PN-AAR-533 [redacted]
ISN: 37419

Intsormil

CLIGEN — A Computer Program that Generates Daily Agroclimatic Parameters from Simple Climatic Data

INTSORMIL Project Report UN 8
R.E. Neild 377 Plant Science
University of Nebraska
Lincoln, Nebraska
U.S.A. 68583

☆ International Sorghum/Millet

☆ Collaborative Research Support Program (CRSP)

A Research Development Program of the Agency for International Development, Participating Land-Grant Universities, Host County Research Agencies and Private Donors.

Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln

INTRODUCTION

INTSORMIL, THE INTENATIONAL SORGHUM/MILLET COLLABORATIVE RESEARCH PROGRAM OF THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT IS DIRECTED TOWARD IMPROVING SORGHUM/MILLET PRODUCTION IN LESSER DEVELOPED AREAS OF THE WORLD WHERE YIELDS ARE LOW. INTSORMIL IS COMPOSED OF A VARIETY OF PROJECTS CONCERNED WITH CULTURAL PRACTICES, PHYSIOLOGY, BREEDING AND GENETICS, ENTOMOLOGY, PLANT PATHOLOGY, STORAGE, UTILIZATION, NUTRITION AND SOCIO-ECONOMIC PROBLEMS. THESE PROJECTS ARE LED BY 22 SCIENTISTS FROM AGRICULTURAL EXPERIMENT STATIONS CONCERNED WITH SORGHUM/MILLET IN 8 DIFFERENT STATES. AT PRESENT, RESEARCH ACTIVITIES ARE LINKED WITH OTHER SCIENTISTS AND/OR STUDENTS IN 12 DIFFERENT COUNTRIES. INTSORMIL HAS COOPERATIVE RELATIONSHIPS WITH THE FOLLOWING OTHER INTERNATIONAL RESEARCH CENTERS:

CIAT (INTERNATIONAL CENTER FOR TROPICAL AGRICULTURE)

CIMMYT (INTERNATIONAL MAIZE AND WHEAT IMPROVEMENT CENTER

ICRISAT (INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMIARID TROPICS)

IRRI (INTERNATIONAL RICE RESEARCH INSTITUTE)

SAFGRAD (SEMIARID FOOD GRAIN RESEARCH AND DEVELOPMENT)

THE SUCCESS OR FAILURE OF PROGRAMS FOR DEVELOPING AND INTRODUCING NEW STRAINS OF CROPS OR TRANSFERRING IMPROVED TECHNOLOGY FROM ONE REGION TO ANOTHER IS CLOSELY RELATED TO SIMILARITIES OF CLIMATE DURING THE SEASON WHEN THE CROP MAY BE GROWN. AGROCLIMATIC ANALYSES, THEREFORE, ARE FUNDAMENTAL IN AGRICULTURE DEVELOPMENT. THEY PROVIDE IMPORTANT INFORMATION FOR THOSE ADMINISTRATING AND COORDINATING COMPLEX PROGRAMS FOR INTERNATIONAL SCOPE AS WELL AS TO SPECIALISTS INVOLVED WITH SPECIFIC DETAILS OF DIFFERENT RESEARCH DISCIPLINES. SUCH ANALYSIS ALSO HAS USEFUL APPLICATION IN ASSESSING CONDITIONS IN AREAS WHERE PRODUCTION INFORMATION IS NOT RECORDED OR IS OTHERWISE NOT AVAILABLE. INTSORMIL PROJECT NU 8 CONCERNS THE AGRICULTURAL CLIMATOLOGY OF SORGHUM/MILLET. REPORTED HERE IS A PROCEDURE FOR CONVERTING SIMPLE CLIMATIC DATA INTO DAILY CLIMATIC PARAMETERS THAT ARE NEEDED FOR AGROCLIMATIC ANALYSIS.

CLIMATIC DATA

THE MOST COMMON AND OFTEN ONLY CLIMATIC DATA AVAILABLE FOR MANY LOCATIONS ARE SUMMARIES OF MONTHLY AVERAGES OF TEMPERATURE AND PRECIPITATION. THIS IS PARTICULARLY TRUE FOR MANY 'THIRD WORLD' COUNTRIES WHERE SORGHUM/MILLET ARE PRINCIPAL FOOD CROPS. WORLD CLIMATIC DATA BY WERNSTEDT* CONTAINS MONTHLY SUMMARIES FOR OVER 18,000 LOCATIONS. THIS IS THE MOST COMPREHENSIVE COLLECTION OF CLIMATIC DATA IN A SINGLE VOLUME AND IS A VALUABLE CONVENIENT INFORMATION SOURCE. THESE DATA DESCRIBE THE GENERAL CLIMATIC CHARACTERISTICS OF REGIONS THROUGHOUT THE WORLD AND ARE USEFUL FOR COMPARING ONE LOCATION WITH ANOTHER. THEY SHOW SEASONAL PATTERNS ON A MONTHLY BASIS AND CAN BE USED TO SCHEDULE A CALENDAR OF CERTAIN EVENTS.

HOWEVER, SUMMARIES OF WEATHER NORMALS ON FIXED TIME PERIODS OF ONE MONTH ARE TOO LONG AND OUT OF PHASE WITH CRITICAL STAGES OF CROP DEVELOPMENT AND ESSENTIAL FIELD OPERATIONS SUCH THAT THEIR USE IN AGRICULTURE IS LIMITED. PLANT GROWTH AND DEVELOPMENT, THOUGH TIME RELATED IN A SPECIFIC AREA, ARE MORE CLOSELY RELATED TO CRITICAL VALUES IN THE RISE AND FALL OF SEASONAL TEMPERATURE, PRECIPITATION AND DAYLENGTH PATTERNS AND THEIR INTERACTIVE EFFECTS ON BIOLOGICAL PROCESSES. THEY ARE ALSO RELATED TO ACCUMULATIONS OF TEMPERATURE AND PRECIPITATION BETWEEN PHENOLOGICAL STAGES AND TO CONDITIONS WHEN ESSENTIAL OPERATIONS SUCH AS PLANTING AND HARVEST MUST BE PERFORMED.

DAILY TEMPERATURE, PRECIPITATION, DAYLENGTH AND OTHER DERIVED PARAMETERS ARE NEEDED TO DETERMINE GROWING SEASON AND TO EVALUATE THE EXPECTED RESPONSE OF DIFFERENT CROPS AND CROP MATURITIES PLANTED AT DIFFERENT TIMES WITHIN THESE SEASONS. DAILY WEATHER PARAMETERS ARE ALSO NEEDED TO ASSES CHANGE IN CROP-WEATHER CONDITIONS ON A 'REAL TIME' BASIS TO DETERMINE IF CROP DEVELOPMENT OR THE SEASON IS AHEAD OR BEHIND NORMAL AND BY HOW MANY DAYS, DEGREES, MILLIMETERS OR BY WHAT PERCENT. IT IS NECESSARY TO WAIT UNTIL THE END OF EACH MONTH TO

MAKE SUCH ASSESSMENTS WHEN ONLY MONTHLY WEATHER NORMALS ARE AVAILABLE. THIS IS OFTEN TOO LATE FOR CERTAIN DECISIONS EVEN IF CROP ASSESSMENT MODELS BASED ON MONTHLY DATA ARE SUFFICIENTLY SENSITIVE TO MEASURE THE EFFECTS OF SEASONAL CHANGES. CLIGEN IS AN INTERACTIVE COMPUTER PROGRAM DEVELOPED BY DOUGLAS SMITH OF BELIZE, JOANNE LOGAN OF THE U.S.A. (GRADUATE STUDENTS AT THE UNIVERSITY OF NEBRASKA SUPPORTED IN PART BY INTSORMIL) AND R. E. NEILD, (NU 8 PROJECT LEADER) THAT WILL DERIVE SETS OF DAILY PARAMETERS FROM SIMPLE CLIMATIC DATA. IT IS DESCRIBED AND LISTED IN THE FOLLOWING SECTION WITH EXAMPLE TABLES OF DAILY DATA FOR LINCOLN, NEBRASKA, U.S.A.; MOROGORO, TANZANNIA; OUAGADOUGU, UPPER VOLTA; HYDERABAD, INDIA; SHENYANG, CHINA; AND RAFAELA, ARGENTINA.

* WORLD CLIMATIC DATA
  FREDERICK L. WERNSTEDT
  CLIMATIC DATA PRESS
  P. O. BOX 413
  LEMONT, PENNSYLVANIA 16851
  1972

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cligen

CLIGEN IS A PROGRAM WHICH GENERATES DAILY ESTIMATES OF CLIMATIC DATA.

DO YOU WANT A DESCRIPTION OF CLIGEN ? PLEASE ANSWER YES OR NO
,yes

     CLIGEN IS A PROGRAM THAT COMPUTES DAILY WEATHER DATA
THAT ARE MORE CROP SPECIFIC. THIS IS OFTEN NECESSARY BECAUSE
CLIMATIC DATA ARE USUALLY PUBLISHED AS MONTHLY AVERAGES WHICH
ARE TOO LONG AND OUT OF PHASE WITH CRITICAL PHENOLOGICAL CROP
STAGES I.E. PLANTING, EMERGENCE, HEADING, ANTHESIS, FLOWERING,
MATURITY, HARVEST, ETC.

     THIS PROGRAM WILL GENERATE DAILY ESTIMATES AND DAILY ACC-
UMULATED TOTALS OF TEMPERATURE AND PRECIPITATION FROM CLIMATO-
LOGICAL SUMMARIES OF MONTHLY NORMAL TEMPERATURES AND MONTHLY
NORMAL PRECIPITATION. THE PROGRAM WILL ALSO DERIVE SUCH QUAN-
TITIES AS: GROWING DEGREE DAYS, HEATING DEGREE DAYS, COOLING
DEGREE DAYS, POTENTIAL EVAPOTRANSPIRATION AND DAYLENGTHS FOR
A SPECIFIC LOCATION.

     THE USER HAS SEVENTEEN OPTIONS FROM WHICH TO CHOOSE. DE-
PENDING ON THE CHOICE, THE PROGRAM WILL PROMPT THE USER TO EN-
TER ONE OR MORE OF THE FOLLOWING: THE STATION NAME, STATION
LATITUDE, TWELVE AVERAGE MONTHLY TEMPERATURES OR TWELVE AVERAGE
MONTHLY PRECIPITATION VALUES. THE PROGRAM THEN RESPONDS BY RETUR-
NING AVERAGE DAILY ESTIMATES OF THE REQUESTED VARIABLE.

     THE BASIS FOR COMPUTING DAILY TEMPERATURES FROM MONTHLY
AVERAGES LIES IN THE FACT THAT ANNUAL TEMPERATURE VARIATION AT
A GEOGRAPHICAL LOCATION IS ESSENTIALLY PERIODIC AND IS DUE
MAINLY TO CHANGES IN THE POSITION OF THE SUN. THEREFORE, A PER-
IODIC REGRESSION MODEL WAS USED TO DESCRIBE TEMPERATURE AS A
FUNCTION OF TIME. IN CONTRAST TO TEMPERATURE, ANNUAL PRECIPITA-
TION AT A GIVEN LOCATION IS USUALLY MUCH MORE VARIABLE AND IS
MORE SUBJECT TO REGIONAL AND LOCAL INFLUENCES. A HALFING PROCE-
DURE, SIMILAR TO A NUMERICAL INTEGRATION PROCEDURE, WAS USED TO
PRODUCE DAILY ESTIMATES OF PRECIPITATION FROM MONTHLY NORMALS.

PREPARED BY: DOUGLAS T. SMITH, JOANNE LOGAN AND RALPH E. NEILD.
FOR FURTHER INFORMATION CALL (402) 472-1639.

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.help
 OPTIONS AVAILABLE FOR SINGLE VARIABLE

 OPTIONS                                          REQUIRED INPUT
 -------                                          --------------

  1. TABLE OF JULIAN DAYS.                         NONE
  2. HARMONIC ANALYSIS ON TEMPERATURES.            TEMPERATURES
  3. DAILY ESTIMATED TEMPERATURES.                 TEMPERATURES
  4. DAILY ESTIMATED GDD40.                        TEMPERATURES
  5. DAILY ACCUMULATED GDD40.                      TEMPERATURES
  6. DAILY ESTIMATED GDD50.                        TEMPERATURES
  7. DAILY ACCUMULATED GDD50.                      TEMPERATURES
  8. DAILY ESTIMATED HDD65.                        TEMPERATURES
  9. DAILY ACCUMULATED HDD65.                      TEMPERATURES
  10.DAILY ESTIMATED CDD65.                        TEMPERATURES
  11.DAILY ACCUMULATED CDD65.                      TEMPERATURES
  12.DAILY ESTIMATED PET.                          TEMP./STATION LATITUDE
  13.DAILY ESTIMATED .5 PET.                       TEMP./STATION LATITUDE
  14.DAILY DIFFERENCES OF PRECIP.-PET              TEMP/LAT/PRECIP
  15.DAILY ESTIMATED PRECIPITATION.                PRECIPITATION
  16.DAILY ACCUMULATED PRECIPITATION.              PRECIPITATION
  17.DAILY DAYLENGTHS AT A LOCATION.               LATITUDE

 PLEASE ENTER A CODE NUMBER FROM 1 TO 17 TO REQUEST THE VARIABLE
 WHICH YOU WOULD LIKE TO SEE. IF YOU WANT A LIST OF VARIABLES,
 THEN TYPE HELP AND PRESS RETURN.
 (OR CONTACT DR. RALPH NEILD/(402) 472-1639).

.1
      ****************************************************
      *                                                  *
      * TO SEE A SAMPLE PRINT-OUT FOR ANY SELECTED OPTION, *
      * PLEASE PRESS RETURN IN PLACE OF INPUT DATA. ALL  *
      * SAMPLE OUTPUT ARE IN SI UNITS, EXCEPT OPTIONS 1 & 2*
      *                                                  *
      ****************************************************

 ENTER :
 STATION NAME. (CITY, STATE OR COUNTRY) E.G. LINCOLN, NEBRASKA.
```

JULIAN DAYS CONVERSION. LINCOLN, NEBRASKA.

UNITS: NONE. JULIAN DAY NUMBER OF THE YEAR.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1.	32.	60.	91.	121.	152.	182.	213.	244.	274.	305.	335
2	2.	33.	61.	92.	122.	153.	183.	214.	245.	275.	306.	336
3	3.	34.	62.	93.	123.	154.	184.	215.	246.	276.	307.	337
4	4.	35.	63.	94.	124.	155.	185.	216.	247.	277.	308.	338
5	5.	36.	64.	95.	125.	156.	186.	217.	248.	278.	309.	339
6	6.	37.	65.	96.	126.	157.	187.	218.	249.	279.	310.	340
7	7.	38.	66.	97.	127.	158.	188.	219.	250.	280.	311.	341
8	8.	39.	67.	98.	128.	159.	189.	220.	251.	281.	312.	342
9	9.	40.	68.	99.	129.	160.	190.	221.	252.	282.	313.	343
10	10.	41.	69.	100.	130.	161.	191.	222.	253.	283.	314.	344
11	11.	42.	70.	101.	131.	162.	192.	223.	254.	284.	315.	345
12	12.	43.	71.	102.	132.	163.	193.	224.	255.	285.	316.	346
13	13.	44.	72.	103.	133.	164.	194.	225.	256.	286.	317.	347
14	14.	45.	73.	104.	134.	165.	195.	226.	257.	287.	318.	348
15	15.	46.	74.	105.	135.	166.	196.	227.	258.	288.	319.	349
16	16.	47.	75.	106.	136.	167.	197.	228.	259.	289.	320.	350
17	17.	48.	76.	107.	137.	168.	198.	229.	260.	290.	321.	351
18	18.	49.	77.	108.	138.	169.	199.	230.	261.	291.	322.	352
19	19.	50.	78.	109.	139.	170.	200.	231.	262.	292.	323.	353
20	20.	51.	79.	110.	140.	171.	201.	232.	263.	293.	324.	354
21	21.	52.	80.	111.	141.	172.	202.	233.	264.	294.	325.	355
22	22.	53.	81.	112.	142.	173.	203.	234.	265.	295.	326.	356
23	23.	54.	82.	113.	143.	174.	204.	235.	266.	296.	327.	357
24	24.	55.	83.	114.	144.	175.	205.	236.	267.	297.	328.	358
25	25.	56.	84.	115.	145.	176.	206.	237.	268.	298.	329.	359
26	26.	57.	85.	116.	146.	177.	207.	238.	269.	299.	330.	360
27	27.	58.	86.	117.	147.	178.	208.	239.	270.	300.	331.	361
28	28.	59.	87.	118.	148.	179.	209.	240.	271.	301.	332.	362
29	29.	***	88.	119.	149.	180.	210.	241.	272.	302.	333.	363.
30	30.	***	89.	120.	150.	181.	211.	242.	273.	303.	334.	364.
31	31.	***	90.	***	151.	***	212.	243.	***	304.	***	365.

