



Bulletin 78

**Teaching Water Resource Management
With the Aid of a
Computer-Implemented Simulator**

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PREFACE

The general approach to addressing water resource management problems has changed in scope and complexity. Formerly, a single governmental agency was relatively autonomous in its decisions; now other governmental agencies and private groups have a voice. The impact of water resource decisions is appreciated as never before by the general public. It is this kind of complex decision-making world which awaits graduates of water resource management programs.

Water resource management education poses an important, yet difficult, challenge to the university community and resource managers. Few would argue the fact that students must develop a basic understanding of water resource systems, but are we achieving this? Certainly with all the changes in public attitudes on environment and ecology, the time is ripe for a critical evaluation of educational objectives, methods, and attitudes.

Water resource management problems are usually complex and interdisciplinary, with the public integrally involved in the decision-making process. These kinds of problems do not fit well into conventional lecture format. Problem solving and decision making under uncertainty are too important to be omitted from our educational programs. One possible solution available to university professors is the computer simulator used as an integrative teaching tool.

Robert T. Lackey

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ABSTRACT

Computer-implemented learning exercises involving large system management should become an important natural resource educational tool. DAM illustrates the principles of managing a large multiple-use reservoir system. Stages in the development of DAM were: (1) model conceptualization; (2) model quantification and implementation; and (3) model refinement. The finished product is based on the use of economic and quantity numerical accumulators and a random number generating function. Management realism and role switching enhance DAM's value as a tool for acquainting students with management based on total system understanding.

INTRODUCTION

Actual management experience is a valuable commodity to practicing water resource managers. A manager's decision-making adeptness usually increases with the amount of field management experience that he possesses. Resource agencies employing managers seek those with experience, those who have made many decisions, and those who have had time to receive useful feedback or to observe responses to these decisions. Methods of providing the equivalent of management experience are vital to the training of water resource management personnel. Due to time and financial constraints placed on management training programs, as well as general public unwillingness to utilize natural resource systems as experimental case studies, efforts to provide long-term field management experience to natural resource management trainees are rare (Titlow and Lackey 1974, Lackey 1973).

Using computer-implemented learning exercises in water resource education can provide management experience to students in the classroom. Use of learning exercises does not totally substitute for actual field management experience, but does allow students to evaluate the response of a natural resource system to their management decisions. This contrasts with other teaching methods, such as case studies, during which students can only evaluate management strategies applied by other people.

Learning exercises are computer-implemented models of realistic management situations. When using a learning exercise, students make management decisions for a particular system, analyze the impact of their decisions on the system, and revise their management strategies accordingly. Computer-implementation minimizes time lag between making decisions and evaluating results, thus allowing management efforts to continue until an optimal strategy has been attained.

There are two methods of using computer-implemented learning exercises. Direct card deck manipulation requires some familiarity with computer facilities since each user must keypunch his management decisions on data cards and submit these cards to the computer center. There is typically a delay of at least several hours before the management output is ready. With the remote terminal, each student simply types the numbers representing his management decisions directly into the main computer system via a direct hookup.

Among the documented attributes of learning exercises are: (1) students become actively engaged in the learning process instead of passively listening

to a lecture; (2) students are aware of good or bad decisions as quickly as the computer can process their management plans; (3) there is a great deal of competition between student groups or individual students during exercise use; (4) students working in groups learn to cooperate with each other, which is a necessity for a career in water resource management; and (5) simulation of natural resource management gives students insight into the inter-relationships among system components (Downey 1971).

Among the negative features associated with learning exercises are: (1) high cost required for proper utilization; (2) extensive development time; (3) the danger of teaching incorrect relationships and concepts; (4) the problem of interpersonal rivalries due to intensive involvement; (5) the relatively high level of abstractness; (6) the tendency to emphasize quantitative factors over qualitative factors; and (7) the danger of transferring exercise results to specific real-life situations (Bare 1971).

There are two general classes of computer-implemented learning exercises—large, interactive system exercises, and specific subsystem exercises emphasizing the management of a particular system component while involving relatively few system interactions. Large system exercises stress inter-relationships between components, as in management of estuaries, reservoirs, or river drainages while specific subsystem exercises usually illustrate particular management principles, such as the stock-recruitment relationship in salmon fisheries management. Large system exercises are being received with increasing interest. The idea of allowing students to actively manage resource systems in which economic and political factors are considered, as well as biological factors, is especially appealing (Paulik 1969). A general weakness in natural resource management is the reluctance of decision-making agencies to adopt a total system viewpoint (Newell and Newton 1968).

There have been extensive applications of simulators and computer-implemented learning exercises in manufacturing, marketing, corporate structure, transportation, communications, medicine, facility planning, artificial intelligence, and in a large variety of military and space fields (Paulik 1969). However, learning exercises have been used sparingly in water resource education. There is a dearth of published material concerning previously developed learning exercises in water resources, in part because simulation models are difficult to express in the usual publication format (Garfinkel 1968).

Examples of current learning exercises are TROUT, SCRAP, and FARMS. TROUT and SCRAP are specific subsystem exercises. TROUT was developed

to illustrate the principles of managing a rainbow trout fishery (Titlow and Lackey 1973). Robert H. Giles, Jr. and Charles H. Lobdell formulated SCRAP at Virginia Polytechnic Institute and State University. Students manage for optimal yearly harvest of a deer population when using SCRAP. FARMS is a large-system exercise which was developed to evaluate land use and big game populations in British Columbia. The model incorporates plant production and succession, wildlife habitat and food selection, and dynamics of wildlife herds (Walters and Bunnell 1971).

Complex management situations are created by the impounding of large multiple-use (e.g., hydroelectric power, recreation, and flood control) reservoirs. Due primarily to rapidly increasing demands for electrical energy and flood control, the number of large reservoirs in the United States increases significantly each year. Large reservoir systems are exceedingly difficult to manage because of: (1) speed of development around the reservoir; (2) nature of developmental controls; (3) strength and influence of local governments; (4) amount and allocation of financial assistance; (5) extent of public sewage treatment and water supply facilities; (6) type of secondary road systems; (7) quality of recreational facilities; (8) effects of river pollution; and (9) range of local public services (e.g., police and fire protection, refuse collection) (Burby, Donnelly, and Weiss 1972, Wirth and Associates 1971).

In order to effectively manage a newly impounded reservoir system, participating management personnel must appreciate the total system. The complexity of interactions between a variety of system demands (i.e., physical, chemical, biological, economic, political, and sociological demands) makes cooperation and compromise an integral part of successful reservoir system management. A spirit of cooperation and compromise can best be derived by providing multi-discipline orientation during management training programs. Allowing management trainees to experimentally apply their knowledge of reservoir management principles in the field is not practical. The potential values (e.g., economic, recreational, industrial) of newly-impounded reservoir systems are too great to entrust to inexperienced decision-makers. There exists a need for a method of allowing prospective reservoir management personnel to test their management strategies within the confines of a classroom.

METHODS

Study Area

Much of DAM, the computer-implemented simulator to be illustrated here, is based on information about Smith Mountain Lake, a hydroelectric and flood control project located on the Roanoke River in south-central Virginia. The reservoir is located approximately 80 km from Roanoke, Virginia, and is bounded by four counties—Franklin, Campbell, Pittsylvania, and Bedford. The dam was completed in 1965 by the Appalachian Power Company as a pump-storage facility for the annual production of approximately 400,000 kilowatts of electrical power.

Model Conceptualization

The general objective of model conceptualization was to determine the basic relationships involved in reservoir management. This objective was accomplished by accumulating information about the Smith Mountain Lake area. Personnel from numerous federal, state, and local agencies were interviewed by telephone and in person. Information from available literature on general reservoir management problems and possible solutions was also used extensively.

The initial phase of model conceptualization involved the delineation of management units and major decision areas. Five management units were selected: (1) a regional planning commissioner; (2) a fisheries manager; (3) a power company executive; (4) a recreation specialist; and (5) a city mayor. Each major decision area was assigned to a management unit (Table 1).

Also, a range of management alternatives was deduced for each major decision area. For example, an antiquated secondary road system is a major problem in the Smith Mountain Lake area. Correspondingly, road construction was designated as a major decision area for DAM. A user of DAM can select the number of miles of secondary roads he wants to construct, improve, and maintain.

DAM may be used either by a single student sequentially assuming each management role or by a group of students selectively occupying the five management positions. The choice of several management units for DAM allows for role switching during group use of the learning exercise. Members of a management group may either assume different roles (e.g., the regional planning commissioner becomes the power company executive) with suc-

TABLE 1
Decision Areas
(Choices in each area are made each year)

Regional Planning Commissioner

Decision Area	Decision Range Y=Yes, N=No	Unit Cost (dollars/year)
Development Controls		
None	Y-N	-
Option to counties	Y-N	-
Subdivision regulations	Y-N	-
Land-use plan	Y-N	150,000
Financing Land-Use Plan		
Request county funds	Y-N	-
Apply for federal funds	Y-N	-
Sell bonds	Y-N	-
Sewage Treatment		
Inspect septic systems	Y-N	-
Extend sewage systems	Y-N	800,000
Construct treatment plant	Y-N	3,000,000
Water Supply		
Inspect private wells	Y-N	-
Extend water supplies	Y-N	400,000
Construct water supply facility	Y-N	2,000,000
Financing Utility Improvements		
Increase utility rates	Y-N	-
Apply for federal funds	Y-N	-
Road Construction and Maintenance		
Miles of construction	0-100	45,000
Miles of improvement	0-1,000	15,000
Miles maintained	0-1,000	1,000
Number of bridges constructed	0-100	100,000
Public Services		
Hire deputy sheriffs	0-100	8,000
Construct fire stations	0-100	20,000

Construct landfills	0-100	20,000
Construct schools	0-100	50,000
Hire agricultural agents	0-100	9,000

Fisheries Manager

Decision Areas	Decision Range	Unit Cost (dollars/year)
Research		
Study effects of water level fluctuation	Y-N	10,000
Monitor water quality	Y-N	5,000
Stocking feasibility study	Y-N	10,000
Study population dynamics of largemouth bass	Y-N	10,000
Comprehensive creel census	Y-N	10,000
Study gamefish/roughfish ratio	Y-N	5,000
Study nutrient limiting factors	Y-N	10,000
Study effects of water discharge on plankton	Y-N	10,000
Study fishery effects of artificial reefs	Y-N	10,000
Stocking		
Largemouth bass (3 to 4 in.)	0-1,000,000	1.50
Rainbow trout (6 to 8 in.)	0-1,000,000	2.00
Coho salmon (3 to 4 in.)	0-1,000,000	1.65
Striped bass (2 to 3 in.)	0-1,000,000	5.00
Muskellunge (5 to 6 in.)	0-1,000,000	4.25
Bluegill sunfish (1 to 2 in.)	0-1,000,000	0.12
Threadfin shad (1 to 2 in.)	0-1,000,000	0.15
White bass (2 to 3 in.)	0-1,000,000	3.00
Other Management Techniques		
Fertilization (number of acres)	0-20,000	100
Chemical eradication of fish (number of acres)	0-20,000	80
Introduce artificial reefs	0-1,000	1,000

<u>Public Services</u>		
Recreational land grant (number of acres)	0–100,000	2,000
Install navigational lighting	Y–N	10,000
Hire fish- and game-wardens	0–100	10,000
Conduct boating safety classes	Y–N	–
Pass licensing ordinance for boaters	Y–N	–
Implement water surface zoning regulations	Y–N	–

Recreation Specialist

Decision Area	Decision Range	Unit Cost (dollars/year)
<u>Constructing Recreational Facilities</u>		
Swimming beaches (7 acres each)	0–100	60,000
Rental cottages	0–100	15,000
Public access sites (4 acres each)	0–100	20,000
Parks (100 acres each)	0–100	300,000
Marinas	0–100	70,000
Floating fishing docks	0–100	20,000
<u>Public Services</u>		
Construct scenic road (number of miles)	0–100	35,000
Purchase wildlife management land (number of acres)	0–100,000	2,000
Promotional campaign (number of months)	0–12	10,000
Design and publish up-to-date maps	Y–N	20,000

Power Company Executive

Decision Area	Decision Range	Unit Cost (dollars/year)
<u>Operational Constraints</u>		
Minimum flow (number of cubic feet per second)	0–1,000,000	60

Flood control (number of vertical storage feet)	0–70	24,000
Fluctuation control during spawning periods	Y–N	90,000
Land Management		
Sell (number of acres)	0–100,000	–
Buy (number of acres)	0–100,000	2,000
Lease (number of acres)	0–100,000	–
Public Services		
Construct a visitor center	Y–N	200,000
Hire public relations men	0–100	15,000
Equipment Maintenance		
At damsite (number of dollars)	0–100,000,000	0–1,000,000,000

City Mayor

Decision Area	Decision Range	Unit Cost (dollars/year)
Immediate Plans for Sewage Treatment Improvement		
No plans	Y–N	–
Construct holding pond	Y–N	1,500,000
Install manual chemical feed facilities	Y–N	250,000
Install automatic chemical feed facilities	Y–N	1,000,000
Future Plans for Sewage Treatment Improvement		
No plans	Y–N	–
Expand present plant	Y–N	2,500,000
Construct new plant	Y–N	15,000,000
Financing Sewage Treatment Improvements		
Apply for federal funds	Y–N	–
Increase sewage service charges	Y–N	–
Request county funds	Y–N	–
Financial Aid		
To regional planning commission (number of dollars)	0–1,000,000	0–1,000,000

cessive management years or may retain the same roles throughout the management period.

Reservoir systems response to the applications of each management alternative was based on previously accumulated information and verified by contact with appropriate personnel in the Smith Mountain Lake area. For instance, interviews with the Virginia Commission of Game and Inland Fisheries and Appalachian Power Company established that a minimum flow regulation of 650 cubic feet per second (cfs) was necessary for protecting the fishery in the river below Smith Mountain Lake. In addition, the local Coast Guard Auxiliary stated that permanent navigation of the river below the dam required a guaranteed flow of 6000 cfs. The Commission recommended that a minimum flow regulation of 650 cfs be included in the project license application for Smith Mountain Lake, and Appalachian Power complied. The regulation required for navigation (6000 cfs) would be too costly to Appalachian Power Company in terms of loss of generating head. The student manager, assuming the role of power company executive, must decide on a minimum flow regulation when using DAM. Choosing a flow regulation of less than 650 cfs will result in lawsuits, while one of 6000 cfs or greater could cost the power company executive his job. System response to other management alternatives was determined in a similar manner.

Flow charts were used to clarify interactive system response to the simultaneous application of two or more management alternatives. For example, during the use of DAM, the city mayor may give financial assistance to the regional planning commissioner who may use the money to develop the reservoir area. With an \$8,000 donation, the regional planning commissioner could hire another deputy sheriff, resulting in a decrease in the number of burglaries and auto accidents in the reservoir area. Also, additional enforcing agents will facilitate establishing water surface zoning regulations and boat licensing ordinances by the fisheries manager.

Finally, the economic aspects of DAM were considered during model conceptualization. A cost or revenue was affixed to each management alternative. For example, consultation with a county secondary road engineer led to the cost of road construction being set at \$45,000 per mile, improvement at \$15,000 per mile, and maintenance at \$1,000 per mile. Analysis of the total budget of the Virginia Department of Outdoor Recreation led to an annual budget allocation fluctuating between zero and \$500,000 for the recreation specialist of DAM. Contact with several real estate agents in the Smith Mountain area established an average per acre land value of \$2,000.

Model Quantification and Implementation

The objective of model quantification was to summarize the reservoir system in preparation for computer implementation. Funding probabilities and expectations for the occurrence of stochastic events included in DAM were verified by personal contacts. For example, discussion with the Office of Economic Opportunity established a probability of 0.20 for obtaining federal funds to finance the design and implementation of a Land-Use Plan in the Smith Mountain Lake area. Contact with Appalachian Power Company and the U.S. Army Corps of Engineers established the probability of a serious flood in the Smith Mountain drainage basin of the Roanoke River.

Quantification of DAM is based on the use of two types of numerical accumulators, economic and quantity, and a random number generating function. The budget accumulator of the recreation specialist is an example of an economic accumulator. Suppose that the recreation specialist is advised that he has a budget allocation of \$250,000 for management during a year. He decides to construct two public swimming beaches (\$60,000 each), four public access sites (\$20,000 each), and two marinas (\$70,000 each). The budget accumulator would total \$340,000 at the end of the year and the recreation specialist would be fired for exceeding his budget allocation by \$90,000.

The quantity accumulator is used in determining management results based on total value. For example, the fisheries manager may stock striped bass each year and by so doing increase the value of the striped bass quantity accumulator. Suppose that the fisheries manager chooses to stock 40,000 striped bass during his first year of management, 20,000 during the second year, and 40,000 during the third year. Depending on other factors (e.g., whether or not the power company executive controls water level fluctuation during spawning periods), successive high stocking rates of striped bass will increase the value of the striped bass accumulator past a critical number. The fisheries manager will then be advised that the stocking has resulted in the establishment of a striped bass fishery in the reservoir. The number of striped bass which the fisheries manager can stock is, of course, controlled by budget limitations.

The random number generating function in DAM has several uses. Budget allocations for the various management units vary in accordance with the current value of the random number generating function. Several managers have the option to apply for financial assistance when using DAM. The value of the random number generating function is the criterion for determining

whether an application for funding is approved or declined. An example of this involves the option of the regional planning commissioner to implement a Land Use Plan with federal funds. He has two chances out of 10 each year of having his application accepted.

The occurrence of stochastic events during the use of DAM is also controlled by the random number generating function. These events include: (1) flooding of the river valley below the dam; (2) explosion of a generator at the dam; (3) fish kills; (4) serious boating accidents with resultant loss of life; (5) contamination of the underground water supply as a result of septic system seepage; and (6) plankton blooms. Depending on the flood control regulations established by the power company executive, the yearly probability of a serious flood during the use of DAM ranges from 0.01 to 0.20. A probability range governing the occurrence of each stochastic event is similarly programmed into DAM.

DAM was programmed in PL/1 for an interactive terminal (Appendix I). Each of the five management units of DAM is represented by a separate subroutine.

Calculations, with the exception of those involving the random number generating function, are confined to the subroutines. The subroutines are called in sequence, which enables the value of all variables to be established before processing the management results each year in the main program. Subroutines also list decisions made by the five unit managers each year. Output results for each year of management follow these decision lists.

The PL/1 version of DAM, as implemented on an IBM 370 under TSO (time-sharing) requires approximately 35 minutes of connection time, approximately 5 seconds of execution time, and produces from 220 to 250 lines of output.

A DO loop is used to maintain management carry-over from one year to the next. Each group of student managers sets the unit value of the DO loop in accordance with the number of years they want to manage DAM. The management duration of at least five years is suggested, at which time the "typical" reservoir system would be highly developed and management alternatives would be highly developed and management alternatives would be limited.

Model Refinement

Model refinement involving the detection of simulation flaws was accomplished by exercising the model over a wide range of management

alternatives. For example, interviews with citizens in the Smith Mountain Lake area indicated a definite need for more public access sites. The general opinion was that one public access is needed for every 64 km of reservoir shoreline. Since Smith Mountain Lake has a total shoreline of 640 km, a minimum of ten access sites would be required to satisfy the recreation-seeking public. However, too many access sites would be considered an invasion of privacy by reservoir property owners. Exercising the option of the recreation specialist in DAM to develop public access sites over a wide range of values verified that the response of DAM was in accord with the information. If the recreation specialist constructs too few access sites (<10), he is advised that tourists are complaining about the lack of public access sites in the reservoir area. If he constructs too many (>20), he receives a statement that private landowners in the area are upset over the increasing number of public access sites.

RESULTS

Introduction of DAM requires from 15 to 30 minutes (Appendix II). First, the instructor should briefly familiarize the class with learning exercises (e.g., what are they? what is their value?). Next, members of the class form management groups (1 to 5 members per group). Each group member is then given a hand-out which describes the reservoir system and a set of instructions specific to the management role (roles) he is to assume (Appendix III). Sufficient time should be taken to answer any questions class members may have concerning the instruction sheets. Each management group should arrange meeting times and places for analysis and implementation of management strategies. Each group should manage Franklin Lake for a minimum of nine years. General class discussion of final management summaries for DAM requires about 60 minutes.

Response of students to the use of DAM was evaluated during development of the exercise. Many students at first seemed skeptical about the value of learning exercises. Several students voiced displeasure at the volume of information provided for decision-making and at their inability to make "right" decisions. Difficulty in obtaining financial assistance was the source for many of these complaints. Most students exhibited enthusiasm for the use of DAM, especially during analysis of management output. A group usually demonstrated a progressive increase in understanding of the principles involved in the management of DAM. Management cooperation among group members became more apparent with each strategy revision.

DISCUSSION

DAM is an unusual learning exercise in water resource education because several viewpoints—biological, chemical, physical, political, economic, and sociological—must be considered simultaneously during management activities. Most water resource learning exercises concentrate on a specific component of a system. For instance, a student's primary concern when using TROUT is maximizing sustained yield of rainbow trout (Titlow and Lackey 1973). FARMS is also based on the premise that computer simulation models can be used as management games to bring together decision-makers on resources (Walters and Bunnell 1971). In their game, a simple intervention scheme allows users to control harvest rates of game and trees, stocking rates of cattle, range-burning practices, and grazing intensities. Aspects of learning exercises common to both FARMS and DAM include: (1) involvement with multiple-use management; (2) inclusion of a variety of management roles; (3) a wide range of management alternatives associated with each management role; (4) use of sub-models in the programming technique; (5) application to teaching general management principles; (6) simulation of real management situations in order to provide insight into the interrelationships among system components; (7) demonstration of the interdisciplinary conflicts attendant with and the degree of cooperation necessary for multiple-resource management; and (8) potential for utilization by students in a variety of fields (e.g., economics, regional planning, natural resources).

The specific purpose of DAM is to provide students with an understanding of the principles of managing a large multiple-use reservoir. An important part of the learning process involves the various pressures exerted much like those in real management situations. Each unit manager is given specific objectives which he must strive to attain or risk losing his job. A manager cannot make decisions which totally satisfy everyone. For example, if the city mayor decides to assume financial responsibility for sewage treatment plant expansion, the city populace becomes disgruntled because they feel that the residents of the surrounding county are responsible for overloading the present sewage treatment plant. If the mayor shuns this responsibility, the State Water Control Board will place a moratorium on all sewer connections in the city. The lack of clearcut answers is unsettling for students oriented toward obtaining a "correct" answer.

