AD-A169 589 ADA (TRADE NAME) BIBLIOGRAPHY VOLUME 3(U) IIT RESEARCH INST LANHAM MD FEB 86 MDA903-83-C-0306 1/3

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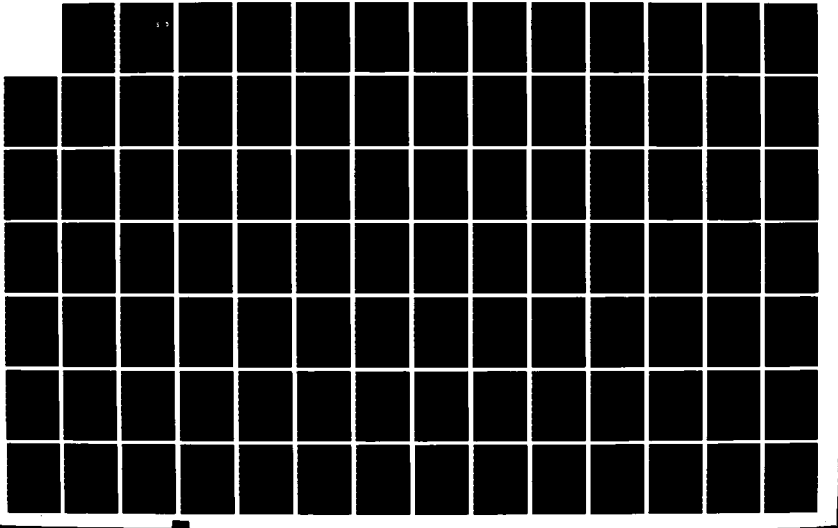

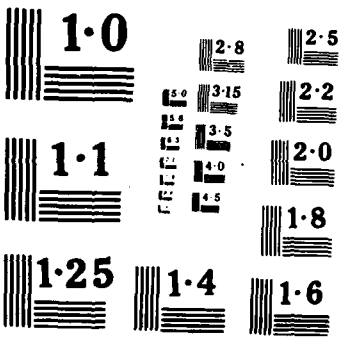
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Ada®BIBLIOGRAPHY

VOLUME III

May 1984 - February 1986

Prepared for:

Ada Joint Program Office
1211 South Fern Street
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Reliability, Data Abstraction, Modifiability, Language Design, Language Structure, Configuration Management, Ada tool environment, Software life cycle, Validation, Ada tool environment, Software Tools, portability, Compilers, Concurrent Programming

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This bibliography contains citations for documents pertaining to the history, development, progress and use of the Ada programming language. It also contains comprehensive author and subject indices which provide a cross reference to the appropriate document citation. The citations in this volume represent all documents added to the Ada Bibliographic Database since the publication of Volume II in May 1984.

*Ada is a registered trademark of the U.S. Government (Ada Joint Program Office)

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE
S/N 0102-LF-014-6601

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

The Ada Joint Program Office (AJPO) manages DoDs effort to provide life-cycle support for Ada, DoDs common high-order language for computer systems, by: (1) coordinating the development and introduction of Ada; Ada Program Support Environments (APSE) and policies and methodologies regarding their use, (2) ensuring the maintenance of the language as a consistent, standard; (3) providing education and training in the use of Ada for DoD and other Government agency personnel to support the Ada program and (4) encouraging the use of Ada by the software development community.

The Ada Information Clearinghouse (AdaIC) is a function of the AJPO which coordinates the collection integration and dissemination of information on all aspects of Ada, and associated aspects of DoDs Software Initiative. As part of this effort, the AdaIC has prepared this, the third volume of the Ada Bibliography.

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1. INTRODUCTION 1
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1. INTRODUCTION

The Ada Joint Program Office (AJPO) manages DoD's effort to provide life-cycle support for Ada, DoD's common high-order language for computer systems, by: (1) coordinating the development and introduction of Ada, Ada Program Support Environments (APSE), and policies and methodologies regarding their use, (2) ensuring the maintenance of the language as a consistent, unambiguous standard, (3) providing education and training in the use of Ada for DoD and other Government agency personnel so that adequate human resources will exist to support the Ada program and (4) encouraging the use of Ada by the software development community.

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The bibliography contains citations for documents pertaining to the history, development, progress and use of the Ada language. It also contains comprehensive author and subject indices which provide a cross reference to the appropriate document citation. The citations in this volume represent all documents added to the Ada Bibliographic Database since the publication of Volume II in May 1984.

EXAMPLE DOCUMENT CITATION

Ada Language Programming
Doe, John;
Computer Science Magazine, Vol. 1, Issue 1, PP. 21-30, 3/1/84
Publisher: Eagle Crest Printing, Citytown, 1983

DOCUMENT NUMBER: 8123 DOCUMENT DATE: 10/80 TYPE: PAPER

This paper discusses the emergence of Ada® and presents an overview of the language. The paper highlights the capabilities that do not exist in most major languages and briefly discusses the development of the Ada Programming Support Environment (APSE) . (®Ada is a trademark of the U.S. Government (Ada Joint Program Office).)

INDEX TERMS

DATA TYPES LANGUAGE STRUCTURE

AVAILABLE FROM: THE AUTHOR
ORDER NUMBER: A - 1
REPORT NUMBER: 1234 - ABC

SPONSORS: U.S. DEPARTMENT OF DEFENSE

EXAMPLE AUTHOR INDEX CITATION

DOE, JOHN, AFFILIATED RESEARCH CORPORATION, CITYTOWN, USA
8123-02 ADA LANGUAGE PROGRAMMING

EXAMPLE SUBJECT INDEX CITATION

DATA TYPES

2492-01 2681-01 2916-01 3251-01 3264-01 3271-01 3273-01 3299-01 3301-01 3302-01
3304-01 3307-01 3316-01 3321-01 3364-01 3461-01 3613-01 3771-01 3964-01 4077-02
4344-01 3435-01 4430-02 4431-02 4653-02 4670-02 8123-02

DATA ITEM		DESCRIPTION
1.	Document Number	An internal identification number assigned by IIT Research Institute.
2.	Document Date	The date the report was produced.
3.	Type	The type of document.
4.	Title	The complete title of the document.
5.	Author	The author(s) of the document.
6.	Journal	The title of the journal in which the article appeared.
7.	Volume	The volume number of the journal in which the article appeared.
8.	Issue Number	The issue number of the document.
9.	Page(s)	If the document is self-contained, pagination is shown as a single number and denotes the length of the document. If an article is part of a larger document, pagination is shown as a range, indicating the starting and ending page.
10.	Issue Date	The month, day, and year of publication.
11.	Publisher	The name of the publisher.
12.	City and State	The city and state where the publisher is located.
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19.	Sponsor(s)	The organization sponsoring the research contract or grant for which the document was produced.
20.	Organization	The author's affiliation at the time the document was written.
21.	Volume Number	The volume of the Ada Bibliography in which the document citation appears.

Please note that the journal name, volume number, issue number, and date issued are printed only if the article appeared as part of a larger document. In addition, not all of these items are available for every journal. The publisher information appears if the document is a textbook.

2. DOCUMENT CITATIONS

ADA COMPILER VALIDATION SUMMARY REPORT; TELESOFT ADA COMPILER, VERSION 2.0A2 FOR CALLAN UNISTAR 300, USING SYSTEM V VERSION 4.1A

SOFTECH, INC.

DOCUMENT NUMBER: 3971 DOCUMENT DATE: 08/10/84 TYPE: TECHNICAL REPORT

The TeleSoft Compiler (TeleSoft Ada), version 2.0a2, for the Callan Unistar 300, using System V Version 4.1a, was tested with version 1.3 of the Ada Compiler Validation Capability (ACVC) validation tests. Version 1.3 of the test suite contained 1989 tests, of which 1668 were applicable to this implementation. Of the applicable tests, 61 were withdrawn due to errors in the tests. All of the remaining 1607 applicable correct tests were passed. (author)

INDEX TERMS

COMPILERS VALIDATION

AVAILABLE FROM: THE AUTHOR

SPONSORS: U.S.A.F. ASD,WRIGHT-PATTERSON AFB, OH

ADA INTEGRATED ENVIRONMENT III COMPUTER PROGRAM DEVELOPMENT SPECIFICATION - VOLUME II

STAFF AUTHOR, TEXAS INSTRUMENTS, INC., LEWISVILLE, TX

DOCUMENT NUMBER: 3989 DOCUMENT DATE: 03/15/81 TYPE: SPECIFICATION

This specification establishes the requirements for performance, design, test, and acceptance of a computer program configuration item identified as the Ada Database Subsystem for the Ada Integrated Environment (AIE). The specification describes the functions of the Database Subsystem and describes the interfaces between the Database Subsystem and other components of the AIE. The database dictionary and the program library are also examined. One section reviews the quality assurance provisions of the Ada Database Subsystem.

INDEX TERMS

DATA DICTIONARY QUALITY ASSURANCE
DEVELOPMENT SUPPORT LIBRARIAN SOFTWARE TOOL SYSTEMS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A109 977
REPORT NUMBER: 81-360

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

THE IMPACT OF ADA ON SOFTWARE DEVELOPMENT

LEBLANC, RICHARD J.; GODA, JOHN J.

DOCUMENT NUMBER: 4103 TYPE: JOURNAL ARTICLE

CONFERENCE PROCEEDINGS IEEE SOUTHEASTCON 81, PP. 215-219

This paper will describe some specific features of Ada and discuss how their use should have a significant impact on software development and maintenance costs in a wide variety of application areas. The examples presented in this paper illustrate some of the important features in Ada which will have a significant impact on software design. Foremost of these features is the package, which provides crucial linguistic support for program modularization. The separation of package specification and body makes information hiding possible, thus providing a means to strictly limit the interactions between program modules and programmers. This separation also provides a natural means of individual compilation which retains all of the benefits of complete type and interface checking. The generic parameterization feature adds to the power of the package concept by allowing packages to be as general as possible. (author)

INDEX TERMS

LIFE CYCLE COSTS MAINTENANCE COSTS DEVELOPMENT CYCLE

ADA PROGRAMMING LANGUAGE STANDARDIZATION

COHEN, PAUL M.

DOCUMENT NUMBER: 4287 TYPE: JOURNAL ARTICLE

JOURNAL OF SYSTEMS AND SOFTWARE, VOL 2, ISSUE 4, PP. 351-355

The need for software management and standardization of programming languages used in military systems was first identified by DoD in 1975. DoD at that time supported many limited use languages for what are now called embedded computer applications. This diversity of languages contributed to high software costs. In November 1976, DoD first established seven approved HOLS, FORTRAN, COBOL, JOVIAL-J3, JOVIAL J73, TACPOL, CMS-2, SPL-1. Eventually the number of approved DoD languages may be reduced to three, Ada , FORTRAN, and COBOL. Ada was established as Military Standard 1815, on 10 December 1980. The ANSI standardization process for Ada is in progress. The Ada concept places restrictions on what may be called an Ada compiler. Compilers may not be called Ada compilers until they have passed validation tests. Up to 80% of software costs are incurred after the software has been put into service. Ada can promote a programming style that leads to maintainable software. It is in the program maintenance phase of the software life cycle where large savings will be achieved through the use of Ada. (author)

INDEX TERMS

STANDARDIZATION	EMBEDDED COMPUTER SYSTEMS
COMPILERS	ADA TOOL ENVIRONMENT

ADA STEPS OUT

BERARD, EDWARD V.

