’76 NCC Features Record Program of 126 Sessions

A record program of 126 sessions is scheduled for the 1976 National Computer Conference, June 7-10 in New York City, according to conference chairman Dr. Carl Hammer. The ’76 NCC, sponsored by AFIPS and four of its constituent societies, will also feature the year's largest exhibit of computer hardware, software, systems, and services with 290 organizations occupying more than 900 booths on three floors of the New York Coliseum.

Rounding out the total program will be a series of eight full-day professional development seminars, a special “hands-on” demonstration of interactive computing using the nationwide packet-switching network of Telnet Corporation, plus a variety of special activities including a national student computer fair and a computer graphics art exhibit.

The conference program, under the direction of program chairman Dr. Stanley Winkler, is divided almost equally into three major areas—computers and people, systems, and science and technology. Each represents a major "conference-within-a-conference" of approximately 40 sessions in four tracks.

Computers and people will cover societal concerns, the computer profession, issues in computing, and important applications serving people. The systems area will focus on computer systems and their design, systems management, networking, and business and industrial systems. Science and technology sessions will review computer and data base architecture, software, and computer science and its applications.

A series of 28 mini-symposia, each consisting of a full day or a day-and-one-half of related sessions on a specific topic, has been scheduled throughout the ’76 NCC. The conference will also feature a special three-and-one-half day program on networking.

Under computers and people, mini-symposia will cover data security, public policy issues, computers and the physically handicapped, public access to computers, industry and university relationships, software productivity, criminal justice systems, and medicine and health care. In addition, a special Pioneer Day Program will honor the Moore School of Electrical Engineering, University of Pennsylvania, for its contributions in the development of ENIAC—the world's first operational electronic digital computer.

The systems portion of the program will include mini-symposia on computer system design, microprocessors, minicomputers, computer system management and planning, computer system performance and evaluation, word processing and office automation, computer-assisted manufacturing, and computer-controlled publication.

Science and technology will feature mini-symposia on computer architecture, database architecture, developing data base systems, software design and engineering, programming languages, mathematical programming, artificial intelligence, computer graphics, and computer studies in the humanities.

News from the AFIPS
Washington Report

U.S. Supreme Court Denies Software Patent

The U.S. Supreme Court has ruled in Dann v. Johnston that the program developed by Thomas R. Johnston is not patentable under existing law. The court did not reach the broader issue of software patentability even though it was specifically raised by the petitioner in the case, C. Marshall Dann, the commissioner.
of patents and trademarks. While the court very properly decided the case as narrowly as possible, i.e., on Johnston's specific application for patent as opposed to the broader question of software patentability, it could conceivably have reached the latter issue.

The Johnston Program. The Johnston program, which is being sold as a computer program to banks and data processing companies, would read a magnetically encoded digit on customer checks and interpret it as a specific category of expenditures. The program would then store and sort this information so that it could produce a periodic statement organized according to customer-specified categories.

Rationale Under Existing Patent Criteria. Under existing law, patent protection may be granted only to ideas which are new, useful, and non-obvious. Each of these criteria is a "term of art" in patent law, having a specific and detailed definition. "Non-obvious" is taken by the courts to mean that the subject matter sought to be patented must not be "obvious at the time the invention was made to a person having ordinary skill in the art . . ." The court found that Johnston's invention was obvious under this standard for two reasons: first, banks already use computers extensively to process customer account information (including processing multiple accounts for the same customer), and second, the Johnston application was quite similar to an existing system which used a computer to maintain account information for the various divisions of large business enterprises.

Status of Software Patentability. Under the new Supreme Court ruling, the availability of patent protection for software remains uncertain. While some observers view the court's limited holding, which did not rule against patentability of software, as an indication that it may be willing to allow patent protection for programs which meet the normal requirements for patentability, the point is conjectural at this time. Within the framework of the law as it now stands, however, it remains possible that the Supreme Court will ultimately rule in favor of software patentability.

FCC Chairman Announces Proposal for New Computer Inquiry

Speaking at the recent Fourth Annual Conference on Telecommunications Policy Research (cosponsored by the Federal Communications Commission and the White House Office of Telecommunications Policy), FCC chairman Richard Wiley announced his proposal for a new FCC "Computer Inquiry" which would re-examine the interrelationship between computer and communications technologies. Wiley is specifically proposing to the commissioners that the FCC initiate a notice of inquiry and proposed rule-making, and that it undertake a series of public sessions which would reach both the commercial and research communities regarding new technologies (both current and planned) and their applications. Particularly significant, Wiley indicated an innovative approach in which these public sessions would become part of the record in the formal Computer Inquiry proceedings.

