JANUARY 1980

PRESIDENT’S MESSAGE (p. 3) “The IEEE Computer Society has experienced another prosperous year. Our membership has increased further and is expected to exceed 45,000 in January 1980. Our activities have also grown. ... Our publications sales have also increased tremendously over those of a year ago. As a result of all these efforts, last year’s planned deficit turned out to be a surplus!”

WINDOW ON THE ’80s (p. 6) “The 80’s will be the decade of the computer—the time when hardware technology will not only enhance the price and performance of existing applications but also propel the computer into areas previously unimagined. It will be the decade of the democratization of the computer.

“Computer scientists and engineers are especially fortunate. They will be the cutting edge of a technological revolution that will have the profoundest economic, social, and political consequences. They will shape that revolution and have a chance to see how it turns out—not within their lifetimes but within half, or even less, of their lifetimes. It is the rarest of opportunities.”

MOS SCALING (p. 13) “While ‘stuffing’ is already the preeminent trend in MOS process evolution, many problems are involved in translating the basic principles of MOS scaling into practical products.”

“With MOS, however, past is prologue. Its unbroken record of technical success is perhaps the best indicator of its future ability to solve the problems of scaling.”

SOFTWARE ENGINEERING (p. 14) “By the end of the decade, advances in areas such as structured programming, specification, verification, and language design will have transformed programming into a true engineering discipline.”

COMPUTER EDUCATION (p. 45) “There are no easy solutions to the problems teachers of computer science will face in the 80’s. Many of these problems already exist—others can only be glimpsed. ...”

“It will take the efforts of all concerned persons to tackle these problems. We can’t afford to wait for ‘some agency’ to do it. Moreover, if there is any one central theme to this paper, it’s this: Computer education is interdisciplinary. It will only flourish if people and organizations work together. As is the case with most problems, cooperation is the key to success.”

MICROPROCESSOR LANGUAGES (p. 48) “… In any case, no fewer than 20 different languages or dialects are in use on today’s microprocessors. Not surprisingly, the sales literature in this field is laced with confusing or conflicting acronyms and terminology. All in all, the time seems right for an orderly classification of the subject.”

FLOATING-POINT ARITHMETIC (p. 68) “This is an implementation guide to a draft standard before an IEEE subcommittee whose goal is to standardize binary floating-point arithmetic for mini- and microcomputers. The purpose of the standard is to assure a uniform floating-point software environment for programmers. It may be implemented entirely in hardware or software or, as is most likely, in a combination of the two.”

CONFERENCE REPORT (p. 101) “In his analysis of software engineering as it is in 1979, [Barry] Boehm described a sample of software engineering practices used in the western United States. Evaluating current practices with respect to the lessons learned in the past few years, he concluded that ‘good’ software engineering practices are being applied scarcely 50 percent of the time.”

DOCTORATE DIAGNOSIS (p. 104) “There are too many PhD programs in computer science in the United States. This statement may seem absurd at first reading. There are about 75 computer science PhD programs, a number which has been growing slowly over the last 15 years. Currently, these programs produce approximately 350 PhD holders each year, but there are employment opportunities for more than 3,000.”

MINICOMPUTER (p. 109) “A general-purpose minicomputer available from Digital Equipment Corporation in standard system configurations or as a separate central processing unit, the PDP-11/44 features a maximum memory of one megabyte, an integral 8K-byte cache memory, a microprocessor-controlled programmer’s console with built-in diagnostics, and provisions for optional floating-point and commercial instruction set processors.”

UNMASKING (p. 114) “IBM scientists have developed an experimental laser-enhanced electroplating technique that could eliminate the need for the overlaid masks currently employed in conventional IC fabrication.”

PDFs of the articles and departments from Computer’s January 1980 and 1996 issues are available through the IEEE Computer Society’s website: www.computer.org/computer.
PRESIDENT’S MESSAGE (p. 6) “The IEEE Computer Society traces its origins to the 1946 formation of the Subcommittee on Large-Scale Computing Devices of the American Institute of Electrical Engineers (AIEE), one of the two organizations that merged to form the IEEE. This year, we celebrate our 50th anniversary, and it is a humbling task to assume the presidency of the oldest and largest association of computing professionals in the world on this auspicious occasion.”