DOCUMENT NUMBER: 4359 TYPE: JOURNAL ARTICLE

DATAMATION, VOL 29, ISSUE 9, PP. 114-126

This article presents a current status report on Ada , the DoD sponsored higher level programming language. The article lists the computers on which Ada compilers exist and lists the operating systems under which the Ada compilers run. A history of the Ada development is presented. In addition the development of an Ada Programming Support Environment (APSE) is discussed. The article also discusses the role that Ada will have in the larger DoD effort to improve software technology - Software Technology for Adaptable Software (STARS).

INDEX TERMS

ADA TOOL ENVIRONMENT

KEN BOWLES TALKS ABOUT ADA PART II

HOFKIN, MARY K.

DOCUMENT NUMBER: 4451 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL AND ADA, PP. 40-42

This article is the conclusion of an interview of Ken Bowles by Mary Hofkin which was presented in the September/October 1983 issue of the Journal of Pascal and Ada (see DAN 5689).

INDEX TERMS

HISTORY	TECHNOLOGY TRANSFER	TECHNOLOGY FORECAST

REPORT ON A BRIEFING SESSION FOR CONTRACTORS OF THE US-DOD-HIGH-ORDER-LANGUAGE PROJECT

ELZER, PETER F.

DOCUMENT NUMBER: 4488 TYPE: TECHNICAL REPORT

This report contains the minutes of meetings held July 26 and 27, 1977 at the Institute for Defense Analysis (IDA) and Defense Advanced Research Projects Agency (DARPA) for contraction of the US-DoD-High-Order-language project. Included in this report are copies of the transparencies presented at the meetings. These meetings were part of the inception of establishing Ada as the DoD-high-order-language.

INDEX TERMS

PROGRAMMING LANGUAGE HISTORY
AVAILABLE FROM: THE AUTHOR
REPORT NUMBER: LTPL-E/ PE 770729

REPORT OF ANALYSIS OF THE PRELIMINARY DESIGNS FOR A COMMON PROGRAMMING LANGUAGE

ELZER, PETER F.; HARIVEL; HEGER; MINEL; TIMMESFELD, K. H.; WAND, IAN C.

DOCUMENT NUMBER: 4507 DOCUMENT DATE: 03/13/78 TYPE: TECHNICAL REPORT

This report is an evaluation of the US-DoD-HOL-phase 1 by a LTPL-E-subgroup which was completed March 13, 1978. It contains an analysis of the preliminary designs for Green, Blue, Red and Yellow common programming language. This report was phase one in establishing Ada as the DoD-high-order-language.

INDEX TERMS

PROGRAMMING LANGUAGE HISTORY
AVAILABLE FROM: THE AUTHOR
REPORT NUMBER: LTPL-E/PE780313

SOME COMMENTS ON TINMAN

BARNES, J.G.P.

DOCUMENT NUMBER: 4521 DOCUMENT DATE: 01/10/76 TYPE: MONOGRAPH

This paper contains a series of comments on TINMAN. (TINMAN is a document that contains the requirements specification for Ada.) Because the author continuously references TINMAN, the report is not understandable to the reader without a reference copy of TINMAN.

INDEX TERMS

CRITICISMS/COMMENTS

AVAILABLE FROM: ADA GROUP LTD., THEALE, READING, RG74AF ENGLAND

A PORTABLE VIRTUAL MACHINE FOR ADA

IBSEN, LEIF

DOCUMENT NUMBER: 4583 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE, VOL 14, ISSUE 1, PP. 17-29

A portable compiler can be constructed by letting it generate code for a virtual machine, which is then implemented on the real target machines. The design of a virtual machine, which is especially suitable as a target machine for compiled Ada programs, is described. The main design goals, implementability on mini-computers and portability, are discussed and the resulting design is described in some detail. Some implementation strategies for the machine are proposed and the feasibility of the virtual machine approach is discussed. (author)

INDEX TERMS

PORTABILITY DESIGN VIRTUAL MACHINES
COMPILERS

XADA: AN EXECUTABLE ADA DESIGN LANGUAGE METHODOLOGY

HARBAUGH, SAM

DOCUMENT NUMBER: 4599 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL IV, ISSUE 6, PP. 27-31

A methodology for using Ada as an executable design language is presented. The methodology follows Booch's admonition to "Design a little--Code a little" to achieve a progressive demonstration of design correctness. Resource consuming, evolutionary stubs are used to execute the software design as the design progresses, in order to demonstrate design self-consistency and proper loading on resources such as CPU operations and disk I/O. The methodology continues through implementation if the programming language is Ada. (author)

INDEX TERMS

DESIGN METHODOLOGIES

WEAPONS THAT THINK

SCHULTZ, JAMES B.

DOCUMENT NUMBER: 4642 TYPE: JOURNAL ARTICLE

DEFENSE ELECTRONICS, PP. 74-78

Pentagon and intelligence analysts are studying the field of Artificial Intelligence (AI) to determine if it holds the keys to solving a broad range of weapons systems challenges from Command, Control, Communications, and Intelligence (C3I) to missile guidance. The military applications of weapons equipped with AI features is discussed in this report. Current AI research projects are reviewed, Defense Advance Research Projects Agency (DARPA) interests are examined, and the application of Ada to AI is discussed in this report.

INDEX TERMS

ARTIFICIAL INTELLIGENCE COMMAND, CONTROL, & COMMUNICATION
WEAPONS SYSTEMS APPLICATIONS
NATURAL LANGUAGE PROCESSING KNOWLEDGE BASED SYSTEMS
LISP

ENGINEERING SOFTWARE

SCHINDLER, MAX (EDITOR)

DOCUMENT NUMBER: 4678 TYPE: JOURNAL ARTICLE

ELECTRONIC DESIGN, VOL 32, ISSUE 1, PP. 150-170

This article discusses the development of operating systems for the year 1984. Also mentioned in this article are the Ada developments that are scheduled for completion during 1984.

INDEX TERMS

ADA TOOL ENVIRONMENT COMPILERS OPERATING SYSTEM DESIGN

PROCESSES, TASKS, AND MONITORS: A COMPARATIVE STUDY OF CONCURRENT PROGRAMMING PRIMITIVES

WEGNER, PETER; SMOLKA, SCOTT A.

DOCUMENT NUMBER: 4775 TYPE: JOURNAL ARTICLE

IEEE TRANSACTIONS ON SOFTWARE ENGINEERING, VOL 9, ISSUE 4, PP. 446-462

Three notations for concurrent programming are compared, namely CSP, Ada , and monitors. CSP is an experimental language for exploring structuring concepts in concurrent programming. Ada is a general-purpose language with concurrent programming facilities. Monitors are a construct for managing access by concurrent processes to shared resources. This paper starts by comparing "lower-level" communication, synchronization, and nondeterminism in CSP and Ada and then examines "higher-level" module interface properties of Ada tasks and monitors. Similarities and differences between CSP and Ada are described. Monitors and tasks are two different mechanisms for achieving serial access to shared resources by concurrently callable procedures. Both rely on queues to achieve serialization, but calls on monitor procedures are scheduled on a single monitor queue, and task entry calls are scheduled on separate queues associated with each entry name. Monitors are passive modules which are activated by being called, but tasks are active modules that execute independently of their callers. Monitor procedures represent multiple threads of control each of which may be suspended and later resumed, but tasks have just a single thread of control. The attempt to map a monitor version of a shortest job scheduler into Ada yields interesting insights into the limitations of Ada mechanisms for synchronization, and suggests that Ada packages may be more appropriate than tasks as a user interface for concurrent computation. (author)

INDEX TERMS

CONCURRENT PROGRAMMING MONITORS PARALLEL PROCESSING

SPONSORS: OFFICE OF NAVAL RESEARCH,715 BROADWAY-5TH FL. NY,NY;
NASA GRADUATE STUDENTS RESEARCHERS FELLOWSHIP

SAFETY CRITICAL FAST-REAL-TIME SYSTEMS

GUSMANN, B.; NIELSEN, O.F.; HANSEN, R.

DOCUMENT NUMBER: 4818 TYPE: PAPER

AGARD CONFERENCE PREPRINT, PP. 90-95

This paper discusses four languages: FORTRAN, PEARL, C, and Pascal for use in the CCV III system and CSTS. C was chosen to implement both systems with very satisfactory results. A comment is given with respect to the conversion of C-programmed systems to Ada in the future.

INDEX TERMS

REAL-TIME SYSTEMS C LANGUAGE
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A127131

CONFIGURATION MANAGEMENT AND THE ADA PROGRAMMING SUPPORT ENVIRONMENT

PULFORD, KEVIN J.

DOCUMENT NUMBER: 4821 TYPE: PAPER

AGARD CONFERENCE PREPRINT, PP. 108-117

It is the aim of software development environments to increase the efficiency with which software is produced. One such environment is the Ada Programming Support Environment (APSE) initiated by the U.S. Department of Defense. These environments are a great benefit to programmers, making some of their tasks much easier. They also offer great opportunities to monitor and control software development. This in turn will affect the way that projects are organized and run, and it will affect project personnel's jobs to varying extents. The way that projects will be affected by the adoption of an APSE is explored in this paper by considering the way that Configuration Management can be implemented in an APSE. (author)

INDEX TERMS

CONFIGURATION MANAGEMENT ADA TOOL ENVIRONMENT
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A127131

IMPLEMENTING HIGH QUALITY SOFTWARE

DOWLING, E.J.

DOCUMENT NUMBER: 4825 TYPE: PAPER

AGARD CONFERENCE PREPRINT, PP. 163-175

High quality software is essential in applications such as avionics. Each stage of development (specification, design, etc.) must be validated, but this paper concentrates on the implementation process. Various factors affecting implementation are discussed and some solutions are considered, in particular the range of tools that is available and the way they can be applied. A set of tools that has been developed within Ferranti Computer Systems Limited, and the method they are designed to support are described. The traditional debug program is shown to be only one part of the whole tool set. Finally, the advantages and

problems of Ada and its environment (APSE) are discussed. (author)

INDEX TERMS

QUALITY ASSURANCE AVIONICS APPLICATIONS SOFTWARE TOOL SYSTEMS
ADA TOOL ENVIRONMENT
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A127131

PORTABILITY AND STYLE IN ADA

NISSEN, JOHN; WALLIS, PETER J. L.

