NASA opens supercomputer system

The National Aeronautics and Space Administration has put its Numerical Aerodynamic Simulation supercomputer system on line to scientists and engineers. With the new system — the world's most powerful supercomputer system — more than 150 scientists from NASA, the Defense Department, universities, and industry began running 97 research projects July 21.

Projects include the development of the NASA/DoD national aerospace plane, weather modeling, astrophysics, and computational chemistry. The system will be fully operational in March 1987 and will handle nearly 300 users.

The main computational engine in the system, a Cray-2 with 256 million words of memory, can perform a quarter billion computations per second. The system, based at the NASA Ames Research Center in Mountain View, California, is part of a NASA program to progressively incorporate the world's most advanced supercomputer technology and serve as a supercomputing pathfinder for government, academia, and industry.

NASA expects to add a second supercomputer, capable of a billion computations per second, within a year. The system's near-term goal is to have computers with a billion words of memory and an ability to handle four billion calculations per second.

NSF, ONR, DoD grant $28 million for computer research

The National Science Foundation has made five-year grants of $15.1 million to five universities to help establish and operate major experimental computer research facilities.

The Office of Naval Research has awarded $5.4 million to the University of Texas at Austin for research on the formulation and programming of parallel computations.

The Defense Department made a five-year $8 million grant to Princeton University to establish a turbulence laboratory in its applied and computational mathematics program. Much of the computational work will be done with supercomputers.

The NSF grant recipients are Cornell University, Indiana University, the University of Wisconsin, the University of California at Irvine, and Yale University.

The Cornell project involves the representation, construction, and manipulation of complex objects such as those in physical systems, formal proofs, and programming environments.

At Indiana University, the grant will be used to expand current facilities supporting research in the theoretical foundations of programming, functional languages for parallel computation, and tools to produce hardware and software from formal specifications.

The Wisconsin project will focus on parallel computing research, especially algorithm design. Yale's research concerns parallel multiprocessor-based computers.

The University of California will research four areas cooperatively: modeling and analysis, software development environments, advanced methods and tools, and measurement and evaluation.

Cray retains chess title

The Cray Blitz supercomputer chess program narrowly averted losing its world computer chess championship title at the world tournament. The June tournament was held in Cologne, West Germany.

Deleting four lines of code from the Cray Blitz supercomputer chess program's 28,000 lines in mid-tournament helped the program become the first computer chess player to win the world computer chess championship two years in a row.

After its first two games in a five-game tournament, Cray had just lost a game to a lightly regarded opponent. The four lines of removed code had originally been inserted when the program ran on a DEC VAX to overcome a weakness in evaluating pawn movements. The added four lines not only were unnecessary on the Cray, but actually slowed its performance.

The additional four lines of code may have been responsible for the Cray's loss at the national US computer chess championship to Carnegie Mellon's Hitech system, said Robert Hyatt, a graduate student at the University of Alabama who developed the Blitz program.

Removing the four added lines improved Cray's performance, letting it win its remaining three games. However, the loss in the second game forced Cray into a tie breaker against other entrants. It won, beating Hitech, BEBE, and Sun Phoenix.

Museum honors PC pioneers

The Computer Museum in Boston has honored personal-computer industry pioneers for their contributions to the microcomputer "revolution." The June 14 event featured the winners of a contest to locate unique relics of early computing.

Winners included John Blankenbaker, inventor of the earliest known microcomputer, the Kenbak-1, in 1971; Tri Truong, whose French-built Micral, marketed in 1975, was one of the first successful PCs marketed outside the US; Lee Felsenstein, designer of the Osborne 1; and Ed Roberts, developer of the Altair 8800 computer in the mid-1970's.
Visiting professorships

The deadline for applications to the National Science Foundation's visiting professorships for women is Oct. 1. Applicants must be woman scientists or engineers who want to undertake advanced research at a university or four-year college.

The visiting professors selected will also give lectures and provide counseling to both increase the visibility of women scientists in the academic environment and encourage more women to pursue science and engineering careers.

For more information, contact the program director, NSF Visiting Professorships for Women, Room 1144, NSF, 1800 G St., Washington, DC 20550; (202) 357-7734.