The public sessions will be in two formats. First, Wiley indicated that he would propose a "Future Planning Conference" which would be oriented toward new developments in computer communications and their impact on FCC regulatory responsibilities; while the Future Planning Conferences are not themselves new to the FCC, Wiley's proposal to incorporate the transcript of the conference into the Computer Inquiry record represents a novel approach to obtaining technical information from the research community, which is not normally a party to FCC proceedings. Second, Wiley described a proposed "Commission Demonstration Program", which would supplement written comments submitted in the course of the Computer Inquiry with live demonstrations and debate regarding communications equipment (including terminal devices). This program would attempt to elicit information pertaining to vendors, users, and uses of such equipment; vendors would be allowed to comment on their own as well as competitors' equipment.

OTP Comments on Federal Reserve's Proposed Regulation J

The White House Office of Telecommunications Policy recently submitted comments on the Federal Reserve Board's proposed Regulation J (Computer, May 76, p. 5). OTP's comments indicated concern that the proposed changes would permit the actual provision of EFT services by the Federal Reserve, an activity which would be "inappropriate and unwise." In a letter to the director of the AFIPS Washington Office, OTP acting director John Eger described OTP's specific concerns:

"First, we have been witnessing for some time the steady development by the private sector of the generic type of services now proposed by the Federal Reserve Board. There do not appear to be any economic or technological reasons for the Federal Reserve to involve itself in the actual provision of these services. Accordingly, absent any compelling justification for government entry into this market, the private sector should be left to provide electronic funds transfer services in an environment that is free from government operational involvement.

"Our second concern relates to the control of and access to the comprehensive body of sensitive and confidential financial information that will eventually be carried by electronic funds transfer systems. Operation of such systems by the Federal Reserve would give it direct and automatic access to this information. We seriously question the wisdom of creating an environment wherein a government agency would have such ready and unprecedented access to this vast amount of information concerning the day-to-day financial affairs of the public."

President Signs White House Science Adviser Bill

President Ford has signed a compromise version of legislation to establish a White House science adviser, passed by the House and Senate on April 26. It was anticipated that the President would sign the bill, since the compromise version was without most aspects of the Senate bill which he had found objectionable (Computer, Feb. 76, p. 3). President Ford is expected to name the new science adviser very shortly; amid various rumors, Dr. Simon Ramo of TRW is considered to be a leading candidate for the new position.

The compromise bill* will give the new White House Office of Science and Technology Policy relatively limited budgetary authority, to "advise the President on scientific and technological considerations with regard to Federal budgets, and assist the Office of Management and Budget with an annual review and analysis of funding proposed for research and development in budgets of all Federal agencies" (emphasis supplied). The bill creates a President's Committee

*Available from the AFIPS Washington Office, 2100 L Street NW, Washington, DC 20037.
Communications Reform Bills Generate Growing Controversy

The Consumer Communications Reform Act of 1976, a bill which would radically modify to the benefit of AT&T recent FCC policy on specialized carriers and interconnection, has recently been introduced in various versions in both the House and Senate (primarily H.R. 12323* and S. 3192*). The Act, which closely follows AT&T’s original proposal, carries four key provisions. First, it would restrict approval of specialized carrier (e.g., providers of data communications services) applications by requiring the applicant to show that the proposed service will not result in increased charges for telephone exchange service or “wasteful or unnecessary” duplication of common carrier facilities, and will not significantly impair the technical integrity of, or capacity for unified planning in, the nationwide telephone network. Second, it would preclude the FCC from requiring charges for new common carrier services which exceed the incremental cost of providing such service; opponents argue this provision would allow AT&T to subsidize its new offerings through existing services, thereby forcing specialized carriers out of the market. Third, the bill would allow acquisition of a common carrier by another common carrier. Finally, it would put jurisdiction over interconnection policy (regarding the connection of non-Bell instruments to the network) exclusively under state jurisdiction, which would have a nullifying effect on the recent FCC interconnection decision (Computer, Jan. 76, p. 13).

