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Seventh Annual ACM Urban Symposium On:
COMPUTERS AND URBAN SOCIETY

The Biltmore Hotel
New York City
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Workshop 1: HEALTH CARE DELIVERY SYSTEMS AND
SIMULATION—MACRO-APPROACHES AND
MICRO-MODELS

Chairman: David Valinsky
Baruch College and
Mount Sinai Hospital

"Simulation of Hospital Blood Banking"
Manus Rabinowitz and David Valinsky
Baruch College and The Mount Sinai School of Medicine, CUNY

This paper describes a simulation model of a hospital blood bank. A discussion of a blood bank inventory system is given, indicating the special problems in this area. The simulator program and the functions it performs is then described. Emphasis is given to the impact of the characteristics of the blood bank system on the design and construction of the simulator. This presentation is made in terms of the following considerations: event definition and timing; identification and analysis of demand sources; and the formulations necessary for the investigations of proposed policy decisions.

"Simulating Hospital Laboratories:
The Clinical Microscopy Laboratory System"
M. Barry Dumas
Columbia University and The Mount Sinai School of Medicine
David Valinsky
Baruch College, CUNY and The Mount Sinai School of Medicine

This paper deals with the simulation of hospital laboratories–in particular the clinical microscopy laboratory system. This system is representative of those that deal with the patient indirectly. While analyses are made of samples drawn from patients, the patients' presence is not required for test performance.

The nature of the simulator which has been developed is discussed. Special reference is made to five particular aspects whose treatment defined the basic characteristics of any such simulator: event definitions and timing; demand characterization; decision variables; output data management; measures of effectiveness. Emphasis is on the approaches taken rather than the programming details used.

"Historical Background, Problems of Model Formulation and
Measures of Effectiveness"
David Valinsky

"Macro-Models in Health Delivery Systems: Their Formulation and
Technical Problems"
Norbert Hauser,
Polytechnic Institute of Brooklyn and Mount Sinai Hospital

"Analytical and Implementation Problems in the Use of Simulation
in Health Care"
Lloyd Rosenberg,
Baruch College and Mount Sinai Hospital

Workshop 2:   URBAN MODELING AND SIMULATION
Chairman: Professor Aryeh Lewin
               Graduate School of Business Administration
               New York University

"Issues in the Design of an Urban Game"

Robert W. Blanning
Arie Y. Lewin
Myron Uretsky
Graduate School of Business Administration
New York University

The widespread use of gaming as a training tool for decision-making in business and military organizations suggests that it may also be useful in the training of urban managers. However, the application of gaming in urban studies programs is not a simple extension of its use in business and military training programs. This paper examines the principal differences and suggests how they apply to the design of an urban game.

"Urban Innovation Through "U-DIG"
(Urban Development Investment Game)

Ervin J. Bell
Associate Professor
College of Environmental Design
University of Colorado, Denver

U-DIG is a gaming tool to aid in the understanding of urban dynamics and for research into urban innovations to improve the quality of urban life. One of the complexities of the urban scene, the economic factor, is made more comprehensible by the ability of the computer to produce tables based on seemingly innumerable calculations. Version One is played by three to five teams of one to four individuals. Each team is an investor who can buy, sell or build within the existing economic rules and constraints. In Version Two, a hypothetical change in ownership of private property is introduced in order to look at the resulting living patterns.

"An Interactive Computer System for the Study of
Urban Housing Problems"

Denos C. Gazis
IBM Watson Research Center
Yorktown Heights, New York

The lag of urban housing construction is blamed on many factors, and there is little agreement among experts concerning the relative importance of these factors. This paper discusses an interactive computer program written in APL, which can be used to obtain a quantitative measure of the effect of various parameters related to operating costs, income, as well as government regulations on the financial life of a subsidized housing project.

