VI.3.6F GRIB ENCODER PROGRAM (GRIBIT)

Purpose

Program GRIBIT is used to encode gridded data in GRIB format.

One or more input files can be packed into a single GRIB message using a single communications header. All input files must be in the xmrg format. All parameters required for GRIB and the appropriate communications header (WMO id) are derived from parameters within the xmrg files and built-in tables in the GRIBIT program.

A program function can be used to verify correct encoding of a GRIB file by invoking the decoder. Another program function converts a GRIB encoded file to an XMRG file. All three functions in the gribit program are available with or without use of the gribits script.

Script gribits

The script gribits is used to execute the GRIB encoder/decoder program. The command line format is:

```
gribits [-p pgm] [-b bin_dir]
        [-f file_set]
        [-i in_file] [-n in_dir]
        [-o out_file] [-t out_dir]
        [-c control] [-g geo_dir] [-h hrap_coord_file]
        [-d debug_level]
        [-l logfile]
        [-v verbose]
        [-s search_order]
```

Available options are:

Option	Description	Default Value
-p	Program name	gribit
-b	Use executable directory indicated as: a - $grib_dir/bin/ARCHIVE token d - $my_bin token (devl) m - $mgr_dir/bin/RELEASE token ma - $mgr_dir/bin/ARCHIVE token name - path and directory name	Use directory indicated by the $grib_dir/bin/RELEASE token
-f	File set override for $st3_rfc, $ofs_level, $ffg_level tokens	Sets indicated by $st3_rfc, $ofs_level, $ffg_level tokens
-i	Input file name	None
-n	Input directory path or	Use input directory and

Option	Description	Default Value
	sat - $rfcwide_satpre_dir token mpe - $rfcwide_xmrg_dir token s3 - $ofs_griddb_dir token ffg - $ffg_gridff_dir token ro - $ffg_gridro_dir token	and path indicated by the $grib_in_dir token
-o	Output file name	None
-t	Output directory path	Use output directory and path indicated by the $grib_out_dir token
-c	Control: g - encode XMRG into GRIB u - unpack GRIB, write to a log file x - decode GRIB to XMRG file	g - encode XMRG into GRIB
-g	Geo directory (HRAP coordinates)	Use directory indicated by the $geo_st3_ascii token
-h	HRAP coordinates file	coordinate_xxrfc.dat where xx is the two character RFC identifier
-d	Debug level (d, d2 or d3)	Debug off (levl=0)
-l	Log file on	Log file off
-v	Verbose program prompts	Suppress program prompts
-s	Parameter table search sequence: user-defined table built-in Table 128 built-in Table 2 (NCEP)	Parameter table search sequence: built-in Table 2 (NCEP) built-in Table 128 user-defined table, if available

The following examples demonstrate the use of the gribits script:

Encode XMRG to GRIB: Examples 1-4

Decode GRIB to XMRG: Examples 5-6

1. Run program gribit and show prompts for options, functions and xmrg and GRIB file names. The xmrg (input) and GRIB (output) directories and the executable file are obtained from apps_defaults tokens.

```
gribits
```

2. Run program gribit from the archive directory:

```
gribits -b a
```

3. Encode an xmrg file into GRIB with prompts suppressed. Specify xmrg (input) and GRIB (output) file names in the command line.

```
gribits -i XMRG_file -o GRIB_file
```

4. Encode an xmrg file into GRIB. Specify xmrg and GRIB directories in the command line (over-ride apps_defaults tokens). Show prompts for options, functions and xmrg and GRIB file names:

```
gribits -n XMRG_directory -t GRIB_directory
```

5. Decode a GRIB message and write an RFC subset of the national HRAP grid to an xmrg file. Prompts are suppressed.

```
gribits -i GRIB_file -n GRIB_dir -o XMRG_file -t XMRG_dir
        -c x -f HRAP_office
```

   where HRAP_office is used to create the file name as 'coord_HRAP_office.dat' in geo_directory and is of the form xxrfc where xx is the RFC (eg. abrfc)

   The command line argument '-c x' internally flip-flops input and output directories and files so input becomes the GRIB file and output becomes the XMRG file.

6. Decode NESDIS GRIB encoded Satellite Precipitation Estimates (SPE) and output an RFC subset as an XMRG file.

   1. check that gribit tokens have been defined

   2. check that the gribits script directory is in your path

   3. execute script gribits (see Example 5)

To include debug and log file output to check times, RFC domain and other parameters, append '-d d -l' to the command line.