Rep. Torbert MacDonald (Mass.), chairman of the House Subcommittee on Communications, has responded to the Act by arguing that competition against common carriers would not necessarily increase local

The new EAI 3200 digital computer, based on the SEL 32 series, is now available to existing hybrid computation laboratories to replace or supplement smaller, less powerful machines as interfaced to EAI 600, 700 or 8000 series analog consoles. The standard EAI 3200 expansion package includes the 32-bit word CPU with 40K or more words of core memory, disc bulk memory, either a CRT-based or TTY console device, magnetic tape and new, state-of-the-art hybrid linkage equipment. Programming, in addition to fully-supported hybrid computer-oriented software, can include the EAI ECSSL package for automatic analog and hybrid program generation, set-up checkout and execution. For details on this EAI 3200 digital processor expansion, contact your local EAI office or Mr. Raymond Moran at West Long Branch, N.J.

A new fully-integrated MiniHYBRID computer system is being introduced by EAI for use in educational, research and smaller-scale industrial applications. Based on the EAI 185 analog/hybrid console and a DataPACER™ 16-bit word-size sequential processor, the MiniHYBRID includes a built-in hybrid interface with A/D, D/A, control and sense lines, optional digital-analog multipliers (DAM's), floppy disc bulk memory, and a teletypewriter console. An alphanumeric/graphic CRT terminal is optional to the TTY, and a multi-trace analog oscilloscope is also available. Software includes the MiniHYBRID HYTRAN® Operations Interpreter, FORTRAN IV, Symbolic Assembler, plus library and diagnostic routines.

The MiniHYBRID system brings to the college or university field complete hybrid computational capabilities at an affordable price. Rather than using remote entry terminals or other digital-only methods, students and researchers are able to see and “feel” in real or fast time dynamic solutions to all of the equations used in the mathematical model... including the analog’s ability to give instantaneous solutions to multiple differential equations. Through hands-on, on-line simulation users gain intimate knowledge of the realities of chemical, physical and mechanical systems, with the ability to adjust parameters interactively to obtain an immediate system response. Further data on the EAI MiniHYBRID is available from EAI field offices or Gary Kaplan at West Long Branch, N.J.

The Army Missile Command’s Advanced Simulation Center has been officially dedicated at Redstone Arsenal. Considered a “technological marvel of the missile world,” the new facility brings together three test chambers linked to third and fourth generation hybrid computers that can simulate just about all parameters and environments that affect a missile in launch and flight. Some of EAI’s most advanced analog/hybrid equipment and programming is used and is expected to reduce time and manpower required to develop missile systems, save millions of dollars each year by decreasing the need for test flights, and result in better-tested weapon systems going to the U.S. armed services and allies. The new Advanced Simulation Center is a National Facility, available to all branches of the Armed Forces as well as to their contractors.
rates (contrary to AT&T's position), nor would it cause other undesirable redistributions of rates; he stated it to be in the national interest to allow competitive costs to determine rate structure. Specialized carriers (e.g., MCI and Datran) have also denounced the bill as an AT&T effort to legislatively eliminate competition, despite contrary policies implemented by the FCC and the courts.

AT&T chairman John deBults replied in recent comments at the AT&T shareholder meeting that FCC decisions allowing interconnection and selective competition in high-profit markets (i.e., high-volume urban markets) threatened the technical integrity of the network as well as AT&T's ability to plan its facilities and operations.

AFIPS Provides Comments on Software Copyright to CONTU

In response to a request submitted to the AFIPS Washington Office by the National Commission on New Technological Uses of Copyrighted Works (CONTU), AFIPS societies recently commented on the issue of copyright protection for computer software. The request from CONTU executive director Arthur Levine enumerated nine specific questions on which the commission sought comment. The AFIPS Washington Office, working through the liaisons from the respective AFIPS societies, arranged comment from those societies electing to participate: ACM, DPMA, and the IEEE Computer Society. The participants (Herbert S. Bright for ACM, William J. Moser for DPMA, Nathaniel Macon for the Computer Society) spoke either as individual experts, or presented a summary of comments from various experts within their society.

The comments reflected a fairly widely perceived need for some form of software protection. Although there was little support for the proposition that copyright provided the best legal vehicle for such protection (in contrast to approaches such as patent or trade secret), there appeared to be greater agreement within the societies on the desirable characteristics of software protection, and on the principle that protection should encourage software development by allowing a reasonable commercial return.