```
PLEASE ENTER A CODE NUMBER FROM 1 TO 17 TO REQUEST THE VARIABLE
WHICH YOU WOULD LIKE TO SEE. IF YOU WANT A LIST OF VARIABLES,
THEN TYPE HELP AND PRESS RETURN.
(OR CONTACT DR. RALPH NEILD/(402) 472-1639).

2
     ****************************************************
     *                                                  *
     * NOTE: THE OUTPUT UNITS REQUESTED FOR TEMPERATURE *
     * WILL DETERMINE THE POTENTIAL EVAPOTRANSPIRATION  *
     * OUTPUT UNITS, I.E. SI OR ENGLISH. TYPE HELP FOR  *
     * ADDITIONAL DETAILS.                              *
     *                                                  *
     ****************************************************

ENTER :
12 MONTHLY NORMAL TEMPERATURES FOLLOWED BY ONE OF THESE
COMBINATIONS TO INDICATE YOUR INPUT/OUTPUT UNITS:
FF FC CF CC, NOTATION: F (FAHRENHEIT), C (CELSIUS).

>help
    CODES          MEANING
    -----          --------
     FF            EXPECTING INPUT TEMPERATURES IN        F
                   WILL PRINT OUTPUT IN                   F

     FC            EXPECTING INPUT TEMPERATURES IN        F
                   WILL PRINT OUTPUT IN                   C

     CF            EXPECTING INPUT TEMPERATURES IN        C
                   WILL PRINT OUTPUT IN                   F

     CC            EXPECTING INPUT TEMPERATURES IN        C
                   WILL PRINT OUTPUT IN                   C

EXAMPLE:
22.2 27.9 36.5 51.3 62.0 72.0 77.3 75.6 65.6 54.9 39.0 27.3 FC
```

```
RESULTS OF HARMONIC ANALYSIS
SHOWING TEMPERATURES AS FUNCTION OF TIME.

INPUT (F)  22.3 27.9 36.5 51.3 62.1 72.0 77.0 75.6 65.7 54.9 39.0 27.3

OUTPUT FOR LINCOLN, NEBRASKA.

 XBAR    MEAN ANNUAL TEMPERATURE          (F)        50.9449158
 X1/B1   COEFF. OF 1ST. COSINE TERM IN MODEL          25.2816315
 X2/A1   COEFF. OF 1ST. SINE   TERM IN MODEL          -7.68410683
 X3/B2   COEFF. OF 2ND. COSINE TERM IN MODEL          -1.71686363
 X4/A2   COEFF. OF 2ND. SINE   TERM IN MODEL           0.00100803

