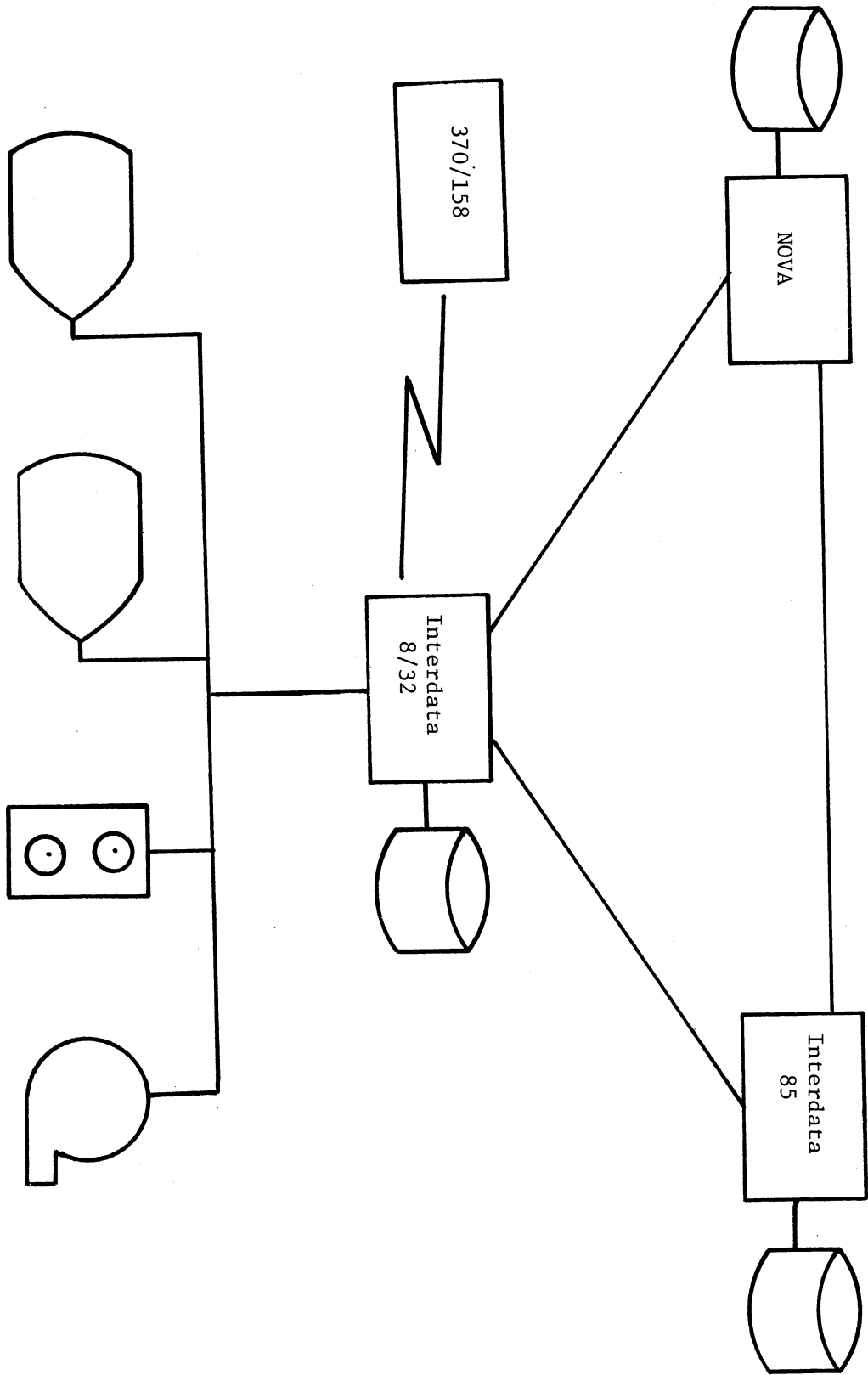


KSU Mini net





Other University Facilities

The other facilities at K-State include a NOVA computer in the Department of Electrical Engineering, and three PDP minicomputers with the Departments of Physics and Chemistry. The computers support computing requirements of these departments and can support computer science needs on an infrequent basis. The University Data Processing Center operates an IBM 360/30 to support the University administrative data requirements. This facility is available to support computer science needs on an infrequent basis.

Remote Facilities

Through dial up telephone service, the University of Kansas main computer is available. The main computer is a GE/Honeywell 635 with 200 K words of memory. The full set of the common high level languages is available to KSU users as are 20 applications program packages.

SUMMARY OF RESEARCH

Steps Toward Reliable Software: Workshop US Army \$15,000

Abstract

Two workshops were sponsored by the US Army with the objective of identifying potentially beneficial research approaches for improvement of software reliability in the military's software production environment. The participants at the workshop included a small number of researchers from the university/industrial community and a selected group of representatives from the Army, Navy, and Air Force. The report of the workshop focuses on mechanisms for the structured refinement of specifications and the interactive "proof" of programs. The first of two workshops considered the theoretical solutions to type problems, and the second considered practical application of techniques to identified problems. Summary of discussions, conclusions, and recommendations was provided to the US Army Computer System Command, Ft. Belvoir, Va. Grant No. DAHC04-75-G-0075.

Usability and Feasibility of Back-End Minicomputers US Army \$29,512

Abstract

This project was a study and evaluation of back-end data base management systems. The objective was to determine the feasibility and utility of such a system in the Army's Base Operating Information System (BASOPS) environment. Work toward the objective was accomplished in 4 steps. First: Functional and statistical descriptions of sample subprocesses in the BASOPS environment were made. Second: The effect of converting these sample subprocesses to a data base management system was determined. Third: Specifications were written for a suitable data base management system and processor to host the sample subprocesses. Finally, an analysis was made of the efficiency of operating in the back-end data base management system. Conclusion and recommendations were provided to the US Army Computer System Command, Ft. Belvoir, Va. Grant No. DAHC04-75-G-0137.