Allowing students to switch roles emphasizes inherent management conflicts and increases total system appreciation. In role switching, the fisheries manager may realize some of the fundamental problems facing the regional planning commissioner, while the regional planning commissioner learns to

appreciate the basic management objectives of the power company executive. An element of cooperation among managers is usually derived from such management interactions.

There is no "best" management scheme for DAM. In practice, each group of users continues managing DAM until they can agree on a final management plan which includes: (1) an outline of the final management strategy; (2) an analysis of the final management decisions of each manager; and (3) an explanation and defense of the recommended strategy. These management summaries are then compared and analyzed in a class discussion.

The most commonly suggested improvement of DAM involves the reversibility of certain management decisions. For example, many students feel that they should have the option to release as well as hire employees. It was also suggested that the need for public services be graduated according to the year of management. For example, the number of landfills needed to serve the reservoir area should increase each year in accordance with the increase in population density.

Changes in DAM should be carefully considered. Providing more information on which to base management decisions or incorporating artificial statements of management success into the programming structure could be detrimental. One must analyze the realistic management situation before modifying DAM. How much information does a fisheries manager in charge of a 20,000-acre reservoir have about the fish populations present? Is an executive of a power company likely to be congratulated for adhering to minimum flow recommendations? While there will probably be some favorable comment, it is virtually impossible to make management decisions to the complete satisfaction of everyone involved in a large scale management situation. Realistically, the complaints will outnumber the compliments regardless of the capabilities of the management personnel. The educational value of DAM will be diminished if realism is not maintained in the management experience.

Large-system learning exercises, such as DAM, have great potential in natural resource education. All management personnel must be cognizant of one another's objectives and problems to ensure cooperation in management activities. Use of large-system exercises may prove to be the best method of providing essential multi-discipline orientation in the training of prospective management personnel.

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APPENDIX I
Program Listing of DAM

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LEADING 'JCL'
DAM:PROCEDURE OPTIONS(MAIN);
DCL (SILT,FED,BONDS,BAN,SEWOK,UTLCS,ROBUD,ROTOT,BRITOT,CWRECK,BWRECK,
ROEXC,ROCAST,SHRTOT,PUBALO,PUBBUD,IRK,IMTOT,ISEED,LANGRA,LANREV,LANTOT,
LDFUND,LM,LNDTOT,MAICCS,MAIREQ,MANBUD,MANEXC,MANMON,MARTOT,MFCOS,MORAT,
MTN,MUSKIE,MUSTOT,NECESS,NOFUND,SELREV,SHRACU,X,LDTOT,PUBEXC,
CONCGS,BRICOS,SHRCOS,FSCOS,SCHCOS,AGCOS,REGRA,TROUT,SALMON,SB,SBTOT,BG,
BGTOT,SHAD,SHATOT,FERT,WB,WBTOT,FERTOT,CHETRE,GRAEXC,POLOK,POLL,XMIN,
XMAX,BYPASS,TROGOS,SALCOS,SBCOS,BGCOS,SHACOS,WBCOS,FERCOS,CHECOS,ARCOS,
GWCOS,RECALO,PECEXP,AOK,RECEXC,SCRTOT,PCOREV,PRMTOT,FCCOS,WLFCOS,TOMUCH
,ALRITE,VCOK,CITMON,DESTRY,COST,SEWMON,HPOK,AFOK,POLICE)
EXT FIXED BIN(31);
DCL YFL EXT FLOAT BIN(21) , DRAND RETURNS(FLOAT BIN(21)) ;
DCL(NAME1,NAME2,NAME3,NAME4,NAME5,TYME) EXT CHAR(20);
DCL (LENGTH,TOTMGT,LANDEV,FINAN,SEWTRE,WATRE,FNCE,ACCON,ACIM,ACMAIN,
BRIBUI,SHER,AGENT,SCHOOL,FS,LDFILL,SBSPA,MONIT,FEAS,POPDY,CC,RATIO,
PLANK,REEFS,STOCK,AR,LANPUR,NAVLIT,WARDEN ,SAFEBO,LICBOA,ZONING,
SWB,COTTGE,PAS,PARKS,MARINA,FD,SCNRD,WMA,AD,MAPS,MF,FC,WLF,SEL,BUY,
VC,PRM,NOCHA,HP,SMF,AF,FP,SFNCE) EXT FIXED BIN(15);
DCL(FSTOT,SCHTOT,AGTOT,BLOOM,K,ARTOT,GWTOT,SWBTOT,COTTOT,PASTOT,PKSTOT,
FDTOT,WMATOT,YEAR,NYEAR,LEASE,LIMIT,J) EXT FIXED BIN(15);
YEAR=1974;
REGRA=35000;
SHTOT=0;
MUSTOT=0;
BGTOT=0;
WBTOT=0;
SHATOT=0;
FERTOT=0;
*/

```

ARTOT=0;
GWTOT=0;
MANMGN=200000;
POLICE=0;
PUBALO=20000;
LDFUND=0;
SILT=0;
FED=0;
BYPASS=0;
BONDS=0;
BAN=0;
NECESS=0;
SEWOK=0;
ALRITE=0;
ROBUD=200000;
ROTOT=90;
BRITOT=0;
IMTOT=0;
MAIREQ=0;
FSTOT=0;
SHRTOT=0;
SCHTOT=0;
LDTOT=0;
AGTOT=0;
POLOK=0;
BLOOM=0;
NOFUND=0;
RECALO=250000;
SWBTOT=0;

```

COTTOT=0;
PASTOT=0;
PKSTOT=0;
MARTOT=0;
FDTOT=0;
WMATOT=0;
SCRTOT=0;
LANTOT=2500;
LNDTOT=2500;
PRMTOT=0;
VCOK=0;
MORAT=0;
IRK=0;
POLL=0;
DESTRY=0;
AOK=0;
HPOK=0;
AFOK=0;
TYME=TIME;GET STRING(TYME) EDIT(ISEED)(X(5),F(4));ISEED=2* ISEED+ 1;
GO TO G15;
/*
REGIONAL PLANNING COMMISSAR
*/
PUT EDIT('***** DAM *****',WELCOME TO FRANKLIN LAKE, THE N
EW 20,000 ACRE IMPOUNDMENT CONSTRUCTED IN SOUTHWESTERN VIRGINIA.',ALTH
OUGH FRANKLIN LAKE WAS CONSTRUCTED PRIMARILY FOR HYDROELECTRIC POWER, I
T OFFERS GREAT',POTENTIAL FOR FISHING AND GENERAL RECREATION. IT IS U
P TO YOU TO DEVELOP THIS POTENTIAL, GOOD LUCK.',SINCE THIS EXERCISE IS
QUITE COMPLEX, IT IS SUGGESTED THE STUDENT HAVE HIS *STUDENTS GUIDE TO
DAM# WITH HIM.')(X(36),A,SKIP(3),A,SKIP,A,SKIP(2),A); PUT SKIP;
G15:

```

```

/*
THE SHORT FORM
*/
G2: PUT EDIT('REGIONAL PLANNING COMMISSIONER',TOTMGT')(SKIP(2),X(10),A
,SKIP,A);PUT SKIP;GET LIST(TOTMGT);
PUT LIST('LANDEV');PUT SKIP;GET LIST(LANDEV);
      LOOP1: DO K=1 TO TOTMGT;
NYEAR=YEAR+1;
MANBUD=0;
BWRECK=0;
CWRECK=0;
LANGRA=0;
MANEXC=0;
UTLCOS=0;
ROEXC=0;
ROCCOST=0;
PUBBUD=0;
PUBEXC=0;
RECEXC=0;
RECEXP=0;
LANREV=0;
PCOREV=0;
SELREV=0;
MFCOS=0;
FCCOS=0;
WLFCOS=0;
COST=0;
      SEWMDN=0;
J=0;
CALL INPUT;
/*

```

MAIN

*
*/

```
G111: CALL REPCO;
IF ALRITE=1 THEN GO TO L1500; IF FINAN<2 THEN GO TO L1500;
IF FINAN>2 THEN GO TO L1501; X=DRAND(ISEED);IF X>0.20 THEN GO TO L1500
; LDFUND=1;FED=1;GO TO L1500;
L1501 :: X=DRAND(ISEED);IF X>0.10 THEN GO TO L1500;LDFUND,BONDS=1;
L1500: IF LDFUND=0 THEN SILT=SILT+1; IF LDFUND=1 THEN SILT=0;
      IF SEWTRE=1 THEN GO TO L615; IF FNCE=3 THEN GO TO L615;IF UTL
COS>=2000000 THEN GO TO L615;X=DRAND(ISEED);IF X<0.70 THEN GO TO L615;
      SEWOK=1;BAN,NECESS=0;
L615 ::IF SEWOK=1 THEN GO TO L616;IF LDFUND=1 THEN GO TO L608;IF LANDEV
=3 THEN GO TO L607;X=DRAND(ISEED);IF X>0.90 THEN GO TO L616;
IF NECESS=1 THEN BAN=1;NECESS=1;GO TO L616;
/*
      MB 2
L607 ::X=DRAND(ISEED);IF X>0.45 THEN GO TO L616;IF NECESS=1 THEN BAN=1;
NECESS=1;GO TO L616;
L608 ::X=DRAND(ISEED);IF X>0.04 THEN GO TO L616;IF NECESS=1 THEN BAN=1;
NECESS=1;
L616 ::IF LANDEV=3 THEN GO TO L627;IF LDFUND=1 THEN GO TO L627;GO TO L6
26;
L627 :: ROTOT=ROTOT+5;GO TO L1503; L626 ::CWRECK=CWRECK+1;
L1503 ::XMIN=110000;XMAX=300000;ROBUD=XMIN+(XMAX-XMIN)*DRAND(ISEED);
IF ROEXC>0 THEN ROBUD=ROBUD-ROEXC; IF AGTOT>0 THEN GO TO L1504;
BLOOM=1; GO TO L1505;
/*
      MB 3
L1504 ::X=DRAND(ISEED);IF X>=0.70 THEN BLOOM=1;
L1505: CALL DOGAF ;
      CALL DOOR ;
```

*/

```

CALL EPCO ;
IF MF=0 THEN GO TO L825; XMIN=MF*3*12; XMAX=MF*7*12;
MFCOS=XMIN+(XMAX-XMIN)*DRAND(ISEED); PCOREV=PCOREV+MFCOS;
L825 ;; IF FC=0 THEN GO TO L826; XMIN=FC*1300*12; XMAX=FC*2700*12;
FCCOS=XMIN+(XMAX-XMIN)*DRAND(ISEED); PCOREV=PCOREV+FCCOS ;
/*
MB5
L826 ;;IF WLF=0 THEN GO TO L827;XMIN=60000;XMAX=120000;
WLFOS=XMIN+(XMAX-XMIN)*DRAND(ISEED);PCOREV=PCOREV+WLFOS;L827 ;;
CALL CIMAY ;
CALL COMISAR;
CALL LACKEY;
CALL JANE;
CALL HITLER;
CALL SEBONJO;
END LOOP1; PUT EDIT('***** END OF MANAGMENT EXERCISE 'DAM', *****
***) (SKIP(2),A); GO TO L10000 ;
L10000: END DAM ;
* PROCESS ('EXTDIC,OPT=0');
DRAND : PROC(IY) RETURNS(FLOAT BIN(21));
DCL YFL FLOAT BIN(21) , SN FLOAT BIN(21) INIT(0.4656613E-9);
DCL IY FIXED BIN(31) , MN FIXED BIN(31) INIT(65539) ,
LN FIXED BIN(31) INIT(2147483647) , ONE FIXED BIN(31)
INIT(1);
ON FOFL;
IY = IY * MN; IF IY<0 THEN IY = IY + LN + ONE; YFL = IY;
YFL = YFL * SN;
ON FOFL SYSTEM;
RETURN(YFL); END DRAND;
* PROCESS ('EXTDIC,OPT=0');

```

```

COMISAR : PROC;
DCL (SILT,FED,BONDS,BAN,SEWOK,UTLCOS,ROBUD,ROTOT,BRITOT,CWRECK,BWRECK,
ROEXC,ROCOST,SHRTOT,PUBALO,PUBBUD,IRK,IMTOT,ISEED,LANGRA,LANREV,LANTOT,
LDFUND,LM,LNDTOT,MAICOS,MAIREQ,MANBUD,MANEXC,MANMON,MARTOT,MFCOS,MORAT,
MTN,MUSKIE,MUSTOT,NECESS,NOFUND,SELREV,SHRACU,X,LDTOT,PUBEXC,
CONCOS,BRICOS,SHRCOS,FSCOS,SCHCOS,AGCOS,REGRA,TROUT,SALMON,SB,SBTOT,BG,
BGTOT,SHAD,SHATOT,FERT,WB,WBTOT,FERTOT,CHESTRE,GRAEXC,POLOK,POLL,XMIN,
XMAX,BYPASS,TROCCOS,SALCOS,SBCOS,BGCOS,SHACOS,WBCOS,FERCOS,CHECOS,ARCOS,
GWCOS,RECALG,RECEXP,AOK,RECEXC,SCRTOT,PCOREV,PRMTOT,FCCOS,WLFCOS,TOMUCH
,ALRITE,VCOK,CITMON,DESTROY,COST,SEWMON,HPOK,AFOK,POLICE)
EXT FIXED BIN(31);
DCL YFL EXT FLOAT BIN(21) , DRAND RETURNS(FLOAT BIN(21)) ;
DCL(NAME1,NAME2,NAME3,NAME4,NAME5,TYME) EXT CHAR(20);
DCL (LENGTH,TCTMGT,LANDEV,FINAN,SEWTRE,WATRE,FNCE,ACCON,ACIM,ACMAIN,
BRIBUI,SHER,AGENT,SCHOOL,FS,LDIFILL,SBSPA,MONIT,FEAS,POPDY,CC,RATIO,
PLANK,REEFS,STOCK,AR,LANPUR,NAVLIIT,WARDEN ,SAFEBO,LICBOA,ZONING,
SWB,COTTGE,PAS,PARKS,MARINA,FD,SCNRD,WMA,AD,MAPS,MF,FC,WLF,SEL,BUY,
VC,PRM,NOCHA,HP,SMF,AF,FP,SFNCE) EXT FIXED BIN(15);
DCL(FSTOT,SCHTOT,AGTOT,BLOOM,K,ARTOT,GWTOT,SWBTOT,COTTOT,PASTOT,PKSTOT,
FDTOT,WMATOT,YEAR,NYEAR,LEASE,LIMIT,J) EXT FIXED BIN(15);
IF AOK=1 THEN GO TO L269;IF SFNCE=-2 THEN GO TO L261;
IF COST>3000000 THEN GO TO L262;X=DRAND(ISEED);IF X<=0.60 THEN GO TO L2
61;SEWMON=1;GO TO L261;L262: IF COST>5000000 THEN GO TO L261;
X=DRAND(ISEED);IF X>0.10 THEN GO TO L261;SEWMON=1;
L261 :;IF HP=0 THEN GO TO L264;IF SEWMON=0 THEN GO TO L264;HPOK=1;
L264 :;IF AF=0 THEN GO TO L265;IF SEWMON=0 THEN GO TO L265;AFOK=1;
L265 :;IF HPOK=0 THEN GO TO L266;POLL,DESTROY=0 ;IF AFOK=0 THEN GO TO L26
7;MORAT,IRK=0; GO TO L268;
/*

```

```

L266 ;;MORAT,POLL=1;GO TO L268;L267: MORAT=1;L268 :
IF AFOK=0 | HPOK=0 | FP=1 THEN GO TO L269; AOK=1;
L269 :
PUT EDIT('***** RESULTS OF MANAGEMENT PLANS FOR ',YE
AR,' *****')(SKIP(5),X(11),A,F(4),A,SKIP(3));
IF ALRITE=1 THEN GO TO L111;IF LANDEV=4 THEN GO TO L111;IF FINAN>0 THE
N GO TO L112; PUT EDIT('SINCE THE REGIONAL PLANNING COMMISSIONER MAD
E NO PLANS FOR FUNDING, HIS LAND USE PLAN WAS NOT IMPLEMENTED DURING',Y
EAR,'.')(SKIP,A,F(4),A);GO TO L111;L112 ;;IF FINAN>1 THEN GO TO L114;
PUT EDIT('COUNTY GOVERNMENTS COULD NOT AFFORD TO FINANCE THE LAND
USE PLAN OF THE REGIONAL PLANNING COMMISSIONER DURING',YEAR,'.')(SKIP,A
,F(4),A);GO TO L111;L114: IF FINAN>2 THEN GO TO L116;
IF FED=0 THEN GO TO L117;

```

MB7

```

/*
PUT EDIT('THE APPLICATION FOR FEDERAL FUNDS TO FINANCE THE LAND US
E PLAN OF THE REGIONAL PLANNING COMMISSIONER WAS ACCEPTED DURING ',
YEAR,'.')(SKIP,A,F(4),A); ALRITE=1;GO TO L111;L117: ;
PUT EDIT('THE APPLICATION FOR FEDERAL FUNDS TO FINANCE THE LAND U
SE PLAN OF THE REGIONAL PLANNING COMMISSIONER WAS REJECTED DURING',YEAR
,'.')(SKIP,A,F(4),A); GO TO L111;

```

MB8

```

/*
L116: IF BONDS=0 THEN GO TO L120;
PUT EDIT('ENOUGH BONDS WERE SOLD DURING ',YEAR,' TO FINANCE THE L
AND USE PLAN OF THE REGIONAL PLANNING COMMISSIONER.')(SKIP,A,F(4),A);
ALRITE=1; GO TO L111;L120:
PUT EDIT('DURING ',YEAR,' RESIDENTS O
F THE FRANKLIN LAKE AREA VOTED AGAINST THE SALE OF BONDS FOR FINANCING
THE LAND USE PLAN', OF THE REGIONAL PLANNING COMMISSIONER.')(SKIP,A,F(
4),A,SKIP,A);

```

MB9

*/

L111: IF SILT=0 THEN GO TO L123;

PUT EDIT('EROSION RESULTING FROM EXTENSIVE SHORELINE DEVELOPMENT DURING ',YEAR,' HAS SHORTENED THE LIFE EXPECTANCY OF FRANKLIN ',LAKE BY SEVERAL YEARS.')(SKIP(2),A,F(4),A,SKIP,A);

L123: IF UTLCOS=0 THEN GO TO L5008;IF FNCE>1 THEN GO TO L5003;

PUT EDIT('DUE TO NO FINANCIAL PROVISIONS BEING MADE, SCHEDULED PLANS FOR IMPROVEMENT OF SEWAGE TREATMENT AND WATER SUPPLY',FACILITIES IN THE FRANKLIN LAKE AREA DURING ',YEAR,' WERE CANCELLED.')(SKIP,A,SKIP,A,F(4),A); GO TO L5008;

*/

MB10

*/

L5003: IF FNCE>2 THEN GO TO L5004;

PUT EDIT('COUNTY RESIDENTS DEFEATED THE BOND REFERENDUM WHICH WAS NEEDED TO FINANCE SEWAGE TREATMENT AND WATER SUPPLY IMPROVEMENTS ',IN THE FRANKLIN LAKE AREA DURING ',YEAR,')(SKIP(2),A,SKIP,A,F(4),A); GO TO L5008; L5004: IF FNCE<4 THEN GO TO L5006;

PUT EDIT('COUNTY RESIDENTS VOTED AGAINST THE PROPOSED PROPERTY TAX INCREASE NEEDED TO FINANCE SEWAGE TREATMENT AND WATER SUPPLY ',IMPROVEMENTS IN THE FRANKLIN LAKE AREA DURING ',YEAR,')(SKIP(2),A,SKIP,A,F(4),A); GO TO L5008 ;

*/

MB11

*/

L5006: IF FNCE=3 THEN GO TO L5007; ELSE GO TO L5008;

L5007: IF SEWOK=0 THEN GO TO L5009;ELSE GO TO G5009;

L5009: PUT EDIT('THE APPLICATION FOR FEDERAL FUNDS TO FINANCE IMPROVEMENTS IN SEWAGE TREATMENT AND WATER SUPPLY DURING ',YEAR,' WAS REJECTED.')(SKIP(2),A,F(4),A);

G5009: IF SEWOK=1 THEN GO TO L5010;ELSE GO TO L5008;

L5010: PUT EDIT('THE APPLICATION FOR FEDERAL FUNDS TO FINANCE IMPROVEMENTS IN SEWAGE TREATMENT AND WATER SUPPLY DURING ',YEAR,' WAS ACCEPTED.')(SKIP(2),A,F(4),A);

