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NEWSLETTER
CENTER
COMPUTING
UNIVERSITY OF ROCHESTER

"Sure, we need a newsletter -- why don't you become the editor?" In these simple, well-chosen words are contained the whole raison d'etre of the University of Rochester Computing Center Newsletter. It is designed to fulfill a need for communication between the Center and the rest of the world, and we hope to accomplish our objective along two main lines; namely, by disseminating information received at the computer, and, secondly, by making the Computing Center and its facilities better known to the campus community.

The first problem arises because of the necessary specialization of computing. We receive periodicals, books and reprints which contain material on a wide variety of subjects. These publications are normally concerned with computer applications and are not normally available in any other form. For example, there are the proceedings of several I.B.M. seminars on scientific applications of computers. These contain papers in a variety of fields such as mathematics, engineering, physics, chemistry, etc., and very often this material can escape the attention of people who would ordinarily be interested in the subject. The Newsletter will contain a listing of new material received at the Center every month, including a title section on papers which may be of interest in specific fields.

To accomplish our second objective, we will enlist the aid of our staff of course, but we also hope to have articles by faculty members describing some of the more interesting research problems that they have worked on. This part of the Newsletter will be used to acquaint people with the physical facilities available, as well as with new programs which are available for special tasks. In this first issue, we have an article by Dr. Keenan on the history of the Computing Center, as well as a short look at computing philosophy.

In addition to our main objectives, we also wish to use the Newsletter as a vehicle for publicizing computer activities not directly concerned with actual computing hardware. In particular, such things as computing seminars, applied mathematics colloquia, and the Computing Center Seminars will be detailed in the Newsletter.

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COMPUTING AT THE U OF R

T. A. Keenan

The development and fulfillment of computing needs at the U of R has not taken place over night. Nine years ago, a committee was formed because of a growing realization of a need for some kind of computing facility. After extensive study, the committee decided that the most pressing computing needs could be handled by using the computing center then being established at Cornell University and on occasion by making use of large computers located elsewhere. Over the next several years, the computing requirements of the University continued to increase and there was a growing

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realization of the possibility of research not being attempted simply because adequate computing facilities were not readily available.

In this span of nine years, the growth of the computing industry itself and of the use of computers in research and commerce has been phenomenal. In 1950, large scale digital computers were not commercially available. Perhaps eight or ten prototypes had been built in this country. Today, more than 500 large scale computers are in daily use in government and industry. Commercially available computers exist today which dwarf the dreams of the designers of 1950. The story of the medium-size computer (such as the IBM 650) is even more fantastic. None were in use in 1950 (marketing began in 1955), as compared to about 2500 in use today. Now, in 1959, no large company and surprisingly few smaller companies are found to be computerless.

This tremendous change has far-reaching implications. A major purpose of computing centers in universities across the country is to understand the current and future implications of the "computer revolution". In 1956, the U of R Computing Center was established to provide a means of studying the effects of a widespread use of computers in our society, to give undergraduate and graduate students the chance to become aware of and familar with computers and their use, and to provide a computing tool for the research carried on in the University. In 1956, there were about 20 universities with computers; today, more than 100 university computing centers have sprung up.

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We began in April, 1956, with a small desk-sized computer made by the Burroughs Company. Incidentally, the machine first installed here was the prototype. In July, 1956, a basic IBM 650 computer was installed. Since then the computer has been kept up to date by repeatedly adding new features and modifications to the 650. In October, 1958, were added floating point arithmetic, index registers, and core storage. In May, 1959, four magnetic tape units were added to make a nearly complete 650-tape system. It is our fond hope that the growth in understanding and ability of the Computing Center staff has been comparable with the increase of available equipment.

Today the Computing Center maintains a library of some 300 different programs ranging from the almost trivial to the extremely complicated. A number of courses in business, engineering, mathematics and physics use the computer as a laboratory tool in their subject. The staff of the Center is developing new methods in numerical analysis, is studying new developments in the theory of formal languages and is evaluating the possibilities in computer simulation of cognitive processes. Today systems are available to permit the scientist to solve his problem by writing a program as algebraic statements rather than as a computer code; to solve his differential equation by writing just the expressions for the derivatives that may be needed. The computer writes its own programs from these algebraic expressions.

What of the future? The prevailing attitude of the past has been that computers are simply a mathematical or accounting tool. Today we are beginning to recognize the computer as a system capable of complex manipulation of symbols, of the simulation of complex processes (including perhaps some processes of the human brain), and incidentially capable of doing arithmetic. This change in our understanding of "what a computer is" may well be the most significant result yet fostered by the university computing centers.

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SIMULATION OF COGNITIVE PROCESSES SERIES

Professor L. A. Hiller, Jr. of the University of Illinois will present two papers on the subject of computers and music, both on Friday, November 20. The first, entitled "Programming Digital Computers to Produce Music", will be at the Eastman School of Music at 3 P.M. The second paper, "Experimental Electronic and Computer Music" will be given at 8 P.M. in Cutler Union. As a highlight of the evening session, a string quartet will play the "Illiac Suite", which was composed with the aid of a high-speed digital computer.

On December 10, Professor Herbert Simon of Carnegie Institute of Technology will speak on Heuristic Programs. Further details as to topic and place will be reported in the next issue.

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COMPUTING CENTER SIMULATION SEMINAR

This group meets regularly in Room 13 of Taylor Hall at 2 P.M. on Mondays.

The seminar deals with three areas:

1. Review of papers on simulation and related topics.
2. Reports on simulation studies carried on at the University.
3. Discussion of talks in the "Simulation of Cognitive Processes" series.

On Monday, November 16, Dr. Vincent Nowlis, Psychology Dept., will speak on the subject of "Generation of Discrimination Networks".

Prior to this, a special seminar will be held on Thursday, November 12, at 2 P.M., with Prof. Arthur Roberts of the Cyclotron, speaking on "Prelude to Experimental (Computer) Music" in the Hollister Lounge, Women's Residence Hall (east wing).

Interested persons are welcome to attend and further information can be obtained from any of the following:

Dr. Nowlis, Psychology
Dr. Keenan, Computing Center
Dr. Patricia Eberlein, "
Mr. John Woodward, " "

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Recently Received Material:

1. Proceedings of the Fifth Annual Computer Applications Symposium, sponsored by the Armour Research Foundation, Illinois Institute of Technology.--
   Contains 15 papers on various computer applications, including:
   (i) Scientific uses of a medium scale computer with extensive accessory features - R. A. Haertle, General Motors Corp.
   (ii) The design of optimum systems - R. R. Brown, M. I. T.
   (iii) Frontiers in Computer Technology - R. W. Hamming, Bell Tel.
2. A series of papers on designing shielding for a nuclear reactor using digital computers; General Electric Co. "Apex" series.