 C1      AMPLITUDE OF THE FIRST HARMONIC (F)          52.8471985
 C2      AMPLITUDE OF THE SECOND HARMONIC(F)           3.43372726
 T1      TIME OF MAX. OCCURRENCE OF 1ST. (JULN)      199.640930
 T2      TIME OF MAX. OCCURRENCE OF 2ND. (JULN)       91.2670280
 SXSQ    VARIANCE OF INPUT DATA          (F**2)      362.129883
 V1      VARIANCE ACCOUNTED FOR BY 1ST.  (%)          96.4027252
 V2      VARIANCE ACCOUNTED FOR BY 2ND.  (%)           0.40698373
 VT      TOTAL VARIANCE EXPLAINED BY 1&2 (%)          96.8097076
```

1

DO YOU WANT INFORMATION ABOUT THE HARMONIC
REGRESSION MODEL USED, INCLUDING SOME REFERENCES

.yes

THE MODEL FOR THE FIRST TWO HARMONICS IS GIVEN BY :

X(DAY) = XBAR + A1 SIN(2 PI DAY/365) + B1 COS(2 PI DAY/365) +
A2 SIN(4 PI DAY/365) + B2 COS(4 PI DAY/365)

WHERE X(DAY) IS THE ESTIMATE OF DAILY AVERAGE TEMPERATURE (F
ON A GIVEN JULIAN CALENDAR DAY OF THE YEAR. AND THE
VARIABLE DAY IS A NUMBER BETWEEN 1 AND 365.

FOR FURTHER REFERENCES SEE :

1. BLISS, C.I. (1958) PERIODIC REGRESSION IN BIOLOGY AND CLIMATOLOGY. THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION. BULLETIN 615.

2. BROOKS, C.E.P. AND CARRUTHERS, N. (1953) HANDBOOK OF STATISTICAL METHODS IN METEOROLOGY. HER MAJESTYS STATIONERY OFFICE, LONDON.

3. NEILD, R.E., SEELEY, M.W. AND RICHMAN, N.H. (1978) THE COMPUTATION OF AGRICULTURALLY ORIENTED NORMALS FROM MONTHLY CLIMATIC SUMMARIES. AGRICULTURAL METEOROLOGY, 19: 181-187.

4. PANOFSKY, H.A. AND BRIER, G.W. (1958) SOME APPLICATIONS OF STATISTICS TO METEOROLOGY. THE PENNSYLVANIA STATE UNIVERSITY.

PLEASE ENTER A CODE NUMBER FROM 1 TO 17 TO REQUEST THE VARIABLE
WHICH YOU WOULD LIKE TO SEE. IF YOU WANT A LIST OF VARIABLES,
THEN TYPE HELP AND PRESS RETURN.
(OR CONTACT DR. RALPH NEILD/(402) 472-1639).

.3
DAILY ESTIMATED TEMPERATURES FOR: LINCOLN, NEBRASKA.

UNITS: FAHRENHEIT OR CELSIUS. DEPENDS ON USER REQUEST.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-5.	-4.	0.	7.	14.	20.	24.	24.	22.	16.	7.	-0.
2	-5.	-4.	0.	7.	14.	20.	24.	24.	21.	15.	7.	-0.
3	-5.	-4.	1.	8.	15.	20.	24.	24.	21.	15.	7.	-0.
4	-5.	-4.	1.	8.	15.	21.	24.	24.	21.	15.	7.	-1.
5	-5.	-4.	1.	8.	15.	21.	24.	24.	21.	15.	6.	-1.
6	-5.	-4.	1.	8.	15.	21.	24.	24.	21.	14.	6.	-1.
7	-5.	-3.	1.	9.	15.	21.	24.	24.	21.	14.	6.	-1.
8	-5.	-3.	2.	9.	16.	21.	24.	24.	21.	14.	6.	-1.
9	-5.	-3.	2.	9.	16.	21.	24.	24.	20.	14.	5.	-2.
10	-5.	-3.	2.	9.	16.	21.	24.	24.	20.	13.	5.	-2.
11	-5.	-3.	2.	10.	16.	22.	24.	24.	20.	13.	5.	-2.
12	-5.	-3.	2.	10.	16.	22.	24.	24.	20.	13.	4.	-2.
13	-5.	-3.	3.	10.	17.	22.	24.	24.	20.	13.	4.	-2.
14	-5.	-3.	3.	10.	17.	22.	24.	24.	19.	12.	4.	-2.
15	-5.	-2.	3.	11.	17.	22.	24.	24.	19.	12.	4.	-3.
16	-5.	-2.	3.	11.	17.	22.	24.	23.	19.	12.	3.	-3.
17	-5.	-2.	4.	11.	17.	22.	24.	23.	19.	12.	3.	-3.
18	-5.	-2.	4.	11.	18.	22.	24.	23.	19.	11.	3.	-3
19	-5.	-2.	4.	11.	18.	22.	24.	23.	18.	11.	3.	-3
20	-5.	-2.	4.	12.	18.	23.	24.	23.	18.	11.	2.	-3
21	-5.	-1.	5.	12.	18.	23.	24.	23.	18.	10.	2.	-3
22	-5.	-1.	5.	12.	18.	23.	24.	23.	18.	10.	2.	-4
23	-5.	-1.	5.	12.	19.	23.	24.	23.	18.	10.	2.	-4
24	-5.	-1.	5.	13.	19.	23.	24.	23.	17.	10.	1.	-4
25	-5.	-1.	5.	13.	19.	23.	24.	23.	17.	9.	1.	-4
26	-5.	-0.	6.	13.	19.	23.	24.	22.	17.	9.	1.	-4
27	-5.	-0.	6.	13.	19.	23.	24.	22.	17.	9.	1.	-4
28	-4.	-0.	6.	14.	19.	23.	24.	22.	16.	9.	1.	-4
29	-4.	***	6.	14.	20.	23.	24.	22.	16.	8.	0.	-4
30	-4.	***	7.	14.	20.	24.	24.	22.	16.	8.	0.	-4
31	-4.	***	7.	***	20.	***	24.	22.	***	8.	***	-4

PLEASE ENTER A CODE NUMBER FROM 1 TO 17 TO REQUEST THE VARIABLE
WHICH YOU WOULD LIKE TO SEE. IF YOU WANT A LIST OF VARIABLES,
THEN TYPE HELP AND PRESS RETURN.
(OR CONTACT DR. RALPH NEILD/(402) 472-1639).

DAILY ESTIMATED GROWING DEGREE DAYS (BASE 40) FOR: LINCOLN, NEBRASKA.

UNITS: FAHRENHEIT OR CELSIUS. DEPENDS ON USER REQUEST.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.	0.	0.	3.	10.	16.	19.	20.	17.	11.	3.	0.
2	0.	0.	0.	3.	10.	16.	19.	20.	17.	11.	3.	0.
3	0.	0.	0.	3.	10.	16.	19.	20.	17.	11.	2.	0.
4	0.	0.	0.	3.	10.	16.	19.	20.	17.	11.	2.	0.
5	0.	0.	0.	4.	11.	16.	19.	20.	17.	10.	2.	0.
6	0.	0.	0.	4.	11.	16.	19.	20.	16.	10.	2.	0.
7	0.	0.	0.	4.	11.	17.	20.	20.	16.	10.	1.	0.
8	0.	0.	0.	4.	11.	17.	20.	20.	16.	9.	1.	0.
9	0.	0.	0.	5.	11.	17.	20.	20.	16.	9.	1.	0.
10	0.	0.	0.	5.	12.	17.	20.	19.	16.	9.	1.	0.
11	0.	0.	0.	5.	12.	17.	20.	19.	16.	9.	0.	0.
12	0.	0.	0.	5.	12.	17.	20.	19.	15.	8.	0.	0.
13	0.	0.	0.	6.	12.	17.	20.	19.	15.	8.	0.	0.
14	0.	0.	0.	6.	12.	17.	20.	19.	15.	8.	0.	0.
15	0.	0.	0.	6.	13.	18.	20.	19.	15.	8.	0.	0.
16	0.	0.	0.	6.	13.	18.	20.	19.	15.	7.	0.	0.
17	0.	0.	0.	7.	13.	18.	20.	19.	14.	7.	0.	0.
18	0.	0.	0.	7.	13.	18.	20.	19.	14.	7.	0.	0.
19	0.	0.	0.	7.	13.	18.	20.	19.	14.	7.	0.	0.
20	0.	0.	0.	7.	14.	18.	20.	19.	14.	6.	0.	0.
21	0.	0.	0.	7.	14.	18.	20.	19.	14.	6.	0.	0.
22	0.	0.	0.	8.	14.	18.	20.	18.	13.	6.	0.	0.
23	0.	0.	1.	8.	14.	18.	20.	18.	13.	5.	0.	0.
24	0.	0.	1.	8.	14.	19.	20.	18.	13.	5.	0.	0.
25	0.	0.	1.	8.	14.	19.	20.	18.	13.	5.	0.	0.
26	0.	0.	1.	9.	15.	19.	20.	18.	12.	5.	0.	0.
27	0.	0.	1.	9.	15.	19.	20.	18.	12.	4.	0.	0.
28	0.	0.	2.	9.	15.	19.	20.	18.	12.	4.	0.	0.
29	0.	***	2.	9	15.	19.	20.	18.	12.	4.	0.	0.
30	0.	***	2.	10.	15.	19.	20.	17.	11.	4.	0.	0.
31	0.	***	2.	***	15.	***	20.	17.	***	3.	***	0.

.5

DAILY ACCUMULATED GROWING DEGREE DAYS (BASE 40) FOR: LINCOLN, NEBRASKA.

UNITS: FAHRENHEIT OR CELSIUS. DEPENDS ON USER REQUEST

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.	0.	0.	17.	209.	609.	1139.	1752.	2335.	2766.	2985.	3000.
2	0.	0.	0.	20.	218.	625.	1158.	1772.	2352.	2777.	2988.	3000.
3	0.	0.	0.	23.	229.	641.	1177.	1792.	2369.	2788.	2990.	3000.
4	0.	0.	0.	26.	239.	657.	1196.	1812.	2386.	2798.	2992.	3000.
5	0.	0.	0.	30.	250.	673.	1216.	1832.	2402.	2808.	2994.	3000.
6	0.	0.	0.	34.	260.	690.	1235.	1851.	2419.	2818.	2996.	3000.
7	0.	0.	0.	38.	271.	706.	1255.	1871.	2435.	2828.	2997.	3000.
8	0.	0.	0.	42.	283.	723.	1274.	1891.	2451.	2838.	2998.	3000.
9	0.	0.	0.	47.	294.	740.	1294.	1910.	2467.	2847.	2999.	3000
10	0.	0.	0.	52.	306.	757.	1314.	1930.	2483.	2856.	3000.	3000.
11	0.	0.	0.	57.	318.	774.	1334.	1949.	2498.	2865.	3000.	3000.
12	0.	0.	0.	62.	330.	791.	1353.	1968.	2514.	2873.	3000.	3000.
13	0.	0.	0.	68.	342.	808.	1373.	1988.	2529.	2881.	3000.	3000
14	0.	0.	0.	74.	354.	826.	1393.	2007.	2544.	2889.	3000.	3000
15	0.	0.	0.	80.	367.	843.	1413.	2026.	2558.	2897.	3000.	3000
16	0.	0.	0.	86.	380.	861.	1433.	2045.	2573.	2904.	3000.	3000
17	0.	0.	0.	93.	393.	879.	1453.	2064.	2587.	2911.	3000.	3000
18	0.	0.	0.	99.	406.	897.	1473.	2083.	2602.	2918.	3000.	3000
19	0.	0.	0.	106.	419.	915.	1493.	2102.	2616.	2925.	3000.	3000
20	0.	0.	0.	114.	433.	933.	1513.	2120.	2629.	2931.	3000.	3000.
21	0.	0.	0.	121.	447.	951.	1533.	2139.	2643.	2937.	3000.	3000.
22	0.	0.	0.	129.	461.	969.	1553.	2157.	2656.	2943.	3000.	3000.
23	0.	0.	1.	137.	475.	988.	1573.	2176.	2669.	2948.	3000.	3000
24	0.	0.	2.	145.	489.	1006.	1593.	2194.	2682.	2953.	3000.	3000
25	0.	0.	3.	153.	504.	1025.	1613.	2212.	2695.	2958.	3000.	3000.
26	0.	0.	4.	162.	518.	1044.	1633.	2230.	2707.	2963.	3000.	3000
27	0.	0.	5.	171.	533.	1063.	1653.	2248.	2719.	2967.	3000.	3000.
28	0.	0.	7.	180.	548.	1081.	1673.	2266.	2731.	2971.	3000.	3000.
29	0.	***	9.	189.	563.	1100.	1693.	2283.	2743.	2975.	3000.	3000
30	0.	***	11.	199.	578.	1119.	1713.	2301.	2755.	2979.	3000.	3000
31	0.	***	14.	***	594.	***	1732.	2318.	***	2982.	***	3000

9

ENTER :
12 MONTHLY NORMAL TEMPERATURES FOLLOWED BY ONE OF THESE
COMBINATIONS TO INDICATE YOUR INPUT/OUTPUT UNITS:
FF FC CF CC, NOTATION: F (FAHRENHEIT), C (CELSIUS).

.72.7 72.5 71.7 70.9 68.5 66.4 64.8 66.4 69.5 71.9 73.9 73.9 FC
DAILY ESTIMATED GROWING DEGREE DAYS (BASE 50) FOR: MOROGORO, TANZANIA

UNITS: FAHRENHEIT OR CELSIUS. DEPENDS ON USER REQUEST.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	13.	13.	13.	13.	11.	9.	8.	8.	10.	12.	13.	13
2	13.	13.	13.	13.	11.	9.	8.	8.	10.	12.	13.	13
3	13.	13.	13.	13.	11.	9.	8.	8.	10.	12.	13.	13
4	13.	13.	13.	13.	11.	9.	8.	8.	10.	12.	13.	13
5	13.	13.	13.	13.	11.	9.	8.	8.	10.	12.	13.	13
6	13.	13.	13.	12.	11.	9.	8.	8.	10.	12.	13.	13
7	13.	13.	13.	12.	11.	9.	8.	8.	10.	12.	13.	13
8	13.	13.	13.	12.	11.	9.	8.	9.	10.	12.	13.	13
9	13.	13.	13.	12.	11.	9.	8.	9.	10.	12.	13.	13
10	13.	13.	13.	12.	11.	9.	8.	9.	10.	12.	13.	13
11	13.	13.	13.	12.	11.	9.	8.	9.	10.	12.	13.	13
12	13.	13.	13.	12.	11.	9.	8.	9.	10.	12.	13.	13
13	13.	13.	13.	12.	10.	9.	8.	9.	11.	12.	13.	13
14	13.	13.	13.	12.	10.	9.	8.	9.	11.	12.	13.	13
15	13.	13.	13.	12.	10.	9.	8.	9.	11.	12.	13.	13
16	13.	13.	13.	12.	10.	8.	8.	9.	11.	12.	13.	13
17	13.	13.	13.	12.	10.	8.	8.	9.	11.	12.	13.	13
18	13.	13.	13.	12.	10.	8.	8.	9.	11.	12.	13.	13
19	13.	13.	13.	12.	10.	8.	8.	9.	11.	12.	13.	13
20	13.	13.	13.	12.	10.	8.	8.	9.	11.	12.	13.	13
21	13.	13.	13.	12.	10.	8.	8.	9.	11.	12.	13.	13
22	13.	13.	13.	12.	10.	8.	8.	9.	11.	12.	13.	13
23	13.	13.	13.	12.	10.	8.	8.	9.	11.	12.	13.	13
24	13.	13.	13.	12.	10.	8.	8.	9.	11.	12.	13.	13
25	13.	13.	13.	12.	10.	8.	8.	9.	11.	13.	13.	13
26	13.	13.	13.	12.	10.	8.	8.	9.	11.	13.	13.	13
27	13.	13.	13.	11.	10.	8.	8.	9.	11.	13.	13.	13
28	13.	13.	13.	11.	10.	8.	8.	10.	11.	13.	13.	13
29	13.	***	13.	11.	9.	8.	8.	10.	11.	13.	13.	13
30	13.	***	13.	11.	9.	8.	8.	10.	12.	13.	13.	13
31	13.	***	13.	***	9.	***	8.	10.	***	13.	***	13

,7
DAILY ACCUMULATED GROWING DEGREE DAYS (BASE 50) FOR: MOROGORO, TANZANIA

UNITS: FAHRENHEIT OR CELSIUS. DEPENDS ON USER REQUEST.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	13.	412.	777.	1178.	1538.	1855.	2111.	2358.	2636.	2959.	3337.	3722.
2	26.	424.	790.	1191.	1549.	1864.	2119.	2367.	2646.	2970.	3350.	3735.
3	38.	437.	803.	1204.	1560.	1873.	2127.	2375.	2656.	2982.	3363.	3748.
4	51.	450.	816.	1216.	1571.	1882.	2135.	2383.	2666.	2994.	3376.	3761.
5	64.	463.	829.	1229.	1582.	1891.	2143.	2392.	2676.	3005.	3388.	3774.
6	77.	476.	842.	1241.	1593.	1900.	2151.	2400.	2686.	3017.	3401.	3787.
7	90.	489.	855.	1254.	1604.	1909.	2158.	2409.	2696.	3029.	3414.	3800.
8	103.	502.	869.	1266.	1615.	1918.	2166.	2417.	2707.	3041.	3427.	3813.
9	115.	515.	882.	1278.	1626.	1927.	2174.	2426.	2717.	3053.	3439.	3826.
10	128.	528.	895.	1291.	1636.	1936.	2182.	2434.	2727.	3065.	3452.	3838.
11	141.	541.	908.	1303.	1647.	1945.	2190.	2443.	2738.	3077.	3465.	3851.
12	154.	555.	921.	1315.	1658.	1953.	2198.	2451.	2748.	3089.	3478.	3864.
13	167.	568.	934.	1327.	1668.	1962.	2206.	2460.	2759.	3101.	3491.	3877.
14	179.	581.	947.	1340.	1678.	1970.	2214.	2469.	2769.	3113.	3504.	3890.
15	192.	594.	960.	1352.	1689.	1979.	2222.	2478.	2780.	3125.	3516.	3903.
16	205.	607.	973.	1364.	1699.	1988.	2230.	2487.	2791.	3138.	3529.	3916.
17	218.	620.	986.	1376.	1709.	1996.	2238.	2496.	2802.	3150.	3542.	3928.
18	231.	633.	999.	1388.	1719.	2004.	2245.	2505.	2812.	3162.	3555.	3941.
19	244.	646.	1012.	1400.	1730.	2013.	2253.	2514.	2823.	3175.	3568.	3954.
20	257.	659.	1025.	1411.	1740.	2021.	2261.	2523.	2834.	3187.	3581.	3967.
21	269.	672.	1038.	1423.	1750.	2029.	2269.	2532.	2845.	3199.	3594.	3980.
22	282.	685.	1051.	1435.	1759.	2038.	2277.	2541.	2856.	3212.	3606.	3993.
23	295.	698.	1063.	1447.	1769.	2046.	2285.	2550.	2867.	3224.	3619.	4005.
24	308.	711.	1076.	1458.	1779.	2054.	2293.	2560.	2879.	3237.	3632.	4018.
25	321.	724.	1089.	1470.	1789.	2062.	2301.	2569.	2890.	3249.	3645.	4031.
26	334.	738.	1102.	1481.	1798.	2070.	2309.	2578.	2901.	3262.	3658.	4044.
27	347.	751.	1115.	1493.	1808.	2078.	2318.	2588.	2913.	3274.	3671.	4057.
28	360.	764.	1128.	1504.	1817.	2087.	2326.	2598.	2924.	3287.	3684.	4069.
29	373.	***	1140.	1516.	1827.	2095.	2334.	2607.	2935.	3299.	3697.	4082.
30	386.	***	1153.	1527.	1836.	2103.	2342.	2617.	2947.	3312.	3710.	4095.
31	399.	***	1166.	***	1846.	***	2350.	2627.	***	3325.	***	4108.

PLEASE ENTER A CODE NUMBER FROM 1 TO 17 TO REQUEST THE VARIABLE
WHICH YOU WOULD LIKE TO SEE. IF YOU WANT A LIST OF VARIABLES,
THEN TYPE HELP AND PRESS RETURN.
(OR CONTACT DR. RALPH NEILD/(402) 472-1639).

.8
DAILY ESTIMATED HEATING DEGREE DAYS (BASE 65) FOR: LINCOLN, NEBRASKA.

UNITS: FAHRENHEIT OR CELSIUS. DEPENDS ON USER REQUEST.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	23.	22.	18.	11.	4.	0.	0.	0.	0.	3.	11.	18.
2	23.	22.	18.	11.	4.	0.	0.	0.	0.	3.	11.	19.
3	23.	22.	18.	11.	4.	0.	0.	0.	0.	3.	11.	19.
4	23.	22.	18.	10.	4.	0.	0.	0.	0.	3.	12.	19.
5	23.	22.	17.	10.	3.	0.	0.	0.	0.	4.	12.	19.
6	23.	22.	17.	10.	3.	0.	0.	0.	0.	4.	12.	19.
7	23.	22.	17.	10.	3.	0.	0.	0.	0.	4.	13.	20.
8	23.	22.	17.	9.	3.	0.	0.	0.	0.	4.	13.	20.
9	23.	22.	17.	9.	2.	0.	0.	0.	0.	5.	13.	20.
10	23.	21.	16.	9.	2.	0.	0.	0.	0.	5.	13.	20.
11	23.	21.	16.	9.	2.	0.	0.	0.	0.	5.	14.	20.
12	23.	21.	16.	9.	2.	0.	0.	0.	0.	5.	14.	20.
13	23.	21.	16.	8.	2.	0.	0.	0.	0.	6.	14.	21.
14	23.	21.	15.	8.	1.	0.	0.	0.	0.	6.	14.	21.
15	23.	21.	15.	8.	1.	0.	0.	0.	0.	6.	15.	21.
16	23.	21.	15.	8.	1.	0.	0.	0.	0.	7.	15.	21.
17	23.	20.	15.	7.	1.	0.	0.	0.	0.	7.	15.	21.
18	23.	20.	15.	7.	1.	0.	0.	0.	0.	7.	15.	21.
19	23.	20.	14.	7.	0.	0.	0.	0.	0.	7.	16.	22.
20	23.	20.	14.	7.	0.	0.	0.	0.	0.	8.	16.	22.
21	23.	20.	14.	6.	0.	0.	0.	0.	0.	8.	16.	22.
22	23.	20.	14.	6.	0.	0.	0.	0.	1.	8.	16.	22.
23	23.	19.	13.	6.	0.	0.	0.	0.	1.	8.	17.	22.
24	23.	19.	13.	6.	0.	0.	0.	0.	1.	9.	17.	22.
25	23.	19.	13.	5.	0.	0.	0.	0.	1.	9.	17.	22.
26	23.	19.	13.	5.	0.	0.	0.	0.	1.	9.	17.	22.
27	23.	19.	12.	5.	0.	0.	0.	0.	2.	10.	18.	22.
28	23.	18.	12.	5.	0.	0.	0.	0.	2.	10.	18.	23.
29	23.	***	12.	5.	0.	0.	0.	0.	2.	10.	18.	23.
30	23.	***	12.	4.	0.	0.	0.	0.	2.	10.	18.	23.
31	23.	***	11.	***	0.	***	0.	0.	***	11.	***	23.

.9
DAILY ACCUMULATED HEATING DEGREE DAYS (BASE 65) FOR: LINCOLN, NEBRASKA.

UNITS: FAHRENHEIT OR CELSIUS. DEPENDS ON USER REQUEST.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	23.	738.	1312.	1768.	1993.	2032.	2032.	2032.	2032.	2048.	2260.	2708.
2	46.	760.	1330.	1779.	1996.	2032.	2032.	2032.	2032.	2051.	2271.	2726.
3	69.	783.	1348.	1789.	2000.	2032.	2032.	2032.	2032.	2054.	2282.	2745.
4	92.	805.	1366.	1800.	2004.	2032.	2032.	2032.	2032.	2058.	2294.	2764.
5	115.	827.	1383.	1810.	2007.	2032.	2032.	2032.	2032.	2062.	2306.	2783.
6	138.	849.	1400.	1820.	2010.	2032.	2032.	2032.	2032.	2065.	2318.	2803.
7	161.	871.	1417.	1830.	2013.	2032.	2032.	2032.	2032.	2070.	2331.	2822.