Script To Transmit QPE GRIB-encoded Products Using distributeProduct

The following script combines the use of the script gribits to generate GRIB encoded files for QPE messages and the AWIPS message handling application distributeProduct to transmit the messages on AWIPS:

```
#!/bin/ksh
APPS_DEFAULTS_SITE=/awips/hydroapps/.Apps_defaults_site;export APPS_DEFAULTS_SITE
PBDIR=/awips/hydroapps/public/bin;export PBDIR
GRIBDIR='$PBDIR/get_apps_defaults nmap_grib_dir';export GRIBDIR
EXEDIR='$PBDIR/get_apps_defaults grib_rls';export EXEDIR
DPBIN=/awips/fxa/bin;export DPBIN
QPEA2AID='KXXXQPEBIN'            (where XXX is the AFOS node, i.e., OKC)

HOUR='date -u +%H'
```

```
MONTH='date -u +%m'
DAY='date -u +%d'
YEAR='date -u +%Y'
RUNPERIOD='date -u +%m%d%Y'
echo $RUNPERIOD

RUNPERIOD2='TZ=GMT+24 date +%m%d%Y'
echo $RUNPERIOD2
#
#   GRIB encode data from xmrg files
${PBDIR}/gribits -b ${EXEDIR} -i xmrg${RUNPERIOD}07z -o xmrg${RUNPERIOD}07z.grb
${PBDIR}/gribits -b ${EXEDIR} -i xmrg${RUNPERIOD}08z -o xmrg${RUNPERIOD}08z.grb
${PBDIR}/gribits -b ${EXEDIR} -i xmrg${RUNPERIOD}09z -o xmrg${RUNPERIOD}09z.grb
${PBDIR}/gribits -b ${EXEDIR} -i xmrg${RUNPERIOD}10z -o xmrg${RUNPERIOD}10z.grb
${PBDIR}/gribits -b ${EXEDIR} -i xmrg${RUNPERIOD}11z -o xmrg${RUNPERIOD}11z.grb
${PBDIR}/gribits -b ${EXEDIR} -i xmrg${RUNPERIOD}12z -o xmrg${RUNPERIOD}12z.grb
${PBDIR}/gribits -b ${EXEDIR} -i xmrg${RUNPERIOD}13z -o xmrg${RUNPERIOD}13z.grb
${PBDIR}/gribits -b ${EXEDIR} -i xmrg${RUNPERIOD}14z -o xmrg${RUNPERIOD}14z.grb
${PBDIR}/gribits -b ${EXEDIR} -i xmrg${RUNPERIOD}15z -o xmrg${RUNPERIOD}15z.grb
${PBDIR}/gribits -b ${EXEDIR} -i xmrg${RUNPERIOD}16z -o xmrg${RUNPERIOD}16z.grb
${PBDIR}/gribits -b ${EXEDIR} -i xmrg${RUNPERIOD}17z -o xmrg${RUNPERIOD}17z.grb
${PBDIR}/gribits -b ${EXEDIR} -i xmrg${RUNPERIOD}18z -o xmrg${RUNPERIOD}18z.grb
#
#   transmit GRIB files
${DPBIN}/distributeProduct -a DEFAULTNCF -e ${GRIBDIR}/xmrg${RUNPERIOD}07z.grb
${DPBIN}/distributeProduct -a DEFAULTNCF -e ${GRIBDIR}/xmrg${RUNPERIOD}08z.grb
${DPBIN}/distributeProduct -a DEFAULTNCF -e ${GRIBDIR}/xmrg${RUNPERIOD}09z.grb
${DPBIN}/distributeProduct -a DEFAULTNCF -e ${GRIBDIR}/xmrg${RUNPERIOD}10z.grb
${DPBIN}/distributeProduct -a DEFAULTNCF -e ${GRIBDIR}/xmrg${RUNPERIOD}11z.grb
${DPBIN}/distributeProduct -a DEFAULTNCF -e ${GRIBDIR}/xmrg${RUNPERIOD}12z.grb
${DPBIN}/distributeProduct -a DEFAULTNCF -e ${GRIBDIR}/xmrg${RUNPERIOD}13z.grb
${DPBIN}/distributeProduct -a DEFAULTNCF -e ${GRIBDIR}/xmrg${RUNPERIOD}14z.grb
${DPBIN}/distributeProduct -a DEFAULTNCF -e ${GRIBDIR}/xmrg${RUNPERIOD}15z.grb
${DPBIN}/distributeProduct -a DEFAULTNCF -e ${GRIBDIR}/xmrg${RUNPERIOD}16z.grb
${DPBIN}/distributeProduct -a DEFAULTNCF -e ${GRIBDIR}/xmrg${RUNPERIOD}17z.grb
${DPBIN}/distributeProduct -a DEFAULTNCF -e ${GRIBDIR}/xmrg${RUNPERIOD}18z.grb
```

