THE ADAPTION AND REFINEMENT OF A COMMUNITY GAME-SIMULATION FOR AUTOMATED USE

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ABSTRACT

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COMMUNITY GAME-SIMULATION
FOR AUTOMATED USE

by Chester Foster

One problem in teaching urban studies lies in the need to replicate the complexities of the urban setting for the student in a classroom situation. One method of solving the problem is to simulate a community and allow the student to act in some capacity within the model community. One such game-simulation has been created and used on this campus: METROPOLIS.[1] The complexities inherent in teaching by the use of a simulated community require a vast amount of energy and attention on the part of the instructor at the very time he could most effectively work with the students. It seemed feasible that the use of the digital computer to automate some of the game would provide a better teaching situation.

The game METROPOLIS was refined and then programmed for the University's computer. Fortran was the computer language used. The game was diagrammed, with the flow chart providing a guide to the written program. Cards containing fixed data items were prepared. A series of trials was used to find and eliminate errors.

The result is a program and modified game which allows the instructor to work with the students. It also points to a methodology for further refinements in gaming-simulation in urban studies.

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By

Chester Foster

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The writer wishes to acknowledge the support and encouragement received during the preparation of this thesis. Dr. Richard D. Duke and Professor Stewart Marquis deserve special mention. The patience of my wife, Margaret, and daughters, Stephanie and Jill, was tested time and again. Their tolerance is appreciated.

Mention of the computer facility available to students and staff at Michigan State University is made, for without this laboratory and the guidance of several of its personnel, a great deal more time and frustration would have been experienced by the writer. The administrators of the Computer Center have provided an excellent research and teaching convenience.

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I INTRODUCTION

The system of related phenomena which characterizes a city is a formidable and dynamic complex with which the student of urban affairs must contend; first in the academic environment and later during his professional career. Since education endeavors to prepare him for the real world situations he will face, some means of presenting the urban unit in a manner in which the student can observe the roles of his colleagues and the results of their actions is useful. One excellent method is the case study technique, a study in depth of some aspect of the community, often involving other disciplines. The case study is valuable for requiring research, synthesizing, and cooperative efforts on the part of the student. Its limits are the time required for fact gathering and the restrictions of breadth of a given study. Another technique, sometimes known as operational gaming, is to model the community, place students in roles of public officials and private citizens in the community, and let the players act out these roles. In modeling the community, the complexities may be reduced in number and magnitude. Consequences of activities can be simulated. The time scale can be compressed. A game "played" in a simulated community is the resulting teaching device.

Games for analytical and instructional purposes have been used for centuries. War games, adapted to board or table play, are well documented with a history which dates back to the origins of chess. Shortly after the beginning of the 18th century, war games underwent a change in which they more accurately reflected the battlefield by substituting maps for stylized boards. Refinements continued at a rapid pace and the complexity and sophistication of the military applications of gaming were enhanced to an impressive degree with development of the electronic computer. Since 1956, the business community has incorporated games into corporation training programs. The business games have training, testing, and demonstration characteristics as main points of emphasis. Within five years of the introduction of a business game, there were more than a hundred games for the purpose of executive development.[1] The business game is an accepted teaching tool in many universities. Intercollegiate competition in a marketing game among twenty-five schools was recently linked via teletype to Michigan State University's computer to be analyzed and scored.[2] The spread of gaming-simulation to other fields of education has been rapid and extensive. Today it covers a wide spectrum

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[1]William R. Dill, "What Management Games Do Best," Business Horizons, Vol. IV, No. 3, Fall 1961, p. 55.

[2]The State Journal, February 28, 1965, p. 1.

of subject fields. Several games relating to urban planning have been developed. METROPOLIS models the decision processes for the allocation of land resources. CLUG, the Cornell Land Use Game, models the dynamics of the economics of land use. A parlor game, "Square Mile" dealing with land speculation, is on the market. POGE, Planning Operational Gaming Experiment, pits a planning commission against a land speculator.

The games have tended to have certain common characteristics. These are listed:

"1. They tend primarily to utilize a man-machine combination, with considerable variations between rigid versions and free or umpire governed games.

"2. They are used primarily for training purposes. Although they are used sometimes to study the system under consideration and, in some cases, to demonstrate proposed changes in the system.

"3. They are used for testing alternative courses of action.

"4. They may operate in real time but for the most part compress time and expedite play.

"5. They inevitably employ a simulated environment which attempts to represent the real world as it is relevant to the problem with the perception of the designers.

"6. They progress as a series of plays or cycles, each representing some real life period.

"7. They require that the players 'act out the role,' specifically by requiring appropriate decisions.

"8. They are all simple, relative to the situation they are abstracting from.

"9. They involve the concept of competition between players or teams."[3]

The game METROPOLIS was designed as an instrument to involve the students in decision-making roles in a simulated community. The roles include the administrator, a technical advisor to the city fathers; the politician, who makes the ultimate decisions on what capital expenditures will be made in the community; and the speculator who attempts to profit through real estate transactions. Each of these players exerts an influence on the use and value of land in the community. Their decisions are concerned with community-wide issues of a general nature, capital improvement expenditures, and with land use in a metropolitan setting. Each decision affects each of the players through a system of rewards and penalties. A diagram indicating these linkages is shown on the following page. The sequence of events of a cycle would be, typically:

"1. The newsletter is the first new information the player receives in a given cycle. This is a brief one-page newsletter prepared in advance of the game which describes specific projects or needs of the community. Essentially, there are three categories of news: Local news is intended to alert the politician of the various demands of the citizenry; state-wide news is generally intended to give background information on various issues which will be brought before the players; and national news is designed to give them some perspective on the general state of the economy.

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[3]Richard D. Duke, "The Role of Operational Gaming in the Simulation of Social Systems," Paper read before the Regional Science Association Meeting, Ann Arbor, November 9, 1964.

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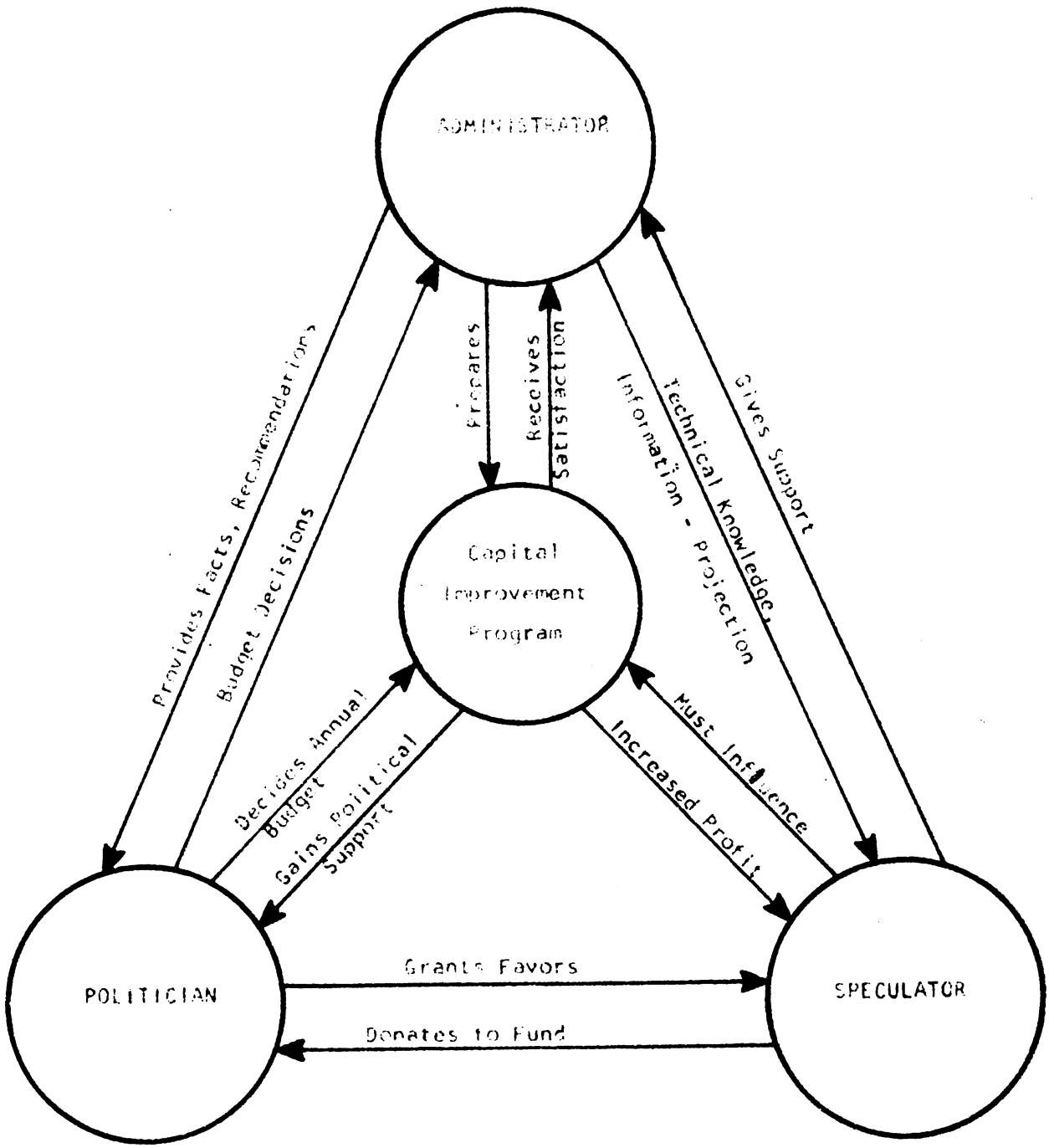
December, 1963
R. D. Duke



Close attention to these news sheets can give valuable clues to the player on coming events. The major limitation of the newspaper (since it is prepared in advance) is that inevitably situations will occur during play which make portions of the paper obsolete from time to time. The alternatives of developing a newspaper for each cycle during the course of play is desirable but our resources to date have prevented this approach.

"2. The public opinion poll, the second piece of information introduced in a given cycle, is a crude attempt to introduce the notion of community power structure to the students. This raises a series of issues, some serious, some minor. Each team is permitted one vote pro, con, or to postpone. In those cases when consensus is reached, the action is final and appropriate consequences are introduced into the game. The issues which are introduced by the public opinion poll attempt to reflect the type of issues which might frequently be encountered in a typical community. Issues on which agreement is not reached are postponed and must be resolved in the following cycle. When this occurs, a penalty is introduced against the players for their indecision.

"3. Individual team decision forms are now introduced. Briefly, the politician must decide how to spend the funds which exist for this year, the speculator must decide how many dollars to invest in what types of land use and in what part of the community, and the administrator must prepare a capital improvement program for the following year.

"4. The budget for the current year, is a function of many factors, most of which are directly influenced by the play of the game. First, the budget is dependent upon the level of population of the community, which — in turn — is in part a function of the prosperity index, a device which attempts to simulate the rate of change of growth reflected by the general aggressiveness of the community in coping with its problems. For every issue which is decided on the public opinion poll, corresponding rewards or penalties are applied against the prosperity index and, in turn, result in a greater or lesser increase in population. Two parameters in the computation of the budget are under the control of the operator. These are the

'assessed value per capita' factor, which allows the game operator to manipulate the general level of prosperity in the community; the second variable under operator control is a percentage of funds drawn off for school purposes. Since the school board is in fact competing for the same tax dollars as an autonomous agency, it really represents a different 'game'; its introduction forces the student to recognize the nature of the relationship.

The tax rate (one of the decisions required of the politician) is applied against total assessed value to determine the total dollars available before school expenses. The politician is free to set this rate at any point he chooses, however, there are several penalties in the game for too abrupt deviations from existing patterns. Penalties for excessive fluctuations in the tax rate are severe and are reflected in the probability for re-election by the politician in the various wards.

"5. End-of-cycle calculations consider a great number of specifically computed linkages to enforce realistic decisions on the part of the various teams. When these calculations have been concluded, the current standing of each team is publicly announced and, when appropriate, an election is held. "[4]

In using the game as an integral part of the urban planning curriculum, controls and tests indicate that the vehicle is a success; it meets the objectives of introducing the student to a taste of the complexities involved in "real world" decision making. Experience in the play of the game during its development with players who were presumed to be more knowledgeable of the political and economic world than undergraduates indicated that the results would probably be satisfactory, but the degree of success was not estimable, except intuitively.

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[4]Ibid.

Gaming-simulation as its name implies, uses as a framework some model; a battlefield, a corporation, an economic system, or a community. The structure of the model and how closely it resembles the real world in the mind of the player is critical to the utility of the game. Simulation of a community so that verisimilitude is experienced by the participants in their various roles as the community decision makers was one of the most challenging features of the design of the game. The initial attempt in the construction of METROPOLIS was to devise a purely hypothetical community. This scheme was abandoned after a relatively short expenditure of effort. The extreme complexity of inter-relationships existing in a metropolitan area and the vast amount of detailed data to be invented are difficult to replicate in a convincing way. The Lansing metropolitan area was used as a model for the community and the available data was extracted from the various sources, refined, and reproduced to provide the players with a set of data sources for the model community. The design of the various roles of the players was clarified in several test plays.

The actual play of the game has been characterized by a long session, seven to nine hours of continuous activity. The confusing number of forms, results, and data which are necessary for knowledge of the community and those which accumulate during the play are not an unimportant handicap to the learning process. Of a

more serious nature is the frenetic activity required of the game director who makes the complex computations, keeps the decision making process moving, answers questions, collects and distributes forms, records the standings of the players, and publishes the results of all of the decisions. In addition, at the end of each cycle there is a brief critique to explain the published results and the rationale behind the results. This activity on the part of the game director, nominally a lecturer in the senior studio course, has not allowed him to observe the play and to be of assistance to the players except in a very cursory way. The relief of the game director seemed to be worth a considerable effort. Several reasons in addition to those previously cited are worthy of note: at the present, only a few persons are aware of all of the details necessary to running the game. If the game is to become useful to other universities than Michigan State, the extraneous complexities ought to be eliminated. By automating the computation procedure, the game director has more time to spend observing the play of the game. He is allowed a better opportunity to assist the players.[5]

In summary, the problem and its background can be stated: (1) the dynamic and highly complex urban community is exceedingly difficult to comprehend and deal with. (2) The urban specialist can

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[5]With the exceptions noted, the material in this section was abstracted from Gaming-Simulation in Urban Research by Richard D. Duke, Institute for Community Development and Services, East Lansing, Michigan. See especially Chapters 2, 3, and 4.

can concentrate only a a narrow band of the wide spectrum which encompasses the urban scene. (3) This narrow view or outlook is characteristic of the student of urban affairs, especially the neophyte. Only after several years of tempering in the professional world will his perspective be broadened through his experiences and observations. (4) The restricted view, the lack of a comprehensive knowledge of the community will not allow the urban specialist to know the true nature of the urban community. This is particularly true of understanding the many faceted problems to be faced by the decision makers, and the relationships between various decision makers in the community. Game, or gaming-simulation techniques have evolved to allow in-school experience which is in some way comparable with the real world. The real world, or some portion of it, is modeled for specific learning situations, and a hopefully accurate duplication of experiences takes place for the student players. (5) Gaming-simulation has proven to be an accepted and powerful teaching device. It reduces intricate situations to levels which can be understood and are helpful to the student. While some reduction of complexity is necessary, there is the problem of retaining much of the desirable portion of the complexity of the urban world. Human limitations being what they are, a simulated community game must be relatively simple. (6) The experience with METROPOLIS to date indicates that the mechanical aspects of managing this game impose a major limitation on it. Automating appropriate aspects of the game is an attempt to reduce these constraints.

II PROBLEM OBJECTIVES

One of the early hopes in the design of the game was that it would some day be possible to utilize the computer. Several reasons make the computerized game a desirable alternative to the hand operation: it frees the game director from the onerous chore of making the computations. It enables the results of the plan to be displayed in a compact manner, and it eliminates some of the possibilities of human error which are present. It was hoped that certain improvements in handling information would be accomplished: the newsletter is occasionally out of date since there is the possibility that capital improvement projects might be budgeted before their need is reflected in the newsletter. It would be desirable to print a newsletter each cycle which would not indicate the need of a repetition of the news item concerned with the already accomplished fact. A listing of all completed projects is desirable. The recording of the list enables players to keep track of projects which extend over several years and once budgeted must be budgeted each following cycle until completed.

In spite of the advantages of automating a game, certain liabilities are present. The non-computerized game has great flexibility enabling its continued evolution and further allowing the director to modify play during a given run. In the computerized version both of

these advantages tend to be lost, however, another gain is achieved: the game tends to be a more standard instrument which increases the validity of observations made relative to differences in play when one or more of the constraints are altered.

The objectives pursued were limited to an improved teaching atmosphere, an improved presentation of results, and certain changes in the original game.

The improved teaching atmosphere occurs through the release of the instructor from the time-consuming task of his hectic data manipulations. He is able to devote the time to act as mentor to the students. The nuances of the play can be pointed out to the players and close observations made of their activities.

The digital computer is able to print out alphabetic and numeric results, and the programmer can control their form. A continuous strip of 11.5" x 15" sheets is a common form of computer print-out paper. The printing of play results and their posting (or distribution of multiple copies to each of the players) results in neatly displayed information as complete as the programmer wishes to make it. Since the same program is used for the consecutive cycles, there is unity of format in each presentation of results.

The game itself was changed in several ways: deficit spending is allowed by the politician although a penalty in the form of interest charges is assessed against the next year's budget. Unspent

funds are carried forward with interest. The speculator too can spend more than he has in his possession. There is the same stiff interest charge against his borrowing but he is also allowed a modest return for money not invested. These features are an attempt to make the game closer to reality than the hand-run version, where their inclusion would add to the burdens of the game director. A school board was added to the game. (The school board does not appear in the computerized version of the game at this writing.) The function of the school board is limited to two items: raising funds, and estimating school needs for the next year. Funds for capital improvements are raised through bond issues on the opinion poll. The school board must work with the other power groups to secure their support. The estimation of school needs is based on population increases which in turn are based on opinion poll decisions. While the role of the school board players is a greatly simplified form of a real world school board, the complexities inherent in simulating all of the activities and their consequences precluded more than these. The school board adds some complexity and realism to the game since the schools affect the money available to the city for capital improvements. The activities of the school board in the real community have at least peripheral effects on the other decision makers in the community. The school board game allows more student participation and a partial knowledge of another decision maker in the community.

The benefits of campaign contributions are automatically distributed to the ward in which the politician is faring most poorly. This may be a hardship to the politician in some instances, such as trying to insure re-election by winning in two wards. In METROPOLIS he can increase his odds in those two wards and write off the third ward. It was felt, however, that the programming of this choice factor would add unnecessary difficulty to data submission and programming.

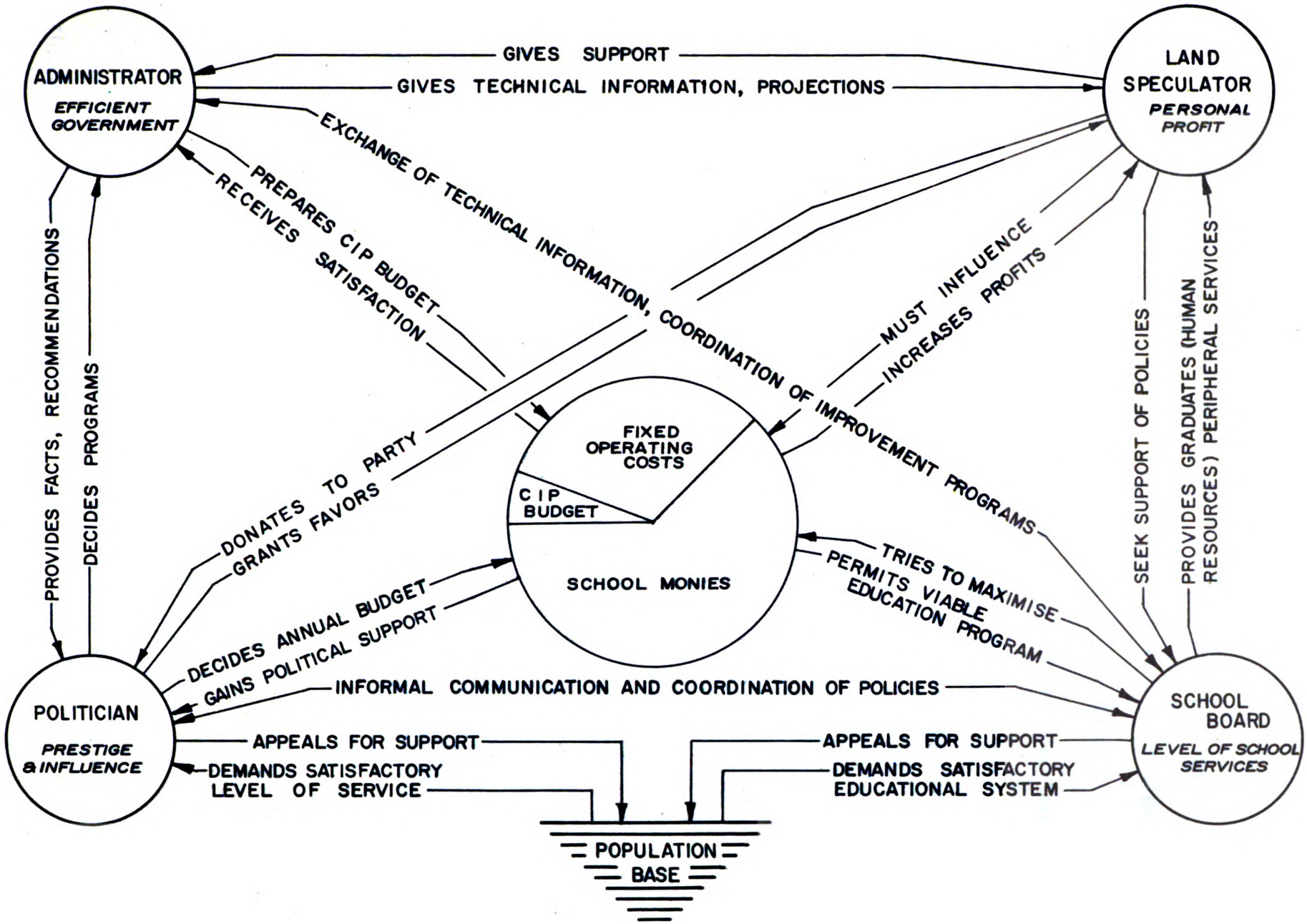
The increase in population in the original version of the game is determined by first finding the algebraic sum of growth factors which result from the Public Opinion Poll decisions. A slope for each of the possibilities is tested against a population vs. time chart and the increase is added to the existing population. In the computer directed computations the algebraic sum of the growth factors is used to determine in which memory location the population growth figure is stored; then that number is added to the existing population.

It was also decided to penalize for too rapid growth by charging an extra percentage of the "available" funds for schools, to compensate for the added capital outlays needed in times of rapid growth. The mechanism to accomplish this is the calculation of an expansion factor. The expansion factor is the population growth divided by five thousand. If the factor is less than one, it is ignored. If one or more, it is added to the percentage pre-set as the share of total property tax that accrues to the schools.

New forms were devised for the school board game. These include the decision form, a record of bond issue results, creation of new bond issues, and the rationalization of penalties, rewards, and growth factors, new newsletters, including school and education items, new public opinion poll forms with school bond issued added, and a new chart to reflect the addition of the school board to the community power structure and the resulting linkages. The chart indicating the linkages is shown on the following page. A draft of the sub-program to include the school board in the computerized version of the game was made.

Human errors are reduced to those of data input, not data manipulation. These errors of data imput exist in the hand-run version and are impossible to eliminate entirely. Some of these errors in the computer-run version may be fatal to the successful run of the program, but the data can be corrected and the program re-submitted.

The manner of play (making decisions, submitting the program and the decision data to the computer, and awaiting the computer printout before beginning the next cycle) could be handled as continuous play or as interrupted play. Continuous play would require breaking in to the regular work load of the computer (using the computer for METROPOLIS for an entire day would be prohibitive from the standpoint of dollar cost and unacceptable from the point of lost time of the other computer users) for the few seconds the computer requires to run through the cyclic calculations, and the arrangement can be made with the Computer Laboratory. Interrupted play would result because



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of a wait (8-19 hours[1]) for the normal "turn-around" time for problems submitted to the computer facility. This would require 10 meetings to play the game through its optimum 10-cycle run. The decision that interrupted play would be acceptable was made. It was decided to begin the revision of METROPOLIS and to program it with the limitations noted above. The revised version of the game was dubbed METROPOLIS II.

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[6]Computer Laboratory Notice No. 65, Michigan State University, March 19, 1965.