8	185.	892.	1434.	1839.	2016.	2032.	2032.	2032.	2032.	2074.	2344.	2842.
9	208.	914.	1450.	1849.	2018.	2032.	2032.	2032.	2032.	2079.	2357.	2862.
10	231.	935.	1467.	1858.	2020.	2032.	2032.	2032.	2032.	2084.	2370.	2882.
11	254.	957.	1483.	1866.	2022.	2032.	2032.	2032.	2032.	2089.	2384.	2902.
12	278.	978.	1499.	1875.	2024.	2032.	2032.	2032.	2032.	2094.	2397.	2923.
13	301.	999.	1514.	1883.	2026.	2032.	2032.	2032.	2032.	2100.	2411.	2944.
14	324.	1020.	1530.	1891.	2027.	2032.	2032.	2032.	2032.	2106.	2426.	2964.
15	348.	1040.	1545.	1899.	2029.	2032.	2032.	2032.	2032.	2112.	2440.	2985.
16	371.	1061.	1560.	1907.	2030.	2032.	2032.	2032.	2032.	2119.	2455.	3007.
17	394.	1081.	1575.	1914.	2030.	2032.	2032.	2032.	2032.	2125.	2471.	3028.
18	417.	1101.	1589.	1921.	2031.	2032.	2032.	2032.	2032.	2132.	2486.	3049.
19	441.	1121.	1604.	1928.	2032.	2032.	2032.	2032.	2032.	2140.	2502.	3071.
20	464.	1141.	1618.	1935.	2032.	2032.	2032.	2032.	2032.	2147.	2517.	3093.
21	487.	1161.	1632.	1941.	2032.	2032.	2032.	2032.	2033.	2155.	2534.	3114.
22	510.	1181.	1645.	1947.	2032.	2032.	2032.	2032.	2033.	2163.	2550.	3136.
23	533.	1200.	1658.	1953.	2032.	2032.	2032.	2032.	2034.	2172.	2567.	3158.
24	556.	1219.	1672.	1959.	2032.	2032.	2032.	2032.	2035.	2180.	2583.	3180.
25	579.	1238.	1684.	1964.	2032.	2032.	2032.	2032.	2036.	2189.	2600.	3203.
26	602.	1257.	1697.	1970.	2032.	2032.	2032.	2032.	2038.	2199.	2618.	3225.
27	625.	1276.	1709.	1975.	2032.	2032.	2032.	2032.	2039.	2208.	2635.	3248.
28	648.	1294.	1722.	1979.	2032.	2032.	2032.	2032.	2041.	2218.	2653.	3270.
29	671.	***	1733.	1984.	2032.	2032.	2032.	2032.	2043.	2228.	2671.	3293.
30	693.	***	1745.	1988.	2032.	2032.	2032.	2032.	2046.	2238.	2689.	3316.
31	716.	***	1757.	***	2032.	***	2032.	2032.	***	2249.	***	3338.

PLEASE ENTER A CODE NUMBER FROM 1 TO 17 TO REQUEST THE VARIABLE
WHICH YOU WOULD LIKE TO SEE. IF YOU WANT A LIST OF VARIABLES,
THEN TYPE HELP AND PRESS RETURN.
(OR CONTACT DR. RALPH NEILD/(402) 472-1639).

.10
DAILY ESTIMATED COOLING DEGREE DAYS (BASE 65) FOR: LINCOLN, NEBRASKA.

UNITS: FAHRENHEIT OR CELSIUS. DEPENDS ON USER REQUEST.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.	0.	0.	0.	0.	2.	5.	6.	3.	0.	0.	0.
2	0.	0.	0.	0.	0.	2.	5.	6.	3.	0.	0.	0.
3	0.	0.	0.	0.	0.	2.	5.	6.	3.	0.	0.	0.
4	0.	0.	0.	0.	0.	2.	5.	6.	3.	0.	0.	0.
5	0.	0.	0.	0.	0.	2.	6.	6.	3.	0.	0.	0.
6	0.	0.	0.	0.	0.	2.	6.	6.	3.	0.	0.	0.
7	0.	0.	0.	0.	0.	3.	6.	6.	2.	0.	0.	0.
8	0.	0.	0.	0.	0.	3.	6.	6.	2.	0.	0.	0.
9	0.	0.	0.	0.	0.	3.	6.	6.	2.	0.	0.	0.
10	0.	0.	0.	0.	0.	3.	6.	6.	2.	0.	0.	0.
11	0.	0.	0.	0.	0.	3.	6.	6.	2.	0.	0.	0.
12	0.	0.	0.	0.	0.	3.	6.	5.	1.	0.	0.	0.
13	0.	0.	0.	0.	0.	3.	6.	5.	1.	0.	0.	0.
14	0.	0.	0.	0.	0.	4.	6.	5.	1.	0.	0.	0.
15	0.	0.	0.	0.	0.	4.	6.	5.	1.	0.	0.	0.
16	0.	0.	0.	0.	0.	4.	6.	5.	1.	0.	0.	0.
17	0.	0.	0.	0.	0.	4.	6.	5.	0.	0.	0.	0.
18	0.	0.	0.	0.	0.	4.	6.	5.	0.	0.	0.	0.
19	0.	0.	0.	0.	0.	4.	6.	5.	0.	0.	0.	0.
20	0.	0.	0.	0.	0.	4.	6.	5.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	4.	6.	5.	0.	0.	0.	0.
22	0.	0.	0.	0.	0.	4.	6.	5.	0.	0.	0.	0.
23	0.	0.	0.	0.	0.	5.	6.	4.	0.	0.	0.	0.
24	0.	0.	0.	0.	0.	5.	6.	4.	0.	0.	0.	0.
25	0.	0.	0.	0.	1.	5.	6.	4.	0.	0.	0.	0.
26	0.	0.	0.	0.	1.	5.	6.	4.	0.	0.	0.	0.
27	0.	0.	0.	0.	1.	5.	6.	4.	0.	0.	0.	0.
28	0.	0.	0.	0.	1.	5.	6.	4.	0.	0.	0.	0.
29	0.	***	0.	0.	1.	5.	6.	4.	0.	0.	0.	0.
30	0.	***	0.	0.	1.	5.	6.	4.	0.	0.	0.	0.
31	0.	***	0.	***	2.	***	6.	3.	***	0.	***	0.

.11
DAILY ACCUMULATED COOLING DEGREE DAYS (BASE 65) FOR: LINCOLN, NEBRASKA.

UNITS: FAHRENHEIT OR CELSIUS. DEPENDS ON USER REQUEST.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.	0.	0.	0.	0.	10.	122.	306.	458.	488.	488.	488.
2	0.	0.	0.	0.	0.	12.	128.	312.	461.	488.	488.	488.
3	0.	0.	0.	0.	0.	14.	133.	318.	464.	488.	488.	488.
4	0.	0.	0.	0.	0.	16.	139.	324.	467.	488.	488.	488.
5	0.	0.	0.	0.	0.	18.	144.	329.	470.	488.	488.	488.
6	0.	0.	0.	0.	0.	21.	150.	335.	472.	488.	488.	488.
7	0.	0.	0.	0.	0.	24.	155.	341.	474.	488.	488.	488.
8	0.	0.	0.	0.	0.	26.	161.	347.	477.	488.	488.	488.
9	0.	0.	0.	0.	0.	29.	167.	352.	479.	488.	488.	488.
10	0.	0.	0.	0.	0.	32.	173.	358.	480.	488.	488.	488.
11	0.	0.	0.	0.	0.	35.	178.	363.	482.	488.	488.	488.
12	0.	0.	0.	0.	0.	39.	184.	369.	484.	488.	488.	488.
13	0.	0.	0.	0.	0.	42.	190.	374.	485.	488.	488.	488.
14	0.	0.	0.	0.	0.	46.	196.	380.	486.	488.	488.	488.
15	0.	0.	0.	0.	0.	49.	202.	385.	487.	488.	488.	488.
16	0.	0.	0.	0.	0.	53.	208.	390.	487.	488.	488.	488.
17	0.	0.	0.	0.	0.	57.	214.	395.	488.	488.	488.	488.
18	0.	0.	0.	0.	0.	61.	220.	400.	488.	488.	488.	488.
19	0.	0.	0.	0.	0.	65.	226.	405.	488.	488.	488.	488.
20	0.	0.	0.	0.	0.	69.	233.	410.	488.	488.	488.	488.
21	0.	0.	0.	0.	0.	74.	239.	414.	488.	488.	488.	488.
22	0.	0.	0.	0.	0.	78.	245.	419.	488.	488.	488.	488.
23	0.	0.	0.	0.	0.	83.	251.	423.	488.	488.	488.	488.
24	0.	0.	0.	0.	1.	87.	257.	428.	488.	488.	488.	488.
25	0.	0.	0.	0.	1.	92.	263.	432.	488.	488.	488.	488.
26	0.	0.	0.	0.	2.	97.	269.	436.	488.	488.	488.	488.
27	0.	0.	0.	0.	3.	102.	275.	440.	488.	488.	488.	488.
28	0.	0.	0.	0.	4.	107.	281.	444.	488.	488.	488.	488.
29	0.	***	0.	0.	5.	112.	288.	448.	488.	488.	488.	488.
30	0.	***	0.	0.	7.	117.	294.	451.	488.	488.	488.	488.
31	0.	***	0.	***	8.	***	300.	455.	***	488.	***	488.

ENTER :
12 MONTHLY NORMAL TEMPERATURES FOLLOWED BY ONE OF THESE
COMBINATIONS TO INDICATE YOUR INPUT/OUTPUT UNITS:
FF FC CF CC, NOTATION: F (FAHRENHEIT), C (CELSIUS).

.76.6 81.1 87.1 90.7 88.7 84.6 81.5 79.2 80.8 84.6 83.3 77.7 FC
DAILY ESTIMATED POTENTIAL EVAPOTRANSPIRATION (PET) FOR: OUAGADOUGA, U. VOLTA

UNITS: INCHES OR MM. DEPENDS ON USER REQUEST.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	3.03	3.95	4.99	9.14	10.89	8.24	6.92	4.57	4.30	4.72	5.99	5.58
2	3.03	3.95	4.99	9.14	10.22	8.24	6.09	4.57	4.30	5.56	5.99	4.43
3	3.03	3.95	4.99	9.14	10.22	8.24	6.09	4.57	4.30	5.56	5.99	4.43
4	3.03	3.95	6.32	9.14	10.22	8.24	6.09	4.57	4.30	5.56	5.99	4.43
5	3.03	3.95	6.32	9.14	10.22	8.24	6.09	4.57	4.30	5.56	5.99	4.43
6	3.03	3.95	6.32	9.14	10.22	8.24	6.09	4.57	4.30	5.56	5.99	4.43
7	3.03	3.95	6.32	9.14	10.22	8.24	6.09	4.57	4.30	5.56	5.99	4.43
8	3.03	3.95	6.32	9.14	10.22	8.24	6.09	4.57	4.30	5.56	5.99	4.43
9	3.03	3.95	6.32	9.14	10.22	8.24	6.09	4.57	4.30	5.56	5.99	4.43
10	3.03	3.95	6.32	9.14	10.22	8.24	6.09	4.57	4.30	5.56	5.99	4.43
11	3.03	3.95	6.32	9.14	10.22	8.24	6.09	4.57	4.30	5.56	5.99	4.43
12	3.03	3.95	6.32	9.14	10.22	8.24	6.09	4.57	4.30	5.56	5.99	4.43
13	3.03	3.95	6.32	9.14	10.22	8.24	6.09	4.57	4.30	5.56	5.99	4.43
14	3.03	3.95	6.32	9.14	10.22	8.24	6.09	4.57	4.30	5.56	5.99	4.43
15	3.03	4.99	6.32	9.14	10.22	8.24	6.09	4.57	4.30	5.56	5.99	4.43
16	2.97	4.99	6.32	10.89	10.22	6.92	6.09	4.18	4.72	5.56	5.58	4.43
17	2.97	4.99	6.32	10.89	9.56	6.92	5.26	4.18	4.72	6.39	5.58	3.29
18	2.97	4.99	6.32	10.89	9.56	6.92	5.26	4.18	4.72	6.39	5.58	3.29
19	2.97	4.99	7.99	10.89	9.56	6.92	5.26	4.18	4.72	6.39	5.58	3.29
20	2.97	4.99	7.99	10.89	9.56	6.92	5.26	4.18	4.72	6.39	5.58	3.29
21	2.97	4.99	7.99	10.89	9.56	6.92	5.26	4.18	4.72	6.39	5.58	3.29
22	2.97	4.99	7.99	10.89	9.56	6.92	5.26	4.18	4.72	6.39	5.58	3.29
23	2.97	4.99	7.99	10.89	9.56	6.92	5.26	4.18	4.72	6.39	5.58	3.29
24	2.97	4.99	7.99	10.89	9.56	6.92	5.26	4.18	4.72	6.39	5.58	3.29
25	2.97	4.99	7.99	10.89	9.56	6.92	5.26	4.18	4.72	6.39	5.58	3.29
26	2.97	4.99	7.99	10.89	9.56	6.92	5.26	4.18	4.72	6.39	5.58	3.29
27	2.97	4.99	7.99	10.89	9.56	6.92	5.26	4.18	4.72	6.39	5.58	3.29
28	2.97	4.99	7.99	10.89	9.56	6.92	5.26	4.18	4.72	6.39	5.58	3.29
29	2.97	***	7.99	10.89	9.56	6.92	5.26	4.18	4.72	6.39	5.58	3.29
30	2.97	***	7.99	10.89	9.56	6.92	5.26	4.18	4.72	6.39	5.58	3.29
31	2.97	***	7.99	***	9.56	***	5.26	4.18	***	6.39	***	3.29

.13
DAILY ESTIMATED .5 POTENTIAL EVAPOTRANSPIRATION FOR: OUAGADOUGA, U. VOLTA

UNITS: INCHES OR MM. DEPENDS ON USER REQUEST.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1.52	1.97	2.49	4.57	5.45	4.12	3.46	2.28	2.15	2.36	2.99	2.79
2	1.52	1.97	2.49	4.57	5.11	4.12	3.05	2.28	2.15	2.78	2.99	2.22
3	1.52	1.97	2.49	4.57	5.11	4.12	3.05	2.28	2.15	2.78	2.99	2.22
4	1.52	1.97	3.16	4.57	5.11	4.12	3.05	2.28	2.15	2.78	2.99	2.22
5	1.52	1.97	3.16	4.57	5.11	4.12	3.05	2.28	2.15	2.78	2.99	2.22
6	1.52	1.97	3.16	4.57	5.11	4.12	3.05	2.28	2.15	2.78	2.99	2.22
7	1.52	1.97	3.16	4.57	5.11	4.12	3.05	2.28	2.15	2.78	2.99	2.22
8	1.52	1.97	3.16	4.57	5.11	4.12	3.05	2.28	2.15	2.78	2.99	2.22
9	1.52	1.97	3.16	4.57	5.11	4.12	3.05	2.28	2.15	2.78	2.99	2.22
10	1.52	1.97	3.16	4.57	5.11	4.12	3.05	2.28	2.15	2.78	2.99	2.22
11	1.52	1.97	3.16	4.57	5.11	4.12	3.05	2.28	2.15	2.78	2.99	2.22
12	1.52	1.97	3.16	4.57	5.11	4.12	3.05	2.28	2.15	2.78	2.99	2.22
13	1.52	1.97	3.16	4.57	5.11	4.12	3.05	2.28	2.15	2.78	2.99	2.22
14	1.52	1.97	3.16	4.57	5.11	4.12	3.05	2.28	2.15	2.78	2.99	2.22
15	1.52	2.49	3.16	4.57	5.11	4.12	3.05	2.28	2.15	2.78	2.99	2.22
16	1.49	2.49	3.16	5.45	5.11	3.46	3.05	2.09	2.36	2.78	2.79	2.22
17	1.49	2.49	3.16	5.45	4.78	3.46	2.63	2.09	2.36	3.20	2.79	1.65
18	1.49	2.49	3.16	5.45	4.78	3.46	2.63	2.09	2.36	3.20	2.79	1.65
19	1.49	2.49	4.00	5.45	4.78	3.46	2.63	2.09	2.36	3.20	2.79	1.65
20	1.49	2.49	4.00	5.45	4.78	3.46	2.63	2.09	2.36	3.20	2.79	1.65
21	1.49	2.49	4.00	5.45	4.78	3.46	2.63	2.09	2.36	3.20	2.79	1.65
22	1.49	2.49	4.00	5.45	4.78	3.46	2.63	2.09	2.36	3.20	2.79	1.65
23	1.49	2.49	4.00	5.45	4.78	3.46	2.63	2.09	2.36	3.20	2.79	1.65
24	1.49	2.49	4.00	5.45	4.78	3.46	2.63	2.09	2.36	3.20	2.79	1.65
25	1.49	2.49	4.00	5.45	4.78	3.46	2.63	2.09	2.36	3.20	2.79	1.65
26	1.49	2.49	4.00	5.45	4.78	3.46	2.63	2.09	2.36	3.20	2.79	1.65
27	1.49	2.49	4.00	5.45	4.78	3.46	2.63	2.09	2.36	3.20	2.79	1.65
28	1.49	2.49	4.00	5.45	4.78	3.46	2.63	2.09	2.36	3.20	2.79	1.65
29	1.49	***	4.00	5.45	4.78	3.46	2.63	2.09	2.36	3.20	2.79	1.65
30	1.49	***	4.00	5.45	4.78	3.46	2.63	2.09	2.36	3.20	2.79	1.65
31	1.49	***	4.00	***	4.78	***	2.63	2.09	***	3.20	***	1.65

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.14
      ****************************************************
      *                                                  *
      * TO SEE A SAMPLE PRINT-OUT FOR ANY SELECTED OPTION, *
      * PLEASE PRESS RETURN IN PLACE OF INPUT DATA. ALL  *
      * SAMPLE OUTPUT ARE IN SI UNITS, EXCEPT OPTIONS 1 & 2*
      *                                                  *
      ****************************************************

 ENTER :
 STATION NAME. (CITY, STATE OR COUNTRY) E.G. LINCOLN, NEBRASKA.

.HYDERABAD, INDIA
 ENTER 2 NUMBERS FOR YOUR STATION LATITUDE. ONE FOR DEGREES
 AND THE OTHER FOR MINUTES. EXAMPLE: LINCOLN, NEBRASKA =
 40 49 ( WHICH MEANS 40 DEGREES 49 MINUTES NORTH LATITUDE )
 BOTH NUMBERS SHOULD BE NEGATIVE FOR SOUTHERN HEMISPHERE.

.17.27 0
      ****************************************************
      *                                                  *
      * NOTE: THE OUTPUT UNITS REQUESTED FOR TEMPERATURE *
      * WILL DETERMINE THE POTENTIAL EVAPOTRANSPIRATION  *
      * OUTPUT UNITS, I.E. SI OR ENGLISH. TYPE HELP FOR  *
      * ADDITIONAL DETAILS.                              *
      *                                                  *
      ****************************************************

 ENTER :
 12 MONTHLY NORMAL TEMPERATURES FOLLOWED BY ONE OF THESE
 COMBINATIONS TO INDICATE YOUR INPUT/OUTPUT UNITS:
 FF FC CF CC, NOTATION: F (FAHRENHEIT), C (CELSIUS).

.70.9 75.1 81.3 86.5 90.4 84.4 78.9 78.4 78.2 77.1 72.2 69.1 FC
 ENTER :
 12 MONTHLY NORMAL PRECIPITATION TOTALS FOLLOWED BY ONE OF THESE
 COMBINATIONS TO INDICATE YOUR INPUT/OUTPUT UNITS:
 II IM MI MM. NOTATION: I (INCHES), M (MILLIMETERS
 (TYPE HELP FOR ADDITIONAL DETAILS).

.0.08 0.43 0.51 0.94 1.18 4.21 6.50 5.79 6.42 2.80 0.98 0.24 IM
DAILY DIFFERENCES OF PRECIP.-PET FOR:                HYDERABAD, INDIA

UNITS: INCHES OR MM. DEPENDS ON PRECIP. REQUEST.
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DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-1.65	-2.35	-2.80	-5.41	-6.62	-6.00	-3.21	0.78	0.99	1.40	-1.32	-1.45
2	-1.65	-2.35	-2.80	-5.41	-7.71	-6.00	-1.13	0.78	0.99	0.11	-1.32	-1.46
3	-1.65	-2.35	-2.80	-5.41	-7.71	-6.00	-1.13	0.78	0.99	0.11	-1.32	-1.46
4	-1.65	-2.35	-3.59	-5.41	-7.71	-6.00	-1.13	0.78	0.99	0.11	-1.32	-1.46
5	-1.65	-2.35	-3.59	-5.41	-7.71	-6.00	-1.13	0.78	0.99	0.11	-1.32	-1.46
6	-1.65	-2.35	-3.59	-5.41	-7.71	-6.00	-1.13	0.78	0.99	0.11	-1.32	-1.46
7	-1.65	-2.35	-3.59	-5.41	-7.71	-6.00	-1.13	0.78	0.99	0.11	-1.32	-1.46
8	-1.65	-2.35	-3.59	-5.41	-7.71	-6.00	-1.13	0.78	0.99	0.11	-1.32	-1.46
9	-1.65	-2.35	-3.59	-5.41	-7.71	-6.00	-1.13	0.78	0.99	0.11	-1.32	-1.46
10	-1.65	-2.35	-3.59	-5.41	-7.71	-6.00	-1.13	0.78	0.99	0.11	-1.32	-1.46
11	-1.65	-2.35	-3.59	-5.41	-7.71	-6.00	-1.13	0.78	0.99	0.11	-1.32	-1.46
12	-1.65	-2.35	-3.59	-5.41	-7.71	-6.00	-1.13	0.78	0.99	0.11	-1.32	-1.46
13	-1.65	-2.35	-3.59	-5.41	-7.71	-6.00	-1.13	0.78	0.99	0.11	-1.32	-1.46
14	-1.65	-2.35	-3.59	-5.41	-7.71	-6.00	-1.13	0.78	0.99	0.11	-1.32	-1.46
15	-1.65	-2.80	-3.59	-5.41	-7.71	-6.00	-1.13	0.78	0.99	0.11	-1.32	-1.46
16	-1.94	-2.80	-3.59	-6.62	-7.71	-3.21	-1.13	0.64	1.40	0.11	-1.45	-1.46
17	-1.94	-2.80	-3.59	-6.62	-8.79	-3.21	0.96	0.64	1.40	-1.18	-1.45	-1.48
18	-1.94	-2.80	-3.59	-6.62	-8.79	-3.21	0.96	0.64	1.40	-1.18	-1.45	-1.48
19	-1.94	-2.80	-4.56	-6.62	-8.79	-3.21	0.96	0.64	1.40	-1.18	-1.45	-1.48
20	-1.94	-2.80	-4.56	-6.62	-8.79	-3.21	0.96	0.64	1.40	-1.18	-1.45	-1.48
21	-1.94	-2.80	-4.56	-6.62	-8.79	-3.21	0.96	0.64	1.40	-1.18	-1.45	-1.48
22	-1.94	-2.80	-4.56	-6.62	-8.79	-3.21	0.96	0.64	1.40	-1.18	-1.45	-1.48
23	-1.94	-2.80	-4.56	-6.62	-8.79	-3.21	0.96	0.64	1.40	-1.18	-1.45	-1.48
24	-1.94	-2.80	-4.56	-6.62	-8.79	-3.21	0.96	0.64	1.40	-1.18	-1.45	-1.48
25	-1.94	-2.80	-4.56	-6.62	-8.79	-3.21	0.96	0.64	1.40	-1.18	-1.45	-1.48
26	-1.94	-2.80	-4.56	-6.62	-8.79	-3.21	0.96	0.64	1.40	-1.18	-1.45	-1.48
27	-1.94	-2.80	-4.56	-6.62	-8.79	-3.21	0.96	0.64	1.40	-1.18	-1.45	-1.48
28	-1.94	-2.80	-4.56	-6.62	-8.79	-3.21	0.96	0.64	1.40	-1.18	-1.45	-1.48
29	-1.94	***	-4.56	-6.62	-8.79	-3.21	0.96	0.64	1.40	-1.18	-1.45	-1.48
30	-1.94	***	-4.56	-6.62	-8.79	-3.21	0.96	0.64	1.40	-1.18	-1.45	-1.48
31	-1.94	***	-4.56	***	-8.79	***	0.96	0.64	***	-1.18	***	-1.48

.15

