Preface

This issue is the first of a two-part set commemorating the twenty-fifth anniversary of the *IBM Systems Journal.* We are celebrating this anniversary with papers that reflect the diversity of topics now at the forefront of computing systems. These papers are clustered around the theme of *architecture*, which has shown a continuing evolution during the span of our publication.

When the *Systems Journal* first published in September of 1962, the IBM 7040/7090 systems were the focus of IBM's and our customers' attention. The announcement of the IBM System/360 was then twenty months in the future. The *Systems Journal* was created to convey the theory and application of computing to IBM's Systems Engineers and in turn to our customers in their combined efforts to expand the uses of information processing systems. Among the themes in these first few issues were several that have continued to this day: program development, operating systems, multiprocessing, availability and recovery, and large and small systems.

In 1972, the *Journal* refocused its contents to emphasize practical applications, rather than theoretical work, for a target audience of systems engineers, analysts, and users.

This focus has continued to the present, while our readership has widened to encompass a growing community of computing specialists in business, universities, and government. Much of this expansion is in response to the broadened needs of systems engineers, including system design and operation, installation management, and software selection and development. The *Journal* also seeks to provide systems engineers with an appreciation for ongoing research in computing. We hope these topics prove to be of value to all our readers, who hail from diverse disciplines and industries.

In this issue, the paper by Lorin provides a thoughtful perspective on the evolution of systems architecture as machines are interconnected in cooperating arrangements with differing needs for both central control and interaction. He discusses both hardware and software implications of unit structures, instruction sets, granularity of elements, memory sharing, and input/output architectures.

One of the most dramatic changes in computer architecture has been in the arena of architectures for hierarchical memory systems, file structures, and data bases. Workstations, mainframes, and control units are being designed with seemingly massive amounts of storage, yet applications continue to demand more. The paper by Matick examines the relationships and requirements of memory design with respect to the evolution of system organization and architecture.

Understanding the future implications of technology, and its impact on people, is an important aspect of systems planning. The paper by Doherty and Pope describes the results that have been observed in a research computing environment where increasingly responsive computing resources were provided. These observations offer a glimpse of what other professionals can expect in productivity gains as they too have available computing resources in more abundance.

Small systems have assumed an expanded role throughout the computer industry. They offer attractive capabilities as standalone single- and multi-user systems, as workstations to larger systems, and as shared network servers. The architecture and design of these systems within IBM is discussed by Henry. One can observe that major changes in technology, demands, and applications for these systems have occurred. The paper describes how system design has responded to these major factors, and discusses continuing trends.

Among the papers in the first issues of the *Systems Journal* was one on decision tables which reflected a

new technique for the then-current state of the art of software development. The decades since have brought about a degree of consensus on the practices and principles by which software projects can be planned and executed with reasonable expectations of success. In his paper, Goldberg takes a look at the history and future of Software Engineering as it attempts to move software development from an art to a discipline that can consistently generate products that are on-target, understandable, reliable, and maintainable.

As batch systems have been replaced by on-line systems, and these have in turn migrated to workstation-supported systems, the design of the user interface becomes increasingly important. Developers are continuing to gain an appreciation for the often subtle differences between ease of learning and ease of use—particularly when users have diverse backgrounds, interests, and skill levels. The paper by Bennett develops the concept of the User Interface Management System to separate the application software from details of the user interface.

Aschenbrenner, in his paper on Open Systems Interconnection, discusses international communications standards and provides an IBM view of OSI and its relationship to Systems Network Architecture.

The technology of digital electronics has blurred the distinctions that previously separated the processing of analog voice and digital data signals. The paper by Kasson describes the ROLM CBX II, a solid-state circuit-switched Private Branch Exchange that provides advanced voice services together with a workstation attachment alternative to LANs and direct host system attachment.

A view of the era of the *Systems Journal* would not be complete without a discussion of the advances in input-output facilities that have supported the productivity gains based on improvements in processors and memory. The paper by Mayadas and his colleagues chronicles the evolution in printers from electromechanical to electrophotographic technologies, and in terminals from typewriter-like devices to high-function graphics units.

The system trends of providing increasing capability in smaller packages at lower cost have continued and are opening new horizons in system design. With the recently announced IBM 9370 series of System/370-compatible processors, it is evident that we will be seeing the creative use of mainframe-oriented systems economically dedicated to the needs of the individual, the application, or the small work group.

The opportunities for new applications and delivery systems abound; the combinations and choices are many; and the challenges have never been greater! The *IBM Systems Journal* is looking forward to bringing you insight into designing, programming, managing, and using the expanding set of building blocks available to our industry.

Gary Gershon
Editor