Application of Macroprocessors for Software Systems US Army \$37,850

Abstract

This work consisted of a study of the US Army's EPS II Macroprocessor (derived from FJ Brown's ML/1) and an evaluation of the suitability for use in implementing various software support tools. Applications considered were macroprocessor portability, PL/1 to TACPOL translation, extensions of METACOBOL, support for "host/target" programming (minicomputer software development on a large timesharing system); preprocessors for language extensions for structured programming, modular programming, standards enforcement, source optimization and debugging techniques. The results of this study were provided to the US Army Computer Systems Command, Ft. Belvoir, Va. Grant No. DAHC04-75-G.

Functionally Distributed Systems for Software Development and Production
US Army **\$190,000**

Abstract

The purpose of this 20-month effort is to examine, develop and test where feasible, ideas and concepts surrounding functionally distributed networked computing systems. Development will consider use of back-end minicomputer concepts and bear on portability of programs. Advantages in the use of host/back-end systems for supporting data bases will be considered. Known technical difficulties inherent in this investigation are: multiple systems architecture within a network, accessibility of data bases within networks, mixture of hardware within networks, and communications (message control) within networks. Using state-of-the-art techniques, a prototype solution of these technical problems will be developed and delivered. This effort is on-going with completion scheduled for October 1977.

Minicomputer Diagnostic Routines
Unified Industries Inc. **\$25,612**

Abstract

The objective of this study was to design computer routines that would effectively and efficiently test the operation of a NOVA 840 computer. Specific tests were designed to test the CPU's efficiency and ability to decode and execute a broad spectrum of program instructions. Routines were developed to test memory and memory addressing under dynamic load. Routines were written to test arithmetic/logic unit, real time clock control, floating point arithmetic and general logic and arithmetic functions. After validation of support test modules, a generalized diagnostic test was developed to perform a fast automatic check of the NOVA 840 main frame computer, providing diagnostic messages of test results. The resulting general diagnostic program was delivered to the grantor at the conclusion of the project, March, 1975.

Research Into and Development of a Low-Cost Hardware Monitor
US Army **\$29,690**

Abstract

The objective of this research was to design a hardware monitor, its controlling software and the user instructions needed to analyze the data collected by the monitor. The research took into account the various monitors that are currently available from commercial sources. The shortcomings of the existing monitors were analyzed so that a new design would alleviate those shortcomings. In the design, a need for a user-oriented monitor was recognized. The design concept centered on the use of a minicomputer to control data collection and data display. The report provides a complete specification for the monitor including the specification for a computer language for users of the monitor. The recommendations were provided to the U.S. Army Computer Systems Command, Ft. Belvoir, Va. Grant No. DAHC04-74-G-0103, July 1975.

Numerical Methods for Partial Differential Equations
Submitted to NSF and ERDA **Proposed Amount \$69,619**

Abstract

The numerical method of lines has been found to be very effective in solving difficult engineering problems and quite amenable to the development of generalized software. The purpose of this research is to further refine the numerical techniques utilized in the one-dimensional software and to study the extension of the one-dimensional concepts to higher dimensions. The results of this research should lead to improved numerical methods for partial differential equations and the development of generalized software for wide classes of nonlinear problems in higher dimensions.

Picture Pattern Processor
Un-sponsored

Abstract

A picture processing language called ESP³ (Extended SNOBOL Picture Pattern Processor) has been developed. This language allows construction of two-dimensional line drawings through the evaluation of picture expressions and the description of classes of line drawings with picture patterns. ESP³ includes a pattern recognition system which performs an ordered search of a subject picture to find occurrences of subpictures which match a given picture pattern. An important aspect of the search procedure is the use of guidance information from the given picture pattern to limit the area of search in the subject picture. Research is currently continuing in exact matching techniques whereby distorted pictures due to noise/interference could also be matched to ESP³ picture patterns.

Computer Science Graphics Package
Un-sponsored

Abstract

As an ongoing project, the department supports and is developing a largely portable package of interactive graphics software. It consists of a core of modules written in a restricted FORTRAN to be highly machine independent together with a few machine dependent I/O and character manipulation routines and terminal dependent display file translators. The core uses basic primitives for vectoring (drawing straight lines), generating character strings, and detecting points and sequences of points. For display it constructs an intermediate (machine independent) display file consisting of operands, coordinates, strings, and processor calls. It includes transformations for translation, rotation, scaling, clipping, concatenation, scan line conversion, and simple hidden line removal. Terminals supported included Computek vector display, Calcomp plotter, and line printing devices.

**Portable, Modular, Interactive Interpreter
Unsponsored**

Abstract

Another continuing project is the design, implementation, and verification of an interactive interpreter. Overall objective of the project is to develop a prototype for the study of translators, portability, software engineering, verification and proof of programs, and translator/interpreter performance. Objectives of the interpreted languages are:

- easy to use, with many debugging aids
- dynamic type checking and allocation, and large set of high level operators as in APL
- control structures consistent with modern principles of software engineering (no gotos, modules without side effects, etc.)

Objective of the implementation:

- modular, portable, extendable, based in FORTRAN IV

The interpreter organization includes a finite state scanner, an LL(2) parser for control structures, an operator precedence parser for expressions, a pure stack execution model with a "tagged architecture" heap memory and operators, and simple versions of the editor, a command line processor, a file system interface, and a memory management system. Currently, the core of the interpreter has been built as a single user system, but with essentially no high-level operators.