ADAPTATION OF A GROUND-WATER-FLOW MODEL OF THE LITTLE ANDROSCOGGIN RIVER VALLEY AQUIFER, OXFORD COUNTY, MAINE TO A MICROCOMPUTER

By Thomas J. Mack

U.S. GEOLOGICAL SURVEY

Open-File Report 90-371

Prepared in cooperation with the

ANDROSCOGGIN RIVER VALLEY COUNCIL OF GOVERNMENTS
and the MAINE GEOLOGICAL SURVEY

Bow, New Hampshire
1991

U.S. DEPARTMENT OF THE INTERIOR

MANUEL LUJAN, JR., *Secretary*

U.S. GEOLOGICAL SURVEY

Dallas L. Peck, *Director*

For additional information, write to:

Chief, NH-VT Office
U.S. Geological Survey
Water Resources Division
525 Clinton Street
Bow, New Hampshire 03304

Copies of this report can be purchased from:

Books and Open-File Reports Section
U.S. Geological Survey
Federal Center
Box 25425, Bldg. 810
Denver, Colorado 80225

CONTENTS

	Page
Abstract	1
Introduction	1
Purpose and scope	3
Model data files	3
Adaptation of the model	4
Conceptualization of the aquifer system and model construction	4
Boundary conditions	4
Grid dimensions	4
Aquifer properties	5
Recharge and discharge	5
Calibration	5
Use and limitations of the model	8
Microcomputer considerations	10
Hydrologic considerations	12
Summary	12
References cited	13
Appendix A: BAS - Basic package data set	A-1
Appendix B: BCF - Block-centered flow package data set	B-1
Appendix C: RECHARGE - Recharge package data set	C-1
Appendix D: RIVER - River package data set	D-1
Appendix E: SIP - Strongly implicit procedure package data set	E-1
Appendix F: OUTPUT CONTROL - Output control data set	F-1
Appendix G: WELL - Well package data set	G-1

ILLUSTRATIONS

		Page
Figure	1. Index map showing location of the study area	2
	2. Finite-difference grid and boundary conditions used to model the Little Androscoggin River valley aquifer, Oxford County, Maine	7

TABLES

		Page
Table	1. MODFLOW data sets for the Little Androscoggin River valley aquifer ground-water-flow model	3
	2. Measured June 1981 heads and MODFLOW model-calculated heads for the Little Androscoggin River valley aquifer	9
	3. Comparison of computed ground-water discharge with observed values in the Little Androscoggin River valley aquifer	10
	4. Comparison of model-calculated steady-state water budgets for average 1981 water-year conditions	11

CONVERSION FACTORS AND ABBREVIATIONS

For the convenience of readers who prefer to use International System (SI) units rather than inch-pound units used in this report, the following conversion factors may be used:

Multiply inch-pound unit	By	To obtain metric unit
	Length	
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
square mile (mi^2)	2.590	square kilometer (km^2)
	Flow	
cubic foot per second (ft^3/s)	0.028317	cubic meter per second (m^3/s)

Sea Level: In this report "sea level" refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)--a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called "Sea Level Datum of 1929."

Adaptation of a Ground-Water-Flow Model of the Little Androscoggin River Valley Aquifer, Oxford County, Maine to a Microcomputer

By Thomas J. Mack

ABSTRACT

A digital-computer ground-water-flow model of the Little Androscoggin River valley aquifer, Oxford County, Maine, was calibrated to simulate ground-water flow using a program compatible with microcomputers. Ground-water flow in the Little Androscoggin River valley aquifer--a 15-square mile sand and gravel valley-fill aquifer--was originally simulated by use of a two-dimensional finite-difference program developed by Trescott and others. This Little Androscoggin River Valley flow model was converted to be compatible with a program developed by McDonald and Harbaugh that simulates two or three-dimensional ground-water flow.

The model can be used to predict water-level and water-budget changes that would be caused by changes in well discharge or aquifer recharge. This report describes the conceptualized ground-water-flow model and model-input data necessary to simulate ground-water flow with the newer program, and the use and limitations of the model.

INTRODUCTION

The Little Androscoggin River valley aquifer extends from West Paris in the north to Mechanic Falls in the south, a distance of about 15 mi (miles) (fig. 1). This aquifer is described by Morrissey (1983) as ranging in width from less than 1 mi near South Paris to slightly greater than 2 mi near the town of Oxford. The aquifer is composed of coarse-grained ice-contact sand and gravel to the north and, generally, fine to medium outwash sand overlying marine silt and clay south of Norway (Morrissey, 1983). The sand and gravel aquifer is underlain by low-permeability till and bedrock.

A ground-water-flow model for the Little Androscoggin River valley aquifer was developed by Morrissey (1983) by use of the finite-difference program for aquifer simulation by Trescott and others (1976) and mainframe computer hardware. The model data sets were converted to be compatible with the ground-water-flow program recently developed by McDonald and Harbaugh (1988) and

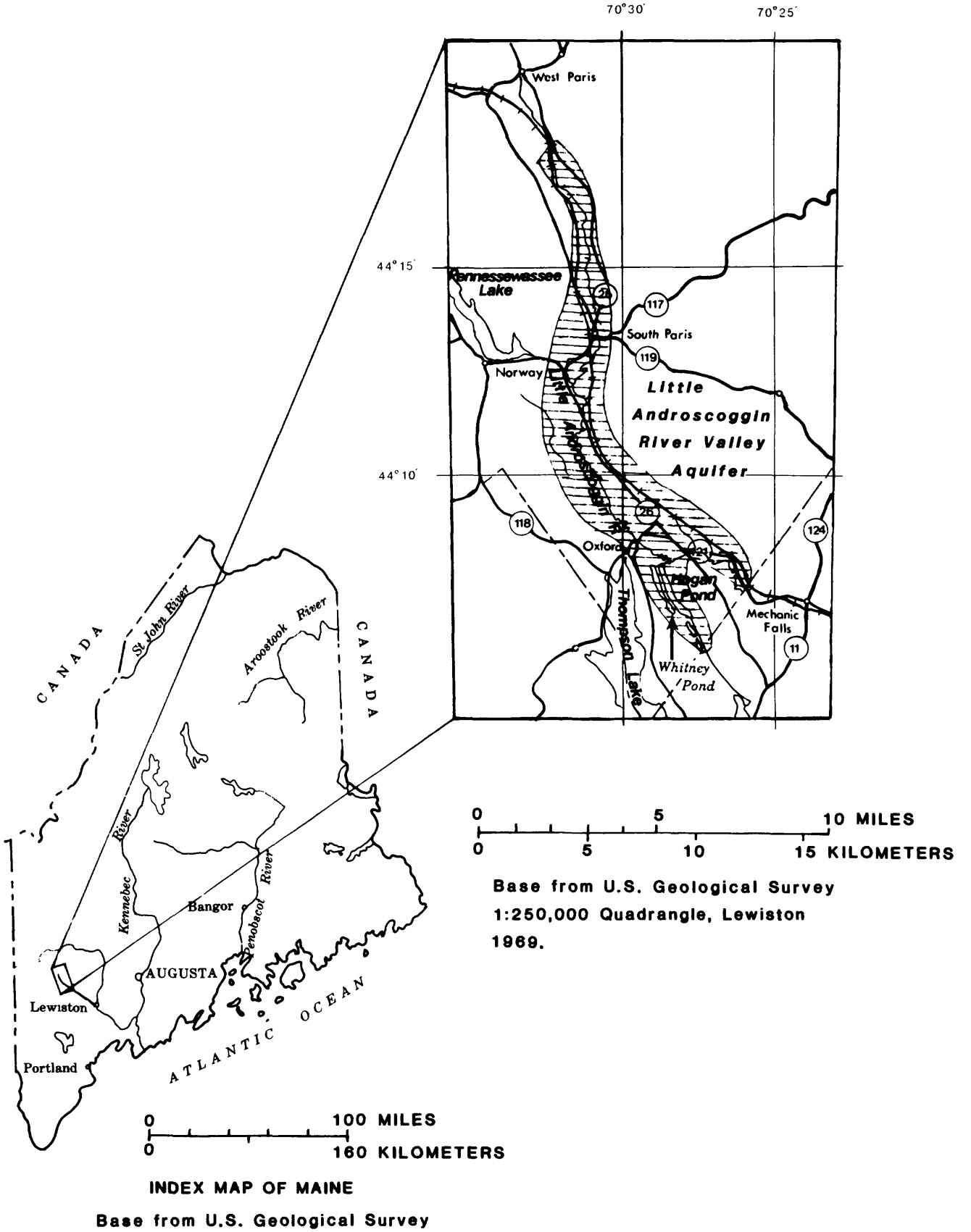


Figure 1.--Location of the study area.

microcomputer hardware. The ground-water-flow program developed by McDonald and Harbaugh (1988) is hereafter referred to as MODFLOW and the ground-water flow program developed by Trescott and others (1976) is hereafter referred to as the Trescott program. In this report, "model" refers to the conceptualized aquifer system or the associated data sets which describe that system.

This report was prepared by the U.S. Geological Survey in cooperation with the Androscoggin River Valley Council of Governments and the Maine Geological Survey.

Purpose and Scope

The purpose of this study was to demonstrate the utility of the ground-water-flow model developed by Morrissey (1983) in simulating a broad range of problems related to availability of ground water in the Little Androscoggin River valley aquifer. This report describes the conversion of the Little Androscoggin River valley aquifer model to be compatible with the MODFLOW program (McDonald and Harbaugh, 1988). Use and limitations of the model are discussed with respect to microcomputer and hydrologic considerations.

Model Data Files

All data files used to run the model as presented in this report are listed in appendixes A through G. Names of the modular-model data sets, which make up the ground-water-flow model, are listed in table 1 below. A brief description of each data set is given in table 1. For a complete description of the data that make up each data set and input format, refer to McDonald and Harbaugh (1988).

Table 1.-- *MODFLOW*[1] *data sets for the Little Androscoggin River valley aquifer ground-water-flow model*

Modular data set	Description	Appendix
BAS	Contains parameters relating to the model as a whole, including length of time-step, boundary and initial conditions.	A
BCF	Contains parameters relating to cell discretization, including cell size and status, aquifer hydraulic conductivity, and bottom-surface elevation.	B
RECHARGE	Rate of recharge applied to the simulated aquifer.	C
RIVER	Parameters describing streambed conductance, location, stage, and bottom elevation.	D
SIP	Parameters necessary for solution of finite-difference flow equations by the strongly implicit procedure.	E
OUTPUT CONTROL	Control parameters for printing and form of model output.	F
WELL	Contains parameters describing well locations and recharge or discharge rates.	G

[1] The ground-water-flow program of McDonald and Harbaugh (1988).

Copies of the data sets (appendixes A-G) can be obtained on diskette by sending a formatted diskette to the author at:

U.S. Geological Survey
Water Resources Division
525 Clinton Street
Bow, New Hampshire 03304

The data sets listed in table 1 were constructed from modifications of the original data sets which were in a form compatible with the Trescott program (Morrissey, D.J., U.S. Geological Survey, written commun., 1989). The original data sets and related data are at the U.S. Geological Survey, Water Resources Division, in Augusta, Maine.

