

5LOADEPHEMERIDES

5LIST

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10 HOME : HTAB 13: PRINT "EPHEMERIDES"
12 REM *****
14 REM * CALCUL D'EPHEMERIDES *
16 REM * MATTHIEU BENOIT 1990 *
18 REM *****
20 HTAB 13: PRINT "-----"
30 HTAB 12: PRINT "STARDUST 0.0": PRINT : PRINT "-----"
-----"
35 PRINT
40 PRINT "COORDONNEES DU LIEU D'OBSERVATION "
50 PRINT "EN DEGRES ET DECIMALES USUELLES"
60 PRINT "<LONGITUDE < 0 A L'EST DE GREENWICH>"
65 PRINT
70 PI = 3.14159265359
71 VTAB 13: HTAB 12: PRINT "DEGRES          RADIANS"
75 VTAB 15: HTAB 2
80 INPUT "LATITUDE ?";LA:LA = LA * PI / 180: VTAB 14: HTAB 28: PRINT LA
85 VTAB 17: HTAB 2
90 INPUT "LONGITUDE ";LO
91 VTAB 19: HTAB 7: PRINT " J, M,  A"
95 VTAB 21: HTAB 2
100 INPUT "DATE ";J,M,A
101 GET R$
106 CALL - 936: HTAB 12: VTAB 4: PRINT "HH,MN": HTAB 30: VTAB 4: PRINT
"SECONDES"
109 HTAB 2: VTAB 6
110 INPUT "HEURE T.U.";HE,MI:HS = (HE + MI / 60) / 24: VTAB 6: HTAB 29: PRINT
HS
115 PRINT
120 J = J + HS
130 N = A * 365 + 31 * (M - 1) + J
140 IF M > 2 GOTO 160
150 A = A - 1
160 N = INT ((M - 1) * 0.4 + 2.7)
190 N = N - 694325
200 VTAB 2: PRINT "N = ";N;
205 DIM LO(15)
206 DIM LP(15)
207 DIM A(15)
208 DIM P0(7)
209 DIM PP(7): DIM O0(7): DIM OP(7): DIM E(7): DIM I(7)
210 DIM Z$(6):Z$(5) = "SAMEDI":Z$(6) = "DIMANCHE"
220 Z$(0) = "LUNDI":Z$(1) = "MARDI":Z$(2) = "MERCREDI"
230 Z$(3) = "JEUDI":Z$(4) = "VENDREDI"
240 I = INT ((N / 7 - INT (N / 7)) * 7 + 0.005)
250 REM
260 PRINT SPC( 4)Z$(I): PRINT
270 REM
271 REM *****
272 REM * CALCUL DE POSITION *
273 REM *      SOLAIRE      *
274 REM *****
280 DATA 4.8689,1.72027914E-2,4.9085,8.1856E-7,.01675104,1.00000023,3
290 READ LO,LP,P0,PP,E,A,KE
300 P = P0 + PP * N:LL = LO + LP * N:M = LL - P:MS = M
310 GOSUB 420
320 V = 2 * ATN ( TAN ( U / 2) * SQR ((1 + E) / (1 - E)))
330 R = A * (1 - E * COS (U)):L = V + P:LS = L
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340 XS = R * COS (L):YS = R * SIN (L)
350 GOSUB 470
360 VTAB 2: PRINT "LONGITUDE SOLEIL ";LD: PRINT
370 GOSUB 1170: GOSUB 1270
380 GOSUB 1080
390 AH = TS - AR
400 ZX = 90.85 * PI / 180: GOSUB 1510: GOSUB 1550
410 GOTO 510
420 U = M: REM EQU DE KEPLER
430 FOR K = 0 TO KE
440 U = M + E * SIN (U): NEXT K: RETURN
450 NEXT K
460 RETURN
470 LD = L * 180 / PI: REM TRANS RD/DEGRE
480 LD = (LD / 360 - INT (LD / 360)) * 360
490 IF LD < 0 THEN LD = LD + 360
500 LD = INT (LD * 10 + 0.5) / 10: RETURN
510 DATA 4.0117,7.14254534E-2,1.3249,7.4229E-7,0.82304,5.6618E-7,0.2056
15,0.1222,0.387098
520 DATA 3.6086,2.79631195E-2,2.2716,6.5572E-7,1.3229,4.3668E-7,0.00681
6,0.05923,0.72333
530 DATA 2.1776,9.14676584E-3,5.8338,8.793E-7,.8516,3.712E-7,0.093309,3
.2294E-2,1.523678
540 DATA 4.6879,1.4509868E-3,0.2289,857E-9,1.7358,483E-9,0.048376,0.022
84,5.202799
550 DATA 4.8567,5.8484028E-4,1.5974,412E-9,1.9686,417E-9,0.54311,435E-4
,9.552098
560 DATA 4.3224,205424E-9,2.9523,762E-9,1.2825,2.3824E-7,0.047319,1.348
2E-2,19.21694
570 DATA 1.5223,105061E-9,.7637,393E-9,2.281,525E-9,0.008262,3.1054E-2,
30.112912
580 DATA 1.6406,701214E-10,3.8978,6.672E-7,1.9034,6.672E-7,0.250236,0.2
9968,39.438712
585 DATA 2.694,3.5515529,5.9059,5.771,1.76932338,9.3969,2.597,0.8782085
9,14.989,3.091,.37648689,26.3641
588 DATA 0.434,3.32830711,4.877,4.472,2.29571836,6.246,6.081,1.39085442
,8.723,3.857,0.39404325,20.213
590 FOR J = 0 TO 7
600 READ LO(J),LP(J),PO(J),PP(J),OO(J),OP(J),E(J),I(J),A(J): NEXT J
605 FOR I = 8 TO 15: READ LO(I),LP(I),A(I): NEXT
610 VTAB 2: INPUT "ENTRER LES 2 IERES LETTRES DE L'ASTRE CHERCHE";P$
620 IF P$ = "ME" GOTO 800
630 IF P$ = "VE" GOTO 810
640 IF P$ = "MA" GOTO 820
650 IF P$ = "JU" GOTO 830
660 IF P$ = "SA" GOTO 840
670 IF P$ = "UR" GOTO 850
680 IF P$ = "NE" GOTO 860
690 IF P$ = "PL" GOTO 870
700 IF P$ = "LU" GOTO 2000
720 IF P$ = "ST" GOTO END
730 IF P$ = "ET" GOTO 2500
740 PRINT "ASTRE NON CONNU SUR LA VERSION 0.0": GET P$
750 CV = PEEK (37) - 1
760 POKE 37,CV
770 POKE 36,0
780 CALL - 958
790 GOTO 620
800 T$ = "MERCURE":J = 0:KE = 5:DO = 6.7:MO = - 0.21:A0 = 3.8:BO = - 3.
4:CO = 2: GOTO 880
810 T$ = "VENUS":J = 1:KE = 3:DO = 16.7:MO = - 4.1:A0 = 0.1:BO = 2.4:CO =
- 0.65: GOTO 880
820 T$ = "MARS":J = 2:KE = 5:DO = 9.4:MO = - 1.36:A0 = 1.5: GOTO 880
830 T$ = "JUPITER":J = 3:KE = 4:FG = 1:DO = 196.9:MO = - 9:A0 = 1.48: GOTO
880
840 T$ = "SATURNE":J = 4:KE = 4:FG = 2:DO = 165.5:MO = - 8.7:A0 = 1.7: GOTO
880