"Systems for Urban Planning and Management"
Dilip R. Limaye and Donald F. Blumberg
Decision Sciences Corporation
Jenkintown, Pennsylvania

This paper discusses the evolution of urban planning and management systems, which integrate models of urban growth processes, incorporating the dynamic characteristics of the community, together with the financial policy planning aspects of local government. The PROMUS system, implemented for the City of Toronto, is described illustrating the history of the system, model structure, and typical application areas. The two major subsystems, the Community Model Subsystem (CMS) and the Financial Policy Planning Subsystem (FPPS) and the concept of Departmental Program Matrices are briefly discussed.

"Computer Based Urban Planning Systems and the User Interface"
Marshall H. Whithed
Temple University
Philadelphia, Pennsylvania

The urgency of our urban problems and crises has led to a search for new methodologies to better understand the situation and to explore new solutions. The advent of the modern computer, systems analysis, operations research, and other related phenomena have led to the possibilities of much more sophisticated analysis and decision-making. But these techniques have also raised a significant problem of user interface.

Increasingly, as new modes of urban analysis become available, the question of the technological decision-making support system versus user interface becomes critical. Policy-makers are often not trained or knowledgeable in the utilization of new techniques, and sometimes tend to view them with suspicion and distrust. The simplest answer for the technologists may be to suggest that the fault lies with the inadequate education in modern decision-making techniques, and dismiss the problem at the doorstep of policy-makers. The fact remains, however, that the finest technological decision-making support system is absolutely useless in achieving an impact on the quality of life in this country unless it is applied. The theme of this paper, short and simple, is that with an understanding of the environment of the public policy-maker, the developer of technological decision-making support systems—PERT, CPM, operations research, simulation modeling, or whatever—can make his contributions much more likely to experience meaningful usage in public policy analysis.

For examples of illustration in this paper, a proposed analysis schema based upon urban simulation modeling as applied to analysis and evaluation

of New Communities or New Town development proposals will be utilized. The reason for this choice is that the writer has had experience in developing a prototype simulation analysis system for this purpose and in proposing a variant of the system described below to the U.S. Department of Housing and Urban Development to deal with this problem of the user interface. It should be emphasized, however, that although the New Communities project will be used for illustrative purposes, the theme of this article is not particularistic to that project, but rather, is meant to refer to the general context of technological decision-making support systems and the policy-maker user interface.

Workshop 3:   URBAN MANAGEMENT INFORMATION SYSTEMS

Chairman: Mr. Harry Lipton
                Bureau of the Budget, New York City

"The Los Angeles Story"

Charles Steven Dwyer

The design of large-scale urban environments is a matter of increasing concern to those who live within them. As the growth processes of such environments continue in a generally uncontrolled manner, large sections of the city are subjected to changes over which the inhabitants of these areas have no control and which are not always favorable to them. The study upon which this documentation is based investigates techniques by which change in an urban environment can be anticipated and seeks to establish the means for controlling such changes to provide a maximum benefit to the communities involved.

"Unimatch: Generalized Record Linkage Applied to Urban Data Files"

Matthew A. Jaro
U.S. Bureau of Census

UNIMATCH (for UNIversal MATCHer) is a generalized record linkage system which will be released to the general public by the Census Use Study of the Bureau of the Census. Record linkage is a powerful tool for providing a single source of information that previously existed on multiple sources. UNIMATCH was written to enable sophisticated geographic coding, transportation planning, and police reporting problems to be solved, as well as to provide a system for statistical matching and record linkage experimentation. Procedures elaborated from control specifications will be supplied with the system so that users will not be required to devise their

own weighting scheme and algorithms to solve common problems. Discussions of some of the basic concepts of record linkage, applications of record linkage for persons involved in urban studies, and the basic structure of the UNIMATCH system are presented.

"A Comprehensive Approach to User Participation in the Space-Planning Process"

Donald P. Grant, Architect, Associate Professor
Arthur J. Chapman, Lecturer
School of Architecture and Environmental Design
California Polytechnic State University
San Luis Obispo

A computer-aided, overlay-model space-planning technique is combined with Rittel's IBIS (issue-based information system) in an attempt to set up a sequential, adaptive, user-educating land-use-planning decision process. The process is aimed at resolving conflicts of interest among multiple clients in problems wherein land must be allocated among several competing uses. The approach aims at eliciting the crucial value judgments in complex land-use problems from the clients or user themselves instead of from professional proxies such as architects or planners. The role of the professional in a successful application of this approach would be more that of a "midwife" of educator-facilitator than that of decision-maker. Implementation in real world problems using portable mini-computers is proposed.