```

/*
MB12
L5008: IF SEWOK=1 | NECESS=0 THEN GO TO L125; IF BAN=1 THEN GO TO L6001;
      PUT EDIT('***** FLASH *****', 'SEEPAGE FROM PRIVATE SEPTIC SYSTEMS
      HAS CONTAMINATED THE UNDERGROUND WATER SUPPLY IN THE FRANKLIN LAKE ARE
      A.')(SKIP(2), X(20), A, SKIP, A); IF BAN=0 THEN GO TO L125;
L6001: PUT EDIT('THE STATE WATER CONTROL BOARD PLACED A BAN ON ALL DEVE
      LOPMENT IN THE FRANKLIN LAKE AREA DURING ', YEAR, '.')(SKIP(2), A, F(4), A);
L125: IF SEWTRE=1 THEN GO TO L127;
/*
MB13
      PUT EDIT('MANY RESIDENTS ARE UNHAPPY. ***THEY FELT THAT PRIVATE SEP
      TIC SYSTEMS WERE SATISFACTORY FOR THE FRANKLIN LAKE AREA.')(SKIP(2), A);
L127: IF WATRE=1 THEN GO TO L130;
      PUT EDIT('MANY RESIDENTS ARE UNHAPPY. ***THEY FELT THAT PRIVATE WAT
      ER SUPPLIES WERE SATISFACTORY FOR THE FRANKLIN LAKE AREA.')(SKIP(2), A);
L130: IF LDFUND=1 | LANDEV=3 THEN GO TO L132;      PUT EDIT('THE HIGHWA
      Y DEPARTMENT REFUSED TO MAINTAIN NEW ACCESS ROADS IN THE FRANKLIN LAKE
      AREA DURING ', YEAR, ' BECAUSE THEY DO ', 'NOT CONFORM TO MINIMUM CONSTRUC
      TION SPECIFICATIONS.')(SKIP(2), A, F(4), A, SKIP, A);
/*
MB14
L132: IF IMTOT<=35 THEN PUT EDIT('THERE WERE NUMEROUS COMPLAINTS ABOUT
      THE POOR CONDITION OF MANY ACCESS ROADS IN THE FRANKLIN LAKE AREA DURIN
      G ', YEAR, '.')(SKIP(2), A, F(4), A);
      IF ACMAINKMAIREQ THEN PUT EDIT('RESIDENTS COMPLAINED VEHEMENTLY D
      URING ', YEAR, ' THAT MANY ACCESS ROADS IN THE FRANKLIN LAKE AREA WERE NO
      T BEING MAINTAINED.')(SKIP(2), A, F(4), A); PUT SKIP;
/*
MB15
      IF BRITOT<2 THEN PUT EDIT('RESIDENTS LIVING IN THE FOUR COUNTIES
      SURROUNDING FRANKLIN LAKE ARE DEMANDING THAT MORE BRIDGES BE BUILT ACRO
      SS', 'THE RESERVOIR.')(SKIP, A, SKIP, A);

```

PUT EDIT('EXPENDITURES FOR HIGHWAY CONSTRUCTION, IMPROVEMENT, AND MAINTENANCE IN THE FRANKLIN LAKE AREA DURING ',YEAR, 'TOTALLED ',ROCO ST,' DOLLARS.')(SKIP,A,F(4),SKIP,A,F(6),A);

/*

MB16

*/

IF ROEXC>0 THEN PUT EDIT('DURING ',YEAR,' HIGHWAY EXPENDITURES EXCEEDED THE STATE HIGHWAY DEPARTMENT ALLOCATIONS FOR THE FRANKLIN LAKE AREA BY ',ROEXC,',',DOLLARS. THIS AMOUNT WILL BE DEDUCTED FROM THE HIGHWAY ALLOCATION FOR ',NYEAR,',')(SKIP(2),A,F(4),A,F(6),A,SKIP,A,F(4),A);

IF ROEXC>50000 THEN PUT EDIT('***** FLASH *****',THE REGIONAL PLANNING COMMISSIONER HAS BEEN FIRED FOR EXTRAVAGANTLY EXCEEDING HIS HIGHWAY BUDGET ALLOCATION DURING ',YEAR,',')(SKIP(2),X(20),A,SKIP,A,F(4),A);

/*

MB17

*/

PUT EDIT('STATE HIGHWAY DEPARTMENT FUNDS ALLOCATED FOR USE IN THE FRANKLIN LAKE AREA DURING ',YEAR,' TOTAL ',ROBUD,' DOLLARS.')(SKIP(2),A,F(4),A,F(7),A); IF PUBALO>0 THEN GO TO L142;

PUT EDIT('DUE TO THE EXISTING BUDGET DEFICIT, ALL PLANS OF THE REGIONAL PLANNING COMMISSIONER FOR IMPROVEMENT OF PUBLIC SERVICES',IN THE FRANKLIN LAKE AREA DURING ',YEAR,' WERE CANCELLED.')(SKIP(2),A,SKIP,A,F(4),A); PUBBUD=0;

/*

MB18

*/

L142: IF LDFUND=0 THEN PUT EDIT('THE SCATTERED NATURE OF DEVELOPMENT IN THE FRANKLIN LAKE AREA MADE THE ADMINISTRATION OF PUBLIC SERVICES VERY ',DIFFICULT DURING ',YEAR,',')(SKIP(2),A,SKIP,A,F(4),A,SKIP(2));

IF FSTOT<3 THEN PUT EDIT('RESIDENTS OF THE FRANKLIN LAKE AREA ARE CLAMORING FOR MORE FIRE PROTECTION.')(SKIP,A);

IF LDTOT<3 THEN PUT EDIT('ILLEGAL DUMPING CREATED SERIOUS PROBLEMS IN THE FRANKLIN LAKE AREA DURING ',YEAR,', ** THE STATE HEALTH DEPARTMENT IS',DEMANDING THAT MORE SANITARY LANDFILLS BE CONSTRUCTED.')(SKIP(2),A,F(4),A,SKIP,A);

/*

MB19

*/

IF BLOOM=1 THEN PUT EDIT('THERE WERE SEVERAL REPORTS OF PLANKTON
BLOOMS CAUSED BY AGRICULTURAL RUNOFF INTO FRANKLIN LAKE DURING ',YEAR,'
')(SKIP(2),A,F(4),A);

IF PUBBUD>0 THEN PUT EDIT('PUBLIC SERVICE EXPENDITURES OF THE REG
IONAL PLANNING COMMISSIONER FOR THE FRANKLIN LAKE AREA DURING ',YEAR,'
TOTALLED ', PUBBUD,' DOLLARS.')(SKIP(2),A,F(4),A,SKIP,F(6),A);
IF PUBBUD>PUBALO THEN PUBEXC=PUBBUD-PUBALO;
IF PUBALOC<0 THEN GO TO L6003;

/*

MB20

*/

IF PUBEXC>0 THEN PUT EDIT('DURING ',YEAR,' PUBLIC SERVICE EXPENDI
TURES IN THE FRANKLIN LAKE AREA EXCEEDED AVAILABLE FUNDS BY ',PUBEXC,'
DOLLARS.',*** THIS AMOUNT WILL BE DEDUCTED FROM THE BUDGET ALLOCATION
OF THE REGIONAL PLANNING COMMISSIONER FOR ',NYEAR,'.')(SKIP(2),A,F(4),A
,F(6),A,SKIP,A,F(4),A);

/*

MB21

*/

IF PUBEXC>=20000 THEN PUT EDIT('*****FLASH*****',THE REGIONAL PL
ANNING COMMISSIONER HAS BEEN FIRED FOR EXTRAVAGANTLY EXCEEDING HIS PUBL
IC SERVICE BUDGET ALLOCATION',DURING ',YEAR,'.')(SKIP(2),X(20),A,SKIP,
A,SKIP,A,F(4),A);

L6003: PUBALO=20000+CITMON-PUBEXC;

PUT EDIT('THE REGIONAL PLANNING COMMISSIONER WILL HAVE ',PUBALO,'
DOLLARS AVAILABLE FOR PUBLIC SERVICES IN THE FRANKLIN LAKE AREA',DURIN
G ',NYEAR,'.')(SKIP(2),A,F(7),A,SKIP,A,F(4),A);

/*

MB22

*/

IF CITMON>0 THEN PUT EDIT('THE BUDGET ALLOCATION OF THE REGIONAL
PLANNING COMMISSIONER FOR ',NYEAR,' INCLUDES ',CITMON,' DOLLARS DONATED
BY THE CITY',GOVERNMENT OF SPARKLE FOR IMPROVEMENT OF THE FRANKLIN LAK
E AREA.')(SKIP(2),A,F(4),A,F(6),A,SKIP,A);

```

END COMISAR;
* PROCESS ('EXTDIC,OPT=0');
LACKEY : PROC;
DCL (SILT,FED,BONDS,BAN,SEWOK,UTLCS,ROBUD,KOTOT,BRITOT,CWRECK,BWRECK,
ROEXC,ROCOST,SHRTOT,PUBALO,PUBBUD,IRK,IMTOT,ISEED,LANGRA,LANREV,LANTOT,
LDFUND,LM,LNDTOT,MAICGS,MAIREQ,MANBUD,MANEXC,MANMON,MARTOT,MFCOS,MORAT,
MTN,MUSKIE,MUSTOT,NECESS,NOFUND,
CONCOS,BRICOS,SHRCOS,FSCOS,SCHCOS,AGCOS,REGRA,TROUT,SALMON,SB,SBTOT,BG,
BGTOT,SHAD,SHATOT,FERT,WB,WBTOT,FERTOT,CHEFRE,GRAEXC,POLOK,POLL,XMIN,
XMAX,BYPASS,TROCOS,SALCOS,SBCOS,BGCOS,SHACOS,WBCOS,FERCOS,CHECOS,ARCOS,
GWCOS,RECALO,RECEXP,AOK,RECEXC,SCRTOT,PCOREV,PRMTOT,FCCOS,WLFCOS,TOMUCH
,ALRITE,VCOK,CITMON,DESTRY,COST,SEWMON,HPOK,AFOK,POLICE)
EXT FIXED BIN(31);
DCL YFL EXT FLOAT BIN(21) , DRAND RETURNS(FLOAT BIN(21)) ;
DCL(NAME1,NAME2,NAME3,NAME4,NAME5,TYME) EXT CHAR(20);
DCL (LENGTH,TOTMGT,LANDEV,FINAN,SEWTRE,WATRE,FNCE,ACCON,ACIM,ACMAIN,
BRIBUI,SHER,AGENT,SCHOOL,FS,LDIFILL,SBSPA,MONIT,FEAS,POPDY,CC,RATIO,
PLANK,REEFS,STOCK,AR,LANPUR,NAVLIT,WARDEN ,SAFEBO,LICBOA,ZONING,
SWB,COTTGE,PAS,PARKS,MARINA,FD,SCNRD,WMA,AD,MAPS,MF,FC,WLF,SEL,BUY,
VC,PRM,NOCHA,HP,SMF,AF,FP,SFNCE) EXT FIXED BIN(15);
DCL(FSTOT,SCHTOT,AGTOT,BLOOM,K,ARTOT,GWTOT,SWBTOT,COTTOT,PASTOT,PKSTOT,
FDTOT,WMATOT,YEAR,NYEAR,LEASE,LIMIT,J) EXT FIXED BIN(15);
IF NOFUND=1 THEN GO TO L21;
IF SBSPA=0 THEN GO TO L4;
IF SBTOT<10000 THEN GO TO L4;
/*
*/
IF WLF=0 THEN PUT EDIT('RESEARCH DURING THE PAST YEAR SHOWED THAT C
ONTROL OF WATER LEVEL FLUCTUATION DURING THE SPRING WOULD INCREASE',TH
E SPAWNING SUCCESS OF STRIPED BASS.')(SKIP,A,SKIP,A);

```

MB23

```

L4: IF MONIT=0 THEN GO TO L6;
    IF LDFUND=0 THEN PUT EDIT('MONITORING INDICATED RAPID DETERIORATION
    OF WATER QUALITY THROUGHOUT FRANKLIN LAKE DURING ',YEAR,'.')(SKIP(2),A
    ,F(4),A);
/*
MB24
L6: IF FEAS=1 THEN PUT EDIT('RESEARCH DURING ',YEAR,' INDICATED THAT EX
OTIC SPECIES SUCH AS TROUT, SALMON, MUSKIE AND STRIPED BASS COULD SURVI
VE IN ',FRANKLIN LAKE.*** WHETHER OR NOT THESE SPECIES COULD SUCCESSFU
LLY REPRODUCE IS QUESTIONABLE.',THERE IS A TREMENDOUS OVERPOPULATION O
F THREADFIN SHAD IN FRANKLIN LAKE.')(SKIP(2),A,F(4),A,SKIP,A,SKIP,A);
    IF POPDY=1 THEN PUT EDIT('RESEARCH DURING ',YEAR,' INDICATED THAT
THE FRANKLIN LAKE ECOSYSTEM IS NOT CONDUCTIVE TO SURVIVAL AND GROWTH OF
LARGEMOUTH',BASS. ***EFFORTS TO STOCK LARGEMOUTH BASS WOULD PROBABLY B
E FUTILE.')(SKIP(2),A,F(4),A,SKIP,A);
/*
MB25
    IF CC=1 THEN PUT EDIT('EFFORTS TO MAINTAIN A COMPREHENSIVE CREEL C
ENSUS FOR FRANKLIN LAKE DURING ',YEAR,' PROVED FUTILE AND WERE ABANDONE
D.')(SKIP(2),A,F(4),A);
    IF RATIO=1 THEN PUT EDIT ('RESEARCH DURING ',YEAR,' DID NOT INDICA
TE AN OVERABUNDANCE OF ROUGH FISH IN FRANKLIN LAKE.',***HOWEVER, THERE
IS A TREMENDOUS OVERPOPULATION OF THREADFIN SHAD.')(SKIP(2),A,F(4),A,
SKIP,A);
/*
MB26
    IF LIMIT=1 THEN PUT EDIT ('RESEARCH DURING ',YEAR,' YIELDED NO CON
CLUSIVE INFORMATION ON THE NATURE OF INORGANIC NUTRIENT LIMITING FACTOR
S IN FRANKLIN LAKE.')(SKIP(2),A,F(4),A);
L18: IF PLANK=1 THEN PUT EDIT ('RESEARCH DURING ',YEAR,' INDICATED THAT
THERE IS AN INVERSE RELATIONSHIP BETWEEN GENERATION AT THE FRANKLIN LA
KE DAM AND THE',TOTAL NUMBER OF PLANKTON PRESENT IN THE RESERVOIR.')(S

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KIP(2),A,F(4),A,SKIP,A);
/*
MB27
*/
IF REEFS=1 THEN PUT EDIT ('RESEARCH DURING ',YEAR,' INDICATED THAT
ARTIFICIAL REEFS WOULD CONCENTRATE PANFISH FOR ANGLERS.')(SKIP(2),A,F(
4),A);
L21: IF REGRA<0 THEN GO TO L22; IF REGRA=0 THEN GO TO L23;
ELSE GO TO L24; L22: GRAEXC=0-REGRA;
PUT EDIT ('THE FIVE-YEAR RESEARCH ALLOTMENT OF THE STATE DEPARTMEN
T OF FISH AND GAME HAS BEEN EXCEEDED BY ',GRAEXC,' DOLLARS.',***THIS A
MOUNT WAS ADDED TO THE MANAGEMENT BUDGET OF THE FISHERIES MANAGER DURIN
G ',YEAR,',',**NO RESEARCH FUNDS ARE AVAILABLE FOR ',NYEAR,',')(SKIP(
2),A,F(6),A,SKIP,A,F(4),A,SKIP,A,F(4),A);
/*
MB28
*/
MANBUD=MANBUD+GRAEXC; REGRA=0; GO TO L28;
L23: PUT EDIT ('THE FIVE YEAR RESEARCH ALLOTMENT OF THE FISHERIES MANAGE
R HAS BEEN EXHAUSTED.',***NO RESEARCH FUNDS ARE AVAILABLE FOR ',NYEAR
,',')(SKIP,A,SKIP,A,F(4),A);
GO TO L28;
L24: PUT EDIT ('THE FISHERIES MANAGER HAS ',REGRA,' DOLLARS OF HIS RESEA
RCH ALLOCATION REMAINING.')(SKIP(2),A,F(5),A);
/*
MB29
*/
L28: PUT EDIT ('MANY AREA FISHING ENTHUSIASTS AND CONCESSIONAIRES WERE U
NHAPPY DURING ',YEAR,',',*** THEY WANT MORE LARGEMOUTH BASS STOCKED IN
FRANKLIN LAKE.')(SKIP(2),A,F(4),A,SKIP,A);
IF SALMON>0 THEN PUT EDIT ('THE MAJORITY OF THE COHO SALMON STOCK
ED IN FRANKLIN LAKE DURING ',YEAR,' SEEM TO HAVE DISAPPEARED.')(SKIP(2)
,A,F(4),A);
IF TROUT>0 THEN PUT EDIT ('THE PERCENTAGE RETURN TO THE CREEEL OF ST
OCKED RAINBOW TROUT WAS VERY LOW DURING ',YEAR,',')(SKIP(2),A,F(4),A);

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/*
MB30
IF WLF=1 THEN GO TO L32; IF SBTOT<20000 THEN GO TO L35;
IF SBTOT<100000 THEN GO TO L53; IF SBTOT>=100000 THEN GO TO L50;
L32: IF SBTOT<12000 THEN GO TO L35; IF SBTOT>=60000 THEN GO TO L50;
L53: IF SBTOT<60000 THEN PUT EDIT('REPORTS FROM FISHERMAN DURING ',YEAR
,' INDICATE THAT STRIPED BASS ARE RAPIDLY INCREASING IN ABUNDANCE IN FR
ANKLIN LAKE.')(SKIP(2),A,F(4),A);
/*
MB31
GO TO L35;
L50: PUT EDIT('STOCKING HAS RESULTED IN THE ESTABLISHMENT OF A STRIPED
BASS FISHERY IN FRANKLIN LAKE.')(SKIP(2),A);
PUT EDIT('REPORTS FROM FISHERMAN INDICATE THAT FISHING FOR ALL GAM
E SPECIES INCREASED GREATLY DURING ',YEAR,')(SKIP(2),A,F(4),A);
L35: IF MUSKIE>=5000 THEN PUT EDIT('DUE TO LIMITED FACILITIES THE ',MUS
KIE,' MUSKIES YOU WANTED FOR STOCKING DURING ',YEAR,' WERE NOT AVAILABL
E.')(SKIP(2),A,F(7),A,F(4),A);
/*
MB32
IF MUSTOT<20000 THEN GO TO L55; PUT EDIT('STOCKING HAS RESULTED IN
THE ESTABLISHMENT OF A MUSKIE FISHERY IN FRANKLIN LAKE.')(SKIP(2),A);
L55: IF BGTOT>=10000 THEN PUT EDIT('REPORTS FROM FISHERMEN DURING ',YEA
R,' INDICATE THAT PANFISH POPULATIONS ARE STUNTED IN SEVERAL AREAS OF F
RANKLIN LAKE.')(SKIP(2),A,F(4),A);
IF SHATOT<5000 THEN GO TO L42; IF SBTOT>=60000 THEN GO TO L42;
IF WBTOT<75000 THEN PUT EDIT('A FANTASTICALLY LARGE POPULATION OF
SHAD HAS COMPLETELY RUINED THE FISHING FOR MOST GAME FISH SPECIES IN FR
ANKLIN LAKE.')(SKIP(2),A);
L42: IF WBTOT<50000 THEN GO TO L46; IF WBTOT>=150000 THEN GO TO L48;
/*
MB33
PUT EDIT('REPORTS FROM FISHERMEN DURING ',YEAR,' INDICATE THAT WHI

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TE BASS ARE INCREASING IN ABUNDANCE IN FRANKLIN LAKE.')(SKIP(2),A,F(4),
A); GO TO L46;
L48: PUT EDIT('STOCKING HAS RESULTED IN THE ESTABLISHMENT OF A WHITE BA
SS FISHERY IN FRANKLIN LAKE.')(SKIP(2),A);
L46: IF FERTOT<500 THEN GO TO L59;
/*
MB34
PUT EDIT('***** FLASH *****',THE FISHERIES MANAGER HAS BEEN FIRED
BECAUSE OF POOR MANAGEMENT PRACTICES.')(SKIP(2),X(20),A,SKIP,A);
L59: IF CHETRE<100 THEN GO TO L62;
PUT EDIT('THOUSANDS OF GAME FISH WERE KILLED BY CHEMICAL ERADICATI
ON PROCEDURES DURING ',YEAR,','.')(SKIP(2),A,F(4),A);
IF CHETRE>=1000 THEN PUT EDIT('***** FLASH *****',THE FISHERIES MANAGE
R HAS BEEN FIRED BECAUSE OF POOR MANAGEMENT PRACTICES.')(SKIP(2),X(20),
A,SKIP,A);
L62: IF ARTOT<2 THEN GO TO L65;
PUT EDIT('ARTIFICIAL REEFS ARE INCREASING FISHING PRESSURE BY CONC
ENTRATING PANFISH IN AREAS WHERE THEY HAVE BEEN INTRODUCED.')(SKIP(2),A
); IF ARTOT<5 THEN GO TO L65;
/*
MB35
PUT EDIT('MANY PEOPLE COMPLAINED DURING ',YEAR,' THAT ARTIFICIAL R
EEFS ARE INTERFERING WITH SWIMMING AND BOATING ACTIVITIES.')(SKIP(2),A,
F(4),A); L65: IF LANPUR=0 THEN GO TO L70;
PUT EDIT('DURING ',YEAR,' THE FISHERIES MANAGER PURCHASED ',LANPUR
', ACRES OF LAND AND LEASED THEM TO THE DEPARTMENT OF OUTDOOR RECREATIO
N',TO BE USED IN THE DEVELOPMENT OF RECREATIONAL FACILITIES.')(SKIP(2)
,A,F(4),A,F(5),A,SKIP,A);
/*
MB36
L70: IF NAVLIT=1 THEN GO TO L72;
PUT EDIT('INCREASED NIGHT BOATING DURING ',YEAR,' PRODUCED A SERIO

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US SAFETY PROBLEM.')(SKIP(2),A,F(4),A);
L72: IF POLICE>=10 THEN GO TO L75; IF LDFUND=1 THEN GO TO L76;
ELSE GO TO L77;
L76: IF POLICE<6 THEN GO TO L77; ELSE GO TO L75;
/*
MB37
L77: PUT EDIT('THE NUMBER OF INCIDENTS OF VANDALISM AND BURGLARY INCREA
SED ALARMINGLY IN THE FRANKLIN LAKE AREA DURING ',YEAR,','RESIDENTS A
RE AFRAID TO LEAVE ANYTHING OF VALUE IN THEIR HOMES.')(SKIP(2),A,F(4),A
,SKIP,A);
BWRECK=BWRECK+3; CWRECK=CWRECK+1; GO TO L5011; L75: POLOK=1;
L5011: PUT EDIT('THE DISREGARD FOR SAFE BOATING REGULATIONS EXHIBITED B
Y MANY BOATERS DURING ',YEAR,' WAS APPALLING.')(SKIP(2),A,F(4),A);
/*
MB38
IF SAFEBO=1 THEN PUT EDIT('THE WEEKLY BOATING SAFETY CLASSES CONDU
CTED BY THE FISHERIES MANAGER DURING ',YEAR,' WERE DISCONTINUED AFTER O
NE MONTH DUE TO LACK OF ATTENDANCE.')(SKIP(2),A,F(4),SKIP,A);
IF LICBOA=0 THEN GO TO L82; IF POLOK=1 THEN GO TO L83;
PUT EDIT('THERE WERE NOT ENOUGH LAW ENFORCEMENT PERSONNEL IN THE F
RANKLIN AREA DURING ',YEAR,' TO ENFORCE THE LICENSING ORDINANCE OF',TH
E FISHERIES MANAGER.')(SKIP(2),A,F(4),A,SKIP,A);
/*
MB39
L82: BWRECK=BWRECK+1; L83: IF ZONING=0 THEN GO TO L85;
IF POLOK=1 THEN GO TO L86;
PUT EDIT('THERE WERE NOT ENOUGH LAW ENFORCEMENT PERSONNEL IN THE F
RANKLIN LAKE AREA DURING ',YEAR,' TO ENFORCE THE WATER SURFACE',ZONING
REGULATIONS APPLIED BY THE FISHERIES MANAGER.')(SKIP,A,F(4),A,SKIP,A);
L85: BWRECK=BWRECK+2;
/*
MB40
L86: IF BWRECK>=3 THEN PUT EDIT('AN UNUSUALLY HIGH NUMBER OF BOATING AC