DOCUMENT NUMBER: 4844 TYPE: TEXT

This book contains two guides, one on the portability of Ada programs and one on Ada programming style. The guides are the result of work by the Ada- Europe Portability Working Group and represent the combined expertise of some of the leading authorities on Ada. In the design of Ada, compromises were made between portability and freedom of the compiler implementor; also there are features in Ada that allow the programmer access to machine representations. The portability guide discusses the necessary restrictions on the use of Ada so that truly portable programs can be written. Although Ada is a significant step forward in the encouragement of good programming practice, it is a large language, and so guidance is needed on how best to use the many features. The style guide is concerned with how Ada should be used to contribute towards legibility, maintainability, and correctness of programs. To facilitate use of the guides, the chapters and section numbers correspond to those in the Reference Manual for the Ada Programming Language (ANSI/MIL-STD 1815A, 1983). (author)

INDEX TERMS

PORTABILITY PROGRAMMING TECHNIQUES/METHODOLOGIES

AVAILABLE FROM: CAMBRIDGE U. PRESS 510 NORTH AVE. NEW ROCHELLE, NY

DESIGN EVALUATION REPORT FOR THE ADA INTEGRATED ENVIRONMENT

STAFF AUTHOR, COMPUTER SCIENCES CORP.,ARLINGTON BLVD,FALLS CHURCH,VA;
STAFF AUTHOR, SOFTWARE ENGINEERING ASSOCIATES

DOCUMENT NUMBER: 4845 DOCUMENT DATE: 05/11/81 TYPE: TECHNICAL REPORT

This document presents the Computer Sciences Corporation/Software Engineering Associates (CSC/SEA) evaluation of the three competitive Ada Integrated Environment (AIE) designs performed for Rome Air Development Center (RADC). The purpose of these designs is to provide a baseline for the development of an Ada Programming Support Environment (APSE) in the spirit of STONEMAN (Requirements for Ada Programming Support Environments, February 1980). This involves the design of a Kernel APSE (KAPSE) surrounded by a set of program development and

support tools to form a Minimal APSE (MAPSE). Section 2 provides a discussion of advantages and disadvantages of each of the designs organized into major functional areas. Section 3 presents the rating of the designs in terms of the STONEMAN guidelines. Section 4 provides the evaluation in terms of SOW requirements. Section 5 discusses the Phase II evaluation criteria. The basic conclusion of our evaluation team is given in Section 6. Appendix A provides the result of our evaluation of the System Specification against the SOW and content requirements of MIL-STD-483 and MIL-STD-490. (author)

INDEX TERMS

ADA TOOL ENVIRONMENT DESIGN METHODOLOGIES
AVAILABLE FROM: THE AUTHOR

THE HARDEST THING TO LEARN (THOUGHTS ON ADA)

LAMB, DAVID A.

DOCUMENT NUMBER: 4975 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL II, ISSUE 1, PP. 28-29

A discussion on Ada packages is provided in this article. One of the points discussed is what has to be done about packages now and in the future. Another point commented on is how can existing libraries be used effectively.

INDEX TERMS

PROGRAMMER TRAINING

ADA COMPILER IS AIMED AT DEC VAX

JONES, KEITH (EDITOR)

DOCUMENT NUMBER: 5059 TYPE: JOURNAL ARTICLE

MINI-MICRO SYSTEMS, VOL 15, ISSUE 11, PP. 138

This article describes a forthcoming Ada language compiler that can be hosted by the Berkeley 3 and 4 versions of UNIX and UNIX 32V, and is targeted for Digital Equipment Corporation's VAX minicomputers.

INDEX TERMS

COMPILERS

ADA VALIDATION SUMMARY REPORT

FED. S/W TESTING CNTR

DOCUMENT NUMBER: 5107 DOCUMENT DATE: 05/18/84 TYPE: TECHNICAL REPORT

This report describes the results of the validation effort for the Data General Corporation Compiler ADE Ada , version 5.234, for the Eclipse MV/10000, MV/4000, MV/6000, MV/8000C, MV8000II, and Rolm MSE/800, using AOS/VS 3.12 the compiler was tested with the version 1.3 of the ACVC validation tests. Version 1.3 of the test suite contained 1714 tests, of which 1652 were applicable to this implementation. Of the applicable tests, 61 were withdrawn due to errors in the tests. Of the remaining applicable correct tests 1652 passed, and one anomaly was discovered. The purpose of this report is to document the results of the testing performed on the compiler. (author)

INDEX TERMS

VALIDATION COMPILERS
AVAILABLE FROM: THE AUTHOR

A COMMENT ON "OPERATOR IDENTIFICATION IN ADA"

GANZINGER, HARALD; RIPKEN, KNUT

DOCUMENT NUMBER: 5132 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES, VOL 15, ISSUE 9, PP. 39-43

In this article, the author presents an alternate version of an algorithm for traversing expression trees. The article is in response to an article by H. Ganzinger and K. Ripken on the impacts of the Ada overloading rule for the problem of operator identification.

INDEX TERMS

OVERLOADING

SSAGS: A SYNTAX AND SEMANTICS ANALYSIS AND GENERATION SYSTEM

PAYTON, TERI F.; KELLER, S.; PERKINS, J.; ROWAN, S.; MARDINLY, S.

DOCUMENT NUMBER: 5204 TYPE: PAPER

COMPSAC 82, PROCEEDINGS, PP. 424-432

This paper describes a system of automated tools for program generation called a Syntax and Semantics Analysis and Generation System (SSAGS). A functional overview is provided for the Semantics Specification Language (SSL), which is a restricted set of the Ada programming language. An overview is also provided for the program generation tools that make up the SSAGS. Examples are presented depicting the usage of these compiler generation techniques to develop software outside the language translator domain.

INDEX TERMS

AUTOMATIC PROGRAMMING	SPECIFICATION LANGUAGES	DATA STRUCTURES
SPECIFICATIONS	SOFTWARE TOOL SYSTEMS	EMBEDDED LANGUAGES

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854
ORDER NUMBER: 82CH1810-1

PROGRAMMING LANGUAGES AND THE PROGRAMMING PROCESS

LEVY, MICHAEL R.

DOCUMENT NUMBER: 5207 TYPE: PAPER

COMPSAC 82, PROCEEDINGS, PP. 482-485

This paper shows how it is possible, with the aid of a simple programming environment, to achieve abstraction and encapsulation using a subset of the programming language Pascal. The resulting system is compared with Ada and CLU.

INDEX TERMS

CLU	SOFTWARE TOOL SYSTEMS	DATA STRUCTURES
MODULARIZATION	PASCAL	

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854
ORDER NUMBER: 82CH1810-1

SPONSORS: NATURAL SCIENCES & ENG RESEARCH COUNCIL OF CANADA

A SURVEY OF COMPUTER RESOURCE UTILIZATION IN ESD WEAPON SYSTEM ACQUISITIONS

CLAPP, JUDITH A.

DOCUMENT NUMBER: 5228 DOCUMENT DATE: 07/82 TYPE: TECHNICAL REPORT

As a part of Air Force System Commands (AFSC's) High Level Standardization Plan, in June 1981 MITRE conducted a survey of embedded computer system acquisitions at Electronic Systems Division (ESD). The purpose of the survey was to determine the impact on ESD programs of proposed military standards for computer Instruction Set Architectures and standards for programming languages. The survey shows a proliferation of computer types among ESD programs but uniformity

in choice of high order programming language. Other data about the practices in procurement of computer resources are also presented. (author)

INDEX TERMS

STANDARDS RESOURCE MANAGEMENT PROGRAMMING LANGUAGE
NEBULA
AVAILABLE FROM: MITRE CORP.,BOX 208, BEDFORD, MA 01731
REPORT NUMBER: ESD-TR-82-406

SPONSORS: U.S.AIR FORCE

PROCEEDINGS PAPERS OF THE SECOND AFSC AVIONICS STANDARDIZATION CONFERENCE

PORUBCANSKY, CYNTHIA A.

DOCUMENT NUMBER: 5270 TYPE: PROCEEDINGS

PROCEEDINGS 2ND AFSC STANDARDIZATION CONFERENCE, VOL III, 330 P.

This document is a collection of papers presented at the Second AFSC Avionics Standardization Conference held 30 November to 2 December 1984 in Dayton, OH. The scope of the Conference included the complete range of DoD approved embedded computer hardware/software and related interface standards, as well as standard subsystems used within the Tri-Service community and NATO. The theme of the conference was "Rational Standardization." Lessons learned, as well as the pros and cons of standardization, are highlighted. (author)

INDEX TERMS

COMPILERS EMBEDDED COMPUTER SYSTEMS
STANDARDIZATION AVIONICS APPLICATIONS JOVIAL
NEBULA
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
REPORT NUMBER: ASB(ENA)-TR-82-5031

PORTABLE ADA PROGRAMMING SYSTEM COMPILER PROJECT OVERVIEW

MOLICH, ROLF; OEST, OLE N.; BJORNER, DINES

DOCUMENT NUMBER: 5363 DOCUMENT DATE: 03/81 TYPE: TECHNICAL REPORT

This document contains a summary of the Ada Compiler Development Project which is being carried out by a consortium. Chapter 2 contains a brief outline of the total project while the remaining chapters focus on the Ada compiler development project. Chapter 3 contains a technical survey of the compiler project while chapter 4 gives a more detailed technical presentation. A list of references is provided after Chapter 4.

INDEX TERMS

COMPILERS PORTABILITY DEVELOPMENT

AVAILABLE FROM: DANSK DATAMATIK CTR LUNDTOFTEVEJ,DK-2800,LYNBY,DENMARK
REPORT NUMBER: DDC 02/1981-03-27/B

THE DDC ADA COMPILER PROJECT DEVELOPMENT PLAN. PART 0: DEVELOPMENT METHODOLOGY.

BJORNER, DINES; OEST, OLE N.

DOCUMENT NUMBER: 5364 DOCUMENT DATE: 04/12/80 TYPE: TECHNICAL REPORT

This report is the first of four documents which constitute the four parts of a Development Plan for a mutually beneficial, joint university-industry full Ada compiler construction project. This document contains the Compiler Development Methodology (Part 0). Outlined in this document is the method which will be adhered to and the various components of the project (the formal definition, the compiler, the compiler environment and the run time environment support).

INDEX TERMS

COMPILERS ADA TOOL ENVIRONMENT
DEVELOPMENTAL METHODOLOGIES SOFTWARE ENGINEERING
QUALITY ASSURANCE PROGRAMMING TECHNIQUES/METHODOLOGIES
AUTOMATED DOCUMENTATION
AVAILABLE FROM: DANSK DATAMATIK CTR LUNDTOFTEVEJ,DK-2800,LYNBY,DENMARK
REPORT NUMBER: DDC 80/2 (E2)

ADA DOCUMENTATION AND PROGRAMMING GUIDELINES

WINTERSTEIN, GEORG; PERSCH, GUIDO; DROSSOPOULOU, SOPHIA; DAUSMANN, MANFRED

DOCUMENT NUMBER: 5365 DOCUMENT DATE: 04/24/81 TYPE: TECHNICAL REPORT

This report comprises three papers on the development, implementation and documentation of Ada projects. They summarize the experience gained during the development of a compiler front end for Ada and related work. The three papers described are: Software Documentation Guidelines, Ada Programming Guide, and Documentation Frames of the Ada Implementation Group.