ADAPTATION OF THE MODEL

Morrissey (1983) simulated ground-water flow in his model by means of the two-dimensional finite-difference program of Trescott and others (1976). The Trescott program was designed to simulate flow in two dimensions and the modeled aquifer may be confined, unconfined, or a combination of both; it may be heterogeneous, anisotropic, and have irregular boundaries. This program can simulate constant recharge, evapotranspiration, recharging and discharging wells, and leakage through confining beds.

The finite-difference digital-computer program of McDonald and Harbaugh (1988), MODFLOW, was used to simulate ground-water flow for the aquifer model. MODFLOW consists of a main program and a set of independent subroutines or packages. Each package handles a specific feature of the hydrologic system, such as wells, recharge, or rivers. This program has the same features as the Trescott model, including other features such as the ability to simulate flow in three dimensions and the ability to estimate flow terms at all cell faces. Given flow terms, further data interpretations are possible using software compatible with MODFLOW output. Software are now available to produce, for example, head-contour maps (Harbaugh, 1990), zonal aquifer budgets (Harbaugh, A.W., U.S. Geological Survey, written commun., 1989), statistical pre- and post-processing (Scott, 1990), and flow-line paths (Pollock, 1989).

Conceptualization of the Aquifer System and Model Construction

The ground-water-flow model developed by Morrissey (1983) is, out of necessity, a simplification of the real system as it is known. The model is described in detail by Morrissey (1983) and will be briefly summarized here. All parameters and conditions were handled in the same, or comparable, manner.

Boundary Conditions

Boundary conditions specified in the revised model and their locations are the same as those specified by Morrissey (1983, pl. 5) shown in figure 2. The aquifer is simulated in the model as one layer that terminates at the contact between stratified-drift and till or bedrock valley walls. These lateral inflow boundaries are simulated as constant-flux boundaries (fig. 2). By adding recharging wells in the model, recharge to the aquifer from adjacent upland areas is simulated. The bottom of the aquifer model is at the contact between stratified drift and the till/bedrock surface or silt and clay marine deposits. The bottom boundary is simulated as a no-flow boundary, although in reality there probably is some flux at this interface. This assumption is inherent in the model in that ground-water flow to or from bedrock is small compared with flow in the aquifer. The northern and southern ends of the valley, where the saturated thickness decreases to zero, are treated as no-flow boundaries.

The Little Androscoggin River and Weber and Meadow Brooks (Morrissey, 1983, pl. 5) represent the ground-water outflow of the aquifer and are simulated as head-dependent flow boundaries (fig. 2). Ground-water flow between the aquifer and these rivers is a function of head gradient, streambed thickness, and permeability. Hogan and Whitney Ponds (fig. 1) (Morrissey, 1983, pl. 5) are simulated as constant-head boundaries set equal to the average water-surface elevation in the ponds (fig. 2). Bedrock outcrops within the modeled area are treated as no-flow boundaries.

Grid Dimensions

The finite-difference grid used to discretize the Little Androscoggin River valley aquifer originally

consists of a grid of 55 rows and 106 columns (Morrissey, D.J., 1983, pl. 5). The finite difference grid used for the Trescott program was required to be surrounded by a row and column of inactive cells. An exterior row or column is not necessary for the MODFLOW program, however, the first row and column of inactive cells were retained for the MODFLOW data sets for simplicity in converting data sets. The finite-difference grid used with the MODFLOW program consists of 54 rows and 105 columns (fig. 2). There are a total of 5,885 grid blocks (cells); of these, 1,282 are within the aquifer area and are considered "active." The grid has variable spacing with cell dimensions that range from 400 ft (feet) on a side in the northern parts of the aquifer, to 800 ft on a side in the southern part of the aquifer.

Aquifer Properties

Hydraulic properties of the water-table aquifer assigned to each cell in the model include horizontal hydraulic conductivity, aquifer bottom elevation, and specific yield. Estimated values of stratified-drift horizontal hydraulic conductivity for the calibrated model range from 10 ft/d (feet per day) for fine-grained deposits to 120 ft/d for coarse-grained deposits (Morrissey, 1983, pl. 6).

Properties associated with cells corresponding to the location of the Little Androscoggin River, Webber, and Meadow Brooks (Morrissey, 1983, pl. 5), were estimated by Morrissey (1983). Streambed hydraulic conductivity (K) was 2 ft/d and riverbed thickness (M) was 2 ft for all model cells with river leakage. The riverbed conductance term (C) used by MODFLOW is calculated according to the equation (McDonald and Harbaugh, 1988, p. 6-4):

$$C = \frac{LWK}{M}, \qquad (1)$$

where L is river-segment length and W is river width. These terms were estimated by Morrissey (U.S. Geological Survey, written commun., 1989), for use in the Trescott program, from river discharge measurements and field observations. The Trescott program uses the terms given above differently than the MODFLOW program and does not make use of the riverbed conductance term given in equation 1. To obtain the equivalent riverbed conductance term (C) for the MODFLOW river package, from Trescott program data sets, multiply the Trescott confining bed hydraulic conductivity by cell area divided by confining bed thickness (M).

Recharge and Discharge

The average rate of recharge to the aquifer from precipitation during the 1981 water year[1] was estimated to be 16.4 ft^3/s (cubic feet per second), or 18 inches (Morrissey, 1983). This value was based on the total annual runoff of the Little Androscoggin River and was uniformly distributed over the model area.

Lateral ground-water inflow to the aquifer from till-covered uplands, along the valley-wall boundaries, was estimated to be 11.2 ft^3/s or 0.5 $(ft^3/s)/mi^2$ (cubic feet per second per square mile) of upland drainage area (Morrissey, 1983). This recharge was distributed by recharge wells along the model boundaries in proportion to contributing drainage area.

Discharge from the aquifer, as leakage to surface water, was computed by the model. Discharges from municipal wells serving the towns of Norway, South Paris, and Oxford were simulated with 1981 average withdrawals of 0.50, 1.50, and 0.25 ft^3/s, respectively.

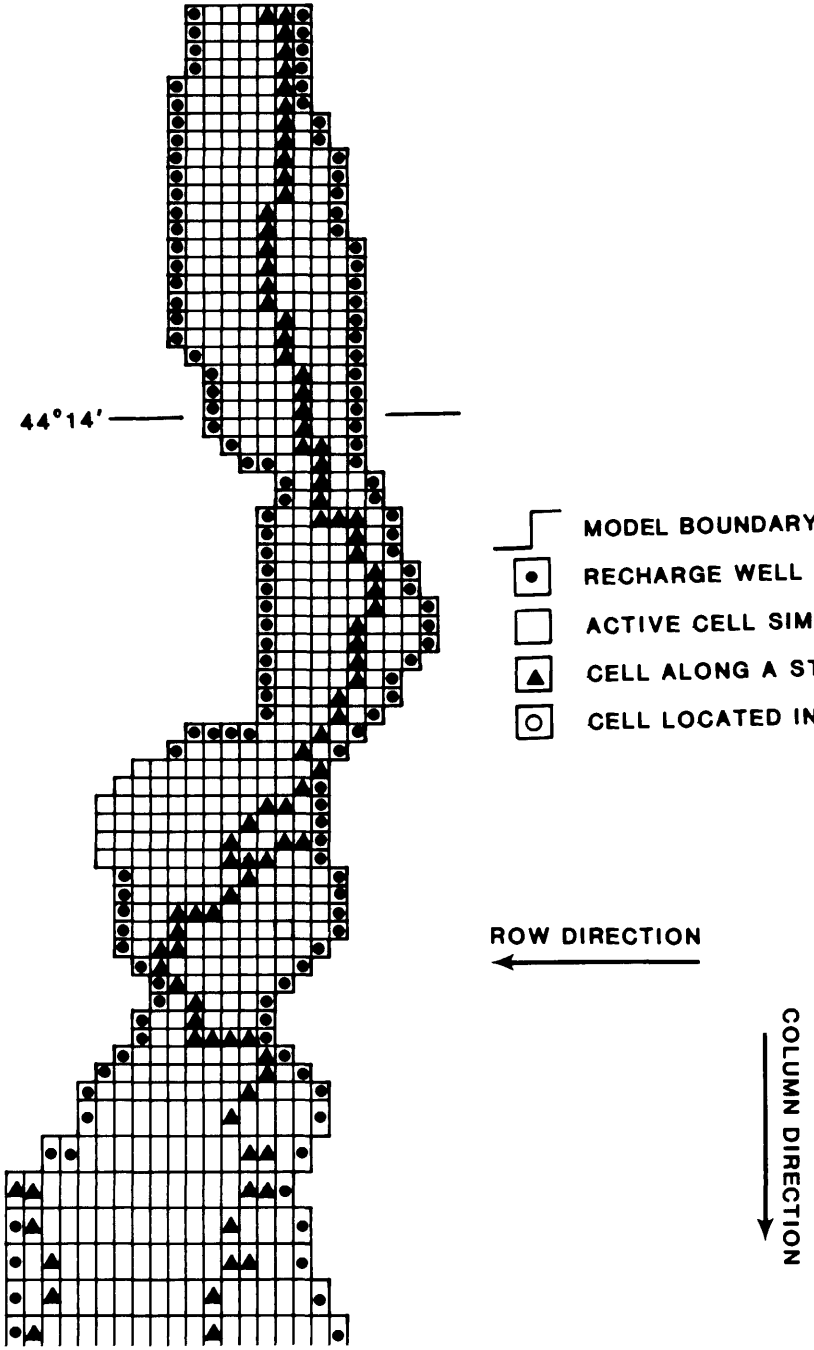
Calibration

The ground-water-flow model of the Little Androscoggin River valley aquifer (Morrissey, 1983) was calibrated to average conditions for the 1981 water year. Morrissey (1983) compared computed-head values against measured heads and surface-water leakage. Aquifer and streambed parameters were adjusted to improve model calibration.

