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LOOKAHEAD (p. 24). “Speed advances were provided in the third generation of computers. Since then, an order-of-magnitude improvement in speed has been achieved in logic circuitry. A high-speed parallel arithmetic unit can perform a complete operation in 80 nanoseconds; main memory, with the help of high-speed buffers, can produce operands or instructions in 80 nanoseconds. Why should the arithmetic unit have to wait for several cycles before it gets each instruction and the operands for it? To improve this situation, lookahead control was developed and performs these functions:

- fetches instructions in advance continuously;
- validates each instruction as encountered;
- obtains operand addresses and operands for preprocessed instructions;
- prepares for the alternatives of branching.”

COMPUTER SCIENCE FACILITIES (p. 46). “The long-range plans for a [computer science] laboratory should take into account the need for a ‘critical mass’ of equipment in the initial stages, followed by a pattern of incremental growth. Though a laboratory can begin with a minimal configuration (CPU and teletypewriter), it is very difficult to motivate other faculty to take advantage of such a limited resource, especially if they are accustomed to the amenities provided by the large central system. The critical mass could be defined as that configuration required to comfortably support an interesting operating system. It would usually include a CPU with at least 48K bytes of memory, a disk, a medium-speed card reader and line printer, a teletypewriter, and a CRT.

“It is necessary that the curriculum be changed to reflect the laboratory aspects of computer science. . . .”

TECHNICAL WRITERS (p. 51). “… Writers ought not to be assigned to document projects that already are completed. It is hardly ideal for a documentor to discover a bug and find that the code is already sealed and the programmers on the golf course. Writers should be made an integral part of product development. They should be present when programs are designed so that—serving as user and reader advocates—they can immediately point out inconsistencies or ambiguities or illogicalities, and these flaws can be corrected at once and never need reach the pages of the book to darken the reader’s eye.

“The problems with flawed manuals, then, are frequently really problems of a larger nature that go beyond the writer. Solutions are possible, however, and the technical writer can play an integral part in bringing them about.”

INTELLIGENT TERMINAL (p. 59). “The Digital Systems Division of Texas Instruments Incorporated has announced an intelligent terminal in its ‘Silent 700’ Series, the new Model 742 Programmable Data Terminal. . . .”

“The key feature of this new terminal is its built-in, byte-oriented microprocessor. The microprocessor and 10K memory provide the user a complete tape cassette operating system with programmability. Because the operating system resides in read-only memory, it is nonvolatile and therefore survives power failures. The Model 742’s powerful TICOL language (Texas Instruments Cassette Operating Language) allows users to generate ‘fill-in-the-blank’ data entry forms; check data for type, size and range; perform standard arithmetic functions; and format data for the user’s system. Data collection may be batched independently of the central computer facility with transmission of previously prepared data occurring simultaneously.”

LIBRARY OPERATION (p. 63). “With a mere sweep of a light-pen scanner, a University of Chicago student this winter can charge out a book from any of several library sites.

“The process is called ‘wanding,’ but there is nothing magic about it. A team of University library specialists has spent $1.7 million in grants over the past eight years to develop what they describe as the most advanced library system under development anywhere.

“The system permits any library operation, from circulation desk to acquisition department, to query the computer, add new data, or update previous entries.”

BAR CODE CHECKOUT (p. 64). “Customers at a Marsh supermarket in Troy, Ohio are pushing their shopping carts right into the computer age.

“Marsh is using electronic scanners instead of ringing up groceries the old-fashioned way.

“Checkout operators merely pass packages over a small glass panel in the checkout stand, exposing the printed bar code to the scanning device. The checkout terminal emits a beep, and the price is flashed on a digital display panel and is added to the total.”

THE SOLAR HOME (p. 65). “An experimental home shown at the 1974 Ohio State Fair . . . was not unlike other modern dwellings in appearance. But this home was heated and cooled by the sun and had a computer in the garage. It should make a significant contribution toward solving the nation’s energy problems.

“Homewood Corporation, the builder, says it can be marketing solar homes within 20-24 months if no major problems occur during testing. They are expected to sell in the $30,000–$50,000 price range.”