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CIDENTS OCCURED ON FRANKLIN LAKE DURING ',YEAR,','.')(SKIP(2),A,F(4),A);
IF CWRECK>=1 THEN PUT EDIT('AN UNUSUALLY HIGH NUMBER OF AUTOMOBIL
E ACCIDENTS OCCURED IN THE FRANKLIN LAKE AREA DURING ',YEAR,','.')(SKIP(2
),A,F(4),A);
IF CHETRE>=1000 THEN GO TO L89; IF FERT>=100 THEN GO TO L89; IF POLL=1
THEN GO TO L89; ELSE GO TO L90;
/*
MB41
L89: X=DRAND(ISEED); IF X>=0.50 THEN GO TO L91; ELSE GO TO L92;
L90: X=DRAND(ISEED); IF X>=0.80 THEN GO TO L91; ELSE GO TO L92;
L91: PUT EDIT('***** FLASH *****',AN ESTENSIVE FISH KILL HAS OCCURED I
N FRANKLIN LAKE. *** INVESTIGATING AND CLEANING UP THE KILL WILL ADD 20
000 DOLLARS',TO THE BUDGET OF THE FISHERIES MANAGER DURING ',YEAR,','.')(
SKIP(3),X(20),A,SKIP,A,SKIP,A,F(4),A);
MANBUD=MANBUD+20000; L92: X=DRAND(ISEED); IF X>=0.65 THEN GO TO L94;
ELSE GO TO L95;
/*
MB42
L94: PUT EDIT('***** FLASH *****',TWO BOATS HAVE COLLIDED ON FRANKLIN
LAKE. *** THREE PEOPLE DROWNED AS A RESULT OF THE ACCIDENT.')(SKIP(3),X
(20),A,SKIP,A);
L95: PUT EDIT('EXPENDITURES OF THE FISHERIES MANAGER DURING ',YEAR,',' TO
TALLED ',MANBUD,',' DOLLARS.')(SKIP(2),A,F(4),A,F(8),A);
IF MANBUD<=MANMON THEN GO TO L98; MANEXC=MANBUD-MANMON;
/*
MB43
PUT EDIT('THE FISHERIES MANAGER HAS EXCEEDED HIS BUDGET ALLOCATION
FOR ',YEAR,',' BY ',MANEXC,',' DOLLARS.',*** THIS AMOUNT WILL BE DEDUCTED
FROM THE ',NYEAR,',' BUDGET ALLOCATION OF THE FISHERIES MANAGER.')(SKIP
(2),A,F(4),A,F(8),A,SKIP,A,F(4),A);
IF MANEXC>50000 THEN PUT EDIT('***** FLASH *****',THE FISHERIES
MANAGER HAS BEEN FIRED FOR EXTRAVAGANTLY EXCEEDING HIS MANAGEMENT BUDGE

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T ALLOCATION DURING ' , YEAR, ' . ' ) ( SKIP ( 3 ) , X ( 20 ) , A , SKIP , A , F ( 4 ) , A ) ;
/*
MB44
L98: XMIN=50000; XMAX=350000; MANMON=XMIN+(XMAX-XMIN)*DRAND(ISEED);
IF MANEXC>0 THEN MANMON=MANMON-MANEXC;
PUT EDIT('THE BUDGET ALLOCATION OF THE FISHERIES MANAGER FOR ' , NY
EAR, ' IS ' , MANMON, ' DOLLARS. ' ) ( SKIP ( 2 ) , A , F ( 4 ) , A , F ( 7 ) , A ) ;
END LACKEY;
* PROCESS ('EXTDIC,OPT=0');
JANE : PROC;
DCL ( SILT, FED, BONDS, BAN, SEWOK, UTLCOS, ROBUD, ROTOT, BRITOT, CWRECK, BWRECK,
ROEXC, ROCOST, SHRTOT, PUBALO, PUBBUD, IRK, IMTOT, ISEED, LANGRA, LANREV, LANTOT,
LDFUND, LM, LNDTOT, MAICOS, MAIREQ, MANBUD, MANEXC, MANMON, MARTOT, MFCOS, MORAT,
MTN, MUSKIE, MUSTOT, NECESS, NOFUND, SELREV, SHRACU, X, LDTOT, PUBEXC,
CONCOS, BRICOS, SHRCOS, FSCOS, SCHCOS, AGCOS, REGRA, TROUT, SALMON, SB, SBTOT, BG,
BGTOT, SHAD, SHATOT, FERT, WB, WBTOT, FERTOT, CHETRE, GRAEXC, POLOK, POLL, XMIN,
XMAX, BYPASS, TROCOS, SALCOS, SBCOS, BGCOS, SHACOS, WBCOS, FERCOS, CHECOS, ARCOS,
GWCOS, RECALO, RECEXP, AOK, RECEXC, SCRTOT, PCOREV, PRMTOT, FCCOS, WLF COS, TOMUCH
, ALRITE, VCOK, CITMON, DESTRY, COST, SEWMON, HPOK, AFOK, POLICE)
EXT FIXED BIN(31);
DCL YFL EXT FLOAT BIN(21) ; DRAND RETURNS(FLOAT BIN(21) ;
DCL(NAME1,NAME2,NAME3,NAME4,NAME5,TYME) EXT CHAR(20);
DCL (LENGTH, TOTMGT, LANDEV, FINAN, SEWTR, WATRE, FNCE, ACCON, ACIM, ACMAIN,
BRIBUI, SHER, AGENT, SCHOOL, FS, LDFILL, SBSPA, MONIT, FEAS, POPDY, CC, RATIO,
PLANK, REEFS, STOCK, AR, LANPUR, NAVLIT, WARDEN , SAFEBO, LICBOA, ZONING,
SWB, COTTGE, PAS, PARKS, MARINA, FD, SCNRD, WMA, AD, MAPS, MF, FC, WLF, SEL, BUY,
VC, PRM, NOCHA, HP, SMF, AF, FP, SFNCE) EXT FIXED BIN(15);
DCL(FSTOT, SCHATOT, AGTOT, BLOOM, K, ARTOT, GWTOT, SWBTOT, COTTOT, PASTOT, PKSTOT,
FDTOT, WMATOT, YEAR, NYEAR, LEASE, LIMIT, J) EXT FIXED BIN(15);
IF BAN=0 THEN GO TO L201;

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PUT EDIT('DUE TO THE BAN ON DEVELOPMENT PERPETRATED BY THE STATE
WATER CONTROL BOARD, ALL PLANS OF THE RECREATION SPECIALIST', 'FOR IMPRO
VEMENT OF RECREATION DURING ', YEAR, ' WERE RESCINDED.')(SKIP(2), A, SKIP, A
, F(4), A); RECEXP=0; AD=0; MAPS=0;
/*
MB45
*/

L201: IF SWBTOT<2 THEN PUT EDIT('MANY VISITORS TO THE FRANKLIN LAKE ARE
A DURING ', YEAR, ' WERE DISGRUNTLED AT THE LACK OF PUBLIC SWIMMING SITES
'')(SKIP(2), A, F(4), A);

IF SWBTOT>4 THEN PUT EDIT('OPERATION OF PUBLIC SWIMMING BEACHES I
N THE FRANKLIN LAKE AREA DURING ', YEAR, ' RESULTED IN SUBSTANTIAL FINANC
IAL LOSSES FOR THE', 'RECREATION SPECIALIST.')(SKIP(2), A, F(4), A, SKIP, A);
/*
MB45
*/

IF COTTOT<5 THEN PUT EDIT('TOP RANKING STATE OFFICIALS WHO VISITE
D FRANKLIN LAKE DURING ', YEAR, ' WERE DISPLEASED AT NOT BEING PROVIDED',
' WITH LODGING IN THE IMMEDIATE AREA.')(SKIP(2), A, F(4), A, SKIP, A);
IF COTTOT>10 THEN PUT EDIT('CARE AND MAINTENANCE OF RENTAL COTTAG
ES IN THE FRANKLIN LAKE AREA DURING ', YEAR, ' RESULTED IN SUBSTANTIAL FI
NANCIAL LOSSES', 'FOR THE RECREATION SPECIALIST.')(SKIP(2), A, F(4), A, SKIP
, A);
/*
MB46
*/

IF PASTOT<10 THEN PUT EDIT('VISITORS TO THE FRANKLIN LAKE AREA DU
RING ', YEAR, ' COMPLAINED VIGOROUSLY ABOUT THE LACK OF PUBLIC ACCESS SIT
ES.')(SKIP(2), A, F(4), A);

IF PASTOT>20 THEN PUT EDIT('LOCAL RESIDENTS FEEL THAT THE ABUNDA
NCE OF PUBLIC ACCESS SITES GREATLY DIMINISHED AESTHETIC', 'VALUES IN THE
FRANKLIN LAKE AREA DURING ', YEAR, '')(SKIP(2), A, SKIP, A, F(4), A);
/*
MB47
*/

IF PKSTOT<2 THEN PUT EDIT('MANY CONCERNED PEOPLE STATED DURING ',
YEAR, ' THAT PUBLIC PARKS WOULD GREATLY INCREASE THE RECREATIONAL VALUE'

```
' OF THE FRANKLIN LAKE AREA.')(SKIP,A,F(4),A,SKIP,A);
IF PKSTOT>4 THEN PUT EDIT('MANY LOCAL RESIDENTS COMPLAINED DURING
, YEAR, ' THAT PUBLIC PARK DEVELOPMENT IS MONOPOLIZING TOO MUCH', 'VALUA
BLE SHORELINE, AND HURTING THE ECONOMIC POTENTIAL OF THE FRANKLIN LAKE
AREA.')(SKIP(2),A,F(4),A,SKIP,A);
/*
```

MB48

```
IF MARTOT<2 THEN PUT EDIT('DURING ', YEAR, ' SEVERAL CONCERNED LOCA
L RESIDENTS COMMENTED THAT STATE OWNED MARINAS ON FRANKLIN LAKE WOULD B
E BENEFICIAL', 'TO THE PUBLIC.')(SKIP,A,F(4),A,SKIP,A);
```

```
IF MARTOT>=4 THEN PUT EDIT('PRIVATE MARINA OPERATORS IN THE FRANK
LIN LAKE AREA COMPLAINED BITTERLY DURING ', YEAR, ' , THAT THE OPERATION
OF STATE OWNED MARINAS IS RUINING THEIR BUSINESS.')(SKIP(2),A,F(4),A,SK
IP,A);
/*
```

MB49

```
IF FDTOT=0 THEN PUT EDIT('DURING ', YEAR, ' THERE WERE REPORTS FROM
FISHERMAN THAT FLOATING FISHING DOCKS PRODUCED AN INCREASE IN YIELD', '
IN OTHER LARGE IMPOUNDMENTS.')(SKIP,A,F(4),A,SKIP,A);
```

```
IF FDTOT>2 THEN PUT EDIT('THE FLOATING DOCKS IN FRANKLIN LAKE CRE
ATED A HAZARD TO BOATERS DURING ', YEAR, ' .')(SKIP(2),A,F(4),A);
```

```
IF SCRTO>0 THEN PUT EDIT('THE STATE HIGHWAY DEPARTMENT REFUSED T
O MAINTAIN THE ', SCRTO, ' MILES OF SCENIC ROAD IN THE FRANKLIN LAKE ARE
A DURING ', YEAR, ' .')(SKIP(2),A,F(3),A,F(4),A);
/*
```

MB50

```
IF WMAOT<250 THEN PUT EDIT('DURING ', YEAR, ' LOCAL HUNTING ENTHUS
IASTS MADE MANY PLEAS FOR MORE PUBLIC HUNTING LAND IN THE FRANKLIN LAKE
AREA.')(SKIP(2),A,F(4),A);
```

```
IF AD<3 THEN PUT EDIT('DURING ', YEAR, ' MANY LOCAL BUSINESSMEN NOT
ED THAT A PROMOTIONAL CAMPAIGN WOULD INCREASE THE TOURIST TRADE IN THE
FRANKLIN', 'LAKE AREA.')(SKIP(2),A,F(4),A,SKIP,A);
```

```
IF AD>0 THEN PUT EDIT('THERE WAS A MULTITUDE OF COMPLAINTS AGAINST THE PROMOTIONAL CAMPAIGN FOR THE FRANKLIN LAKE AREA DURING ',YEAR,')'(SKIP(2),A,F(4),A);
```

```
IF MAPS=0 THEN PUT EDIT('REPORTS OF LOST TOURISTS IN THE FRANKLIN LAKE AREA DURING ',YEAR, ' WERE COMMONPLACE.')(SKIP(2),A,F(4),A);
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/*
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MB51
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*/
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```
IF RECEXP>0 THEN PUT EDIT('EXPENDITURES OF THE RECREATION SPECIALIST IN THE FRANKLIN LAKE AREA DURING ',YEAR, ' TOTALLED ',RECEXP, ' DOLLARS.')(SKIP(2),A,F(4),A,F(7),A);IF RECEXP>RECALO THEN RECEXC=RECEXP-RECALO; IF RECEXC>0 THEN PUT EDIT('DURING ',YEAR, ' EXPENDITURES FOR RECREATION IN THE FRANKLIN LAKE AREA EXCEEDED AVAILABLE FUNDS BY ',RECEXC, ' DOLLARS.', '** THIS AMOUNT WILL BE DEDUCTED FROM THE BUDGET ALLOCATION OF THE RECREATION SPECIALIST FOR ',NYEAR,')(SKIP(2),A,F(4),A,F(7),A,SKIP,A,F(4),A);
```

```
IF RECEXC>=50000 THEN PUT EDIT('***** FLASH *****', 'THE RECREATION SPECIALIST HAS BEEN FIRED FOR EXTRAVAGANTLY EXCEEDING HIS BUDGET ALLOCATION DURING ',YEAR,')(SKIP(2),X(20),A,SKIP,A,F(4),A);
```

```
/*
```

```
MB52
```

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*/
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```
LANREV=LANGRA*2000 ;XMIN=0 ;XMAX=500000 ;RECALO=XMIN+(XMAX-XMIN)*DRAND(ISEED); RECALO=RECALO+LANREV-RECEXC;
```

```
PUT EDIT('THE BUDGET ALLOCATION OF THE RECREATION SPECIALIST FOR ',NYEAR, ' TOTALS ',RECALO, ' DOLLARS.')(SKIP(2),A,F(4),A,F(7),A);
```

```
IF LANREV>0 THEN PUT EDIT('THE BUDGET ALLOCATION OF THE RECREATION SPECIALIST FOR ',NYEAR, ' INCLUDES ',LANREV, ' DOLLARS', 'PROVIDED BY LAND GRANTS MADE DURING ',YEAR,')(SKIP(2),A,F(4),A,SKIP,A,F(4),A);
```