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850 T$ = "URANUS":J = 5:KE = 4:DO = 71.4:MO = - 7: GOTO 880
860 T$ = "NEPTUNE":J = 6:KE = 3:DO = 68.3:MO = - 7: GOTO 880
870 T$ = "PLUTON":J = 7:KE = 7:DO = 8.3:MO = - 1.5: GOTO 880
880 P = PO(J) + PP(J) * N:M = LO(J) + LP(J) * N - P
890 E = E(J): GOSUB 420
900 V = 2 * ATN ( TAN ( U / 2 ) * SQR ((1 + E) / (1 - E)))
910 O = OO(J) + OP(J) * N:C = V + P - O
920 IF COS (C) = 0 THEN D = C: GOTO 950
930 D = ATN ( TAN (C) * COS (I(J)))
940 IF COS (C) < 0 THEN D = D + PI
950 LH = D + O
960 BS = ATN ( SIN (D) * TAN (I(J)))
970 RS = A(J) * (1 - E * COS (U))
980 XP = RS * COS (BS) * COS (LH) + XS:YP = RS * COS (BS) * SIN (LH) +
    YS:ZP = RS * SIN (BS)
990 R = SQR (XP * XP + YP * YP):B = ATN (ZP / R):L = ATN (YP / XP)
1000 IF XP < 0 THEN L = L + PI
1010 GOSUB 470
1020 HOME : PRINT TAB( 17)T$
1030 PRINT : HTAB 2: PRINT "POSITION A ";HE;" H ";MI;" T.U."
1040 PRINT : HTAB 2: PRINT "LONGITUDE ";LD;
1050 PRINT SPC( 2)"LATITUDE "; INT (B * 18000 / PI + 0.5) / 100
1060 PRINT
1070 GOSUB 1000: GOTO 1130
1080 REM *****
1081 REM * CALCUL DU TSL *
1082 REM *****
1090 RD = 1.7273 + 1.72027914E - 2 * N + HS * 2 * PI - LO * PI / 180
1100 GOTO 1300
1110 TS = RD
1120 RETURN
1130 GOSUB 1170: GOSUB 1270
1140 GOSUB 1360: GOSUB 3510
1150 GOSUB 1510: GOSUB 1550
1160 GET S$: IF S$ = "F" THEN END
1165 GOTO 610
1170 REM *****
1171 REM *DECLINAISON CALCUL*
1172 REM * ET ASCENSION DR. *
1173 REM *****
1180 EP = 0.40927971
1190 SD = COS (EP) * SIN (B) + SIN (EP) * COS (B) * SIN (L)
1200 DE = ATN (SD / SQR (1 - SD * SD))
1210 SR = - SIN (EP) * SIN (B) + COS (EP) * COS (B) * SIN (L)
1220 RD = ATN (SR / COS (B) / COS (L))
1230 IF COS (B) * COS (L) < 0 THEN RD = RD + PI
1250 AR = RD: GOSUB 1300
1260 GOSUB 1320: RETURN
1270 VTAB 10: HTAB 2: PRINT "ASCENSION DROITE (AR)";H;" H ";M;" M ";S;"
    S ";
1278 VTAB 12: HTAB 2
1279 AA = ( INT (DE * 18000 / PI + .5) / 100)
1280 PRINT SPC( 4)"DECLINAISON " ;AA: PRINT
1290 RETURN
1300 RD = (RD / 2 / PI - INT (RD / 2 / PI)) * 2 * PI
1305 IF RD < 0 THEN RD = RD + 2 * PI
1310 RETURN
1320 H = INT (RD / PI * 12)
1330 M = INT ((RD - H * PI / 12) * 720 / PI)
1340 S = INT ((RD - H * PI / 12 - M * PI / 720) * 43200 / PI)
1350 RETURN
1360 REM *****
1361 REM *CALC.HAUTEUR+AZIM.*
1362 REM *****
1370 AH = TS - AR
1380 ZC = SIN (LA) * SIN (DE) + COS (LA) * COS (DE) * COS (AH)
1390 HT = ATN (ZC / SQR (- ZC * ZC + 1))

