DATA 253,195,218,218,202,213,208,187,218
,161,171,187,175,162,170,153
5380 DATA 158,135,143,138,124,160,239,152,246
,232,250,140,258,130,260,128
5390 DATA 280,118,293,110,299,115,282,139,265
,151,281,149,317,147,325,158

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5400 DATA 328,168,330,170,326,166,267,90,285,
90,295,82,265,55,298,43
5410 DATA 170,100,187,110,240,85,218,85,192,8
7,174,85,170,87,115,105
5420 DATA 148,87,134,68,232,70,219,60,210,53,
208,50,195,42,195,45
5430 DATA 341,330,350,317,378,319,390,307,428
,372,419,367,410,364,407,348
5440 DATA 415,350,548,388,540,372,508,365,498
,367,465,368,542,345,522,342
5450 DATA 508,322,492,328,475,332,465,337,554
,308,560,298,509,277,360,398
5460 DATA 347,355,367,340,375,331,358,262,355
,255,348,246,406,278,399,273
5470 DATA 380,232,352,222,398,198,345,298,357
,293,365,290,362,287,418,200
5480 DATA 430,186,412,157,436,160,530,261,526
,257,488,270,479,239,475,232
5490 DATA 462,234,465,180,442,208,408,237,497
,238,552,229,570,205,565,200
5500 DATA 555,185,548,178,552,152,513,157,502
,120,487,158,570,180,578,175
5510 DATA 578,140,562,118,555,113,548,107,534
,82,530,70,527,51,511,47
5520 DATA 487,50,475,60,480,65,490,72,472,72,
386,154,385,147,390,142
5530 DATA 597,134,404,132,412,112,420,110,438
,118,452,135,445,100,460,97
5540 DATA 442,82,450,72,384,42,382,58,407,100
,398,107,392,117,382,120
5550 DATA 372,118,345,114,350,112,347,110,638
,380,622,352,580,338,585,330
5560 DATA 592,327,598,328,608,328,612,335,609
,345,590,303,600,298,593,292
5570 DATA 584,282,593,280,606,260,598,247,592
,238,595,203,622,180,608,160
5580 DATA 585,128,586,115,588,102,620,42,608,
56,585,66,592,85,602,81
5590 DATA 600,80,618,75,616,73,619,58
5600 TAG
5610 ra=ta:dec=da:GOSUB 5700:PRINT"Mo";
5620 ra=tb:dec=db:GOSUB 5700:PRINT"Me";
5630 ra=tc:dec=dc:GOSUB 5700:PRINT"V";
5640 ra=td:dec=dd:GOSUB 5700:PRINT"Ma";

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5650 ra=tf:dec=df:GOSUB 5700:PRINT"J";
5660 ra=tr:dec=dr:GOSUB 5700:PRINT"B";
5670 ra=th:dec=dh:GOSUB 5700:PRINT"U";
5680 ra=tj:dec=dj:GOSUB 5700:PRINT"N";
5690 ra=tk:dec=dk:GOSUB 5700:PRINT"P";GOTO 5
740
5700 ra=(360-ra)*4+100:dec=dec*4+220
5710 IF ra>100 AND ra<580 THEN ra=ra-0 ELSE
ra=-100
5720 MOVE ra,dec
5730 RETURN
5740 MOVE 470,17:PRINT"Press for new date";:T
AGOFF
5750 WHILE INKEY$="" :WEND:CLS:BORDER 18:INK 1
,0:INK 0,18:RUN 400
5800 REM -----
5810 REM  D R A W   F R A M E
5820 REM -----
5830 PLOT 0,0
5840 DRAW 0,399
5850 DRAW 639,399
5860 DRAW 639,0
5870 DRAW 0,0
5880 MOVE 47,40:DRAW 47,399
5890 MOVE 0,40:DRAW 639,40
5900 MOVE 47,220:DRAW 639,220
5910 TAG
5920 RETURN
6000 REM -----
6010 REM  DECLINATION DEG.
6020 REM -----
6030 z=-50
6040 FOR c=68 TO 390 STEP 40
6050 MOVE 15,c
6060 z=z+10
6070 PRINT z;
6080 NEXT
6090 TAGOFF
6100 FOR x=1 TO 15
6110 LOCATE 2,x+3
6120 a$="Declination deg"
6130 PRINT MID$(a$,x,1);
6140 NEXT
6150 RETURN

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