The ground-water-flow model presented here was designed to reproduce Morrissey's (1983) calibrated simulation. The only changes made to original model-input values were to horizontal hydraulic conductivity and bedrock-surface altitudes along the model boundary in the Norway area (fig. 1). This area contains six model-boundary cells

---

1 The 1981 water year is from October 1, 1980 to September 30, 1981.



EXPLANATION

MODEL BOUNDARY

RECHARGE WELL SIMULATING CONSTANT FLUX ACROSS BOUNDARY

ACTIVE CELL SIMULATING ZERO FLUX ACROSS BOUNDARY

CELL ALONG A STREAM WHERE LEAKAGE FROM THE AQUIFER IS SIMULATED

CELL LOCATED IN A LAKE WHERE A CONSTANT HEAD IS SIMULATED

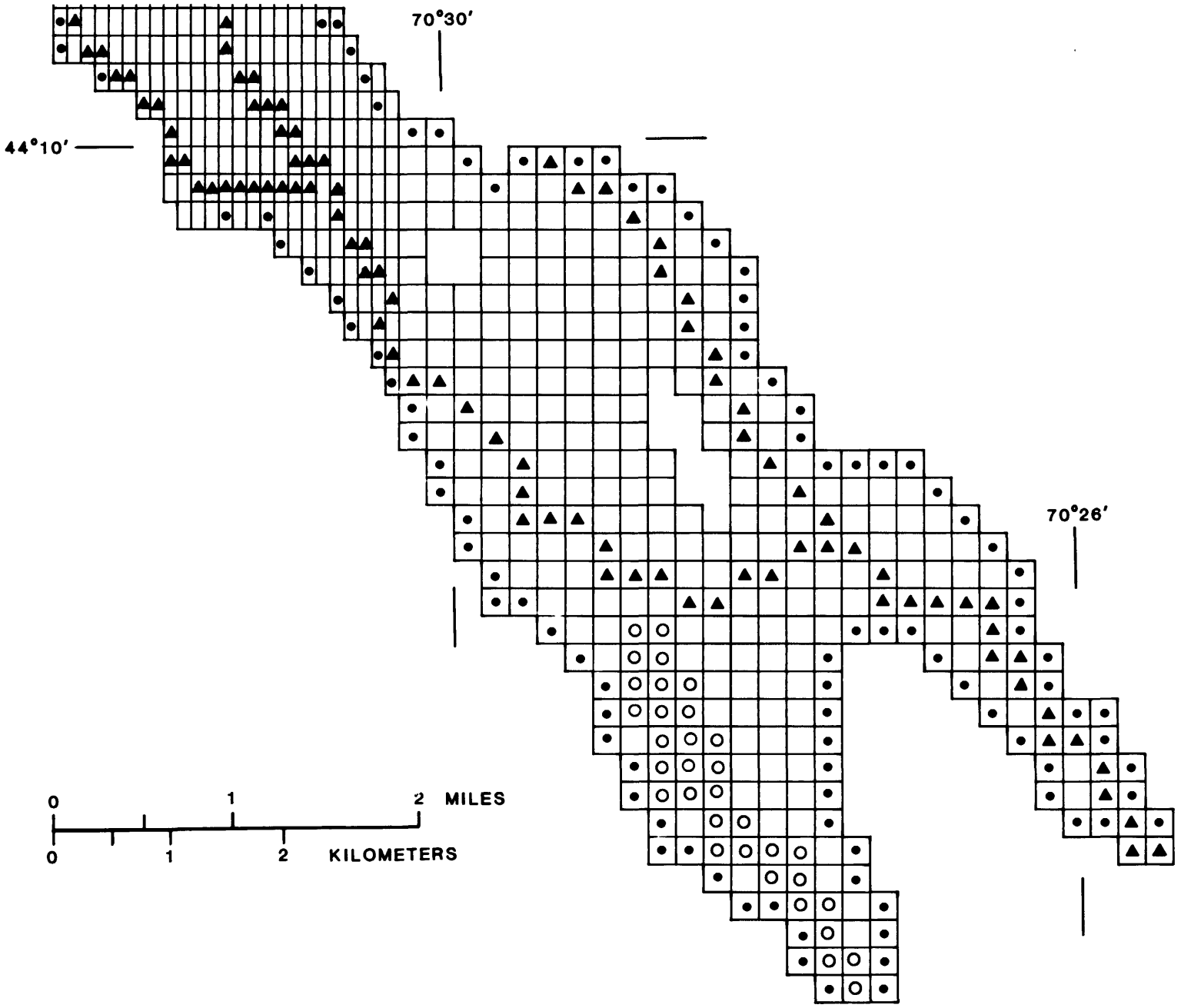


Figure 2.--Finite-difference grid and boundary conditions used to model the Little Androscoggin River valley aquifer, Oxford County, Maine [Modified from Morrissey, 1983, pl. 5].

(fig. 2) that do not receive recharge from upland drainage. These six cells "dried up" in calibration simulations and caused head oscillations and further drying of valley-edge cells. To alleviate the drying, horizontal hydraulic conductivities were lowered by up to 50 percent and aquifer-bottom elevations were lowered by 5 to 15 ft at 18 cells along this boundary. To reduce the magnitude of head changes in order to prevent oscillations, the acceleration parameter (McDonald and Harbaugh, 1988, p. 25-12) in SIP (appendix E) was set at 0.7.

The calibrated ground-water-flow model presented here reproduces favorably the simulation results produced by Morrissey's (1983) model. Water levels computed by this model were compared against observed June 1981 water levels in table 2. The average-absolute head difference was 2.8 ft at 63 locations for this model simulation and 2.5 ft for Morrissey's (1983) simulation; 90 percent of the head differences were 5 ft or less for both model simulations. The mean head difference--calculated head minus observed head--was -0.6 ft, which suggests that heads are slightly lower in general and errors are relatively unbiased.

The measured ground-water outflow from the aquifer, along four surface-water reaches, is compared against Morrissey's (1983) computed outflow and the outflow computed with MODFLOW in table 3. Minor differences in simulated leakage occur from the manner in which the MODFLOW program calculates flow terms as compared to the Trescott program.

The total leakage calculated by the Trescott program (29 ft^3/s) shown in table 3 as reported by Morrissey (1983, table 9, p. 39), does not appear to be the correct value; it probably is 26.7 ft^3/s. The lower value was reported for leakage in the Trescott model steady-state budget (Morrissey, 1983, table 10, p. 40). Calculated leakages from each river reach, reported by Morrissey (1983, table 9, p. 39), are also believed to be lower, probably by less than 1 ft^3/s each. With these revisions, leakage calculated by MODFLOW compares very well with that calculated by the Trescott program and the average observed leakage per river reach. The difference in total computed leakage between the two programs is probably less than 1 ft^3/s.

The steady-state mass balances computed by the two models shown in table 4 compare very well with each other. In the Trescott simulation (table 4), reported by Morrissey (1983, table 10, p. 40), constant-head outflow is added together with river leakage to give 26.7 ft^3/s. For the MODFLOW simulation, the sum of river leakage (24.1 ft^3/s) and constant-head outflow (2.5 ft^3/s) is 26.6 ft^3/s, or essentially the same result as the Trescott program.

Inflow and outflow from the model during steady-state simulation, the mass-balance discrepancy, was less than 0.01 percent for this model and 0.08 percent for the Trescott model. The percent discrepancy is a measure of the numerical accuracy of the ground-water-flow solution and should be less than 0.1 percent (Konikow, 1978). This percentage is largely governed by specification of the head-closure criterion. This criterion is attained when the maximum change in simulated head at any cell in the model, from one iteration to the next, is below a specified amount. Solution of a ground-water-flow simulation to a small head closure value will result in a small mass-balance difference. In the present simulation, a head-closure criterion of 0.01 ft was used and the simulation converged on this value in 20 iterations.

Minor differences are noted between Trescott and MODFLOW program results (tables 2 and 3), the two programs should produce identical results given the same input data. Differences in simulation results can be attributed to the fact that the final data sets for the Trescott program are not available and there are believed to be minor differences between the two model data sets. Data sets are available for the Trescott program; however, final output from the Trescott program is not available to determine if the model data sets were the final data sets or to use in recreating the final data sets. Final model data values were interpolated from Morrissey (1983) text and plates in some cases.

An additional source of discrepancy between program simulations can be attributed to the value of the head closure criterion for convergence used in the iterative routine of each program. To produce identical results from the two programs, the same value of closure criterion should be used. The value used for the Trescott program is not known; however, the value used for the MODFLOW program is undoubtedly lower because the MODFLOW program simulation resulted in a lower mass-balance discrepancy.

USE AND LIMITATIONS OF THE MODEL

Use of a ground-water-flow model requires considerations regarding the computer system, in this case the capabilities of the microcomputer system and the setting up and compilation of an executable ground-water-flow model program.

Table 2.-- *Measured June 1981 heads and MODFLOW model-calculated heads for the Little Androscoggin River valley aquifer*

[All head measurements in ft, feet]

Model		Head			Model		Head		
Row	Column	Calculated	Observed	Difference	Row	Column	Calculated	Observed	Difference
12	87	323	320	3	39	9	348	348	0
13	92	313	312	1	39	10	347	348	-1
13	102	324	325	-1	40	5	355	360	-5
15	95	324	327	-3	40	8	349	347	2
16	84	328	325	3	40	9	347	340	7
16	102	312	310	2	40	12	344	345	-1
18	79	342	335	7	40	51	325	336	-11
18	85	324	326	-2	41	10	346	345	1
20	81	334	330	4	41	11	344	346	-2
21	84	334	335	-1	41	52	312	315	-3
22	76	344	340	4	42	12	348	350	-2
22	94	308	304	4	42	13	349	347	2
23	82	337	337	0	42	14	349	347	2
24	80	339	337	2	42	15	349	344	5
24	86	318	324	-6	42	25	377	381	-4
24	89	303	305	-2	42	54	312	315	-3
25	77	345	343	2	42	73	311	309	2
25	84	324	326	-2	43	42	376	380	-4
26	78	343	342	1	43	62	302	308	-6
27	87	333	335	-2	43	66	312	315	-3
29	75	327	325	2	44	4	388	390	-2
29	82	309	310	-1	44	15	380	381	-1
34	28	376	380	-4	44	18	373	370	3
34	38	349	350	-1	45	48	319	325	-6
36	28	344	344	0	46	63	354	360	-6
36	71	334	335	-1	46	76	353	355	-2
37	20	348	350	-2	47	69	358	363	-5
37	24	345	345	0	48	46	348	350	-2
38	6	353	355	-2	51	64	377	370	7
38	54	357	360	-3	53	69	370	365	5
38	63	350	350	0	54	65	380	380	0
38	68	352	355	-3					

Table 3.-- *Comparison of computed ground-water discharge with observed values in the Little Androscoggin River valley aquifer*

[All leakage measurements in cubic feet per second, ft^3/s]

River reach	Average observed leakage[1]	Computed leakage	
		Morrissey[2]	MODFLOW[3]
1. Biscoe Falls to South Paris	5	4	4
2. South Paris to Oxford	11	12	11
3. Oxford to Welchville	7	5	4
4. Welchville to Mechanics Falls	6	8	7
Total	29	29	26

[1] From Morrissey (1983, table 9, p. 39).

[2] Data from Morrissey (1983, table 9, p. 39) that was calculated using the ground-water-flow program of Trescott and others (1976). These values are probably lower by up to 1 ft^3/s; the total value is probably in error and should be about 27 ft^3/s.

[3] Data calculated using the ground-water-flow program of McDonald and Harbaugh (1988).

Hydrologic considerations, such as valid uses of the ground-water-flow model, data changes, and calibration of a model, are also necessary.

Microcomputer Considerations

The version of MODFLOW used in this study was written in FORTRAN77 and was designed to be highly portable. Portability is discussed in detail by McDonald and Harbaugh (appendix A, 1988). Basically, this means that the model program can be compiled and run on most computers; mainframe, mini- or microcomputers with little modification. The source program is listed by McDonald and Harbaugh (1988) or it is available at cost from:

Chief, Office of Ground Water
MS 411, National Center
U.S. Geological Survey
Reston, Virginia 22092

To run the model program, it must be compiled into an executable program by means of a FORTRAN77 compiler. The executable program was compiled with software routines that make use of a math coprocessor. If the program is run on a computer with a math coprocessor installed, computation speed and solution accuracy will be improved.