```
*****
*                                                    *
* TO SEE A SAMPLE PRINT-OUT FOR ANY SELECTED OPTION, *
* PLEASE PRESS RETURN IN PLACE OF INPUT DATA. ALL    *
* SAMPLE OUTPUT ARE IN SI UNITS, EXCEPT OPTIONS 1 & 2*
*                                                    *
******************************************************
```

ENTER :
STATION NAME. (CITY, STATE OR COUNTRY) E.G. LINCOLN, NEBRASKA.

.SHENYANG, CHINA
ENTER :
12 MONTHLY NORMAL PRECIPITATION TOTALS FOLLOWED BY ONE OF THESE
COMBINATIONS TO INDICATE YOUR INPUT/OUTPUT UNITS:
II IM MI MM. NOTATION: I (INCHES), M (MILLIMETERS).
(TYPE HELP FOR ADDITIONAL DETAILS).

.HELP

CODES	MEANING	
II	EXPECTING INPUT PRECIP. VALUES IN WILL PRINT OUTPUT IN	I I
IM	EXPECTING INPUT PRECIP. VALUES IN WILL PRINT OUTPUT IN	I M
MI	EXPECTING INPUT PRECIP. VALUES IN WILL PRINT OUTPUT IN	M I
MM	EXPECTING INPUT PRECIP. VALUES IN WILL PRINT OUTPUT IN	M M

EXAMPLE:
0.62 0.90 1.51 2.51 3.49 4.99 3.32 3.27 2.92 1.53 0.87 0.73 II

.0.20 0.24 0.80 1.10 2.36 3.98 5.94 5.71 3.07 1.73 0.94 0.35 II
DAILY ESTIMATED PRECIPITATION FOR: SHENYANG, CHINA

UNITS: INCHES OR MM. DEPENDS ON USER REQUEST.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.01	0.01	0.01	0.03	0.04	0.11	0.13	0.19	0.14	0.10	0.04	0.03
2	0.01	0.01	0.01	0.03	0.06	0.11	0.17	0.19	0.14	0.08	0.04	0.02
3	0.01	0.01	0.01	0.03	0.06	0.11	0.17	0.19	0.14	0.08	0.04	0.02
4	0.01	0.01	0.02	0.03	0.06	0.11	0.17	0.19	0.14	0.08	0.04	0.02
5	0.01	0.01	0.02	0.03	0.06	0.11	0.17	0.19	0.14	0.08	0.04	0.02
6	0.01	0.01	0.02	0.03	0.06	0.11	0.17	0.19	0.14	0.08	0.04	0.02
7	0.01	0.01	0.02	0.03	0.06	0.11	0.17	0.19	0.14	0.08	0.04	0.02
8	0.01	0.01	0.02	0.03	0.06	0.11	0.17	0.19	0.14	0.08	0.04	0.02
9	0.01	0.01	0.02	0.03	0.06	0.11	0.17	0.19	0.14	0.08	0.04	0.02
10	0.01	0.01	0.02	0.03	0.06	0.11	0.17	0.19	0.14	0.08	0.04	0.02
11	0.01	0.01	0.02	0.03	0.06	0.11	0.17	0.19	0.14	0.08	0.04	0.02
12	0.01	0.01	0.02	0.03	0.06	0.11	0.17	0.19	0.14	0.08	0.04	0.02
13	0.01	0.01	0.02	0.03	0.06	0.11	0.17	0.19	0.14	0.08	0.04	0.02
14	0.01	0.01	0.02	0.03	0.06	0.11	0.17	0.19	0.14	0.08	0.04	0.02
15	0.01	0.01	0.02	0.03	0.06	0.11	0.17	0.19	0.14	0.08	0.04	0.02
16	0.01	0.01	0.02	0.04	0.06	0.13	0.17	0.19	0.10	0.08	0.03	0.02
17	0.01	0.01	0.02	0.04	0.08	0.13	0.20	0.19	0.10	0.06	0.03	0.01
18	0.01	0.01	0.02	0.04	0.08	0.13	0.20	0.19	0.10	0.06	0.03	0.01
19	0.01	0.01	0.03	0.04	0.08	0.13	0.20	0.19	0.10	0.06	0.03	0.01
20	0.01	0.01	0.03	0.04	0.08	0.13	0.20	0.19	0.10	0.06	0.03	0.01
21	0.01	0.01	0.03	0.04	0.08	0.13	0.20	0.19	0.10	0.06	0.03	0.01
22	0.01	0.01	0.03	0.04	0.08	0.13	0.20	0.19	0.10	0.06	0.03	0.01
23	0.01	0.01	0.03	0.04	0.08	0.13	0.20	0.19	0.10	0.06	0.03	0.01
24	0.01	0.01	0.03	0.04	0.08	0.13	0.20	0.19	0.10	0.06	0.03	0.01
25	0.01	0.01	0.03	0.04	0.08	0.13	0.20	0.19	0.10	0.06	0.03	0.01
26	0.01	0.01	0.03	0.04	0.08	0.13	0.20	0.19	0.10	0.06	0.03	0.01
27	0.01	0.01	0.03	0.04	0.08	0.13	0.20	0.19	0.10	0.06	0.03	0.01
28	0.01	0.01	0.03	0.04	0.08	0.13	0.20	0.19	0.10	0.06	0.03	0.01
29	0.01	***	0.03	0.04	0.08	0.13	0.20	0.19	0.10	0.06	0.03	0.01
30	0.01	***	0.03	0.04	0.08	0.13	0.20	0.19	0.10	0.06	0.03	0.01
31	0.01	***	0.03	***	0.08	***	0.20	0.19	***	0.06	***	0.01

.16
DAILY ACCUMULATED PRECIPITATION FOR: SHENYANG, CHINA

UNITS: INCHES OR CM, DEPENDS ON USER REQUEST.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.01	0.25	0.47	1.13	2.14	4.30	7.90	13.54	19.35	22.97	25.08	26.21
2	0.02	0.25	0.48	1.16	2.20	4.40	8.06	13.72	19.49	23.05	25.13	26.23
3	0.03	0.26	0.49	1.19	2.26	4.51	8.23	13.91	19.64	23.13	25.17	26.25
4	0.04	0.27	0.51	1.22	2.32	4.61	8.39	14.10	19.78	23.21	25.21	26.27
5	0.04	0.28	0.53	1.25	2.38	4.72	8.56	14.29	19.92	23.29	25.26	26.29
6	0.05	0.29	0.54	1.28	2.43	4.82	8.72	14.47	20.06	23.37	25.30	26.31
7	0.06	0.29	0.56	1.31	2.49	4.93	8.89	14.66	20.20	23.45	25.35	26.33
8	0.07	0.30	0.58	1.34	2.55	5.03	9.05	14.85	20.34	23.53	25.39	26.36
9	0.08	0.31	0.60	1.37	2.61	5.14	9.22	15.04	20.49	23.61	25.44	26.38
10	0.09	0.32	0.61	1.40	2.66	5.25	9.39	15.23	20.63	23.69	25.48	26.40
11	0.10	0.32	0.63	1.44	2.72	5.35	9.55	15.41	20.77	23.77	25.53	26.42
12	0.11	0.33	0.65	1.47	2.78	5.46	9.72	15.60	20.91	23.85	25.57	26.44
13	0.12	0.34	0.66	1.50	2.84	5.56	9.88	15.79	21.05	23.93	25.62	26.46
14	0.12	0.35	0.68	1.53	2.89	5.67	10.05	15.98	21.19	24.01	25.66	26.49
15	0.13	0.35	0.70	1.56	2.95	5.77	10.21	16.17	21.33	24.09	25.70	26.51
16	0.14	0.36	0.72	1.59	3.01	5.91	10.38	16.36	21.44	24.17	25.74	26.53
17	0.15	0.37	0.73	1.63	3.09	6.04	10.58	16.55	21.54	24.23	25.77	26.54
18	0.15	0.38	0.75	1.67	3.17	6.17	10.77	16.74	21.64	24.29	25.80	26.55
19	0.16	0.39	0.78	1.70	3.25	6.31	10.97	16.93	21.74	24.34	25.83	26.56
20	0.17	0.40	0.80	1.74	3.32	6.44	11.17	17.12	21.85	24.40	25.86	26.57
21	0.17	0.41	0.83	1.78	3.40	6.57	11.37	17.31	21.95	24.46	25.89	26.59
22	0.18	0.41	0.86	1.81	3.48	6.70	11.57	17.50	22.05	24.52	25.92	26.60
23	0.19	0.42	0.88	1.85	3.56	6.84	11.76	17.69	22.15	24.58	25.95	26.61
24	0.19	0.43	0.91	1.89	3.64	6.97	11.96	17.88	22.26	24.63	25.99	26.62
25	0.20	0.44	0.94	1.92	3.72	7.10	12.16	18.07	22.36	24.69	26.02	26.63
26	0.21	0.45	0.96	1.96	3.80	7.23	12.36	18.26	22.46	24.75	26.05	26.64
27	0.21	0.46	0.99	2.00	3.87	7.37	12.56	18.45	22.56	24.81	26.08	26.66
28	0.22	0.47	1.02	2.03	3.95	7.50	12.75	18.64	22.67	24.86	26.11	26.67
29	0.23	***	1.04	2.03	4.03	7.50	12.95	18.83	22.67	24.92	26.11	26.68
30	0.23	***	1.07	2.07	4.11	7.63	13.15	19.02	22.77	24.98	26.14	26.69
31	0.24	***	1.10	***	4.19	***	13.35	19.21	***	25.04	***	26.70

.-31.11 0
DAILY DAYLENGTHS FOR: RAFAELA, ARGENTINA
LATITUDE -31.11 S.

UNITS: HOURS AND HUNDRETHS / MULTIPLY DECIMAL FRACTION BY 60 TO GET MINUTES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	14.25	13.70	12.88	11.89	11.02	10.39	10.28	10.73	11.55	12.48	13.43	14.12
2	14.25	13.67	12.84	11.86	10.99	10.37	10.28	10.76	11.58	12.51	13.45	14.14
3	14.24	13.64	12.81	11.83	10.97	10.36	10.29	10.78	11.61	12.54	13.48	14.15
4	14.23	13.62	12.78	11.80	10.94	10.35	10.30	10.80	11.64	12.57	13.51	14.17
5	14.22	13.59	12.75	11.77	10.92	10.34	10.30	10.83	11.67	12.60	13.54	14.18
6	14.21	13.56	12.72	11.74	10.89	10.33	10.31	10.85	11.70	12.64	13.57	14.19
7	14.19	13.54	12.69	11.71	10.87	10.32	10.32	10.87	11.73	12.67	13.59	14.20
8	14.18	13.51	12.65	11.68	10.84	10.31	10.33	10.90	11.76	12.70	13.62	14.21
9	14.17	13.48	12.62	11.65	10.82	10.30	10.34	10.92	11.79	12.73	13.65	14.23
10	14.15	13.45	12.59	11.62	10.80	10.29	10.35	10.95	11.82	12.76	13.67	14.24
11	14.14	13.42	12.56	11.59	10.77	10.29	10.37	10.97	11.86	12.79	13.70	14.24
12	14.12	13.39	12.53	11.56	10.75	10.28	10.38	11.00	11.89	12.82	13.72	14.25
13	14.11	13.36	12.49	11.53	10.73	10.27	10.39	11.02	11.92	12.85	13.75	14.26
14	14.09	13.34	12.46	11.50	10.71	10.27	10.41	11.05	11.95	12.89	13.77	14.27
15	14.07	13.31	12.43	11.47	10.68	10.26	10.42	11.08	11.98	12.92	13.80	14.27
16	14.06	13.28	12.40	11.44	10.66	10.26	10.43	11.10	12.01	12.95	13.82	14.28
17	14.04	13.25	12.37	11.41	10.64	10.25	10.45	11.13	12.04	12.98	13.84	14.28
18	14.02	13.22	12.33	11.38	10.62	10.25	10.47	11.16	12.07	13.01	13.87	14.29
19	14.00	13.19	12.30	11.35	10.60	10.25	10.48	11.18	12.10	13.04	13.89	14.29
20	13.98	13.15	12.27	11.32	10.58	10.25	10.50	11.21	12.13	13.07	13.91	14.29
21	13.96	13.12	12.24	11.29	10.56	10.25	10.52	11.24	12.16	13.10	13.93	14.29
22	13.94	13.09	12.21	11.26	10.54	10.25	10.53	11.27	12.20	13.13	13.95	14.29
23	13.91	13.06	12.18	11.24	10.53	10.25	10.55	11.29	12.23	13.16	13.98	14.29
24	13.89	13.03	12.14	11.21	10.51	10.25	10.57	11.32	12.26	13.19	14.00	14.29
25	13.87	13.00	12.11	11.18	10.49	10.25	10.59	11.35	12.29	13.22	14.02	14.29
26	13.85	12.97	12.08	11.15	10.47	10.25	10.61	11.38	12.32	13.25	14.03	14.29
27	13.82	12.94	12.05	11.13	10.46	10.26	10.63	11.41	12.35	13.28	14.05	14.29
28	13.80	12.91	12.02	11.10	10.44	10.26	10.65	11.44	12.38	13.31	14.07	14.28
29	13.77	***	11.99	11.10	10.43	10.26	10.67	11.47	12.38	13.34	14.07	14.28
30	13.75	***	11.95	11.07	10.41	10.26	10.69	11.50	12.42	13.37	14.09	14.27
31	13.72	***	11.92	***	10.40	***	10.71	11.52	***	13.40	***	14.26

16

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TOP:
C       DOUGLAS T. SMITH, JOANNE LOGAN AND RALPH E. NEILD
C       THE UNIVERSITY OF NEBRASKA-LINCOLN, LINCOLN, NE.
C
C
C       THIS PROGRAM IS A FORTRAN VERSION OF THE CLIGEN PROGRAM WHICH
C       WAS ORIGINALLY WRITTEN IN SAS/PL1 FOR DR. RALPH NEILD. IT GE-
C       NERATES DAILY TEMPERATURE VALUES AND DAILY ESTIMATES OF MANY
C       OTHER TEMPERATURE DEPENDENT VARIABLES, FROM NORMAL MONTHLY
C       TEMPERATURES. THESE MONTHLY NORMALS ARE THEN USED TO COM-
C       PUTE COEFFICIENTS OBTAINED BY RUNNING A HARMONIC SUBROUTINE
C       (FORTRAN VERSION) OR TEMPEST SUBROUTINE (ORIGINAL SAS VER-
C       SION). THE PROGRAM ALSO GENERATES DAILY PRECIPITATION VALUES
C       FROM MONTHLY NORMALS.
C
C       TEMPERATURE CALCULATIONS ARE BASED ON A HARMONIC REGRESSION
C       EQUATION DEVELOPED BY DR. RALPH NEILD.  DAILY TEMPERATURES
C       ARE PREDICTED FROM THIS EQUATION. THE COEFFICIENTS OBTAINED
C       FROM THE HARMONIC ANALYSIS SUBROUTINE IS SUPPLIED TO THE MAIN
C       PROGRAM BY FORMAL PARAMETERS IN SUBROUTINE CALLS.
C
C       PRECIPITATION CALCULATIONS ARE ESTIMATED DIRECTLY FROM MON-
C       THLY NORMALS. HALF MONTH NORMALS ARE DETERMINED. THEN LAST
C       HALF OF A MONTH IS ADDED TO THE FIRST HALF OF THE NEXT MONTH
C       THEN DIVIDED BY THE NUMBER OF DAYS IN THE INTERVAL. THIS
C       VALUE IS ASSIGNED BY DAY TO THE FIRST HALF OF THE MONTH,
C       BUT THE SECOND HALF OF EACH MONTH'S PRECIPITATION VALUES
C       IS BASED ON THE DAY NORMALS OF THE SECOND HALF OF THAT MONTH.
C       THESE ARE CALCULATED BY DIVIDING THE HALF MONTH NORMALS BY
C       THE NUMBER OF DAYS IN THE SECOND HALF OF THE MONTH.
C
C
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      REAL CODE1(39),CODE2(39),CODE3(39),CODE4(39),CODE5(39),
     $ CODE6(39),ONELIN(65),R6(2),R7(14),R8(14),R9(20)
      DIMENSION RL1(2),RU1(2),R1(5),RL2(2),RU2(2),R2(2),RL3(2),
     $RU3(2),R3(2),RL4(12),RU4(12),R4(14),RL5(12),RU5(12),R5(14),
     $Z(366,16),RSP(12),LENGTH(12),TT(12),CH(2),ST(20),RO(20),
     $RR(12),UN(2),TABLE(112),PE(12)
      LOGICAL FLAG0,FLAG1,FLAG2,FLAG3
      COMMON/ANY/ T(365),A1,B1,A2,B2,C1,C2,T1,T2,SXSQ,V1,V2
      DATA XXX/'N'/
      DATA RL1/1.,0./,RU1/2.,0./
      DATA RL2/1.,0./,RU2/17.,0./
      DATA RL3/-60.,-60./,RU3/60.,60./
      DATA ST/' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',
     $' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' '/
      DATA R6/40.,49./
      DATA R7/-5.4,-2.3,2.5,10.7,16.7,22.2,25.0,
     $        24.2,18.7,12.7,3.9,-2.6,'C','C'/
      DATA R8/15.7,22.9,38.4,63.8,88.6,126.7,84.3,
     $        83.1,74.2,38.9,22.1,18.5,'M','M'/
      DATA R9/'L','I','N','C','O','L','N',',',' ',
     $'N','E','B','R','A','S','K','A',',',' ',' '/
      DATA UN/'I','M'/
      DATA RL4/-99.,-99.,-99.,-99.,-99.,-99.,-99.,-99.,-99.,-99.,
     $-99.,-99./
      DATA RU4/150.,150.,150.,150.,150.,150.,150.,150.,150.,150.,
     $150.,150./
      DATA RL5/0.,0.,0.,0.,0.,0.,0.,0.,0.,0.,0.,0./
      DATA RU5/1500.,1500.,1500.,1500.,1500.,1500.,1500.,1500.,
     $1500.,1500.,1500.,1500./
      DATA RSP/15.,46.,74.,105.,135.,166.,196.,227.,258.,288.,
     $319.,349./
      DATA LENGTH/31,28,31,30,31,30,31,31,30,31,30,31/
      DATA CH/'C','F
      FLAG0=.FALSE.
      FLAG1=.FALSE.
      FLAG2=.FALSE.
      FLAG3=.FALSE.
      WRITE(6,10)
10    FORMAT(/,2X,'CLIGEN IS A PROGRAM WHICH GENERATES DAIL
     $'ESTIMATES OF CLIMATIC DATA.',//)
20    WRITE(6, 30)
30    FORMAT(2X,'DO YOU WANT A DESCRIPTION OF CLIGEN ? PLEA
     'SE ANSWER YES OR NO.'/)
40    KK=-111
      CALL READN2(0,1,RL1,R1,RU1,KK)
      GO TO (50,20,20,740),KK
C***            K H  C  STOP
C
50    IF(XXX.EQ.R1(1)) GO TO  90
      REWIND 3
         DO  80 I9=1,40
         READ(3, 60) (ONELIN(IL),IL=1,65)
         WRITE(6, 70)(ONELIN(IL),IL=1,65)
60       FORMAT(65A1)
70       FORMAT(6X,65A1)
80       CONTINUE
C
```

```
C
90    WRITE(6,100)
100   FORMAT(/2X,'PLEASE ENTER A CODE NUMBER FROM 1 TO 17 TO',
     #' REQUEST THE VARIABLE',/,2X,'WHICH YOU WOULD LIKE TO',
     #' SEE. IF YOU WANT A LIST OF VARIABLES,',/,2X,'THEN',
     #' TYPE HELP AND PRESS RETURN.',/2X,'(OR CONTACT DR.',
     #' RALPH NEILD/(402) 472-1639).'/)
110   KK=-111
      CALL READN2(1,1,RL2,R2,RU2,KK)
      GO TO (130,120,110,740),KK
C***          K H C STOP
C
120   CALL HELPER
      GO TO 90
130   J=INT(R2(1))
      IF(.NOT.FLAG0) WRITE(6,140)
140   FORMAT(7X,'*****************************',
     #'*************************',/7X,'*',52X,'*',
     #/7X,'* TO SEE A SAMPLE PRINT-OUT FOR ANY SE',
     #'LECTED OPTION, *'/7X,'* PLEASE PRESS RETUR',
     #'N IN PLACE OF INPUT DATA. ALL',4X,'*',/7X,
     #'* SAMPLE OUTPUT ARE IN SI UNITS, EXCEPT',
     #' OPTIONS 1 & 2*',/7X,
     #'*',52X,'*',/7X,'*************************',
     #'*****************************',//)
      IF(FLAG0) GO TO 210
      WRITE(6,150)
150   FORMAT(2X,'ENTER :',/,2X,'STATION NAME. (CITY, STATE OR
     #' COUNTRY) E.G. LINCOLN, NEBRASKA.',/)
160   KK=-111
      CALL READN2(0,20,RL1,R0,RU1,KK)
      GO TO (200,170,180,740),KK
C***          K    HP  CR STOP
C
170   WRITE(6,420)
      GO TO160
180      DO 190 I=1
         ST(I)=R9(I
         RO(I)=R9(I
190      CONTINUE
200   FLAG0=.TRUE.
210   REWIND 1
         DO  230 II=1,J
         READ(1, 220) (TABLE(JH),JH=1,56)
         READ(1, 220) (TABLE(JH),JH=57,112)
220      FORMAT(1X,56A1)
230      CONTINUE
      REWIND 2
      READ(2,250) (CODE5(IX),IX=1,39)
      READ(2,250) (CODE6(IX),IX=1,39)
      READ(2,240) (CODE1(IX),IX=1,29)
      READ(2,250) (CODE2(IX),IX=1,39)
      READ(2,250) (CODE3(IX),IX=1,39)
      READ(2,250) (CODE4(IX),IX=1,39)
240   FORMAT(29A1)
250   FORMAT(39A1)
      IF(FLAG1) GO TO310
      GO TO (640,320,320,320,320,320,320,320,320,320,320,
     #       260,260,260,460,460,260),J
260   WRITE(6,270)
270   FORMAT(2X,'ENTER 2 NUMBERS FOR YOUR STATION LATITUDE.
     #' ONE FOR DEGREES',/,2X,'AND THE OTHER FOR MINUTES. '
     #'EXAMPLE: LINCOLN, NEBRASKA =',/,2X,'40 49 ( WHICH ',
     #'MEANS 40 DEGREES 49 MINUTES NORTH LATITUDE ).',/,
     #2X,'BOTH NUMBERS SHOULD BE NEGATIVE FOR SOUTHERN ',
     #'HEMISPHERE.',/)
280   KK=-111
      CALL READN2(2,2,RL3,R3,RU3,KK)
      GO TO (300,260,290,740),KK
C***          OK HP CR STOP
C
290   R3(1)=R6(1)
      R3(2)=R6(2)
300   FLAG1=.TRUE.
      ALAT=R3(1)+R3(2)/60.
310   IF(FLAG2.AND.(J.EQ.14)) GO TO 460
320   IF(FLAG2) GO TO 660
      GO TO (640,330,330,330,330,330,330,330,330,330,330,
     #       330,330,330,460,460,730),J
```

```
330   WRITE(6,340)
340   FORMAT(7X,'*******************************',
     #'************************',/7X,'*',52X,'*',
     #/7X,'* NOTE: THE OUTPUT UNITS REQUESTED FOR
     #'TEMPERATURE    *',/7X,'* WILL DETERMINE THE
     #'POTENTIAL EVAPOTRANSPIRATION     *',/7X,
     #'* OUTPUT UNITS, I.E. SI OR ENGLISH. TYPE '
     #'HELP FOR     *',/7X,'* ADDITIONAL DETAILS.'
     #32X,'*',/7X,'*',52X,'*',/7X,'**************
     #'*************************************',/
      WRITE(6,350)
350   FORMAT(2X,'ENTER :',/,2X,'12 MONTHLY NORMAL TEMPERATURES ',
     #'FOLLOWED BY ONE OF THESE',/,2X,'COMBINATIONS TO INDICATE '
     #'YOUR INPUT/OUTPUT UNITS:',/,2X,'FF FC CF CC
     #' NOTATION: F (FAHRENHEIT), C (CELSIUS).',/)
360   KK=-111
      CALL READN2(12,14,RL4,R4,RU4,KK)
      GO TO (450,370,430,740),KK
C***          OK HP CR STOP
C
370   WRITE(6,250) (CODE5(IX),IX=1,39)
      WRITE(6,250) (CODE6(IX),IX=1,39)
         DO 400 IY=1,10,3
         IX=IY
         IO=(IY+2)/3
         WRITE(6,380) CODE1(IX),CODE1(IX+1),(CODE2(IZ),IZ=1,39),
         CODE1(IX)
         WRITE(6,390) (CODE4(IP),IP=1,39),CODE1(IX+1)
380      FORMAT(7X,2A1,12X,39A1,A1)
390      FORMAT(21X,39A1,A1,/)
400      CONTINUE
      WRITE(6,410)
410   FORMAT(1X,'EXAMPLE:'/1X,'22.2 27.9 36.5 51.3 62.0 72.0
     #'77.3 75.6 65.6 54.9 39.0 27.3 FC'/)
420   FORMAT(' START OVER AND RETYPE YOUR ENTRIES.'
      GO TO360
430      DO 440 I=1,14
         R4(I)=R7(I)
440      CONTINUE
450   FLAG2=.TRUE.
      IF(J.LT.12) GO TO 570
460   IF(FLAG3) GO TO 660
      GO TO (640,570,570,570,570,570,570,570,570,570,570,
            710,710,470,470,470,730),J
470   WRITE(6,480)
480   FORMAT(2X,'ENTER :',/,2X,'12 MONTHLY NORMAL PRECIPITATI',
     #'ON TOTALS FOLLOWED BY ONE OF THESE',/2X,'COMBINATIONS TO
     #'INDICATE YOUR INPUT/OUTPUT UNITS:',/,2X,
     #'II IM MI MM. NOTATION: I (INCHES), M (MILLIMETERS).'/,
     #2X,'(TYPE HELP FOR ADDITIONAL DETAILS).'/)
490   KK=-111
      CALL READN2(12,14,RL5,R5,RU5,KK)
      GO TO (550,500,530,740),KK
C***          OK  HLP CAR STOP
C
500   WRITE(6,250) (CODE5(IX),IX=1,39)
      WRITE(6,250) (CODE6(IX),IX=1,39)
         DO 510 IY=13,22,3
         IX=IY
         IO=(IY+2)/3
         WRITE(6,380) CODE1(IX),CODE1(IX+1),(CODE3(IZ),IZ=1,39),
         CODE1(IX)
         WRITE(6,390) (CODE4(IP),IP=1,39),CODE1(IX+1)
510      CONTINUE
        [TE(6,520)
520     RMAT(1X,'EXAMPLE:'/1X,'0.62 0.90 1.51 2.51 3.49 4.99 '
        ,32 3.27 2.92 1.53 0.87 0.73 II'/)
         TO 490
530      DO 540 I=1,14
         R5(I)=R8(I)
540      CONTINUE
550     )G3=.TRUE.
         DO 560 L=1,12
         RR(L)=R5(L)
         IF((R5(13).EQ.UN(2)).AND.(R5(14).EQ.UN(1))) RR(L)=R5(L)/25.4
560      CONTINUE
```