LOOKING BACK (p. 7) “So, just as all of us individually celebrate the anniversaries of major events in our lives ... the Computer Society too celebrates one of its several anniversaries in 1996. As a small part of that celebration, Computer will publish a page each month entitled ‘looking back,’ in which we recognize the significant events of computer history that occurred in that month.”

THE INFO AGE (p. 13) “The next time you read about a merger between two fierce competitors in the computer industry, remember the Lanchester Strategy and the rules of the game. The winner is the one that ends up with a 73 percent market share. Using other people’s money to buy companies is perhaps the easiest way. But it all depends on where you want to go—up or down?”

MANAGEMENT SOFTWARE (p. 14) “No matter how quickly vendors roll out their products, independent industry analyst Rob Enderle said, a vendor’s solution must be endorsed and actively supported by Microsoft for it to be successful. Without that, upcoming versions of the operating system and the system management solution will lag behind and bugs will be difficult to work out.”

UNIVERSAL E-MAIL (p. 16) “The study concluded that full implementation of universal e-mail could take a decade or more. It said the US government could pay about $1 billion annually to subsidize current household access. However, at least some of that total could be offset by ‘commercial experiments,’ such as providing free e-mail to anyone willing to accept advertising.”

MEDICAL PROCEDURES (p. 20) “… Stunning, in vivo anatomic presentations from computed tomography (CT), magnetic resonance (MR), digital ultrasound, and other forms of computer-assisted diagnostic radiology have captured subtle disease processes never before seen so early in development. Such presentations have helped physicians finally understand complex disorders in a vivid three-dimensional context. But how do these pictures affect the patient’s overall quality of care?”

A MODEL BODY (p. 25) “Neither superhero nor crash-test dummy, Voxel-Man is an attempt to combine in a single framework a detailed spatial model enabling realistic visualization with a symbolic model of the human body.”

SURGICAL REHEARSAL (p. 39) “Doctors use interactive technology and computer-generated 3D images of patients’ bodies to plan and rehearse surgery, so it will be more effective, less risky, and less expensive.”

BRAIN NAVIGATION (p. 48) “An orientation device to aid physician accuracy in brain surgery has been developed by combining 3D position measurement techniques, digital image processing, and 3D display techniques.”

CARDIAC ASSESSMENT (p. 55) “New imaging and computerized visualization technology may let doctors replace today’s multiple costly heart exams with one procedure, making it easier and more economical to diagnose heart disease.”

MICRO MACHINES (p. 93) “In the past few years, the field of micro-electromechanical systems (MEMS) industry has exceeded the $1-billion-a-year mark. Some economic forecasters estimate that the industry will surpass $14 billion by the year 2000. The reason for this tremendous growth is the enabling nature of MEMS, which give engineers and researchers the tools to build things that have been impossible or prohibitively expensive with other techniques.”

PROCESS IMPROVEMENT (p. 95) “Significant software improvements do not occur at random. By generalizing the patterns used by the most successful companies, we see that the initial activity is an assessment and a baseline, followed by a six-stage improvement program.”

DOMAIN NAMES (p. 110) “The registration policy for domain names on the Internet began simply enough: first come, first served. This policy worked fine until recently, when the number of commercial forces—addresses ending with ‘.com’—skyrocketed. In just the past year, .com registrations have shot up from 18,000 to more than 82,000. …”

EDUCATION (p. 136) “What would such high-tech education accomplish? Visualize this: All eight-month-old babies are supplied with motorized wheelchairs. They will quickly learn to push the right buttons and gain a ‘control over their own destiny’ that leaves crawlers in the dust. And given enough power, they’ll leave behind their own parents. So what if they will never walk? Oh, brave new world!”

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