INDEX TERMS

COMPILERS SOFTWARE LIFE CYCLE DOCUMENTATION

REPORT NUMBER: DOC-09

SPONSORS: BUNDESAMT FUR WEHRTECHNIK UND BESCHAFFUNG,KOBLENZ,GER.

BABBAGE- THE LANGUAGE OF THE FUTURE

KARP, TONY

DOCUMENT NUMBER: 5368 TYPE: JOURNAL ARTICLE

DATAMATION, VOL 27, ISSUE 11, PP. 242-247

This article is a satire on the Ada language. Ada is compared to a fictional language called Babbage. As described in this article Babbage is just the opposite of Ada. For example, Ada stresses the concept of software portability while Babbage encourages hardware portability. A number of new conditional statements introduced by Babbage are also presented in this article.

INDEX TERMS

PROGRAMMING LANGUAGE

ADA MULTI-TASKING SUPPORT FOR MICROPROCESSOR SYSTEMS

PETTUS, ROBERT O.; TRASK, MICHAEL J.; LAREAU, NEIL W.

DOCUMENT NUMBER: 5370 TYPE: JOURNAL ARTICLE

CONFERENCE PROCEEDINGS IEEE SOUTHEASTCON '82, PP. 239-242

The purpose of the work described in this paper is to investigate the services which must be provided if Ada is to be supported by a microprocessor which is not specifically designed for this purpose. The topics discussed in this paper are design philosophy of Ada, Ada support requirements, Ada Task Manager (ATM), Task Structure and ATM commands.

INDEX TERMS

MICROPROCESSORS SCHEDULING

REVISIONS TO THE COMPILER VALIDATION IMPLEMENTORS GUIDE

STAFF AUTHOR, ADA JT. PROG. OFF., ARLINGTON, VA 22209

DOCUMENT NUMBER: 5371 DOCUMENT DATE: 02/84 TYPE: TECHNICAL REPORT

This document is a hard copy of the revised chapters of the Compiler Validation Implementor's Guide to comply with the February 1983 ANSI/MIL-STD-1815A version of the Ada language. It was previously only accessible on-line on ECLB. This

revision only contains the following chapters and topics: Chapter 4-Literals, Aggregates and Allocators; Chapter 5-Case, Loop, Blocks, Exit, Return and GOTO Statements; Chapter 6-Subprogram Declarations, Formal Parameters, Subprogram Bodies, Conformance Rules, Parameter Associations, Function Subprograms, Overloading of Subprograms and operators; Chapter 7-Package Structure, Specifications and Declarations; Chapter 8-User Clauses, Renaming Declarations and Context of overloading Resolution.

INDEX TERMS

COMPILERS VALIDATION
AVAILABLE FROM: DATA & ANALYSIS CENTER FOR SOFTWARE (DACS)

ADA COMPILER VALIDATION SUMMARY REPORT: NYU ADA/ED, VERSION 19.7 V001

STAFF AUTHOR, SOFTECH,INC. TOTTEN POND RD,WALTHAM,MA 02154

DOCUMENT NUMBER: 5372 DOCUMENT DATE: 04/11/83 TYPE: TECHNICAL REPORT

This report describes the results of the validation effort for the following Ada translator: Host Machine - DEC VAX 11/780 at New York University; Operating System - VMS 3.1; Target Machine - DEC VAX 11/780; Operating System - VMS 3.1; Language Version - ANSI/MIL-STD-1815A Ada; Translator Name - NYU Ada/ED; Translator Version - 19.7 (March 21, 1983); Validator Version - 1.1 (March 4, 1983). Testing was completed March 31, 1983, in accordance with policies and procedures described in the AVO Policies and Procedures. This report contains test analysis which provides the test procedures and results for each test performed. Also described in detail is how the validation was conducted. (author)

INDEX TERMS

COMPILERS SYSTEM VALIDATION

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209

ADA COMPILER VALIDATION SUMMARY REPORT: WESTERN DIGITAL STC-ADA COMPILER, VERSION C1.OM V-004

STAFF AUTHOR, SOFTECH,INC. TOTTEN POND RD,WALTHAM,MA 02154

DOCUMENT NUMBER: 5373 DOCUMENT DATE: 07/28/83 TYPE: TECHNICAL REPORT

This report describes the results of the validation effort for the following Ada translator: Host Machine - Western Digital WD1600 Series Micro engine; Operating System - STC Ada Operating System 2.9; Host Disk System - 10 megabyte Winchester; Target Machine - Western Digital WD1600 Series MicroEngine; Operating System - STC Ada Operating System 2.9; Language Version - ANSI/MIL-STD-1815A Ada; Translator Name - STC-Ada; Translator Version - C1.Om;

Validator Version - 1.1 (March 4, 1983). Testing was conducted from July 26, 1983 through July 28, 1983 at the Western Digital System Technology Center, Pittsburgh, Pa., in accordance with AVO policies and procedures. This report contains test analysis which provides the test procedures and results for each test performance. It describes in detail how the validation was conducted. Also included in this report is a complete list of the ACVC test files used in the validation attempt. (author)

INDEX TERMS

COMPILERS SYSTEM VALIDATION
AVAILABLE FROM: DATA & ANALYSIS CENTER FOR SOFTWARE (DACS)

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209

ADA COMPILER VALIDATION SUMMARY REPORT: ROLM ADA COMPILER, VERSION 4.52 V-003

STAFF AUTHOR, SOFTECH,INC. TOTTEN POND RD,WALTHAM,MA 02154

DOCUMENT NUMBER: 5374 DOCUMENT DATE: 06/03/83 TYPE: TECHNICAL REPORT

This report describes the results of the validation effort for the following Ada translator: Host Machine - ROLM MSE/800, Data General MV/4000, MV/6000, MV/8000, and MV/10000; Operating System - AOS/VS-Ada 2.03; Host Disk System - 2 96 megabyte drives; Target machine - ROLM MSE/800 Data General MV/4000, MV/6000, MV/8000, and MV/10000; Operating System - AOS/VS-Ada 2.03; Language Version - ANSI/MIL-STD-1815A Ada; Translator Version - 4.52; Validator Version - 1.1 March 4, 1983). Testing was conducted from June 1, 1983 through June 3, 1983 at the ROLM Corporation, San Jose, CA, and from June 2, 1983 through June 4, 1983 at Data General, Westborough, MA, in accordance with AVO policies and procedures. This report contains test analysis which provides the test procedures and results for each test performance. It describes in detail how the validation was conducted. Also included in this report is a complete list of the ACVC test files used in the validation attempt for the MV/8000, MSE/800, MV/4000, MV/6000 and MV/10000. (author)

INDEX TERMS

COMPILERS SYSTEM VALIDATION
AVAILABLE FROM: DATA & ANALYSIS CENTER FOR SOFTWARE (DACS)

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209

ADA COMPILER VALIDATION SUMMARY REPORT: ROLM ADA COMPILER, VERSION 4.42 V-002

STAFF AUTHOR, SOFTECH,INC. TOTTEN POND RD,WALTHAM,MA 02154

DOCUMENT NUMBER: 5375 DOCUMENT DATE: 05/12/83 TYPE: TECHNICAL REPORT

This report describes the results of the validation effort for the following Ada translator: Host Machine - ROLM MSE/800, Data General MV/4000, MV/6000,

MV/8000, and MV/10000; Operating System - AOS/VS-Ada 2.03; Host Disk System - 2 96 megabyte drives; Target machine - ROLM MSE/800 Data General MV/4000, MV/6000, MV/8000, and MV/10000; Operating System - AOS/VS-Ada 2.03; Language Version - ANSI/MIL-STD-1815A Ada; Translator Version - 4.42; Validator Version - 1.1 (March 4, 1983). Testing was conducted from May 9, 1983 through May 12, 1983 at the ROLM Corporation, San Jose, CA, in accordance with AVO policies and procedures. This report contains test analysis which provides the test procedures and results for each test performed. It describes in detail how the validation was conducted. This report also furnishes a list of compiler nonconformances. (author)

INDEX TERMS

COMPILERS SYSTEM VALIDATION

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209

THE CURRENT PROGRAMMING LANGUAGE STANDARDS SCENE VIIIA: ADA

MCGETTRICK, ANDREW D.

DOCUMENT NUMBER: 5390 TYPE: JOURNAL ARTICLE

COMPUTERS & STANDARDS, VOL 2, ISSUE 2, PP. 107-113

This article summarizes the developments in the standardization of the Ada Programming language from January 1980 to May 1983.

INDEX TERMS

STANDARDIZATION

THOUGHTS ON ADA (SUBSETS)

LAMB, DAVID A.

DOCUMENT NUMBER: 5399 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL II, ISSUE 3, PP. 14-15

This article includes discussions on Ada subsetting. A rule on subsets is established in this article, then differences are presented on this rule. A list of reasons for defining subsets is also discussed in the critique.

INDEX TERMS

COMPILERS

ADA TEAMS UP WITH 32-BIT CHIP TO FORM EFFICIENT OEM SYSTEM

SCHINDLER, MAX

DOCUMENT NUMBER: 5400 TYPE: JOURNAL ARTICLE

ELECTRONIC DESIGN, VOL 29, ISSUE 4, PP. 36-38

This article discusses the design of the 32-bit iAPX 432 microprocessor chip sets hardware together with its software, an operating system called iMAX, which is written in the Ada programming language. Extensions to the Ada language along with results of these extensions are also discussed.

INDEX TERMS

OPERATING SYSTEMS MICROPROCESSORS DISTRIBUTED PROCESSING
ARCHITECTURE

PROGRAMMING EMBEDDED SYSTEMS WITH ADA

DOWNES, V.A.; GOLDSACK, STEPHEN J.

DOCUMENT NUMBER: 5401 TYPE: TEXT

This book is not intended for the beginning Ada programmer. This is a book on how to use Ada in the embedded systems environment. The examples in this book were tested using the NYU compiler, and a full listing of a hospital patient monitoring system is given in the last chapter. The book centers on the monitor system as the main example. Some of the topics covered are special problems of embedded systems, Ada solutions to the problems of software building for large scale embedded systems, modeling the problem domain, building data structures and low level and real time features.

INDEX TERMS

SPECIFICATION TOOLS AND TECHNIQUES DATA STRUCTURES
CONCURRENT PROGRAMMING EMBEDDED COMPUTER SYSTEMS

AVAILABLE FROM: PRENTICE-HALL,200 OLD TAPPAN RD,OLD TAPPAN,NJ 07645

ADA AN ADVANCED INTRODUCTION

GEHANI, NARAIN H.