III PROGRAMMING METROPOLIS

The computer program for METROPOLIS II could not be written until the programmer was quite well acquainted with the original game and until the proposed alterations were made between the original and the modified game. Learning about METROPOLIS was accomplished by a series of meetings with its originator. The meetings were held over a period of several weeks and included a continuing discussion of changes which were felt to be feasible and which would enhance the game. As the sequence of the activities was learned, a process flow chart was sketched. The process flow chart indicated the major activities which take place in the manually administered game. It also indicated the forms on which were recorded the information, decisions, and data necessary to the computations of the game.[7] The diagram became a major aid in making subsequent flow charts for the coding into the computer language.

Since the computer handles the data, decisions, and mathematics in a different order and manner than a human game director, and the computer lacks the human's flexibility of adapting to changing circumstances, a flow chart for programming enables a pre-

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[7]A refined version of this flow chart appears in Richard D. Duke's Gaming-Simulation in Urban Research, p. 18.

cise indication of all necessary operations. The detail of the flow chart for this program lies somewhere between a completely detailed diagram and a rough picture of the problem. It was detailed enough, however, to enable the coding of the problem with little difficulty. The flow chart indicates the order of operations and the branching and consequences of the branching operations. The computations required for each player and the budget calculation are listed in order on the diagram. Code words are used in the program language to designate variable quantities and these are noted adjacent to operation boxes on the flow chart. A simplified flow chart is shown on the next page. The complete flow chart is in Appendix A.

When the flow chart was complete, the coding of the program was undertaken. The computer available for student research on the Michigan State University Campus is the Control Data Corporation 3604. The computer and the peripheral equipment associated with it are known as the CONTROL DATA 3600 system which is described as,

> "a solid-state, stored program, general purpose digital computing system. . . large storage capacity and exceedingly fast data transmission and computation speeds, the 3600 computing system is efficient in large-volume data processing."[8]

Facilities for attendant activities such as card punching and handling equipment, consultants, and a computer library are a part of the com-

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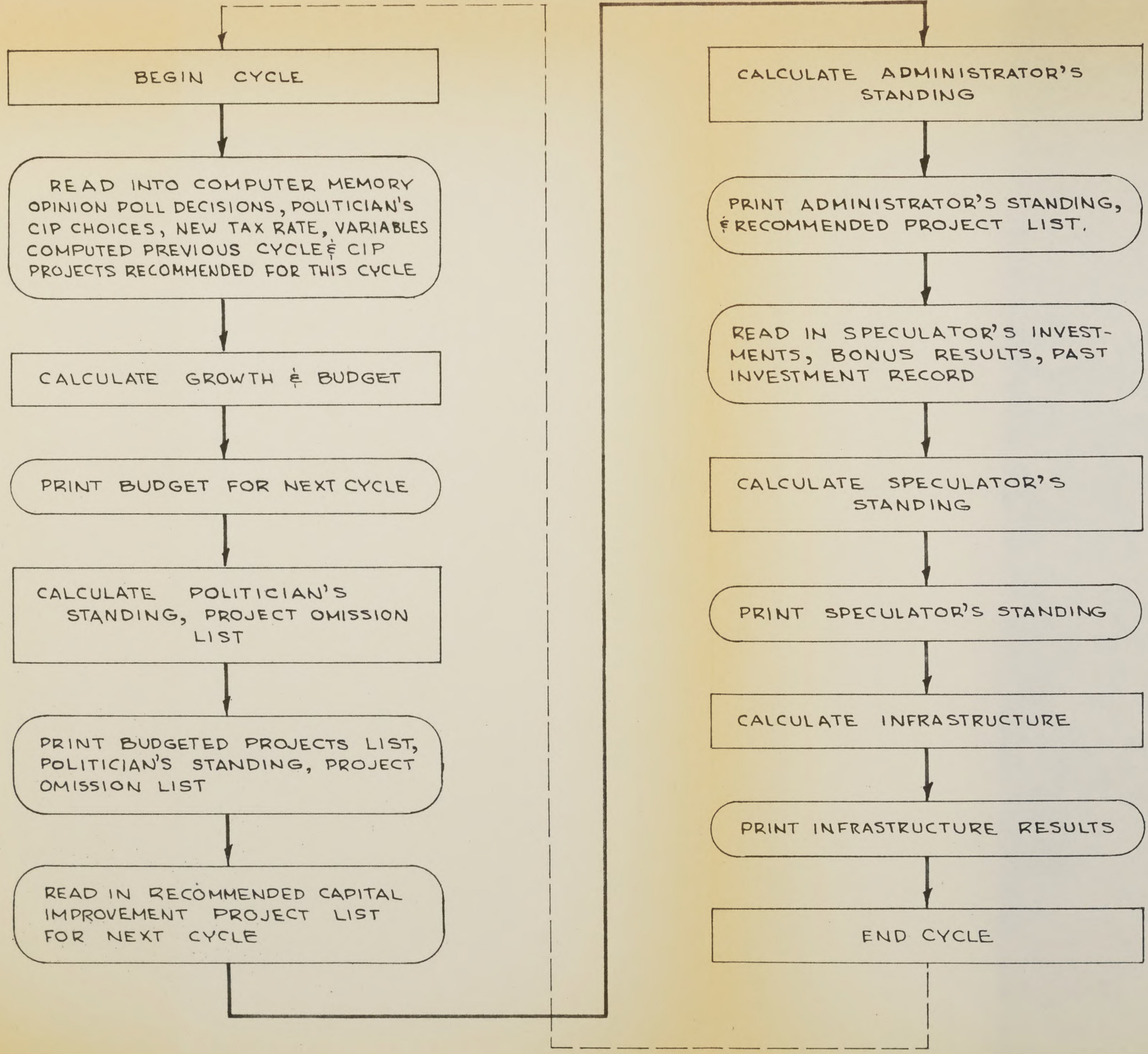
[8]3600, CONTROL DATA 3600 Computer System Reference Manual, Control Data Corporation, Minneapolis, Minnesota, 1963, p. 1.1.


BEGIN CYCLE
READ INTO COMPUTER MEMORY OPINION POLL DECISIONS, POLITICIAN'S CIP CHOICES, NEW TAX RATE, VARIABLES COMPUTED PREVIOUS CYCLE & CIP PROJECTS RECOMMENDED FOR THIS CYCLE
CALCULATE GROWTH & BUDGET
PRINT BUDGET FOR NEXT CYCLE
CALCULATE POLITICIAN'S STANDING, PROJECT OMISSION LIST
PRINT BUDGETED PROJECTS LIST, POLITICIAN'S STANDING, PROJECT OMISSION LIST
READ IN RECOMMENDED CAPITAL IMPROVEMENT PROJECT LIST FOR NEXT CYCLE
CALCULATE ADMINISTRATOR'S STANDING
PRINT ADMINISTRATOR'S STANDING, & RECOMMENDED PROJECT LIST.
READ IN SPECULATOR'S INVEST-MENTS, BONUS RESULTS, PAST INVESTMENT RECORD
CALCULATE SPECULATOR'S STANDING
PRINT SPECULATOR'S STANDING
CALCULATE INFRASTRUCTURE
PRINT INFRASTRUCTURE RESULTS
END CYCLE

puter center and are available for student use. The computer language used was Fortran, because this is the language the programmer is most familiar with. A Fortran compiler is part of the "software" of the 3600 system. The word Fortran is a combination of the lead syllables of the words formula and translator, and indicates the use of the mathematical terms converted to the simple on-off coding with which the computer manipulates binary numbers. The language was developed as a scientific and mathematical language and has a great deal of flexibility.

In programming METROPOLIS II, most steps could be reduced to or already were mathematical operations. Data can be input and printed out which consists of alphabetic characters and symbols as well as numbers, so no great obstacles were presented by the issue and project descriptions. Although the university acquired the 3600 computer prior to the programming of METROPOLIS, the programming languages were undergoing change and revision during this time. A change in the versions of Fortran during the coding involved several minor variations in writing the program and some re-writing. The change allowed a bit more flexibility and ease in the programming, and a decrease in the number of cards in the program deck. One disadvantage in using the more sophisticated language is the re-writing necessary to regress to the simpler Fortran if the program is to be used on a machine with less capability than the CDC 3600.

METROPOLIS presented some challenging features for the programmer. The various issues decided by the public opinion poll affect each player; the politician is affected by the ward; and the speculator may be affected in one, two, or three land-use categories within each ward. The future growth of the community is affected for as long as five years after the cycle in which the decision is reached. The capital improvement projects budgeted must be compared with those previously recommended, and the format by which the projects are designated in the original game does not lend itself to Fortran since data must be in numerical form. Data cards for the issues, the projects, and the cyclic data which changes with each cycle were prepunched. A code number for each project consists of three digits: The first indicates the ward in which the project is located; the second the type of capital improvement (street, utility, recreation, or miscellaneous), and the third digit the particular project within the given ward and type. The code number allows the project to be handled by mathematical means but does not have to be printed for display purposes where it might be confusing.

The mathematical operations are simple addition, subtraction, multiplication and division, but the number of computations for each cycle is staggering. In the final version of the program, all of the computations are executed in less than two seconds. Hand operation of the original game requires about a half hour of the game director's time.

Format statements, the directions which ordain for the computer the form in which the data is made available to the computer and the form in which the results will be presented, was rather formidable. Well over one hundred statements were written and rewritten. Each word of the print-out required that that word be pre-punched on a standard data card along with format coding to direct the computer and line printer to space the line of type on the page and the word on the line, and to indicate the form of data; integer, decimal, alphabetical, or alpha-numerical.

The major programming effort extended over approximately twelve weeks, on a part-time basis. Parts of the program were tested in the computer before the entire problem was coded. After the first "complete" run seemed to be a reasonable success, several features were added. Changes in the form of the print-out from the early versions of the program were incorporated from time to time. When the program seemed to be in some semblance of the desired finished state, a series of cycles were "played" by the advisor and programmer. The play served as the final "debugging" operation, and to fix the final format of data input. It became apparent rather early in the programming that data input is a critical factor in the administration of the computerized game. Several errors in the logic of the program, due to lack of complete understanding on the part of the programmer, were uncovered and corrected. Several errors in

punching program and data cards were uncovered; those which were not fatal to the program but which gave erroneous results. Errors which are fatal to the execution of the program are automatically indicated by the print-out returned to the user of the computer.

The seemingly endless task of refining and debugging has resulted in a Fortran program which cycles METROPOLIS. The decisions made by the players are submitted in proper form and proper order to the computer with the card deck containing the program. The computer performs the required operations and prints the results of the decisions in a compact and reasonably complete form. The complete program is printed and enclosed in this paper. See Appendix A.

Preparation time, the organizing of the data deck and punching the needed cards, is about the same as the time required to do the calculations by hand. Interrupted play with one or two days between cycles, has been noted as the probable mode of play because of the "turn-around time" at the computer center. There will undoubtedly be some advantages as well as some disadvantages which will result from a delay between cycles. The players will have time for careful analysis and interplay among themselves, the opportunity to review locations of projects, and time to consult the data available about the community.

The politician and the administrator will have decks of the data cards on which are punched and printed project data, each card representing a project. They will make their decisions regarding the projects and make up decks of cards to be submitted as part of the data. This activity will facilitate the task of the game director and decrease the chances of his erring by mis-reading the designations of the projects. Pre-punched cards for all except the investments made by the speculator and the tax rate for the next cycle set by the politician will enable the game director to execute the program with dispatch.

IV OPERATION OF THE COMPUTERIZED GAME

The briefing of players for the game in its automated mode is similar to that used in the hand operated game. The players are introduced to the simulated community with the same forms, maps, and diagrams containing political, social, economic, demographic, and historic data. After a period of time in which assimulation of the data takes place, the players are briefed on their roles: the decisions required, their goals, the permissible activities, and some information on potential consequences. The first cycle is a "walk-through" with the game director demonstrating to each player the mechanics of the duties required. Previously completed forms are examined and explained and the data decks prepared by the politician and administrator are displayed. Then the print-out is displayed. This is the results of the data for the first cycle which was just discussed and examined. The results are explained to the players and a question and answer period closes the briefing cycle.

Cycle two is begun immediately. The newsletter and public opinion poll are distributed and the players begin their decision making. The pre-punched project data card decks containing all of the projects available during the game are given to the players. After the decisions are made, the data is collected:

1. The politician submits:

    a) Data cards representing projects budgeted for the current cycle.

    b) A form indicating the tax rate for the next cycle.

    c) His Public Opinion Poll decisions.

2. The Administrator submits:

    a) Data cards indicating recommended projects for the next cycle.

    b) Public Opinion Poll decisions

3. The Speculator submits:

    a) Investments by ward and category.

    b) Campaign contribution amount, if any.

    c) Public Opinion Poll decisions.

When the data is collected from the players, the game director proceeds to assemble the data deck:

1. A single card indicating per capita assessed valuation, the amount of total revenue for schools, the cycle number, and the amount of non-property tax revenue.

2. A single card indicating the number of issues decided in the Public Opinion Poll.

3. The pre-punched Public Opinion Poll cards in three card sets, one set for each issue acted on:

    a) The first card gives general information.

    b) The second card of the set indicates the effects of the decision on the speculator, the bonus per ward per category.

c) The third card gives the growth factor for METROPOLIS for the current cycle and the succeeding cycles.

4. A single card which contains the information generated by decisions made in the previous cycle:

   a) The tax rate for this cycle.

   b) The budget surplus or deficit from the previous capital improvements program.

   c) Growth factors for the next five cycles from Opinion Poll decisions made earlier.

   d) The discretionary fund amounts from the previous cycle.

   e) The politician's standing, by ward, at the close of the previous cycle.

   f) The administrator's standing, in utils, at the end of the previous cycle.

   g) The net worth of the speculator at the end of the last cycle.

5. A single card indicating the tax rate for the next cycle.

6. A single card showing the number of projects budgeted by the politician for the current cycle.

7. A deck of project cards selected by the politician.

8. A single card indicating street, utility, and recreation funds unexpended in the previous cycle.

9. A card indicating the number of projects recommended by the administrator for this cycle.

10. The deck of project cards recommended for this cycle.

11. A single card indicating the amount of campaign contribution by the speculator.

12. A single card indicating the number of projects the administrator is recommending for the action in the next cycle.

13. A deck of project cards for those projects recommended for the next cycle.

14. A single card indicating the investments, by ward and budget category, made by the investor for the current cycle.

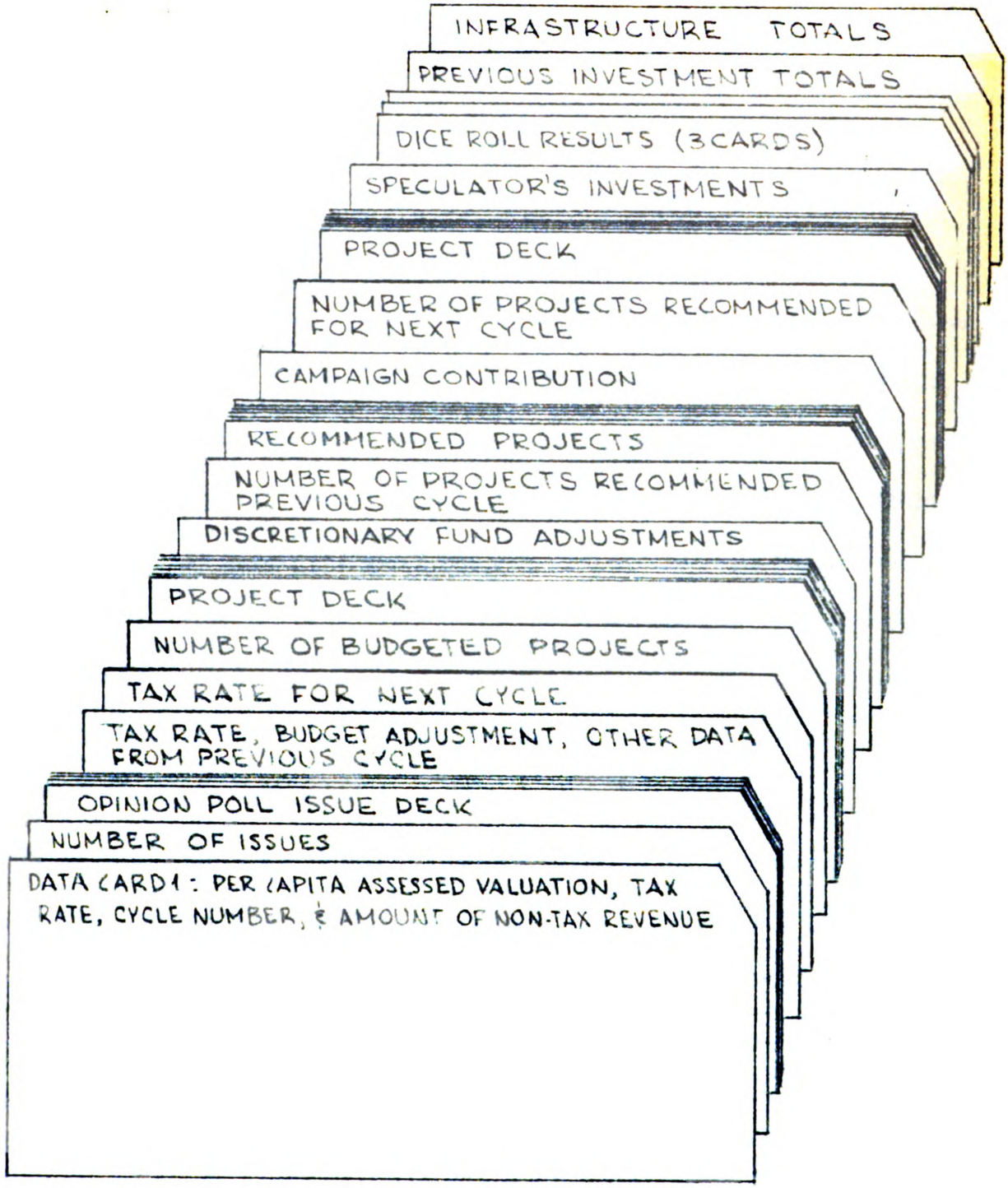
15. A group of three cards indicating the speculator's bonus (the dice roll factor) for the investments.

16. A single card indicating the sum of the previous investments by ward and land use.

17. A single card showing the sum of capital improvement monies expended by the city in each ward.

The data deck is added to the program deck and the cards are given to the computer center personnel. Since the computer is limited to the precise information fed to it, the data must be assembled with care. It is recommended that the deck, after it is assembled, be printed out by the use of an accounting machine and the items checked with great care. The completed run will be returned in 8 to 44 hours, depending on the work load and other factors beyond the control of the game director.

Details on card format and deck assembly are shown on the following page.



DATA DECK ASSEMBLY

V RESULTS

One of the most difficult aspects of operational gaming lies in testing the validity of what has been achieved. Considerable research has gone into this problem, but currently the best estimates tend to be highly subjective. Duke demonstrated that METROPOLIS, when used with undergraduate students, influences their learning as evidenced by their scores on objective examinations.[9] These findings, however, are highly tentative and our best indicators remain the various subjective criteria. A substantiating support to the hypothesis that there is indeed value derived from gaming, is the acceptance by the faculty of the Urban Planning school at Michigan State of METROPOLIS as part of the studio course in the senior year of the program. Since the detailed analysis given in the monograph was made, the game has been used with another senior studio class. It has also been played at several other universities: Cornell, Pittsburgh, Rutgers, and Northwestern; to a planning group in Louisville, Kentucky; and to a research group at the Tri-County Regional Planning Commission (Lansing area). The latter group is engaged in a project similar to but a logical extension of the original

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[9]Richard D. Duke, Gaming-Simulation in Urban Research, p. 36.

game. The group is concerned with anticipating the consequences of decisions made in land use policy formulations using a gaming-simulation technique.

The Tri-County run was the first incorporation of the school board into METROPOLIS II. The attempt to use that version of the school board game a failure. The linkage devised between the school board and the rest of the players was such that in order to defend their own standings, the other players had to work against the school board, even though they were torn by their desire to support a viable educational program. A more serious failing was a lack of definition of the role and duties of the school board, so that the players were in a quandry until several cycles had been played.

After several weeks and a review of the school board functions and linkages, several changes were incorporated. The school taxes were no longer fixed by the school board to be deducted from the general revenue. This caused too severe a penalty on the politician who had no compensating control until after the fact. The school taxes voted by the public opinion poll were still of concern since they remained a drain on the city revenue. The school board role was reduced in stature: the board activity is one of estimation of needs and a forecasting of school population for the succeeding cycles. Rewards for the school board are a result of the favorable action taken on public opinion poll issues, which are usually bonds to

finance capital improvements. Penalties are a result of the lack of ability to accurately estimate population and the percentage of available funds needed to supply the schools.

A request from Northwestern University to demonstrate the game provided an opportunity to test the revised school board game. The players would be graduate students in transportation and planning, with a strong engineering background. The Northwestern University players would be different from the typical Michigan State University players in some respects but not too different to test the school board role. The writer was present. The demonstration of METROPOLIS II was a feature of a seminar in simulation methods and techniques and student interest was high. A large number of players volunteered and each role was played by a group of six students. Although it seemed that there was a little linkage between the school board and the other players, a close affinity between the administrators and the school board soon developed. Their roles were similar in that each was vitally concerned with the growth of the simulated community; their standing depended in part upon their skill in analysis of the issues and how those issues would affect the growth of the community. Both teams became very skilled at estimating the budgets for the next cycle on the basis of the issues, and the effects hinted at in the news letters.

The Northwestern group played seven cycles, and the school board teams (a shuffling of participants occurred after the first few cycles) became acquainted with and adept at the technical features of their role, although still somewhat at the mercy of the other players in the matter of bond issues. The school bond mortality rate in METROPOLIS II during this run was somewhat greater than real life school bond issues have had in the recent past. The players seemed a bit disappointed in the activities and their effect on the others, although they played the "role" with enthusiasm and intensity.

The Northwestern University students were required to make a formal evaluation of their experience with METROPOLIS II. Their criticisms are of interest, and are primarily directed toward the roles of administrator and school board. The students felt that these are weak roles, and the reward system is inadequate. Their suggestions for improving the roles varied from team to team, and in range from none, to physical re-arrangement of players in the room, and to specific complex modifications in the reward structure. The comments were also interesting in that the students place a great amount of faith in what the computerized version of the game could evolve to. They were almost unanimously favorable to the game, and only one student indicated refusal to participate again if given the opportunity.[10]

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[10]Letter from Kenneth J. Dueker, Lecturer, Northwestern University, Evanston, Illinois, April 2, 1965.

Some questions arise with regard to the use of a "machine" in the game situation: Will the students attempt to second-guess the computer? Will they try to figure out how the game works; that is, attempt to "beat the machine" rather than remain in the designed role? When this happens, the effectiveness of the simulated community is lost. The player is interested in maximizing his score but only to the extent of an intra-class competition, or worse, a man-machine contest, and a system to circumvent the programmed consequences becomes the goal. The illusion that the computer can be controlled by the player can occur if the player has some success, and the ego takes over. An opposite illusion, but one equally dangerous, is that the computer is more sophisticated than it really is. It is an easy illusion to acquire. Since the computer is much less than a super brain and much more than "a fast adding machine," and remains a mystery to many, the illusion persists. The computer can perform only in the manner in which it is programmed, and the intelligence it transmits is equivalent to what is put into its memory.

The other changes incorporated into METROPOLIS II have not been tested, except for the "de-bugging" runs, but little trouble is anticipated with these. It should be quite interesting to see what use future "politicians" will make of the deficit spending which is permitted in the new version. The twenty per cent interest penalty assessed for deficit spending is designed to keep the players spending

within the budget unless desperate measures are called for. The recession built into the game should provide the politician an opportunity to display his ingenuity. The penalty also will be a reminder to be accurate when preparing the budget, especially after an error has been committed.

In his monograph Gaming-Simulation in Urban Research, Duke sets eight criteria for measuring the effectiveness of a gaming instrument. Refining the original vehicle and programming it for the computer did not make drastic changes in the effectiveness of the game, but there are three criteria which would seem to apply more directly to the mechanized version of METROPOLIS II: Criterion 2, dealing with conveyance of concepts of an elaborate system by employing a simplified model. This criterion is met by allowing the model to be simplified from the real world but yet to maintain a prodigious amount of detail and complexity so that the decisions are not made patently simple—the computer allows a good measure of complexity in the model but permits a viable game to be played. Criterion 3, that the emphasis must be placed on enhancing learning which is general and structural. It is hoped that the release of the instructor from computational duties will allow him a more effective role as a mentor for the students in their roles as decision makers in the simulated community. Criterion 8, in part, that the mechanical vehicle can be reasonably convenient to operate seems to be well met, in that this was one of the prime reasons for programming METROPOLIS II.

