

## XXXI. ADVANCED COMPUTATION RESEARCH\*

Prof. H. M. Teager  
N. E. Bolen

E. L. Ivie  
U. Shimony

R. L. Ward  
D. U. Wilde

### RESEARCH OBJECTIVES

Our objective is to develop devices, systems, and languages for fruitful interaction between scientists and computers, through the use of the computer as a powerful, on-line aid to understanding. Taking cost and computer capacity into consideration, we can provide this facility by time-sharing a slightly modified computer with a normalized memory. The computer is equipped with random access files and many low-cost remote consoles, each of which has low-data-rate graphical and character-producing input-output devices. The consoles can be operated simultaneously.

Work in this field has been concerned with the following problems. We have tested on-line programming and computation, utilizing a system of multiple independent typewriters. An existing digital plotter has been connected to an IBM 709 computer, and we are constructing a special-purpose computer to control multiple independent plotters. A prototype of a high-resolution graphical input device for figures and symbols that are drawn by hand is being built. Design modifications for an IBM 7090 computer have been proposed and incorporated into the Computation Center machine. Scheduling systems for time-sharing and memory allocation have been simulated and found satisfactory. An information-retrieval system for programs and data is being designed. Programming systems for recognition of handwritten input are being checked out, and new graphical languages for several major problem classes for input and output have been partially specified.<sup>1-3</sup>

In a wider sense, we are investigating theoretical problems, such as associate memories, information-retrieval systems, pattern recognition, and machine organization, with a view toward the development of a comprehensive theory of computation and information processing.

H. M. Teager

### References

1. H. M. Teager, Marriage of on-line human decision with computer programs, Naval Research Logistics Quarterly, December 1960, pp. 379-383.
2. H. M. Teager, Systems considerations in real-time computer usage, ONR Symposium on Automated Teaching, October 12, 1961.
3. Real-time, Time-shared Computer Project, First, Second, Third, and Fourth Quarterly Progress Reports on Contract ONR 1841(69), January, March, July, October 1961.

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\*This work is supported in part by the Computation Center, M. I. T.

