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MAIN MEMORY (p. 21). "The cycle time of main memory is mostly dependent upon the speed of the storage medium. As the main memory technology moved from magnetic drums to magnetic cores and on to semiconductor memories, the speed of the medium saw dramatic improvements from the milliseconds to the microseconds and on down to nanoseconds respectively. This certainly improved the data transfer rates considerably. However, it is questionable whether it will continue to have such great influence in the future since we are now approaching the limits of nature with semiconductor memories in the range of a few nanoseconds. Memory component technology, though, will continue to make progress, but it is expected to have much greater impact on the economic aspects of main memory systems rather than bandwidth."

MASS STORAGE (p. 29). "For the foreseeable future, magnetic recording will remain the technological base for mass storage. Magnetic recording enjoys a wide base of technical expertise and associated manufacturing facilities, and derives intense stimulation from the computer industry as well as the audio/video recording industry.

"Fifteen years ago, the highest storage density in a commercial disk file was 2,000 bits/in.^{2} (Ramac). Today this figure is about 2 ¥ 10^6 bits/in.^{2} (IBM 3340)—an increase of three orders of magnitude. Progress commensurate with that made in the past also appears attainable during the seventies."

MAGNETIC BUBBLES (p. 36). "By far the most promising magnetics technology for future memories is that involving motion of magnetic domains ('bubbles') in thin films of magnetic garnets. This new technology, which is still very much in the laboratory stage, offers the prospect of several million bits per square inch on substrates 0.1 inch to 1 inch square. Stored information is non-volatile if a uniform DC magnetic field is maintained."

DATA TERMINAL (p. 39). "Teletype Corporation has announced a new set of data terminals known as the Model 40 system. The Model 40, in its current, basic offering, includes a new, medium-speed impact printer, a volatile display and a full ASCII keyboard. Designed as part of a modular system, each device can be combined with any other to create a terminal tailored to the specific needs of the end user."

REMOTE DATA ENTRY (p. 41). "Interface Technology, Inc. has announced Model 720 and 721 compact Touch Tone generators that can be coupled acoustically to any standard telephone for transmission to a computer from remote locations. Bell System tones are produced through a 12-key Touch Tone pad. Both units operate from a regular 9-volt transistor battery and are completely portable."

80 COLUMN CARDS (p. 43). "Decision Data Computer Corporation has announced its entry into the 80 column OEM market with the introduction of four new machines.

"The keystone product in Decision Data's new line is the model 8010 Interpreting Data Recorder. The 8010 is the fastest 80 column card data recorder on the market as well as being the most versatile. The 8010 and its sister unit, the 8001 (without interpreting), have both on-line and off-line capabilities making them an important contribution to the Original Equipment Manufacturer market."

TORNADO SIGNATURES (p. 45). "Scientists at the National Severe Storms Laboratory (NSSL) in Norman, Oklahoma expect to be able to read the deadly signature of a tornado quickly on the display scope of a new radar processor. The processor °uses the Fast Fourier Transform (FFT) algorithm to sample radar signals in real time and to produce their frequency spectra.

"In the past, FFT processing of radar returns at NSSL has been possible only with fairly large computers operating 'off-line.' The processor developed by Technology Service Corporation is a self-contained unit that can be located at the radar site to process signals in real time, as fast as they are received."

AUDIO RESPONSE (p. 45). "The Valley National Bank of Arizona, Business Services Division, has used a Periphonics T-COMM 7 Data Communications Processor with audio response to implement a unique medical/retail billing service. The service is offered to doctors, hospitals, and retail stores requiring over a hundred customer or patient statements a month. Each day, customers call the computer using a touch-tone phone and enter debit and credit information on their day's activity. The audio response is used to step the customer through the proper data input sequence."

"As the customer enters the necessary data it is written on a disk. Once all of the data has been entered and the customer verifies that it is correct, the information is transferred to a tape. The tapes are used in the batch processing of the invoices. Valley National is currently processing over 200,000 invoices per month. The Bank's customers are enthusiastic about the service since it reduces their paperwork and has all of their invoices and statements mailed within 48 hours after the cut-off time."

SHIP DATA BANK (pp. 45-46). "An NCR Century 200 computer is expediting the 15,000 ship passages made through the Panama Canal each year.

"It accomplishes this through the use of a 'Ship Data Bank' which is believed to be the world's first fully comprehensive ship data system in an operating environment."

