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UNIX Time-Sharing System:

Preface

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Since 1962, *The Bell System Technical Journal* has published over 90 articles on computer programming. Although that number is not insignificant, it is only about 6 percent of all the articles published in the B.S.T.J. during that period. Publications in the B.S.T.J. tend to reflect the amount of activity in many areas of technology at Bell Laboratories, but that has certainly not been true for computer programming work. Better indicators of the importance of programming for current Bell Laboratories work are the following:

- (i) 25 percent of the technical staff spent more than 50 percent of their time on programming, or related work, in 1977.
- (ii) 25 percent of the professional staff recruited in 1977 majored in computer science.
- (iii) 40 percent of the employees entering the Bell Laboratories Graduate Study Program in 1977 are majoring in computer science.

Programming activities under way at Bell Laboratories cover a very broad spectrum. They range from basic research on compiler-

generating techniques to the maintenance of Bell Laboratories-developed programs now in routine use at operating telephone companies. They include writing of real-time control programs for switching systems, development of time-shared text editing facilities, and design of massive data-base systems. They involve work on microprocessors, minicomputers, and maxicomputers. They extend from the design of sophisticated programming tools to be used only by experts to the delivery of program products to be used by clerks in operating telephone companies. They include programming for computers made by all the major computer hardware vendors as well as programming for special-purpose computers designed at Bell Laboratories and built by the Western Electric Company.

Because computer science is still in an early stage of development, no well-formulated theoretical structure exists around which problems can be defined and results organized. "Elegance" is of prime importance, but is not easily defined or described. Reliability and maintainability are important, but they also are neither precisely defined nor easily measured.

No single issue of the B.S.T.J. can characterize all of Bell Laboratories software activities. However, by using the UNIX* operating system as a central theme, it has been possible to assemble a number of related articles that do provide some idea of the importance of computer programming to Bell Laboratories. The original design of the UNIX system was an elegant piece of work done in the research area, and that design has proven useful in many applications. The range of applications described here typifies much of Bell Laboratories software work with the notable omissions of real-time programming for switching control systems and the design of very large data-base systems. Given the growing importance of computers to the Bell System and the growing importance of programming to the use of computers, it is certain that computer programming will continue to grow in importance at Bell Laboratories.

* UNIX is a trademark of Bell Laboratories.