Whereas existing copyright law precludes only copying of protected materials, the participants' comments supported the suggestion that software protection should be extended to include use (i.e., execution) as well. Further, the comments indicated that "copying" should be defined to include the reading (or copying) of a program into core memory for execution, a necessary prerequisite to "use." The commentators all indicated that approaches other than copyright may constitute the best solution; there was some indication that an entirely new legal system of protection (i.e., outside of patent and trade secret) as well should be considered.

Although there were divergent statements on whether software protection should extend beyond program code itself, the participants indicated that programs other than literal copies in the same computer language should, in some cases, constitute an infringing copy. The witnesses generally concurred that software protection, properly implemented, would increase the useful dissemination of software and not unduly restrict users.

17% Rate of Increase Predicted for Computer Industry in 1976

Total 1976 U.S. spending for computer industry hardware, software, outside services, and salaries will jump to nearly a 17% rate of increase, well above last year's 14.5%, according to data presented recently at International Data Corporation's Annual Computer Industry Briefing Session in New York City. Spending is predicted to total just above $30 billion in the U.S. for minicomputers, EDP services, and data communications products and services.

Spending on hardware, including minicomputers, will be up 11% with an 8% real increase and a 3% growth due to hardware pricing increases. This slight drop in growth compared to 1975, estimated at 13%, hides a shift in inflationary pressures. Price increases play a minor role, and 3% of the 11%, compared to 4% of 1975's 13% growth. The percentage increase in "real dollar" terms with inflationary effects removed is actually 8% versus 1975's 9%.

However, user spending on EDP system rentals paid to the manufacturer is estimated up 15% to $5 billion including a 3% inflationary contribution. This compares to the 1974-1975 growth of 11% (7% real and 4% inflationary).

Other system hardware trends appear stable for the most part, including a continued high rate of purchase for general-purpose computers. IDC estimates that the total will again be approximately $1.9 billion in 1976, level with 1975 and up from 1974's $1.6 billion. Shipments of the IBM System 370/158 and 168 are important factors in this calculation as other large mainframe products usually purchased at high rates by users.

Minicomputer spending, including purchase and maintenance in the U.S., will be up approximately 43% in the U.S., expecting to exceed $1.4 billion. This figure includes end-user oriented minis and maintenance charges.

Teleprocessing hardware and communications services will reach $3.4 billion including information appliances and terminals, communications service charges, and modem and multiplexor hardware items. The overall growth rate is 10% and 20% for transmission charges alone.

Moderating inflation in the business forms area has caused a drop in the growth rate for supply products, due primarily to a lower inflationary content. The growth rate is forecast at 4% real with a 5% inflationary factor.

Outside services, software, and custom programming consulting will
grow at a rate of approximately 23%, with a very bright outlook for programming and EDP services business. Salary for data processing personnel is expected to grow by 13%, a 5% real addition to EDP staff and an 8% wage increase or inflationary factor. Staff additions are being made in the programming and data communications areas. Overall, the salary function continues to be approximately 40%-41% of total spending.

ACM Election Results

Herbert J. Grosch, consulting editor of Computerworld and private consultant, has been elected president of ACM. Daniel D. McCracken, an author and consultant, was elected vice president. Elected to the office of ACM secretary was George C. Dodd of General Motors Research Laboratories.

All three officers are currently members of the ACM Council—Grosch serving as vice president, McCracken as member-at-large, and Dodd as regional representative of ACM's East Central Region.

The candidates-elect will take office July 1 for a term of two years.

Update Section
continued on p. 88

Letters to the Editor

Re: ANSI X3 Ballot on BSR X3.53, "Programming Language PL/I"

Before the objectives of a language standard can be met, the standard must be implemented by compiler writers and used by users. Neither area of interest stands alone. The compiler implementations must "correctly" reflect the intent of the standard document so that standard-conforming programs will exhibit the desired behavior. Programmers must be able to use the language "correctly" so they can translate their application requirements into standard-conforming programs. From reviewing the draft proposed standard for PL/I (ANSI BSR X3.53), I have serious reservations about the probability that such tandem requirements for correctness in the interpretation of the document will be met with reasonable frequency.

Interpretation of the document will be a serious problem. How are compilers to be validated for conformance to the standard? How are people to be trained in the use of the language? If educators base their instruction on the use of validated compilers for the full PL/I language, with no local extension, and if students can learn the language in a reasonable amount of time, perhaps these problems can be solved and the objectives of the standard can be met. These are details in implementing standard PL/I, not properly within the scope of the standard itself. However, the complexity of the language and the standard describing it will have considerable impact on the ability of people to use Standard PL/I.