The executable program used in this study was compiled using Microsoft's[2] FORTRAN77 compiler (version 5.0) with the addition of two Microsoft commands as the first two lines of the

[2] Use of trade or firm names in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

Table 4.-- *Comparison of model-calculated steady-state water budgets for average 1981 water-year conditions*

[All rates are measured in cubic feet per second, ft^3/s; dashes indicate no comparison]

	Inflow		Outflow	
	Morrissey[1]	MODFLOW[2]	Morrissey[1]	MODFLOW[2]
Infiltration from precipitation	16.4	16.8	--	--
Flux from uplands	11.2	11.5	--	--
Stream-aquifer interactions	1.4	.6	26.7	24.1
Constant head	--	.0	--	2.5
Pumpage			2.3	2.3
Total	29.0	28.9	29.0	28.9

[1] Data from Morrissey (1983, table 10, p. 40) that was calculated using the ground-water-flow program of Trescott and others (1976).

[2] Data calculated using the ground-water-flow program of McDonald and Harbaugh (1988).

main-program source code and each module source code. These commands are:

```
$LARGE
$NOFLOATCALLS
```

and allow arrays in the executable program to have explicit dimensions larger than 64,000 words and allow the program to take advantage of a computer's math coprocessor. The only other changes made to the program source code were the additions of file-opening statements in the main program module. An input redirection command, however, could also be used at the operating level instead of file-opening statements in the program code.

For the ground-water-flow problem described in this report, the model-program X-array size requirement was approximately 90,000 words. The size of this array needs to be set large enough for a particular problem in the main-program source code. Refer to McDonald and Harbaugh (1988) for a complete description and treatment of the X-array. The size of this array for a particular problem can be estimated to be 10 to 15 times the number of model nodes. The size of the X-array required will also vary with the number of modular packages used; more packages will result in a larger array.

The program compiled for the model presented, with all packages installed and an X-array of 90,000 words, requires approximately 570K (570,000) of available random access memory (RAM) to execute. If not enough RAM is available on a computer to run the program, an executable program can be constructed that requires less RAM by compiling the source code with only those packages that are used in the ground-water-flow simulation.

The computation time (the time it takes a computer to solve a ground-water-flow problem) varies with the specific computer system used. Where a solution is attained in 20 iterations, such as the problem presented in this report, the computation time varies from approximately 6 minutes on an 8 MHz (megahertz), 16 bit, 8086 processor computer; and approximately 4 minutes with a 12 MHz, 16 bit, 80286 processor system; to about 1 minute on a 20 MHz, 32 bit, 80386 processor system. Computation time is also dependent on the size and complexity of the problem, and the number of iterations required to solve the ground-water-flow problem. Larger,

more complex problems and poor initial conditions will require more iterations and take longer to solve.

Hydrologic Considerations

The model presented can be used to analyze the ground-water-flow system, to test hypotheses about the system, and to help water managers. For example, the model can be used to predict water-level and water-budget changes that would be caused by changes in well discharge or aquifer recharge. Morrissey (1983) describes use of the original model to predict the effects of reduced recharge and increased pumpage on the aquifer. Users of the model need to be aware of the limitations and assumptions of ground-water-flow modeling, such as those outlined by Morrissey (1983).

Model-input data files must be modified to produce different simulations. Slight changes can be made to some data sets without recalibrating the model--for example, varying stress periods or pumping rates, and well and recharge data sets. Other changes can be made to the data sets given but the model should be recalibrated. Recalibration to average heads and flows can be made using the measured head and budget data given in tables 2 and 3. Some model simulations may need a different data set for calibration. For example, to test a ground-water-flow hypothesis for a drought period, simulated by reducing recharge, the model may need to be calibrated to low flow, well hydrographs, and head elevations typical of a dry period. Descriptions and format statements necessary to make changes to the data sets, such as adding or subtracting wells or modifying pumping rates, are given by McDonald and Harbaugh (1988).

Many different ground-water-flow simulations can be investigated by varying model-input data. Care must be taken in doing so, however, because it is possible to create unrealistic simulations. Basic principals and assumptions used in ground-water-flow-modeling must be kept in mind, such as assuming that flow in the aquifer is only horizontal or the altitude of surface waters remains constant. Because simulated rivers have a constant water surface and ponds a constant head, the model has no provisions for drying a river or pond; therefore, more water could be withdrawn from these areas than is actually present because surface water heads do not change.

Simulations of large or small discharges could raise numerous problems. For example, water-level declines caused by excessive discharges could lower the simulated water level below the aquifer bottom and dry up cells. Once dry, a cell becomes irreversibly inactive and recharge or discharge will not be simulated in that cell. As cells go dry, the error in water budget will progressively increase. Simulations of very small stresses may be in error on many processors and may require the use of double precision in the MODFLOW source code or a 32-bit processor or both.

Other limitations to simulating ground-water flow are raised because the calculated head in a cell is an average for that area. The model can not be used for calculation of site-specific drawdown because the grid scale is too coarse and the hydraulic data, used in the model generally is averaged over large areas. When a discharging well is simulated, for example, the model-predicted water level for that cell may be above the aquifer bottom, indicating that the cell is active, whereas drawdown in the well may actually extend to below the aquifer bottom. Simulated drawdown in a well can be calculated by the method outlined by Trescott and others (1976, p. 9).

SUMMARY

A computerized ground-water-flow model of the Little Androscoggin River valley aquifer, Oxford County, Maine, was calibrated to simulate ground-water flow by means of a program compatible with microcomputers. Ground-water flow in the Little Androscoggin River valley aquifer--a 15-square mile sand and gravel valley-fill aquifer--was originally simulated by use of a two-dimensional finite-difference program. The original model was converted to be compatible with a program that simulates two- or three-dimensional ground-water flow and produces output in a form compatible with other software; output can be, for example, head-contour maps, zonal-aquifer budgets, flow-line paths, and summary statistics.

The calibrated ground-water-flow model presented here favorably reproduces the simulation results produced by the original model. Water levels computed by this model were compared to observed June 1981 water levels. The average absolute-head difference was 2.8 ft at 63 locations for this model simulation and 2.5 ft for the original simulation; 90 percent of the head differences were 5 ft or less for both model simulations.

The measured ground-water outflow from the aquifer along four surface-water reaches compares favorably to the original Trescott computed outflow

and the outflow computed by the present model. The mass balances computed by the two models compare very well with each other. In the Trescott simulation, constant-head outflow is added together with river leakage to give 26.7 ft^3/s. For the MODFLOW simulation, the sum of river leakage (24.1 ft^3/s) and constant head outflow (2.5 ft^3/s) is 26.6 ft^3/s, or essentially the same result as that of the Trescott program. Inflow and outflow from the model during steady-state simulation, the mass-balance discrepancy, was less than 0.01 percent for this model and 0.08 percent for the Trescott model.

The program compiled for the model presented, with all packages installed and an X-array of 90,000, requires approximately 570K of available RAM to execute. The computation time-- the time required for a computer to solve a ground-water-flow problem--differs with the computer system used. A solution, such as the solution to the problem presented in this report, is attainable in 20 iterations in approximately 6 minutes on an 8 MHz (megahertz), 8086 processor computer, approximately 4 minutes with a 12 MHz, 80286 processor system, and approximately 1 minute on a 20 MHz, 80386 processor system. Computation time increases with the number of iterations.

The model can be used to predict water-level and water-budget changes that would result from changes in well discharge or aquifer recharge. Many different ground-water-flow simulations can be investigated by varying model-input data. Care must be taken in doing so, however, to avoid unrealistic simulations. Also, basic principals and assumptions used in ground-water-flow modeling, such as direction of flow in the aquifer or the altitude of surface waters, need to be kept in mind.

REFERENCES CITED

Harbaugh, A.W., 1990, A simple contouring program for gridded data: U.S. Geological Survey Open-File Report 90-144, 37 p.

Konikow, L.F., 1978, Calibration of ground-water models: Proceedings of the Specialty Conference on Verification of Mathematical and Physical Models in Hydraulic Engineering ASCE, College Park, Maryland, August 9-11, p. 87-93.

McDonald, M.G., and Harbaugh, A.W., 1988, A modular three-dimensional finite-difference ground-water-flow model: U.S. Geological Survey Techniques of Water-Resources Investigations Report, Book 6, Chapter A1, 586 p.

Morrissey, D.J., 1983, Hydrology of the Little Androscoggin River valley aquifer, Oxford County, Maine: U.S. Geological Survey Water-Resources Investigations Report 83-4018, 79 p.

Pollock, D.W., 1989, Documentation of computer programs to compute and display pathlines using results from the U.S. Geological Survey modular three-dimensional finite-difference ground-water-flow model: U.S. Geological Survey Open-File Report 89-381, 188 p.

Scott, J.C., 1990, A statistical processor for analyzing simulations made using the modular-finite-difference ground-water-flow model: U.S. Geological Survey Water-Resources Investigations Report 89-4159, 218 p.

Trescott, P.C., Pinder, G.F., and Larson, S.P., 1976, Finite-difference model for aquifer simulation in two dimensions with results of numerical experiments: U.S. Geological Survey Techniques of Water-Resources Investigations, Book 7, Chapter C1, 116 p.

APPENDIX A

BAS – Basic package data set

```
LITTLE ANDROSCOGGIN RIVER VALLEY
ONE LAYER STEADY-STATE
          1         54        105          1          1
 11 12   0 14   0   0   0 18 19   0   0 22
          0          0
          1          1(20I4)                          -2          IBOUND
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    4    4
   0    0    0    0    0         2
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    4    4    4    4
   0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    4    4    4    4    4    0
   0    0    0    0    0         4
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    4    4    4    4    4    0
   0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    4    4    4    4    4    4    0    0
   0    0    0    0    0         6
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    4    4    4    4    4    4    4    0    0    0    0
   0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    4    4    4    4    4    4    4    0    0    0    0    0    0
   0    0    0    0    0         8
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    4    4    4    4    4    4    4    0    0    0    0    0    0
   0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    4    4    4    4    4    4    4    0    0    0    0    0    0    0
   0    0    0    0    0        10
```

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 4 4 4 4 4 4 4 0 0 0 0 0 0 0 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 4 4 4 4 4 4 4 0 0 0 0 0 0 0 0
0 3 3 3 3 12
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 4 4 4 4 4 4 4 0 0 0 0 0 0 0 3
3 3 3 -3 -3
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 4 4 4 4 4 4 4 4 4 4 3 3 3 3 3
3 -3 -3 -3 3 14
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 4 4 4 4 4 4 4 4 4 4 4 3 3 3 3 3 -3
-3 -3 3 3 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 4 4 4 4 4 4 3 3 3 3 3 3 3 3 3 3 3 -3
-3 3 0 0 0 16
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 4 4
4 4 4 4 4 4 4 4 3 3 3 3 3 3 3 3 3 3 -3 -3
3 3 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 4 4 4
4 4 4 4 4 0 0 0 3 3 3 3 3 3 3 -3 -3 -3 -3 -3
3 0 0 0 0 18
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 4 4 4 4
4 4 4 0 0 0 0 3 3 3 3 3 3 -3 -3 -3 -3 -3 3 3
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 4 4 4 4 4
4 4 0 0 0 3 3 3 3 3 3 -3 -3 -3 -3 -3 -3 -3 3 3
0 0 0 0 0 20
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 4 4 4 4 4
3 3 3 3 3 3 3 3 3 3 3 -3 -3 -3 -3 3 3 3 0 0
0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 4 4 4 4 4 4
3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 0 0 0 0
0 0 0 0 0 22
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 4 4 4 4 4 3
3 3 3 3 3 3 3 3 3 3 3 3 3 0 0 0 0 0 [illegible] 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 4 4 4 3 3 3
3 3 2 2 2 2 3 3 3 3 3 3 0 0 0 0 0 0 0 0
0 0 0 0 0 24
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 4 4 3 3 3 3
2 2 2 2 2 2 2 3 3 3 3 0 0 0 0 0 0 0 0 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 2 2 2 2
2 2 2 2 2 2 2 2 3 3 3 0 0 0 0 0 0 0 0 0
0 0 0 0 0 26
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 2 2 0 0 2
2 2 2 2 2 2 2 2 3 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 2 2 2 2 0 0 2
2 2 2 2 2 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 28
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2
2 2 2 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2
2 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 30
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 2
2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 2
2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 32