Apps Default Tokens

Paths and directories for the executable, output and input files are specified by Apps Default tokens. Another Apps Default token is used to specify the transmitting office:

```
   grib_dir      : $(apps_dir)/rfc/grib
   grib_rls      : $(grib_dir)/bin/RELEASE
   grib_arc      : $(grib_dir)/bin/ARCHIVE
   grib_in_dir   : $(grib_dir)/input   # also depends on data:
                                       #  stage3 - $(ofs_griddb_dir)
                                       #  mpe    -
$(rfcwide_xmrg_dir)
   grib_out_dir  : $(grib_dir)/output
   awips_rfc_id  : XXX         # XXX is 3-character AWIPS ID, e.g.
TUA

Optional:
   grib_tab_dir  : $(grib_dir)/table  # Over-ride built-in tables.
   grib_verbose  : on   # show program prompts for manual execution.
                          Default is off.
   grib_error_output : on   # print error messages, default is none
   grib_debug_output : d    # debug output levels d, d2 or d3.
                              Default is no debug output.
```

```
   grib_log_output   : on   # write error and debug output to a file,
                              Default is no log file.
   hrap_domain_dir   : $(geo_st3_ascii)  # Directory containing HRAP
                                           box for the RFC.
   hrap_domain_id    : xxrfc  # RFC identifier, i.e., abrfc
   hrap_domain_file  : coord_xxrfc.dat     # File containing HRAP box
```

All optional tokens except grib_tab_dir are generated as needed from command line entries in the script.

Directory Structure

The directory structure for the GRIB encoder application gribit is:

```
   .../rfc/grib
               /bin
                   /ARCHIVE          Archived executables
                   /RELEASE          Current executable
               /doc                  Documentation
               /input                XMRG files
               /output               GRIB encoded files
               /scripts              Script file
               /table                Optional user defined tables
```

Program Execution

```
Token: grib_in_dir = /awips/hydroapps/rfc/ffg/files/ofstest/grff
Token: grib_out_dir =/awips/hydroapps/rfc/ffg/output/ofstest/grib


                              G R I B I T

                           GRIB Encoder Program

                         Release x.xx - mm/dd/ccyy

   OPTIONS:
     dn - debug level n = 1, 2, or 3
     e  - error messages on
     l  - log file on (name is grbitlog)
     v  - show prompts
   FUNCTION:
     g  - encode XMRG to GRIB file (default)
     u  - unpack GRIB to log file
     x  - decode GRIB to XMRG
   Enter (options, functions, or GRIB output filename):
                                  qpe06_040106z.grb

   Enter XMRG (input) filename: qpe06_040106z.xmrg

 Wrote GRIB Bulletin: ZETA98 KTUA ddhhmm of nnnnnn bytes
   To file: /awips/hydroapps/rfc/ffg/output/grib/qpe06_040106z.grb
   For File:
/awips/hydroapps/rfc/ffg/files/ofstest/grff/qpe06_040106z.xmrg

   Enter input filename: <return>
```

Responses and sequence of responses to 'Enter (options ... GRIB output filename)':

d - debug on (also d2 or d3)
l - logfile on
u - unpack on (decode a GRIB encoded file, includes d2 and l)
name - name of file to encode in GRIB (normal response)

Input file (xmrg format)

The Process field and the Valid Time field in an xmrg file must contain specific information to support the GRIB encoder. The Process field translates to (1) a GRIB Generating Process or Model and (2) accumulation time or duration of the data. The Valid Time field has two formats depending on observed data or forecast data.

