Preface

This issue contains papers on seven subjects: the evolution and design of user interfaces such as the Common User Access* (CUA*) Workplace Model, the Distributed Data Management (DDM) architecture and its implementation in the Customer Information Control System (CICS), a discussion of the data description and conversion architecture and data language that has been adopted for Systems Application Architecture* (SAA*) programs, a heterogeneous multiprocessing environment resulting from the creation of a System/370* and Personal System/2* BiProcessor, Project Athena** and its impact on distributed computing, considerations for the design of distributed applications, and the extension and formalization of Zachman's information systems architecture.

The first subject is the evolution and design of user interfaces, such as the Workplace Model for Common User Access (CUA), which is covered in two papers. Berry and Reeves describe the influences, technological shifts, and factors that can be observed in the evolution of the CUA Workplace Model, showing how interface designs and styles are affected over the long term. They relate their discussion to the implementation of the Workplace Model in the OS/2* Version 2.0 Workplace Shell*. The paper also describes many of the features of the model and their evolutionary origins.

The second paper on user interfaces, by Berry, provides an introduction to three types of interface models—the user's conceptual model, the interface designer's model, and the programmer's model—and the ways in which those models influenced the rationale and design of the CUA Workplace Model. An extensive description is given of the designer's model for the Workplace Model, showing its object orientation and presenting its features and capabilities from the designer's viewpoint.

The next two subjects are Distributed Data Management (DDM) architecture and the data description and conversion (DD&C) architecture with its data language, which are treated in a series of three papers. The first paper in the series addresses the evolution and framework of the DDM architecture as a suite of five layers for distributed application services within the object-oriented paradigm: the distributed system layer, the client/server layer, the manager layer, the object layer, and the data layer. Demers, Fisher, Gaitonde, and Sanders show the architecture of each layer and the services that each provides for the user and for each other.

The second paper in this series, by Demers and Yamaguchi, provides the rationale, a description of the architecture, and a discussion of the data language for enhanced data interchange as adopted for Systems Application Architecture (SAA) environments. The resulting DD&C architecture is supported by A Data Language (ADL) that treats both data description and data conversion, an efficient method for encoding ADL, and programs that translate between ADL and other programming languages.

The final paper in this series shows how heterogeneous and distributed files are supported in online transaction processing systems such as the Customer Information Control System (CICS) through the provision of data management capabilities by CICS/DDM. Deinhart discusses the merger of CICS and the DDM architecture, and the resulting benefits for transaction processing and for SAA.

The remaining four papers treat separate subjects. Berggren presents the results of the creation of a heterogeneous multiprocessing environment by the connecting and merging of a System/370 and a Personal System/2 into a Bi-Processor. The closely coupled connection is effected by a high-speed pipe, which allows each processor to take advantage of the other's capabilities without inhibiting the capabilities of either one. This is termed concurrent coprocessing. Objectives of this project and possible applications are described.

Project Athena started in 1983 as an initiative of the Massachusetts Institute of Technology (MIT), with the support and cooperation of the Digital Equipment Corporation (DEC) and IBM. The goal was to provide distributed computing services on MIT's campus and to learn what would be required of such broad distributed systems in the future. Arfman and Roden discuss the origins of the project, the realization of the goals over the next decade, and the evolution to the mature, heterogeneous, distributed computing environment that exists today. Many other technical projects, standards, and products had their start as part of Project Athena.

As more and more systems and programs either operate in a distributed processing arena or become inherently distributed in their structure, programmers will need to understand the considerations that affect the design of distributed applications. Rofrano presents the results of an extensive exploration of these design considerations, including the questions of data placement, function placement, and design methods. He treats the fundamental tradeoffs that must be addressed for the design of any distributed application, and especially for those operating in a heterogeneous machine environment.

Sowa and Zachman provide an update, extension, and formalization of the information systems architecture (ISA) first presented in these pages in 1987 by Zachman and widely adopted and accepted thereafter. The extensions address the who, when, and why dimensions that were not part of the original model showing the what, how, and where dimensions of information systems design. The formalism is represented by conceptual graphs.

The next issue of the *Journal* will be devoted to European cooperative efforts involving IBM, in this noteworthy year for Europe's future—1992.

Gene F. Hoffnagle
Editor

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It has come to our attention that one of the papers in our special issue on APL (Volume 30, Number 4, 1991)—"Extending the domain of APL" by M. T. Wheatley—was published in "APL-ication Conference Proceedings" (1988), edited by P. Goacher under the auspices of the British APL Association. As a refereed, archival journal it is not our practice nor intent to publish material that has appeared before in a public medium, whether copyrighted or not. Quoted passages and specialized figures may be reprinted with approval of the editor and submission of any required permissions. Authors bear the responsibility for submitting only original, unpublished work and for informing the editor whenever that work has been submitted elsewhere for simultaneous or prior consideration.—Ed.