VI FUTURE POSSIBILITIES

The next step for the refinement of METROPOLIS II is to mount the school board game for the computer. This involves detailing and punching the cards for the various school issues, as well as writing the program and punching the cards which are the media for instructing the computer. Since the forms for the non-computer run game are worked up and will not change, all of the work remaining is in programming and deciding on the format of the printed results. Then de-bugging runs are essential to check the program.

After mounting the school board, METROPOLIS II will be ready for play or for more esoteric treatment. Several improvements are desirable. Slight modifications in the game will allow a magnetic tape to be made which will eliminate handling the program deck and several of the data cards. This will permit a very small and compact deck of cards to be handled each cycle. The ultimate computerized version was hinted at in Section II. This is a program which would print not only the results of the decisions but which would also print the public opinion poll and the newsletter and a list at the close of each cycle, of all projects completed through that cycle. The programming of this version of the game does not appear to be impossible, but is quite formidable. It is realized that it would take a con-

siderable amount of time. Since all of the verbal information to be printed must be stored, the amount of memory space needed in the computer is great. Before programming begins, a feasibility study should be undertaken to determine whether or not this sophisticated version is possible on the existing equipment available in the university's computer center.

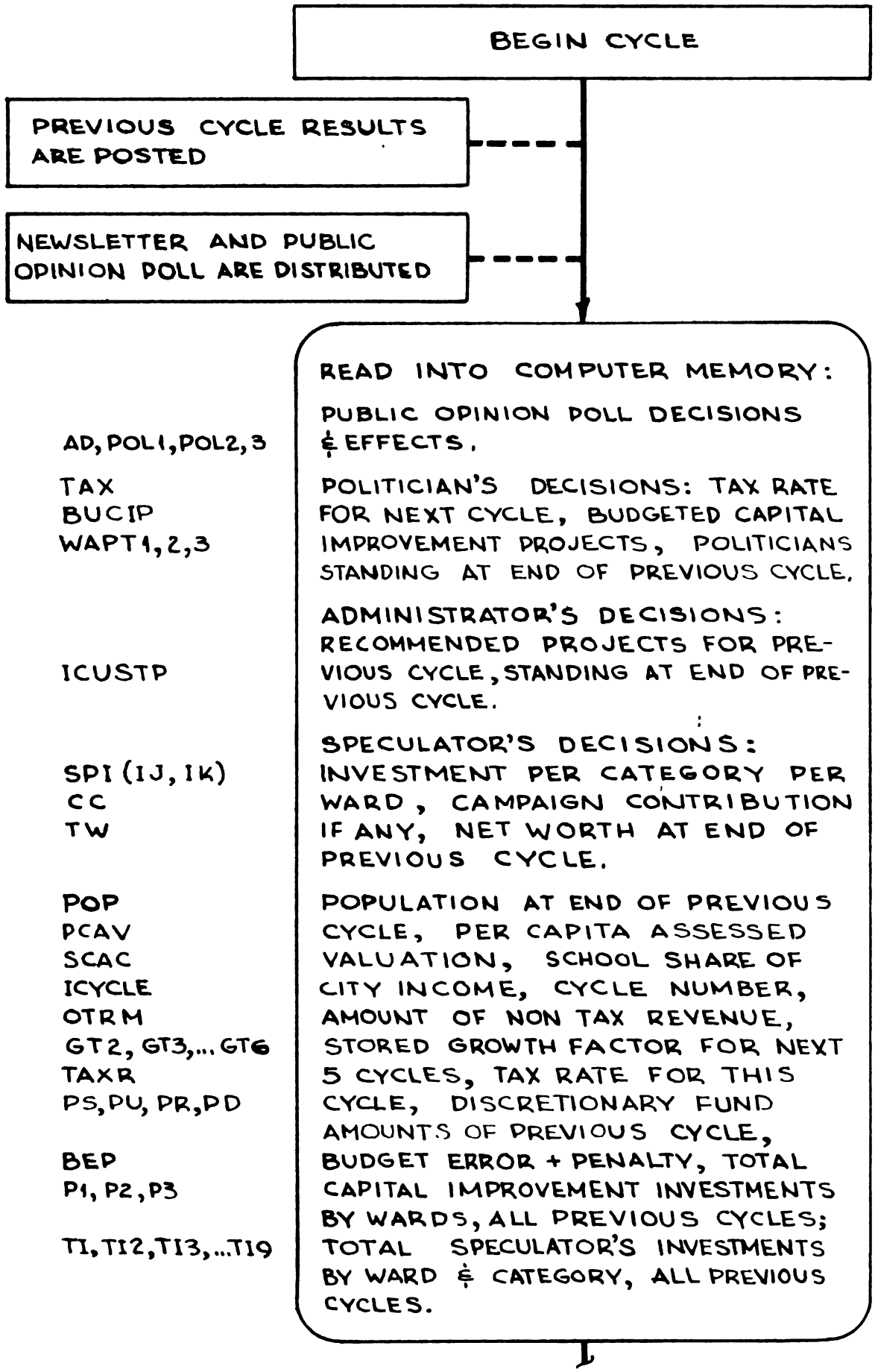
The great amount of time and energy that have gone into METROPOLIS, and the lesser but still considerable effort in programming METROPOLIS II, could well be utilized by other universities. The advanced language Fortran 3600 had several features which were used. These may not be available to computer systems at other universities. A simplified program, that is one which will be common to other compilers, would enable the present program to be utilized at other universities, with all of the supporting data of the game in their present form. This wider use of METROPOLIS II could be a significant contribution to planning education.

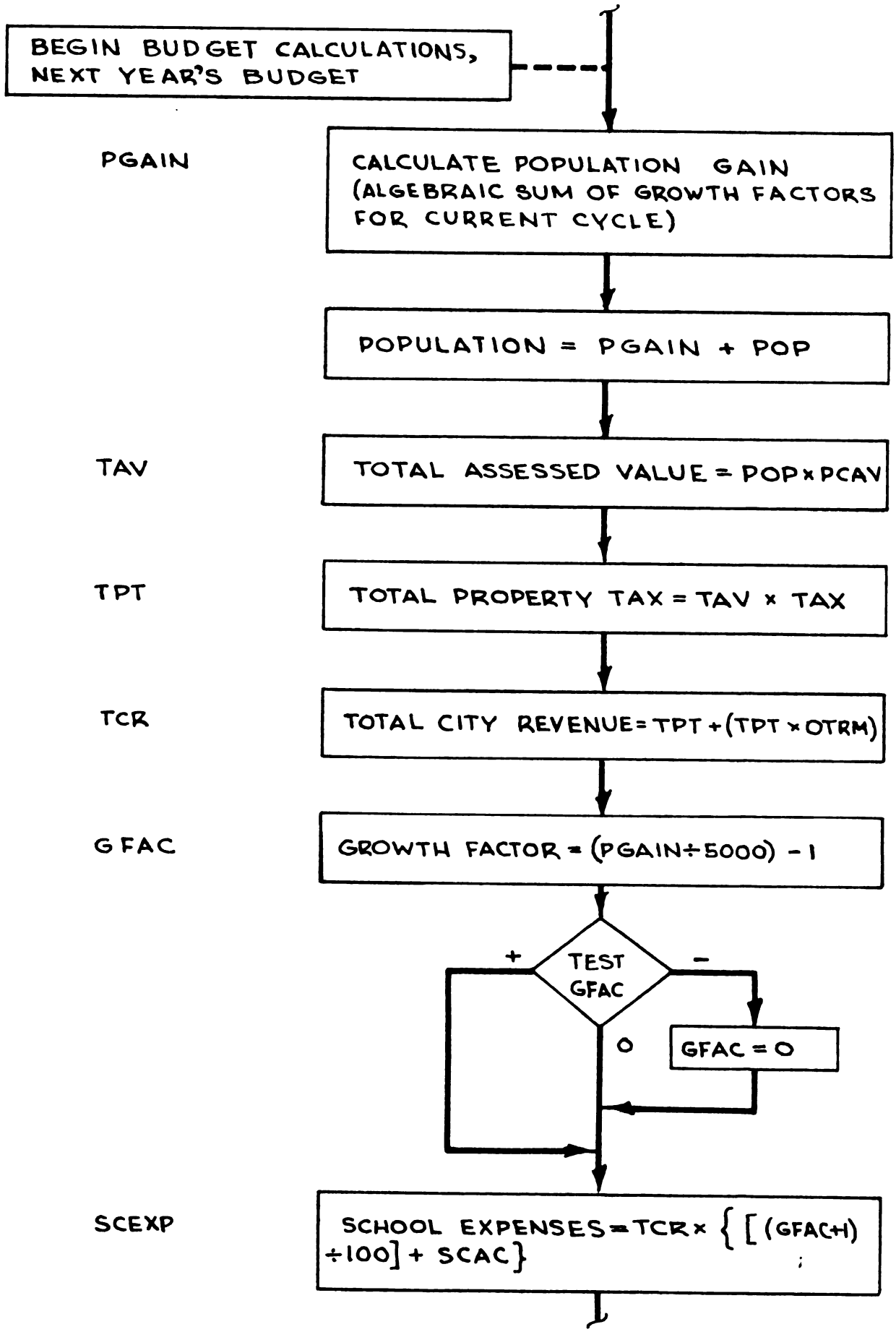
METROPOLIS II can be considered a second generation game, a more complex version of the original, in part automated. One drawback is that in the present and original versions of the game, it is important to note physical changes in the land use pattern that are effected through the various decisions. It has been proposed that a marriage of CLUG and METROPOLIS take place and the deficiency of METROPOLIS' unchanging map be eliminated, and the complexities of

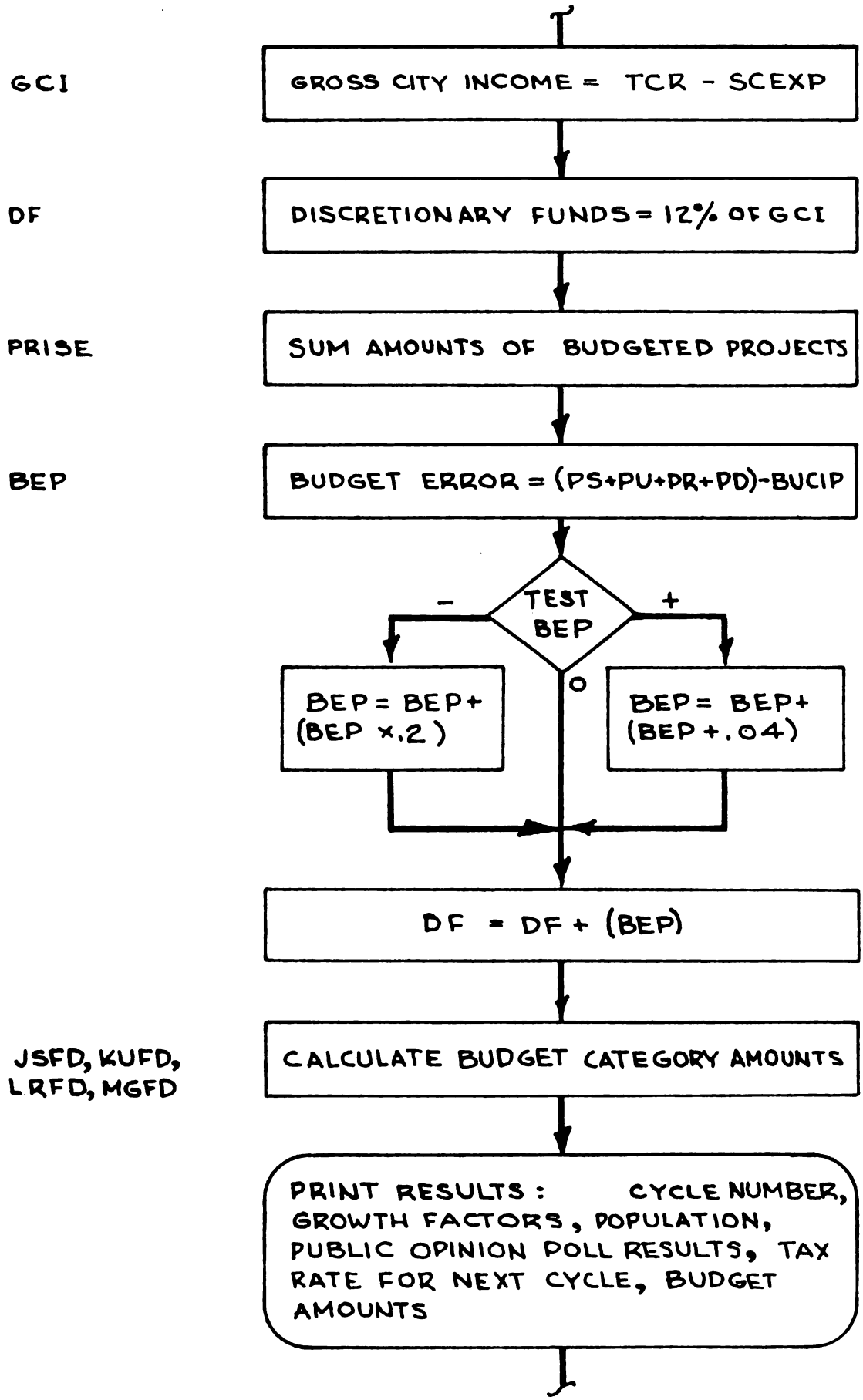
politics lacking in CLUG would survive in the combined version. METROPOLIS-CLUG then, is the third generation game. A fourth generation game, a direct descendent of the original game, is under development: Metro, the attempt to assess the political, social and physical consequences of development decisions in the Lansing metropolitan area. The combined talents of economists, geographers, planners, political scientists, and social scientists are working as a group to develop the matrix of causal relationships which can be used as a predictive tool in the real world. A computer is essential in solving the complex decision-effect activities.

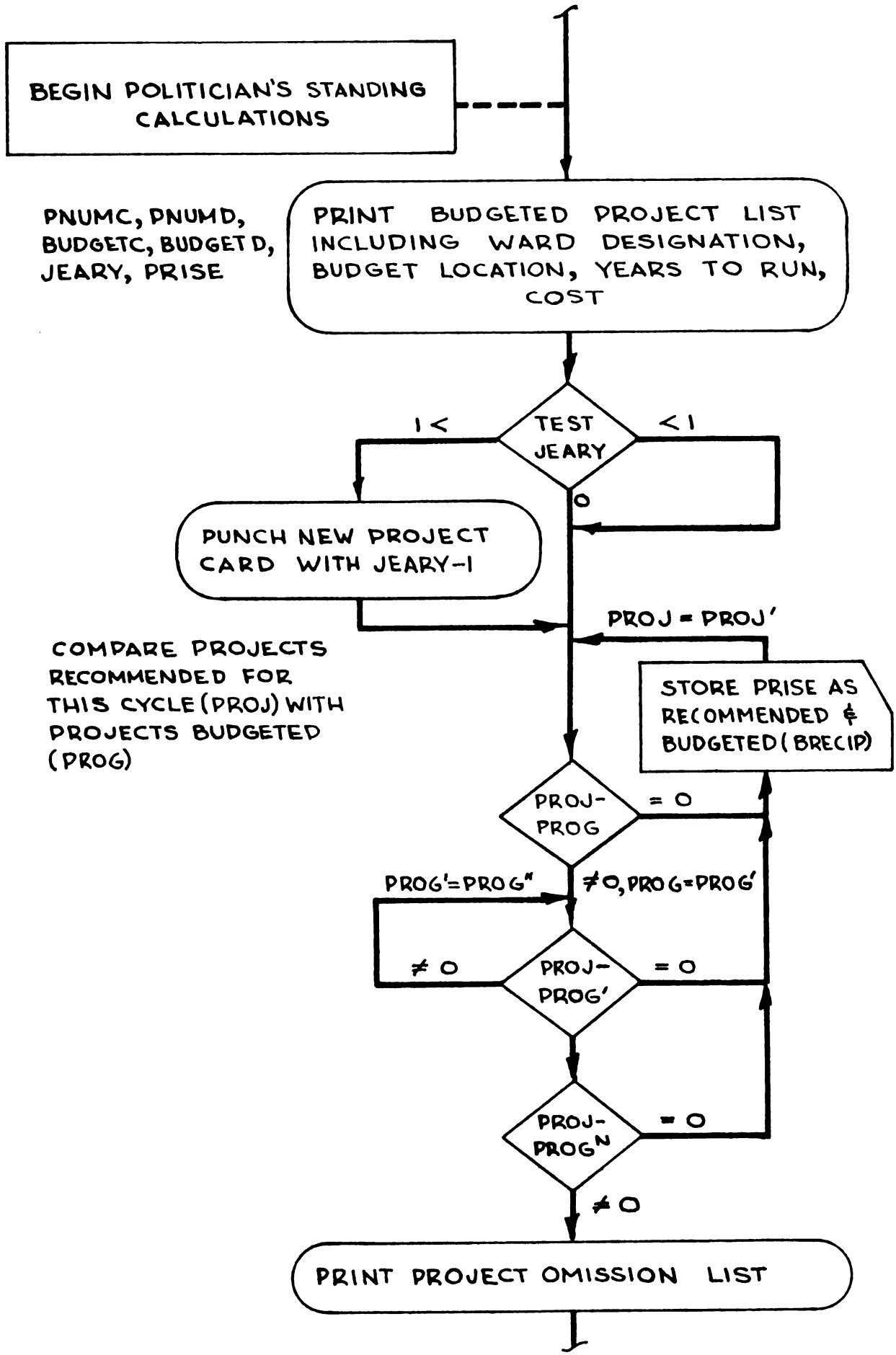
APPENDIX A

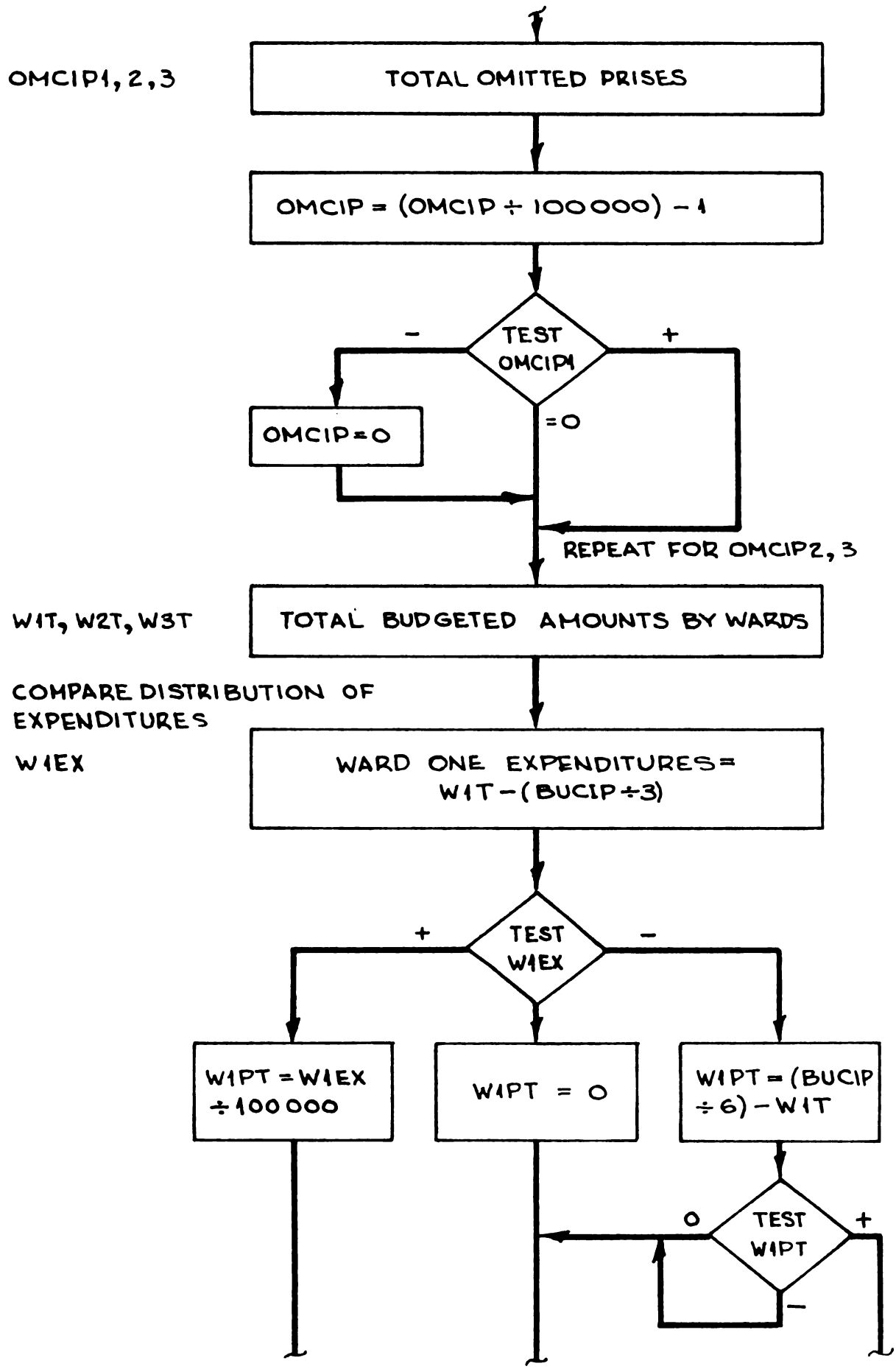
FLOW CHART AND PROGRAM

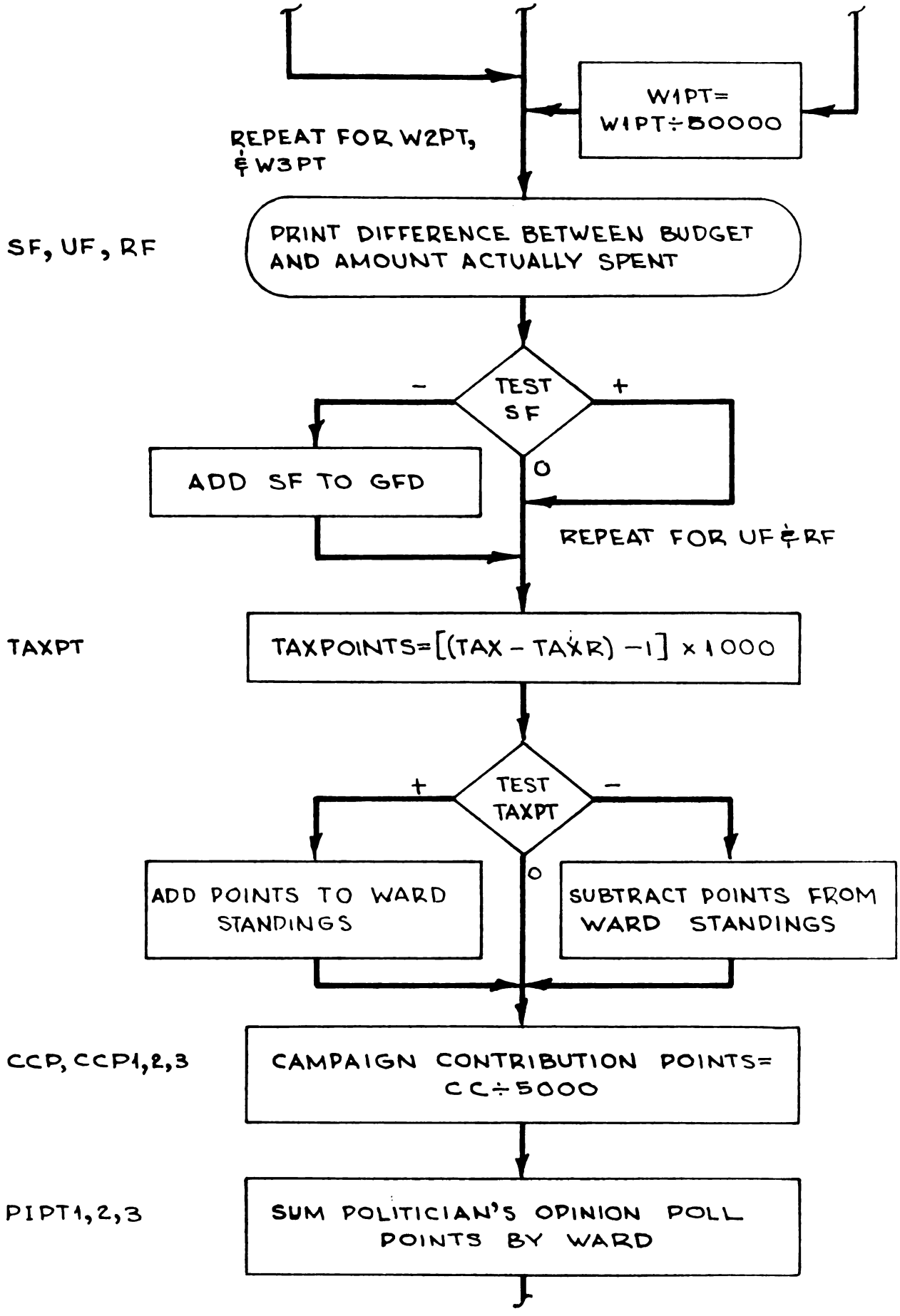

BEGIN CYCLE
PREVIOUS CYCLE RESULTS ARE POSTED
NEWSLETTER AND PUBLIC OPINION POLL ARE DISTRIBUTED
READ INTO COMPUTER MEMORY:
PUBLIC OPINION POLL DECISIONS & EFFECTS.
AD, POL1, POL2, 3
TAX
BUCIP
WAPT1, 2, 3
POLITICIAN'S DECISIONS: TAX RATE FOR NEXT CYCLE, BUDGETED CAPITAL IMPROVEMENT PROJECTS, POLITICIANS STANDING AT END OF PREVIOUS CYCLE.
ADMINISTRATOR'S DECISIONS: RECOMMENDED PROJECTS FOR PREVIOUS CYCLE, STANDING AT END OF PREVIOUS CYCLE.
ICUSTP
SPECULATOR'S DECISIONS:
SPI (IJ, IK)
CC
TW
INVESTMENT PER CATEGORY PER WARD, CAMPAIGN CONTRIBUTION IF ANY, NET WORTH AT END OF PREVIOUS CYCLE.
POP
PCAV
SCAC
ICYCLE
OTRM
GT2, GT3, ... GT6
TAXR
PS, PU, PR, PD
POPULATION AT END OF PREVIOUS CYCLE, PER CAPITA ASSESSED VALUATION, SCHOOL SHARE OF CITY INCOME, CYCLE NUMBER, AMOUNT OF NON TAX REVENUE, STORED GROWTH FACTOR FOR NEXT 5 CYCLES, TAX RATE FOR THIS CYCLE, DISCRETIONARY FUND AMOUNTS OF PREVIOUS CYCLE,
BEP
BUDGET ERROR + PENALTY, TOTAL
P1, P2, P3
CAPITAL IMPROVEMENT INVESTMENTS BY WARDS, ALL PREVIOUS CYCLES;
TI, TI2, TI3, ... TI9
TOTAL SPECULATOR'S INVESTMENTS BY WARD & CATEGORY, ALL PREVIOUS CYCLES.