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 2 2
2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1
1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 2 2 2
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 34

0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 2 2 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 35

0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 0 0 0 0 0 0 2 2 2 2 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 2 2 2 2 2 2 2 2 2 2 2 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 36

0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 2 2 2 2 2 2 2 2 2 0 0 0 0 0 0
0 2 2 0 0 0 0 2 2 2 2 2 2 2 2 2 2 2 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 37

0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 0 0 0 0 0
2 2 2 2 0 2 2 2 2 2 2 2 2 2 2 2 2 2 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 38

0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1
2 2 2 2 2 2 2 2 2 2 2 2 0 2 2 2 0 0 0 2
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0

0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 2 2 2 2 2 0 0 2 2 2 2 2 2 2 2 2 2 1
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 40

0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
2 2 2 2 2 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0
0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0

0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 42

0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 43

0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0		44												
0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0														
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0		46												
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	2	2	2	2	2	2	2	2	2	2	2	0	0	2	2	2
2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0														
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	2
2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0		48												
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0
2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0														
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0		50												
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0														
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0		52												
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0														
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0		54												

```
      0.
       1          1.(20F4.0)                          -7          STARTING HEAD
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0  300  280
0    0    0    0    0                      2
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0  310  300  281  281
0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0  315  308  283  282  300    0
0    0    0    0    0                      4
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0  310  284  297  297  310    0
0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0  315  300  285  285  297  310    0    0
0    0    0    0    0                      6
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0  310  305  300  287  286  300  320    0    0    0    0
0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0  325  310  289  288  300  310  320    0    0    0    0    0
0    0    0    0    0                      8
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0  330  310  299  289  300  310  320    0    0    0    0    0    0
0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0  335  320  300  299  290  290  320    0    0    0    0    0    0    0
0    0    0    0    0                     10
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
```

0 0 0 0 0 330 320 300 299 297 291 310 0 0 0 0 0 0 0 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 330 320 310 299 292 291 300 0 0 0 0 0 0 0 0
0 335 330 320 310 12
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 330 315 300 293 297 300 312 0 0 0 0 0 0 0 335
333 325 322 303 303
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 325 310 297 294 299 303 307 320 335 335 335 335 333 330 325
320 303 303 303 320 14
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 335 330 320 300 303 295 300 303 307 310 320 327 327 325 322 320 302
302 303 310 320 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 335 325 315 315 310 313 305 300 308 308 308 315 320 320 320 315 310 302
302 310 0 0 0 16
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 340 340
340 335 325 315 310 320 320 320 320 300 310 310 310 310 320 322 322 320 302 302
308 310 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 350 335 333
330 320 316 320 326 0 0 0 335 310 301 310 310 310 310 302 302 302 302 302
310 0 0 0 0 18
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 350 335 333 326
323 330 335 0 0 0 0 330 320 310 301 310 308 302 302 302 302 302 308 320
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 343 340 333 330 330
330 334 0 0 0 335 331 325 310 302 308 302 302 302 302 302 302 302 308 310
0 0 0 0 0 20
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 343 336 337 335 335
335 335 335 335 333 331 325 320 310 302 308 302 302 302 302 308 310 320 0 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 345 340 338 336 336 336

336	335	334	333	331	325	320	310	302	302	310	310	310	304	310	330	0	0	0	0
0	0	0	0	0					22										
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	350	345	340	338	336	336
337	337	333	330	327	323	320	302	310	310	310	310	320	0	0	0	0	0	0	0
0	0	0	0	0															
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	350	347	345	341	339	337
335	330	330	328	326	324	320	302	305	310	310	330	0	0	0	0	0	0	0	0
0	0	0	0	0					24										
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	350	347	343	341	340	335
330	327	325	326	320	302	302	302	308	310	330	0	0	0	0	0	0	0	0	0
0	0	0	0	0															
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	348	348	342	343	340
330	320	310	308	303	308	310	320	320	320	330	0	0	0	0	0	0	0	0	0
0	0	0	0	0					26										
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	348	346	344	0	0	330
320	310	308	303	310	330	335	340	340	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0															
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	350	340	340	340	0	0	310
308	308	303	310	330	340	350	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0					28										
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	340	325	310	310	310	308	308
305	310	303	335	345	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0															
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	350	330	310	308	308	308	308	303
308	303	330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0					30										
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	380	380	380	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	350	345	325	310	308	308	308	303	308
303	330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0															
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	370	370	370	370	370	370	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	350	340	320	308	308	308	304	303	310
340	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0					32										
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	380	370	360	360	355	355	355	355	360	350	350
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	350	345	330	315	310	308	308	304	320	340

360 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 380 370 360 355 355 341 341 341 350 350 350 350 360
360 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 350 350 340 325 310 308 304 304 310 320 340
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 34
0 0 0 0 0 0 0 0 0 0 0 0 0 0 360 360 360 360 360 360
360 360 360 360 360 360 360 350 350 342 342 341 342 340 338 330 327 325 333 350
355 360 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 350 340 330 320 310 304 308 310 320 350 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 365 365 360 360 360 355 355 355 355 355 355
350 350 350 350 350 348 345 342 342 342 345 345 345 343 340 335 330 328 330 320
320 350 355 0 0 0 0 0 0 365 365 365 365 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 360 355 335 325 315 310 304 304 315 330 350 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 36
0 0 0 0 0 0 0 360 360 360 360 355 355 352 352 350 350 350 350 350
349 349 345 345 344 343 343 343 343 342 345 345 345 345 345 343 340 340 330 330
330 315 340 311 350 355 360 360 365 365 365 365 365 365 0 0 0 0 0 0
0 355 355 0 0 0 0 360 355 350 330 320 310 304 304 306 320 340 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0
360 360 355 350 350 355 349 349 349 349 349 349 349 349 349 349 349 349 349 349
346 345 344 344 344 343 346 346 348 348 349 349 349 350 350 350 350 350 345 340
336 330 313 330 310 340 340 350 350 350 350 350 350 360 360 0 0 0 0 0
350 350 350 350 0 355 355 355 350 340 325 315 304 304 310 309 320 350 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 38
360 350 350 349 349 349 349 348 348 348 347 347 348 348 348 348 345 345 345 345
345 345 345 345 345 347 349 350 350 360 360 360 370 370 380 380 370 360 360 350
350 340 330 320 310 310 310 309 310 340 340 340 340 340 340 340 0 0 0 340
330 330 330 330 330 340 340 340 335 325 315 310 304 310 310 310 350 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0
350 350 370 355 360 350 349 347 340 347 346 345 347 347 347 346 346 346 346 346
349 350 350 350 350 350 360 0 0 380 380 380 380 380 380 380 380 380 380 380
360 350 340 330 315 310 310 309 309 310 336 335 335 335 335 335 335 330 320 307
307 320 320 306 306 335 340 340 335 325 315 305 305 308 315 312 340 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 40
375 370 370 370 370 360 355 352 350 345 346 346 346 346 346 346 346 346 346 348
355 360 360 360 360 370 380 0 0 0 0 0 0 0 0 0 0 0 0 0
0 370 350 350 340 315 309 310 309 309 310 315 320 325 327 327 320 310 307 308
308 307 308 306 306 309 305 310 310 309 308 305 308 309 310 314 370 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0
380 380 380 380 375 370 365 370 370 365 360 350 347 347 344 345 345 347 350 360
365 370 375 380 381 385 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 380 360 350 330 315 309 309 309 309 309 310 316 315 320 320 310 308 308 308
307 307 306 306 306 305 305 306 306 305 305 306 309 310 320 316 370 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 42
390 390 390 385 385 380 380 375 375 375 370 370 365 360 355 350 350 355 360 370
375 380 390 395 395 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 380 370 350 340 330 315 308 308 308 308 309 308 310 310 310 308 308 308 308
310 308 320 320 320 315 308 305 305 308 310 310 320 325 330 318 370 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0
395 393 393 390 390 390 390 385 385 380 380 380 380 380 381 375 370 370 375 380
385 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 380 370 350 345 335 325 320 310 308 308 308 308 308 303 308 308 308 308 330
335 340 340 340 330 320 320 320 320 325 330 330 330 330 350 320 370 0 0 0

```
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0                   44
  0   0   0   0   0 395 395 392 392 391 390 390 390 390 390 390 390 390 390 390
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0 380 350 345 340 330 325 320 325 310 308 308 308 308 308 310 330 350 350
355 355 350 350 350 350 345 340 340 340 345 345 345 350 331 360 370   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0 370 350 340 340 340 335 330 320 320 320 308 308 360 360 365 365 365
362 362 360 360 355 355 355 355 355 355 355 350 360 342 340 355   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0                   46
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0 380 350 345 345 343 340 340 340 345 350 360 370   0   0 375 375 370
369 365 365 363 362 362 362 362 363 362 362 360 345   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0 370 350 350 350 350 360 370 370 370 380   0   0   0   0   0 375
375 370 365 363 363 363 363 363 363 363 363 363 347   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0                   48
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0 380 380 380 380   0   0   0   0   0   0   0   0   0   0   0
375 370 365 363 363 363 363 363 363 363 365 350   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0 375 375 370 365 365 365 365 365 365 365 353   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0                   50
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0 370 365 365 365 365 365 365 356 370   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0 370 370 367 373 370 365 365 355   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0                   52
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0 375 376 375 370 365 363 375   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0 380 380 380 380 375 375 380   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0                   54
   86400.           1         1.
```