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1400 AS = COS (DE) * SIN (AH) / COS (HT)
1410 AC = ( - COS (LA) * SIN (DE) + SIN (LA) * COS (DE) * COS (AH)) /
      COS (HT)
1420 AZ = ATN (AS / AC)
1430 IF AC < 0 THEN AZ = AZ + PI
1440 LJ = L:L = AZ: GOSUB 470
1450 PRINT : HTAB 2: PRINT "AZIMUT ";LD;
1460 HD = HT * 180 / PI:HD = INT (HD * 10 + 0.5) / 10
1470 PRINT SPC( 3)"HAUTEUR ";HD
1480 IF HD < 0 THEN PRINT "   INVISIBLE A ";HE;" H ";MI;" (TU) ": GOTO
      1500
1490 IF HD < 10 THEN PRINT "   DIFFICILEMENT VISIBLE A L'HORIZON "
1500 RETURN
1510 REM *****
1511 REM *CALCUL SUNRISE/SET*
1512 REM *****
1520 ZX = 90.58 * PI / 180
1530 HC = ( COS (ZX) - SIN (LA) * SIN (DE)) / COS (LA) / COS (DE)
1535 IF HC >= 1 THEN PRINT "CALCUL SUNRISE/SET IMPOSSIBLE"
1540 HL = - ATN (HC / SQR ( - HC * HC + 1)) + PI / 2: RETURN
1550 HZ = 2 * P * HS - AH:RD = HZ - HL
1560 GOSUB 1300: GOSUB 1320
1570 PRINT : VTAB 16: HTAB 2: PRINT "LEVER ";H;" H ";M;" MN ";
1580 RD = HZ + HL
1590 GOSUB 1300: GOSUB 1320
1600 VTAB 17: HTAB 2: PRINT "COUCHER ";H;" H ";M;" MN ";
1610 IF FG = 1 OR FG = 2 GOTO 1650
1620 PRINT : RETURN
1650 PRINT : VTAB 20: HTAB 2: INPUT " SATELLITE Y/N ";S$
1660 IF S$ = "N" THEN FG = 0: PRINT : RETURN
1665 IF S$ < "Y" THEN GOTO 1650
1690 IF FG = 2 THEN GOTO 1720
1700 FOR I = 8 TO 11
1705 SS(I - 8) = LO(I) + LP(I) * (N - R / 173) - LJ
1710 EL(I - 8) = A(I) * SIN (SS(I - 8))
1715 NEXT
1716 GOTO 1750
1720 FOR I = 12 TO 15
1725 SS(I - 8) = LO(I) * LP(I) * (N - R / 173) - LJ
1730 EL(I - 8) * A(I) * SIN (SS(I - 8))
1735 NEXT
1740 HOME : VTAB 15: GOTO 1821

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5RUN

EPHEMERIDES

STARDUST 0.0

COORDONNEES DU LIEU D'OBSERVATION
 EN DEGRES ET DECIMALES USUELLES
 (LONGITUDE < 0 A L'EST DE GREENWICH)

DEGRES	RADIANS		
LATITUDE 250			
	.872664626	LONGITUDE SOLEIL 285.4	
LONGITUDE -2.3			
J, M, A		ASCENSION DROITE (AR)19 H 7 M 1 S	DECLINAISON
DATE 1,9,1990			
HH,MN			
HEURE T.U.10,20	SECONDES	LEVER 5 H 17 MN COUCHER 13 H 29 MN	
	.430555556		

N = -694320 JEUDI