"To facilitate storage of the data, each ship is assigned a permanent identification number. This remains constant regardless of changes of name, ownership or flag.

"Using the number to find the stored data, the computer can automatically determine the number of pilots, towing locomotives, wires and tugboats needed for each vessel as it traverses the canal. These are based on the ship's length, beam, displacement and location of her bridge."

TRANSACTION MONITORING (p. 46). "Trans World Airlines has introduced the first computer communications system in the airline industry in New York to thwart the use of lost or stolen credit cards, bad checks and stolen or counterfeit tickets.

"TWA completed installation of TRW Validata, a real-time computer-based customer transaction monitoring system, in the New York metropolitan area in June. The system stored information on stolen tickets, delinquent accounts, worthless checks, lost and misused credit cards. These stored data result in the confiscation of dozens of tickets and credit cards and the refusal of an equal number of cards and checks per day."

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DISTRIBUTED SYSTEMS (p. 47). "A preemptive process migration facility in a distributed system dynamically relocates running processes among the component machines. Such relocation can help cope with dynamic fluctuations in loads and service needs, meet real-time scheduling deadlines, bring a process to a special device, or improve the system's fault tolerance. Yet, successful migration facilities are not common in distributed operating systems, due largely to the inherent complexity of such facilities and the potential execution penalty if the migration policy and mechanism are not tuned correctly. Not surprisingly, some operating systems terminate remote processes rather than rescue them by migration."

SOFTWARE ENGINEERING CURRICULUM (p. 59). "Industry is concerned that colleges and universities are not producing students who can work productively on industrial software projects. Recent graduates understand coding, compilers, operating systems, and Turing machines but not working in teams under real constraints. Somewhat oversimplified, industry needs software engineers, but universities are supplying computer scientists. Thus, it's time to promote widespread development of software engineering degree programs."

STANDARDS AND SOFTWARE (p. 72). "The typical project manager must produce important products with inadequate funding, impossible schedules, and limited staff.

"In preparing procurement documents, the project manager looks for quick fixes—things that do not take much thought to implement and that allow the project to immediately move ahead, meet the next milestone, etc. For example, tradition in the computer field holds that software will be a problem on every project, so the typical project manager will reach for the nearest set of software standards, write those into the contract, and rush off to the next problem. This is the point where standards may become the cause of problems they purport to cure."

MULTIPROCESSOR (p. 97). "Silicon Graphics has expanded its Iris Power Series with the Power Center 4D/280 and the Iris 4D/210. The Power Center, the new high end of the series, is an eight-processor system that reportedly achieves 160 MIPS and 28 Mflops of sustained performance. The Iris 4D/210, a midrange system, delivers 20 MIPS and 3.3 Mflops."

"The Power Center 4D/280 comes in a 62-inch high, 19-inch rack-mount chassis. Designed primarily as a server, it can house up to 4.8 Gbytes of disk storage, 128 Mbytes of ECC memory, and a variety of tape storage devices."

WIRELESS NETWORK (p. 99). "O'Neill Communications offers a Local Area Wireless Network, or LAWN, that combines very high frequency radio transmissions with menu-driven communications software for electronic mail, file transfer, and peripheral sharing. LAWN units attach to the RS-232 serial port.

"Each LAWN includes a radio transceiver, a microprocessor, memory for storing electronic mail when the computer is off, a 45-day battery backup for memory retention, and four radio channels."

PORTABLE COMPUTER (p. 100). "Zenith Data Systems says that the new Minisport is its smallest, lightest PC at less than six pounds. It measures 12.4 ¥ 9.8 ¥ 1.3 inches.

"The portable features an 8/4.77-MHz switchable 80C88-2 microprocessor, a 9½-inch backlit screen, a removable and rechargeable NiCd battery pack with Intelligent Power Management, an AC adapter/charger, a 9-pin serial port, a 25-pin parallel port, an RGB video port, a 20-pin floppy disk drive port, an internal modem slot, data transfer software, and an 80-key keyboard."

SOFTWARE ENGINEERING (p. 119). "Most software development shops have adopted development standards, generally consisting of a commercial project-management methodology such as SDM 70 and Method 1. I have observed that software developers find these standards cumbersome, since they generate overhead that reduces productivity and restricts creativity. In practice, adherence to these standards means that the software developers are using the documentation formats and meeting the procedural milestones of these methodologies, regardless of their appropriateness to the task at hand."

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