APPENDIX B

BCF - Block-centered flow package data set

```
         1         00             BCF
1
         0         1.
        11       100.(16F4.0)                        -7
   4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4
   4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4
   4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4
   4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    8
   8    8    8    8    8    8    8    8    8    8    8    8    8    8    8    8
   8    8    8    8    8    8    8    8    8    8    8    8    8    8    8    8
   8    8    8    8    8    8    8    8    8    8    8
        11       100.(16F4.0)                        -7
   8    8    8    8    8    8    8    8    8    8    8    8    8    8    8    8
   8    8    8    8    8    8    8    8    8    8    8    8    4    4    4    4
   4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4
   4    4    4    4    4    4    4
        11  1.157E-4(20F4.1)                        -2         HYDRAULIC CONDUCTIVITY
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0          1
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 1.0
0.0 0.0 0.0 0.0 0.0          2
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 1.0 1.0 1.0
0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 1.0 1.0 1.0 1.0 0.0
0.0 0.0 0.0 0.0 0.0          4
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 1.0 1.0 1.0 1.0 0.0
0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 1.0 1.0 1.0 1.0 1.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0          6
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.0 2.0 1.0 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.0 3.0 2.0 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0          8
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.0 3.0 3.0 2.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 2.0 3.0 3.0 3.0 2.0 1.0 1.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0          10
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 2.0 3.0 4.0 3.0 2.0 1.0 1.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 2.0 4.0 4.0 3.0 1.0 1.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.5 0.5 1.0 1.0          12
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 2.0 4.0 4.0 4.0 4.0 5.0 5.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0
0.5 0.5 0.5 3.0 5.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 2.0 3.0 2.0 2.0 3.0 5.0 5.0 5.0 5.0 3.0 3.0 3.0 3.0 3.0 2.0
2.0 2.0 3.0 5.0 5.0                    14
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 3.0 3.0 3.0 3.0 2.0 2.0 3.0 4.0 4.0 4.0 3.0 3.0 3.0 3.0 3.0 2.0 2.0
2.0 2.0 3.0 5.0 0.0                  15
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 2.0 3.0 3.0 3.0 2.0 2.0 2.0 2.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0
2.0 2.0 0.0 0.0 0.0                16
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 2.0
2.0 2.0 2.0 3.0 1.0 1.0 3.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.010.0
1.0 1.0 0.0 0.0 0.0                17
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 4.0 4.0
4.0 4.0 4.0 1.0 0.5 0.0 0.0 0.0 2.0 5.0 5.0 4.0 4.0 4.0 4.0 4.0 4.010.010.0 1.0
0.5 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.0 4.0 4.0 4.0
4.0 4.0 2.0 0.0 0.0 0.0 0.0 1.0 3.0 4.0 4.0 4.0 4.0 4.010.010.0 4.0 2.0 1.0 0.5
0.0 0.0 0.0 0.0 0.0                19
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.0 3.0 4.0 4.0 4.0
4.0 2.0 0.0 0.0 0.0 3.0 3.0 3.0 3.0 4.0 4.010.010.010.0 4.0 4.0 4.0 3.0 0.5 0.5
0.0 0.0 0.0 0.0 0.0 20
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 2.0 3.0 4.0 4.0
4.0 4.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 4.010.010.0 5.0 4.0 4.0 3.0 1.0 0.5 0.0 0.0
0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 2.0 3.0 4.0 4.0 4.0
4.0 4.0 3.0 3.0 3.0 3.0 3.0 3.0 3.010.010.0 5.0 5.0 5.0 5.0 0.5 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 22
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 2.0 3.0 4.0 4.0 4.0
4.0 3.0 3.0 2.0 2.0 2.0 2.0 2.010.010.0 5.0 1.0 0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 4.0 5.0 5.0 4.0 4.0
4.0 4.0 2.0 2.0 1.0 1.0 1.0 1.010.0 5.0 1.0 0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 24
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 4.0 5.0 5.0 4.0 4.0
4.0 4.0 2.0 1.0 1.0 1.0 1.0 1.0 3.0 1.0 0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 5.0 4.0 4.0 4.0
4.0 4.0 3.0 1.0 1.0 3.0 3.0 3.0 1.0 0.5 0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 26
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.0 2.0 3.0 0.0 0.0 3.0
3.0 3.010.010.0 3.0 3.0 0.5 0.5 0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.0 3.0 4.0 4.0 0.0 0.0 3.0
5.010.010.0 3.0 1.0 0.5 0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 28
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 5.0 5.0 5.0 5.0 5.0 4.0 5.0
10.0 5.0 3.0 1.0 0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 3.0 5.0 5.0 5.0 5.0 4.0 5.010.0
5.0 1.0 0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 30
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 1.0 1.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 2.0 5.0 5.0 5.0 4.0 4.0 4.0 3.0
1.0 0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.5 0.5 1.0 1.0 1.0 1.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 2.0 5.0 5.0 5.0 5.0 4.0 3.0 1.0
0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 32
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.5 0.5 0.5 1.0 1.0 3.0 3.0 1.0 1.0 1.0 1.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 2.0 3.0 4.0 4.0 4.0 4.0 4.0 3.0 1.0
0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.3 0.5 1.0 1.0 1.0 3.0 3.0 5.0 5.0 1.0 0.5 0.5 1.0
0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.5 1.0 1.0 3.0 4.0 4.0 4.0 4.0 3.0 1.0 0.5
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 34
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.5 0.5 0.5 0.5 0.5 0.5
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 1.0 3.0 3.0 5.0 6.0 7.0 7.0 5.0 5.0 3.0 3.0
1.0 0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.5 1.0 3.0 4.0 4.0 4.0 4.0 3.0 1.0 0.5 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.5 0.5 0.5 0.5 0.5 1.0 1.0 2.0 2.0 2.0 2.0
2.0 2.0 3.0 3.0 4.0 5.0 7.012.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0
5.0 3.0 0.5 0.0 0.0 0.0 0.0 0.0 0.0 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.5 0.5 0.5 2.0 3.0 4.0 4.0 4.0 3.0 1.0 0.5 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 36
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.5 0.5 1.0 1.0 1.0 2.0 2.0 2.0 2.0 2.0 3.0 3.0 3.0
3.0 4.0 5.0 7.0 9.010.010.0 7.0 5.0 5.0 3.0 3.0 2.0 2.0 2.0 2.0 2.0 3.0 4.0 7.0
9.0 7.0 5.0 1.0 0.5 0.5 0.5 0.5 0.5 1.0 2.0 2.0 2.0 1.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 2.0 2.0 0.0 0.0 0.0 0.0 0.5 0.5 0.5 1.0 3.0 4.0 4.0 4.0 3.0 1.0 0.5 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
1.0 1.0 1.0 1.0 2.0 2.0 2.0 2.0 2.0 3.0 3.0 3.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 5.0
5.0 7.0 9.0 9.0 7.0 5.0 4.0 3.0 2.0 1.0 1.0 1.0 0.5 0.5 0.5 1.0 1.0 1.0 2.0 2.0
4.0 6.0 9.0 7.0 5.0 3.0 3.0 2.0 1.0 1.0 1.0 2.0 2.0 1.0 0.5 0.0 0.0 0.0 0.0 0.0
2.0 3.0 3.0 3.0 0.0 0.5 0.5 0.5 0.5 1.0 3.0 4.0 4.0 4.0 3.0 2.0 1.0 0.5 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 38
1.0 1.0 2.0 2.0 2.0 2.0 3.0 4.0 4.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 6.0 7.0 7.0 7.0
9.0 7.0 7.0 6.0 5.0 4.0 2.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 0.5 0.5 0.5 1.0
2.0 4.0 6.0 9.0 7.0 5.0 4.0 4.0 3.0 2.0 2.0 2.0 0.0 1.0 1.0 0.5 0.0 0.0 0.0 1.0
1.0 3.0 3.0 3.0 1.0 1.0 0.5 1.0 2.0 3.0 4.0 4.0 4.0 4.0 3.0 2.0 1.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
1.0 1.0 2.0 2.0 2.0 5.0 7.010.010.010.010.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 7.0
7.0 7.0 5.0 4.0 3.0 1.0 0.5 0.0 0.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 0.1 0.5 0.5
0.5 2.0 4.0 6.0 9.0 7.0 7.0 7.0 7.0 1.0 0.1 0.5 0.5 0.5 1.0 1.0 0.5 0.5 0.5 1.0
1.0 3.0 3.0 3.0 1.0 1.0 0.5 1.0 2.0 3.0 4.0 4.0 4.0 4.0 3.0 2.0 1.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 40
1.0 1.0 2.0 2.0 2.0 5.0 5.0 7.0 7.0 7.0 7.0 7.0 9.0 9.0 9.0 7.0 5.0 5.0 5.0 4.0
4.0 4.0 3.0 3.0 2.0 1.0 0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.5 2.0 4.0 6.0 9.0 9.0 9.0 9.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 4.0 3.0 2.0 2.0
2.0 2.0 3.0 3.0 3.0 3.0 3.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 3.0 2.0 1.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
1.0 1.0 2.0 2.0 2.0 5.0 5.0 5.0 5.0 5.0 5.0 7.0 9.0 9.0 9.0 7.0 3.0 3.0 3.0 3.0

3.0 3.0 2.0 1.0 0.5 0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.5 0.7 2.0 4.0 7.0 7.0 9.0 9.0 9.0 9.0 7.0 7.0 7.0 7.0 9.0 9.0 7.0 7.0 5.0
5.0 5.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 5.0 4.0 3.0 2.0 1.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
42
1.0 1.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 4.0 4.0 4.0 2.0 2.0 2.0 2.0 2.0
1.0 0.5 0.5 0.5 0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.3 0.6 1.8 3.0 4.0 6.0 5.0 5.0 7.0 7.0 5.0 5.0 5.0 5.0 5.0 5.0 7.0 7.0 7.0
7.0 7.0 5.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 3.0 2.0 3.0 2.0 2.0 1.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
43
1.0 2.0 2.0 2.0 2.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 0.5 0.1 0.5 0.5 1.0 1.0 1.0
0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.5 0.7 1.5 2.0 2.0 2.0 2.0 3.0 5.0 5.0 5.0 5.0 5.0 5.0 6.0 1.0 1.0 1.0 1.0
1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
44
0.0 0.0 0.0 0.0 0.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 0.5 0.5 0.5 0.5 0.5 0.5 0.5
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.5 0.8 1.0 1.0 1.0 1.0 2.0 3.0 5.0 5.0 4.0 4.0 4.0 4.0 3.0 0.5 0.5 0.5
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
45
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.5 1.0 1.0 1.0 1.0 1.0 2.0 2.0 1.0 1.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1
0.1 0.1 0.1 0.1 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.3 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
46
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.2 0.5 0.8 1.0 1.0 1.0 1.0 1.0 0.8 0.5 0.5 0.5 0.0 0.0 2.0 2.0 2.0
3.0 3.0 3.0 3.0 3.0 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
47
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.2 0.4 0.5 0.8 0.8 0.5 0.5 0.5 0.5 0.5 0.0 0.0 0.0 0.0 0.0 0.5
4.0 4.0 4.0 4.0 4.0 3.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
48
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.2 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
4.0 4.0 4.0 4.0 4.0 3.0 3.0 2.0 2.0 2.0 2.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
49
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 5.0 5.0 5.0 5.0 4.0 3.0 2.0 2.0 2.0 2.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
50
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 5.0 5.0 4.0 3.0 3.0 3.0 2.0 2.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 1.0 2.0 3.0 3.0 3.0 3.0 3.0 3.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
52
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

```
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 3.0 3.0 3.0 2.0 2.0 2.0 3.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0                                 54
        11          1.(20F4.0)                                -7          BOTTOM SURFACE
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0  270  270
   0    0    0    0    0              2
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0  280  270  270  280
   0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0  300  280  270  270  280    0
   0    0    0    0    0              4
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0  270  270  270  270  300    0
   0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0  300  270  270  270  270  300    0    0
   0    0    0    0    0              6
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0  300  300  270  270  270  270  300    0    0    0    0
   0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0  300  300  270  270  270  280  300    0    0    0    0    0
   0    0    0    0    0              8
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
   0    0    0    0    0    0    0  300  300  280  270  270  280  300    0    0    0    0    0    0
   0    0    0    0    0
```