```
END JANE;
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```
* PROCESS ('EXTDIC,OPT=0');
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HITLER : PROC;
```

DCL (SILT,FED,BONDS,BAN,SEWOK,UTLCS,ROBUD,ROTOT,BRITOT,CWRECK,BWRECK,
 ROEXC,ROCAST,SHRTOT,PUBALO,PUBBUD,IRK,IMTOT,ISEED,LANGRA,LANREV,LANTOT,
 LDFUND,LM,LNDTOT,MAICOS,MAIREQ,MANBUD,MANEXC,MANMON,MARTOT,MFCOS,MORAT,
 MTN,MUSKIE,MUSTOT,NECESS,NOFUND, SELREV,SHRACU,X,LDTOT,PUBEXC,
 CONCOS,BRICOS,SHRCOS,FSCOS,SCHCOS,AGCOS,REGRA,TROUT,SALMON,SB,SBTOT,BG,
 BGTOT,SHAD,SHATOT,FERT,WB,WBTOT,FERTOT,CHEGRE,GRAEXC,POLOK,POLL,XMIN,
 XMAX,BYPASS,TROCOS,SALCOS,SBCOS,BCCOS,SHACOS,WBCOS,FERCOS,CHECOS,ARCOS,
 GWCOS,RECALO,RECEXP,AOK,RECEXC,SCRTOT,PCOREV,PRMTOT,FCCOS,WLFCOS,TOMUCH
 ,ALRITE,VCOK,CITMON,DESTROY,COST,SEWMON,HPOK,AFOK,POLICE)

EXT FIXED BIN(31);

DCL YFL EXT FLOAT BIN(21) , DRAND RETURNS(FLOAT BIN(21)) ;

DCL(NAME1,NAME2,NAME3,NAME4,NAME5,TYME) EXT CHAR(20);

DCL (LENGTH,TOTMGT,LANDEV,FINAN,SEWTRE,WATRE,FNCE,ACCON,ACIM,ACMAIN,
 BRIRUI,SHER,AGENT,SCHOOL,FS,LDIFILL,SBSPA,MONIT,FEAS,POPDY,CC,RATIO,
 PLANK,REEFS,STOCK,AR,LANPUR,NAVLIT,WARDEN ,SAFERO,LICBOA,ZONING,
 SWB,COTTGE,PAS,PARKS,MARINA,FD,SCNRD,WMA,AD,MAPS,MF,FC,WLF,SEL,BUY,

VC,PRM,NOCHA,HP,SMF,AF,FP,SFNCE) EXT FIXED BIN(15);

DCL(FSTOT,SCHTOT,AGTOT,BLOOM,K,ARTOT,GWTOT,SWBTOT,COTTOT,PASTOT,PKSTOT,
 FDTOT,WMATOT,YEAR,NYEAR,LEASE,LIMIT,J) EXT FIXED BIN(15);

/*

MB53

*/

IF MF>0 THEN PUT EDIT('ADHERANCE TO MINIMUM FLOW CONSTRAINTS DURIN
 G ,YEAR,' RESULTED IN A LOSS OF ',MFCOS,' DOLLARS FOR THE POWER COMPAN
 Y EXECUTIVE.')(SKIP(2),A,F(4),A,F(7),A);

IF MF<650 THEN PUT EDIT('THE STATE DEPARTMENT OF FISH AND GAME IS
 TAKING LEGAL ACTION AGAINST THE INTERMONTANE ELECTRICAL POWER COMPANY.
 ',THEY CLAIM THAT LOW FLOW DURING ',YEAR,' SEVERLY DAMAGED THE FISHER
 Y IN THE RIVER BELOW FRANKLIN LAKE DAM.')(SKIP(2),A,SKIP,A,F(4),A);

/*

MB54

*/

IF MF<6000 THEN PUT EDIT('MANY FISHING AND BOATING ENTHUSIASTS CO

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MPLAINED DURING ',YEAR,' BECAUSE NAVIGATION OF THE RANCID RIVER BELOW F
RANKLIN LAKE','DAM WAS OFTEN IMPOSSIBLE.')(SKIP(2),A,F(4),A,SKIP,A);
IF FC>0 THEN PUT EDIT('ADHERENCE TO FLOOD CONTROL CONSTRAINTS DUR
ING ',YEAR,' RESULTED IN A LOSS OF ',FCCOS,' DOLLARS FOR THE POWER COMP
ANY EXECUTIVE.')(SKIP(2),A,F(4),A,F(6),A);
IF FC<3 THEN GO TO L235; IF FC<=5 THEN GO TO L236;ELSE GO TO L237;
L235: X=DRAND(ISEED);IF X>0.20 THEN GO TO L237;
      PUT EDIT('***** FLASH *****','TORRENTIAL RAINS HIT FRANKLIN LAK
E AREA CAUSING THE DAM TO BURST ** HUNDREDS ARE DEAD, DAMAGE IS IN THE
MILLIONS OF','DOLLARS. ','***** EXERCISE OVER *****')(SKIP(3),
X(20),A,SKIP,A,SKIP,A,SKIP(2),X(40),A); STOP;
/*
      MB55
L236: X=DRAND(ISEED); IF X<0.95 THEN GO TO L237;
      PUT EDIT('***** FLASH *****','TORRENTIAL RAINS HIT FRANKLIN LAKE
AREA *** PROPERTY DAMAGE FROM FLOODING IS GREAT','*** MANY LAWSUITS ARE
BEING FILED AGAINST THE INTERMONTANE ELECTRICAL POWER COMPANY.')(SKIP
(2),X(20),A,SKIP,A,SKIP,A,SKIP(3));
L237: IF WLF=1 THEN PUT EDIT('ADHERENCE TO WATER LEVEL FLUCTUATION CONS
TRAINTS DURING ',YEAR,' RESULTED IN-A LOSS OF ',WLFCCS,' DOLLARS','FOR
THE POWER COMPANY EXECUTIVE.')(SKIP(2),A,F(4),A,F(6),A,SKIP,A);
/*
      MB56
IF LNDTOT>=0 THEN GO TO L254;
PUT EDIT('THE POWER COMPANY EXECUTIVE SOLD AND LEASED MORE LAND T
HAN HE OWNED DURING ',YEAR,',','CONSEQUENTLY ALL LAND SALES AND LEASING
S MADE DURING ',YEAR,' WERE CANCELLED.')(SKIP(2),A,F(4),A,SKIP,A,F(4),A
); LNDTOT=LNDTOT+LEASE;LNDTOT=LNDTOT+SEL;
L254: IF VCOK=1 THEN GO TO L256; IF VC=0 THEN PUT EDIT('DURING ',YEAR,'
SEVERAL LOCAL CITIZEN ORGANIZATIONS SUGGESTED THAT THE INTERMONTANE EL
ECTRICAL POWER COMPANY SHOULD','MAKE AN EFFORT TO IMPROVE RECREATION IN

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THE FRANKLIN LAKE AREA.')(SKIP(2),A,F(4),A,SKIP,A);
/*
MB57
IF VC=0 THEN GO TO L256;IF BAN=0 THEN GO TO L243; PUT EDIT('DUE TO THE
BAN ON DEVELOPMENT PERPETRATED BY THE STATE WATER CONTROL BOARD, PLANS
FOR THE CONSTRUCTION',OF A VISITOR CENTER AND PICNIC AREA AT THE FRANK
LIN LAKE DAM DURING ',YEAR,', WERE CANCELLED.')(SKIP(2),A,SKIP,A,F(4),A)
; GO TO L256; L243: VCOK=1;
/*
MB58
L256: IF PRMTOT<2 THEN PUT EDIT('DURING ',YEAR,', THERE WAS A MULTITUDE
OF VARIED COMPLAINTS FROM BOTH RESIDENTS AND TOURISTS CONCERNING',THE
POLICIES OF THE INTERMONTANE ELECTRICAL POWER COMPANY USED IN THE FRANK
LIN LAKE AREA.')(SKIP(2),A,F(4),A,SKIP,A);IF MTN<150000 THEN GO TO L246
;IF MTN<200000 THEN GO TO L247;ELSE GO TO L248;L246:X=DRAND(ISEED);
IF X<0.65 THEN GO TO L249;
L250: PUT EDIT('***** FLASH *****',A GENERATOR HAS EXPLODED AT THE FRA
NKLIN LAKE DAMSITE *** THREE WORKMEN ARE DEAD.',*** DAMAGE IS ESTIMATE
D AT OVER ONE MILLION DOLLARS.',*** THE POWER COMPANY EXECUTIVE HAS BE
EN FIRED FOR GROSS NEGLIGENCE.')(SKIP(3),X(20),A,SKIP,A,SKIP,A);
GO TO L249;L247:X=DRAND(ISEED);IF X>0.10 THEN GO TO L249;
/*
MB59
ELSE GO TO L250; L248: X=DRAND(ISEED);IF X<0.97 THEN GO TO L249; ELSE
GO TO L250; L249: XMIN=200000;XMAX=360000; TOMUCH=XMIN+(XMAX-XMIN)*DRA
ND(ISEED);
IF PCOREV>0 THEN PUT EDIT('OPERATIONAL COSTS INCURRED BY INTERMON
TANE ELECTRICAL POWER COMPANY AT FRANKLIN LAKE DURING ',YEAR, ' TOTAL
ED ',PCOREV,' DOLLARS.')(SKIP(2),A,SKIP,F(4),A,F(7),A);
/*
MB60
IF PCOREV>=TOMUCH THEN PUT EDIT('***** FLASH *****',THE POWER CO
MPANY EXECUTIVE HAS BEEN FIRED DUE TO EXTREMELY HIGH OPERATIONAL COSTS

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FOR FRANKLIN LAKE DURING ',YEAR,'.')(SKIP,X(20),A,SKIP,A,F(4),A);
END HITLER;
* PROCESS ('EXTDIC,OPT=0');
SEBONJU : PROC;
DCL (SILT,FED,BONDS,BAN,SEWOK,UTLCO,ROBUD,RODOT,BRITOT,CWRECK,BWRECK,
ROEXC,ROCAST,SHRTOT,PUBALO,PUBBUD,IRK,IMTOT,ISEED,LANGRA,LANREV,LANTOT,
LDFUND,LM,LNDTOT,MAICOS,MAIREQ,MANBUD,MANEXC,MANMON,MARTOT,MFCOS,MORAT,
MTN,MJSKIE,MUSTOT,NECESS,NOFUND,SELREV,SHRACU,X,LDTOT,PUBEXC,
CONCOS,BRICO,SHRCOS,FSCOS,SCHCOS,AGCOS,REGRA,TROUT,SALMON,SB,SBTOT,BG,
BGTOT,SHAD,SHATOT,FERT,WB,WBTOT,FERTOT,CHETRE,GRAEXC,POLOK,POLL,XMIN,
XMAX,BYPASS,TROCOS,SALCOS,SBCOS,BGCOS,SHACOS,WBCOS,FERCO,CHECOS,ARCOS,
GWCOS,RECALO,RECEXP,AOK,RECEXC,SCRTOT,PCOREV,PRMTOT,FCCOS,WLFCOS,TOMUCH,
ALRITE,VCOK,CITMON,DESTRY,COST,SEWMON,HPOK,AFOK,POLICE)
EXT FIXED BIN(31);
DCL YFL EXT FLOAT BIN(21), DRAND RETURNS(FLOAT BIN(21)) ;
DCL(NAME1,NAME2,NAME3,NAME4,NAME5,TYME) EXT CHAR(20);
DCL (LENGTH,TOTMGT,LANDEV,FINAN,SEWTRE,WATRE,FNCE,ACCON,ACIM,ACMAIN,
BRIBUI,SHER,AGENT,SCHOOL,FS,LD,LFILL,SBSPA,MONIT,FEAS,POPDY,CC,RATIO,
PLANK,REEFS,STOCK,AR,LANPUR,NAVLIT,WARDEN,SAFEBO,LICBOA,ZONING,
SWB,COTTGE,PAS,PARKS,MARINA,FD,SCNRD,WMA,AD,MAPS,MF,FC,WLF,SEL,BUY,
VC,PRM,NOCHA,HP,SMF,AF,FP,SFENCE) EXT FIXED BIN(15);
DCL(FSTOT,SCHTOT,AGTOT,BLOOM,K,ARTOT,GWTOT,SWBTOT,COTTOT,PASTOT,PKSTOT,
FDTOT,WMATOT,YEAR,NYEAR,LEASE,LIMIT,J) EXT FIXED BIN(15);
IF MORAT=1 THEN PUT EDIT('THE STATE WATER CONTROL BOARD PL
AGED A MORATORIUM ON ALL SEWER CONNECTIONS IN SPARKLE DURING ',YEAR,'.
',***) CONSEQUENTLY, ALL PLANS FOR NEW CONSTRUCTION IN THE CITY WERE CAN
CELLED.')(SKIP(2),A,F(4),A,SKIP,A);
/*
MB61
*/
IF IRK=1 THEN PUT EDIT('***** FLASH *****',DUE TO CONTINUED PRES

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SURE FROM THE STATE WATER CONTROL BOARD TO CORRECT THE SEWAGE TREATMENT
, 'PROBLEMS OF SPARKLE DURING ', YEAR, ' THE CITY MAYOR HAS RESIGNED.')(
SKIP,X(20),A,SKIP,A,SKIP,A,F(4),A); IF DESTRY=1 THEN GO TO L274
; IF POLL=1 THEN PUT EDIT('WATER QUALITY IN THE UPPER END OF FRANKL
IN LAKE DETERIORATED RAPIDLY DURING ', YEAR, 'DUE TO THE SEWAGE INFLUX F
ROM THE RANCID RIVER.')(SKIP(2),A,F(4),SKIP,A);

*/
MB62
L274: IF DESTRY=1 THEN PUT EDIT('THE RECREATIONAL VALUES OF THE UPPER E
ND OF FRANKLIN LAKE WERE LOST DURING ', YEAR, ' AS A RESULT OF THE ', 'SEWA
GE INFLUX FROM THE RANCID RIVER.', '**' THE STATE DEPARTMENT OF FISH AN
D GAME, THE INTERMONTANE ELECTRICAL POWER COMPANY, THE STATE DEPARTMENT
OF OUTDOOR', 'RECREATION, AND THE FRANKLIN LAKE ASSOCIATION OF BUSINESS
MEN ARE ALL CONSIDERING LEGAL ACTION AGAINST THE CITY OF SPARKLE.')(SKI
P,A,F(4),A,SKIP,A,SKIP,A,SKIP,A);

*/
MB63
IF SFNCE=1 THEN GO TO L276; IF COST=0 THEN GO TO L281;
PUT EDIT('SINCE THE CITY MAYOR MADE NO FINANCIAL PROVISIONS DURIN
G ', YEAR, ' ALL PLANS FOR IMPROVEMENT', 'OF THE SPARKLE SEWAGE TREATMENT
PLANT WERE CANCELLED.')(SKIP(2),A,F(4),A,SKIP,A); GO TO L281;
L276: IF SFNCE>2 THEN GO TO L278;

IF SEWMON=0 THEN PUT EDIT('THE APPLICATION OF THE CITY MAYOR FOR
, COST, ' IN FEDERAL FUNDS TO FINANCE IMPROVEMENT OF THE SPARKLE', 'SEWAG
E TREATMENT PLANT WAS REJECTED DURING ', YEAR, '.')(SKIP(2),A,F(8),A,SKIP
,A,F(4),A);

*/
MB64
IF SEWMON=1 THEN PUT EDIT('THE APPLICATION OF THE CITY MAYOR FOR ', COST
, ' IN FEDERAL FUNDS TO FINANCE IMPROVEMENTS OF THE SPARKLE', 'SEWAGE TRE
ATMENT PLANT WAS ACCEPTED DURING ', YEAR, '.')(SKIP(2),A,F(8),A,SKIP,A,F(4),A);
GO TO L281; L278: IF SFNCE>3 THEN GO TO L282;

PUT EDIT('THE SPARKLE CITY COUNCIL VOTED AGAINST THE PROPOSED INC
 REASE IN SEWAGE SERVICE CHARGES', 'NEEDED TO FINANCE SEWAGE TREATMENT PL
 ANT IMPROVEMENTS DURING ', YEAR, '.')(SKIP(2), A, SKIP, A, F(4), A); GO TO L281
 ; /* MB65

L282: IF SFNCE=4 THEN PUT EDIT('LOCAL GOVERNMENTS IN THE SURROUNDING CO
 UNTY REFUSED TO PROVIDE THE FUNDS NEEDED TO FINANCE IMPROVEMENTS', 'IN T
 HE SPARKLE SEWAGE TREATMENT PLANT DURING ', YEAR, '.')(SKIP(2), A, SKIP, A, F
 (4), A);

L281: IF AOK=1 THEN PUT EDIT('THE CITY MAYOR HAS SUCCESSFULLY RE
 SOLVED THE SEWAGE TREATMENT PROBLEMS OF SPARKLE.')(SKIP(2), A);

/* MB66
 IF CITMON>=50000 THEN PUT EDIT('***** FLASH *****', 'THE CITY MAYO
 R HAS BEEN FORCED TO RESIGN DUE TO HIS EXTRAVAGANT BUDGETING DURING ', Y
 EAR, '.')(SKIP(3), X(20), A, SKIP, A, F(4), A); YEAR=1974+K;
 END SEBONJO;

* PROCESS ('EXTDIC, OPT=0');
 DOGAF:PROC ; DCL(MUSCOS, LANCOS, LMCOS JFIXED BINARY(31));
 DCL (SILT, FED, BONDS, RAN, SEWOK, UTLCOS, ROBUD, ROTOT, BRITOT, CWRECK, BWRECK,
 ROEXC, ROCOST, SHRTOT, PUBALO, PUBBUD, IRK, IMTOT, ISEED, LANGRA, LANREV, LANTOT,
 LDFUND, LM, LNDTOT, MAICOS, MAIREQ, MANRUD, MANEXC, MANMON, MARTOT, MFCOS, MORAT,
 MTN, MUSKIE, MUSTOT, NECESS, NCFUND, SELREV, SHRACU, X, LDTOT, PUBEXC,
 CONCOS, BRICOS, SHRCOS, FSCOS, SCHCOS, AGCOS, REGRA, TROUT, SALMON, SB, SBTOT, BG,
 BGTOT, SHAD, SHATOT, FERT, WB, WBTOT, FERTOT, CHETRE, GRAEXC, POLOK, POLL, XMIN,
 XMAX, BYPASS, TROCOS, SALCOS, SBCOS, BGCOS, SHACOS, WBCOS, FERCOS, CHECOS, ARCOS,
 GWCOS, RECALO, RECEXP, AOK, RECEXC, SCRTOT, PCOREV, PRMTOT, FCCOS, WLFCOS, TOMUCH
 , ALRITE, VCOK, CITMON, DESTRY, COST, SEWMON, HPOK, AFOK, POLICE)
 EXT FIXED BIN(31);

DCL YFL EXT FLOAT BIN(21) , DRAND RETURNS(FLOAT BIN(21)) ;
 DCL(NAME1, NAME2, NAME3, NAME4, NAME5, TYME) EXT CHAR(20);

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DCL (LENGTH,TOTMGT,LANDEV,FINAN,SEWTRE,WATRE,FNCE,ACCON,ACIM,ACMAIN,
BRIBUI,SHER,AGENT,SCHOOL,FS,LDIFILL,SBSPA,MONIT,FEAS,POPDY,CC,RATIO,
PLANK,REFFS,STOCK,AR,LANPUR,NAVIT,WARDEN,SAFEBO,LICBOA,ZONING,
SWB,COTTGE,PAS,PARKS,MARINA,FD,SCNRD,WMA,AD,MAPS,MF,FC,WLF,SEL,BUY,
VC,PRM,NOCHA,HP,SMF,AF,FP,SNCE) EXT FIXED BIN(15);
DCL(FSTOT,SCHTOT,AGTOT,BLOOM,K,ARTOT,GWTOT,SWBTOT,COTTOT,PASTOT,PKSTOT,
FDTOT,WMATOT,YEAR,NYEAR,LEASE,LIMIT,J) EXT FIXED BIN(15);
/*
DOGB1
PUT EDIT(NAME2,', AS FISHERIES MANAGER DURING ',YEAR,' MADE THE FO
LLOWING DECISIONS:')(SKIP(4),A(20),A,F(4),A);
/*
DOGB2
IF FERTOT>=500 THEN FERTOT=0;IF REGRA<=0 THEN GO TO L525;
IF SBSPA=0 THEN GO TO L501;
PUT EDIT('YOU DECIDED TO STUDY THE EFFECTS OF WATER LEVEL FLUCTUAT
ION ON THE SPAWNING OF STRIPE BASS AT A COST OF 10000 DOLLARS.')(SKIP(2
),A); REGRA=REGRA-10000;
L501:IF MONIT=0 THEN GO TO L504; PUT EDIT('YOU DECIDED TO MONITOR
WATER QUALITY AT A COST OF 5000 DOLLARS.')(SKIP(2),A);REGRA=REGRA-5000;
L504:IF FEAS=0 THEN GO TO L507; PUT EDIT('YOU DECIDED TO MAKE A ST
OCKING FEASIBILITY STUDY AT A COST OF 10000 DOLLARS.')(SKIP(2),A);
REGRA=REGRA-10000;L507: IF POPDY=0 THEN GO TO L510; PUT EDIT('YOU
DECIDED TO STUDY THE POPULATION DYNAMICS OF LARGEMOUTH BASS AT A COST O
F 10000 DOLLARS.')(SKIP(2),A); REGRA=REGRA-10000;
/*
DOGB3
L510: IF CC=0 THEN GO TO L513; PUT EDIT('YOU DECIDED TO RUN A COM
PREHENSIVE CREEEL CENSUS AT A COST OF 10000 DOLLARS.')(SKIP(2),A);
REGRA=REGRA-10000;
L513:IF RATIO=0 THEN GO TO L516; PUT EDIT('YOU DECIDED TO STUDY TH
E RATIO OF GAME FISH TO ROUGH FISH AT A COST OF 5000 DOLLARS.')(SKIP(2)

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,A); REGRA=REGRA-5000;
L516: IF LIMIT=0 THEN GO TO L519;      PUT EDIT('YOU DECIDED TO STUDY TH
E NATURE OF THE INORGANIC NUTRIENT LIMITING FACTORS AT A COST OF 10000
DOLLARS.')(SKIP(2),A); REGRA=REGRA-10000;
L519: IF PLANK=0 THEN GO TO L522;      PUT EDIT('YOU DECIDED TO DETERM
INE THE EFFECTS OF VARIATIONS IN GENERATING PATTERNS ON THE PLANKTON PO
PULATION', 'AT A COST OF 10000 DOLLARS.')(SKIP,A,SKIP,A);
      REGRA=REGRA-10000;
/*
      DOGB5
L522: IF REEFS=0 THEN GO TO L5051;      PUT EDIT( 'YOU DECIDED TO DETER
MINE WHAT EFFECTS THE PLACING OF ARTIFICIAL REEFS IN THE RESERVOIR WOULD
HAVE ', 'ON THE FISHERY. THIS COST 5000 DOLLARS.')(SKIP(2),A,SKIP,A);
      REGRA=REGRA-5000 ; GO TO L5051; L525: NOFUND=1;
L5051: IF STOCK=0 THEN GO TO L550; IF LM=0 THEN GO TO L529;
LMCOS=LM*150/100; MANBUD=MANBUD+LMCOS;      PUT EDIT('YOU DECIDED TO STO
CK ', LM, ' LARGEMOUTH BASS AT A COST OF ', LMCOS, ' DOLLARS.')(SKIP(2),A,F
(7),A,F(8),A); L529: IF TROUT=0 THEN GO TO L532; TROCOS=TROUT*200/100;
/*
      DOGB6
MANBUD=MANBUD+TROCOS;      PUT EDIL('YOU DECIDED TO STOCK ', TROUT, ' CAT
CHABLE RAINBOW TROUT AT A COST OF ', TROCOS, ' DOLLARS.')(SKIP(2),A,F(7),
A,F(8),A);
L532: IF SALMON=0 THEN GO TO L535; SALCOS=SALMON*165/100; MANBUD=MANBUD+
SALCOS;      PUT EDIT('YOU DECIDED TO STOCK ', SALMON, ' COHO SALMON AT A