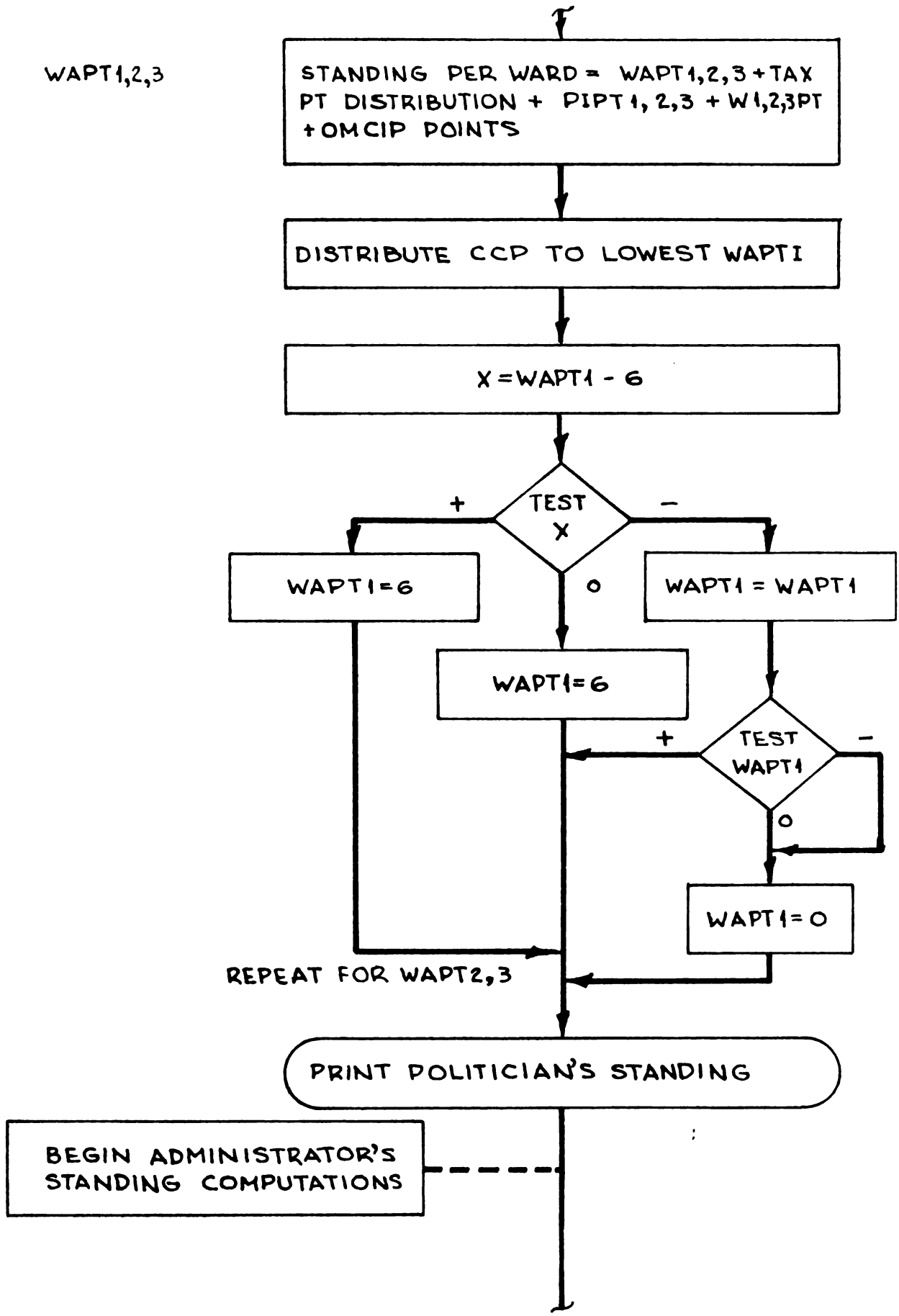

BEGIN BUDGET CALCULATIONS, NEXT YEAR'S BUDGET
PGAIN
CALCULATE POPULATION GAIN (ALGEBRAIC SUM OF GROWTH FACTORS FOR CURRENT CYCLE)
POPULATION = PGAIN + POP
TAV
TOTAL ASSESSED VALUE = POP × PCAV
TPT
TOTAL PROPERTY TAX = TAV × TAX
TCR
TOTAL CITY REVENUE = TPT + (TPT × OTRM)
GFAC
GROWTH FACTOR = (PGAIN ÷ 5000) - 1
TEST GFAC
+
-
0
GFAC = 0
SCEXP
SCHOOL EXPENSES = TCR × { [(GFAC+1) ÷ 100] + SCAC }

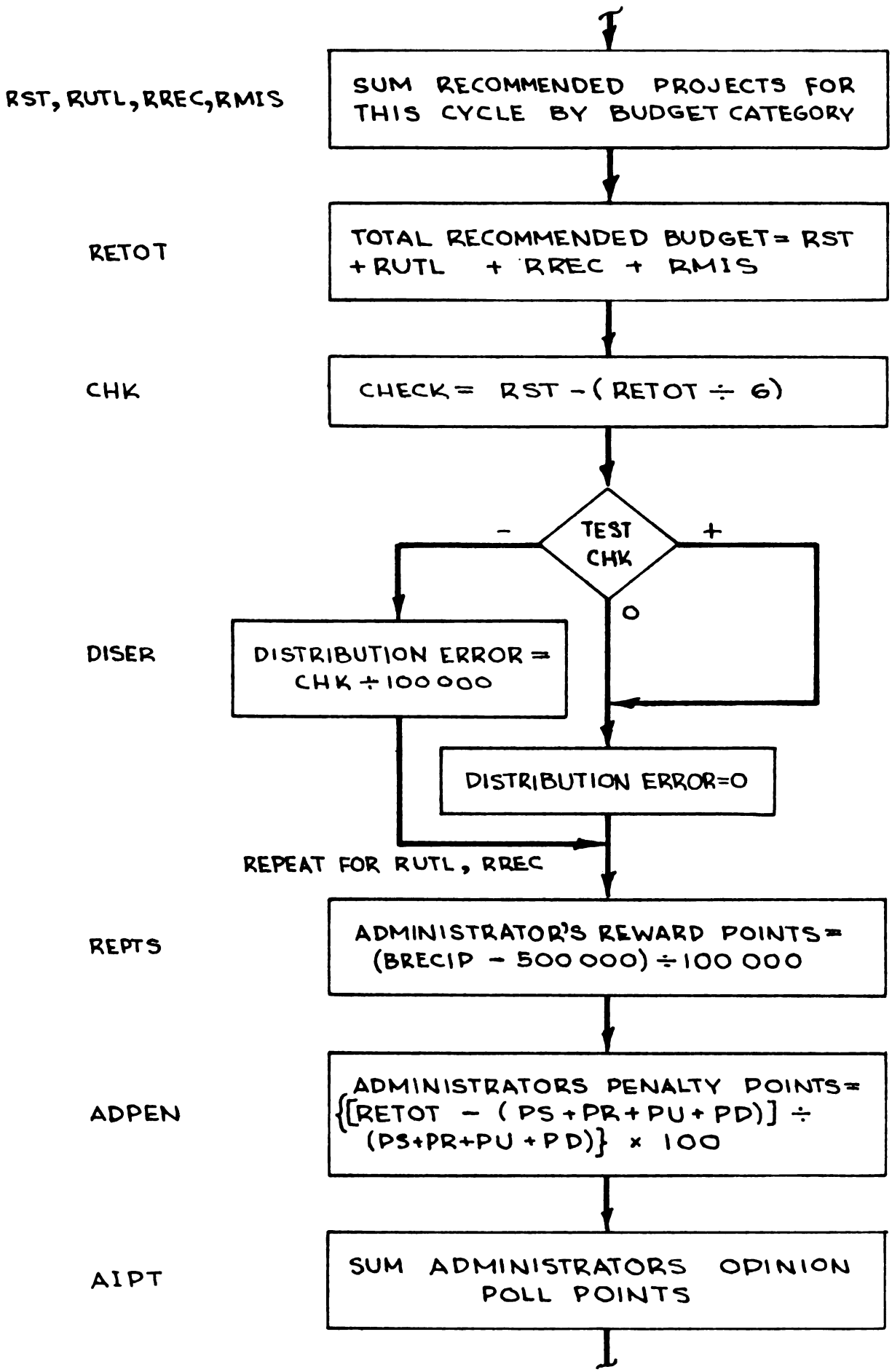

GCI
GROSS CITY INCOME = TCR - SCEXP
DF
DISCRETIONARY FUNDS = 12% OF GCI
PRISE
SUM AMOUNTS OF BUDGETED PROJECTS
BEP
BUDGET ERROR = (PS+PU+PR+PD)-BUCIP
TEST BEP
-
+
0
BEP = BEP+ (BEP x.2)
BEP = BEP+ (BEP +.04)
DF = DF + (BEP)
JSFD, KUFD, LRFD, MGFD
CALCULATE BUDGET CATEGORY AMOUNTS
PRINT RESULTS : CYCLE NUMBER, GROWTH FACTORS, POPULATION, PUBLIC OPINION POLL RESULTS, TAX RATE FOR NEXT CYCLE, BUDGET AMOUNTS

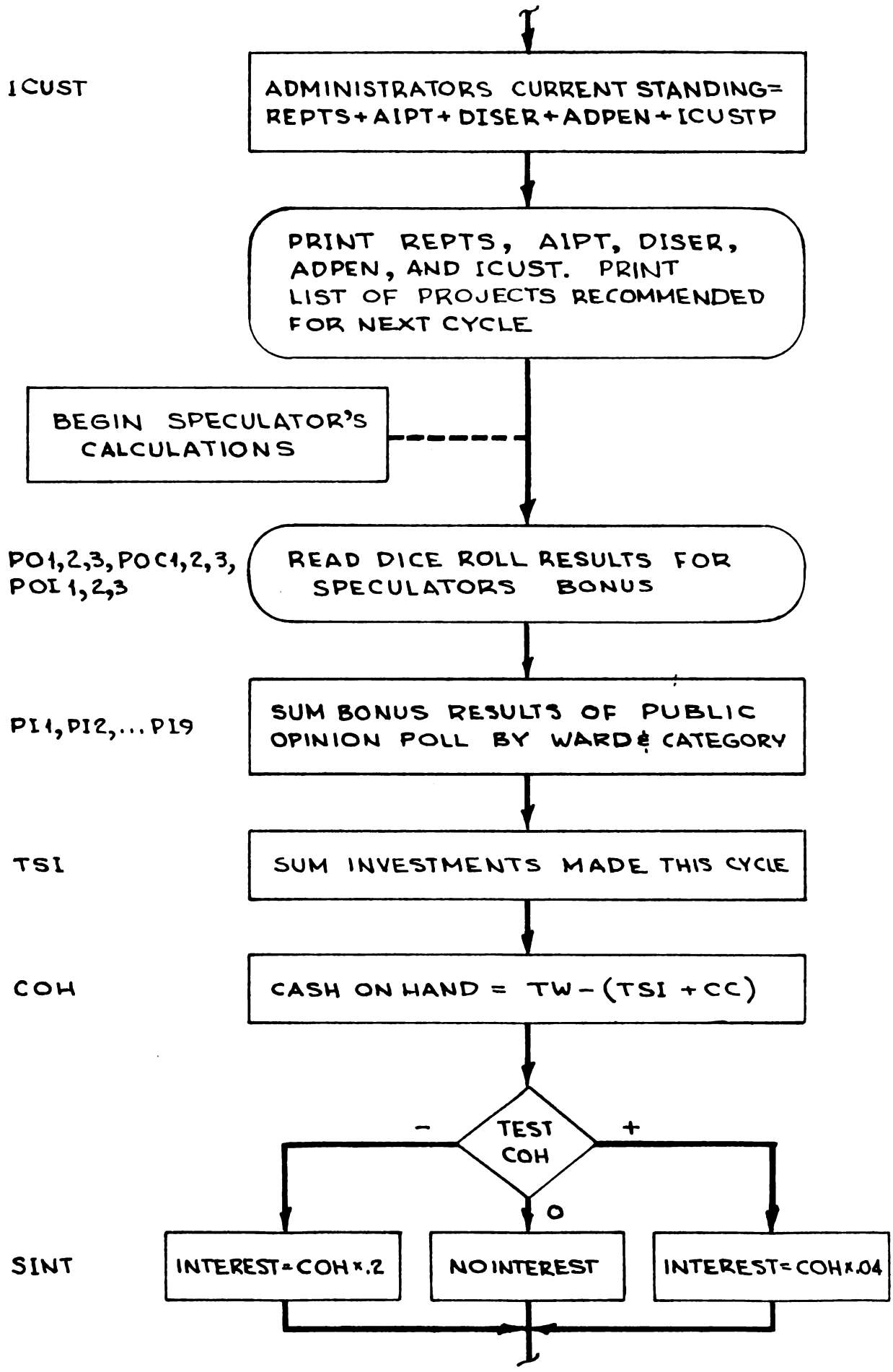

BEGIN POLITICIAN'S STANDING CALCULATIONS
PNUMC, PNUMD, BUDGETC, BUDGETD, JEARY, PRISE
PRINT BUDGETED PROJECT LIST INCLUDING WARD DESIGNATION, BUDGET LOCATION, YEARS TO RUN, COST
TEST JEARY
1<
<1
0
PUNCH NEW PROJECT CARD WITH JEARY-1
PROJ = PROJ'
COMPARE PROJECTS RECOMMENDED FOR THIS CYCLE (PROJ) WITH PROJECTS BUDGETED (PROG)
STORE PRISE AS RECOMMENDED & BUDGETED (BRECIP)
PROJ-PROG
= 0
PROG'=PROG"
≠0, PROG=PROG'
≠ 0
PROJ-PROG'
= 0
PROJ-PROG^N
= 0
≠ 0
PRINT PROJECT OMISSION LIST

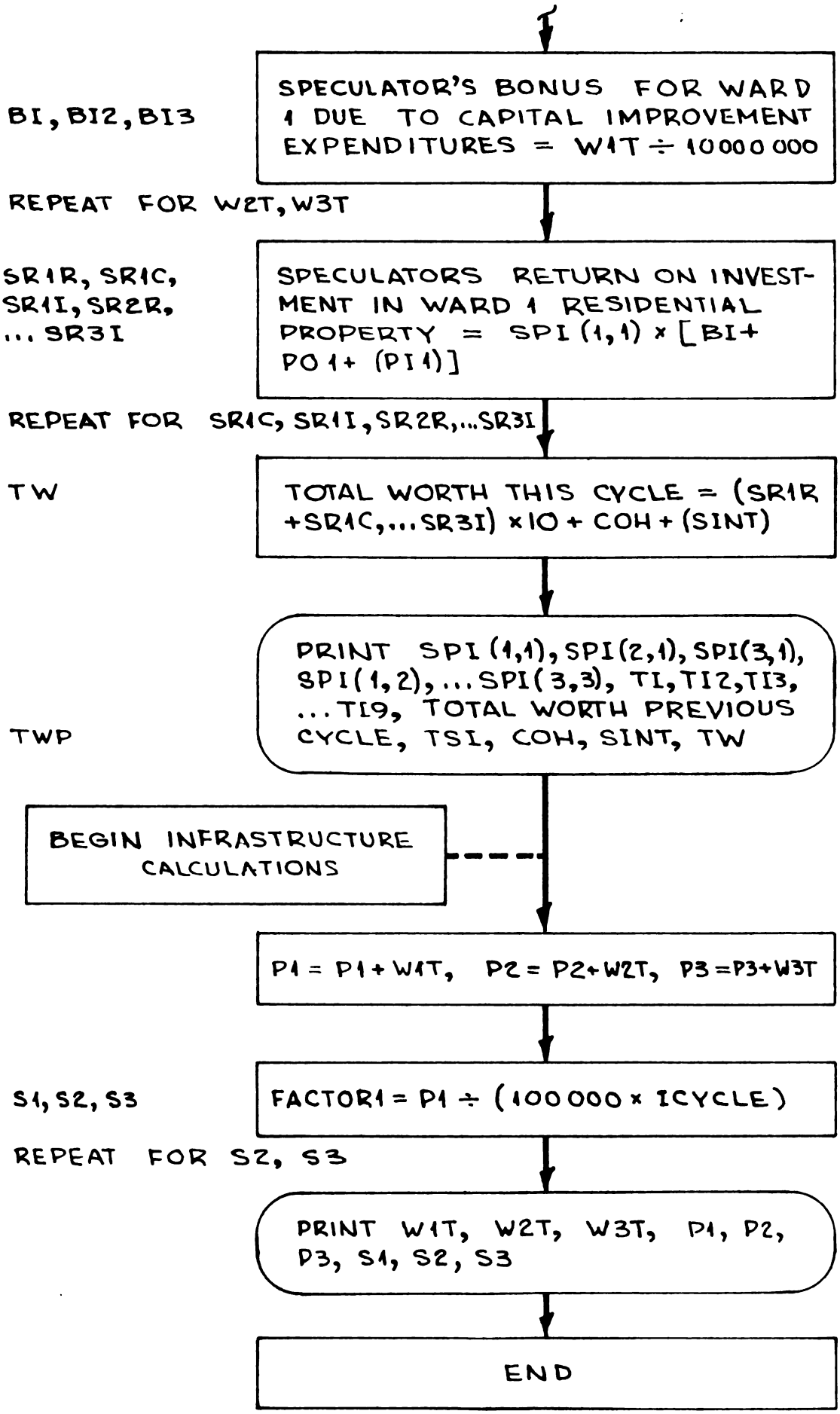

OMCIP1, 2, 3
TOTAL OMITTED PRISES
OMCIP = (OMCIP ÷ 100000) – 1
TEST OMCIP1
–
+
=0
OMCIP=0
REPEAT FOR OMCIP2, 3
W1T, W2T, W3T
TOTAL BUDGETED AMOUNTS BY WARDS
COMPARE DISTRIBUTION OF EXPENDITURES
W1EX
WARD ONE EXPENDITURES= W1T – (BUCIP ÷ 3)
TEST W1EX
+
–
W1PT = W1EX ÷ 100000
W1PT = 0
W1PT = (BUCIP ÷ 6) – W1T
TEST W1PT
0
+
–


W1PT=
W1PT÷50000
REPEAT FOR W2PT,
& W3PT
SF, UF, RF
PRINT DIFFERENCE BETWEEN BUDGET
AND AMOUNT ACTUALLY SPENT
TEST
SF
−
+
0
ADD SF TO GFD
REPEAT FOR UF & RF
TAXPT
TAXPOINTS=[(TAX − TAXR) −1] × 1000
TEST
TAXPT
+
−
0
ADD POINTS TO WARD
STANDINGS
SUBTRACT POINTS FROM
WARD STANDINGS
CCP, CCP1,2,3
CAMPAIGN CONTRIBUTION POINTS=
CC÷5000
PIPT1,2,3
SUM POLITICIAN'S OPINION POLL
POINTS BY WARD


WAPT1,2,3
STANDING PER WARD = WAPT1,2,3 + TAX PT DISTRIBUTION + PIPT1, 2,3 + W1,2,3PT + OMCIP POINTS
DISTRIBUTE CCP TO LOWEST WAPTI
X = WAPT1 - 6
TEST X
+
-
0
WAPT1=6
WAPT1 = WAPT1
WAPT1=6
TEST WAPT1
+
-
0
WAPT1=0
REPEAT FOR WAPT2,3
PRINT POLITICIAN'S STANDING
BEGIN ADMINISTRATOR'S STANDING COMPUTATIONS


RST, RUTL, RREC, RMIS
SUM RECOMMENDED PROJECTS FOR THIS CYCLE BY BUDGET CATEGORY
RETOT
TOTAL RECOMMENDED BUDGET = RST + RUTL + RREC + RMIS
CHK
CHECK = RST - (RETOT ÷ 6)
TEST CHK
-
+
0
DISER
DISTRIBUTION ERROR = CHK ÷ 100 000
DISTRIBUTION ERROR=0
REPEAT FOR RUTL, RREC
REPTS
ADMINISTRATOR'S REWARD POINTS = (BRECIP - 500 000) ÷ 100 000
ADPEN
ADMINISTRATORS PENALTY POINTS = {[RETOT - (PS + PR + PU + PD)] ÷ (PS+PR+PU + PD)} x 100
AIPT
SUM ADMINISTRATORS OPINION POLL POINTS


ICUST
ADMINISTRATORS CURRENT STANDING= REPTS+AIPT+DISER+ADPEN+ICUSTP
PRINT REPTS, AIPT, DISER, ADPEN, AND ICUST. PRINT LIST OF PROJECTS RECOMMENDED FOR NEXT CYCLE
BEGIN SPECULATOR'S CALCULATIONS
PO1,2,3, POC1,2,3, POI 1,2,3
READ DICE ROLL RESULTS FOR SPECULATORS BONUS
PI1, PI2, ... PI9
SUM BONUS RESULTS OF PUBLIC OPINION POLL BY WARD & CATEGORY
TSI
SUM INVESTMENTS MADE THIS CYCLE
COH
CASH ON HAND = TW - (TSI + CC)
TEST COH
-
+
0
SINT
INTEREST=COH x .2
NO INTEREST
INTEREST=COH x .04