I do not know whether the language itself or its documentation in the form of the draft proposed standard is at fault. Perhaps it is both, but the effect is the same either way. As documented in the standard, PL/I is intellectually unmanageable to a significant segment of the computer programming profession.

A PL/I standard would still be appropriate if it could meet the objectives of even a small segment of the industry. I feel the "PL/I segment" may be further fragmented by the various local interpretations of the standard document to the extent that the transportability objectives of the standard have little likelihood of being met. If some segment of industry feels it is useful to produce a standard they can use, even though this segment may be a very small minority, I feel the rest of us have no right to deny such a tool simply because it is of no use to us. My hope is that the utility to this small group is enough to compensate for the significant and often thankless effort that goes into producing such a document as the PL/I standard.

The greatest value of a PL/I standard will probably be for it to serve as the basis for further work to define intellectually-manageable subsets of the language, which could then (hopefully) be standardized in a way that most of us can understand, implement and use. On that basis, I have voted on behalf of the IEEE to approve the draft proposed standard for PL/I.

Richard L. Curtis
IEEE Representative to ANSI X3

Committee's Response

X3J1 agrees that the objective of a language standard is to provide a language definition that permits both "correct" compiler implementations and the translation of user application requirements into standard conforming programs. We do not necessarily agree, however, that all types of programmers require equal access to the standard in order to achieve this objective. It is generally acknowledged that a single document cannot serve as a tutorial, as a general purpose reference, and as a precise specification. X3J1 feels that by providing a precise specification it has laid the foundation on which other documents, which address the requirements of the various users of PL/I, can be reliably constructed. We are aware, for example, that a tutorial describing the use of BSR CX3.53 is now being prepared by a private author.

Since exhaustive validation procedures are beyond the state of the art, it is the opinion of X3J1 that great emphasis must be placed on providing a specification that will permit an implementation to be correct initially, rather than on expecting "implementation accidents" to be detected afterward. We feel that the high degree of precision in BSR X3.53, Programming Language PL/I, best serves the interests of the language users by ensuring more precise conformance by compilers purporting to be standard. It is our hope that BSR X.53 will permit questions of implementation to be answered in an unambiguous manner without resort to the various clarification agencies that have been necessary in the past.

We believe that the size of the active membership of both ANSI/X3J1 and ECMA/TC10 indicates that PL/I is an intellectually manageable language that is useful to an important segment of the computer industry. We recognize, however, that not all users of PL/I require the function provided by the full language. Therefore, we are initiating subsetting activities in both X3J1 and ECMA/TC10 and we would welcome the participation of IEEE members.

Lois C. Frampton
Chairwoman, ANSI X3J1
PL/I Standardization Committee
Signetics Donates CMOS Technology to Polytechnic

Signetics Corporation of Sunnyvale, California, has donated over a quarter-million dollars worth of CMOS integrated circuit technology to the Polytechnic Institute of New York, Charles Harwood, president of Signetics, and Dr. George Bugliarello, president of the Polytechnic, have announced.

The gift includes mask sets, wafers, devices, and fabrication manuals for Signetics’ 4000 series logic circuitry, which the company was producing until last December.

Polytechnic will use the devices in a variety of undergraduate and graduate electrical engineering courses and for research in its microelectronics laboratories at its Brooklyn and Farmingdale, N.Y., campuses.

The donation was arranged through the efforts of Charles Rubenstein, a member of the electrical engineering teaching staff at the Polytechnic, and Gregory V. Ross, product marketing engineer at Signetics. Rubenstein learned of Signetics’ discontinuance of the 4000 line through an article in a trade publication, and contacted the company.

Unique Contest: “Change the World with a Microprocessor”

Schweber Electronics is sponsoring “The First Annual Microprocessor Applications Competition,” a contest which the New York firm says is designed to inspire people to “narrow the gap between today’s challenges and tomorrow’s realities.”

Five cash prizes will be awarded including a $1000 grand prize, a $500 second prize, and three $250 runner-up prizes plus five honorable mentions. The projects of the winning entrants will be published internationally and winners will receive specially designed certificates.

Schweber Electronics has prepared a complete entry kit for persons wishing to participate. Some of the competition requirements include a systems concept, block diagram, listing of component parts, program source listing, and a 50-word description of the project itself.

As for the direction of the project, the only requirement is that it “should make the world a better place in which to live.”