Program analyzes nuclear fuel loading

Using a computer program to determine complex core fuel requirements, researchers at Purdue University and Westinghouse have developed a safer and more efficient method for loading fuel into nuclear reactors.

The program is applicable to pressurized-water reactors, which account for 66 of the 99 US nuclear power plants.

A typical reactor with 200 fuel assemblies will have billions of possible loading arrangements, said Thomas Dowar, a nuclear engineering professor at Purdue. The time- and space-dependence and neutron absorbers for power control must also be determined for each possible fuel arrangement.

The new program lets designers analyze the possibilities and find an optimum arrangement based on economy and safety concerns, Dowar said. Westinghouse is now testing the program.

In addition to lessening the risks of loading fuel, the program can help optimize placement so control rods can more quickly reduce the reactor core's temperature during an emergency, reducing the risk of a partial reactor meltdown, like those at the Three Mile Island (Pennsylvania) and Chernobyl (USSR) reactors.

Magazine has new managing editor

Angela Reilly has been named managing editor of IEEE Software, Editor and Publisher True Seaborn announced. Reilly replaces founding managing editor Marilyn Potes, who now manages Computer.

Reilly had been assistant editor at IEEE Computer Graphics and Applications. She had also worked as assistant editor at IEEE Design & Test and IEEE Software.

Before joining the society's magazines, she had worked as an editor for several videotapes/electronic publishing ventures, including Time Mirror Videotech Services in suburban Los Angeles, Insourc in Dallas, and Belo Information Systems in Dallas.

Reilly received a BS in journalism and international studies from Iowa State University, where she concentrated on print journalism and Soviet studies.

NSF, ICOT begin cooperative effort

The National Science Foundation and Japan's Institute for New Generation Computer Technology (ICOT) have initiated a program that supports ICOT research by US computer scientists and engineers.

Under the agreement, the US will send as many as three researchers a year to ICOT, beginning in 1987. Proposals for support under the program are welcomed. For information, contact Y.T. Chien or Kent K. Curtis, Division of Computer Research, NSF, 1800 G St., Washington, DC 20550; (202) 357-7345 or 357-9747.

Information theory mimics living organisms

A theory of information processing being developed at the California Institute of Technology could lead to computers that handle information in the manner of living organisms. Although in its infancy, the theory of associative memory holds out the hope that computers may one day be able to easily and naturally recognize patterns, reconcile conflicting data, and find answers to "fuzzy" problems beyond today's digital machines.

Led by Caltech professor of chemistry and biology John Hopfield in collaboration with researchers at AT&T Bell Laboratories, work in associative memory seeks a mathematical model of the functioning of nerve cells that could be implemented in electronic hardware. Such a model works differently from the elementary circuits of digital computers that in operation are either switched on or off. Instead, associative memory components function like amplifiers and resistors, either increasing or damping the current that passes through them.

Using associative memory theories, circuit designers can devise a structure of amplifiers and resistors that implicitly contains a set of memories, much as the brain contains information in the neural synapses. Each memory that the circuit holds is spread throughout all its resistors; the resulting structure "remembers" the information by producing the desired output voltage when an input voltage pattern representing part of a stored pattern is fed into it.

Such circuits behave "biologically," Hopfield claims, remembering a whole piece of information from a partial "hint." For example, in one experiment Hopfield programmed a computer to simulate a circuit of 100 neurons with 10,000 interconnections. This simulated circuit produced strings of voltages that Hopfield assigned to letter sequences. When queried with a portion of the letters in a given sequence or with a sequence that contained some incorrect letters, the system recalled the entire word. Likewise, when fed ambiguous sets of letters, the system reconstructed all possibilities and chose the largest letter set among them—mimicking, Hopfield suggests, the brain's tendency to more readily recall more important (that is, larger) sets of information.

Other researchers working under Caltech professor Carver Mead have discovered the ability of such associative circuits to function at a reduced level in the presence of faults. Such "fail-soft" behavior is reminiscent of biological memories that degrade overall when damaged but do not usually forget specific data, as would a conventional computer memory. Because of this ability to withstand damage, associative memories could prove useful for mission-critical applications.