SPECULATOR'S BONUS FOR WARD 1 DUE TO CAPITAL IMPROVEMENT EXPENDITURES = W1T ÷ 10000000
BI, BI2, BI3
REPEAT FOR W2T, W3T
SPECULATORS RETURN ON INVESTMENT IN WARD 1 RESIDENTIAL PROPERTY = SPI(1,1) × [BI + PO1 + (PI1)]
SR1R, SR1C, SR1I, SR2R, ... SR3I
REPEAT FOR SR1C, SR1I, SR2R, ... SR3I
TOTAL WORTH THIS CYCLE = (SR1R + SR1C, ... SR3I) × 10 + COH + (SINT)
TW
PRINT SPI(1,1), SPI(2,1), SPI(3,1), SPI(1,2), ... SPI(3,3), TI, TI2, TI3, ... TI9, TOTAL WORTH PREVIOUS CYCLE, TSI, COH, SINT, TW
TWP
BEGIN INFRASTRUCTURE CALCULATIONS
P1 = P1 + W1T, P2 = P2 + W2T, P3 = P3 + W3T
FACTOR1 = P1 ÷ (100000 × ICYCLE)
S1, S2, S3
REPEAT FOR S2, S3
PRINT W1T, W2T, W3T, P1, P2, P3, S1, S2, S3
END

```
      PROGRAM METROP2
     0DIMENSION ISSUEA(6),ISSUEB(6),ACTIONA(6),ACTIONB(6),
     1PROJECT(6),PROJECK(6),COST(6),JEARS(6),AD(6),POL1(6),POL2(6),POL3(
     26),NAMEA(6),NAMEB(6),NAMEC(6),NAMED(6),SPEC(6,9),GROW(6,6),
     3PROJ(20),PNUMA(20),PNUMB(20),BUDGETA(20),BUDGETB(20),JEARI(20),
     4PRICE(20),PROG(20),PNUMC(20),PNUMD(20),BUDGETC(20),BUDGETD(20),
     5JEARY(20),PRISE(20)
      DIMENSION PRJ(20),PNO(20),PNU(20),BUD(20),BUG(20),YRS(20),COS(20)
      DIMENSION SPI(3,3), S(3,3)
  300 FORMAT(F6.4)
  301 FORMAT (F6.0,F6.4,I2,F4.2)
  302 FORMAT(9F8.0)
  303 FORMAT (3F3.2)
  304 FORMAT (1H0,46X,33HPOPULATION OF METROPOLIS RISES TO   ,I8////)
  305 FORMAT (53X,17HNET CITY INCOME =,I10/)
  306 FORMAT (57X,13HSTREET FUND =,I10)
  307 FORMAT (56X,14HUTILITY FUND =,I10)
  308 FORMAT (53X,17HRECREATION FUND =I10)
  309 FORMAT (56X,14HGENERAL FUND = , I10/)
  310 FORMAT (43X,27HTOTAL DISCRETIONARY FUNDS =,I10///)
  311 FORMAT (1H0,47X,27HPUBLIC OPINION POLL RESULTS//)
 3120FORMAT(5X,I2,5X,I1,3X,A8,A2,A8,A2,1X,F9.0,2X,I1,3X,3A8,A6,7X,F5.0,
    17X,F3.0,1X,F3.0,1X,F3.0/)
 3130FORMAT(1H0,3X,108HCYCLE,ISSUE..,ACTION.....PROJECT......COST..TIME.
    1..........COMMENT.....          ...   WARD 1...2...3/)
  314 FORMAT(I2)
  315 FORMAT (1H-,38X,40HMETROPOLIS  INFRA-STRUCTURE ACCUMULATION/)
  316 FORMAT (38X,42HCUMULATIVE INCREASE OF PROGRAMMED PROJECTS//)
 3170FORMAT(24X,71HCYCLE...WARD 1.......FACTOR...WARD 2.......FACTOR...
    1WARD 3.......FACTOR /)
  318 FORMAT(25X,I2,4X,F8.0,12X,F10.0,12X,F10.0)
  319 FORMAT (21X,8HSUBTOTAL,2XF8.0,6X,F6.3,F10.0,F12.3,F10.0,F12.3//)
 3200FORMAT (1H0,35X,49HADMINISTRATORS RECOMMENDED PROJECTS FOR NEXT YE
    1AR/)
  321 FORMAT (40X,A8,A4,A8,A4,I2,1X,F8.0)
  322 FORMAT (36X,43HWARD.....CODE.....LOCATION....TO RUN...YEAR/)
  323 FORMAT (36X,16HBUDGETED PROJECT,A8,A4,5X,19HCONTINUES OVER NEXT)
  324 FORMAT(35X,I2,3X,26HYEARS AT AN ANNUAL COST OF,F8.0/)
  325 FORMAT(F5.0,A8,A4,A8,A4,I2,1X,F8.0)
  326 FORMAT (5F9.6)
 3270FORMAT (27X, 78HCURRENT CYCLE
    1  TOTAL PREVIOUS INVESTMENTS/)
  328 FORMAT (31X,10HFIRST WARD,A8,A4,A8,A4,F8.0)
  329 FORMAT(30X,11HSECOND WARD,A8,A4,A8,A4,F8.0)
  330 FORMAT (31X,10HTHIRD WARD,A8,A4,A8,A4,F8.0)
  332 FORMAT (10X,43HPOLITICIANS STANDING, BY WARD, END OF CYCLE//)
  331 FORMAT(1H0,43X,46HCITY COUNCIL BUDGETS CAPITAL IMPROVEMENTS...../)
  333 FORMAT(25X13HWARD ONE     ,I3)
  334 FORMAT(25X13HWARD TWO     ,I3)
  335 FORMAT(25X13HWARD THREE    ,I3////)
  336 FORMAT (12X, 5F5.0)
 3370FORMAT(36X57HTHE FOLLOWING PROJECTS HAVE BEEN APPROVED FOR THIS YE
    1AR  //)
  338 FORMAT(3X,23HTAX RATE FOR NEXT CYCLE,2X,F4.1,2X,5HMILLS//)
  339 FORMAT (1H-,49X,20HSPECULATORS STANDING//)
  340 FORMAT(F7.0)
```

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  341 FORMAT (1H0,46X,28HBUDGETED MULTI-YEAR PROJECTS/)
  342 FORMAT (1H0,47X,23HADMINISTRATORS STANDING//)
  343 FORMAT(60X15HREWARD POINTS =,I5)
  344 FORMAT(36X39HDISCRETIONARY FUND DISTRIBUTION ERROR =,I5)
  345 FORMAT(41X34HOVER-, UNDER-EXPENDITURE PENALTY =,I5)
  346 FORMAT (42X,33HADMINISTRATORS CURRENT STANDING =,I5//)
  347 FORMAT(42X28HAMOUNT INVESTED THIS CYCLE $,F10.0)
  348 FORMAT(48X22HCASH HELD IN RESERVE $,F10.0)
  349 FORMAT(43X27HCONTRIBUTED TO POLITICIAN $,F10.0)
  350 FORMAT(40X25HNET WORTH AT END OF CYCLE,I2,2X1H$,F10.0////)
  351 FORMAT(5X44HTHIS WILL BE A PUNCHED CARD IN FINAL PROGRAM)
 3530FORMAT (1H0,26X,51HRECOMMENDED PROJECTS NOT BUDGETED BY THE POLITI
     1CIAN/)
  354 FORMAT (F8,0)
 3550FORMAT(3X,76HCAMPAIGN CONTRIBUTION POINTS FOR WARDS ONE, TWO, AND
     1THREE RESPECTIVELY ARE  ,3I6//)
  356 FORMAT(1H0,16X,35HNO CAMPAIGN CONTRIBUTION THIS CYCLE//)
  357 FORMAT(1H0,65X,39HPOLITICIAN OVERSPENDS GENERAL FUND BY $,F8,0//)
  358 FORMAT(54X,11HINVESTMENTS//)
  359 FORMAT (56X,8HCATEGORY/)
 3600FORMAT(1H0,2X,83HPOLITICIANS PENALTY POINTS FOR IGNORING RECOMMEND
     1ED PROJECTS IN WARDS 1, 2, AND 3 =,3I6//)
 3610FORMAT (3X,47HADD UNSPENT FUNDS OF THIS YEAR, PLUS INTEREST,$,F9.0
     1,2X,8HTO CYCLE,I3///)
 3620FORMAT (12X,1H1,8X,F8.0,5X,F8.0,5X,F8.0,14X,1H1,8X,F8.0,5X,F8.0,5X
     1,F8.0)
 3630FORMAT (12X,1H2,8X,F8.0,5X,F8.0,5X,F8.0,14X,1H2,8X,F8.0,5X,F8.0,5X
     1,F8.0)
 3640FORMAT (12X,1H3,8X,F8.0,5X,F8.0,5X,F8.0,14X,1H3,8X,F8.0,5X,F8.0,5X
     1,F8.0///)
 3650FORMAT (1X,90HPROJECTS RECOMMENDED BY ADMINISTRATOR FOR ACTION THI
     1S YEAR, BUT NOT BUDGETED BY POLITICIAN/)
  366 FORMAT(33X,37HTOTAL ASSESSED VALUE OF METROPOLIS =$,F10.0/)
  367 FORMAT(42X,28HPER CAPITA ASSESSED VALUE =$,4X,F6.0/)
  368 FORMAT(50X,20HNON TAX REVENUE IS $,F10.0/)
  369 FORMAT(32X,38HTOTAL CITY INCOME FROM PROPERTY TAX =$,F10.0/)
  370 FORMAT(41X,29HTAXES ALLOCATED TO SCHOOLS =$,F10.0/)
  371 FORMAT(51X,19HTAX RATE IN MILLS =,3X,F8.1/)
  372 FORMAT(47X,28HPUBLIC OPINION POLL POINTS =,I5/)
 3730FORMAT(3X,68HCITY COUNCIL OVERSPENDS DISCRETIONARY FUNDS, CURRENT
     1BUDGET CUT BY $,F8.0/)
 3740FORMAT(11X,22HNON TAX REVENUE EQUALS,2X,I3,2X,31HPERCENT OF PROPER
     1TY TAX REVENUE/)
  375 FORMAT (30X,40HINTEREST ON CASH RESERVE AT 4 PERCENT =$,F10,0)
  376 FORMAT (F4.2)
 3770FORMAT(3X,72HPENALTY OR REWARD POINTS DUE TO PUBLIC OPINION POLL I
     1N WARDS 1, 2, 3 ARE,3I6//)
  378 FORMAT (3F2,0)
  379 FORMAT (I3)
  380 FORMAT (52X,6F3,0)
  381 FORMAT (10X,29HGROWTH INDICES, NEXT 5 CYCLES///)
  382 FORMAT (5F3,0)
  383 FORMAT (3F9.0)
  384 FORMAT (43X,31HSPECULATORS OPINION POLL POINTS/)
 3850FORMAT (17X,86HWARD, LAND USE...1,RES...1,COM...1,IND...2,RES...2,
     1COM...2,IND...3,RES...3,COM...3,IND/)
```

FTN4,

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3860FORMAT (35X,F4.2,4X,F4.2,4X,F4.2,4X,F4.2,4X,F4.2,4X,F4.2,4X,F4.2,4X,F4.2,4X,F4.2
   1,4X,F4.2,4X,F4.2//)
387 FORMAT (3F9.0)
388 FORMAT(3X,51HCURRENT CYCLE DISCRETIONARY FUNDS LESS AMOUNT SPENT/)
3890FORMAT (3X,9HSTREETS $,F8.0,4X,11HUTILITIES $,F8.0,4X,12HRECREATIO
   1N $,F8.0//)
3900FORMAT (3X,17HDEDUCT FROM CYCLE,I3,2X,68HCAPITAL IMPROVEMENT BUDGE
   1T, FUNDS OVERSPENT THIS YEAR PLUS PENALTY $,F9.0///)
394 FORMAT (38X,1H1,1X,A8,A4,A8,A4,3X,I2,3X,F8.0)
395 FORMAT (1H0,50X,20HPOLITICIANS STANDING///)
396 FORMAT (94X,17HPENALTY OR REWARD)
397 FORMAT (90X,25HADMINISTRATOR,.POLITICIAN)
398 FORMAT (38X,1H2,1X,A8,A4,A8,A4,3X,I2,3X,F8.0)
399 FORMAT (38X,1H3,1X,A8,A4,A8,A4,3X,I2,3X,F8.0)
400 FORMAT (1H1,62X,5HCYCLE,I3//)
401 FORMAT (36X,3HALL,1X,A8,A4,A8,A4,3X,I2,3X,F8.0)
402 FORMAT (66X,15HYEARS  COST PER)
403 FORMAT (36X,3HALL,1X,A8,A4,A8,A4,3X,I2,3X,F8.0,2X,8HPER WARD)
404 FORMAT (I2,I1,A8,A2,A8,A2,F9.0,I1,F5.0,3F4.0,3A8,A6)
405 FORMAT (9F4.2,/,6F3.0)
406 FORMAT (6F3.0)
407 FORMAT (10X25HCALCULATED GROWTH INDEX =,I3///)
408 FORMAT (41X,29HUNSPENT FUNDS CARRIED FORWARD, F10.0/)
4090FORMAT (10X,106HWARD.......,RESIDENTIAL..COMMERCIAL...INDUSTRIAL..
   1       WARD.....,RESIDENTIAL...COMMERCIAL...INDUSTRIAL  /)
412 FORMAT (42X,28HINTERST ON BORROWED MONEY =$,F10.0)
414 FORMAT (42X,28HBUDGET ERROR PLUS PENALTY =$,F10.0/)
413 FORMAT (37X,33HUNSPENT FUNDS CARRIED FOREWARD =$,F10.0/)
415 FORMAT(F5.4,F8.0,5F3.0,F7.0,4F7.0,3F2.0,I3,F8.0)
416 FORMAT (F5.4)
417 FORMAT (I5,F8.0,5F3.0,F7.0,4F7.0,3F2.0,I3,F8.0)
4550FORMAT (3X,52HTAXES AFFECT POLITICIANS STANDING BY WARD AS FOLLOWS
   1,3I5/)
4560FORMAT (3X,50HPOLITICIANS PENALTY FOR BUDGET INEQUITIES IN WARDS,3
   1I5/)
457 FORMAT (1H1,3X,9F8.0)
458 FORMAT (4F10.0)
459 FORMAT (1H0,60X,17HREVENUE FOR CYCLE,I3//)
460 FORMAT  (I5,F8.0,5F3.0,F7.0,4F7.0,3F2.0,I3,F8.0)
    READ 301, PCAV,SCAC,ICYCLE,OTRM
    READ 314, IS
    DO 31 I=1,IS
   0READ404, ISSUEA(I),ISSUEB(I),ACTIONA(I),ACTIONB(I),
   1PROJECT(I),PROJECK(I),COST(I),JEARS(I),AD(I),POL1(I),POL2(I),POL3(
   2I), NAMEA(I),NAMEB(I),NAMEC(I),NAMED(I)
    READ 405,(SPEC(I,M),M=1,9),(GROW(I,L),L=1,6)
 31 CONTINUE
    PRINT 400, ICYCLE
    CYCLE=ICYCLE
    LAS=ICYCLE-1
   0READ 415,TAXR,BEPP,GT2,GT3,GT4,GT5,GT6,POP,PS,PU,PR,PD,WAPT1,WAPT2
   1,WAPT3,ICUSTP,TW
    READ 416, TAX
    TWP=TW
    GTOT=0.
    DO 32 I=1,IS
```

```
   32 GTOT=GTOT+GROW(I,1)
      IGTOT=GTOT+GT2
      PRINT 407, IGTOT
      GT2=GT3
      DO 33 I=1,IS
   33 GT2=GT2+GROW(I,2)
      GT3=GT4
      DO 34 I=1,IS
   34 GT3=GT3+GROW(I,3)
      GT4=GT5
      DO 35 I=1,IS
   35 GT4=GT4+GROW(I,4)
      GT5=GT6
      DO 36 I=1,IS
   36 GT5=GT5+GROW(I,5)
      GT6=0.
      DO 37 I=1,IS
   37 GT6=GT6+GROW(I,6)
      PRINT 381
      PRINT 336, GT2,GT3,GT4,GT5,GT6
      IGAIN=IGTOT+6
      GO TO(1,2,3,4,5,6,7,8,9,10,11,12,13),IGAIN
    1 PGAIN=1500.0
      GO TO 14
    2 PGAIN=2000.0
      GO TO 14
    3 PGAIN=2300.0
      GO TO 14
    4 PGAIN=2700.0
      GO TO 14
    5 PGAIN=3000.0
      GO TO 14
    6 PGAIN=3500.0
      GO TO 14
    7 PGAIN=4200.0
      GO TO 14
    8 PGAIN=5000.0
      GO TO 14
    9 PGAIN=5500.0
      GO TO 14
   10 PGAIN=7500.0
      GO TO 14
   11 PGAIN=11000.0
      GO TO 14
   12 PGAIN=15000.0
      GO TO 14
   13 PGAIN=25000.0
   14 POP=POP+PGAIN
      TAV=PCAV*POP
      TPT=TAV*TAX
      TCR=TPT+TPT*OTRM
      NTRM=OTRM*100.
      OREV=TPT*OTRM
      TX=TAX*1000.
      GFAC=PGAIN/5000.0
      GFAC=GFAC-1.0
```

FTN4,

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      IF(GFAC)50,50,52
   50 GFAC=0.
   52 SCEXP=TCR*(((GFAC+1.0)/100.0)*SCAC)
      GCI=TCR-SCEXP
      DF=GCI*.12
      READ 314, KI
     0READ 325, (PROG(N),PNUMC(N),PNUMD(N),BUDGETC(N),BUDGETD(N),
     1JEARY(N),PRISE(N),N=1,KI)
      BUCIP=0.0
      DO 30 N=1,KI
   30 BUCIP=BUCIP+PRISE(N)
      BEP=(PS+PU+PR+PD)-BUCIP
      IF (BEP)27,28,28
   27 BEP=(BEP*.2)+(BEP)
      GO TO 29
   28 BEP=BEP+BEP*.04
   29 DF=DF+(BEP)
      READ 387, SF,UF,RF
      SFUND=DF/6. + (SF)
      UFUND=DF/3. + (UF)
      RFUND=DF/12. +(RF)
      GFUND=(DF/12.)*5.
      IPOP=POP
      SFUND=SFUND/10000.
      JSFD=SFUND
      JSFD=JSFD*10000
      UFUND=UFUND/10000.
      KUFD=UFUND
      KUFD=KUFD*10000
      RFUND=RFUND/10000.
      LRFD=RFUND
      LRFD=LRFD*10000
      GFUND=GFUND/10000.
      MGFD=GFUND
      MGFD=MGFD*10000
      RGFD=MGFD
      ITOT=JSFD+KUFD+LRFD+MGFD
      TOTFUND=ITOT
      NGCI=GCI
      PCI=GCI
      PTOT=PS+PU+PR+PD
      IGCI=GCI
      GCI=IGCI*10000
      PRINT 311
      PRINT 396
      PRINT 397
      PRINT 313
     0PRINT 312,(ISSUEA(L),ISSUEB(L),ACTIONA(L),ACTIONB(L) ,
     1PROJECT(L),PROJECK(L),COST(L),JEARS(L),NAMEA(L),NAMEB(L),NAMEC(L),
     2NAMED(L),AD(L),POL1(L),POL2(L),POL3(L),L=1,IS)
      NCYC=ICYCLE+1
      PRINT 459, NCYC
      PRINT 304,IPOP
      PRINT 367, PCAV
      PRINT 366, TAV
      PRINT 369,TPT
```

```
      PRINT 368, OREV
      PRINT 374, NTRM
        PRINT 370, SCEXP
      PRINT 371,TX
      PRINT 305,NGCI
      PRINT 306,JSFD
      PRINT 307,KUFD
      PRINT 308,LRFD
      PRINT 309,MGFD
      PRINT 310,ITOT
      ST=JSFD
      UT=KUFD
      GM=MGFD
      RM=LRFD
C                    POLITICIAN≠S STANDING
      PRINT 395
      PRINT 331
      PRINT 337
      BRECIP=0.
      PRINT 402
      PRINT 322
      DO 24 N=1,KI
      IF(PROG(N)-90.)24,24,23
   23 IF(PROG(N)-200.)200,201,201
 2000 PRINT 394,PNUMC(N),PNUMD(N),BUDGETC(N),BUDGETD(N),JEARY(N),PRISE(N
     1)
      GO TO 24
  201 IF(PROG(N)-300.)202,203,203
 2020 PRINT 398,PNUMC(N),PNUMD(N),BUDGETC(N),BUDGETD(N),JEARY(N),PRISE(N
     1)
      GO TO 24
  203 IF (PROG(N)-400.)204,205,205
  204 PRINT 399,PNUMC(N),PNUMD(N),BUDGETC(N),BUDGETD(N),JEARY(N),PRISE(N
     1)
      GO TO 24
  205 IF(PROG(N)-700.)206,24,24
 2060 PRINT 401,PNUMC(N),PNUMD(N),BUDGETC(N),BUDGETD(N),JEARY(N),PRISE(N
     1)
   24 CONTINUE
      PRINT 341
      DO 26 N=1,KI
      IF(JEARY(N)-1)26,26,25
   25 PRINT 323, PNUMC(N),PNUMD(N)
      JEARY(N)=JEARY(N)-1
      PRINT  324,JEARY(N),PRISE(N)
     0PUNCH 325, PROG(N),PNUMC(N),PNUMD(N),BUDGETC(N),BUDGETD(N),JEARY(N
     1),PRISE(N)
   26 CONTINUE
      READ 314, KJ
     0READ 325, (PROJ(M),PNUMA(M),PNUMB(M),BUDGETA(M),BUDGETB(M),
     1JEARI(M),PRICE(M),M=1,KJ)
      OMCIP1=0.
      OMCIP2=0.
      OMCIP3=0.
      PRINT 353
      DO 22 M=1,KJ
```

```
      IF (PROJ(M)-PROG(1))15,16,15
   16 BRECIP=BRECIP+PRICE(M)
      GO TO 22
   15 DO 17 N=2,KI
      IF(PROJ(M)-PROG(N))17,16,17
   17 CONTINUE
      IF(PROJ(M)-200.)18,18,19
   18 PRINT 328, PNUMA(M),PNUMB(M),BUDGETA(M),BUDGETB(M),PRICE(M)
      OMCIP1=OMCIP1+PRICE(M)
      GO TO 22
   19 IF(PROJ(M)-300.)20,21,21
   20 PRINT 329, PNUMA(M),PNUMB(M),BUDGETA(M),BUDGETB(M),PRICE(M)
      OMCIP2=OMCIP2+PRICE(M)
      GO TO 22
   21 PRINT330, PNUMA(M),PNUMB(M),BUDGETA(M),BUDGETB(M),PRICE(M)
      OMCIP3=OMCIP3+PRICE(M)
   22 CONTINUE
      OMCIP1=OMCIP1/100000.
      OMCIP2=OMCIP2/100000.
      OMCIP3=OMCIP3/100000.
      ICIP1=OMCIP1*(-1.)
      ICIP2=OMCIP2*(-1.)
      ICIP3=OMCIP3*(-1.)
      IF (ICIP1)207,208,208
  207 ICIP1=ICIP1+1
      GO TO 209
  208 ICIP1=0
  209 IF (ICIP2)210,211,211
  210 ICIP2=ICIP2+1
      GO TO 212
  211 ICIP2=0
  212 IF (ICIP3)213,214,214
  213 ICIP3=ICIP3+1
      GO TO 215
  214 ICIP3=0
  215 BUCIP=0.
      W1T=0.
      W2T=0.
      W3T=0.
      W1S=0.
      W1U=0.
      W1R=0.
      W1M=0.
      W2S=0.
      W2U=0.
      W2R=0.
      W2M=0.
      W3S=0.
      W3U=0.
      W3R=0.
      W3M=0.
      SFD=0.
      RFD=0.
      UFD=0.
      GFD=0.
      PRINT 360,ICIP1,ICIP2,ICIP3
```

```
      DO 140 N=1,KI
      IF(PROG(N)-90.)115,115,116
  115 GO TO 140
  116 IF(PROG(N)-110.)117,117,118
  117 W1S=W1S+PRISE(N)
      GO TO 140
  118 IF(PROG(N)-120.)119,119,120
  119 W1U=W1U+PRISE(N)
      GO TO 140
  120 IF(PROG(N)-130.)121,121,122
  121 W1R=W1R+PRISE(N)
      GO TO 140
  122 IF(PROG(N)-140.)123,123,124
  123 W1M=W1M+PRISE(N)
      GO TO 140
  124 IF (PROG(N)-210.)125,125,126
  125 W2S=W2S+PRISE(N)
      GO TO 140
  126 IF (PROG(N)-220.)127,127,128
  127 W2U=W2U+PRISE(N)
      GO TO 140
  128 IF (PROG(N)-240.)129,129,130
  129 W2R=W2R+PRISE(N)
      GO TO 140
  130 IF(PROG(N)-250.)131,131,132
  131 W2M=W2M+PRISE(N)
      GO TO 140
  132 IF (PROG(N)-310.)133,133,134
  133 W3S=W3S+PRISE(N)
      GO TO 140
  134 IF (PROG(N)-320.)135,135,136
  135 W3U=W3U+PRISE(N)
      GO TO 140
  136 IF (PROG(N)-340.)137,137,138
  137 W3R=W3R+PRISE(N)
      GO TO 140
  138 IF (PROG(N)-350.)139,139,141
  139 W3M=W3M+PRISE(N)
      GO TO 140
  141 IF (PROG(N)-630.)221,221,222
  221 W1U=W1U+(PRISE(N)/3.)
      W2U=W2U+(PRISE(N)/3.)
      W3U=W3U+(PRISE(N)/3.)
      GO TO 140
  222 IF (PROG(N)-640.)223,223,140
  223 W1M=W1M+(PRISE(N)/3.)
      W2M=W2M+(PRISE(N)/3.)
      W3M=W3M+(PRISE(N)/3.)
  140 CONTINUE
      SFD=SFD+W1S+W2S+W3S
      UFD=UFD+W1U+W2U+W3U
      RFD=RFD+W1R+W2R+W3R
      GFD=GFD+W1M+W2M+W3M
      W1T=W1S+W1U+W1R+W1M
      W2T=W2S+W2U+W2R+W2M
      W3T=W3S+W3U+W3R+W3M
```

