

## XXXI. COMPUTER RESEARCH\*

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### RESEARCH OBJECTIVES

The purpose of this group, which is operated jointly by the Research Laboratory of Electronics, the Electronic Systems Laboratory, and the Department of Electrical Engineering, M. I. T., is threefold:

1. To provide a flexible and readily accessible computation facility oriented toward the Laboratory's research goals.
2. To develop computation techniques, especially in the sense of increasing the convenience with which operating programs for particular tasks may be produced, and of allowing the scientist easy communication with the machine about tasks that are being performed for him.
3. To provide an education facility where students may learn the principles of automatic computation, and undergraduate and graduate theses and projects may be carried out.

### Multi-User Computer Facility

A multi-user computation facility has been built around the PDP-1 computer given to the Department of Electrical Engineering, M. I. T. by the Digital Equipment Corporation. The installation permits three persons to encode, test, and operate programs from individual typewriter stations using symbolic languages. A flexible arrangement for the operation of external equipment by time-sharing programs has been included in the system. One application of this feature is the guidance of a high-gain antenna in celestial coordinates for experiments of the Radio Astronomy Group of the Research Laboratory of Electronics. The tracking computation may proceed in parallel with use of the machine by the three on-line users.

A paper that presents the philosophy of the system and many details of its design has been prepared.<sup>1</sup> Information on the use of the facility is contained in internal memoranda<sup>2-6</sup> which are available at the computer room.

The group is studying means of improving the performance of the facility by employing new concepts of modular organization of computer components and recent developments regarding the structure of information in multiprogrammed systems.

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### References

1. J. B. Dennis, A multi-user computation facility for education and research, *Communs. ACM*, Vol. 7, No. 9, pp. 521-529, September 1964.
2. Memorandum PDP-6, Time-Shared Operation of the Electrical Engineering PDP-1 Computer, May 22, 1962.
3. Memorandum PDR-11-1, Programming the PDP-1 Computer, July 29, 1963.

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4. MACRO Assembly Program for Programmed Data Processor-1 (PDP-1), Digital Equipment Corporation, Maynard, Massachusetts, n. d.
5. Memorandum PDP-5, Expensive Typewriter, April 18, 1962.
6. Memorandum PDP-23, ID Invisible Debugger, August 20, 1964.