DOCUMENT NUMBER: 5402 TYPE: TEXT

This book is written especially for readers who have a good knowledge of at

least one procedural programming language such as Pascal, C, PL/I, Algol 60, Simula 67, Algol 68 or FORTRAN. The book focuses primarily on the novel aspects of Ada , which are illustrated by many fairly difficult and concrete examples which are written out in full. Interesting differences between Ada and other programming languages are noted. The example programs are developed using stepwise refinement to assist the reader in understanding their design and development. The first chapter is an introduction to the features of Ada that are rather common, such as those found in programming languages like Pascal, C, PL/I or FORTRAN. Elaborate details about each feature are not provided. The remaining chapters focus on the novel aspects of Ada devoting a chapter to each of the following topics: treatment of types, packages, concurrency or tasking, exception handling generic facilities, program structure and separate compilation, and representation clauses and implementation dependent features.

INDEX TERMS

CONCURRENT PROGRAMMING PROGRAM COMPLEXITY STEPWISE REFINEMENT

AVAILABLE FROM: PRENTICE-HALL,200 OLD TAPPAN RD,OLD TAPPAN,NJ 07645

CAN ADA LOWER THE COST OF SOFTWARE IN C3I SYSTEMS?

SCHMITZ, H. GREGORY DR.

DOCUMENT NUMBER: 5403 TYPE: JOURNAL ARTICLE

SIGNAL - JOURNAL OF AFCEA, VOL 37, ISSUE 12, PP. 75-77

This paper discusses what initiated the Ada program, the development process that was used, the current status of Ada, and most importantly, how Ada can help lower the cost of software for C3I systems in the future. (author)

INDEX TERMS

COMMAND, CONTROL, & COMMUNICATION COST
STANDARDS PACKAGING STRONG TYPING

ADA FOR PROGRAMMERS

OLSEN, ERIC W.; WHITEHILL, STEPHEN B.

DOCUMENT NUMBER: 5404 TYPE: TEXT

The Reference Manual for Ada Programming Language (LRM) is not intended for use by anyone not already familiar with Ada. This book presents an overview of the Ada programming language. The Ada topics covered in this book are predefined types and operations, expressions, object declarations, basic Ada statements, subprograms, packages, user-defined types, derived types, real types, array

types, record types and access types, operator overloading, overloading enumeration literals, generics, tasking, exceptions, program structure and separate compilation.

INDEX TERMS

STRUCTURED PROGRAMMING CONCURRENT PROGRAMMING
AVAILABLE FROM: PRENTICE-HALL,200 OLD TAPPAN RD,OLD TAPPAN,NJ 07645

ADA FOR EXPERIENCED PROGRAMMERS

HABERMANN, A. NICO; PERRY, DEWAYNE E.

DOCUMENT NUMBER: 5405 TYPE: TEXT

The goal of this book is a presentation of the major features of the Ada programming language and their relevance to software engineering. Since concepts such as data abstraction, exception handling and concurrency are of fundamental importance to the design and maintenance of software systems, the book explains in detail how Ada's facilities support such concepts. The book consists of three parts: an introductory chapter, nine chapters dealing with sequential language features and six chapters and an appendix dealing with concurrent language features. The introductory chapter presents a brief look at the development of programming languages, discusses the similarities and major differences between Pascal and Ada, and covers the traditional language constructs of declarations, control statements and expressions. In the sequential part, the central themes discusse. are the concepts of data types in Pascal and of data abstraction in Ada. Starting with the open types and the limited abstraction in Pascal, the discussion proceeds to the various degrees of information hiding and abstraction available in Ada. In addition, it shows the generalization of the static objects in Pascal into the flexible, dynamic objects in Ada. In the third part, discussed are the traditional problems of concurrent processes such as synchronization, mutual exclusion and communication. (author)

INDEX TERMS

PROGRAMMING LANGUAGE CONCURRENT PROGRAMMING DATA STRUCTURES

AVAILABLE FROM: ADDISON-WESLEY PUBLISHING CO., READING, MA 01867

PROBLEM SOLVING WITH ADA

MAYOH, BRIAN

DOCUMENT NUMBER: 5406 TYPE: TEXT

Chapter one of this book looks at how one can specify problems precisely and introduces the divide-and-conquer approach to problem solving. Chapter two describes the notions of algorithms, variables and parameters and tells how to convert algorithms into Ada programs and run them on a computer. Chapter three discusses several powerful ways of combining solutions of small problems into

solutions of large problems: choice, repetition, recursion, exceptions and parallelism. Chapter four presents several useful environments to illustrate the slogan: "Careful design of environments is the key to solving large problems in Ada." Chapter five explains the Ada type mechanism for finding conceptual errors in problem solutions. Chapter six contains various ways of structuring data. Chapter seven illustrates the Ada concepts of generic problem solutions by treating the important practical problem of sorting and searching. Chapter eight contains a history of computer revolution and a discussion of the real dangers that accompany this revolution.

INDEX TERMS

DATA STRUCTURES STEPWISE REFINEMENT

AVAILABLE FROM: JOHN WILEY & SONS, 605 3RD AVE., NY, NY 10016

ADA: A PROGRAMMER'S CONVERSION COURSE

STRATFORD-COLLINS M.J.

DOCUMENT NUMBER: 5407 TYPE: TEXT

This book is aimed at providing the professional programmer with an easy means to learn the basics of Ada . It therefore assumes that the reader has knowledge of at least one other high-level programming language. It is not intended to be a primer on programming, nor a reference manual for the language. It concentrates instead on those features which will be used most often by most programmers. The first five chapters are designed to cover the basic language elements which are common to most modern procedural languages. Chapter 1 is an introduction, Chapter 2 is concerned with control over program flow, Chapters 3 and 4 with data types and data structures and Chapter 5 with procedures and functions. Chapters 6, 7, 8 and 9 cover the package concept, the generic concept, support for exception handling and language constructs for tasking support, respectively. Chapter 10 is devoted to a discussion of the issues of program structure, and name scope and visibility, and the book closes with a chapter covering the Input and Output facilities provided by Ada. For reference purposes, Appendix A provides a syntax definition of the language while Appendix B contains a list of Ada's reserved words. (author)

INDEX TERMS

MODERN PROGRAMMING PRACTICES
PROGRAMMING TECHNIQUES/METHODOLOGIES PROGRAM UNDERSTANDING

AVAILABLE FROM: JOHN WILEY & SONS, 605 3RD AVE., NY, NY 10016

AN INTRODUCTION TO ADA

YOUNG, STEPHEN J.,PH.D.

DOCUMENT NUMBER: 5408 TYPE: TEXT

This book is aimed at students and experienced programmers. It provides a complete introduction to programming in Ada . All Ada language features are carefully explained and wherever possible are illustrated by examples. A key feature of the book is the inclusion of an extended example at the end of each chapter. These are intended to give further clarification of the points covered in that chapter, but more importantly they are used to illustrate how programs should be designed in Ada. In particular, strong emphasis is placed on the use of the package in supporting data abstraction. Finally, exercises are provided with each chapter, and solutions to a selection of these are given at the end of the book. (author)

INDEX TERMS

PROGRAM UNDERSTANDING MODERN PROGRAMMING PRACTICES
PROGRAMMING TECHNIQUES/METHODOLOGIES

AVAILABLE FROM: JOHN WILEY & SONS, 605 3RD AVE., NY, NY 10016

PROGRAMMING IN ADA

WIENER, RICHARD S.; SINCOVEC, RICHARD F.

DOCUMENT NUMBER: 5409 TYPE: TEXT

The book's organization is straightforward and logical. The first eight chapters deal with the basic control and data structures associated with Ada . This material is easily accessible to anyone with a knowledge of another high-level language. The second part of the book (chapters 9-16) is devoted to the powerful and advanced features that set Ada apart from other programming languages. Concepts associated with advanced programming and large-scale development and maintenance of software are discussed in detail. Convenient summaries at the end of each chapter reinforce the subject matter. The authors make extensive use of applications programs in data structures, numerical analysis, and algorithm design to support their explanations of Ada constructs and features. As new Ada features are presented, some programs that were introduced earlier in the text are updated to demonstrate how these new features improve program design. All examples reflect proper programming style, and most of the programs have been checked and run to ensure their validity. (author)

INDEX TERMS

DATA STRUCTURES CONCURRENT PROGRAMMING RECURSION

AVAILABLE FROM: JOHN WILEY & SONS, 605 3RD AVE., NY, NY 10016

PROGRAMMING CONCEPTS WITH THE ADA LANGUAGE

FREEDMAN, ROY S.

DOCUMENT NUMBER: 5410 TYPE: TEXT

This book is designed to help the reader understand the concepts discussed in

the Ada Language Reference Manual. The reader will be able to more effectively design an Ada program by using this book in conjunction with the Language Reference Manual and the more formal and rigorous Ada literature. Many examples used in this book are not strictly confined to traditional programming because of the many unique characteristics of the Ada language. Features of Ada which illustrate its use as a design aid are emphasized in this book. Some of the topics covered are programming structures, data structures, tasks and system design with Ada. The appendix discusses the following important language characteristics: use of the apostrophe, exceptions, pragmas, input-output and special characters in Ada.

INDEX TERMS

PROGRAMMING LANGUAGE EMBEDDED LANGUAGES
PROGRAM CONTROL LANGUAGE (PDL)
AVAILABLE FROM: PETROCELLI BOOKS,1101 STATE RD,PRINCETON,NJ 08540

INVITATION TO ADA & ADA REFERENCE MANUAL (JULY 1980)

KATZAN, HARRY JR.

DOCUMENT NUMBER: 5411 TYPE: TEXT

There are two parts to this book. Part One is an invitation to scientists, engineers, analysts, and students to learn the Ada programming language. Part Two contains the Reference Manual of the Ada Programming Language Proposed Standard Document, dated July 1980. A basic understanding of computers is necessary to use this text effectively, and no previous knowledge of any higher-level programming language is required. This text emphasizes classical programming and leaves many of the esoteric features in Ada for advanced books on the subject. The textual material attempts to encourage good programming practices.

INDEX TERMS

EMBEDDED LANGUAGES PROGRAMMING LANGUAGE
AVAILABLE FROM: PETROCELLI BOOKS,1101 STATE RD,PRINCETON,NJ 08540

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT (KAPSE) INTERFACE TEAM: PUBLIC REPORT VOL. III

KAPSE INTERFACE TEAM

DOCUMENT NUMBER: 5414 DOCUMENT DATE: 10/25/83 TYPE: TECHNICAL REPORT

This report is the third in a series that is being published by the KAPSE Interface Team (KIT). This series of reports serves to record the activities which have taken place to date and submits for public review the products that have resulted. The reports are issued approximately every six months. They should be viewed as snapshots of the progress of the KIT and its companion team,

the KAPSE Interface Team from Industry and Academia (KITIA); everything that is ready for public review at a given time is included. These reports represent evolving ideas, so the contents should not be taken as fixed or final. (author)

INDEX TERMS

ADA TOOL ENVIRONMENT
AVAILABLE FROM: DATA & ANALYSIS CENTER FOR SOFTWARE (DACS)
ORDER NUMBER: AD-A141576
REPORT NUMBER: TD 552

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209

A PROGRAMMER'S VIEW OF THE INTEL 432 SYSTEM

ORGANICK, DR. ELLIOTT I.