```
      BUCIP=W1T+W2T+W3T
      W1EX= (W1T -(BUCIP/3.))
      IF(W1EX)145,146,147
  145 W1PT=(BUCIP/6.)-W1T
      IF (W1PT)146,146,86
   86 W1PT=W1PT/50000.
      GO TO 148
  146 W1PT=0.
      GO TO 148
  147 W1PT=W1EX/100000.
      GO TO 148
  148 W2EX= (W2T-(BUCIP/3.))
      IF (W2EX)149,150,151
  149 W2PT=(BUCIP/6.0)-W2T
      IF(W2PT)150,150,87
   87 W2PT=W2PT/50000.
      GO TO 152
  150 W2PT=0.
      GO TO 152
  151 W2PT=W2EX/100000.
  152 W3EX=(W3T-(BUCIP/3.))
      IF(W3EX)153,154,155
  153 W3PT=(BUCIP/6.0)-W3T
      IF(W3PT)154,154,88
   88 W3PT=W3PT/50000.
      GO TO 156
  154 W3PT=0.
      GO TO 156
  155 W3PT=W3EX/100000.
  156 SF=PS-SFD
      UF=PU-UFD
      RF=PR-RFD
      ZFD=PD-GFD
      GFD=ZFD
      PRINT 388
      PRINT 389, SF, UF, RF
      IF (SF)103,104,104
  103 GFD=GFD+SF
  104 IF (UF)106,107,107
  106 GFD=GFD+UF
  107 IF (RF)108,109,109
  108 GFD=GFD+RF
  109 IF(GFD)100,101,101
  100 DISBB=GFD*(-1.)
      PRINT 357, DISBB
  102 PRINT  408, GFD
      RF=0.
      UF=0.
      GO TO 101
  101 READ 340, CC
      TAXM=TAX*1000.
      PRINT 338, TAXM
      TAXPT=(TAX-TAXR)-.001
      TX1=0.
      TX2=0.
      TX3=0.
```

```
      TAXPT=TAXPT*1000.
      IF (TAXPT)191,194,195
  191 TX3=TX3+1.
      TAXPT=TAXPT+1.
      IF(TAXPT)192,194,194
  192 TX2=TX2+1.
      TAXPT=TAXPT+1.
      IF(TAXPT)193,194,194
  193 TX1=TX1+1.
      TAXPT=TAXPT+1.
      IF(TAXPT)191,194,194
  194 GO TO 114
  195 TX3=TX3-1.
      TAXPT=TAXPT-1.
      IF(TAXPT)194,194,196
  196 TX2=TX2-1.
      TAXPT=TAXPT-1.
      IF(TAXPT)194,194,197
  197 TX1=TX1-1.
      TAXPT=TAXPT-1.
      IF(TAXPT)194,194,195
  114 CCP=CC/5000.
      ITX=TX1
      ITXA=TX2
      ITXB=TX3
      IW1=W1PT
      IW2=W2PT
      IW3=W3PT
      PRINT 456, IW1,IW2,IW3
      PRINT 455,ITX,ITXA,ITXB
      CCP1=0.
      CCP2=0.
      CCP3=0.
      PIPT1=0.
      PIPT2=0.
      PIPT3=0.
      DO 190 I=1,IS
      PIPT1=PIPT1+POL1(I)
      PIPT2=PIPT2+POL2(I)
      PIPT3=PIPT3+POL3(I)
  190 CONTINUE
      IPOL1=PIPT1
      IPOL2=PIPT2
      IPOL3=PIPT3
      PRINT 377, IPOL1, IPOL2, IPOL3
      O1=ICIP1
      O2=ICIP2
      O3=ICIP3
      WAPT1=WAPT1+(PIPT1)+(TX1)+(W1PT)+(O1)
      WAPT2=WAPT2+(PIPT2)+(TX2)+(W2PT)+(O2)
      WAPT3=WAPT3+(PIPT3)+(TX3)+(W3PT)+(O3)
      IF(CCP)169,169,159
  159 IF(WAPT1-WAPT2)160,161,167
  160 IF (WAPT1-WAPT3)162,162,167
  167 IF(WAPT2-WAPT3)164,164,166
  161 IF (WAPT2-WAPT3)162,162,166
```

```
      162 CCP1=CCP1+1.
          CCP=CCP-1.
          WAPT1=WAPT1+CCP1
          IF(CCP)170,170,159
      164 CCP2=CCP2+1.
          CCP=CCP-1.
          WAPT2=WAPT2+CCP2
          IF(CCP)170,170,159
      166 CCP3=CCP3+1.
          CCP=CCP-1.
          WAPT3=WAPT3+CCP3
          IF(CCP)170,170,159
      170 ICCP1=CCP1
          ICCP2=CCP2
          ICCP3=CCP3
          PRINT 355, ICCP1, ICCP2, ICCP3
          GO TO 171
      169 PRINT 356
      171 PRINT 332
          IF(WAPT1)172,176,174
      172 WAPT1=0.
          GO TO 176
      174 IF(WAPT1-6.)176,176,175
      175 WAPT1=6.
      176 IF(WAPT2)177,181,179
      177 WAPT2=0.
          GO TO 181
      179 IF(WAPT2-6.)181,181,180
      180 WAPT2=6.
      181 IF(WAPT3)182,173,184
      182 WAPT3=0.
          GO TO 173
      184 IF(WAPT3-6.)173,173,185
      185 WAPT3=6.
      173 IWPT1=WAPT1
      178 IWPT2=WAPT2
      183 IWPT3=WAPT3
          PRINT 333, IWPT1
          PRINT 334, IWPT2
          PRINT 335, IWPT3
          NCY=ICYCLE+1
          IF (BEP)218,219,220
      218 PRINT 390, NCY, BEP
      219 GO TO 199
      220 PRINT 361, BEP, NCY
      199 CONTINUE
          WAPT1=IWPT1
          WAPT2=IWPT2
          WAPT3=IWPT3
C                     ADMINISTRATOR=S STANDING
          W1ST=0.
          W1UTL=0.
          W1REC=0.
          W1MIS=0.
          W2ST=0.
          W2UTL=0.
```

```
      W2REC=0.
      W2MIS=0.
      W3ST=0.
      W3UTL=0.
      W3REC=0.
      W3MIS=0.
      DO 84 M=1,KJ
      IF(PROJ(M)-100.)59,60,60
   59 GO TO 84
   60 IF(PROJ(M)-110.)61,61,62
   61 W1ST=W1ST+PRICE(M)
      GO TO 84
   62 IF(PROJ(M)-120.)63,63,64
   63 W1UTL=W1UTL+PRICE(M)
      GO TO 84
   64 IF(PROJ(M)-130.)65,65,66
   65 W1REC=W1REC+PRICE(M)
      GO TO 84
   66 IF(PROJ(M)-140.)67,67,68
   67 W1MIS=W1MIS+PRICE(M)
      GO TO 84
   68 IF(PROJ(M)-210.)69,69,70
   69 W2ST=W2ST+PRICE(M)
      GO TO 84
   70 IF(PROJ(M)-220.)71,71,72
   71 W2UTL=W2UTL+PRICE(M)
      GO TO 84
   72 IF(PROJ(M)-240.)73,73,74
   73 W2REC=W2REC+PRICE(M)
      GO TO 84
   74 IF(PROJ(M)-250.)75,75,76
   75 W2MIS=W2MIS+PRICE(M)
      GO TO 84
   76 IF(PROJ(M)-310.)77,77,78
   77 W3ST=W3ST+PRICE(M)
      GO TO 84
   78 IF(PROJ(M)-320.)79,79,80
   79 W3UTL=W3UTL+PRICE(M)
      GO TO 84
   80 IF(PROJ(M)-340.)81,81,82
   81 W3REC=W3REC+PRICE(M)
      GO TO 84
   82 IF(PROJ(M)-350.)83,83,259
   83 W3MIS=W3MIS+PRICE(M)
      GO TO 84
  259 IF (PROJ(M)-630.)260,260,261
  260 W1UTL=W1UTL+PRICE(M)/3.
      W2UTL=W2UTL+PRICE(M)/3.
      W3UTL=W3UTL+PRICE(M)/3.
      GO TO 84
  261 W1MIS=W1MIS+PRICE(M)/3.
      W2MIS=W2MIS+PRICE(M)/3.
      W3MIS=W3MIS+PRICE(M)/3.
   84 CONTINUE
      RST=W1ST+W2ST+W3ST
      RUTL=W1UTL+W2UTL+W3UTL
```

```
      RREC=W1REC+W2REC+W3REC
      RMIS=W1MIS+W2MIS+W3MIS
      RETOT=RST+RUTL+RREC+RMIS
      DISER=0.
      CHK=RETOT/12.
      SCK=RST-(CHK*2.)
      IF (SCK)270,271,271
  270 DISER=DISER+ SCK/100000.
  271 CKUT=RUTL-(CHK*4.)
      IF (CKUT)272,273,273
  272 DISER=DISER+CKUT/100000.
  273 RCK=RREC-CHK
      IF (RCK)274,275,275
  274 DISER=DISER+RCK/100000.
  275 IDE=DISER
      REPTS=(BRECIP-500000.)/100000.
      IRP=REPTS
      ADPEN=((RETOT-PTOT)/PTOT)*100.
      IAP=ADPEN
      IF (IAP)258,257,257
  257 IAP=IAP*(-1)
  258 CONTINUE
      AIPT=0.
      DO 85 I=1,IS
   85 AIPT=AIPT+AD(I)
      IAIPT=AIPT
      ICUST=IRP+(IAIPT)+(IDE)+(IAP)+(ICUSTP)
      PRINT 342
      PRINT 343,IRP
      PRINT 344,IDE
      PRINT 345,IAP
      PRINT 372,IAIPT
      PRINT 346,ICUST
      READ 314, KK
     0READ 325, (PRJ(M),PNO(M),PNU(M),BUD(M),BUG(M),YRS(M),COS (M),M=1,K
     1K)
      PRINT 320
      PRINT 402
      PRINT 322
      DO 49 M=1,KK
      IF (PRJ(M)-100.)49,48,48
   48 IF(PRJ(M)-200.)500,501,501
  500 PRINT 394, PNO(M),PNU(M),BUD(M),BUG(M),YRS(M),COS (M)
      GO TO 49
  501 IF(PRJ(M)-300.)502,503,503
  502 PRINT 398, PNO(M),PNU(M),BUD(M),BUG(M),YRS(M),COS (M)
      GO TO 49
  503 IF (PRJ(M)-400.)504,505,505
  504 PRINT 399, PNO(M),PNU(M),BUD(M),BUG(M),YRS(M),COS (M)
      GO TO 49
  505 IF (PRJ(M)-700.)506,49,49
  506 PRI=(COS(M)/3.0)
      PRINT 403,PNO(M),PNU(M),BUD(M),BUG(M),YRS(M),PRI
   49 CONTINUE
C                    SPECULATOR≠S STANDING
      READ 302,((SPI(IJ,IK),IJ=1,3)IK=1,3)
```

```
      READ 303,PO1,PO2,PO3
      READ 303, POC1,POC2,POC3
      READ 303, POI1,POI2,POI3
      BI= W1T/10000000.
      BI2=W2T/10000000.
      BI3=W3T/10000000.
      PI1=0.$PI2=0.$PI3=0.$PI4=0.$PI5=0.$PI6=0.$PI7=0.$PI8=0.$PI9=0.
      DO 450 I=1,IS
      PI1=PI1+SPEC(I,1)
      PI2=PI2+SPEC(I,2)
      PI3=PI3+SPEC(I,3)
      PI4=PI4+SPEC(I,4)
      PI5=PI5+SPEC(I,5)
      PI6=PI6+SPEC(I,6)
      PI7=PI7+SPEC(I,7)
      PI8=PI8+SPEC(I,8)
  450 PI9=PI9+SPEC(I,9)
      SINT=0.
      TSI=0.0
      DO 420  IK=1,3
      DO 420 IJ=1,3
  420 TSI=TSI+SPI(IJ,IK)
      COH=TW-(TSI+CC)
      IF(COH)421,422,423
  421 COH=(COH+(COH*.2))
      GO TO 424
  422 COH=0.0
      GO TO 424
  423 SINT=COH*.04
  424 SR1R=SPI(1,1)*(BI+PO1+(PI1))
      SR1C=SPI(2,1)*(BI+POC1+(PI2))
      SR1I=SPI(3,1)*(BI+POI1+(PI3))
      SR2R=SPI(1,2)*(BI2+PO2+(PI4))
      SR2C=SPI(2,2)*(BI2+POC2+(PI5))
      SR2I=SPI(3,2)*(BI2+POI2+(PI6))
      SR3R=SPI(1,3)*(BI3+PO3+(PI7))
      SR3C=SPI(2,3)*(BI3+POC3+(PI8))
      SR3I=SPI(3,3)*(BI3+POI3+(PI9))
      TW=((SR1R+SR1C+SR1I+SR2R+SR2C+SR2I+SR3C+SR3I+SR3R)*10.)+COH+(SINT)
      READ 302, TI, TI2, TI3, TI4, TI5, TI6, TI7, TI8, TI9
      PRINT 339
      PRINT 384
      PRINT 385
      PRINT 386, PI1, PI2, PI3, PI4, PI5, PI6, PI7, PI8, PI9
       PRINT 358
      PRINT 327
       PRINT 359
      PRINT 409
      PRINT 362,SPI(1,1),SPI(2,1),SPI(3,1),TI,TI2,TI3
      PRINT 363,SPI(1,2),SPI(2,2),SPI(3,2),TI4,TI5,TI6
      PRINT 364,SPI(1,3),SPI(2,3),SPI(3,3),TI7,TI8,TI9
      PRINT 350,LAS,TWP
      PRINT 347, TSI
      USE= COH/6.*(-1.)
      IF (COH)427,426,425
  427 PRINT 412, USE
```

```
      GO TO 426
  425 PRINT 375,SINT
  426 PRINT 349,CC
      PRINT 348, COH
      PRINT 350, ICYCLE, TW
      READ 383, P1, P2, P3
      CYCLE=ICYCLE
      S1=0.
      S2=0.
      S3=0.
      P1=P1+W1T
      P2=P2+W2T
      P3=P3+W3T
      S1=P1/(100000.*CYCLE)
      S2=P2/(100000.*CYCLE)
      S3=P3/(100000.*CYCLE)
      PRINT 315
      PRINT 316
      PRINT 317
      PRINT 318,ICYCLE,W1T,W2T,W3T
      PRINT 319,P1,S1,P2,S2,P3,S3
      TI=TI+SPI(1,1)$TI2=TI2+SPI(2,1)$TI3=TI3+SPI(3,1)$TI4=TI4+SPI(1,2)
      TI5=TI5+SPI(2,2)$TI6=TI6+SPI(3,2)$TI7=TI7+SPI(1,3)
      TI8=TI8+SPI(2,3)$TI9=TI9+SPI(3,3)
      PRINT 457, TI,TI2,TI3,TI4,TI5,TI6,TI7,TI8,TI9
      PRINT 383,P1,P2,P3
      JTX=TAX*10000.
     0PRINT 417,JTX,BEP,GT2,GT3,GT4,GT5,GT6,POP,ST,UT,RM,GM,WAPT1,WAPT2,
     1WAPT3,ICUST,TW
      PUNCH 302,TI,TI2,TI3,TI4,TI5,TI6,TI7,TI8,TI9
      PUNCH 383,P1,P2,P3
     0PUNCH 460, JTX,BEP,GT2,GT3,GT4,GT5,GT6,POP,ST,UT,RM,GM,WAPT1,WAPT2
     1,WAPT3, ICUST,TW
      END
```

```
LOAD
RUN
```

APPENDIX B

DATA DECK ASSEMBLY MATERIALS

The assembly of the data deck in a precisely ordered form is critical to the operation of the game. The computer program calls for data to be read in a certain order and to be available in exactly the form specified. A deviation in either order or form of data will result in fatality to the program either before the program is begun or from the point in the program which uses the improper information. The computer cannot compensate for human errors. It is essential for the game director to check and recheck the data against the information given below. The program has been written to reduce to a minimum the number of cards to be punched by the director, and pre-punched cards are available for some of the "limited" variables. Those cards which must be punched by the game director must be punched in the proper format and should be carefully proof-read before being assembled into the deck.

The cards that make up the data deck came from several sources: pre-punched cards for issues and cyclic information, cards automatically punched by the computer during the previous cycle run which contain the data generated during that cycle for use in the current cycle, including the post-initial year cards of multi-year projects,

decks of project cards submitted from the politician (the projects budgeted during the current cycle), and the administrator (the projects recommended for budgeting in the next cycle), a deck of project cards retrieved from the previous cycle data deck which are the projects recommended for budgeting this cycle, and the cards which must be punched because they contain data which are submitted by the players and which are too variable in nature to prepare ahead.

Item 1. — The first data card has four items. The card is pre-punched, with the per capita assessed valuation occupying the first four columns and followed by a decimal point in column five. Two columns are left blank and the per cent of revenues allocated to schools are punched following a decimal point punched in column 8. The cycle number is punched in column 14, if a single digit, or in column 13 and 14 if a two-digit number. The next number represents the percentages of non-tax revenues available to the city. Normally, this is 100 per cent and is punched as 1.0 (the percentage is divided by one hundred).

Item 2. — Next is a single card which indicates the number of issues acted on by the players. (a single digit in column 2, no decimal point).

Item 3. — A sub-deck is compiled using pre-punched and printed cards indicating the public opinion poll responses to the issue posed. Each issue decision has a set of three cards, which must

appear in order: the first card contains general information about the issue and the effects of the decision on the administrator and the politician. The second card indicates the bonus points, if any, which accrue to the speculator due to the issue resolution. This card contains 9 numbers, usually zeros and each preceded by a decimal point. The third card contains 6 numbers which indicate the growth factors for the current cycle and the succeeding five cycles. Each of the growth factor numbers is followed by a decimal point. The order of cards is critical, not the order of sets. The issues will be printed in the order in which they are presented.

Item 4. — Next is a single card containing seven data categories. These data were generated during the computations of the previous cycle: the current tax rate (a decimal point followed by four digits, including zeros), the budget surplus or deficit form previous capital improvements program plus the interest or the penalty factor (columns 6 through 12, with a decimal point in column 13), then five digits reflecting the growth factors for the current cycle and the next four (columns 14 through 28, with decimal points in columns 16, 19, 22, 25, and 28), then a six digit number which is the population of METROPOLIS at the end of the previous cycle (six digits followed by a decimal point), then four numbers which record the values in the discretionary funds for the preceding cycle (four six-digit numbers are available) each followed by a decimal point, the points appearing

in columns 42, 49, 56, and 63), the sixth data items are the standing by ward of the politician at the end of the cycle (three one-digit numbers, each followed by a decimal point), then three columns are available for the administrator's standing (no decimal point, the last digit appears in column 72), and the last entry contains the net worth of the speculator at the close of the previous cycle (again a seven digit number is permissible followed by a decimal point in column 80).

Item 5. — The next card contains only the tax rate the politician has decided upon for the next cycle. (a decimal point in column one followed by four digits, the ciphers to the right of the last significant number may be omitted, as .0480 may be punched .048).

Item 6. — A single card indicating the number of budgeted projects in the sub-deck presented by the politician. (a number in columns one and two, the single digit numbers (1-9) appearing in column two).

Item 7. — The sub-deck assembled by the politician. The game director must check to see that the multi-year projects begun, but not completed,are included in the deck. The number of cards must agree with the number on the preceding card. The project cards are pre-punched and printed on green card stock.

Item 8. — The sub-deck is followed by a data card which shows the deficits in street, utility, and recreation funds, when the previous cycle had a deficit. (nine columns for figures and a decimal point in the tenth column, repeated twice. This card will nominally

contain three zeros, one each in the ninth, eighteenth, and twenty-seventh column, each followed by a decimal point).

Item 9. — A single card indicating the number of budgeted projects in the sub-deck presented by the politician. (a number in columns one and two, the single digit numbers (1-9) appearing in column two).

Item 10. — The sub-deck assembled by the city administrator during the previous cycle. This sub-deck is salvaged from the data deck of the preceding cycle, as the preceding card is. These cards are pre-punched and printed on orange card stock.

Item 11. — A single card showing the amount of campaign contribution made by the speculator to the politician. Since the rules stipulate amounts in multiples of $5,000, several cards are pre-punched and available for use. (six columns are available for figures and a decimal point is punched in column seven).

Item 12. — The campaign contribution is followed by a card containing the number of projects being recommended by the administrator for the next cycle. (a number in columns one and two, the single digit numbers (1-9) appearing in column two).

Item 13. — A sub-deck of project cards prepared by the administrator, recommended for action during the next cycle.

Item 14. — A single card containing the investments made by the speculator for the current cycle. The order is: first ward—residential land, commercial land, industrial land. Second ward—

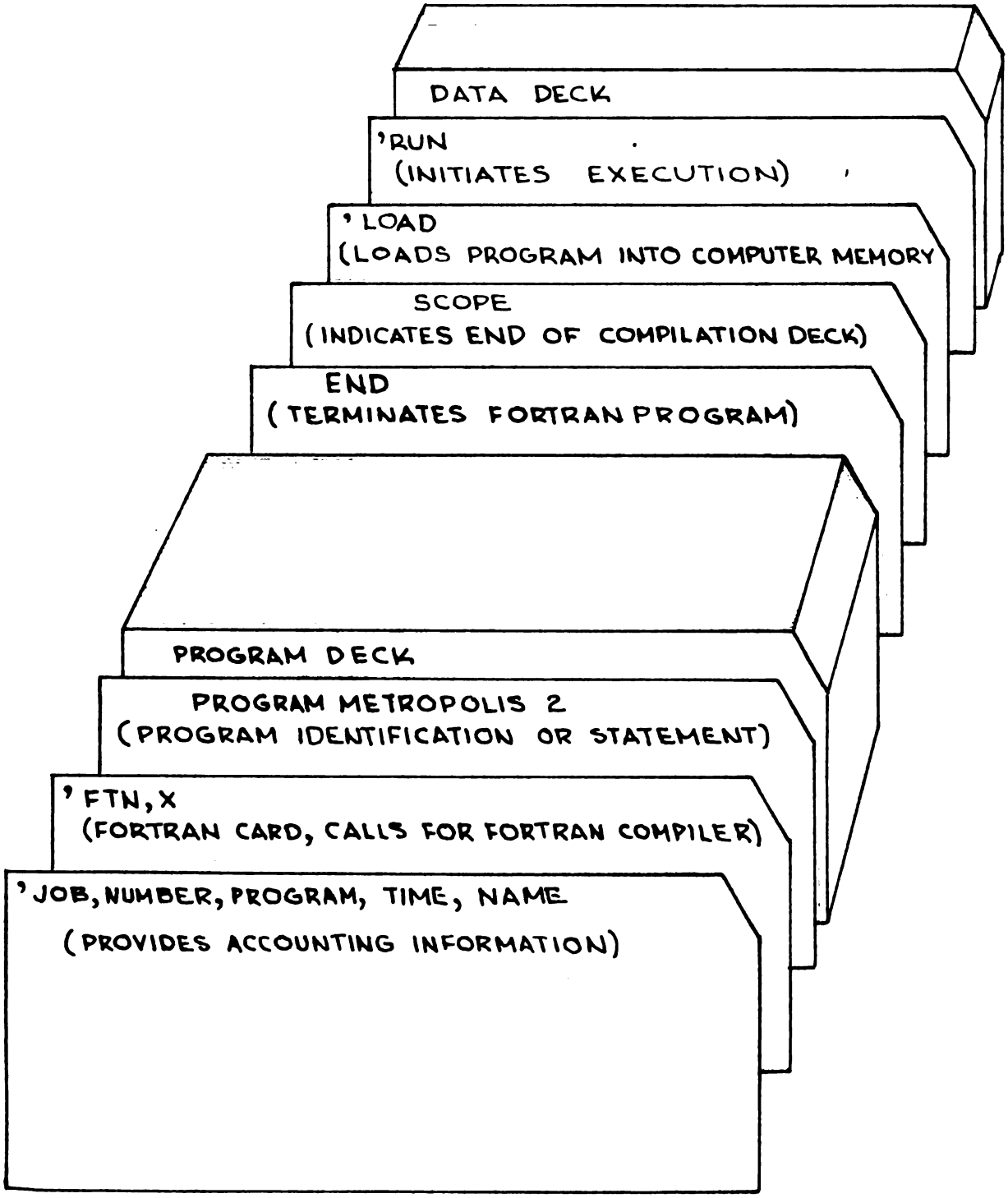
residential land, commercial land, industrial land. Third ward — residential land, commercial, and industrial land. (space is provided for an eight digit number followed by a decimal point. This is repeated eight times for a total of nine investment possibilities, with decimal points appearing in columns 9, 18, 27, . . . , 72). This is one of the few cards to be punched by the game director and it is imperative that the format be adhered to. A zero should appear immediately in front of the decimal point if no investment is made in the category. No spaces should occur between the amount of the investment and the decimal point.

Item 15. — Three cards, which convert the speculator's dice, roll to his bonus points. These are pre-punched cards. The first contains the bonus for residential property investments, for the three wards; the second, the commercial property; and the third, the industrial investments. The proper order must be maintained to accurately assess the speculator's profits or losses. (column one is blank — a decimal point is punched in column two, and column three contains a zero or a number one, two or five — corresponding to the bonus, if the roll of the dice was fortuitous for the speculator. Column four is blank. Column five contains a decimal point, and column six, a zero or the number one, etc., through column nine.)

Item 16. — A single card which contains the total amounts invested to the end of the current cycle in each category in each of the wards. (The format for this card is identical to the card containing the investments for the current cycle).

Item 17. — The last card contains the total amount of money budgeted for capital improvement projects in each of the wards at the end of the previous cycle.

The last two cards (items 16 and 17) are punched by the computer at the end of the previous cycle and merely need to be added to the deck. It is suggested that the deck be assembled, checked and printed in the IBM 407 accounting machine and the print-out compared with the above material. A sketch of the data deck submitted for a typical cycle follows. This is followed by the print-out of the data deck submitted for cycle one. The list should be compared step by step with the items listed above.



METROPOLIS II DECK ASSEMBLY

DATA DECK FOR TYPICAL CYCLE