COST OF ', SALCOS, ' DOLLARS.')(SKIP(2),A,F(7),A,F(8),A);
L535: IF SB=0 THEN GO TO L538; SBCOS=SB*500/100; MANBUD=MANBUD+SBCOS;
SBTOT=SBTOT+SB;
/*
      DOGB7
      PUT EDIT('YOU DECIDED TO STOCK ', SB, ' STRIPED BASS AT A COST OF '
, SBCOS, ' DOLLARS.')(SKIP(2),A,F(7),A,F(8),A);

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L538: IF MUSKIE=0 THEN GO TO L541; IF MUSKIE>=5000 THEN GO TO L541;
MUSCOS=MUSKIE*425/100;MANBUD=MANBUD+MUSCOS;MUSTOT=MUSTOT+MUSKIE;
  PUT EDIT('YOU DECIDED TO STOCK ',MUSKIE,' MUSKIES AT A COST OF ',
MUSCOS,' DOLLARS.')(SKIP(2),A,F(4),A,F(5),A);
/*
DOGB8
L541: IF BG=0 THEN GO TO L544;BGCOS=BG*12/100;MANBUD=MANBUD+BGCOS;
BGTOT=BGTOT+BG;  PUT EDIT('YOU DECIDED TO STOCK ',BG,' BLUEGILL SUN
FISH AT A COST OF ',BGCOS,' DOLLARS.')(SKIP(2),A,F(7),A,F(7),A);
L544: IF SHAD=0 THEN GO TO L547;SHACOS=SHAD*15/100;SHATOT= SHATOT+SHAD;
  PUT EDIT('YOU DECIDED TO STOCK ',SHAD,' THREADFIN SHAD AT A COST
OF ',SHATOT,' DOLLARS.')(SKIP(2),A,F(7),A,F(7),A);
/*
DOGB9
L547: IF WB=0 THEN GO TO L550;WBCOS=WB*300/100;MANBUD=MANBUD+WBCOS;
WBTOT=WBTOT+WB;  PUT EDIT('YOU DECIDED TO STOCK ',WB,' WHITE BASS A
T A COST OF ',WBCOS,' DOLLARS.')(SKIP(2),A,F(7),A,F(8),A);
L550: IF FERT=0 THEN GO TO L553;FERCOS=FERT*100;MANBUD=MANBUD+FERCOS;
FERTOT=FERTOT+FERT;  PUT EDIT('YOU DECIDED TO FERTILIZE ',FERT,' AC
RES OF WATER SURFACE AT A COST OF ',FERCOS,' DOLLARS.')(SKIP(2),A,F(5),
A,F(7),A);
/*
DOGB10
L553: IF CHETRE=0 THEN GO TO L556;CHECOS=CHETRE*80;MANBUD=MANBUD+CHECOS;
  PUT EDIT('YOU DECIDED TO CHEMICALLY TREAT ',CHETRE,' ACRES OF WAT
ER SURFACE AT A COST OF ',CHECOS,' DOLLARS.')(SKIP(2),A,F(5),A,F(7),A);
L556: IF AR=0 THEN GO TO L559;ARCOS=AR*1000;MANBUD=MANBUD+ARCOS;
ARTOT=ARTOT+AR;
  PUT EDIT('YOU DECIDED TO PLACE ',AR,' ARTIFICIAL REEFS IN THE RES
ERVOIR AT A COST OF ',ARCOS,' DOLLARS.')(SKIP(2),A,F(2),A,F(5),A);
/*
DOGB11
L559: IF ARTOT>=5 THEN BWRECK=BWRECK+1; IF LANPUR=0 THEN GO TO L564;

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LANCOS=LANPUR*2000;MANBUD=MANBUD+LANCOS;LANGRA=LANGRA+LANPUR;
  PUT EDIT('YOU DECIDED TO PURCHASE ',LANPUR,' ACRES OF LAND TO BE
USED FOR THE DEVELOPMENT OF RECREATIONAL FACILITIES AT A COST OF ',LANC
OS,' DOLLARS.')(SKIP(2),A,F(5),A,SKIP,F(8),A);
L564: IF NAVLIT=0 THEN GO TO L567;MANBUD=MANBUD+10000;
  PUT EDIT('YOU DECIDED TO INSTALL A NAVIGATIONAL LIGHTING SYSTEM A
T A COST OF 10000 DOLLARS.')(SKIP(2),A); GO TO L2000;
/*
DOGB13
L567: BWRECK=BWRECK+1;
L2000: IF WARDEN=0 THEN GO TO L569;POLICE=POLICE+WARDEN ;GWTOT=GWTOT+WA
RDEN;GWCOS=GWTOT*1000;MANBUD=MANBUD+GWCOS;
  PUT EDIT('YOU DECIDED TO INCREASE THE NUMBER OF WARDENS ON YOUR S
TAFF BY ',WARDEN,'.',YOUR TOTAL YEARLY SALARY EXPENSE FOR WARDENS IS N
OW ',GWCOS,' DOLLARS.')(SKIP(2),A,F(2),A,SKIP,A,F(6),A);
L569: IF SAFEBO=1 THEN PUT EDIT('YOU DECIDED TO HOLD WEEKLY BOATING SAF
ETY CLASSES.')(SKIP(2),A);
/*
DOGB13
IF LIC80A=1 THEN PUT EDIT('YOU DECIDED TO IMPLEMENT A SYSTEM FOR LICENS
ING ALL BOAT OPERATORS.')(SKIP(2),A);
IF ZONING=1 THEN PUT EDIT('YOU DECIDED TO APPLY WATER SURFACE ZONING RE
GULATIONS.')(SKIP(2),A); RETURN; END DOGAF;
* PROCESS ('EXTDIC,OPT=0');
DOOR:PROC ;DCL(MARCOS,PASCOS,PKSCOS,RDCOS,SWBCOS,WMACOS,ADCOS,COTCOS,
FDCOS
DCL (SILT,FED,BUNDS,BAN,SEWOK,UTLCS,ROBUD,ROTOT,BRITOT,CWRECK,BWRECK,
ROEXC,ROCOST,SHRTOT,PUBALO,PUBBUD,IRK,IMTOT,ISEED,LANGRA,LANREV,LANTOT,
LDFUND,LM,LNDTOT,MAICOS,MAIREQ,MANBUD,MANEXC,MANMON,MARTOT,MFCOS,MORAT,
MTN,MUSKIE,MUSTOT,NECESS,NOFUND, SELREV,SHRACU,X,LDTOT,PUBEXC,
CONCOS,BRICOS,SHRCOS,FSCOS,SCHCOS,AGCOS,REGRA,TROUT,SALMON,SB,SBTOT,BG,

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BGOT,SHAD,SHATOT,FERT,WB,WBTOT,FERTOT,CHETRE,GRAEXC,POLOK,POLL,XMIN,
XMAX,BYPASS,TROCOS,SALCOS,SBCOS,BGCOS,SHACOS,WBCOS,FERCOS,CHECOS,ARCOS,
GWCOS,RECALO,RECEXP,AKK,RECEXC,SCRTOT,PCOREV,PRMTOT,FCCOS,WLFCOS,TOMUCH
,ALRITE,VCOK,CITMON,DESTRY,COST,SEWMON,HPOK,AFOK,POLICE)
EXT FIXED BIN(31);

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DCL YFL EXT FLOAT BIN(21) , DRAND RETURNS(FLOAT BIN(21)) ;
DCL(NAME1,NAME2,NAME3,NAME4,NAME5,TYME) EXT CHAR(20);
DCL (LENGTH,TOTMGT,LANDEV,FINAN,SEWTR,WATRE,FNCE,ACCON,ACIM,ACMAIN,
BRIBUI,SHER,AGENT,SCHOOL,FS,LDIFILL,SBSPA,MONIT,FEAS,POPDY,CC,RATIO,
PLANK,REEFS,STOCK,AR,LANPUR,NAVLIT,WARDEN,SAFEBO,LICBCA,ZONING,
SWB,COTTGE,PAS,PARKS,MARINA,FD,SCNRD,WMA,AD,MAPS,MF,FC,WLF,SEL,BUY,
VC,PRM,NOCHA,HP,SMF,AF,FP,SFNCE) EXT FIXED BIN(15);
DCL(FSTOT,SCHTOT,AGTOT,BLOOM,K,ARTOT,GWTOT,SWBTOT,COTTOT,PASTOT,PKSTOT,
FDTOT,WMATOT,YEAR,NYEAR,LEASE,LIMIT,J) EXT FIXED BIN(15);
PUT EDIT(NAME3,',',AS RECREATION SPECIALIST DURING ',YEAR,',MADE
THE FOLLOWING DECISIONS:')(SKIP(4),A(20),A,F(4),A);

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/* DOOR1 */
IF SWB=0 THEN GO TO L701; SWBCOS=SWB*60000; RECEXP=RECEXP+SWBCOS;
PUT EDIT('YOU DECIDED TO INCREASE THE NUMBER OF PUBLIC SWIMMING B
EACHES IN THE FRANKLIN LAKE AREA BY ',SWB,' AT A COST OF ', SWBCOS,'
DOLLARS.')(SKIP,A,F(2),SKIP,A,F(7),A);
L701: IF COTTGE=0 THEN GO TO L703; COTCOS=COTTGE*15000;
RECEXP=RECEXP+COTCOS;

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/* DOOR2 */
PUT EDIT('YOU DECIDED TO INCREASE THE NUMBER OF RENTAL COTTAGES I
N THE FRANKLIN LAKE AREA BY ',COTTGE,' AT A COST OF ',COTCOS,' DOLLARS.
')(SKIP(2),A,F(2),A,F(7),A);
L703: IF PAS=0 THEN GO TO L705; PASCOS=PAS*20000; RECEXP=RECEXP+PASCOS;
PUT EDIT('YOU DECIDED TO INCREASE THE NUMBER OF PUBLIC ACCESS SIT

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ES IN THE FRANKLIN LAKE AREA BY 'PAS,' AT A COST OF 'PASCOS,' DOLLARS
')(SKIP(2),A,F(2),A,F(7),A);
/*
DOOR3
L705: IF PARKS=0 THEN GO TO L707; PKSCOS=PARKS*300000;
RECEXP=RECEXP+PKSCOS;
      PUT EDIT('YOU DECIDED TO INCREASE THE NUMBER OF PUBLIC PARKS IN T
HE FRANKLIN LAKE AREA BY ',PARKS,' AT A COST OF ',PKSCOS,' DOLLARS.')(S
KIP(2),A,F(1),A,F(7),A);
/*
DOOR4
L707: IF MARINA=0 THEN GO TO L709; MARCOS=MARINA*70000;
RECEXP=RECEXP+MARCOS;
      PUT EDIT('YOU DECIDED TO INCREASE THE NUMBER OF PUBLIC MARINAS IN
THE FRANKLIN LAKE AREA BY ',MARINA,' AT A COST OF ',MARCOS,' DOLLARS.
')(SKIP(2),A,F(2),A,F(7),A);
L709: IF FD=0 THEN GO TO L711; FDCCS=FD*20000; RECEXP=RECEXP+FDCCS;
/*
DOOR5
      PUT EDIT('YOU DECIDED TO INCREASE THE NUMBER OF FLOATING INFORMAT
ION DUCKS IN FRANKLIN LAKE BY ',FD,' AT A COST OF ',FDCOS,' DOLLARS.')(
SKIP(2),A,F(2),A,F(7),A);
L711: IF FDOT>2 THEN BWRECK=BWRECK+1; IF SCNRD=0 THEN GO TO L713;
RDCOS=SCNRD*35000; RECEXP=RECEXP+RDCOS;
      PUT EDIT('YOU DECIDED TO CONSTRUCT ',SCNRD,' MILES OF SCENIC ROAD
IN THE FRANKLIN LAKE AREA AT A COST OF ',RDCOS,' DOLLARS.')(SKIP(2),A,
F(2),A,F(7),A);
/*
DOOR6
L713: IF WMA=0 THEN GO TO L715; WMACOS=WMA*2000; RECEXP=RECEXP+WMACOS;
      PUT EDIT('YOU DECIDED TO PURCHASE ',WMA,' ACRES OF LAND FOR USE A
S A WILDLIFE MANAGEMENT AREA AT A COST OF ',WMACOS,' DOLLARS.')(SKIP(2)
,A,F(3),A,F(7),A);

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L715: IF AD=0 THEN GO TO L717; ADCOS=AD*10000; RECEXP=RECEXP+ADCOS;
/*
DOOR7
PUT EDIT('YOU DECIDED TO HIRE AN ADVERTISING AGENCY TO PROMOTE TH
E FRANKLIN LAKE AREA FOR ',AD,' MONTHS AT A COST OF ',ADCOS,' DOLLARS.
')(SKIP(2),A,F(2),A,F(6),A);
L717: IF MAPS=0 THEN GO TO L721; RECEXP=RECEXP+20000;
PUT EDIT('YOU DECIDED TO DESIGN AND PRODUCE UP-TO-DATE MAPS HIGHL
IGHTING RECREATIONAL FACILITIES IN THE FRANKLIN LAKE AREA',AT A COST O
F 20000 DOLLARS.')(SKIP(2),A,SKIP,A);
/*
DOOR8
L721: IF BAN=1 THEN GO TO L719;SWBTOT=SWBTOT+SWB; COTTOT=COTTOT+COTTGE;
PASTOT=PASTOT+PAS; PKSTOT=PKSTOT+PARKS; MARTOT=MARTOT+MARINA;
FDTOT=FDTOT+FD; SCRTOT=SCRTOT+SCNRD; WMATOT=WMATOT+WMA;
L719: RETURN; END DOOR;
* PROCESS ('EXTDIC,OPT=0');
EPCO:PROC ; DCL(PRMCOS,LNDCOS
DCL (SILT,FED,BONDS,BAN,SEWOK,UTLCOS,ROBUD,ROTOT,BRITOT,CWRECK,BWRECK,
ROEXC,ROCAST,SHRTOT,PUBALO,PUBBUD,IRK,IMTOT,ISEED,LANGRA,LANREV,LANTOT,
LDFUND,LM,LNDTOT,MAICCS,MAIREQ,MANBUD,MANEXC,MANMON,MARTOT,MFCOS,MORAT,
MTN,MUSKIE,MUSTOT,NECESS,NOFUND,
SELREV,SHRACU,X,LDTOT,PUBEXC,
CONCOS,BRICOS,SHPCOS,FSCOS,SCHCOS,AGCOS,REGRA,TROUT,SALMON,SB,SBTOT,BG,
BGTOT,SHAD,SHATOT,FERT,WB,WBTOT,FERTOT,CHEGRE,GRAEXC,POLOK,POLL,XMIN,
XMAX,BYPASS,TROCOS,SALCUS,SBCOS,BGCOS,SHACOS,WBCOS,FERCOS,CHECOS,ARCOS,
GWCOS,RECALO,RECEXP,AOK,RECEXC,SCRTOT,PCOREV,PRMTOT,FCCOS,WLFCOS,TOMUCH
,ALRITE,VCOK,CITMON,DESTRY,COST,SEWMON,HPOK,AFOK,POLICE)
EXT FIXED BIN(31);
DCL YFL EXT FLOAT BIN(21) , DRAND RETURNS(FLOAT BIN(21)) ;
DCL(NAME1,NAME2,NAME3,NAME4,NAME5,TYME) EXT CHAR(20);
DCL (LENGTH,TOTMGT,LANDEV,FINAN,SEWTRE,WATRE,FNCE,ACCON,ACIM,ACMAIN,

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BRIBUI,SHER,AGENT,SCHOOL,FS,LDFILL,SBSPA,MONIT,FEAS,POPDY,CC,RATIO,
PLANK,REEFS,STOCK,AR,LANPUR,NAVIT,WARDEN,SAFEBO,LIC80A,ZONING,
SWB,COTTGE,PAS,PARKS,MARINA,FD,SCNRD,WMA,AD,MAPS,MF,FC,WLF,SEL,BUY,
VC,PRM,NOCHA,HP,SMF,AF,FP,SFNC) EXT FIXED BIN(15);
DCL(FSTOT,SCHTOT,AGTOT,BLOOM,K,ARTOT,GWTOT,SWBTOT,COTTOT,PASTOT,PKSTOT,
FDTOT,WMATOT,YEAR,NYEAR,LEASE,LIMIT,J) EXT FIXED BIN(15);
PUT EDIT(NAME4,, AS POWER COMPANY EXECUTIVE DURING ',YEAR,', MAD
E THE FOLLOWING DECISIONS:')(SKIP(4),A(20),A,F(4),A);
/*
IEP1
IF MF=0 THEN GO TO L801;
PUT EDIT('YOU DECIDED TO SET MINIMUM FLOW CONSTRAINTS FOR THE RIV
ER BELOW THE DAM AT ',MF,' CUBIC FEET PER SECOND.')(SKIP(2),A,F(5),A);
L801: IF FC=0 THEN GO TO L803;
PUT EDIT('YOU DECIDED TO MAINTAIN ',FC,' FEET OF STORAGE IN FRANK
LIN LAKE FOR FLOOD CONTROL.')(SKIP(2),A,F(2),A);
/*
IEP2
L803: IF WLF=0 THEN GO TO L805;
PUT EDIT('YOU DECIDED TO REGULATE WATER LEVEL FLUCTUATION IN ORDE
R TO ALLOW STRIPED BASS TO MAKE SUCCESSFUL SPAWNING RUNS.')(SKIP(2),A);
L805: IF BUY=0 THEN GO TO L807; LNDTOT=LNDTOT+BUY; LANTOT=LANTOT+BUY;
LNDCCS=BUY*2000; PCOREV=PCOREV+LNDCCS;
PUT EDIT('YOU DECIDED TO BUY ',BUY,' ACRES OF LAND FOR ADDITIONAL
RESOURCE PROTECTION AT A COST OF ',LNDCCS,' DOLLARS.')(SKIP(2),A,F(4),
A,F(7),A);
/*
IEP3
L807: IF LEASE=0 THEN GO TO L809; LNDTOT=LNDTOT-LEASE;
LANGRA=LANGRA+LEASE;
PUT EDIT('YOU DECIDED TO GRANT ',LEASE,' ACRES OF LAND TO THE DEP
ARTMENT OF OUTDOOR RECREATION.')(SKIP(2),A,F(4),A);

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L809: IF SEL=0 THEN GO TO L811; LANTOT=LANTOT-SEL; LNDTOT=LNDTOT-SEL;
SELREV=SEL*2000; PCOREV=PCOREV-SELREV;
/*
      IEP4
PUT EDIT('YOU DECIDED TO SELL ',SEL,' ACRES OF LAND RESULTING IN
AN INCOME OF ',SELREV,' DOLLARS.')(SKIP(2),A,F(4),A,F(7),A);
L811: IF LNDTOT>=0 THEN GO TO L813; LANGRA=LANGRA-LEASE;
PCOREV=PCOREV+SELREV; LANTOT=LANTOT+SEL;
L813: IF LANTOT<2000 THEN SILT=SILT+1; IF VCOK=1 THEN GO TO L814;
IF BAN=1 THEN GO TO L814; IF VC=0 THEN GO TO L814;PCCREV=PCOREV+200000;
/*
      IEP5
PUT EDIT('YOU DECIDED TO CONSTRUCT A VISITOR CENTER AND PICNIC AR
EA AT THE DAMSITE AT A COST OF 20000 DOLLARS.')(SKIP(2),A);
L814: IF PRM=0 THEN GO TO L816; PRMTOT=PRMTOT+PRM; PRMCOS=PRMTOT*15000;
PCOREV=PCOREV+PRMCOS;
PUT EDIT('YOU DECIDED TO INCREASE THE NUMBER OF PUBLIC RELATIONS M
EN IN THE FRANKLIN LAKE AREA BY ',PRM,'.',',YOUR TOTAL YEARLY SALARY EXP
ENSE FOR PUBLIC RELATIONS MEN IS NOW ',PRMCOS,' DOLLARS.')(SKIP(2),A,F(
1),A,SKIP,A,F(5),A);
/*
      IEP6
L816: IF MTN=0 THEN GO TO L818; PCCREV=PCOREV+MTN;
PUT EDIT('YOU DECIDED TO SPEND ',MTN,' DOLLARS ON MAINTENANCE OF
EQUIPMENT AT THE DAMSITE.')(SKIP(2),A,F(7),A);
L818: RETURN; END EPCO;
* PROCESS ('EXTDIC,OPT=0');
CIMAY:PROC
;
DCL (SILT,FED,BONDS,BAN,SEWOK,UTLCOS,ROBUD,ROTOT,BRITOT,CWRECK,BWRECK,
ROEXC,ROCAST,SHRTOT,PUBALO,PUBBUD,IRK,IMTOT,ISEED,LANGRA,LANREV,LANTOT,
LDFUND,LM,LNDTOT,MAICOS,MAIREQ,MANBUD,MANEXC,MANMON,MARTOT,MFCOS,MORAT,
MTN,MUSKIE,MUSTOT,NECESS,NOFUND,
SELREV,SHRACU,X,LDTOT,PUBEXC,

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CONCOS,BRICOS,SHRCOS,FSCOS,SCHCOS,AGCOS,REGRA, TROUT,SALMON,SB,SBTOT,BG,
BGTOT,SHAD,SHATOT,FERT,WB,WBTOT,FERTOT,CHEGRE,GRAEXC,POLOK,POLL,XMIN,
XMAX,BYPASS,TROCCOS,SALCUS,SBCOS,BGCOS,SHACOS,WBCOS,FERCOS,CHECOS,ARCOS,
GWCOS,RECALO,RECEXP,AOK,RECEXC,SCRTOT,PCOREV,PRMTOT,FCCOS,WLFCOS,TOMUCH
,ALRITE,VCOK,CITMON,DESTRY,COST,SEWMON,HPOK,AFOK,POLICE)
EXT FIXED BIN(31);

DCL YFL EXT FLOAT BIN(21) , DRAND RETURNS(FLOAT BIN(21)) ;
DCL(NAME1,NAME2,NAME3,NAME4,NAME5,TYME) EXT CHAR(20);
DCL (LENGTH,TOTMGT,LANDEV,FINAN,SEWTR,WATRE,FNCE,ACCON,ACIM,ACMAIN,
BRIBUI,SHER,AGENT,SCHOOL,FS,LDIFILL,SBSPA,MONIT,FEAS,POPDY,CC,RATIO,
PLANK,REEFS,STOCK,AR,LANPUR,NAVLIT,WARDEN ,SAFEBO,LICBDA,ZONING,
SWB,COTTGE,PAS,PARKS,MARINA,FD,SCNRD,WMA,AD,MAPS,MF,FC,WLF,SEL,BUY,
VC,PRM,NOCHA,HP,SMF,AF,FP,SFNCE) EXT FIXED BIN(15);
DCL(FSTOT,SCHTOT,AGTOT,BLOOM,K,ARTOT,GWTOT,SWBTOT,COTTOT,PASTOT,PKSTOT,
FDTOT,WMATOT,YEAR,NYEAR,LEASE,LIMIT,J) EXT FIXED BIN(15);
PUT EDIT(NAME5,', AS CITY MAYOR DURING ',YEAR,' MADE THE FOLLOWIN
G DECISIONS:')(SKIP(4),A(20),A,F(4),A); IF AOK=1 THEN GO TO L923;
IF MORAT=1 THEN IRK=1; IF POLL=1 THEN DESTRY=1;IF NOCHA=0 THEN GO TO L9
01 ; MORAT=1; POLL=1; PUT EDIT('YOU DECIDED TO MAKE NO CHANGES IN
THE CURRENT SEWAGE TREATMENT METHODS.')(SKIP(2),A);
/*
CIMBI
*/
L901: IF HP=0 THEN GO TO L903;COST=COST+1500000;
PUT EDIT('YOU DECIDED TO CONSTRUCT A HOLDING POND AT A COST OF 150
0000 DOLLARS.')(SKIP(2),A);GO TO L905;L903:MORAT=1;POLL=1;L905: IF SMF
=0 THEN GO TO L906; MORAT=1; COST=COST+2500000;
PUT EDIT('YOU DECIDED TO INSTAL A SEMI-MANUAL FEED DEVICE FOR PH
OSPATE REMOVAL AND CONSTRUCT',A SLUDGE LAGOON AT A COST OF 250000 DOL
LARS.')(SKIP(2),A,SKIP,A); L906: IF AF=0 THEN GO TO L908;
COST=COST+1000000;

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PUT EDIT('YOU DECIDED TO INSTALL AN AUTOMATIC FEED DEVICE FOR PHO
SPHATE AND SLUDGE REMOVAL AT A COST OF 1000000 DOLLARS.')(SKIP(2),A);
/*
CIMB2
GO TO L910;L908: MORAT=1;L910: IF FP>1 THEN GO TO L911; MORAT=1;
PUT EDIT('YOU DECIDED TO MAKE NO FURTHER PLANS FOR SEWAGE TREATME