10

```
570   BASE1=40.
      BASE2=50.
      BASE3=65.
      IF(R4(14).NE.CH(1)) GO TO 580
      BASE1=8.*5./9.
      BASE2=18.*5./9.
      BASE3=33.*5./9.
580   M1=1
      N=12
      P=365.
      IF(R4(13).NE.CH(1)) GO TO600
         DO590 J1=1,N
         T(J1)=(R4(J1)*9./5.)+32.
         TT(J1)=T(J1)
         XBAR=XBAR+T(J1)
590      CONTINUE
      GO TO620
600      DO610 J1=1,N
         T(J1)=R4(J1)
         TT(J1)=T(J1)
         XBAR=XBAR+T(J1)
610      CONTINUE
620   XBAR=XBAR/FLOAT(N)
      CALL HRMONC(N,P,RSP)
      IF(J.NE.2) GO TO 640
         DO 630 J1=1,20
         ST(J1)=RO(J1)
630      CONTINUE
640      DO650 I=2,366
         D=FLOAT(I)-1.
         Z(I,1)=D
         IF(J.EQ.1) GO TO650
         TERM1=(2.*3.14159*D)/365.
         TERM2=(4.*3.14159*D)/365.
         Z(I,3)=XBAR+B1*COS(TERM1)+A1*SIN(TERM1)+
         B2*COS(TERM2)+A2*SIN(TERM2)
         IF(R4(14).EQ.CH(1)) Z(I,3)=(Z(I,3)-32.)*5./9.
         Z(I,4)=Z(I,3)-BASE1
         IF(Z(I,4).LT.0.) Z(I,4)=0.
         Z(I,5)=Z(I-1,5)+Z(I,4)
         Z(I,6)=Z(I,3)-BASE2
         IF(Z(I,6).LT.0.) Z(I,6)=0.
         Z(I,7)=Z(I-1,7)+Z(I,6)
         Z(I,8)=BASE3-Z(I,3)
         IF(Z(I,8).LT.0.) Z(I,8)=0.
         Z(I,9)=Z(I-1,9)+Z(I,8)
         Z(I,10)=Z(I,3)-BASE3
         IF(Z(I,10).LT.0.) Z(I,10)=0
         Z(I,11)=Z(I-1,11)+Z(I,10)
650      CONTINUE
660   IF(J.NE.2) GO TO 700
      CALL HARMRS(TT,ST,XBAR,N)
670   WRITE(6, 680)
680   FORMAT(2X,'DO YOU WANT INFORMATION ABOUT THE HARMONIC',/2X,
     )'REGRESSION MODEL USED, INCLUDING SOME REFERENCES ?',//)
      KKK=-111
      CALL READN2(0,  1,  RL1,R1,RU1,KK)
      GO TO(690,670,670,740),KK
C**          OK HLP CR  STOP
690   IF(XXX.EQ.R1(1)) GO TO  90
      CALL HMONIC
      GO TO  90
700   IF(J.GT.11) GO TO 710
      CALL CLIGE1(Z,J,TABLE,RO
      GO TO  90
710   IF(J.GT.14) GO TO 720
      IF((.NOT.FLAG3).AND.(J.EQ.14)) GO TO 470
      CALL SURPET(12,ALAT,R4,PE,CH)
      CALL HALF(Z,RR,PE,J,R4,CH,R5,UN,TABLE,RO)
      GO TO  90
720   IF((.NOT.FLAG3).AND.(J.NE.17)) GO TO 470
      IF((J.EQ.15).OR.(J.EQ.16)) CALL HALF(Z,RR,PE,J,R4,CH,R5,
     )UN,TABLE,RO)
730   IF(J.EQ.17) CALL DAYLEN(ALAT,1,TABLE,RO)
      FLAG1=.FALSE.
      GO TO  90
740   STOP
      END
```

```
TOF:
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C     THE UNIVERSITY OF NEBRASKA-LINCOLN, LINCOLN, NE.
C
C
C
      SUBROUTINE CLIGE1(Z,J,TABLE,RO)
      INTEGER DAY
      DIMENSION LENGTH(12),T(31,12),Z(366,16),TABLE(112),RO(20)
      DATA LENGTH/31,28,31,30,31,30,31,31,30,31,30,31/
      WRITE(6,  10) ((TABLE(JH),JH=1,56),(RO(JI),JI=1,20))
      WRITE(6,  20) (TABLE(JH),JH=57,112)
10    FORMAT(1X,56A1,20A1,/)
20    FORMAT(1X,56A1,/)
      N1=1
         DO40 K=1,12
         N2=LENGTH(K)
            DO30 I=1,N2
            N1=N1+1
            T(I,K)=Z(N1,J)
30          CONTINUE
40       CONTINUE


      WRITE(6,50)
50    FORMAT(' DAY',2X,'JAN',3X,'FEB',3X,'MAR',3X,'APR',
     3X,'MAY',3X,'JUN',3X,'JUL',3X,'AUG',3X,'SEP',5X,
     'OCT',4X,'NOV',4X,'DEC',/)



         DO 70 K=1,28
         WRITE(6,60) K,T(K,1),T(K,2),T(K,3),T(K,4),T(K,5)
         T(K,6),T(K,7),T(K,8),T(K,9),T(K,10),T(K,11),
         T(K,12)
60       FORMAT(1X,I3,1X,9(F5.0,1X),3F7.0)
70       CONTINUE


      K=29
      WRITE(6,80) K,T(K,1),T(K,3),T(K,4),T(K,5),T(K,6),
     T(K,7),T(K,8),T(K,9),T(K,10),T(K,11),T(K,12)
80    FORMAT(1X,I3,1X,F5.0,1X,' *** ',1X,7(F5.0,1X),3F7.0)


      K=30
      WRITE(6,80) K,T(K,1),T(K,3),T(K,4),T(K,5),T(K,6),
     T(K,7),T(K,8),T(K,9),T(K,10),T(K,11),T(K,12)


      K=31
      WRITE(6,90) K,T(K,1),T(K,3),T(K,5),T(K,7),T(K,8),
     T(K,10),T(K,12)
90    FORMAT(1X,I3,1X,F5.0,1X,' *** ',1X,F5.0,1X,' ***
     1X,F5.0,1X,' *** ',1X,2(F5.0,1X),' *** ',1X,F7.0,


      RETURN
      END
```

