# Preface

Personal computers have proved to be effective and valuable tools in the support of many business and professional applications. As the hardware and software building blocks have been provided, systems have been developed to meet the needs of an ever-expanding user community. However, the offerings that meet the needs of business professionals have fallen short of directly fulfilling the requirements of engineers, scientists, and technical professionals in their research and development activities. This issue of the *IBM Systems Journal* describes hardware and software offerings that provide a base for the development of workstation-based systems meeting the needs of the engineering and scientific community.

Graphics systems represent one of the greatest areas of growth in personal computing. Innovative new applications are created as the technology evolves to support user requirements. One result of this rapid evolution is a diversity of graphics hardware and software implementations that must be supported by application developers to ensure a broad market for their products. Similarly, users who invest in application software may be faced with migration concerns as new systems become available. Present systems may not operate in new environments or may not take advantage of the new facilities that will be provided by future systems. Standardization of the application programming interface is the logical solution to this problem. One of the standards currently under consideration by ANSI is the Virtual Device Interface (VDI). An implementation of this standard for the IBM Personal Computer is presented in our first paper, by Clarkson. It offers the potential of a reduction in the application programming requirement to support multiple devices, while providing users with the opportunity for uninterrupted growth.

To meet the needs of engineers and scientists, workstation graphics capability must be available with rich function, while at the same time meeting user performance requirements. Duke and Wall describe the development and implementation of the Professional Graphics Controller, which was designed to meet these needs. In addition to providing superior resolution, the Professional Graphics Controller includes an onboard microprocessor that provides support in hardware for such complex functions as three-dimensional transformations, which would require significant programming effort and processor resources if performed by the software.

XENIX is an enhanced version of the UNIX operating system originally developed by AT&T's Bell Telephone Laboratories. The system supports multiple foreground and background applications, a hierarchical file system, device independence, and a high-level procedural language. Designed to operate on the Personal Computer AT, XENIX is a multiuser, multitasked operating system for use by up to three users. The paper by Korn, McAdaragh, and Tondo reviews UNIX systems facilities and the XENIX system enhancements and architecture.

Technical professionals expect that the languages with which they are most familiar will be available in the workstation environment. They also require that the generated object code meet their performance and precision requirements. In addition, they may need compatibility with host systems facilities. From the point of view of the compiler designer this is in no sense an easily accomplished task. Three papers, by Ryan and Spiller, Roberts and Griffiths, and Tavera, Alfonseca, and Rojas, describe the unique design, implementation, and optimization features of IBM Professional FORTRAN, C, and APL, respectively.

The diverse workstation requirements of engineering and scientific users are most effectively met by a set of system, language, and application building blocks. Tools such as those described in this issue can then be integrated with host computing facilities or used in a stand-alone environment to meet specific user needs.

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