"Planning Urban Industrial Policy: A Computer Based Approach"

John H. Lotz
Roman Ferber
A. Isaac Bernstein
The Economic Development Administration
The City of New York

This paper concerns itself with a computer-based comprehensive framework for planning and evaluating urban industrial policy. The components include: a description of initial conditions the data of which is stored in disc; a definition of projected objectives or payoffs to be achieved by governmental intervention; constraints which indicate limitations of money, political feasibility, etc.

These informational components are incorporated through a model taking the form of command programs. The model cranks into the initial conditions alternative development policies as modified by various constraining factors and evaluates their respective payoffs.

The benefits from this approach are: consistent information for administrators; increased richness of analysis; and consistency of outputs.

"Computer-Based Urban Planning Systems and the User Interface"
Marshall Whitehead
Temple University

Workshop 4:   COMPUTERS AND THEIR SOCIAL AND
                POLITICAL IMPLICATIONS
Chairman: Dr. Edward Blum
                The New York City Rand Institute

"Potential Danger of Reforms in Metropolitan Governance"
Richard Lehne
Office of Research and Technology
H.U.D., Washington, D.C.

"General Problems in Accounting for Social and
Political Implications in Urban Services"
Edward Blum
The New York City Rand Institute

"The Legal Aspects of Data Bases and Computer Applications
in the Public Sector"
Charles Lister
Covington and Burling, Attorneys

"Problems with Computerization: A View From Capitol Hill"
Larry Baskier
Counsel to Senator Ervin
Senate Subcommittee on Constitutional Rights

Workshop 5:   COMPUTER AND LAW
Chairman: Professor Fred Stahl
                Coordinated Systems Laboratory
                The University of Illinois at Urbana

"A Computer Service Utility for the Legal Profession"
Peter B. Maggs
University of Illinois at Urbana-Champaign

Existing computer, communications, terminal, and software technology has reached the point where a self sustaining on-line legal computer utility could be put into operation. The economic foundation of such a utility would be automatic typing services, which are needed by almost all law offices.

The utility would also serve as a marketing facility for a wide variety of computer services for lawyers. Many such services now exist off-line. They would be much easier to sell and easier to use once on-line terminals were in a significant number of law offices.

Current research in artificial intelligence offers the possibility of a natural language interface between the user and the system. Further application of artificial intelligence techniques can provide legal services unavailable with conventional data processing approaches.

"Emerging Legal Restrictions Upon Urban Computer Applications"
David Link
The Law School
Notre Dame University and
the ABA Committee on Law and Technology

I want first to describe briefly the dangers which many observers believe might eventually result from the new information technologies. Some of these dangers are real and important. Others have often been, at least with respect to current uses of the computer, seriously exaggerated. The critical point for the moment, however, is that these are the perceived risks which will help to shape future legal restrictions upon urban computer applications. Second, I shall describe the form of restrictions which I believe are likely to emerge, or at least to receive serious attention, over the next five to ten years. The rate at which such restrictions are likely to be imposed, in common with the rate of computerization itself, will vary among systems, but I hope at least to indicate the direction in which the law is going.

"Dimensions and Patterns of Auto Theft Crimes in
a Metropolitan Area"
Anita S. West, Ph.D.
Research Mathematician
University of Denver

This report summarizes the results of a study sponsored by the United States Department of Justice to organize data concerning the circumstances of Denver auto theft. The first objective of the project was to provide the hard data needed for a comprehensive analysis of the problem before

proceeding with any large scale theft prevention programs. A second objective was to provide local law enforcement personnel with a documented one year history of theft data so that prevention and investigation guidelines might be reevaluated in the light of this summary information. An important product of the research is a set of information retrieval computer programs for effectively examining the problem in other cities.

