Guest Editors’ Introduction

Computers in Education:
A New Learning Environment

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One of the exciting features of the computer field is that concepts and applications once considered exotic and unattainable can become commonplace almost overnight. This rapid rate of change places a special burden on computer professionals if they are to stay up-to-date with the latest developments. The best insurance against becoming obsolete is a solid educational background that lays a foundation for lifelong learning. A major responsibility of the Computer Society is to make sure that the educational programs available in our institutions of higher education properly prepare students for entrance into the computer science and engineering profession.

For members of the Computer Society directly associated with higher education, developing and maintaining an up-to-date curriculum is a major problem. However, these problems are also important to our industrial members, since the educational background of recent graduates determines how well they will be able to contribute to future computer developments. The Computer Society is fortunate to have a group of members from academia, government, and industry who, through the Educational Activities Board, actively participate in a wide range of projects designed to improve the educational process at all levels. The purpose of this special issue is to report on a number of these activities.

Curriculum and program development demands continual attention in any institution of higher education. Although the experience and professional capabilities of an institution's faculty are vital to the overall quality of the programs offered, we still need a national standard to use as a guide for evaluating local curriculum and program decisions. To satisfy this need, the Curriculum Development Committee of the EAB continuously monitors new technological developments and advises educators as to how these developments should be integrated into current curricula.

In 1977, the Computer Society published a model curriculum for computer science and engineering that provided a comprehensive overview of the material that should be contained in a basic undergraduate curriculum. The success of this report, which was widely used to define new curricula and update existing programs, clearly established the leadership of the Computer Society in curriculum development. By 1981, the society recognized that technological changes had made the 1977 report somewhat dated, and a new committee was established to evaluate the earlier report. After an extensive review, the committee decided that more than just curriculum needed to be addressed. In December 1983, the committee produced a major new report, entitled The 1983 IEEE Computer Society Model Program in Computer Science and Engineering. In the first article in this issue, J. T. Cain, G. Landgon, Jr., and M. Varanasi provide an overview of key points in this report.

Closely related to the educational programs in computer science and engineering are the programs in computer technology. These programs provide graduates with the understanding and technical background needed to maintain both the hardware and software of modern computer systems. High-quality computer technology graduates are in demand. Unfortunately, many established programs in computer technology lack the depth required to prepare a student with the tools needed to solve real-world problems. Recognizing this need, the EAB established a committee to develop a model curriculum in computer technology. The second article in this issue describes the results of the committee's work.

The demand for educational programs in computer science and engineering has exceeded the ability of higher education to provide quality programs. As a result, a number of institutions have marginal or sub marginal programs—a major problem for both prospective students and employers, since the quality of a program cannot be determined simply by reading an institution's catalog. The IEEE, recognizing that professional accreditation of academic programs is one way to solve the problem, plays an active role in engineering accreditation through membership in the Accreditation Board for Engineering and Technology. At present, 29 engineering-based programs in the computer area have received ABET accreditation. E. Jones and M. Mulder describe this activity and the ABET accreditation criteria a program must satisfy.

ABET accreditation of computer science and engineering programs has been well-received by the profession and the computer industry. Many quality programs, however, are not eligible for ABET accreditation, since they are not located in engineering schools or do not wish to meet the general engineering requirements necessary for ABET accreditation. For the last two years, a joint task force of the IEEE Computer Society and the ACM has been considering this problem. During fall 1983, the task force recommended the establishment of CSAC, the Computer Science Accreditation Commission, to accredit programs that did not choose to be evaluated as engineering programs. These recommendations, which have been approved in principle by both the Governing Board of the Computer Society and the Council of the ACM, are described in the Interim Report of the Joint Task Force, the fourth article in this issue.

The major changes in computer technology have also had an impact on how the educational process is carried out. One exciting development in 1983 was that a number of schools decided to require that their freshmen have a personal microcomputer. A forerunner of this movement is Clarkson University, which issued each incoming freshman a personal computer for unlimited use in the dormitory. The article by D. Bray describes the background of this experiment and reports on the results of the first year of operation.

The impact of computer technology is not limited to higher education. As we have all observed, computers are greatly influencing both elementary and secondary education. Members of the Computer Society are often approached by a local school official for advice on the type of computer the school system should purchase or how computers should be used in the classroom. In the final article in this issue, J. Rogers examines this problem and offers insights into some of the advantages and disadvantages of bringing microcomputers into the classroom.

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The articles in this special issue report on the major activities of the Educational Activities Board. As such, they represent the results of a wide cross section of Computer Society members who have dedicated their time and effort to improving the quality of computer-related education. We, the editors of this special issue, acknowledge the hard work of these volunteers and extend to them the special thanks of the Computer Society for a job well done. The articles in this issue provide a progress report on many of the important EAB activities. Other areas, such as continuing education, tutorials, precollege computer education, and computer laboratory program development, are being studied by other EAB committees. Future issues of Computer or the EAB Newsletter will carry information about these activities.

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Booth was vice president for educational activities of the Computer Society for 1982 and 1983. He has been a major participant in computer science and engineering education development since the mid-1960's when he was a member of the Cosine Committee of the National Academy of Engineering. He is now a fellow of the IEEE and a member of ACM and ASEE. He was also editor-in-chief of the IEEE Transactions on Computers.

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