All entries must be postmarked no later than October 17, 1976. Winners will be announced November 17, 1976.

Judging of entries will be by prominent leaders from the scientific, educational, and electronics business communities. Judges will look for such qualities as the uniqueness of application, practicality of usage, and efficiency in program structure.

For more information and a complete entry kit contact Mr. Mel Kutzin, MPU Center, Schweber Electronics Corporation, Westbury, New York, 11590. Telephone: (516) 334-7474.
Programmable Terminal Printer Market to Increase Six-Fold, IDC Predicts

Explosive growth will mark the programmable terminal printer market from 1974 to 1980 when the number of printers installed will increase six-fold, according to International Data Corporation's report entitled "Terminal Printer Market."

This report, compiled by IDC's computer output program staff, predicts that programmable terminals (both stand-alone and clustered systems) will increase from 47,300 installed in 1974 to 303,300 installed by 1980. These units employ multi-part forms and are similar to small business computers and accounting machines in forms usage, thus offering a new market segment with little replacement risk.

Besides programmables, the report analyzes all segments of the terminal printer market and estimates how each segment will contribute to the overall doubling of the number of terminal printers installed over the next five years. The report's researchers surveyed output specifications and found the average installed terminal printer to be a slow-speed unit, compared to the higher-speed printers that are currently available on the market. Although serial printers are also readily available in 80 or 165 character-second speeds, 45% of the installed surveyed serial printers operated at 30 to 40 cps. Although line printers are available in faster speeds of 600 to 1200 lines per minute, 77% of installed surveyed units operated at 350 lpm or less.

The survey also indicated that the average installed terminal printer operated only 20 hours a week even though it was available for printing for about 60 hours. Also, it was not uncommon to have a printer operate only an hour a day.

With these slow speeds and short printing hours, the average terminal printer uses only 5600 original pages each month: 33% of the output is single-ply paper and 67% is multi-ply; 83% is standard paper and 17% is custom.

The total terminal printer output in 1975 was 15 billion original pages and will increase to almost 50 billion by 1980. The growth in the volume of paper use is the result of several factors: growth in the use of paper by installed printers (3%-6% a year) and rapid growth of the terminal printer market.

Payment Systems Outlook Assessed for Electronic Suppliers

A study of the outlook through 1986 for electronic payment systems and related products and services is expected to be completed this month by Arthur D. Little, Inc.'s Impact Services. The study will assess the implications for suppliers of data processing equipment, software, specialized terminals, and services of the changes taking place in the United States payment system.

According to Frederic G. Withington, the ADL study director, strategic and investment decisions have been particularly difficult for the industry because opportunities and problems have not been clearly defined. "The mixed results, and even market withdrawals of some companies, reflect this lack of definition," he said.

The Impact study will build on the background developed for ADL's technology assessment for the National Science Foundation, "The Consequences of Electronic Funds Transfer." Forecasts of specific electronic products and services will be based on a broad assessment of the electronic payments environment likely to exist over the next ten years.

Additional information may be obtained from Karen Anderson, Arthur D. Little, Inc., Acorn Park, Cambridge, MA 02140; telephone, (617) 864-5770, extension 2405.

Purdue Workshop Held on Industrial Computer Systems

The American regional meeting of the International Purdue Workshop on Industrial Computer Systems was held April 5-8 at Purdue University. Eighty six attendees participated in various committee activities directed toward the development of standards and guidelines for the application of real-time industrial data acquisition and control systems.

Tutorial sessions included a panel presentation, "The Impact of Microprocessor-Based Digital Instrumentation," moderated by Fred Sheane of Imperial Oil Enterprises, Ltd., Canada. The "Tinman" specification stage of the U.S. Department of Defense High-Order Language (DOD/HOL) project...
was discussed by Warren Loper, U.S. Naval Electronics Lab, San Diego. General Motors' ILLIAD, a high-level language for industrial control applications, was described by Mary Adix, GM Research Labs, Warren, Michigan.

The American Long-Term Procedural Languages (LTPL-A) Committee heard a report on the CS/4 language by James Miller, Intermetrics, as part of the group's study of activities leading to the development of new languages. The committee, chaired by Merritt Adams, Western Electric Co., is reviewing past statements of functional requirements, the DOD/HOL Tinman specs, the ILLIAD language features, and a project proposal of the European LTPL Committee. Comments will be prepared on the Tinman for submission to the Department of Defense.