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```
TOI
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C
C
      SUBROUTINE HALF(Z,P,PE,JJ,R4,CH,R5,UN,TABLE,RO)
      INTEGER L1(24),L2(24)
      DIMENSION  H(365),RR(24),P(12),Z(366,16),PE(12),
     *TABLE(112),RO(20),PR(24),R4(14),CH(2),R5(14),UN(2)
      DATA L1/31,15,29,14,30,15,31,15,30,15,30,
     *        15,30,15,31,15,31,15,30,15,30,15,
     *        30,15/
      DATA L2/15,16,14,17,15,13,15,16,15,15,15,
     *        16,15,15,15,16,15,16,15,15,15,16,
     *        15,15/
      K=0
         DO 10 I=2,24,2
         K=K+1
         RR(I)=P(K)/2.
         PR(I)=PE(K)/2.
10       CONTINUE

      RR(1)=RR(2)+RR(24)
      PR(1)=PR(2)+PR(24)

         DO 20 I=3,23,2
         RR(I)=RR(I-1)+RR(I+1)
         PR(I)=PR(I-1)+PR(I+1)
20       CONTINUE

         DO 30 I=1,24
         RR(I)=RR(I)/FLOAT(L1(I))
         PR(I)=PR(I)/FLOAT(L1(I))
30       CONTINUE

      M=1
         DO 50 I=1,24
         N2=L2(I)

            DO 40 K=1,N2
            M=M+1
            Z(M,12)=PR(I)
            Z(M,13)=0.5*Z(M,12)
            Z(M,15)=RR(I)
            Z(M,14)=Z(M,15)-Z(M,12)
            Z(M,16)=Z(M-1,16)+Z(M,15)
40          CONTINUE
50       CONTINUE
      IF(R5(14).EQ.UN(1)) GO TO   80
```

```
      DO   60 K=2,366
      IF(R5(13).EQ.UN(1)) Z(K,15)=Z(K,15)*25.4
      Z(K,14)=Z(K,15)-Z(K,12)
      IF(R5(13).EQ.UN(1)) Z(K,16)=Z(K,16)*2.54
      IF(R5(13).EQ.UN(2)) Z(K,16)=Z(K,16)/10.
60    CONTINUE
      DO   70 K=2,366
      Z(K,14)=Z(K,15)-Z(K,12)
      IF((R4(14).EQ.CH(2)).AND.(R5(14).EQ.UN(2))) Z(K,14)=
      Z(K,15)-(Z(K,12)*25.4)
      IF((R4(14).EQ.CH(1)).AND.(R5(14).EQ.UN(1))) Z(K,14)=
      Z(K,15)-(Z(K,12)/25.4)
70    CONTINUE
80    WRITE(6,  90) ((TABLE(JH),JH=1,56),(RO(JI),JI=1,20))
      WRITE(6, 100) (TABLE(JH),JH=57,112)
90    FORMAT(1X,56A1,20A1,/)
100   FORMAT(1X,56A1,/)
      WRITE(6,110)
110   FORMAT(' ',42HDAY    JAN    FEB    MAR    APR    MAY    JUN
        35HJUL    AUG    SEP    OCT    NOV    DEC,/)
      DO120 I=1,365
      IF(JJ.EQ.12) H(I)=Z(I+1,12)
      IF(JJ.EQ.13) H(I)=Z(I+1,13)
      IF(JJ.EQ.14) H(I)=Z(I+1,14)
      IF(JJ.EQ.15) H(I)=Z(I+1,15)
      IF(JJ.EQ.16) H(I)=Z(I+1,16)
120   ----------
      DO140 J=1,28
      WRITE(6,130) J,H(J),H(J+31),H(J+59),H(J+90),H(J+120),H(J+151)
     ,H(J+181),H(J+212),H(J+243),H(J+273),H(J+304),H(J+334)
130   FORMAT(' ',I3,8F6.2,4F7.2)
140   CONTINUE
      J=29
      WRITE(6,150) J,H(29),H(88),H(118),H(149),H(179),H(210),H(241)
      H(271),H(302),H(332),H(363)
      J=30
      WRITE(6,160) J,H(30),H(89),H(119),H(150),H(180),H(211),H(242),
      H(272),H(303),H(333),H(364)
      J=31
      WRITE(6,170) J,H(31),H(90),H(151),H(212),H(243),H(304),H(365)
150   FORMAT(' ',I3,1F6.2,6H  *** ,6F6.2,4F7.2)
160   FORMAT(' ',I3,1F6.2,6H  *** ,6F6.2,4F7.2)
170   FORMAT(' ',I3,1F6.2,6H  *** ,1F6.2,6H  *** ,1F6.2,6H  *** ,
      2F6.2,7H   *** ,1F7.2,7H   *** ,1F7.2)
180   CONTINUE
      RETURN
      END
```

```
TOF:
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C       THE UNIVERSITY OF NEBRASKA-LINCOLN, LINCOLN, NE.
C
C
        SUBROUTINE SUBPET(M,ALAT,BAR,PE,CH)
C       THIS PROGRAM MAY BE USED FOR ESTIMATING MONTHLY VALUES OF
C       POTENTIAL EVAPOTRANSPIRATION USING THORNTHWAITE'S METHOD.
        DIMENSION BAR(14),TBAR(14),DAYLGT(12),CH(2),PE(12),T(12)
           DO10 I=1,12
           TBAR(I)=BAR(I)
10         CONTINUE
        IF(BAR(13).EQ.CH(2)) GO TO30
           DO20 I=1,12
           TBAR(I)=(BAR(I)*9./5.)+32.
20         CONTINUE
30      HI=0.0
           DO40 I=1,12
           DEGREE=TBAR(I)-32.0
           IF(DEGREE.LT.0.01) GO TO40
           HI=HI+((DEGREE*0.55556)/5.0)**1.514
40         CONTINUE
        A=0.4923940.01792*HI-0.0000771*HI*HI+0.000000675*HI*HI*HI
        RA=0.0174532925
        K=1
           DO50 I=1,M
           DAY=(K*30.0)-15.0
           EPH=23.5*SIN(0.9863*(DAY-80.0)*RA)
           COH=-TAN(ALAT*RA)*TAN(EPH*RA)
           DAYLGT(K)=ARCOS(COH)*7.6400707
           T(I)=TBAR(I)-32.0
           IF(TBAR(13).EQ.CH(1)) T(I)=((TBAR(I)*9./5.)+32.)-32.
           IF(HI.GT.0.0.AND.T(I).GT.0.0) PE(I)=
           ((1.6*(5.5556*T(I)/HI)**A)*DAYLGT(K)/12.)/2.54
           IF(T(I).LT.0.0) PE(I)=0.0
           T(I)=T(I)+32.0
           K=K+1
           IF(K.LE.12) GO TO50
50         CONTINUE
        IF((BAR(13).EQ.CH(2)).AND.(BAR(14).EQ.CH(2))) RETURN
        IF((BAR(13).EQ.CH(1)).AND.(BAR(14).EQ.CH(2))) RETURN
           DO 60 IM=1,M
           PE(IM)=PE(IM)*25.4
60         CONTINUE
        RETURN
        END
```