```
1.10.   .641   -1.0
 5
 5)APPROVED       I-1.0   100000.     5.  -1.   0.   1.
 .0   .2   .0   .0   .0   .0   .0   .0   .0
 1.  1.  1.  1.  1.  0.
 5)REJECTED       I-150          0.0    5.   0.   1.  -1.
 .0   .0   .0   .0   .0   .0   .03  .03  .03
-1.  1.  1.  1.  0.  0.
 5)REJECTED       NONE           0.0    0.   0.   0.   0.
 .0   .0   .0   .0   .0   .0   .0   .0   .0
 0.  0.  0.  0.  0.  0.
.0)I-1.0000.  1.  2.  3.  1.  0.
.0)
 0
 1.4.        I-110 [illegible]   2    40000.
 1.5.        I-120 [illegible]   4   200000.
 6.1.        E-90  UTILITIES     2   100000.
 1.4.        H-130 RECREATION    1    40000.
 1.6.        J-140 STREETS       1   150000.
 3.8.        HWY-5 UTILITIES     1    50000.
 2.7.        E-110 RECREATION    1    40000.
 3.4.        E-90  RECREATION    1    30000.
 2.1.        G-60  RECREATION    1    40000.
       0.          0.          0.
10
 2.0.     E-90.150    STREETS    1   100000.
 1.4.        H-130 RECREATION    1    40000.
 1.3.        E-90  RECREATION    1    30000.
 6.1.        G-60  RECREATION    1    40000.
 1.6.        J-140 STREETS       1   150000.
 1.3.        I-110 [illegible]   2    50000.
```

APPENDIX C

COMPUTER PRINT-OUT OF RESULTS

CYC

CYCLE 4

CALCULATED GROWTH INDEX = 1

GROWTH INDICES, NEXT 5 CYCLES

1 2 3 1 0

PUBLIC OPINION POLL RESULTS

CYCLE	ISSUE	ACTION	PROJECT	COST	TIME	COMMENT	PENALTY OR REWARD ADMINISTRATOR	POLITICIAN WARD 1	2	3
4	1	REJECTED	Z-0	1800000	6	CITY WIDE STORM SEWER PROJECT	-7	-2	-2	-2
4	2	APPROVED	DH-260,290	0	0	LAKELAND SUBURB ANNEXATION	0	0	0	0
4	3	APPROVED	NONE	0	0	SMUT PEDDLING INVESTIGATION	0	0	0	0

REVENUE FOR CYCLE 5

POPULATION OF METROPOLIS RISES TO 229400

PER CAPITA ASSESSED VALUE =$ 1475

TOTAL ASSESSED VALUE OF METROPOLIS =$ 338365000

TOTAL CITY INCOME FROM PROPERTY TAX =$ 17425798

NON TAX REVENUE IS $ 17425798

NON TAX REVENUE EQUALS 100 PERCENT OF PROPERTY TAX REVENUE

TAXES ALLOCATED TO SCHOOLS =$ 22514130

TAX RATE IN MILLS = 51.5

NET CITY INCOME = 12337464

STREET FUND = 210000
UTILITY FUND = 430000
RECREATION FUND = 100000
GENERAL FUND = 540000

TOTAL DISCRETIONARY FUNDS = 1280000

POLI

TAXE

PENA

DEDU

POLITICIANS STANDING

CITY COUNCIL BUDGETS CAPITAL IMPROVEMENTS.....

THE FOLLOWING PROJECTS HAVE BEEN APPROVED FOR THIS YEAR

WARD	CODE	LOCATION	YEARS TO RUN	COST PER YEAR
3	J-70	ISSUE,MISC	1	150000
1	J-140	STREETS	1	150000
1	J-140	STREETS	2	150000
1	I-110	ISSUE,MISC	3	70000
ALL	E-20	UTILITIES	4	600000
2	M-120	RECREATION	1	150000
2	Q-70-140	UTILITIES	1	100000
3	J-80	MISC	1	100000
3	H-70	RECREATION	1	50000
2	M-150	RECREATION	1	20000

BUDGETED MULTI-YEAR PROJECTS

BUDGETED PROJECT J-140 CONTINUES OVER
2 YEARS AT AN ANNUAL COST OF 150000

BUDGETED PROJECT I-110 CONTINUES OVER
3 YEARS AT AN ANNUAL COST OF 70000

BUDGETED PROJECT E-20 CONTINUES OVER
4 YEARS AT AN ANNUAL COST OF 600000

RECOMMENDED PROJECTS NOT BUDGETED BY THE POLITICIAN

FIRST WARD	H-115	RECREATION	40000
FIRST WARD	J-110	MISC	50000
SECOND WARD	AE-120	UTILITIES	50000
SECOND WARD	M-110	RECREATION	20000
THIRD WARD	F-275	RECREATION	50000

POLITICIANS PENALTY POINTS FOR IGNORING RECOMMENDED PROJECTS IN WARDS 1, 2, AND 3 = 0 0 0

CURRENT CYCLE DISCRETIONARY FUNDS LESS AMOUNT SPENT

STREETS $ -70000 UTILITIES $ -230000 RECREATION $ -110000

POLITICIAN OVERSPENDS GENERAL FUND BY $ 140000

UNSPENT FUNDS CARRIED FORWARD -140000

TAX RATE FOR NEXT CYCLE 51.5 MILLS

POLITICIANS PENALTY FOR BUDGET INEQUITIES IN WARDS 0 0 0

TAXES AFFECT POLITICIANS STANDING BY WARD AS FOLLOWS 0 0 1

PENALTY OR REWARD POINTS DUE TO PUBLIC OPINION POLL IN WARDS 1, 2, 3 ARE -2 -2 -2

NO CAMPAIGN CONTRIBUTION THIS CYCLE

POLITICIANS STANDING, BY WARD, END OF CYCLE

WARD ONE 4
WARD TWO 0
WARD THREE 0

DEDUCT FROM CYCLE 5 CAPITAL IMPROVEMENT BUDGET, FUNDS OVERSPENT THIS YEAR PLUS PENALTY $ -168000

ADMINISTRATORS STANDING

REWARD POINTS = 6
DISCRETIONARY FUND DISTRIBUTION ERROR = -0
OVER-, UNDER-EXPENDITURE PENALTY = -3
PUBLIC OPINION POLL POINTS = -7

ADMINISTRATORS CURRENT STANDING = 26

ADMINISTRATORS RECOMMENDED PROJECTS FOR NEXT YEAR

WARD	CODE	LOCATION	YEARS TO RUN	COST PER YEAR	
2	E-90,165	STREETS	1	100000	
1	H-130	RECREATION	1	40000	
3	F-60	RECREATION	1	20000	
2	C-60	RECREATION	1	40000	
1	J-140	STREETS	1	150000	
1	J-110	MISC	2	50000	
ALL	E-20	UTILITIES	5	200000	PER WARD
1	I-110	ISSUE,MISC	4	70000	
3	J-70	ISSUE,MISC	2	150000	

SPECULATORS STANDING

SPECULATORS OPINION POLL POINTS

WARD, LAND USE	1,RES	1,COM	1,IND	2,RES	2,COM	2,IND	3,RES	3,COM	3,IND
	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

INVESTMENTS

CURRENT CYCLE

CATEGORY

WARD	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
1	20000	0	0
2	40000	0	0
3	100000	0	0

TOTAL PREVIOUS INVESTMENTS

WARD	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
1	55000	5000	10000
2	35000	5000	10000
3	20000	10000	10000

NET WORTH AT END OF CYCLE 3 $ 166542

AMOUNT INVESTED THIS CYCLE	$	160000
INTEREST ON CASH RESERVE AT 4 PERCENT =	$	262
CONTRIBUTED TO POLITICIAN	$	0
CASH HELD IN RESERVE	$	6542
NET WORTH AT END OF CYCLE 4	$	247004

METROPOLIS INFRA-STRUCTURE ACCUMULATION

CUMULATIVE INCREASE OF PROGRAMMED PROJECTS

CYCLE	WARD 1	FACTOR	WARD 2	FACTOR	WARD 3	FACTOR
4	570000		470000		500000	
SUBTOTAL	1980000	4,950	1840000	4,600	1470000	3,675

APPENDIX D

FORMS DESIGNED FOR METROPOLIS II

PUBLIC OPINION POLL

PLAYER - ___ Administrator ___ Politician ___ Speculator ___ School Board

ISSUE 1 - New City Hall - (Project I-110) This efficiently designed new structure is planned as an integral part of the CBD Renewal Project. Present City Hall is over a century old. Offices are scattered in old buildings of downtown area.

ALTERNATIVES - 1. ____ Support construction.
2. ____ Postpone and reconsider next year.
3. ____ Oppose construction.

ISSUE 2 - Civil Rights Commission - Negro leaders, supported by the University community have held several demonstrations, seeking the formation of an effective commission to insure fair housing practices, equal employment and fair police treatment.

ALTERNATIVES - 1. ____ Favor formation of the commission.
2. ____ Postpone and reconsider.
3. ____ No comment (prefer to avoid the issue).

ISSUE 3 - Interstate Highway - State Highway department desires formal approval of an Interstate connector route planned for metropolis (K 100-160).

ALTERNATIVES - 1. ____ Favor the route.
2. ____ Postpone and reconsider.
3. ____ Oppose the route.

ISSUE 4 - School Improvement Program - A bond issue will enable the school board to acquire needed school sites in ward 3 while land is available. An additional levy on one mill for five years will finance the bonds.

ALTERNATIVES - 1. ____ Vote the bonds.
2. ____ Postpone and reconsider.
3. ____ Reject the bond issue.

Cycle No. 2

FORM 2-13
Metropolis II
Dec. 64 RDD

PUBLIC OPINION POLL

PLAYER - ___ Administrator ___ Politician ___ Speculator ___ School Board

ISSUE 1 - Primary Thoroughfare Construction - Excessive east-west traffic in south end demands relief by new construction; alternative. 1-way pair can be constructed for 10% of New Construction costs.

ALTERNATIVES - 1. ____ Favor new route.
2. ____ Postpone and reconsider.
3. ____ Favor 1-way pair.

ISSUE 2 - City Income Tax - The proposed 1% City Income Tax would influence all those working or living in the city, and income would be used to compensate for losses from reduced property taxes.

ALTERNATIVES - 1. ____ Favor income tax.
2. ____ Postpone and reconsider.
3. ____ Oppose the tax.

ISSUE 3 - Sewage Treatment Plant - Major expansion of sewage treatment facilities, designed to accommodate growth for next decade. Current plant has been operating in excess of capacity during daily peaks, requiring by-passing of raw sewage. State threatens suit if construction delayed.

ALTERNATIVES - 1. ____ Support Project E-20.
2. ____ Postpone and reconsider.
3. ____ Reject project E-20.

ISSUE 4 - School Improvement Program - Modernization and expansion of several elementary schools in ward 2 requires a bond issue, to be repaid by an additional tax levy. One mill for 5 years will correct the deficiencies in the schools.

ALTERNATIVES - 1. ____ Vote the bonds.
2. ____ Postpone and reconsider.
3. ____ Reject the bond issue.

ISSUE 5 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

ISSUE 6 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

PUBLIC OPINION POLL

PLAYER - ___ Administrator ___ Politician ___ Speculator ___ School Board

ISSUE 1 - Property Reassessment - The city has not been reassessed in a uniform manner since 1948, in violation of a statute which requires changes each five years. The city administration has made a strong plea for a complete study, particular emphasis to be placed on commercial structures and new housing.

ALTERNATIVES - 1. ____ Favor the reassessment.
2. ____ Postpone and reconsider.
3. ____ Oppose the reassessment.

ISSUE 2 - Senior Citizens - A recent week-long conference at the University has recommended formation of a "Commission on Problems of the Aged."

ALTERNATIVES - 1. ____ Favor the commission.
2. ____ Postpone and reconsider.
3. ____ Oppose the commission.

ISSUE 3 - Housing for the Aged - (Project J-70) Low cost housing for the aged, with specially designed facilities. Would provide for the most urgent sector of the market.

ALTERNATIVES - 1. ____ Favor Project J-70
2. ____ Postpone and reconsider.
3. ____ Oppose Project J-70.

ISSUE 4 - School Improvement Program - School improvements in ward 1 will help the city in the urban renewal project, the expenditures will count toward the community share of the renewal costs. One mill for 5 years additional levy will finance the school improvements.

ALTERNATIVES - 1. ____ Vote the bonds.
2. ____ Postpone and reconsider.
3. ____ Reject the bond issue.

ISSUE 5 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

ISSUE 6 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

PUBLIC OPINION POLL

PLAYER - ___ Administrator ___ Politician ___ Speculator ___ School Board

ISSUE 1 - Smut Peddling - Various civic groups have banded together seeking to force the Mayor into naming a committee to investigate smut peddling to teenagers.

ALTERNATIVES - 1. ____ Favor formation of the committee.
2. ____ Postpone and reconsider.
3. ____ Oppose formation of the committee.

ISSUE 2 - Eastside Annexation - "Lakeland," an unincorporated suburb located at DH-260, 290 has severe difficulties providing adequate services to its residents. Local groups are attempting an incorporation, even though their tax base is inadequate. Another group has presented a petition requesting "Lakelands" annexation to Metropolis.

ALTERNATIVES - 1. ____ Support the annexation.
2. ____ Postpone and reconsider.
2. ____ Oppose the annexation.

ISSUE 3 - Storm Sewer Relief - (Project Z-0) This city-wide system will provide an integrated storm drainage facility for metropolis for the next decade. Rapid growth in recent years has created a number of city-wide drainage problems, which are becoming more severe each year.

ALTERNATIVES - 1. ____ Favor Project Z-0.
2. ____ Postpone and reconsider.
3. ____ Oppose Project Z-0.

ISSUE 4 - Princeton Plan Referendum - Civil Rights groups petition for a referendum on use of the "Princeton Plan," the bussing of pupils from defacto segregated schools to assure integration in the schools. This could be done within the present school budget.

ALTERNATIVES - 1. ____ Vote for a referendum.
2. ____ Postpone and reconsider.
3. ____ Oppose the referendum.

ISSUE 5 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

ISSUE 6 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

PUBLIC OPINION POLL

PLAYER - ___ Administrator ___ Politician ___ Speculator ___ School Board

ISSUE 1 - Wet Issue - Since Prohibition days there has been agitation in some quarters to make Metropolis "DRY." Some of the more avid and respected "drys" are making a strong push to put the issue on the ballot.

ALTERNATIVES - 1. ____ Support the "drys".
2. ____ Postpone and reconsider.
3. ____ Avoid the issue.

ISSUE 2 - Industrial Rezoning - "Diversified Industries" has decided to locate a major plant in metropolis. It has optioned land in L-160 which must be rezoned in violation of the Master Plan, or "Diversified" threatens to build elsewhere.

ALTERNATIVES - 1. ____ Favor the Rezoning.
2. ____ Postpone and reconsider.
3. ____ Oppose the rezoning.

ISSUE 3 - CBD Renewal - (Project I-120) Long awaited plan to rebuild the Central Business District has been completed, and there is widespread support for its early completion.

ALTERNATIVES - 1. ____ Support Project I-120.
2. ____ Postpone and reconsider.
3. ____ Oppose Project I-120.

ISSUE 4 - Teacher Salary Increase - Teacher turnover in Metropolis is presently above average for the state. A bond issue for improvement of the salary schedule for teachers will require a levy of 4 mills for 10 years.

ALTERNATIVES - 1. ____ Vote the bonds.
2. ____ Postpone and reconsider.
3. ___ Vote down the bond issue.

ISSUE 5 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

ISSUE 6 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

Cycle No. 6

FORM 2-18
Metropolis II
Dec. 64 RDD

PUBLIC OPINION POLL

PLAYER - ___ Administrator ___ Politician ___ Speculator ___ School Board

ISSUE 1 - Airport Expansion - Improvements required to enable service by national airline.

ALTERNATIVES - 1. ____ Support Project C-70
2. ____ Postpone and reconsider.
3. ____ Reject Project C-70.

ISSUE 2 - Zoning Revision - A comprehensive revision of the Pre-World War II zoning ordinance has been completed by a nationally famous consultant, and is being recommended by the Planning Commission.

ALTERNATIVES - 1. ____ Support adoption of new zoning.
2. ____ Postpone and reconsider.
3. ____ Oppose adoption of new zoning.

ISSUE 3 - Riverbank Beautification Committee - The League of Women Voters has become alarmed about the condition of the Riverbank and is thumping for a working committee to suggest solutions.

ALTERNATIVES - 1. ____ Support the League.
2. ____ Postpone and reconsider.
3. ____ Avoid the issue.

ISSUE 4 - Memorial Stadium Bonds - City high-school athletic programs can be enhanced by a new all-city, all-school athletic facility. The bonds can be retired by a special half-mill levy for the next 6 years.

1. ____ Vote the bonds.
2. ____ Postpone and reconsider.
3. ____ Vote down the bond issue.

ISSUE 5 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

ISSUE 6 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

Cycle No. 7

FORM 2-18
Metropolis II
Dec. 64 RDD

PUBLIC OPINION POLL

PLAYER - ___ Administrator ___ Politician ___ Speculator ___ School Board

ISSUE 1 - Roadside Advertising Commission - The Federated Garden Clubs of Greater Metropolis is seeking action to increase controls over outdoor advertising.

ALTERNATIVES - 1. ____ Favor controls.
2. ____ Postpone and reconsider.
3. ____ Oppose controls.

ISSUE 2 - Day Care Center - The "Metropolitan Day Care Center" is being forced to relocate by highway construction. Currently their clientele is predominantly Negro, because of their location. They are seeking support in an effort to build a center in each ward.

ALTERNATIVES - 1. ____ Support the effort.
2. ____ Postpone and reconsider.
3. ____ Oppose the plan.

ISSUE 3 - Industrial Renewal - (Project KC 200, 210) Development of an industrial park for specialized research oriented industries. A joint venture with the University, it will replace slum housing.

ALTERNATIVES - 1. ____ Support Project KL 200, 210.
2. ____ Postpone and reconsider.
3. ____ Oppose Project KL 200, 210.

ISSUE 4 - Physical Plant Expansion - Three mills added to the school taxes for 5 years will allow for needed expansion of physical facilities throughout the school system.

ALTERNATIVES - 1. ____ Vote the bonds.
2. ____ Postpone and Reconsider.
3. ____ Vote down the bonds.

ISSUE 5 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

ISSUE 6 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

Cycle No. 8

FORM 2-18
Metropolis II
Dec. 64 RDD

PUBLIC OPINION POLL

PLAYER - ___ Administrator ___ Politician ___ Speculator ___ School Board

ISSUE 1 - Digit Dialing - The "Anti-Digit Dialing League" is incensed over an announcement by the telephone company that all letter exchanges will be replaced by numerals. Seek committee to investigate problem.

ALTERNATIVES - 1. ____ Support the investigation.
2. ____ Postpone and reconsider.
3. ____ Avoid the issue.

ISSUE 2 - Mass Transit - Subsidy required to keep City Transit Company operating. Formula requested will insure minimum profit for next five years.

ALTERNATIVES - 1. ____ Favor the subsidy.
2. ____ Postpone and reconsider.
3. ____ Oppose the subsidy.

ISSUE 3 - Residential Renewal - (Project HI-150, 160) Neighborhood conservation project in mixed racial area. Will remove non-residential uses, add improvements.

ALTERNATIVES - 1. ____ Support Project HI-150, 160.
2. ____ Postpone and reconsider.
3. ____ Oppose Project HI-150, 160.

ISSUE 4 - Youth Training Program - School drop-outs can be added to the productive work force and off street corners by a vocational training program. School facilities and teachers can be utilized. Will require a 1/2 mill levy for five years to begin program.

ALTERNATIVES - 1. ____ Vote for the plan.
2. ____ Postpone and reconsider.
3. ____ Vote against the plan.

ISSUE 5 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

ISSUE 6 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

Cycle No. 9

FORM 2-18
Metropolis II
Dec. 64 RDD

PUBLIC OPINION POLL

PLAYER - ___ Administrator ___ Politician ___ Speculator ___ School Board

ISSUE 1 - Floridation of Water - The Metropolis Sanitation Commission has announced its intention to floridate the water supply, in keeping with recommended Federal and State Health Practice. Several groups are seeking a referendum on the issue.

ALTERNATIVES - 1. ____ Support the referendum.
2. ____ Postpone and reconsider.
3. ____ Oppose the referendum.

ISSUE 2 - Air Pollution Control - Air pollution has become an increasing menace in Metropolis, resulting in the current control bill. Behemoth industries threatens to leave if the bill is passed.

ALTERNATIVES - 1. ____ Support the bill.
2. ____ Postpone and reconsider.
3. ____ Oppose the bill.

ISSUE 3 - Public Housing - (Project L-155) Low income families replaced by urban renewal and highway construction require housing. Construction has already slowed because of a shortage of suitable units.

ALTERNATIVES - 1. ____ Support Project L-155.
2. ____ Postpone and reconsider.
3. ____ Oppose Project L-155.

ISSUE 4 - Community College - One mill (throughout Metropolis and several adjacent school districts) will finance needed expansion of the community college. The levy will run for 10 years.

ALTERNATIVES - 1. ____ Vote the levy.
2. ____ Postpone and reconsider.
3. ____ Oppose the additional mill.

ISSUE 5 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

ISSUE 6 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

Cycle No. 10

FORM 2-18
Metropolis II
Dec. 64 RDD

PUBLIC OPINION POLL