"Law and Technology"

David Link

The Law School

Notre Dame University and

the ABA Committee on Law and Technology

"The Computer and the Quality of Life"

Michael Dugan

School of Business Administration

The University of Texas at Austin

Workshop 6:   URBAN SERVICES AND THE COMPUTER

Chairman: William Hanna

Lehman College, City University of New York

"A Central Area Transit Simulation Model"

Alf R. Eriksen

An essential part of this study was the development of a computer simulation model capable of testing alternative transit distribution systems in central areas. The model simulates the operation of buses during the afternoon peak hour as they travel through a downtown area, stopping at signalized intersections and at designated stations to collect passengers.

Preferential bus treatment such as exclusive streets for buses, grade-separated busways, and bus-actuated traffic signals have been analyzed, in addition to facility improvements in the form of skip-stop operation, bus loading bays at stations, and improved boarding and fare collection methods. Different station spacings and vehicle sizes are also part of the inventory of the alternatives being tested. The results indicate that transit operation in central areas can be substantially improved by the use of such preferential bus treatments and facility improvements as those mentioned. Further, comparative evaluations of the results reveal what amount of timesaving and increase in efficiency can be expected from any particular preferential treatment of improvement.

"OPTALL: A Technique and Computer Program for Optimizing
the Distribution of Urban Services"

Elliott E. Dudnik
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University of Illinois at Chicago Circle
Chicago, Illinois

The optimum distribution and allocation of public services and goods by local, state, and federal agencies has become a critical problem as the demand and costs for such items have steadily risen while available fiscal resources needed to pay for them have dwindled. There exists, therefore, a need for a method to allocate all available resources, facilities, or services in the most equitable and optimum manner. While certain techniques exist for obtaining optimum solutions to most types of resource allocation problems, they generally require explicitly defined problem constraints which is not typical of the usual urban planning situation.

This paper describes and demonstrates a method for solving precisely that type of resource allocation problem where only the amounts of available resources are known and where the demand for utilization of these resources is only estimated, projected, or not precisely known. In addition to the general method for solution of such problems, this paper presents specific examples of the application of this technique to urban problems. Solutions to these examples obtained by use of OPTALL, a computer program developed by the author, will be presented as well as details of the program and its use.

"Districting in Solid Waste Collection: A Case Study"

James Hudson and David Marks
Department of Civil Engineering
Massachusetts Institute of Technology

A political districting algorithm was used to divide the town of Brookline, Massachusetts, into a set of districts, each requiring one crew day for waste collection. Districting of this sort leads to equitable task assignments for the crews as well as to compact collection areas where efficient routing may be done. The Districts were also aggregated into compact daily collection areas and continuous weekly truck routes.

"School Bus Routing by Computer for Metropolitan Areas"

Allen R. Bernstein
Department of Mathematics
University of Maryland
College Park, Maryland

Eliot D. Feldman
Computer Science Center
University of Maryland

This paper presents a new approach to the problem of school bus routing in urban areas. It deals with the central question of how to best devise bus routes in order to meet a staggered school opening-time schedule. Furthermore the application of our method results in minimal disruption to an existing operation. The method is tested on the District Heights section of Prince Georges County, Maryland, and results in substantial reduction in the mileage travelled by the buses.

"A Model for Selection of Urban Recreation Facilities"

Norbert Dee
Senior Environmental Planner
Battelle
Columbus Laboratories
Columbus, Ohio

Jon C. Liebman
Professor of Environmental Engineering
University of Illinois
Urbana, Illinois

Location of public recreation facilities is an important consideration in the management of today's urban places. To achieve desirable locations, it is necessary to interface public participation with planning tools. In this paper, the demand for urban playgrounds, a particular type of urban recreation, is determined and analyzed for the City of Baltimore. Information obtained from this analysis along with some form of public participation is used to formulate the location of playgrounds into an optimal location model. This formulation is tested on a study area in Baltimore City and is used to compare alternative recreation development.

"Land Use and Transportation Models: A Global Perspective"

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