Each file contains grid and data definition parameters (header portion) and gridded data (data portion). The file format is described as follows:

Starting Input/

Record	Position	Dim.	Type	Gen.	Description
Header portion:					
1	1	1	I*4	I	XOR, western most x coordinate
	2	1	I*4	I	YOR, southern most y coordinate
	3	1	I*4	I	MAXX, number of grids along the x axis
	4	1	I*4	I	MAXY, number of grids along the y axis
2	1	1	C*10	I	USER, user that saved the file
	2	1	C*20	I	SDATIM, saved date and time (Z), ccyy-mm-dd hh:mm:ss
	3	1	C*8	I	PROCES, process generating the data and duration or accumula-tion time 1/
	4	1	C*20	I	VDATIM, valid date and time (Z), IVALHR 2/
	5	1	I*4	I	MXVAL, maximum value of data
	6	1	R*4	I	VERS, version number of file format, 2.1
Data portion:					
4-MAXY	1	MAXX	I*2	I	IVAL, gridded data

Notes:

1/ PROCES is a combination of the process identifier and accumulation or duration time of the data. See NCEP Office Note 388 GRIB, Table A for Originating Center 9 and Xmrg Parameter to GRIB Parameter Translation section below.

2/ The Valid Time field (VDATIM) is coded as:

Accumulated > 1 hour and forecast : ccyy-mm-dd hhfvvv

Accumulated = 1 hour : ccyy-mm-dd hh:mm:ss

where ccyy-mm-dd hh is the reference hour
vvv is the valid number of hours (IVALHR) after the reference hour ref_hr such that ref_hr plus valid hour is the ending time and

ref_hr plus valid hour minus accumulation hours is the beginning time of the accumulation period - typical values for vvv are 006, 012, 018, 024, 030, 036, 042, 048, 054, 060, 066 and 072

For observed data VDATIM is the end of the accumulation period. VDATIM minus accumulation hours is the start of the accumulation period.

Some Valid Time field examples:

Accumulated/observed = 1 hour

Precip Period	VDATIM
09/14/2000 22Z to 23Z	2000-09-14 23:00:00
09/14/2000 23Z to 00Z	2000-09-15 00:00:00
09/15/2000 00Z to 01Z	2000-09-15 01:00:00
09/15/2000 12Z to 13Z	2000-09-15 13:00:00

For accumulated hours of observed data IVALHR is the elapsed number of hours after reference time VDATIM to the end of the accumulation period. IVALHR is the three-number field following 'f'.

Accumulated/observed = 6 hours

Precip Period	VDATIM
03/31/1993 12Z to 18Z	1993-03-31 12f006
03/31/1993 18Z to 00Z	1993-03-31 12f012
04/01/1993 00Z to 06Z	1993-03-31 12f018
04/01/1993 06Z to 12Z	1993-03-31 12f024

For forecast data VDATIM is the end of the computation period (observed data) and the start of the forecast period. IVALHR is the elapsed number of hours after VDATIM to the end of the forecast period. VDATIM plus IVALHR is the valid time of the forecast.

Forecast - 6 hour

Precip Period	VDATIM
04/01/1993 12Z to 18Z	1993-04-01 12f006
04/01/1993 18Z to 00Z	1993-04-01 12f012
04/02/1993 00Z to 06Z	1993-04-01 12f018
04/02/1993 06Z to 12Z	1993-04-01 12f024
04/02/1993 12Z to 18Z	1993-04-01 12f030
04/02/1993 18Z to 00Z	1993-04-01 12f036