DOCUMENT NUMBER: 5421 TYPE: TEXT

The principle theme in this book is the effective implementation of the concepts of multiprocessing, object-based design, and object filing systems as exhibited by the i432. This book provides the user with a new dimension for expressive power and productivity for both system software and applications programs, and at new levels of simplicity and efficiency. Some of the areas discussed include structure and use of Ada packages and tasks; hardware and system software support for interprocess communication and for process (task) dispatching and scheduling; architectural and Ada language support for object structures; emphasizing type management and access control; the supporting operating system iMAX; several of its important "user-interfaces"; the importance of input-output peripheral sub-systems and their relationship with the central object-based architecture of i432; and iMAX provided implementations of process management, memory management, and object filing and user interfaces to these facilities. This book contains three sets of appendices providing lists of i432-based literature references; a group of compiled Ada program units comprising versions of an investment management system; and user interfaces to iMAX that help confirm and expand understanding of the functionality, scope, and flexibility of iMAX. (author)

INDEX TERMS

MICROPROCESSORS
MEMORY MANAGEMENT
INTERPROCESS COMMUNICATION
DISTRIBUTED PROCESSING
CONCURRENT PROGRAMMING
STRUCTURED PROGRAMMING

AVAILABLE FROM: MCGRAW-HILL BOOK CO,1221 AV OF AMERICAS,NY,NY 10020

ADVANCED COMPUTER INFORMATION PROCESSING CAPABILITY

MARCINIAK, JOHN J. COL

DOCUMENT NUMBER: 5423 TYPE: JOURNAL ARTICLE

SIGNAL - JOURNAL OF AFCEA, VOL 37, ISSUE 12, PP. 50-51

This article discusses advanced computer technology which can support military command, control, communication and intelligence (C3I) systems. The technology includes requirement and design language, standardized instruction set computers, and standard high order language compilers (Ada). The need for successful technology transitions in the development of C3I system is also discussed.

INDEX TERMS

COMMAND, CONTROL, & COMMUNICATION
DECISION SUPPORT SYSTEMS
TECHNOLOGY TRANSFER

INTEGRATION TESTING OF SOFTWARE

LEATHRUM, JAMES F.

DOCUMENT NUMBER: 5428 TYPE: PROCEEDINGS

NATIONAL CONFERENCE ON SOFTWARE TEST & EVALUATION, PP. C1-C4

The technology of integration testing for software is considered in the context of similar problems arising in other disciplines. The impact of Ada and the Ada program support environments upon integration testing is developed in terms of the reduction of risk associated with strong typing of user - defined types. The case for shared testing technology is established in relationship to other technologies which have not openly shared details of successes or failures. (author)

INDEX TERMS

TESTING
ADA TOOL ENVIRONMENT

PROGRAMMING LANGUAGES, TESTING, AND REUSABILITY

WEGNER, PETER

DOCUMENT NUMBER: 5437 TYPE: PROCEEDINGS

NATIONAL CONFERENCE ON SOFTWARE TEST & EVALUATION, PP. L1-L11

This paper presents a variety of ideas and opinions on increasing the productivity and reliability of software. Interface technology and knowledge engineering are suggested as primary themes for research and development in the 1980's and 1990's. The impact of programming environments and powerful personal computers on testing and management technology is considered. The evolution of programming languages and the relation of Ada to its predecessors is reviewed. The notion of "capital" and "capital-intensive" are defined in terms of reusability of resources, and the contribution of Ada to the development of capital-intensive software technology is examined. The relation between maintainability, enhancement, and evolution of systems is discussed. The relation between knowledge engineering and software technology is explored. Coordinated approaches to making software technology more capital-intensive, such as the Japanese fifth-generation computer proposal and the DoD software initiative are examined in the conclusion. (author)

INDEX TERMS

PRODUCTIVITY
RELIABILITY--DIFFERENCES OF OPINION
SOFTWARE ENGINEERING
KNOWLEDGE BASED SYSTEMS
TECHNOLOGY FORECAST

SPONSORS: OFFICE OF NAVAL RESEARCH

ADA SYSTEM SPECIFICATION FOR ADA INTEGRATED ENVIRONMENT TYPE A

STAFF AUTHOR, INTERMETRICS,INC.,CAMBRIDGE,MA 02138

DOCUMENT NUMBER: 5444 DOCUMENT DATE: 07/12/82 TYPE: TECHNICAL REPORT

This specification establishes the performance, design, development and test requirements for the Ada Integrated Environment (AIE). The following topics are discussed: (1) Applicable documents, (2) Requirements, (3) Quality Assurance Provisions, and (4) Preparation for Delivery.

INDEX TERMS

QUALITY ASSURANCE
DESIGN TOOLS AND TECHNIQUES
TEST METHODOLOGIES
ADA TOOL ENVIRONMENT
AVAILABLE FROM: THE AUTHOR
REPORT NUMBER: IR-676-1

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

PROGRAM VERIFICATION USING ADA

MCGETTRICK, ANDREW D.

DOCUMENT NUMBER: 5452 TYPE: TEXT

The main concern of this book is program verification. The discussions are not confined to proving correctness but are more generally concerned with proving properties of programs. The book begins with simple programs and progresses gradually to programs involving the use of conditionals, loops, arrays, complex data structures, and procedures (possibly recursive). The programming language used for expressing these programs is Ada . In the final chapter some brief remarks are made concerning the provision of automatic aids for program verification.

INDEX TERMS

VERIFICATION TOOLS AND TECHNIQUES
CORRECTNESS PROOFS
AUTOMATED VERIFICATION TOOLS
LANGUAGE DESIGN
PARALLEL PROCESSING

AVAILABLE FROM: CAMBRIDGE U. PRESS 510 NORTH AVE. NEW ROCHELLE, NY

TOWARD ADA: THE CONTINUING DEVELOPMENT OF AN ADA COMPILER

WERNER, PATRICK R.

DOCUMENT NUMBER: 5454 DOCUMENT DATE: 12/81 TYPE: DISSERTATION

This thesis involves the continuing development of an Ada compiler, the AFIT-Ada compiler. Basic concepts of the compilation process are reviewed. The design and structure of the AFIT-Ada compiler are examined. Tests from the Ada Compiler Validation Capability system are modified for the subset of the Ada language currently implemented by the AFIT-Ada compiler. Those modified tests are run against the compiler to assure compliance with the Ada Reference Manual. Deviations from the language were corrected. Sections of the existing compiler were rewritten into a more structured manner. Recommendations were made for further development. This continuing development of the AFIT-Ada compiler was performed on the DEC-10 system of the Air Force Avionics Laboratory at Wright-Patterson AFB, Ohio.

INDEX TERMS

COMPILERS
VALIDATION

AVAILABLE FROM: DEFENSE TECH INFO CNTR,CAMERON STN,ALEXANDRIA VA 22314
ORDER NUMBER: AD-A115479
REPORT NUMBER: AFIT/GCS/MA/81D-7

SPONSORS: U.S.A.F. AVIONICS LAB,W-PAFB,OH 45433

ENGINEERING ADA

BERARD, EDWARD V.

DOCUMENT NUMBER: 5456 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL 3, ISSUE 3, PP. 33-44

This article discusses utilizing Ada in software engineering. In particular, the author discusses software metrics and Ada. He focuses on Maurice H. Halstead's software metrics by providing a brief introduction to the topic, a sample calculation using the metrics, limitations in the metrics, and a brief bibliography.

INDEX TERMS

SOFTWARE SCIENCE COMPLEXITY MEASUREMENT HALSTEAD'S LAW

DRAFT SPECIFICATION OF THE COMMON APSE INTERFACE SET (CAIS) VERSION 1.1

KIT/KITIA CAIS WKG GROUP

DOCUMENT NUMBER: 5471 DOCUMENT DATE: 09/30/83 TYPE: TECHNICAL REPORT

This document provides specifications for a set of Ada packages which together form a Common APSE Interface Set (CAIS) for Ada Programming Support Environments (APSEs). This interface set is designed to promote the source-level portability of Ada programs, particularly Ada software development tools. The initial phase of this effort is directed toward the interfaces of the Ada Integrated Environment(AIE) and the Ada Language System (ALS). This document is version 1.1 of the CAIS which is intended to provide the basis for evolution of the CAIS as APSEs are implemented, as tools are transported, and as tools interoperability issues are encountered. The scope of the CAIS includes interfaces to those services traditionally provided by an operating system that affect tool transportability. Ideally, all APSE tools would be implementable using only the Ada language and the CAIS. This version of the CAIS is intended to provide most interfaces required by common tools. This version of the CAIS includes six interface areas: node models, structured nodes, file nodes, process nodes, device nodes, and utilities. (author)

INDEX TERMS

ADA TOOL ENVIRONMENT
AVAILABLE FROM: DATA & ANALYSIS CENTER FOR SOFTWARE (DACS)

STUDIES IN ADA STYLE (SECOND EDITION JANUARY 1983)

HIBBARD, PETER; HISGEN, ANDY; ROSENBERG, JONATHAN; SHAW, MARY; SHERMAN, MARK S.

DOCUMENT NUMBER: 5472 TYPE: TEXT

The aim of this book is not to teach how to write Ada programs. It discusses the style of Ada programs and proper usage of advanced Ada constructs. It also contains a discussion of abstraction in programming languages. This book is organized into two parts. The first part traces the important ideas of modern languages to their roots in the languages of the past decade and shows how modern languages respond to contemporary problems in software development. The second part examines five problems to be programmed using Ada. For each problem a complete Ada program is given, followed by a discussion of how the Ada language affected various design decisions. These problems were selected to be as practical as possible rather than to illustrate any particular set of language features.

INDEX TERMS

PROGRAMMING TECHNIQUES/METHODOLOGIES
MODERN PROGRAMMING PRACTICES DISTRIBUTED PROCESSING

AVAILABLE FROM: SPRINGER-VERLAG, INC., NEW YORK NY 10010

SPONSORS: NATIONAL SCIENCE FOUNDATION;
U.S.A.F. AVIONICS LAB,W-PAFB,OH 45433;
DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

A COMPARISON OF PASCAL AND ADA

WINCHMANN, B.A.

DOCUMENT NUMBER: 5474 TYPE: TEXT

This paper presents a high-level comparison of Pascal and Ada . It shows how similar concepts are expressed in the two languages and points out that there are many facilities in Ada that have no counterparts in Pascal (e.g. concurrent programming, exception handling, and packages.) Thus, some of the seeming simplicity of Pascal and complexity of Ada is actually a result of the completeness of the Ada language definition.

INDEX TERMS

PASCAL
AVAILABLE FROM: PRENTICE-HALL,200 OLD TAPPAN RD,OLD TAPPAN,NJ 07645

A COMPARISON OF PROGRAMMING LANGUAGES: ADA, PASCAL,C

EVANS, ARTHUR JR.