NT PLANT EXPANSION.')(SKIP(2),A); GO TO L913;L911: IF FP>2 THEN GO TO L
914; COST=COST+2500000;
PUT EDIT('YOU DECIDED TO MAKE PLANS FOR THE EXPANSION OF SEWAGE T
REATMENT PLANT FACILITIES RESULTING IN A COST OF 2500000 DOLLARS.')(SKI
P(2),A); GO TO L913; L914: IF FP=3 THEN GO TO L913;
/*
CIMB3
COST=COST+15000000; PUT EDIT('YOU DECIDED TO CONSTRUCT A NEW SEWAGE
TREATMENT PLANT AT A COST OF 15000000 DOLLARS.')(SKIP(2),A);
L913: IF COST=0 THEN GO TO L917; IF SFNCE=1 THEN GO TO L917;
IF SFNCE=2 THEN PUT EDIT('YOU DECIDED TO APPLY TO THE FEDERAL GOV
ERNMENT FOR FUNDS TO FINANCE SEWAGE TREATMENT IMPROVEMENTS.')(SKIP(2),A
); IF SFNCE=3 THEN PUT EDIT('YOU DECIDED TO INCREASE SEWAGE SERVI
CE CHARGES IN ORDER TO FINANCE SEWAGE TREATMENT IMPROVEMENTS.')(SKIP(2
),A);
/*
CIMB4
IF SFNCE=4 THEN PUT EDIT('YOU DECIDED TO PETITION LOCAL GOVERNMEN
TS IN THE SURROUNDING COUNTY FOR MONEY TO FINANCE SEWAGE TREATMENT IMPR
OVEMENTS.')(SKIP(2),A);
GO TO L917;
L923: PUT EDIT('YOU MADE NO FURTHER DECISIONS CONCERNING SEWAGE TREATME
NT BECAUSE THE PROBLEMS OF SPARKLE IN THIS AREA', 'HAVE BEEN RESOLVED.')(
SKIP,A,SKIP,A);
/*
CIMB5
L917: IF CITMON=0 THEN GO TO L921; PUT EDIT('YOU DECIDED TO GIVE

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,CITMON,' DOLLARS TO THE REGIONAL PLANNING COMMISSIONER TO ASSIST IN D
EVELOPMENT OF',THE FRANKLIN LAKE AREA DURING ',NYEAR,'.')(SKIP(2),A,F(
7),A,SKIP,A,F(4),A); L921: RETURN; END CIMAY;
* PROCESS ('EXTDIC,OPT=0');
REPCO:PROC ;
DCL (SILT,FED,BONDS,BAN,SEWOK,UTLCOS,ROBUD,ROTOT,BRITOT,CWRECK,BWRECK,
ROEXC,ROCAST,SHRTOT,PUBALO,PUBBUD,IRK,IMTOT,ISEED,LANGRA,LANREV,LANTOT,
LDFUND,LM,LNDTOT,MAICOS,MAIREQ,MANBUD,MANEXC,MANMON,MARTOT,MFCOS,MORAT,
MTN,MUSKIE,MUSTOT,NECESS,NOFUND, SELREV,SHRACU,X,LDTOT,PUBEXC,
CONCOS,BRICOS,SHRCOS,FSCOS,SCHCOS,AGCOS,REGRA,TROUT,SALMON,SB,SBTOT,BG,
BGTOT,SHAD,SHATOT,FERT,WB,WBTOT,FERTOT,CHETRE,GRAEXC,POLOK,POLL,XMIN,
XMAX,BYPASS,TROCOS,SALCOS,SBCOS,BGCOS,SHACOS,WBCOS,FERCOS,CHECOS,ARCOS,
GWCOS,RECALO,RECEXP,AKK,RECEXC,SCRTOT,PCOREV,PRMTOT,FCCOS,WLFCOS,TOMUCH
,ALRITE,VCOK,CITMON,DESTRY,COST,SEWMON,HPOK,AFOK,POLICE)
EXT FIXED BIN(31);
DCL YFL EXT FLOAT BIN(21) , DRAND RETURNS(FLOAT BIN(21)) ;
DCL(NAME1,NAME2,NAME3,NAME4,NAME5,TYME) EXT CHAR(20);
DCL (LENGTH,TOTMGT,LANDEV,FINAN,SEWTRE,WATRE,FNCE,ACCON,ACIM,ACMAIN,
BRIBUI,SHER,AGENT,SCHOOL,FS,LD,ILL,SBSPA,MONIT,FEAS,POPDY,CC,RATIO,
PLANK,REEFS,STOCK,AR,LANPUR,NAVLIIT,WARDEN ,SAFEBO,LICBOA,ZONING,
SWB,COTTGE,PAS,PARKS,MARINA,FD,SCNPD,WMA,AD,MAPS,MF,FC,WLF,SEL,BUY,
VC,PRM,NOCHA,HP,SMF,AF,FP,SFNC) EXT FIXED BIN(15);
DCL (FSTOT,SCHTOT,AGTOT,BLOOM,K,ARTOT,GWTOT,SWBTOT,COTTOT,PASTOT,PKSTOT,
FDTOT,WMATOT,YEAR,NYEAR,LEASE,LIMIT,J) EXT FIXED BIN(15);
DCL (IMCOS,LDCOS,AGACU
)FIXED BINARY(31);
PUT EDIT(NAME1,', AS REGIONAL PLANNING COMMISSIONER DURING ',YEAR,' MAD
E THE FOLLOING DECISIONS:')(SKIP(4),A(20),A,F(4),A);
/*
REPBI
*/
IF YEAR>1974 THEN GO TO L5012;

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IF LANDEV=1 THEN PUT EDIT('YOU DECIDED NOT TO IMPLEMENT ANY CONTR
OLS OVER DEVELOPMENT.')(SKIP(2),A);
IF LANDEV=2 THEN PUT EDIT('YOU DECIDED TO LET EACH COUNTY ESTABLISH ITS OWN CONTROLS OVER DEVELOPMENT.')(SKIP(2),A);
IF LANDEV=3 THEN PUT EDIT('YOU DECIDED TO ESTABLISH SUBDIVISION REGULATIONS WITH WHICH LAND DEVELOPERS MUST COMPLY.')(SKIP(2),A);
IF LANDEV=4 THEN PUT EDIT('YOU DECIDED TO ESTABLISH COMPLETE CONTROL OVER DEVELOPMENT BY IMPLEMENTATION OF A COMPREHENSIVE, LAND USE PLAN COSTING 150,000 DOLLARS.')(SKIP(2),A,SKIP,A);
/*
REP82
L5012: IF LANDEV=4 THEN GO TO L590;IF FINAN=0 THEN GO TO L590;
IF LDFUND=1 THEN GO TO L590;
IF FINAN=1 THEN PUT EDIT('YOU DECIDED TO FINANCE THE LAND USE PLAN BY REQUESTING ADDITIONAL FUNDS FROM EACH COUNTY GOVERNMENT.')(SKIP(2),A);
/*
IF FINAN=2 THEN PUT EDIT('YOU DECIDED TO FINANCE THE LAND USE PLAN BY APPLYING FOR FEDERAL FUNDS.')(SKIP(2),A);
REP83
IF FINAN=3 THEN PUT EDIT('YOU DECIDED TO FINANCE THE LAND USE PLAN THROUGH THE SALE OF BONDS.')(SKIP(2),A);
L590: IF SEWTRE>1 THEN GO TO L583;
PUT EDIT('YOU DECIDED TO HAVE ALL PRIVATE SEPTIC SYSTEMS INSPECTED SEMI-ANNUALLY.')(SKIP(2),A); GO TO L582;
/*
REP84
L583: IF SEWTRE>2 THEN GO TO L581;
PUT EDIT('YOU DECIDED TO EXPAND EXISTING COUNTY SEWAGE FACILITIES TO SERVE THE FRANKLIN LAKE AREA AT A COST OF 80000 DOLLARS.')(SKIP(2),A);
UTLCOS=UTLCOS+80000; GO TO L582;
L581: IF SEWTRE=3 THEN PUT EDIT('YOU DECIDED TO CONSTRUCT A 3000000 DOLLAR

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LAR SEWAGE TREATMENT FACILITY FOR THE FRANKLIN LAKE AREA.')(SKIP(2),A);
/*
REP B5
UTLCOS=UTLCOS+3000000;
L582: IF WATRE>1 THEN GO TO L584;
      PUT EDIT('YOU DECIDED TO HAVE ALL PRIVATE WATER SUPPLIES INSPECTE
D SEMI-ANNUALLY.')(SKIP(2),A); GO TO L585;
L584: IF WATRE>2 THEN GO TO L609;
      PUT EDIT('YOU DECIDED TO EXPAND COUNTY PUBLIC WATER SUPPLY FACILI
TIES TO SERVE THE FRANKLIN LAKE AREA AT A COST OF 400000 DOLLARS.')(SKI
P(2),A); UTLCOS=UTLCOS+400000; GO TO L585;
/*
REP B6
L609: IF WATRE=3 THEN PUT EDIT('YOU DECIDED TO CONSTRUCT A 2000000 DOLL
AR WATER SUPPLY FACILITY FOR THE FRANKLIN LAKE AREA.')(SKIP(2),A);
UTLCOS=UTLCOS+2000000;
L585: IF FNCE=2 THEN PUT EDIT('YOU DECIDED TO SELL BONDS IN ORDER TO FI
NANCE IMPROVEMENT OF SEWAGE TREATMENT AND WATER SUPPLY FACILITIES.')(SK
IP(2),A);
/*
REP B7
      IF FNCE=3 THEN PUT EDIT('YOU DECIDED TO APPLY FOR FEDERAL FUNDS I
N ORDER TO FINANCE IMPROVEMENT OF SEWAGE TREATMENT AND WATER SUPPLY FAC
ILITIES.')(SKIP(2),A);
      IF FNCE=4 THEN PUT EDIT('YOU DECIDED TO INCREASE PROPERTY TAXES I
N ORDER TO FINANCE IMPROVEMENT OF SEWAGE TREATMENT AND WATER SUPPLY FAC
ILITIES.')(SKIP(2),A);
/*
REP B8
      IF ACCON=0 THEN GO TO L618; CONCOS=ACCON*45000;
      ROCOST=ROCCOST+CONCOS; ROTOT=ROTOT+ACCON;
      PUT EDIT('YOU DECIDED TO CONSTRUCT ',ACCON,' MILES OF NEW ACCESS
ROADS AT A COST OF ',CONCOS,' DOLLARS.')(SKIP(2),A,F(2),A,F(7),A);
/*

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L618: IF ACIM=0 THEN GO TO L620; IMCOS=ACIM*15000;
ROCOST=ROCOST+IMCOS; IMTOT=IMTOT+ACIM;
/*
REP89
PUT EDIT('YOU DECIDED TO IMPROVE ',ACIM,' MILES OF ACCESS ROADS A
T A COST OF ',IMCOS,' DOLLARS.')(SKIP(2),A,F(2),A,F(7),A);
L620: IF IMTOT<35 THEN CWRECK=CWRECK+1; IF ACMAIN=0 THEN GO TO L622;
MAICOS=ACMAIN*1000; ROCOST=ROCOST+MAICOS;
PUT EDIT('YOU DECIDED TO MAINTAIN ',ACMAIN,' MILES OF ACCESS ROAD
S AT A COST OF ',MAICOS,' DOLLARS.')(SKIP(2),A,F(3),A,F(6),A);
/*
REP810
L622: MAIREQ=ROTOT*3/4; IF ACMAIN<MAIREQ THEN CWRECK=CWRECK+1;
IF BRIBUI=0 THEN GO TO L624; BRICOS=BRIBUI*100000;
ROCOST=ROCOST+BRICOS; BRITOT=BRITOT+BRIBUI;
PUT EDIT('YOU DECIDED TO INCREASE THE NUMBER OF BRIDGES ACROSS FR
ANKLIN LAKE BY ',BRIBUI,' AT A COST OF ',BRICOS,' DOLLARS.')(SKIP(2),A,
F(2),A,F(6),A);
/*
REP811
L624: IF BRITOT>=2 THEN BWRECK=BWRECK+1;
IF ROCOST>ROBUD THEN ROEXC=ROCOST-ROBUD;
IF SHER=0 THEN GO TO L632; SHRACU=SHRTOT; SHRACU=SHRACU+SHER;
SHRCOS=SHRACU*8000; PUBBUD=PUBBUD+SHRCOS;
PUT EDIT('YOU DECIDED TO INCREASE THE NUMBER OF DEPUTY SHERIFFS O
N YOUR STAFF BY ',SHER,'.',',YOUR TOTAL YEARLY SALARY EXPENSE FOR DEPUTY
SHERIFFS IS NOW ',SHRCOS,' DOLLARS.')(SKIP(2),A,F(2),A,SKIP,A,F(6),A);
/*
REP812
L632: IF FS=0 THEN GO TO L634; FSCOS=FS*20000; PUBBUD=PUBBUD+FSCOS;
PUT EDIT('YOU DECIDED TO INCREASE THE NUMBER OF FIRE STATIONS IN
THE FRANKLIN LAKE AREA BY ',FS,' AT A COST OF ',FSCOS,' DOLLARS.')(SKIP
(2),A,F(2),A,F(6),A);

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L634: IF SCHOOL=0 THEN GO TO L636; SCHCOS=SCHOOL*50000;
PUBBUD=PUBBUD+SCHCOS;
/*
      REPB13
PUT EDIT('YOU DECIDED TO INCREASE THE NUMBER OF SCHOOL BUILDINGS
IN THE FRANKLIN LAKE AREA BY ',SCHOOL,' AT A COST OF ',SCHCOS,' DOLLARS
.')(SKIP(2),A,F(2),A,F(6),A);
L636: IF LDFILL=0 THEN GO TO L638; LDCOS=LDFILL*20000;
PUBBUD=PUBBUD+LDCOS;
      PUT EDIT('YOU DECIDED TO INCREASE THE NUMBER OF LANDFILLS IN THE
FRANKLIN LAKE AREA BY ',LDFILL,' AT A COST OF ',LDCOS,' DOLLARS.')(SKIP
(2),A,F(2),A,F(6),A);
/*
      REPB14
L638: IF AGENT=0 THEN GO TO L640; AGACU=AGTOT; AGACU=AGACU+AGENT;
AGCOS=AGACU*9000; PUBBUD=PUBBUD+AGCOS;
      PUT EDIT('YOU DECIDED TO INCREASE THE NUMBER OF AGRICULTURAL ADVI
SORY AGENTS ON YOUR STAFF BY ',AGENT,'.',',YOUR TOTAL YEARLY SALARY EXPE
NSE FOR AGRICULTURAL AGENTS IS NOW ',AGCOS,' DOLLARS.')(SKIP(2),A,F(2),
A,SKIP,A,F(6),A);
/*
      REPB15
L640: IF PUBALOC<=0 THEN GO TO L642; SHRTOT=SHRTOT+SHER;
POLICE=POLICE+SHER; FSTOT=FSTOT+FS; SCHTOT=SCHTOT+SCHOOL;
LDTOT=LDTOT+LDFILL; AGTOT=AGTOT+AGENT;
L642: RETURN; END REPCO ;
* PROCESS ('EXTDIC,OPT=0');
INPUT : PROC;
DCL (SILT,FED,BONDS,BAN,SEWOK,UTLCCS,ROBUD,ROTOT,BRITOT,CWRECK,BWRECK,
ROEXC,ROCAST,SHRTOT,PUBALO,PUBBUD,IRK,IMTOT,ISEED,LANGRA,LANREV,LANTOT,
LDFUND,LM,LNDTOT,MAICOS,MAIREQ,MANBUD,MANEXC,MANMON,MARTOT,MFCOS,MORAT,
MTN,MUSKIE,MUSTOT,NECESS,NOFUND,SELREV,SHRACU,X,LDTOT,PUBEXC,

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CONCOS,BRICOS,SHFCOS,FSCOS,SCHCOS,AGCOS,REGRA,TROUT,SALMON,SB,SRTOT,BG,
BGTOT,SHAD,SHATOT,FERT,WB,WBTOT,FERTOT,CHETRE,GRAEXC,POLOK,POLL,XMIN,
XMAX,BYPASS,TROCOS,SALCOS,SBCOS,BGCOS,SHACOS,WBCOS,FFRCOS,CHECOS,ARCOS,
GWCOS,RECALO,RECEXP,AOK,RECEXC,SCRTOT,PCOREV,PRMTOT,FCCOS,WLFCOS,TOMUCH
,ALRITE,VCOK,CITMON,DESTROY,COST,SEWMCN,HPOK,AFOK,POLICE)
    EXT FIXED BIN(31);
DCL YFL EXT FLOAT BIN(21) , DPAND RETURNS(FLOAT BIN(21)) ;
DCL(NAME1,NAME2,NAME3,NAME4,NAME5,TYME) EXT CHAR(20);
DCL (LENGTH,TOTMGT,LANDEV,FINAN,SEWTRE,WATRE,FNCE,ACCON,ACIM,ACMAIN,
BRIBUI,SHER,AGENT,SCHOOL,FS,LDFILL,SBSPA,MONIT,FEAS,POPDY,CC,RATIO,
    PLANK,REEFS,STOCK,AR,LANPUR,NAVLIT,WARDEN ,SAFEBO,LICBOA,ZONING,
SWB,COTTGE,PAS,PARKS,MARINA,FD,SCNRD,WMA,AD,MAPS,MF,FC,WLF,SEL,BUY,
    VC,PRM,NOCHA,HP,SMF,AF,FP,SFNCE) EXT FIXED BIN(15);
DCL(FSTOT,SCHTOT,AGTOT,BLOOM,K,ARTOT,GWTOT,SWBTOT,COTTOT,PASTOT,PKSTOT,
FDTOT,WMATOT,YEAR,NYEAR,LEASE,LIMIT,J) EXT FIXED BIN(15);
DCL (C_CARD) CHAR(72) VARYING;
DCL (SEMI_COLON) CHAR(1) INITIAL(';');
DCL LABEL LABEL;
ON CONVERSION GO TO E_CONVRT;
EL101: LABEL=EL101;
PUT EDIT('FINAN')(SKIP(2),A); PUT SKIP;GET LIST(FINAN);
IF FINAN=5 THEN GO TO FIJ00 ;
PUT LIST('NAME1') ;PUT SKIP;GET LIST(NAME1) ;
PUT LIST('SEWTRE') ;PUT SKIP;GET LIST(SEWTRE) ;
PUT LIST('WATRE') ;PUT SKIP;GET LIST(WATRE) ;
PUT LIST('FNCE') ;PUT SKIP;GET LIST(FNCE) ;
PUT LIST('ACCON') ;PUT SKIP;GET LIST(ACCON) ;
PUT LIST('ACIM') ;PUT SKIP;GET LIST(ACIM) ;
PUT LIST('ACMAIN') ;PUT SKIP;GET LIST(ACMAIN);

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PUT LIST('BRIBUI');PUT SKIP;GET LIST(BRIBUI);
PUT LIST('SHER') ;PUT SKIP;GET LIST(SHER) ;
PUT LIST('AGENT') ;PUT SKIP;GET LIST(AGENT) ;
PUT LIST('SCHOOL');PUT SKIP;GET LIST(SCHOOL);
PUT LIST('FS') ;PUT SKIP;GET LIST(FS) ;
PUT LIST('LDFILL');PUT SKIP;GET LIST(LDFILL);
EL201 : LABEL=EL201;
PUT EDIT('FISHERIES MANAGER', 'NAME2')(SKIP(2),X(10),A, SKIP,A);PUT SKIP;
GET LIST(NAME2);
PUT LIST('SBSPA') ;PUT SKIP;GET LIST(SBSPA) ;
PUT LIST('MONIT') ;PUT SKIP;GET LIST(MONIT) ;
PUT LIST('FEAS') ;PUT SKIP;GET LIST(FEAS) ;
PUT LIST('POPDY') ;PUT SKIP;GET LIST(POPDY) ;
PUT LIST('CC') ;PUT SKIP;GET LIST(CC) ;
PUT LIST('RATIO') ;PUT SKIP;GET LIST(RATIO) ;
PUT LIST('LIMIT') ;PUT SKIP;GET LIST(LIMIT) ;
PUT LIST('PLANK') ;PUT SKIP;GET LIST(PLANK) ;
PUT LIST('REEFS') ;PUT SKIP;GET LIST(REEFS) ;
PUT LIST('STOCK') ;PUT SKIP;GET LIST(STOCK) ;
IF STOCK=0 THEN GO TO G3;
PUT LIST('LM') ;PUT SKIP;GET LIST(LM) ;
PUT LIST('TROUT') ;PUT SKIP;GET LIST(TROUT) ;
PUT LIST('SALMON');PUT SKIP;GET LIST(SALMON);
PUT LIST('SB') ;PUT SKIP;GET LIST(SB) ;
PUT LIST('MUSKIE');PUT SKIP;GET LIST(MUSKIE);
PUT LIST('BG') ;PUT SKIP;GET LIST(BG) ;
PUT LIST('SHAD') ;PUT SKIP;GET LIST(SHAD) ;
PUT LIST('WB') ;PUT SKIP;GET LIST(WB) ;

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PUT LIST('FERT') ;PUT SKIP;GET LIST(FERT) ;
PUT LIST('CHETRE');PUT SKIP;GET LIST(CHETRE);
PUT LIST('AR') ;PUT SKIP;GET LIST(AR) ;
PUT LIST('LANPUR');PUT SKIP;GET LIST(LANPUR);
PUT LIST('NAVLIT');PUT SKIP;GET LIST(NAVLIT);
PUT LIST('WARDEN');PUT SKIP;GET LIST(WARDEN);
PUT LIST('SAFEBO');PUT SKIP;GET LIST(SAFEBO);
PUT LIST('LICBOA');PUT SKIP;GET LIST(LICBOA);
PUT LIST('ZONING');PUT SKIP;GET LIST(ZONING);
EL301 : LABEL=EL301;
PUT EDIT('RECREATION SPECIALIST','NAME3')(SKIP(2),X(10),A,SKIP,A);
PUT SKIP;GET LIST(NAME3);
PUT LIST('SWB') ;PUT SKIP;GET LIST(SWB) ;
PUT LIST('COTTGE');PUT SKIP;GET LIST(COTTGE);
PUT LIST('PAS') ;PUT SKIP;GET LIST(PAS) ;
PUT LIST('PARKS') ;PUT SKIP;GET LIST(PARKS) ;
PUT LIST('MARINA');PUT SKIP;GET LIST(MARINA);
PUT LIST('FD') ;PUT SKIP;GET LIST(FD) ;
PUT LIST('SCNRD') ;PUT SKIP;GET LIST(SCNRD) ;
PUT LIST('WMA') ;PUT SKIP;GET LIST(WMA) ;
PUT LIST('AD') ;PUT SKIP;GET LIST(AD) ;
PUT LIST('MAPS') ;PUT SKIP;GET LIST(MAPS) ;
EL401 : LABEL=EL401;
PUT EDIT('POWER COMPANY EXECUTIVE','NAME4')(SKIP(2),X(10),A,SKIP,A);
PUT SKIP;GET LIST(NAME4);
PUT LIST('MF') ;PUT SKIP;GET LIST(MF) ;
PUT LIST('FC') ;PUT SKIP;GET LIST(FC) ;
PUT LIST('WLF') ;PUT SKIP;GET LIST(WLF) ;
PUT LIST('SEL') ;PUT SKIP;GET LIST(SEL) ;

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PUT LIST('BUY') ; PUT SKIP;GET LIST(BUY) ;
PUT LIST('LEASE') ; PUT SKIP;GET LIST(LEASE) ;
PUT LIST('VC') ; PUT SKIP;GET LIST(VC) ;
PUT LIST('PRM') ; PUT SKIP;GET LIST(PRM) ;
PUT LIST('MTN') ; PUT SKIP;GET LIST(MTN) ;
EL501 : LABLE=EL501;
PUT EDIT('CITY MAYOR','NAME5')(SKIP(2),X(10),A,SKIP,A);
PUT SKIP; GET LIST(NAME5);
PUT LIST('NOCHA') ; PUT SKIP;GET LIST(NOCHA) ;
IF NOCHA=1 THEN GO TO G4;
PUT LIST('HP') ; PUT SKIP;GET LIST(HP) ;
PUT LIST('SMF') ; PUT SKIP;GET LIST(SMF) ;
IF SMF=1 THEN GO TO G4;
PUT LIST('AF') ; PUT SKIP;GET LIST(AF) ;

PUT LIST('FP') ; PUT SKIP;GET LIST(FP) ;
PUT LIST('SFNCE') ; PUT SKIP;GET LIST(SFNCE) ;
PUT LIST('CITMON') ; PUT SKIP;GET LIST(CITMON);
ON CONVERSION SYSTEM;
/*
CORRECTIONS ??