Xmrg Parameter to GRIB Parameter Translation

The built-in xmrg and qpfwmo translation table:

```
$         11/09/2000
$
```

```
-1:9:-1:xmrg         xmrg to GRIB library
$xmrg_process    wmoid       ngrid nturef  itrang ibinf ipkflg
$       GRIB_parm      modlid   itunit  ntufc  iwidth idec
$
S2A01     APCP   ZETA98  152  240  1   0   1  4  4  3  0  0
S3A01     APCP   ZETA98  154  240  1   0   1  4  4  3  0  0
S3M01     APCP   ZETA98  155  240  1   0   1  4  4  3  0  0
P1A01     APCP   ZETA98  156  240  1   0   1  4  4  3  0  0
P1M01     APCP   ZETA98  157  240  1   0   1  4  4  3  0  0
P2A01     APCP   ZETA98  158  240  1   0   1  4  4  3  0  0
P2M01     APCP   ZETA98  159  240  1   0   1  4  4  3  0  0
MPA01     APCP   ZETA98  160  240  1   0   1  4  4  3  0  0
MPM01     APCP   ZETA98  161  240  1   0   1  4  4  3  0  0
PA*       APCP   ZETA98  170  240  1  -1  -1  4  0  3  4  0
XN*       APCP   ZETA98  171  240  1  -1  -1  4  0  3  4  0
MM*       APCP   ZETA98  172  240  1  -1  -1  4  4  3  0  0
$
SATA*     APCP   ZETA98  190  240  1  -1  -1  4  4  3  0  0
SATM*     APCP   ZETA98  191  240  1  -1  -1  4  4  3  0  0
$
QPA*      APCP   YEIG98  180  218  1  -1  -1  4  4  3  0  0
QPM*      APCP   YEIG98  180  218  1  -1  -1  4  4  3  0  0
$
FFG**     FFG**  ZEGZ98  151  218  1   0  24  2  4  0  0  0
FFR**     FFR**  ZEGZ98  151  218  1   0  24  2  4  0  0  0
gridff**  FFG**  ZEGZ98  151  240  1   0  24  2  4  0  0  0
gridro**  FFR**  ZEGZ98  151  240  1   0  24  2  4  0  0  0
$
stage2    APCP   ZETA98  152  240  1   0   1  4  4  3  0  0
autoS3    APCP   ZETA98  154  240  1   0   1  4  4  3  0  0
manualS3  APCP   ZETA98  155  240  1   0   1  4  4  3  0  0
P1        APCP   ZETA98  156  240  1   0   1  4  4  3  0  0
rfcwide   APCP   ZETA98  160  240  1   0   1  4  4  3  0  0
$
-1:-1:-1:qpfwmo      QPF WMO Identifiers (TTAA00 portion only)
001:YEIG98
002:YEIM98
003:YEIN98
004:YEIO98
005:YEIP98
006:YEIQ98
007:YEIR98
008:YEIS98
009:YEIS88
010:YEIT98
011:YEIT88
012:YEIU98
$ end
```

* hh (06, 24) hours of accumulation
** hh (01, 03, 06, 12, 24) hours of duration

User-Defined Tables

A parameter specified in a built-in table can be over-ridden by providing a user-defined table in file gribtab and directory ../grib/table. The file may contain more than one table. The format of the file for a single table follows:

First record: -1:sending_center:subcenter:table id

Subsequent records: Depends on table. Can use blanks for delimiters if no embedded spaces. Otherwise, use colons.

Xmrg and GRIB parameters may be in a user_defined table in a single file. The format of the built-in table shown above should be used for any user_defined table.