DOCUMENT NUMBER: 5475 TYPE: TEXT

This paper reviews each of the languages Ada , Pascal, and C for their suitability for systems programming. The author begins by listing characteristics of systems programs and then compares the languages on a feature by feature basis. Although he is especially critical of C, he criticizes the other two languages as well.

INDEX TERMS

C LANGUAGE PASCAL PROGRAMMING
SYSTEM DESIGN REQUIREMENTS

AVAILABLE FROM: PRENTICE-HALL,200 OLD TAPPAN RD,OLD TAPPAN,NJ 07645

AN EARLY ASSESSMENT OF THE ADA PROGRAMMING LANGUAGE

GEHANI, NARAIN H.

DOCUMENT NUMBER: 5477 TYPE: TEXT

This paper is based on extensive study of and experimentation with the Ada language. The author expresses his opinion that despite its problems, Ada represents a considerable advance over existing languages, since it incorporates many of the results of programming language research from the 1970s. He claims that Ada is weakest in its facilities that implement the most recent research results, especially the derived type mechanism and the facilities for concurrent programming.

INDEX TERMS

CONCURRENT PROGRAMMING

AVAILABLE FROM: PRENTICE-HALL,200 OLD TAPPAN RD,OLD TAPPAN,NJ 07645

ADA METHODOLOGY QUESTIONNAIRE SUMMARY

PORCELLA, MARIA; FREEMAN, PETER; WASSERMAN, ANTHONY I.

DOCUMENT NUMBER: 5484 DOCUMENT DATE: 11/82 TYPE: TECHNICAL REPORT

In Spring, 1982, a questionnaire was developed on software development methodologies, identified 48 methodologies to be surveyed, and sent the survey to the developers of these methodologies. The intent of the survey was to gather conceptual, technical, and usage data of a general nature and, more

specifically, to relate the data to potential methodology usage in an Ada development environment, wherever possible. The intent was not to describe any particular methodology in detail. The results of the survey are presented here in a form that captures the factual results and suggests a first level of generalization of the state of the art in software development methodology. A questionnaire was chosen as the instrument for conducting the survey because resource constraints prohibited a more thorough survey method, such as interviewing. The questionnaire contained a combination of free-form and multiple-choice questions. This allowed respondents to describe the methodology of free-form and multiple-choice questions. This allowed respondents to describe the methodology in their own terms, as well as in standardized terms. (author).

INDEX TERMS

DESIGN METHODOLOGIES DEVELOPMENTAL METHODOLOGIES

AVAILABLE FROM: THE AUTHOR

IMPLEMENTING AN ADA KERNEL ON NEBULA

INGARGIOLA, GIORGIO P.

DOCUMENT NUMBER: 5485 DOCUMENT DATE: 08/83 TYPE: TECHNICAL REPORT

This report reviews the concurrency features of Ada , examines the aspects of the NEBULA architecture that are more significant for the implementation of concurrent programs, suggests a method for reducing the tasking mechanisms of Ada to a few simple kernel operations, and evaluates the NEBULA architecture in terms of this method and these operations.

INDEX TERMS

MICROPROCESSORS	SYSTEM ARCHITECTURE	NEBULA
MEMORY MANAGEMENT	REAL-TIME SYSTEMS	MINICOMPUTERS
MICRO COMPUTERS	CONCURRENT PROGRAMMING	

AVAILABLE FROM: DEFENSE TECH INFO CNTR,CAMERON STN,ALEXANDRIA VA 22314
ORDER NUMBER: AD-A132-745
REPORT NUMBER: 18023.1-EL-R

SPONSORS: U.S.ARMY RESEARCH OFFICE

AN APPROACH FOR IMPLEMENTING A MICROCOMPUTER BASED REPORT ORIGINATION SYSTEM IN THE ADA PROGRAMMING LANGUAGE

CRITZ, MICHAEL RICHARD

DOCUMENT NUMBER: 5488 DOCUMENT DATE: 03/83 TYPE: DISSERTATION

This thesis examines the use of an inexpensive commercial microcomputer for the preparation of Naval Reporting Structure Operational Reports. These highly

formatted reports provide critical unit information used by the National Command Authority and Joint Chiefs of Staff in assessing the nation's defense posture. Since these reports are processed by computer, correct formatting and data entry are essential to preserve the timeliness and accuracy of the information. The requirements of a Report Origination System are investigated from the perspective of the system operator, the message drafter, and the message releasing authority. Interfaces are developed which provide for system application to different hardware configuration. A subset of the Ada language is used to allow structured programming and data abstraction techniques. Elements of the Unit Status and Identify Report (UNITREP) are implemented using this method. (author)

INDEX TERMS

TEXT-PROCESSING APPLICATIONS MICRO COMPUTERS
COMMAND, CONTROL, & COMMUNICATION
AVAILABLE FROM: DEFENSE TECH INFO CNTR,CAMERON STN,ALEXANDRIA VA 22314
ORDER NUMBER: ADA128028

SPONSORS: NAVAL POSTGRADUATE SCHOOL,MONTEREY, CA 93940

LIFE CYCLE SUPPORT IN THE ADA ENVIRONMENT

MCDERMID, JOHN A.; RIPKEN, KNUT

DOCUMENT NUMBER: 5496 TYPE: TEXT

This book tackles the requirements for, and the choice of, methods and tools for a full APSE (Ada Programming Support Environment). It concentrates on the combination of methods for software development, integration, maintenance, and configuration control with those for project management to produce a coherent software development and maintenance methodology. Once a coherent methodology has been produced it is possible to see how the methods can be supported by tools to form an APSE giving coherent support for the whole software life-cycle. The work reported on in this book was performed by System Designers Ltd., and TECSI-Software with the support of the Commission of the European Communities. It presents a detailed life-cycle model, discusses a management philosophy compatible with that model, and gives an experimental assessment of individual methods. (author)

INDEX TERMS

ADA TOOL ENVIRONMENT SOFTWARE LIFE CYCLE DEVELOPMENT CYCLE
DEVELOPMENTAL METHODOLOGIES
REQUIREMENTS TOOLS & TECHNIQUES
AVAILABLE FROM: CAMBRIDGE U. PRESS 510 NORTH AVE. NEW ROCHELLE, NY

ADA COMPILER VALIDATION SUMMARY REPORT: NEW YORK UNIVERSITY NYU ADA/ED COMPILER, VERSION 1.4

STAFF AUTHOR, SOFTECH, INC.,3100 PRESIDENTIAL DR.,FAIRBORN, OH 45324

DOCUMENT NUMBER: 5497 DOCUMENT DATE: 08/10/84 TYPE: TECHNICAL REPORT

This report describes the results of the validation effort for an Ada translator. The purpose of the report is to document the results of the testing performed on the translator. The New York University Compiler (NYU Ada /Ed), version 1.4, for the VAX 11/780, using VMS 3.5, was tested with version 1.4 of the Ada Compiler Validation Capability (ACVC) validation tests. Version 1.4 of the test suite contained 2185 tests, of which 1857 were applicable to this implementation. Of the applicable tests, 10 were withdrawn due to errors in the tests. All of the remaining 1847 applicable correct tests were passed. (author)

INDEX TERMS

COMPILERS VALIDATION
AVAILABLE FROM: THE AUTHOR

SPONSORS: U.S.A.F. ASD,WRIGHT-PATTERSON AFB, OH

CPM PLUS BOOTSTRAP LOADER IN JANUS/ADA

MANN, STEPHEN E.

DOCUMENT NUMBER: 5513 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL AND ADA, PP. 36-40

This article presents an example of a JANUS/Ada program. The example program is a portion of a CP/M Plus bootstrap sequence; CPMLDR (bootstrap loader) is executed before the operating system is loaded. The author concludes that even though JANUS/Ada is not a full Ada implementation, it is suited to systems programming and developing embedded systems for microcomputers.

INDEX TERMS

SYSTEM DESIGN MICRO COMPUTERS
EMBEDDED COMPUTER SYSTEMS

ADA INTERFACE

BULMAN, DAVID M.

DOCUMENT NUMBER: 5514 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL AND ADA, 3 P.

This article discusses the value of the Ada facilities for defining floating point and fixed point types. The author examines the difference between delta numbers and digit numbers, explains some reasons why both methods of representing real numbers are provided, and where they might be used.

INDEX TERMS

DATA TYPES	NUMERICAL MANIPULATION

ABSTRACT DATA TYPES IN ADA

APPELBE, WILLIAM F.

DOCUMENT NUMBER: 5515 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL AND ADA, PP. 26-36

Abstract data types are a type encapsulation concept for designing modular, well-structured software. Ada has a package construct for statically encapsulating groups of related declarations, and provides for abstract data type declarations using limited private types within packages. Other systems programming languages, such as CLU, provide a distinct class encapsulation construct for implementing abstract data types. This paper compares the mechanism adopted by Ada with a distinct class construct. The Ada mechanism has a number of disadvantages for Ada language users and implementors. The restrictions upon the use of abstract data types imposed by Ada may result in inefficient or insecure systems. (author)

INDEX TERMS

ABSTRACT DATA TYPES	LANGUAGE STRUCTURE	SECURITY
EFFICIENCY	CLU	DATA ABSTRACTION

MODULA-TO-ADA TYPE TRANSLATION

OGILVIE, JOHN W.L.

DOCUMENT NUMBER: 5516 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL AND ADA, PP. 30-36

This article discusses Modula-to-Ada type translation. The author compares Ada and Modula in order to identify the features and limitations of both languages with respect to data types. Enumeration, subrange, pointer, record, procedure, opaque and private types are examined in the comparison.

INDEX TERMS

ABSTRACT DATA TYPES MODULA

SPONSORS: BURROUGHS CORPORATION;
U. OF UTAH, SALT LAKE CITY, UTAH 84112

THE ARMY ADA EDUCATION PROGRAM

TURNER, DENNIS J.

DOCUMENT NUMBER: 5518 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 1-4

This paper provides an overview of the Army's Ada education and training program and summarizes the products and materials which are being produced under contracts with Softech, Inc., New York University, and Jersey City State College.

INDEX TERMS

PROGRAMMER TRAINING
AVAILABLE FROM: THE AUTHOR

THE U.S. ARMY MODEL ADA TRAINING CURRICULUM

TEXEL, PUTNAM

DOCUMENT NUMBER: 5519 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 5-10

This paper describes the U.S. Army Model Ada Training Curriculum, developed by Softech, Inc. for the U.S. Army, Ft. Monmouth, N.J. The curriculum consists of

individual modules which can be grouped together to form the courses and training plans that best satisfy the needs of specific organizations. The paper describes the modules in terms of content, prerequisites, and status, as of the date of this conference. Finally the paper addresses how a manager might go about using this curriculum to satisfy the training needs of his organization.

INDEX TERMS

PROGRAMMER TRAINING CURRICULA
AVAILABLE FROM: THE AUTHOR

CONFIGURATION MANAGEMENT WITH THE ADA LANGUAGE SYSTEM

THALL, RICHARD M.