```
TOF:
C     DOUGLAS T. SMITH, JOANNE LOGAN AND RALPH E. NEILD
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C
      SUBROUTINE HARMRS(TT,ST,XBAR,N)
C     ILLUSTRATIVE EXAMPLE OF THE USE OF A SUBROUTINE WHICH PERFORMS
C     HARMONIC ANALYSIS.
C     THIS SUBROUTINE PRINTS THE RESULTS COMPUTED BY THE SUBSEQUENT
C     PROCEDURE TAKEN FROM PANOFSKY AND BRIER,PAGE 133.(1965,PENN STATE
C
      DIMENSION TT(12),ST(20)
      COMMON/ANY/ T(365),A1,B1,A2,B2,C1,C2,T1,T2,SXSQ,V1,V2
      WRITE(6,10)
10    FORMAT('1',//)
      WRITE(6,20)
20    FORMAT(' ',28HRESULTS OF HARMONIC ANALYSIS)
      WRITE(6,30)
30    FORMAT(' ',41HSHOWING TEMPERATURES AS FUNCTION OF TIME
      N1=1
      N2=12
         WRITE(6,50) ((TT(I),I=N1,N2),(ST(KK),KK=1,20))
40       FORMAT(12F5.1)
50       FORMAT(1X,9HINPUT (F),1X,12F5.1//1X,'OUTPUT FOI    20A1)
      VV=V1+V2
      WRITE(6,60) XBAR,B1,A1,B2,A2,C1,C2,T1,T2,SXSQ
60    FORMAT(' ',/2X,'XBAR     MEAN ANNUAL TEMPERATURE          (F)
                     F20.8,/,2X,
                     'X1/B1    COEFF. OF 1ST. COSINE TERM IN MODEL
                     F20.8,/,2X,
                     'X2/A1    COEFF. OF 1ST. SINE   TERM IN MODEL
                     F20.8,/,2X,
                     'X3/B2    COEFF. OF 2ND. COSINE TERM IN MODEL
                     F20.8,/,2X,
                     'X4/A2    COEFF. OF 2ND. SINE   TERM IN MODEL
                     F20.8,//,2X,
                     'C1       AMPLITUDE OF THE FIRST HARMONIC (F)
                     F20.8,/,2X,
                     'C2       AMPLITUDE OF THE SECOND HARMONIC(F)
                     F20.8,/,2X,
                     'T1       TIME OF MAX. OCCURRENCE OF 1ST. (JULN)
                     F17.8,/,2X,
                     'T2       TIME OF MAX. OCCURRENCE OF 2ND. (JULN)
                     F17.8,/,2X,
                     'SXSQ     VARIANCE OF INPUT DATA           (F**2)
                     F17.8)
      WRITE(6,70) V1,V2,VV
70    FORMAT(2X,'V1       VARIANCE ACCOUNTED FOR BY 1ST.  (%)'
               F20.8,/,2X,
               'V2       VARIANCE ACCOUNTED FOR BY 2ND.  (%)'
               F20.8,/,2X,
               'VT       TOTAL VARIANCE EXPLAINED BY 1&2 (%)'
               F20.8,//)
      RETURN
      END
C
C
```

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TOF:
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C
      SUBROUTINE HRMONC(N,P,RSP)
C     THIS SUBROUTINE SUBPROGRAM PERFORMS HARMONIC ANALYSIS.
C     THE PROCEDURE IS DESIGNED TO FIT THE FIRST TWO HARMONICS TO
C     A PERIODIC TIME SERIES OF N OBSERVATIONS WITH TIME PERIOD P. THE
C     OBSERVATIONS SHOULD BE TAKEN AT DISCRETE POINTS IN TIME WITH EQUAL
C     SPACINGS BETWEEN OBSERVATIONS. E.G. HOURLY, DAILY, MONTHLY, ETC.
C     IN THIS EXAMPLE THE VARIABLE RSP STORES THE JULIAN CALENDAR
C     DATES FOR THE MIDPOINT OF EACH MONTH OF THE YEAR. NORMAL
C     TEMPERATURES FOR EACH MONTH OF THE YEAR ARE COPIED INTO THE FIRST
C     12 ELEMENTS OF THE ARRAY X(365) BEFORE THIS ROUTINE IS CALLED.
      DIMENSION RSP(12)
      COMMON/ANY/ X(365),A1,B1,A2,B2,C1,C2,T1,T2,SXSQ,V1,V2,VV
      A1=0.
      A2=0.
      B1=0.
      B2=0.
      SUMX=0.
      SUMXSQ=0.
      PYE=3.141592654
      R=PYE/180.
      FLN=FLOAT(N)
      FN=2./FLN
      TERMC=(360./P)*R
         DO 10 IT=1,N
         TERM1=TERMC*1.*RSP(IT)
         TERM2=TERMC*2.*RSP(IT)
         A1=A1+FN*SIN(TERM1)*X(IT)
         B1=B1+FN*COS(TERM1)*X(IT)
         A2=A2+FN*SIN(TERM2)*X(IT)
         B2=B2+FN*COS(TERM2)*X(IT)
         SUMX=SUMX+X(IT)
         SUMXSQ=SUMXSQ+(X(IT)**2)
10       CONTINUE
      C1=2.*SQRT(A1**2+B1**2)
      C2=2.*SQRT(A2**2+B2**2)
      TP1=ATAN(A1/B1)
      TP2=ATAN(A2/B2)
      T1=TP1
      T2=TP2
      IF((B1.GT.0.).AND.(A1.LT.0.)) T1=2.*PYE-TP1
      IF((B1.LT.0.).AND.(A1.LT.0.)) T1= PYE+TP1
      IF((B1.LT.0.).AND.(A1.GT.0.)) T1=PYE-TP1
      IF((B2.GT.0.).AND.(A2.LT.0.)) T2=2.*PYE-TP2
      IF((B2.LT.0.).AND.(A2.LT.0.)) T2=PYE+TP2
      IF((B2.LT.0.).AND.(A2.GT.0.)) T2=PYE-TP2
      T1=(P*T1)/(2.*PYE)
      T2=(P*T2)/(4.*PYE)
      SXSQ=(SUMXSQ-SUMX**2/FLN)/FLN
      V1=100.*(C1/2.)**2/(2.*SXSQ)
      V2=100.*(C2/2.)**2/(2.*SXSQ)
      VV=V1+V2
      RETURN

C
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TOP:
C       DOUGLAS T. SMITH, JOANNE LOGAN AND RALPH E. NEILD
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C
C       THE TWO SUBROUTINES BELOW ARE USED FOR PRINTING TEXT
C       MATERIAL. IT CONTAINS INFORMATION, SUCH AS, THE OP-
C       TIONS THAT ARE AVAILABLE TO THE USER AND REFERENCES FOR
C       ADDITIONAL READING ON THE HARMONIC ANALYSIS PROCEDURE.
        SUBROUTINE HELPER
        WRITE(6,  10)
10      FORMAT(2X,'OPTIONS AVAILABLE FOR SINGLE VARIABLE.',//,2X,
       ‡'OPTIONS',38X,'REQUIRED INPUT',/2X,'-------',38X,'----------
       ‡//,2X,'1. TABLE OF JULIAN DAYS.',22X,'NONE',/,2X,
       ‡'2. HARMONIC ANALYSIS ON TEMPERATURES.',9X,'TEMPERATURES'/2X,
       ‡'3. DAILY ESTIMATED TEMPERATURES.',14X,'TEMPERATURES',/,2X,
       ‡'4. DAILY ESTIMATED GDD40.',21X,'TEMPERATURES',/,2X,
       ‡'5. DAILY ACCUMULATED GDD40.',19X,'TEMPERATURES',/,2X,
       ‡'6. DAILY ESTIMATED GDD50.',21X,'TEMPERATURES'/,2X,
       ‡'7. DAILY ACCUMULATED GDD50.',19X,'TEMPERATURES',/,2X,
       ‡'8. DAILY ESTIMATED HDD65.',21X,'TEMPERATURES',/,2X,
       ‡'9. DAILY ACCUMULATED HDD65.',19X,'TEMPERATURES',/,2X,
       ‡'10.DAILY ESTIMATED CDD65.',21X,'TEMPERATURES',/,2X,
       ‡'11.DAILY ACCUMULATED CDD65.',19X,'TEMPERATURES',/,2X,
       ‡'12.DAILY ESTIMATED PET.',23X,'TEMP./STATION LATITUDE',/,2X,
       ‡'13.DAILY ESTIMATED .5 PET.',20X,'TEMP./STATION LATITUDE',/,2X,
       ‡'14.DAILY DIFFERENCES OF PRECIP.-PET.',10X,'TEMP/LAT/PRECIP',
       ‡/,2X,'15.DAILY ESTIMATED PRECIPITATION.',13X,'PRECIPITATION'/2X,
       ‡'16.DAILY ACCUMULATED PRECIPITATION.',11X,'PRECIPITATION',
       ‡/,2X,'17.DAILY DAYLENGTHS AT A LOCATION.',12X,'LATITUDE',/)
        RETURN
        END
        SUBROUTINE HMONIC
        WRITE(6,  10)
10      FORMAT(/,2X,'THE MODEL FOR THE FIRST TWO HARMONICS IS ',
       ‡'GIVEN BY :',//,2X,'X(DAY) = XBAR + A1 SIN(2 PI DAY/365)
       ‡' + B1 COS(2 PI DAY/365) +',/,18X,'A2 SIN(4 PI DAY/365)'
       ‡' + B2 COS(4 PI DAY/365)',//,2X,'WHERE    X(DAY) IS THE
       ‡'ESTIMATE OF DAILY AVERAGE TEMPERATURE (F)',/,11X,'ON A
       ‡'GIVEN JULIAN CALENDAR DAY OF THE YEAR. AND THE',/,11X,
       ‡'VARIABLE DAY IS A NUMBER BETWEEN 1 AND 365.',//)
        WRITE(6,  20)
20      FORMAT(2X,'FOR FURTHER REFERENCES SEE :',//,2X,'1. BLISS, C
       ‡'I. (1958) PERIODIC REGRESSION IN BIOLOGY AND CLIMATOLOGY.'
       ‡/,11X,'THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION.',
       ‡' BULLETIN 615.',//,2X,'2. BROOKS, C.E.P. AND ',
       ‡'CARRUTHERS, N. (1953) HANDBOOK OF STATISTICAL',/,11X,
       ‡'METHODS IN METEOROLOGY. HER MAJESTYS STATIONERY OFF',
       ‡'ICE, LONDON.',//,2X,'3. NEILD, R.E., SEELEY, M.W. AND
       ‡'RICHMAN, N.H. (1978) THE COMPU-',/,11X,'TATION OF',
       ‡' AGRICULTURALLY ORIENTED NORMALS FROM MONTHLY CLI-',/,
       ‡11X,'MATIC SUMMARIES. AGRICULTURAL METEOROLOGY, ',
       ‡'19: 181-187.',//,2X,'4. PANOFSKY, H.A. AND BRIER, ',
       ‡'G.W. (1958) SOME APPLICATIONS OF STATISTICS',/,11X,
       ‡'TO METEOROLOGY. THE PENNSYLVANIA STATE UNIVERSITY.')
        RETURN
        END
C
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TOF
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C
      SUBROUTINE DAYLEN(F,METHOD,TABLE,RO)
C     THIS COMPUTER PROGRAM COMPUTES DAYLENGTHS FOR EACH DAY
C     OF THE YEAR. THE ONLY INPUT IS THE LATITUDE OF THE STATION
C     AND PERHAPS THE STATION NAME. THE RESULT IS GIVEN IN HOURS
C     AND HUNDREDTHS.
      REAL INTENSE,LAMBDA,M
      DIMENSION H(365),TABLE(56),RO(20)
      R=0.0174532925
      ALAT=F*R
      DO 30 I=1,365
      DAY=FLOAT(I)
      GO TO(10,20),METHOD
10    D=23.5*COS(0.9863*(172.-DAY)*R)
      H(I)=-TAN(ALAT)*TAN(D*R)
      H(I)=ARCOS(H(I))/R
      H(I)=(H(I)*R)*7.6408787
20    INTENSE=0.002206
      B=-4.76-1.03*ALOG(INTENSE)
      ALPHA=(90.0+B)
      M=0.985600*DAY-3.251
      LAMBDA=M+1.916*SIN(M*R)+0.020*SIN(2.*M*R)+282.565
      DELTA=ARSIN(0.39779*SIN(LAMBDA*R))/R
      SEC1=1./COS(ALAT)
      SEC2=1./COS(DELTA*R)
      T1=TAN(ALAT)
      T2=TAN(DELTA*R)
      DAYLGT=ARCOS(COS(ALPHA*R)*SEC1*SEC2-T1*T2)*(2./15.)
      H(I)=DAYLGT/R
30    CONTINUE
      WRITE(6,  40) ((TABLE(JH),JH=1,56),(RO(JI),JI=1,20))
40    FORMAT(1X,56A1,20A1)
      IF(F.LT.0.) WRITE(6,  50) F
      IF(F.EQ.0.) WRITE(6,  60)
      IF(F.GT.0.) WRITE(6,  70) F
50    FORMAT(1X,'LATITUDE ',F6.2,' S.'/)
60    FORMAT(1X,'THE EQUATOR.'/)
70    FORMAT(1X,'LATITUDE ',F6.2,' N.'/)
      WRITE(6,80)
80    FORMAT(' ',42HDAY   JAN   FEB   MAR   APR   MAY   JUN
     #    33HJUL   AUG   SEP   OCT   NOV   DEC,/)
      WRITE(6,90)
90    FORMAT(1X,'UNITS: HOURS AND HUNDRETHS / MULTIPLY ',
     #'DECIMAL FRACTION BY 60 TO GET MINUTES.'/)
      DO110 J=1,28
      WRITE(6,100) J,H(J),H(J+31),H(J+59),H(J+90),H(J+120),H(J+151),
     #H(J+181),H(J+212),H(J+243),H(J+273),H(J+304),H(J+334)
100   FORMAT(' ',I3,12F6.2)
110   CONTINUE
      J=29
      WRITE(6,120) J,H(29),H(88),H(118),H(149),H(179),H(210),H(241),
     #H(271),H(302),H(332),H(363)
      J=30
      WRITE(6,130) J,H(30),H(89),H(119),H(150),H(180),H(211),H(242),
     #H(272),H(303),H(333),H(364)
      J=31
      WRITE(6,140) J,H(31),H(90),H(151),H(212),H(243),H(304),H(365)
120   FORMAT(' ',I3,1F6.2,6H  *** ,10F6.2)
130   FORMAT(' ',I3,1F6.2,6H  *** ,10F6.2)
140   FORMAT(' ',I3,1F6.2,6H  *** ,1F6.2,6H  *** ,1F6.2,6H  *** ,
     #2F6.2,6H  *** ,1F6.2,6H  *** ,1F6.2)
      RETURN
      END
EOF:
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