Example output for unpack option

In the output directory file grbitlog contains the debug output as follows:

```
 PROGRAM GRIBIT  (VERSION: xxx.xx  - mm/dd/ccyy)

 RUN DATE: 11/ 9/2000 - 10:15:12

     Token:  grib_in_dir  = /fs/awips/rfc/ffg/files/ofstest/grff
     Token:  grib_out_dir = /fs/awips/rfc/ffg/output/ofstest/grib

 opened file: /fs/awips/rfc/ffg/output/ofstest/grib/qpe06_040106z.grb
 Using GRIB file: /fs/awips/rfc/ffg/output/ofstest/grib/qpe06_040106z.grb

 COMMS HEADER: ZETA98 KTUA 251552

 UNPACKER ERROR RETURN FLAG =   0

 SECTION 1 - PRODUCT DEFINITION SECTION (PDS)

        9       171       255       192       239
        1         0        93         3        31
       12         0         1        12        18
        4         0         1       128         0
       20         0       150         0        32

 id(3) originating center:                9
 id(4) model id (table A):              171
 id(5) grid identification (table B):   255
 id(6) GDS/BMS flag:                    192
 id(8) parameter & units:               239
 id(9) type of level (table 3):           1
 id(10) value of level:                   0
 id(12) computation time, year:          93
 id(13) comp time, month:                 3
 id(14) comp time, day:                  31
 id(15) comp time, hour:                 12
 id(16) comp time, minutes:               0
 id(17) forecast time unit (table 4):     1
 id(18) p1 period of time:               12
 id(19) p2 period of time:               18
 id(20) time range indicator (table 5):   4
 id(21) number included in average:       0
        edition no. of grib spec:         1
 id(2)  version no. of parameter table: 128
 id(22) no. missing from avg/accum:       0
 id(23) century:                         20
 id(25) decimal scale factor:             0
 id(24) sub-center (table C):           150
 reserved for future use:                 0
 reserved for future use:                32


 SECTION 2 - GRID DESCRIPTION SECTION (GDS)

        5        59        83     38861   -109321
        8   -105000      4762      4762         0
       64         0         0         0         0
        0         0         0         0       255
```

```
igds(3) projection grid (table 6):           5
igds(4) number of points, x-axis:           59
igds(5) number of points, y-axis:           83
igds(6) latitude of origin (x 1000):     38861
igds(7) longitude of origin (x 1000):  -109321
igds(8) resolution & component (table 7):    8
igds(9) meridian parallel to y-axis:   -105000
igds(10) x-direction grid length:         4762
igds(11) y-direction grid length:         4762
igds(12) projection center flag:             0
igds(13) scanning mode flag (table 8):      64
igds(14) not used                            0
igds(15) lat secant cone intersect           0
                                             0
                                             0
                                             0
                                             0
                                             0
                                             0
igds(2) set at 255 user supplied grid      255


Grid coordinates of southwest corner of field:
   lwcol= 311  lsrow=410  lncol=  59  lnrow= 83

KPTR ARRAY
    4988         8        28        32       620
    4296         0      5592         0      4897
      15         0         0         0         1
       0         0         0         0         0

(1) total length of GRIB message            4988
(2) length of indicator (section 0)            8
(3) length of PDS       (section 1)            28
(4) length of GDS       (section 2)            32
(5) length of BMS       (section 3)           620
(6) length of BDS       (section 4)          4296
(7) value of current byte                       0
(8) bit pointer                              5592
(9) GRIB start bit number                       0
(10) GRIB/grid element count                 4897
(11) Number unused bits end of section 3       15
(12) bit map flag                               0
(13) number unused bits end of section 2        0
(14) BDS flags                                  0
(15) number unused bits end of section 4        1


SECTION 3 - BIT MAP SECTION (BMS)
    4897 ELEMENTS      north row first
Row   83: 11111111111111111111111111111111111111111111111111111111111111111
Row   82: 11111111111111111111111111111111111111111111111111111111111111111
    .
    .
    .
Row    4: 11111111111111111111111111111111111111111111111111111111111111111
Row    3: 11111111111111111111111111111111111111111111111111111111111111111
Row    2: 11111111111111111111111111111111111111111111111111111111111111111
Row    1: 11111111111111111111111111111111111111111111111111111111111111111

SECTION 4 - BINARY DATA SECTION (BDS)
    4897 Elements        north row first
  Process>   171:XNAV Aggregate Precipitation Estimation
  Table Num> 128
  Parameter> 239:QPE06   6-hour Quantitative Precip Estimate [kg/m2]
Row   83:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
       11   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
       21   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
```

```
        31   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
        41   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
        51   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
Row    82:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
        11   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
        21   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
        31   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
        41   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
        51   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
  .
  .
  .
Row     4:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
        11   0.00   0.00   0.00   0.00   0.00   6.00  12.00  12.00  17.00  20.00
        21  24.00  26.00  27.00  27.00  27.00  26.00  25.00  25.00  25.00  25.00
        31  26.00  28.00  30.00  32.00  32.00  31.00  28.00  24.00  16.00   0.00
        41   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
        51   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
Row     3:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
        11   0.00   0.00   0.00   0.00   0.00   2.00   7.00   7.00  12.00  17.00
        21  21.00  23.00  24.00  25.00  24.00  24.00  24.00  24.00  24.00  24.00
        31  25.00  26.00  27.00  28.00  28.00  27.00  24.00  19.00  11.00   0.00
        41   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
        51   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
Row     2:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
        11   0.00   0.00   0.00   0.00   0.00   0.00   5.00   5.00   9.00  14.00
        21  18.00  20.00  22.00  22.00  22.00  22.00  22.00  22.00  22.00  23.00
        31  23.00  24.00  25.00  25.00  25.00  23.00  20.00  16.00   0.00   0.00
        41   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
        51   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
Row     1:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
        11   0.00   0.00   0.00   0.00   0.00   0.00   3.00   3.00   7.00  11.00
        21  14.00  15.00  17.00  18.00  18.00  19.00  20.00  20.00  21.00  21.00
        31  22.00  22.00  22.00  22.00  19.00  16.00  15.00   6.00   0.00   0.00
        41   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
        51   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
```