SPECIAL MESSAGE (p. 7) “... With the advent of computer engineering departments at the universities and the growth of software engineering, the institute should encourage maximum participation in this exciting new area. Now might be the time to consider changing the name of the institute from the Institute of Electrical and Electronics Engineers to the Institute of Electrical and Computer Engineers. In my opinion this would encourage increased participation of the computer professional in both the Computer Society and the IEEE.”

BALLISTIC COMPUTING (p. 37) “One of the world’s most complex undertakings in the past two decades has been the US Army Ballistic Missile Defense Program. A critical part of the large research and development investment in this program has been the effort to develop data processing hardware and software technologies to meet the computational challenges of this incredibly complex problem. The demands for a computing system that will deliver a throughput of hundreds of millions of instructions per second at some undetermined point in its life cycle, with a high confidence that correct execution will occur, challenge even the most advanced technologists.”

SUPER DATA FLOW (pp. 48-49) “Data flow architectures offer a possible solution to the problem of efficiently exploiting concurrency of computation on a large scale, and they are compatible with modern concepts of program structure. Therefore, they should not suffer so much from the difficulties of programming that have hampered other approaches to highly parallel computation.”

DISTRIBUTED TASKS (p. 57) “… Distributed processing applications range from large data base installations where processing load is distributed for organizational efficiency to high-speed signal processing systems where extremely fast processing must be performed in a real-time environment. But, like any new concept, distributed processing has problems which must be solved before it can become part of the accepted processing repertoire of system designers.”

VECTOR COMPUTERS (p. 82) “Improvements in the second generation of vector supercomputers include such hardware features as extensive use of LSI memory chip technology, improved memory management to enhance throughput performance, better designs to link and chain execution strings within the CPU, and much higher effective-speed I/O operations integrated into the architecture. Improved software items are a result of both better-working hardware and better compilers. …”

BUSINESS COMPUTING (p. 84) “In spite of the advances made in the past 33 years, business computing is far from being a mature technology. The advances to come in the next 33 years at the technical, business, and social levels can reasonably be expected to match those achieved so far.”

SYSTEM PACKAGING (p. 100) “… As semiconductors in electronic equipment go to VLSI ... a greater percentage of total system cost will be in packaging, a greater percentage of total design and manufacturing delay will be in packaging, and a greater percentage of the cost of testing solutions will be affected by packaging technology. For these reasons, the system packaging engineer will most certainly be needed to ensure system manufacture at reasonable cost.”

WHISTLE BLOWING (p. 104) “I am occasionally consulted by junior employees concerning ‘whistle blowing’—whether the employee, or ‘a friend of his,’ should tell management about another employee’s illegal, unethical, or dishonest action. Responding to such an inquiry is not easy—a company’s high principles are not always universally respected by management in practice and often the farther down in the management chain one goes, the greater the divergence between principles and practice. Consequently, I was delighted to discover an article on the dangers of whistle blowing to which I now can refer inquirers …”

COMPUTERS AND GOVERNMENT (p. 121) “Definition of government’s role is the key to the effective implementation of information technology, but [Simon] Ramo sees five obstacles to the crystallization of that definition: (1) the government is fragmented, (2) it is subject to short-range pressures, (3) bureaucracy is not well-suited to solving complex problems, (4) government tends to be equivocal and unclear, and (5) it has trouble attracting and retaining experts in this difficult-to-comprehend technology.”

OFFICE COMPUTERS (p. 122) “Office procedures will change considerably through the 1980s in response to technological evolution. Four new market research reports measure the impact of voice-activated typewriters, advanced imager/processors, falling disk drive costs, and shifting DP maintenance cost policies.”
TIME SHARING (p. 6) “One programming language, JOSS (Johnniac Open Shop System), does have a specific birth date—November 7, 1960. JOSS was developed by J.C. (Cliff) Shaw at Rand Corporation to give users a hands-on connection to a computer at a time when operating systems had become the major management tool of computing center directors to speed up program turnaround and eliminate programmers’ direct use of the console. JOSS allowed 12 (apparently) simultaneous users on a machine, preceding by a year Fernando Corbató’s invention of time-sharing.”

SECURITY (p. 8) “The CERT Coordination Center’s collection of software vulnerability data provides empirical evidence that vendors continue to release software containing essentially the same classes of security flaws, repeatedly, year after year.”

SURVIVAL (p. 10) “Tools that solve general problems efficiently live forever. We still compute with transistorized binary logic circuits, and we will be doing so 20 years hence. Consequently, back-end software will be written in C 20 years hence because C can efficiently map a general class of procedural algebraic problems onto transistorized binary logic circuits.”

THE TELECOMMUNICATIONS ACT (p. 16) “… it is unclear what the Telecommunications Act’s long-term effects will be and whether the law will fulfill its promise. And under any circumstances, it looks as though consumers should not look for the large-scale development, introduction, and deployment of new technologies in the near future.

“This will be the case partially because many telecommunications companies will be busy in the near future pursuing lawsuits, looking for partners, and figuring out what they need to do to cope with the Telecommunications Act.”

PROGRAM ERROR (p. 20) “An inquiry has revealed that a software design error and insufficient software testing caused an explosion that ended the maiden flight of the European Space Agency’s Ariane 5 rocket less than 40 seconds after liftoff on June 4, 1996.”

Y2K (p. 21) “The US government says it may have to spend up to $30 billion to make sure its computers can cope with the Year 2000 problem. Others think the cost could run even higher.”

THE PENTIUM PRO (p. 47) “Intel designed the Pentium Pro processor to be used gluelessly (without extra chips) in shared-memory multiprocessor systems. Our task was to validate that multiple Pentium Pro processors and the 82450GX chipset would function correctly and perform as specified in such systems.”

ENGINEERED TESTING (p. 61) “Software-reliability-engineered testing combines the use of quantitative reliability objectives and operational profiles (profiles of system use). The operational profiles guide developers in testing more realistically, which makes it possible to track the reliability actually being achieved.”

RELIABILITY PREDICTION (p. 69) “Critical business applications require reliable software, but developing reliable software is one of the most difficult problems facing the software industry. After the software is shipped, software vendors receive customer feedback about software reliability. However, by then it is too late; software vendors need to know whether their products are reliable before they are delivered to customers. Software reliability growth models help provide that information.”

MEASURING QUALITY (pp. 78-79) “… The traditional algorithms and metrics from the hard engineering disciplines either come up short when applied to software or are easily misapplied. Software engineering is a discipline that is largely nonparametric and resistant to traditional modes of analysis. Unquestionably, we need common methods of determining the business value of software. We must also generate and promote the human factors and activity statistics necessary to manage and steer software development.”

ELECTRONIC TRANSACTIONS (p. 92) “Possibly in reaction to the Netscape-MasterCard alliance, Microsoft and Visa began to develop a competing electronic transaction standard, the Secure Transaction Technology. Later, Netscape and MasterCard accused Visa and Microsoft of planning to charge a royalty for each use of their standard. Eventually the differences were resolved, and in February MasterCard and Visa agreed to support a royalty-free standard called Secure Electronic Transactions.”

THE VIRTUAL UNIVERSITY (p. 95) “Following the Monterey conference, a group of higher education network leaders reviewed the technical requirements for the virtual university and for today’s research community. They determined that by the year 2000, higher education will require an advanced, open, internetworking fabric.”

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