```

G4:

*/

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F1000:
PUT EDIT('***** ENTER INPUT CORRECTIONS BELOW. *****
***** FOLLOW PROCEDURE OUTLINED IN THE STUDENTS GUIDE TO
DAM. ***** BE CERTAIN NOT TO EXCEED 70 COLUMNS PER LINE OF
ENTRY *****',1)*****
*****70')(SKIP,A,SKIP,A,SKIP,A); PUT SKIP;
ON ERROR GO TO ECHK;GO TO READ_COR;
ECHK : PUT EDIT('***** AN ERROR IN INPUT HAS BEEN DETECTED. *****',PLE
ASE CHECK VARIABLE NAMES AND RE-ENTER THE ENTIRE LINE.')(SKIP,X(12),A,S

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KIP,X(7),A); PUT SKIP; GO TO READ_COR;
READ_COR:
J=J+1 ; IF J=10 THEN RETURN;
GET EDIT(C_CARD) (COL(1),A(72)) COPY;
GET STRING(C_CARD||SEMI_COLON) DATA;
IF INDEX (C_CARD,SEMI_COLON)=0 THEN DO;
PUT EDIT('***** ENTER ANOTHER LINE OF CORRECTIONS *****',0
R ENTER ';;' TO TERMINATE THE CORRECTION PROCEDURE.')(SKIP,X(7),A,SKIP
,X(9),A);
PUT SKIP ; GO TO READ_COR; END ; ON ERROR SYSTEM ;
RETURN;
E_CONVERT: PUT LIST('AN INPUT ERROR HAS OCCURED. RE-ENTER THE VARIABLE
S.'): GO TO LABEL;
END INPUT;
/* OVERLAY 'JCL'
INSERT DAM,DRAND
OVERLAY X
INSERT REPCO,**REPCOA
OVERLAY X
INSERT DOGAF,**DOGAF
OVERLAY X
INSERT DOOR,**DOORA.
OVERLAY X
INSERT EPCO,**EPCOA
OVERLAY X
INSERT CIMAY,**CIMAYA
OVERLAY X
INSERT INPUT,**INPUTA
OVERLAY X

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INSERT COMISAR,COMISARA
OVERLAY X
INSERT *LACKEYA,LACKEY
OVERLAY X
INSERT JANE,**JANEA
OVERLAY X
INSERT HITLER,*HITLERA
OVERLAY X
INSERT SEBONJOC,SEBONJCA
USE A , //GO.SYSIN DD DUMMY , STATMENT
/*
```

APPENDIX II
Instructor's Guide to DAM

INSTRUCTOR'S GUIDE TO DAM

I. Computer Management Games

Management of natural resources is difficult due to the complexity of large entities such as a lake, a river system, or a watershed. To better understand these environmental systems, they are being studied by breaking them into their important components, modeling each component mathematically and by computer simulation, analyzing the relationships between these components, then reassembling the modeled components into an ecosystem simulator.

Simulators are often used by ecosystem managers to enhance their understanding of the system and its responses to external changes. Simulations can also be modified into computer-implemented teaching games for instruction of management personnel and graduate and undergraduate students in resource management. Such computer-implemented games are invaluable in teaching resource management because they allow the student to acquire management experience on a valuable resource without putting the resource in jeopardy. Also, many more students can train on these games than could possibly work on such ecosystems.

Effective resource management is based on prior management experience. Computer games, in part, offer this experience by confronting the student with situations in which he must use his acquired knowledge, and promptly learn the consequences of his decisions. Student evaluation of these consequences results in a very valuable learning experience. Students participating in remote terminal computer implemented teaching games were found to:

- 1) receive insight into the nature and interrelationships of the systems involved
- 2) become actively involved in the learning experience in contrast to the passive listening to lectures
- 3) compete in the game, thus adding interest to the classroom experience
- 4) interact in various ways, thus learning the achievements possible through cooperation

- 5) receive immediate reinforcement for their management decision, good or bad.

Computer management games offer new initiative and opportunities for the student, in that he may try out his own ideas and concepts of management, as well as test those being taught, and see how each measures up in solving the problems presented.

II. DAM: Purposes

DAM is a large computer-implemented teaching game based mostly on 20,000-acre Smith Mountain Lake, near Roanoke, Virginia. DAM was created to allow students the opportunity to experience the complex and varied management situations created by large multiple-use reservoirs. The game has five player positions, each position representing one of the five major interest groups that use or live in the reservoir area. The positions are: regional planning commissioner, fisheries manager, recreation specialist, power company executive, and city mayor.

The objective of each player is to develop his aspect of the resource as best he can, within his budget. However, the other players' uses of the resource often conflict and each of the five playing positions must interact and cooperate if the resource is to be used to its maximum potential.

III. Use of DAM

DAM was written to be played by junior and senior university students in resource management, but considerable interest in it has been shown by all levels of undergraduate and graduate students, in and out of resource management.

DAM has been used in two ways:

- 1) as an assigned project for students in resource conservation
- 2) as a subjective testing device to evaluate the skills of seniors in resource management against those of freshmen and sophomores just entering resource management.

DAM may be assigned as a short project encompassing 2 to 3 weeks of out-of-class time (possibly to replace a week of lab time), or as a quarterly project (to replace a term paper). It is suggested that you:

- 1) Give the students a 20-30 minute indoctrination lecture on problems of multiple-use resource management and the purpose of computer-implemented teaching games.
- 2) Give each student the Student's Guide to DAM.
- 3) Explain, then demonstrate, the use of the remote terminal, preferably by executing a one-year run of DAM.
- 4) Allow adequate time for questions and, later, time for problems and consultation.
- 5) Require the student to develop a five-year management plan for the Franklin Lake area and submit the final year of computer output of such a plan.
- 6) Require the student to write a short paper on problems involved in being one of the five players, indicating with which players the position chosen conflicts most and how these conflicts may be resolved.

As DAM is a long exercise, the length of the outlines and papers required should be adjusted to match the amount of time and credit the student will be given.

If DAM is to be used as a comparison mechanism for management skills between freshmen and seniors, it is important that the two groups be on similar ground on most other skills required in the game. To assure this, a smaller game (TROUT) is used by both groups. This not only makes the groups more similar in background but also reduces the "game shock" of immediately starting on as massive an exercise as DAM.

To use TROUT and DAM as comparative devices it is suggested you:

- 1) Give the student a short lecture on the purposes of computer implemented teaching games and the objectives for managing trout fisheries.
- 2) Give each student a Student's Guide to TROUT.
- 3) Explain, then demonstrate, the remote terminal, preferably by managing TROUT for 3 to 5 years.

- 4) Be sure to allow time for questions and consultation.
- 5) After one week, require the student to hand in a 5-year management plan for TROUT, with the computer output from implementing such a plan.
- 6) After a short period of playing TROUT, all students should be introduced to DAM.

The outputs from DAM should be evaluated for comparison using the most concrete criteria the outputs offer. For example, check how well the students utilize their budgets. Also, the important facilities of water, sewage, fire protection, schools, waste disposal, and secondary roads can be compared to purely recreational facilities. Admittedly, such comparisons are subjective, but considerable information can be obtained on the quality of management insight developed from the curriculum in use.

IV. Terminal Use

Since there are several types of remote terminals available, no specifics can be given to the instructor to insure the student is receiving adequate information on use of the remote terminal. However, the student clearly should know the logon and logoff procedures, the game execution procedures, and methods to prematurely terminate the game if he chooses to leave in mid-run. It is also important to have someone he can readily contact if terminal difficulties develop.

Because DAM is a time-consuming game, it is easy to assign more students to the game than one terminal will effectively permit; therefore, care must be used in determining terminal load, and it may be necessary to contact other Departments to share their terminals.

APPENDIX III

Student's Guide to DAM (as used at VPI & SU)

Student's Guide to DAM

I. Introduction

As our renewable natural resources come under increasing utilization, conflicts between resource users become more severe. DAM provides students an opportunity to manage a multiple-use renewable natural resource, a reservoir. Rather than having to wait for years for the results of your management decisions, a computer will provide rapid answers to what would probably have happened.

There are four basic principles associated with DAM. First, resource users' interests inevitably conflict. Second, there is no simple, prescribed system for resolving user conflicts. Third, no matter what decision is made, users will consider it inappropriate or wrong. Fourth, a resource manager always starts with limited knowledge of the system at hand, but must make decisions based on the best available information.

II. Objectives

The objective of this exercise is to provide your instructor with a nine-year summary and justification of your recommended management procedures. Your final management plan should be summarized (3 to 4 pages) and then systematically justified (5 to 6 pages). You will undoubtedly have to manage DAM many times to improve your management plans.

III. General Information

Franklin Lake was impounded by the Intermontane Electrical Power Company (IEPCO) to provide hydroelectric power. Filling was completed last month. Surface area of the lake is 20,000 acres at maximum pool elevation, and the mean depth is 70 feet. The drainage basin covers 1,020 square miles. Most of the surrounding land is privately owned, being used primarily for farming and grazing. IEPCO owns 2,500 acres of shoreline property. The climate is moderate, with an average annual rainfall of 45 inches. Soil and rock composition has been generally declared suitable for septic systems and there is a plentiful supply of pure groundwater.

Franklin Lake is located in a geographical area of medium population density. There are several small cities (i.e., population 25,000 to 100,000) within a 50-mile radius. There are no other large bodies of water (i.e., over 5,000 acres) within a 100-mile radius. The lake is bordered by land in four counties.

A Regional Planning Commission, composed of two representatives from each county, was formed to coordinate development in the area. Each county government makes an annual allotment of \$5,000 to the Commission.

Franklin Lake is inhabited by native warmwater fish species. Fishes present include largemouth bass, smallmouth bass, crappie, sunfish, channel catfish, flathead catfish, bullheads, carp, suckers, threadfin shad, and golden shiners. The State Department of Fish and Game has allocated \$35,000 for reservoir fisheries research during the next five years.

The State Department of Fish and Game has recommended that minimum flow for the river below the Franklin Lake dam be set at 650 cubic feet per second (cfs). According to the local Coast Guard Auxiliary, a guaranteed minimum flow of 6,000 cfs is needed to permit navigation of the river. A consultant from the Army Corps of Engineers has recommended that at least 3 vertical feet (60,000 acre-feet) of storage be maintained for flood control. According to Federal Power Commission guidelines, a minimum of \$150,000 per year should be spent on equipment maintenance at the Franklin Lake dam.

The State Department of Outdoor Recreation and Department of Fish and Game both receive state and federal funds for the financing of activities in the Franklin Lake area. The State Highway Department provides funds for road construction and maintenance. There are currently ninety miles of secondary roads in the reservoir area.

The city of Sparkle (population 100,000) is located forty miles upstream on the Rancid River, the main tributary to Franklin Lake. During the past ten years, the sewage treatment plant in Sparkle has become increasingly overloaded. This overloading has resulted mainly from extensive development in rival population centers in the surrounding county. Tremendous amounts of raw sewage (up to 7½ million gallons per day) must bypass treatment during rainy periods. Complaints about rising pollutant levels, especially phosphates and sludge, are becoming more numerous. The State Water Control Board has delegated the responsibility for improving the situation to the city government. However, the citizens of Sparkle believe that residents in the surrounding county should be responsible. The planning budget allocation of the Sparkle city government averages \$100,000 per year.

IV. Terminal Use

- A. The computer terminal is located in 321 Cheatham and is available from 8:00 a.m. to 5:00 p.m., Monday through Friday,

and by appointment at other times. If you have any difficulty, contact:

1. Larry P. Hough (125A Cheatham)
2. Gary F. Martel (122 Cheatham)
3. Richard D. Clark (114 Cheatham)
4. Ed L. Hampton (108 Cheatham)
5. Joseph E. Powers (108 Cheatham)

B. Procedure for using DAM

- (1) Take seat at terminal
- (2) Hit "ON" and hit "RETURN" keys
Terminal response: ENTER LOGON
(Punch "RETURN" and wait for green "PROCEED" light after typing every entry)
- (3) You type: logon forest2/fore02
Terminal response: FOREST 2 LOGON IN PROGRESS AT....READY
- (4) You type: exec program(DAM)

C. Procedure for terminating DAM

- (1) You type: logoff
Terminal response: FOREST2 LOGGED OFF AT
- (2) Hit "OFF"

V. Correction Procedures

If you make an error in entry in input for one of the variables, one of two things will happen. If the error was incorrect language, as not putting single quotes around a name, as FRED instead of 'FRED', you will receive an error message and you will be returned to the top of the management position you are playing for reentry. You must then reenter all the variables asked for.

If the error is numerical on your part, the computer will not react. If after hitting the "RETURN" key you notice an error, you may correct that error at the end of the input section for each year. The computer will always ask: ENTER OUTPUT CORRECTION BELOW. After the correction request is typed, enter corrections in the form VARIABLE=VALUE, with two spaces or more between each variable corrected (i.e., NOCHA=1 FP=3). After entering all input corrections, enter a semicolon to terminate the correction procedure. Entered corrections must not exceed 70 columns. If no corrections are required, enter a semicolon and press the return key.

VI. Decision Alternatives

Regional Planning Commissioner

You have been selected as head of the Regional Planning Commission. Your objective is to control development around Franklin Lake in a manner that will provide maximum benefit to the residents of the surrounding four counties. Your highway budget allocation for the first year of management totals \$200,000. You must make all of the decisions below you are allowed.

P-1. TOTMGT Enter the number of years you will be managing DAM (1-9)

P-2. LANDEV Development Control (1-4)

1 - If you want to establish no control

2 - If you want to let each county establish separate controls

3 - If you want to establish a common set of subdivision regulations for all counties

4 - If you want to establish a comprehensive "Land Use Plan" at a cost of \$150,000

P-3. FINAN "Land Use Plan" Financing (0-3)

0 - If a Land Use Plan was not established

1 - If you want to request additional funds from county governments

2 - If you want to apply for federal funds

3 - If you want to sell bonds to county residents

P-4. NAME1 Enter your name in single quotes (i.e., 'JOHN')

P-5. SEWTRE Sewage Treatment Alternatives (1-3)

1 - If you want to allow private septic systems and require semi-annual inspections

2 - If you want to extend existing county sewage treatment facilities in order to service the Reservoir area at a cost of \$800,000

3 - If you want to construct a sewage treatment plant for the Reservoir area at a cost of \$3,000,000

P-6. WATRE

Water Supply Alternatives (1-3)

1 - If you want to allow private water supplies and require semi-annual inspections

2 - If you want to extend existing county water supplies in order to service the Reservoir area at a cost of \$400,000

3 - If you want to construct a public water supply facility for the Reservoir area at a cost of \$2,000,000

P-7. FNCE

Financing Public Utilities (1-3)

1 - If no costs were associated with your decisions for sewage treatment and water supply

2 - If you want to sell bonds and increase public utility rates in the surrounding counties

3 - If you want to apply for federal funds

P-8. ACCON

How many miles of secondary roads do you want to construct (at \$45,000/mile)? Enter number of miles (0-99)

P-9. ACIM

How many miles of secondary roads do you want to improve (at \$15,000/mile)? Enter number of miles (0-999)

P-10. ACMAIN

How many miles of secondary roads do you want to maintain (at \$1,000/mile)? Enter number of miles (0-999)

P-11. BRIBUI

How many bridges do you want to construct at \$100,000 each? (0-99)

- P-12. SHER How many deputy sheriffs do you want to hire at \$8,000/man/yr? (0-99)
- P-13. AGENT How many agricultural extension agents do you want to hire at a cost of \$9,000/agent/yr? (0-99)
- P-14. SCHOOL How many schools do you want to construct at \$50,000/school? (0-99)
- P-15. FS How many fire stations do you want to construct at \$20,000/fire station? (0-99)
- P-16. LDFILL How many sanitary landfills do you want to construct at \$20,000/landfill? (0-99)

Fisheries Manager

You are a fisheries manager employed by the State Department of Fish and Game. Your objective is to optimize the fishing experience for Franklin Lake anglers. Your budget allocation for the first year of management is \$200,000.

You must make all of the decisions below you are allowed.

- F-1. NAME2 Enter your name in single quotes (i.e., 'FRED')
- F-2. SBSPA If you want to study the effects of water level fluctuation on the fishery at a cost of \$10,000, enter 1; if not, enter 0
- F-3. MONIT If you want to monitor water quality throughout the year at a cost of \$5,000, enter 1; if not, enter 0
- F-4. FEAS If you want to make a stocking feasibility study at a cost of \$10,000, enter 1; if not, enter 0
- F-5. POPDY If you want to study the population dynamics of largemouth bass, at a cost of \$10,000, enter 1; if not, enter 0
- F-6. CC If you want to establish a comprehensive creel survey, at a cost of \$10,000, enter 1; if not, enter 0

- F-7. RATIO If you want to determine the rough fish/gamefish ratio, at a cost of \$5,000 enter 1; if not, enter 0
- F-8. LIMIT If you want to determine the nature of inorganic nutrient limiting factors, at a cost of \$10,000, enter 1; if not, enter 0
- F-9. PLANK If you want to study the effects of power generation on the plankton community, at a cost of \$10,000, enter 1; if not, enter 0
- F-10. REEFS If you want to determine the effects of introducing artificial reefs on the fishery, at a cost of \$10,000, enter 1; if not, enter 0
- F-11. STOCK If you want to stock any fish this year, enter 1 and start at LM; if not, enter 0 and skip to FERT.
- (LM) Enter the number of largemouth bass (3 in–4 in) you want to stock at \$150/100
- (TROUT) Enter the number of rainbow trout (6 in–8 in) you want to stock at \$200/100
- (SALMON) Enter the number of coho salmon (3 in–4 in) you want to stock (at \$165/100)
- (SB) Enter the number of striped bass (2 in–3 in) you want to stock at \$500/100
- (MUSKIE) Enter the number of muskellunge (5 in–6 in) you want to stock (at \$425/100)
- (BG) Enter the number of bluegill sunfish (1 in–2 in) you want stocked (at \$14/100)

- (SHAD) Enter the number of threadfin shad (1 in–2 in) you want stocked (at \$15/100)
- (WB) Enter the number of white bass (2 in–3 in) you want stocked (at \$300/100)
- F-12. FERT Enter the number of acres you want to fertilize (at \$100/surface acre)
- F-13. CHETRE Enter the number of acres you want to treat chemically for rough fish (at \$80/surface acre)
- F-14. AR Enter the number of artificial reefs you want to introduce (at \$1,000/reef)
- F-15. LANPUR Enter the number of acres of land you want to purchase and grant to the Department of Outdoor Recreation (at \$2,000/acre)
- F-16. NAVLIT If you want to install a navigational lighting system, at a cost of \$10,000, enter 1; if not, enter 0
- F-17. WARDENS Enter the number of wardens you want to hire (at \$10,000/warden/yr) (0-99)
- F-18. SAFEBO If you want to conduct weekly safe boating classes, enter 1; if not, enter 0
- F-19. LICBOA If you want to pass an ordinance requiring all boat operators to be licensed, enter 1; if not, enter 0
- F-20. ZONING If you want to establish water surface zoning regulations, enter 1; if not, enter 0

Recreation Specialist

You are employed by the State Department of Outdoor Recreation. Your objective is to maximize the recreational potential of the Franklin Lake area. Your budget allocation for the first year of management totals \$250,000. You must make all of the following decisions:

- R-1. NAME3 Enter your name in single quotes (i.e., 'SAMUEL')
- R-2. SWB Enter the number of 7-acre public swimming beaches (with snack bar, dressing rooms, and parking facilities) you want to construct (at \$60,000/beach) (0-99)
- R-3. COTTGE Enter the number of rental cottages on ½-acre sites you want to construct (at \$15,000/cottage) (0-99)
- R-4. PAS Enter the number of 4-acre public access sites (with boat launch, shore fishing, and picnicking) you want to build (at \$20,000/site) (0-99)
- R-5. PARKS Enter the number of 100-acre parks you want to develop (at \$300,000/park) (0-99)
- R-6. MARINE Enter the number of full-service marinas on 2-acre sites you want to construct (at \$70,000/marina) (0-99)
- R-7. FD Enter the number of floating fishing docks (including emergency aid facilities) you want to place on Franklin Lake (at \$20,000/dock) (0-99)
- R-8. SCNRD Enter the number of miles of scenic road you want to construct (at \$35,000/mile) (0-99)
- R-9. WMA Enter the number of acres of land you want to purchase for use as a wildlife management area and hunting preserve (at \$2,000/acre) (0-999)
- R-10. AD If you want to conduct an advertising campaign to promote recreation in the Franklin Lake area, enter the number of months this year it should run (at a cost of \$10,000/month) (0-99)
- R-11. MAPS If you want to produce up-to-date maps highlighting recreational facilities in the Franklin Lake area, enter 1; if not, enter 0 (cost=\$20,000)

Power Company Executive

You are an executive of the Intermontane Electrical Power Company. Your objective is to minimize company operational costs at Franklin Lake. You must make the following decisions:

- E-1. NAME4 Enter your name in single quotes (i.e., 'SHAHERAZAD')
- E-2. MF Enter the number of cubic feet per second of minimum flow that you want to establish for the river below the dam (at a cost of \$60/cfs/yr) (0-999,999)
- E-3. FC Enter the number of vertical feet of storage that you want to maintain in the reservoir for flood control (at \$24,000/storage foot/yr)
- E-4. WLF If you want to regulate water level fluctuation to benefit striped bass spawning, enter 1; if not, enter 0 (Cost=\$90,000/yr)
- E-5. SEL Enter the number of acres of land you want to sell (at \$2,000/acre) (0-99,999)
- E-6. BUY Enter the number of acres of land you want to buy for additional resource protection (at \$2,000/acre) (0-99,999)
- E-7. LEASE Enter the number of acres of land you want to grant to the State Department of Outdoor Recreation (0-99,999)
- E-8. VC If you want to construct a visitor center and a picnic area at the Franklin Lake dam, at a cost of \$200,000, enter 1; if not, enter 0
- E-9. PRM Enter the number of public relations men you want to add to your staff, at a cost of \$15,000/man/yr (0-99)
- E-10. MTN Enter the number of dollars you want to spend on equipment maintenance at the Franklin Lake dam (0-999,999,999)

- M-4. SFNCE Financing Improvements (1-4)
- 1 - If you have no cost associated with your sewage treatment decisions in Sparkle
 - 2 - If you want to apply for federal funds
 - 3 - If you want to increase sewage service charges
 - 4 - If you want to request funds from the surrounding local county governments
- M-5. CITMON Enter the number of dollars you want to give to the regional Planning Commission for financial aid (0-\$9,999,999)

Reminder – If you have no corrections to enter in the correction request, simply enter a semicolon (;)



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