```
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0 300 300 280 270 270 270 300   0   0   0   0   0   0   0
  0   0   0   0   0             10
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0 300 300 280 280 270 270 300   0   0   0   0   0   0   0   0
  0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0 320 300 280 270 270 270 270 300   0   0   0   0   0   0   0
  0 300 300 300 300             12
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0 300 280 280 270 270 280 300   0   0   0   0   0   0   0 300
300 280 280 250 280
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0 280 280 280 280 280 280 280 300 300 300 300 300 300 300 300
280 250 250 280 300             14
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0 300 300 280 280 280 280 280 280 280 280 300 300 300 300 280 280 280
280 250 280 300   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0 300 280 280 280 280 280 280 280 280 280 280 280 280 280 280 280 280 280
250 300   0   0   0             16
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0 300 300
300 280 280 280 280 280 280 280 280 280 280 280 280 280 280 280 280 280 280 250
280 300   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0 280 280 280
280 280 280 300 300   0   0   0 280 280 280 280 280 280 280 280 280 250 250 280
300   0   0   0   0             18
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0 300 280 280 280
280 280 300   0   0   0   0 300 280 280 280 280 280 280 280 250 250 250 280 300
  0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0 300 280 280 280 280
280 300   0   0   0 280 280 280 280 280 280 280 250 250 250 280 280 280 300 300
  0   0   0   0   0             20
```

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 300 280 280 280 280
280 300 300 280 280 280 280 280 280 280 280 250 280 280 280 280 300 300 0 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 300 300 280 280 280 280
280 280 280 280 280 280 280 280 280 280 250 280 280 290 300 320 0 0 0 0
0 0 0 0 0 22
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 330 300 280 280 280 280
280 280 280 280 280 280 280 280 280 250 280 280 300 0 0 0 0 0 0 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 330 290 280 280 280 280
280 280 280 280 280 280 280 280 280 280 290 300 0 0 0 0 0 0 0 0
0 0 0 0 0 24
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 330 280 280 280 280 280
280 280 280 280 250 250 250 280 280 300 310 0 0 0 0 0 0 0 0 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 280 280 300 300 300
280 280 280 280 280 280 280 300 305 310 320 0 0 0 0 0 0 0 0 0
0 0 0 0 0 26
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 300 280 300 0 0 300
280 280 250 280 280 300 305 310 320 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 300 280 280 280 0 0 280
280 250 280 300 310 320 330 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 28
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 300 290 280 280 280 280 280
250 280 280 280 310 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 300 290 280 280 280 280 280 290
290 290 310 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 30
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 360 360 360 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 300 290 280 280 280 280 280 290 290
300 310 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0

```
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0 350 350 350 350 350 350   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0 300 290 280 280 280 280 280 290 300
320   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0                       32
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0 360 355 340 340 340 330 340 340 340 330 330
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0 300 290 280 280 280 280 280 290 300 310
340   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0 360 350 340 340 340 330 330 320 320 320 320 330 340
340   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0 320 290 280 280 280 280 280 280 280 280 310
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0                       34
  0   0   0   0   0   0   0   0   0   0   0   0   0 340 340 340 340 340 340
340 340 340 340 340 340 340 330 320 320 310 300 300 300 300 300 310 310 320 330
330 340   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0   0 300 290 280 280 280 280 280 290 300 330   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0
  0   0   0   0   0   0   0   0   0 350 350 340 340 340 330 330 330 330 320 320
320 320 320 320 320 310 310 300 300 300 290 280 280 280 280 290 290 300 300 300
310 320 330   0   0   0   0   0   0 320 330 330 330   0   0   0   0   0   0   0
  0   0   0   0   0   0   0   0 320 290 280 280 280 280 280 280 290 310 330   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0                       36
  0   0   0   0   0   0   0 340 340 330 330 330 320 320 310 310 310 300 300 300
300 300 300 300 300 290 280 280 280 280 280 280 270 270 280 280 280 280 290 300
300 300 300 300 310 320 320 320 320 320 320 320 320 320   0   0   0   0   0   0
  0 330 330   0   0   0   0 320 300 290 280 280 280 280 280 290 300 320   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0
340 335 330 340 330 330 320 310 310 310 300 300 300 290 290 290 280 280 280 280
280 280 280 280 280 280 280 280 290 300 300 300 320 320 330 330 310 300 300 290
280 290 300 300 300 300 310 310 300 300 300 300 300 310 330   0   0   0   0   0
330 330 330 330   0 330 320 300 290 280 280 280 280 280 280 290 300 330   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0                       38
340 340 340 330 320 310 300 290 260 270 280 280 280 280 280 280 280 280 280 280
280 280 280 280 290 300 300 310 330 340 340 340 350 350 360 360 350 340 290 270
300 290 280 280 280 280 280 280 280 280 280 280 280 290 300 300   0   0   0 310
310 310 310 310 310 300 300 290 280 280 280 280 280 280 290 300 330   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0
340 340 340 340 330 330 310 300 290 280 280 280 280 280 280 280 280 280 280 280
290 300 300 310 320 330 340   0   0 360 360 365 370 370 370 370 365 360 355 350
340 300 290 270 260 260 270 270 270 270 270 270 270 270 280 290 300 300 300 300
300 300 300 300 290 290 280 280 280 280 280 280 280 280 290 300 320   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0                       40
340 340 340 340 340 330 330 320 310 300 290 290 280 280 280 280 280 280 280 290
300 310 320 330 340 350 355   0   0   0   0   0   0   0   0   0   0   0   0   0
  0 340 300 300 280 250 240 250 250 260 260 260 260 260 260 250 250 250 250 250
260 270 280 280 280 280 280 280 280 280 280 280 280 280 300 310 330   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0
350 350 340 340 340 340 340 330 330 330 320 310 300 300 290 290 290 290 300 310
320 330 340 350 355 360   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0 335 320 290 270 260 250 250 240 240 230 240 240 240 240 240 240 240 240 240
240 250 260 270 280 280 280 280 280 280 280 280 290 300 310 315 330   0   0   0
  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
  0   0   0   0   0                       42
```

350 350 360 350 350 350 350 350 350 340 340 330 330 330 320 320 320 320 330 340
350 350 370 370 370 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 335 325 300 290 280 270 260 250 250 250 240 240 230 220 230 230 230 230 230
240 250 260 280 280 280 280 280 280 280 280 280 290 300 310 315 340 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 43
375 373 370 370 370 365 365 360 360 360 358 355 355 355 350 350 350 350 355 360
365 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 345 325 310 300 280 270 270 260 260 260 260 260 260 250 250 250 240 240 240
240 250 260 280 280 280 280 280 280 280 280 290 300 310 310 310 335 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 44
0 0 0 0 0 375 373 372 372 371 370 370 370 370 370 370 370 370 368 366 365
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 335 320 290 290 280 280 280 270 270 270 280 280 280 280 280 270 250 250
250 260 270 280 280 280 280 280 280 290 300 300 320 325 325 335 335 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 45
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 325 300 290 290 290 290 290 290 290 300 300 300 300 300 300 300 300
300 280 280 280 280 280 280 280 300 300 310 320 325 325 335 335 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 46
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 335 315 300 300 300 300 300 300 310 320 340 350 0 0 350 350 340
320 310 300 300 300 300 300 300 310 310 320 320 340 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 47
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 335 335 325 325 325 335 350 350 350 360 0 0 0 0 0 340
340 330 320 310 310 310 310 310 320 320 320 340 340 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 48
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 345 345 345 345 0 0 0 0 0 0 0 0 0 0 0
360 350 340 330 320 320 320 320 320 330 330 340 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 49
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 350 350 350 330 330 330 330 330 330 340 350 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 50
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 350 350 340 340 330 330 340 350 360 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 360 350 350 340 340 340 340 350 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 52
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 360 360 350 350 350 350 350 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	360	360	360	360	360	360	360	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0					54										

APPENDIX C

RECHARGE - Recharge package data set