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IEEE STANDARDS (p. 7). “The IEEE Computer Society sponsors a large and growing standards program. From a handful of volunteers working on computer terminol-
“Our objective is to provide a forum for professionals to develop needed, high-quality technical standards to serve world-wide providers, users, and implementors of information technology. All of our working groups are open. Anyone can attend the meetings; we have participants from and hold meetings in many countries around the world. Many of the standards developed under Computer Society sponsorship are adopted by international standards organizations.”

**HYPERCUBES AND DATABASES** (p. 13). “...Like other architectures with distributed memory and resources (‘shared nothing’ architectures), hypercube systems can support the high I/O bandwidth required for database processing. However, unlike other architectures, hypercubes are scalable to thousands of nodes. For example, NCube Corporation currently manufactures hypercubes comprising up to 8,196 nodes. These engines can provide large-scale concurrency for both interquery and intraquery processing, and are well suited for such computationally intensive processing as protocol verification using database technology.”

**KNOWLEDGE BASES** (p. 57). “Knowledge-based and database technologies will have to work together. For knowledge-based technology to achieve its potential, knowledge base specialists must take traditional database concerns seriously. And database specialists, to implement expert databases on machines, need to understand what a chunk of knowledge is. In this sense, the technologies converge. Nevertheless, their interests and research directions diverge. The knowledge base specialist focuses on knowledge-level questions: What sorts of knowledge chunks are there? Which are appropriate for specific domains? The database specialist focuses on data-level issues: how to define, store, retrieve, and manipulate different kinds of knowledge chunks under the constraints of a working database system.”

**STANDARDIZATION IN JAPAN** (p. 87). “Industry standardization in Japan can suddenly unlock a potential market, leaving unprepared companies ill-equipped in the path of massive Japanese competition. Some may remember what happened in the American facsimile machine market 10 years ago. American-owned facsimile machine makers did not agree on a communications standard. Consumers were deterred by an expensive machine that could not communicate with anyone except the user of the identical make.

“In 1981, however, Japanese companies adopted the G III standard for facsimile machines, making it possible for one G III machine to communicate with many different makes and models of other G III machines.”

“Today, most offices in America use their fax machines frequently, and the convenience of being able to send a fax without worrying about incompatibility is widely appreciated. However, there haven’t been any American-owned manufacturers of commercial facsimile machines left in the United States for many years.”

**COMPUTER SECURITY** (p. 92). “Computer security is primarily an issue of sound managerial practices. Technological solutions can help, but these resources must be used within the context of a computer security strategy that management must set and enforce.

“It would be unwise to disproportionately commit resources to problems that, while intriguing, are of relatively incidental importance. The greatest return on investment will come through a management approach to controlling employee errors. Computing systems can, at best, provide only a limited and secondary means to manage and govern the actions of those who use them.”

**FLASH MEMORY** (p. 103). “The Flash Memory Card is a memory card based on flash memory technology. Flash memory is nonvolatile (it retains data when the power is turned off).

“Intel says the credit card-sized package increases a portable PC’s performance and durability, while reducing its power consumption (compared with traditional mechanical disk drives).

“Intel claims that portable PCs using flash memory could see a 10- to 100-fold increase in battery life over portable systems using mechanical memory devices, ...”

**A FLEXIBLE PC** (p. 106). “Compaq says its LTE 386s/20 notebook computer is the first commercial computer product to use ‘rigid flex’ technology that incorporates both rigid and flexible materials in one continuous sheet. The computer’s circuit board thus folds in half to save space and uses flexible interconnections instead of detachable cables.

“The 8.5 × 11-inch, 7.5-pound notebook PC is based on a 20-MHz Intel 386SX. The computer includes either a 30- or 60-Mbyte fixed disk drive, VGA display, a cache memory controller, a 3.5-inch floppy disk drive, 2 Mbytes of RAM (expandable to 10 Mbytes), an nickel-cadmium battery pack, and an AC adapter.”

PDFs of the articles and departments from Computer’s November 1990 issue are available at www.computer.org/computer.

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