PLAYER - ___ Administrator ___ Politician ___ Speculator ___ School Board

ISSUE 1 - Apartment Rezoning - The rapidly expanding market for apartments continues. Builder wants rezoning in violation of Master Plan; threatens to invest elsewhere if restrictions not relaxed.

ALTERNATIVES - 1. ____ Favor rezoning.
2. ____ Postpone and reconsider.
3. ____ Oppose rezoning.

ISSUE 2 - Pet Ordinance - In response to numerous complaints council is considering imposing restriction on pet freedoms.

ALTERNATIVES - 1. ____ Favor the restrictions.
2. ____ Postpone and reconsider.
3. ____ Oppose the resolution.

ISSUE 3 - Subdivision Regulations - A comprehensive new subdivision code has been recommended by the Planning Commission.

ALTERNATIVES - 1. ____ Favor the code.
2. ____ Postpone and reconsider.
3. ____ Oppose the code.

ISSUE 4 - Physical Plant Expansion - School plant deficiencies can be corrected by a modest building and maintenance program. An additional 3 mill levy for 5 years will pay for the program.

ALTERNATIVES - 1. ____ Vote the bond issue.
2. ____ Postpone and reconsider.
3. ____ Oppose the bond issue.

ISSUE 5 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

ISSUE 6 - _____

ALTERNATIVES - 1. ____ _____
2. ____ _____
3. ____ _____

FORM 2-34
Metropolis II
Dec. 64 RDD

HEADLINES FROM

THE CITIZENS GAZETTE

Vol. 1 No. 1

*** Local News ***

Ward 1 - Daily traffic jams emphasize the urgency for improved bridge (project H-120)
- Merchants mass at council meeting demanding action on relief from sanitary sewer problems (project GL-120)
- Fire marshall cites need for special high pressure truck (project K-130)

Ward 2 - Ward improvement association demands street action (project P-80)
- Flash flood causes heavy losses, relief action demanded (project LP-140)
- Swimming pool proposal receives strong public approval (project M-120)

Ward 3 - Residents demand action on local street program (projects H-210; H-0, 100)
- New home construction stopped by health department until sewers built (project J-20, 60)
- Park improvement program urged by expert (projects K-80, J-90, H-85, F-200)
- School officials accept gift of small parcel of land, express desire to acquire adjacent property for future school site.

*** State News ***

- Expert predicts continued rise in school expenditures in coming decade
- Crack down demanded on river pollution. Expert claims that every large city in state violates code. Metropolis singled out for dressing down
- Governor expresses concern over lack of adequate housing for minority groups.
- State once again on top in construction of interstate system mileage

*** National News ***

- International tensions up - capacity to fight limited warfare must be expanded
- Automotive sales expected to exceed previous highs

FORM 2-34
Metropolis II
Dec. 64 RDD

HEADLINES FROM

THE CITIZENS GAZETTE

Vol. 1 No. 2

*** Local News ***

Ward 1 - Civic Center improvements declared urgent - convention facilities expansion a "must" (project J-110)
- Chamber of Commerce demands improved street systems (project J-140)
- Park service building destroyed by fire - immediate replacement sought (project K-120)
- School superintendent announces forthcoming visit by national school accreditation committee. Metropolis schools expected to retain high rating

Ward 2 - Sewer problems plague homeowners - raw sewage flows in ditches (project Q-70, 140)
- North end residents demand park (project D-105)

Ward 3 - Angry parents demand sidewalks after third child is injured (project I-220)
- "Contemporary Estates" development halted by sewer lack (project FJ-65)
- Lakeview Estate, last major lake site available, offered to city at generous price (project F-270)

*** State News ***

- Property assessment practices hit. Legislators authorize study of local practices
- School costs continue to mount - no relief in sight
- Governor addresses conference on problems of aged. Cites need for more publicly supported housing

*** National News ***

- Bullish stock market continues. President of exchange says fears of recession unwarranted
- Auto sales exceed all previous peaks
- Employment reaches new high as high ratio of unemployed persists

FORM 2-34
Metropolis II
Dec. 64 RDD

HEADLINES FROM

THE CITIZENS GAZETTE

Vol. 1 No. 3

*** Local News ***

Ward 1 - Negro leader deplores condition of local park, improvements sought (project H-112)

Ward 2 - Development stymied near interchange -- sewer extension required (project A-E-120)
- Judge cites increase in delinquency, urges expansion of recreational activities (project M-110)
- Old Lincoln school declared safe, structurally sound by consulting engineers, although too small for current needs.

Ward 3 - University traffic suffering daily jams as enrollment breaks all records. President says relief a "must" (project K-225)
- School bus submerged in flash flood - hero rescues 12 tots as driver perishes (project G-70)
- Summer camp project sought as means to relieve juvenile problems. Panel of experts emphasizes value to underprivileged children (project F-275)

*** State News ***

- Legislature struggles with home rule legislation. Revised incorporation statutes are the likely outcome
- State fire marshall investigates nursing home fire in metropolis in which five die
- Legislature passes enabling legislation enabling Metropolis to finance new storm sewer program.
- Governor signs aged bill
- Education group announces campaign to raise educational standards in state. Cites expenditure variation of from $54 per capita to $77 per capita in various school districts. Teacher salaries are low compared to other leading states.

*** National News ***

- President's council of economic advisors predicts biggest economic surge. Recession talk branded as partisan effort to discredit administration
- Conflicting national surveys on future of automotive sales; production continues at all time high
- Unemployment drops slightly, first time in two years

FORM 2-34
Metropolis II
Dec. 64 RDD

HEADLINES FROM

THE CITIZENS GAZETTE

Vol. 1 No. 4

*** Local News ***

Ward 1 - Park improvements sought by neighborhood group - facilities for aged urgently needed (project H-115)
- School board announces enrichment program for culturally deprived children.

Ward 2 - Completion of expressway link causes mammoth jam - motorist delayed for hours (project E-90, 165)
- Civil Defense Director joins National Guard in support of armory (project H-150)
- Arboretum park has highest attendance, improvements required (project M-150)

Ward 3 - Largest council meeting as residents protest street conditions (project E-80)
- Recently annexed area needs fire-police building. Insurance rates go up until situation remedied (project J-80)
- "Contemporary Estates" developer urges council to complete golf course. Community building and course urgently needed (project H-70)

*** State News ***

- No relief expected in school costs says state superintendent - more facilities required
- Legislature acts to bring urban renewal funds to city
- Improved administrative procedures designed to encourage big city efforts at central city renewal

*** National News ***

- Car sales fail to keep pace with production - used car market softens
- Bears grow louder, but market continues to climb
- Unemployment levels creep up as new employment fails to meet expectations
- Cold war tensions decline

FORM 2-34
Metropolis II
Dec. 64 RDD

HEADLINES FROM

THE CITIZENS GAZETTE

Vol. 1 No. 5

*** Local News ***

Ward 1 - Neighborhood improvement group demands street improvements (project H-110)
- Park shelter sought to increase utility of park (project H-130)

Ward 2 - "Self-help" neighborhood asks city to help - street improvements needed (project D-110)
- Sewer blockage damages 50 homes--health officer expresses concern (project E-100, 160)
- Church council calls cemetery "disgrace," seek improved care by city (project C-60)
- Recreation council makes plea for parks - "small expenditure with high return" (projects E-110, F-95)

Ward 3 - Near riot as residents protest street conditions - situation called "intolerable" (project FJ-60-80)
- Industrial area plagued by sewer problems - 20 workers laid off (project HK-85)
- Developer offers park site at fraction of market value (project F-60)

*** State News ***

- National Airways cleared to service state by jet as legislature rushes program for runway expansion
- Zoning legislation passes - allows application of modern concepts as flexible enabling bill passes
- State renewal action complete: renewal implementation up to city
- State Education Association begins drive for state-wide minimum salary schedule.

*** National News ***

- Chamber of Commerce head laughs off bust talk! - sees good years ahead
- Unemployment reaches new high as employment fails to keep pace
- Stock wizard warns that earning ratio of many stocks too high
- Precipitous decline of market levels, quick recovery prospects called good

FORM 2-34
Metropolis II
Dec. 64 RDD

HEADLINES FROM

THE CITIZENS GAZETTE

Vol. 1 No. 6

*** Local News ***

Ward 1 - Businessmens group seeks parking changes, improvements called imperative (project G-120)
- Health official seeks alley closings, calls infestation "intolerable" (project G-135)
- Chamber supports sewer work - must remain competitive (project I-130)
- Expert highlights playground need (project I-105)

Ward 2 - Traffic problems mount - connecting route badly needed (project LQ-120)
- High accident rate troubles chief as 3 die - improvements sought (project N-80, 160)
- Industry seeks sewer relief (project N-100)
- In-city park needs cited (projects G-100, G-105, G-150)

Ward 3 - Recently annexed area demands sewers (project J-210, 230)
- New residents want park improvement (project L-250)
- Street tree funds sought (project M-275)
- West end residents protest lack of equipment (project P-40)

*** State News ***

- Governor distressed at unemployment level, seeks bold solutions
- Welfare costs rise as income falls below estimates
- Legislature acts to speed local industrial projects
- School chief says costs cannot be reduced, rise expected
- State Department of Economic Development releases study citing urgency of airport improvements
- Metropolis high school football players dominate mythical All-State Team. Jefferson High (Metropolis) voted Number One by sports writers

*** National News ***

- Stock crash stuns nation - prospects uncertain
- Automotive sales continue drop as consumer confidence fails
- Congress argues tax relief

FORM 2-34
Metropolis II
Dec. 64 RDD

HEADLINES FROM

THE CITIZENS GAZETTE

Vol. 1 No. 7

*** Local News ***

Ward 1 - Twin projects advanced to relieve downtown traffic problem - merchants fear loss of business to new shopping centers (projects GJ-125; I-120, 160)
- Flooded basements bring protests (project J-160)
- Streets closed 3 hours after storm (project K-150)
- Tree plantings sought (project J-138)

Ward 2 - Connecting bridge sought for new expressway - traffic snarls (project E-135)
- Industrial losses high in flash flood (project Q-150)
- Park improvements requested (projects M-140, O-145)
- Piece of cornice of school administration building falls, no one hurt. Investigation reveals need for many minor repairs to correct structural defects.

Ward 3 - Developers howl as health department refuses to authorize further building (project L-240)
- Irate parents demand park improvements as crowd overflows auditorium (project I-70)
- School superintendent acknowledges advantages in school-park concept advocated by planning commission.

*** State News ***

- Governor urges bold action to attract industry - sees bright future
- Legislature ends in red, imposes temporary nuisance taxes
- State welfare group points to desperate plight of working mother - children unprotected
- Legislature refuses tax relief to metropolis transit company, company in red for third year
- Legislature passes Community College Act, enabling school districts to support 2-year colleges.

*** National News ***

- Stock market rallies slightly, bulls more prominent
- Congress certain to pass cross the board tax relief
- H.H.F.A. announces more liberal terms in effort to speed renewal activities

FORM 2-34
Metropolis II
Dec. 64 RDD

HEADLINES FROM

THE CITIZENS GAZETTE

Vol. 1 No. 8

*** Local News ***

Ward 1 - Rash of injury accidents impresses need for improvements (project H-110, 140)
- Business losses high in flood (project J-115)
- Sewer collapse in business area points up need for replacement (project GHI-120)
- Negro leader makes park plea (J-143)

Ward 2 - Parking shortage acute in shopping area (project N-110)
- Development halted by north end drain (project AG-160)
- New residents want park improvements (project Q-130)

Ward 3 - East side traffic improvement required to accommodate new freeway opening (project EI-190)
- Elderly residents protest flooding - "We paid for sewers once" says spokesman (project I-210)
- Park expert urges land acquisition while cost is down (project I-10)

*** State News ***

- Governor announces participation in federal renewal program, urges cities to take advantage of funds
- Health commissioner appraises legislative committee on air pollution problem
- State unemployment rolls off
- Legislature acts on low-income housing - families must be housed or construction stopped

*** National News ***

- Tax cut passes - lower than expected but evenly spread
- Defense department orders new tanks, trucks
- Army notes that rejection rate of draftees at all time high. School dropout problem complicates matter
- Leading educators support Junior College expansion for alleviation of problems of state colleges and universities.

FORM 2-34
Metropolis II
Dec. 64 RDD

HEADLINES FROM

THE CITIZENS GAZETTE

Vol. 1 No. 10

*** Local News ***

Ward 1 - Recent high rise construction requires new fire protection equipment (project H-125)
- Expressway construction and accompanying development has caused serious drainage problem (project K-120, 150)
- Chamber seeks river improvements - Dallas example noted (project J-122)

Ward 2 - Planner cites needs for alley closings (project L-110)
- Sewers required in new residential area (project F-160)
- New residents want parks - service level alleged to be low (project R-100)

Ward 3 - Merchants hurt by parking lack (project I-195)
- Manager cites need for garage facilities (projects J-81, J-230)
- Fire system needs revamping (project HI-90, 100)
- University Hills residents seek park improvements (project F-190)

*** State News ***

- Open space plan sought by planning group
- Legislature seeks to avert water shortage
- Court rules yes in open housing law - Negro leaders jubilant
- Debt limitations on school districts eased as state fire marshal reports need to improve safety standards in many schools in state.

*** National News ***

- Unemployment drops as employment reaches new high
- New urban affairs department operational - called colossal boondoggle by Senator Goldbricker

POLITICIAN'S CURRENT STANDING

I. TAX RATE

a.	Current Tax Rate	
b.	Accumulated school tax rate (form 2-70)	
c.	Total tax rate (a + b)	
d.	Standard tax rate (48.6 + cycle number)	
e.	Difference (d-c)	
f.	Penalty points (line e x 3, av penalty/ward)	

II. PROJECTS

1.	a.	No. of projects recommended not authorized	
	b.	Probability points (excess of multiple of 3 to be subtracted from high ward)	
	c.	Total a + b	
2.	a.	Total value of budgeted projects	$
	b.	Divided by number of wards	÷ 3
	c.	Average ward expenditure	$
	d.	Divided by 2	÷ 2
	e.	1/2 average ward expenditure	$

f. Computation, wards in excess of average:

		Ward ____	Ward ____
(1)	Total expenditure	$	$
(2)	Less av. expenditure	-	-
(3)	Surplus	$	$
(4)	Factor	÷ 100,000	÷ 100,000
(5)	Gain in probability points		

g. Computation, wards below 1/2 average ward expenditures:

		Ward ____	Ward ____
(1)	1/2 av. expenditure	$	$
(2)	Actual expenditure	$	$
(3)	Shortage	$]	$
(4)	Factor	÷ 100,000	÷ 100,000
(5)	Number of points		
(6)	Times penalty	X 2	X 2
(7)	Loss in probability points		

CURRENT CYCLE _____

FORM 2-21
Metropolis II
Dec. 64 RDD/CF

METROPOLIS REVENUE COMPUTATION

1.	POPULATION (Read from Growth Chart, Form 32)	,000
2.	AVERAGE ASSESSED VALUE PER PERSON (Form 19)	X
3.	TOTAL ASSESSED VALUE	$,000
4.	TAX RATE (Form 23)	X .
5.	TOTAL PROPERTY TAX	$,000
6.	NON TAX REVENUE (Factor)	X 2
7.	TOTAL CITY REVENUE	$,000
8.	SCHOOL EXPENDITURE (line 5, form 2-71)	$,000
9.	CITY BUDGET (LINE 7 minus LINE 8)	$,000
10.	DISCRETIONARY FUNDS AVAILABLE:	
	a. STREETS* (2% of LINE 9)	$
	b. UTILITIES* (4% of LINE 9)	$
	c. RECREATION* (1% of LINE 9)	$
	d. GENERAL FUND (5% of LINE 9)	$
	e. TOTAL DISCRETIONARY FUNDS (12% of LINE 9)	$

*Earmarked funds, may be used only for projects bearing this designation.

Cycle _____

Form 2-80
Metropolis II
Jan. 65, RDD, CF

School Board Decision Form

1. Estimated Population Next cycle _____

2. X Standard Ratio of School Children 18.4%

3. Total estimated school population _____

4. Estimated Cost per School Child $ _____

5. Total Estimated School Expenditure for Next cycle $ _____

Cycle _____

Form 2-71
Metropolis II
1/65
RDD/CF

School Board Current Standing

1.	Estimated School Expense (from previous cycle Form 2-80)	$ _____
2.	Actual School Expense this cycle (from Form 2-21 line 8)	$ _____
3.	Error	$ _____
4.	% of Error (line 3 ÷ line 4)	% _____
5.	Penalty loss (Utils)	- _____
6.	Rewards (from Form 9) special issues carried	+ _____
7.	Net gain or loss	(+) or (-) _____ utils
8.	Carried from previous cycle	+ _____
9.	Total utils	_____

METROPOLIS SCHOOL EXPENDITURES
(recent history)

Year	Population (000's)	School Revenue (000's)	Per Capita School Cost	Cost per School Child*	Per Cent of City Revenue
1950	165	$ 3,982	$24.0	$130.0	39.2
1951	169	4,434	26.2	144.0	40.5
1952	173	4,963	28.6	155.5	40.0
1953	177	5,492	31.0	168.3	39.8
1954	180	6,652	37.0	201.3	44.5
1955	185	7,666	41.4	225.0	47.5
1956	190	8,807	46.4	250.4	51.4
1957	195	9,474	48.6	264.0	53.8
1958	200	10,105	50.5	278.6	54.6
1959	205	12,475	61.0	332.0	54.2
1960	210	12,656	60.2	327.0	54.5
1961	215	14,239	66.2	360.0	58.7

*The average ratio of school children to total population is assumed to be 18.4%.

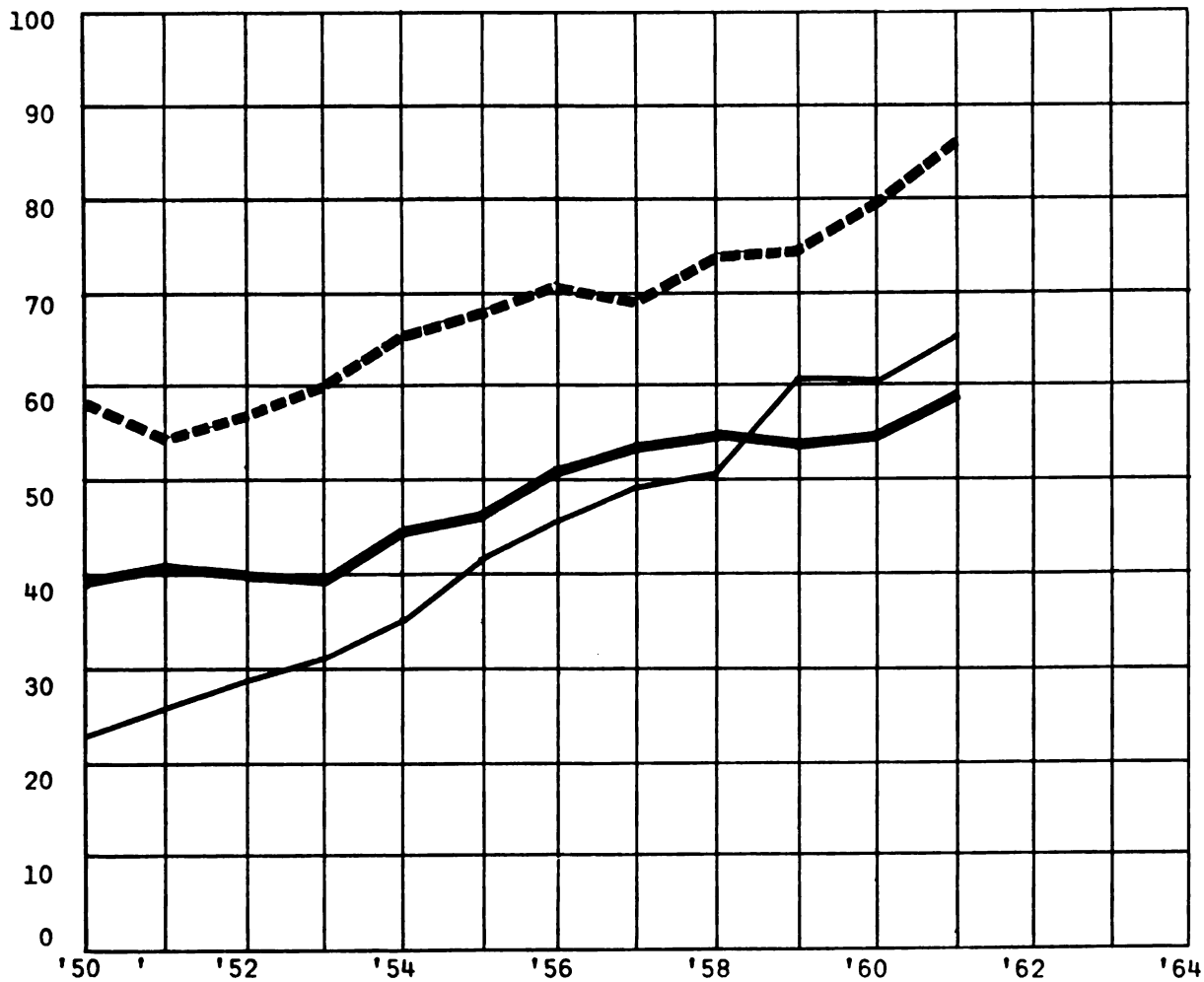
PROJECTED SCHOOL EXPENDITURES
(NATIONAL PER-CAPITA ESTIMATES)

*Estimates by Federal Education Agency of future public school expenditures (for all pre-university lends)

YEAR	COST
1960	$ 360
1961	400
1962	430
1963	460
1964	500
1965	550
1966	600
1967	650
1968	710
1969	780
1970	850

NOTE: Historically, METROPOLIS per-capita school expenditures have equaled, or exceeded, national average.

SCHOOL BOARD DATA CHART

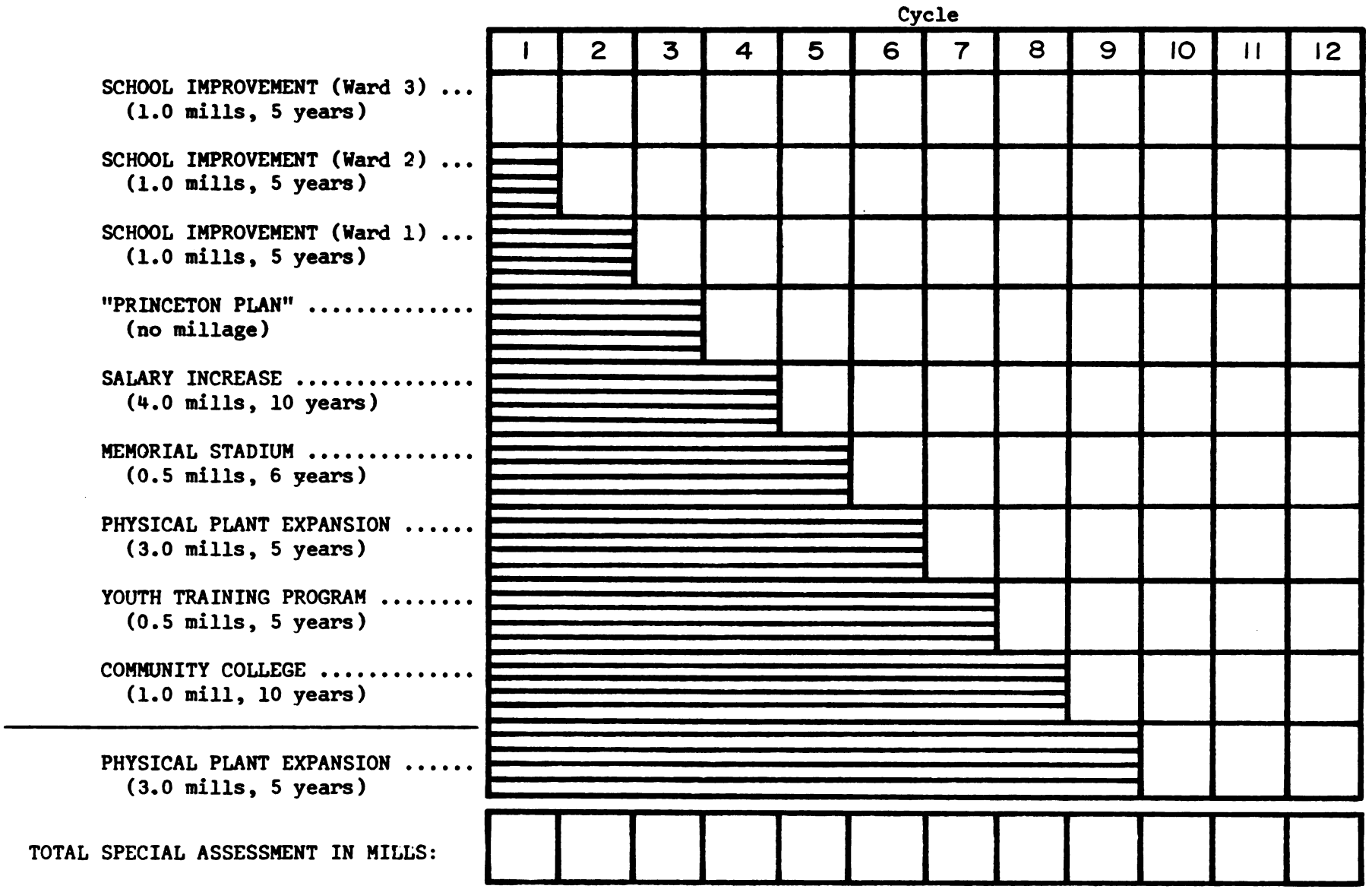


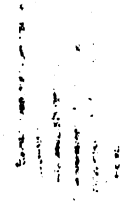
Per capita school expenditures in dollars.

School expenditures as a percent of total Metropolis revenue.

School age population of Metropolis, in thousands.

PUBLIC OPINION POLL BOND ISSUES





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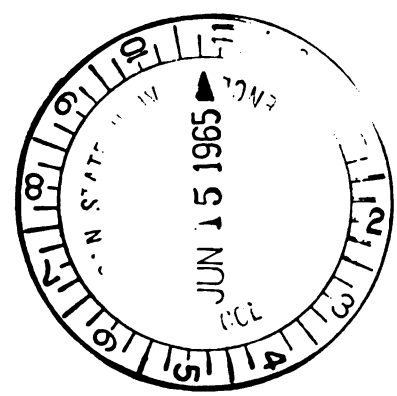
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