```
1        00                RECHARGE
1
0    4.1E-8                                    16.4 IN/YR
```

APPENDIX D

RIVER - River Package data set

185 00 RIVER
185

1	2	100	280.0	0.91840	277.0
1	3	99	281.0	0.91840	278.0
1	3	100	281.0	0.91840	278.0
1	4	97	283.0	0.91840	280.0
1	4	98	282.0	0.91840	279.0
1	5	96	284.0	0.91840	281.0
1	6	95	285.0	0.91840	282.0
1	6	96	285.0	0.91840	282.0
1	7	93	287.0	0.91840	284.0
1	7	94	286.0	0.91840	283.0
1	8	91	289.0	0.91840	286.0
1	8	92	288.0	0.91840	285.0
1	9	91	289.0	0.91840	286.0
1	10	91	290.0	0.91840	287.0
1	10	92	290.0	0.91840	287.0
1	11	91	291.0	0.91840	288.0
1	12	90	292.0	0.91840	289.0
1	12	91	291.0	0.91840	288.0
1	13	89	293.0	0.91840	290.0
1	14	88	297.0	0.05920	294.0
1	14	89	294.0	0.91840	291.0
1	15	87	300.0	0.05920	297.0
1	15	89	295.0	0.91840	292.0
1	16	86	315.0	0.05920	312.0
1	16	90	300.0	0.91840	297.0
1	17	84	315.0	0.05920	312.0
1	17	85	310.0	0.05920	307.0
1	17	90	300.0	0.91840	297.0
1	18	82	320.0	0.05920	317.0
1	18	83	316.0	0.05920	313.0
1	18	91	301.0	0.91840	298.0
1	19	80	326.0	0.05920	323.0
1	19	81	323.0	0.05920	320.0
1	19	91	301.0	0.91840	298.0
1	20	78	333.0	0.05920	330.0
1	20	79	330.0	0.05920	327.0
1	20	90	302.0	0.91840	299.0
1	21	77	336.0	0.05920	333.0
1	21	90	302.0	0.91840	299.0
1	22	76	340.0	0.05920	337.0
1	22	89	302.0	0.91840	299.0
1	22	90	302.0	0.91840	299.0
1	23	76	345.0	0.05920	342.0
1	23	88	302.0	0.91840	299.0
1	24	75	350.0	0.05920	347.0
1	24	88	302.0	0.91840	299.0
1	25	86	302.0	0.45920	299.0
1	25	87	302.0	0.45920	299.0
1	25	88	302.0	0.45920	299.0
1	26	85	303.0	0.45920	300.0
1	27	84	303.0	0.45920	300.0
1	28	83	303.0	0.45920	300.0
1	29	83	303.0	0.91840	300.0
1	30	80	303.0	0.47040	300.0
1	30	82	303.0	0.47040	300.0
1	31	79	303.0	0.47040	300.0
1	31	81	303.0	0.47040	300.0
1	32	78	304.0	0.47040	301.0
1	32	79	303.0	0.47040	300.0
1	33	78	304.0	0.47040	301.0
1	34	33	341.0	0.26120	338.0
1	34	34	341.0	0.26120	338.0
1	34	35	341.0	0.26120	338.0
1	34	76	304.0	0.47040	301.0

1	34	77	304.0	0.47040	301.0
1	35	30	342.0	0.26120	339.0
1	35	31	342.0	0.26120	339.0
1	35	32	341.0	0.26120	338.0
1	35	36	330.0	0.26120	327.0
1	35	37	327.0	0.26120	324.0
1	35	38	325.0	0.26120	322.0
1	35	39	333.0	0.26120	330.0
1	35	75	304.0	0.47040	301.0
1	36	30	342.0	0.26120	339.0
1	36	40	320.0	0.26120	317.0
1	36	41	320.0	0.26120	317.0
1	36	75	304.0	0.47040	301.0
1	36	76	304.0	0.01120	301.0
1	37	26	343.0	0.26120	340.0
1	37	27	343.0	0.26120	340.0
1	37	28	343.0	0.26120	340.0
1	37	29	343.0	0.26120	340.0
1	37	30	342.0	0.26120	339.0
1	37	42	315.0	0.26120	312.0
1	37	44	311.0	0.26120	308.0
1	37	74	304.0	0.47040	301.0
1	37	75	304.0	0.47040	301.0
1	37	76	306.0	0.01120	303.0
1	38	22	345.0	0.26120	342.0
1	38	23	344.0	0.26120	341.0
1	38	24	344.0	0.26120	341.0
1	38	25	344.0	0.26120	341.0
1	38	26	343.0	0.26120	340.0
1	38	43	313.0	0.26120	310.0
1	38	45	310.0	0.26120	307.0
1	38	73	304.0	0.92560	301.0
1	38	74	304.0	0.92560	301.0
1	38	76	309.0	0.01120	306.0
1	39	2	350.0	0.26120	347.0
1	39	3	350.0	0.26120	347.0
1	39	4	349.0	0.26120	346.0
1	39	5	349.0	0.26120	346.0
1	39	6	349.0	0.26120	346.0
1	39	7	349.0	0.26120	346.0
1	39	8	348.0	0.26120	345.0
1	39	9	348.0	0.26120	345.0
1	39	10	348.0	0.26120	345.0
1	39	11	347.0	0.26120	344.0
1	39	12	347.0	0.26120	344.0
1	39	19	345.0	0.26120	342.0
1	39	20	345.0	0.26120	342.0
1	39	21	345.0	0.26120	342.0
1	39	46	310.0	0.26120	307.0
1	39	48	309.0	0.26120	306.0
1	39	73	304.0	0.92560	301.0
1	39	76	310.0	0.01120	307.0
1	40	2	350.0	0.26120	347.0
1	40	13	347.0	0.26120	344.0
1	40	14	347.0	0.26120	344.0
1	40	15	347.0	0.26120	344.0
1	40	16	346.0	0.26120	343.0
1	40	17	346.0	0.26120	343.0
1	40	18	346.0	0.26120	343.0
1	40	46	310.0	0.26120	307.0
1	40	48	309.0	0.26120	306.0
1	40	49	309.0	0.26120	306.0
1	40	60	307.0	0.26120	304.0
1	40	61	307.0	0.26120	304.0
1	40	64	306.0	0.47040	303.0
1	40	65	306.0	0.47040	303.0

1	40	72	305.0	0.92560	302.0
1	40	73	305.0	0.92560	302.0
1	40	76	312.0	0.01120	309.0
1	41	1	375.0	0.26120	372.0
1	41	47	309.0	0.26120	306.0
1	41	49	309.0	0.26120	306.0
1	41	50	309.0	0.26120	306.0
1	41	59	307.0	0.26120	304.0
1	41	62	307.0	0.26120	304.0
1	41	64	306.0	0.47040	303.0
1	41	65	306.0	0.47040	303.0
1	41	67	305.0	0.47040	302.0
1	41	72	305.0	0.92560	302.0
1	41	76	314.0	0.01120	311.0
1	42	48	309.0	0.26120	306.0
1	42	49	309.0	0.26120	306.0
1	42	51	309.0	0.26120	306.0
1	42	59	308.0	0.26120	305.0
1	42	63	306.0	0.47040	303.0
1	42	66	305.0	0.47040	302.0
1	42	67	305.0	0.47040	302.0
1	42	70	305.0	0.47040	302.0
1	42	71	305.0	0.92560	302.0
1	42	76	316.0	0.01120	313.0
1	43	52	309.0	0.26120	306.0
1	43	59	308.0	0.26120	305.0
1	43	68	305.0	0.47040	302.0
1	43	69	305.0	0.47040	302.0
1	43	76	318.0	0.01120	315.0
1	44	52	308.0	0.26120	305.0
1	44	57	308.0	0.26120	305.0
1	44	58	308.0	0.26120	305.0
1	44	59	308.0	0.26120	305.0
1	44	76	320.0	0.01120	317.0
1	45	52	308.0	0.26120	305.0
1	45	53	308.0	0.26120	305.0
1	45	54	308.0	0.26120	305.0
1	45	56	308.0	0.26120	305.0
1	45	75	331.0	0.02240	328.0
1	46	54	308.0	0.26120	305.0
1	46	55	308.0	0.26120	305.0
1	46	74	342.0	0.02240	339.0
1	46	75	341.0	0.02240	338.0
1	47	73	345.0	0.02240	342.0
1	48	73	347.0	0.02240	344.0
1	49	72	350.0	0.02240	347.0
1	50	72	353.0	0.02240	350.0
1	51	71	356.0	0.02240	353.0
1	52	67	373.0	0.02240	370.0
1	52	68	370.0	0.02240	367.0
1	52	71	355.0	0.02240	352.0
1	53	66	376.0	0.02240	373.0
1	53	69	365.0	0.02240	362.0
1	53	70	363.0	0.02240	360.0
1	54	65	380.0	0.02240	377.0

APPENDIX E

SIP - Strongly Implicit Procedure Package Data Set

```
 100          5              SIP
0.70       .010          1          0          1
```

APPENDIX F

OUTPUT CONTROL - Output Control Data Set

-7	0	00	00	OUTPUT CONTROL
0	1	1	1	
1	0	1	0	

APPENDIX G

WELL - Well Package Data Set

238	00	WELL		
238				
1	40	11	-1.5	S.PARIS PROD. WELL
1	24	89	-0.25	OXFORD PROD. WELL
1	43	62	-0.50	NORWAY PROD. WELL
1	2	99	.04	
1	3	97	.04	
1	3	98	.04	
1	4	95	.04	
1	4	96	.04	
1	5	95	.04	
1	6	93	.04	
1	6	94	.04	
1	7	90	.04	
1	7	91	.04	
1	7	92	.04	
1	8	89	.04	
1	9	88	.04	
1	10	87	.04	
1	11	86	.04	
1	12	86	.127	
1	13	86	.127	
1	14	86	.127	
1	15	84	.127	
1	15	85	.127	
1	16	83	.127	
1	17	79	.127	
1	17	80	.127	
1	17	81	.127	
1	17	82	.127	
1	18	78	.127	
1	19	77	.127	
1	20	76	.127	
1	21	76	.127	
1	22	75	.127	
1	23	75	.127	
1	24	75	.127	
1	25	75	.063	
1	26	76	.063	
1	27	75	.02	
1	29	74	.02	
1	30	73	.063	
1	31	72	.063	
1	33	71	.127	
1	34	70	.127	
1	36	69	.127	
1	37	68	.127	
1	38	66	.127	
1	38	67	.127	
1	39	65	.127	
1	38	64	.127	
1	37	63	.127	
1	37	62	.063	
1	38	61	.063	

1	39	60	.063
1	40	57	.063
1	40	58	.063
1	40	59	.063
1	39	56	.063
1	38	55	.063
1	37	54	.063
1	36	50	.063
1	36	51	.063
1	36	52	.063
1	37	44	.063
1	37	45	.063
1	37	46	.063
1	37	47	.063
1	37	48	.063
1	37	49	.063
1	36	43	.063
1	35	42	.063
1	34	41	.063
1	33	39	.063
1	33	40	.063
1	32	38	.063
1	31	36	.063
1	31	37	.063
1	36	53	.063
1	31	35	.019
1	32	33	.019
1	32	34	.019
1	33	30	.019
1	33	31	.019
1	33	32	.019
1	34	28	.019
1	34	29	.019
1	35	15	.019
1	35	16	.019
1	35	17	.019
1	35	18	.019
1	35	19	.019
1	35	20	.019
1	35	21	.019
1	35	22	.019
1	35	23	.019
1	35	24	.019
1	35	25	.019
1	35	26	.019
1	35	27	.019
1	36	10	.019
1	36	11	.019
1	36	12	.019
1	36	13	.019
1	36	14	.019
1	37	8	.019
1	37	9	.019
1	38	2	.019

1	38	3	.019
1	38	4	.019
1	38	5	.019
1	38	6	.019
1	38	7	.019
1	45	9	.037
1	45	6	.037
1	45	7	.037
1	45	8	.037
1	45	10	.037
1	45	11	.037
1	45	12	.037
1	45	13	.037
1	45	14	.037
1	44	2	.037
1	44	3	.037
1	44	4	.037
1	44	5	.037
1	45	15	.037
1	45	16	.037
1	45	17	.037
1	45	18	.037
1	45	19	.037
1	45	20	.037
1	44	21	.037
1	43	22	.037
1	43	23	.037
1	43	24	.037
1	43	25	.037
1	42	26	.037
1	41	27	.037
1	40	27	.037
1	39	28	.037
1	39	29	.037
1	40	30	.037
1	40	31	.037
1	40	32	.037
1	40	33	.037
1	40	34	.037
1	40	35	.037
1	40	36	.037
1	40	37	.037
1	40	38	.037
1	40	39	.037
1	40	40	.037
1	40	41	.037
1	41	42	.037
1	42	42	.037
1	43	42	.037
1	44	42	.037
1	45	43	.037
1	50	62	.02
1	50	63	.02
1	54	66	.06

1	54	67	.06
1	54	68	.06
1	54	69	.06
1	54	70	.06
1	54	71	.06
1	51	72	.06
1	48	73	.06
1	46	74	.06
1	47	55	.03
1	48	50	.03
1	48	51	.03
1	48	52	.03
1	48	53	.03
1	48	54	.03
1	46	56	.03
1	46	57	.03
1	47	58	.03
1	47	59	.03
1	48	60	.03
1	49	61	.03
1	38	78	.04
1	29	85	.04
1	36	79	.04
1	34	80	.04
1	33	81	.04
1	31	82	.04
1	30	83	.04
1	29	84	.04
1	42	77	.04
1	39	77	.04
1	28	86	.04
1	28	87	.04
1	27	88	.04
1	27	89	.04
1	26	90	.04
1	26	91	.04
1	25	91	.03
1	24	92	.03
1	23	93	.03
1	22	94	.03
1	22	95	.03
1	21	97	.03
1	22	96	.03
1	21	98	.03
1	20	99	.03
1	20	100	.03
1	19	100	.03
1	18	101	.03
1	17	102	.03
1	16	102	.03
1	15	103	.03
1	15	104	.03
1	14	105	.03
1	3	100	.051

1	4	99	.051
1	5	99	.051
1	6	98	.051
1	6	97	.051
1	7	96	.051
1	8	95	.051
1	9	94	.051
1	10	93	.051
1	11	92	.051
1	12	92	.031
1	13	92	.031
1	14	93	.031
1	14	94	.051
1	14	95	.051
1	14	96	.051
1	14	97	.051
1	14	98	.051
1	14	99	.051
1	13	100	.051
1	13	101	.051
1	12	103	.051
1	12	102	.051
1	12	104	.051
1	12	105	.051