A new ISO/TC97/SC5 project, "Programming Languages for the Control of Industrial Processes," has been initiated and an ad-hoc working group was scheduled to meet in Germany in late April. The U.S. delegation to the ISO meeting met during the Purdue Workshop to solicit recommendations for a U.S. position on the project's scope and general program of work. The American LTPL Committee expressed a strong interest in achieving coordination and cooperation between the DOD, European, and ISO projects.

The Problem-Oriented Languages Committee, under chairman Roger Hall, Texas Instruments, is placing its emphasis on further development of fill-in-the-forms types of programming systems, particularly as they apply to such areas as plant monitoring, energy conservation, and numerical control.

"Guidelines for the Design of Man/Machine Interfaces for Process Control" were published as part of the minutes of the workshop in October 1975. This comprehensive reference document continues to be refined by the Man/Machine Interface Committee, under chairman Robert Carroll, B. E. Goodrich, and is being used for sample design projects for a pipeline application and a power plant system. The committee has established liaison with the Society for Information Display and a Purdue project group working on complex steel mill systems, and is investigating liaison with the Human Factors Society and the IEEE nuclear power plant control room project.

The Fortran Committee, chaired by Maxine Hands, Datum, Inc., presented a new draft proposed ISA standard S61.2, "Industrial Computer System Fortran Procedures for File Access and the Control of File Contention." Committee work on a proposed ISA standard S61.3, dealing with the control of concurrent processes, has evolved into five separate areas of interest: (1) task initiation; (2) task termination; (3) task synchronization; (4) inter-task communications; and (5) exception handling. A state-transition model has been developed to describe the first two areas of interest; position papers are being developed to try to pin down a specific scope of work to be done in areas 3-5. The Purdue group has also participated in recent Fortran Forum meetings (see Computer, May 1976, p. 108), where the ANSI X3J3 work on a new Fortran standard is being presented to the public. Richard Signor, G.E., has been designated as the workshop representative to X3J3.

The Operating Systems Committee, chaired by W. F. Sims, Western Electric Co., views software structures as hierarchical in nature. The top level is application-oriented and interfaces downward through several layers of utility and library functions to the "kernel" of the operating system. Present European activities are concentrated on the specification of standard kernel behavior, and American efforts are directed toward the definition of interfaces between application-level programs and the kernel.

Interface and Data Transmission Committee activities, headed by J.A. Hruskoci, Inland Steel, included work on several ISO and IEC proposals dealing with process I/O functional requirements, as well as details of various analog input, digital input and digital output specifications. The committee is concentrating on serial line-sharing schemes and their control sequence (protocol) specifications, but has also formed subcommittees to maintain glossary and bibliographical materials. A specification checklist for process I/O systems is being developed, and will be tested as a vendor/user survey form. The group plans to present tutorial sessions at the fall workshop on the ARPA network and on other media used for data transmission. The next committee meeting will be held June 28-29, just prior to the Wilmington ISA Symposium on Computer Interface Instrumentation.

The next international meeting of the workshop will be held November 8-11 at Purdue. Minutes of past meetings, including the man/machine interface guidelines, are available at $15 each from the workshop general chairman: Dr. T. J. Williams, Purdue University, 102 Michael Golden, West Lafayette, IN 47907.

### Short Courses

**Reliability and Maintainability**, July 19-23, Los Angeles, California, and October 18-22, Annapolis, Maryland. Fees: $475, Los Angeles; $425, Annapolis.

Educational Programs Office, ARINC Research Corporation, 2551 Biva Rd., Annapolis, MD 21401; (301) 224-4000.


Post College Professional Education, Carnegie-Mellon University, Schenley Park, Pittsburgh, PA 15213


Director of Summer Sessions, MIT, Cambridge, MA 02139.

**Kleinrock on Computer Networks**, July 19-21, Dallas, Texas; August 9-11, Washington, D.C.; August 30-September 1, Los Angeles, California. Fee: $455.

**Technology Transfer Institute**, P.O. Box 35247, Los Angeles, CA 90035; (213) 533-7397.


Office of Continuing Studies, Rensselaer Polytechnic Institute, Troy, NY 12181; (518) 270-6442.


**Department of Continuing Education**, Georgia Institute of Technology, Atlanta, GA 30332; (404) 894-2400.


**Department of Engineering**, University of Wisconsin-Extension, 929 North Sixth St., Milwaukee, WI 53203; (414) 224-4189.