DOCUMENT NUMBER: 5520 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 11-24

Three characteristics of large software projects and five basic configuration management capabilities are identified. The design of the Ada Language System (ALS) is then described in terms of these basic capabilities. The ALS is a computer programming support environment for Ada.

INDEX TERMS

CONFIGURATION MANAGEMENT ADA TOOL ENVIRONMENT
AVAILABLE FROM: THE AUTHOR

SPONSORS: U.S.ARMY COMM-ELECTRONICS CMD(CECOM), FT. MONMOUTH, NJ

LEARNING THE ADA INTEGRATED ENVIRONMENT

SNYDER, GEORGE

DOCUMENT NUMBER: 5521 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 25-30

The Ada Integrated Environment (AIE) is designed to be easy to learn and easy to use. It will be powerful, efficient, and friendly. This paper describes how these goals are addressed in the design of the Ada compiler, the MAPSE Command Language, and the Program Integration Facility. Plans for future tools are also described.

INDEX TERMS

ADA TOOL ENVIRONMENT
COMPILERS
DESIGN TOOLS AND TECHNIQUES
OPTIMIZATION

AVAILABLE FROM: THE AUTHOR

TEACHING ADA AT THE US MILITARY ACADEMY

COGAN, KEVIN J.

DOCUMENT NUMBER: 5522 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 31-34

This article describes the U.S. Military Academy's Ada education program. It gives a five-year history of teaching Ada with the NYU Ada/Ed translator which has evolved into an effective methodology for teaching top-down engineering design simultaneously with a bottom-up presentation of the Ada grammar. With emphasis on embedded hardware systems, students are confronted with successively more difficult design problems which must be written and executed on a VAX-11/780. Exposed to the Ada features of packages, concurrency, generics, and exception handling, students design, write and execute an extensive term project simulating a real-time embedded system using Ada. Projects approach the 1000 lines of source code limitation of the translator. Reusability of code is stressed by importing a previous year's package when feasible.

INDEX TERMS

CURRICULA
PROGRAMMER TRAINING

AVAILABLE FROM: THE AUTHOR

EXPERIENCES IN TEACHING ADA

CAVERLY, PHILIP; DROCEA, CHARLES; GOLDSTEIN, PHILIP; YEE, DONALD

DOCUMENT NUMBER: 5523 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 35-37

This paper reviews the experiences of several Ada courses given at the Jersey City State College. These Ada courses were structured so that students could start writing complete programs almost immediately. (The courses discussed in this paper using the Ada programming language are: training courses for Fort Monmouth, a one year undergraduate Ada language course, software engineering, a systems programming course, and a visiting faculty course.)

INDEX TERMS

CURRICULA

AVAILABLE FROM: THE AUTHOR

TEACHING ADA AT HAMPTON INSTITUTE

RUDD, DAVID

DOCUMENT NUMBER: 5524 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 38-41

This paper contains a description of an introductory course in Ada . It includes suggestions for a syllabus and for programming assignments, along with various comments and notes. The course described is a one-semester course (approximately 35 contact hours) intended for college students who have already learned at least one high-level language.

INDEX TERMS

CURRICULA PROGRAMMER TRAINING
AVAILABLE FROM: THE AUTHOR

THE CECOM SUMMER FACULTY RESEARCH PROGRAM

TEXEL, PUTNAM

DOCUMENT NUMBER: 5525 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 42-49

This paper describes the U.S. Army sponsored Faculty Research and Enhancement program. The Center for Tactical Computer Systems (CENTACS) located at Fort Monmouth, NJ, in support of its goal of fostering Ada expertise within the Historically Black College community, annually provides intensive Ada training for professors of these colleges. This training provides the professors with the necessary expertise to include Ada within their computer science curriculum, as well as broadening the Department of Defense research community. This paper describes the program and presents some educational issues and interesting Ada errors encountered during the course.

INDEX TERMS

CURRICULA PROGRAMMER TRAINING
AVAILABLE FROM: THE AUTHOR

TEACH ADA AS THE STUDENT'S FIRST PROGRAMMING LANGUAGE?

RICHMAN, SUSAN M.

DOCUMENT NUMBER: 5526 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 50-54

This paper discusses designing an Ada programming course for colleges and universities. The main issue is what level of expertise should be set as a prerequisite to the course. Ada being a complex language, should a student have experience with other high order languages? This paper contends that programming in Ada can be taught to the beginning programmer and there are decided advantages inherent in learning Ada as a first language. Some suggestions are offered for coping with the size and complexity of Ada.

INDEX TERMS

CURRICULA

AVAILABLE FROM: THE AUTHOR

AN ADA NETWORK: A REAL-TIME DISTRIBUTED COMPUTER SYSTEM

LANE, DEBRA S.; HULING, GEORGE; BARDIN, BRYCE M.

DOCUMENT NUMBER: 5527 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 55-61

This paper reports on a prototype real-time distributed computer system which will be implemented in Ada . The goals of the Ada network are to support transparent distribution of application software and incremental growth, and to provide fault-tolerant capabilities. Some of the motivations and methods for distributing software in a local network of communicating processors are discussed, in addition to the hardware configuration and software development facilities. The model of distributed Ada programs is then described. After the prototype software is implemented, the project will focus on assessing the performance characteristics of the network, specifically on distribution, executive software, and Ada language overheads.

INDEX TERMS

FAULT TOLERANCE
DISTRIBUTED PROCESSING
PROTOTYPES
TOP-DOWN IMPLEMENTATION
EMBEDDED COMPUTER SYSTEMS
REAL-TIME SYSTEMS

AVAILABLE FROM: THE AUTHOR

DCP-EXPERIENCE IN BOOTSTRAPPING AN ADA ENVIRONMENT

PARISH, STEVE; RUDMIK, ANDRES

DOCUMENT NUMBER: 5528 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 62-69

This paper describes experiences in developing a Distributed Software Engineering Control Process, (DCP). The DCP is a portable distributed Ada, programming support environment that provides centralized project management and control facilities integrated with an off-the-shelf Ada compiler and associated development tools. A goal of the DCP is to support the reuse of Ada programs and packages. This capability is supported in part by the DCP database which maintains descriptions of Ada packages and can be used to locate packages for reuse. An Ada PDL and methodology is being developed to support the development of reusable programs and packages as well as a methodology for building programs from existing packages. The goal of DCP portability is addressed by building virtual interfaces to the user, the database, and the host environment. The development methodology supported by the DCP is being used to develop the DCP, thereby bootstrapping itself. The methodology is currently supported by manual controls and procedures, but as the DCP capabilities are realized, they will be replaced by automated controls and procedures.

INDEX TERMS

COMPILERS	ADA TOOL ENVIRONMENT	
DEVELOPMENTAL METHODOLOGIES		
DEVELOPMENTAL TOOLS AND TECHNIQUES		DISTRIBUTED PROCESSING
PORTABILITY	SYSTEM ARCHITECTURE	

AVAILABLE FROM: THE AUTHOR

ADA FOR BUSINESS & OTHER NON-DOD APPLICATIONS

CRAFTS, RALPH E.

DOCUMENT NUMBER: 5529 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 70-73

A primary motivation for the U.S. Department of Defense in sponsoring Ada was to provide a common portable computer language for real-time military embedded computer systems. Ada incorporates many features and characteristics that are also appropriate for commercial, non-DoD applications. This paper will discuss some field-proven Ada business applications, ongoing commercial Ada efforts, the benefits derived from using Ada in this environment, and the potential for future commercial and business-oriented Ada applications.

INDEX TERMS

PORTABILITY BUSINESS AND FINANCIAL APPLICATIONS

AVAILABLE FROM: THE AUTHOR

EXPERIENCE WITH ADA FOR THE GRAPHICAL KERNEL SYSTEM

GILROY, KATHLEEN

DOCUMENT NUMBER: 5530 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 74-86

This paper describes the effort to produce an Ada language binding to the Graphical Kernel System (GKS) and to implement a subset of the GKS functionality in Ada. It presents an overview of the GKS/Ada project, discusses some of the issues raised during development of the GKS software, describes the results of a post-coding analysis comparing the binding and prototype code, and comments on the lessons drawn from this experience.

INDEX TERMS

DEVELOPMENTAL TOOLS AND TECHNIQUES GRAPHICS APPLICATIONS
PROTOTYPES

AVAILABLE FROM: THE AUTHOR

MILITARY COMPUTER FAMILY OPERATING SYSTEM: AN ADA APPLICATION

WUEBKER, FREDERICK E.

DOCUMENT NUMBER: 5531 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 86-88

The Military Computer Family Operating System (MCFOS) Program is an interesting Ada application effort. Not only will the operating system be one of the early Ada applications, but it is also an Ada operating system for a new family of machines and is designed to support fielded, real-time Ada applications programs. Finally, the operating system will be the first Ada program designed to be a formally verified, multilevel, secure system. This ambitious, but completely feasible program will certainly stretch the state of the art of Ada programming, if not actually advance it. This paper explores some of the Ada issues that have a major impact on the MCFOS program.

INDEX TERMS

OPERATING SYSTEMS REAL-TIME SYSTEMS

AVAILABLE FROM: THE AUTHOR

AN ADVANCED HOST-TARGET ENVIRONMENT FOR THE MILITARY COMPUTER FAMILY

HART, HAL; HART, RUTH; MUENNICHOW, ISABEL

DOCUMENT NUMBER: 5532 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 89-101

As part of the Military Computer Family Operating System (MCFOS) project, extensions to the Ada Language System (ALS) are being constructed which allow software for the MCF computers to be developed and tested in a host/target environment. These extensions are collectively known as the ALSE. ALS facilities are used for editing, compiling, linking, and exporting Ada programs, while ALSE facilities are used to download the software into a connected MCF computer and execute the software on the MCF, thus providing state-of-the-art high level debugging and performance monitoring facilities in an embedded target environment. This paper describes the components of the ALSE from a user's viewpoint, concentrating on how an applications programmer would use MCFOS and the Extended Ada Language System to develop software.

INDEX TERMS

SOFTWARE TOOL SYSTEMS DEVELOPMENTAL TOOLS AND TECHNIQUES
EMBEDDED COMPUTER SYSTEMS
AVAILABLE FROM: THE AUTHOR

MATHEMATICAL SUBROUTINE PACKAGES FOR ADA

MARTIN, BENJAMIN J.; BOZEMAN, ROBERT E.

DOCUMENT NUMBER: 5533 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 102-103

The authors of this paper demonstrate the feasibility of converting the Linpack routines for analyzing and solving systems of linear equations from FORTRAN to Ada. This is done with minimal alteration of the original program structure, thus requiring very little re-orientation by current users of LINPACK.

INDEX TERMS

CONVERSIONS NUMERICAL MANIPULATION

AVAILABLE FROM: THE AUTHOR

ADA TASKING IN NUMERICAL ANALYSIS

BUONI, JOHN J.

DOCUMENT NUMBER: 5534 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 104-108

Recently the interests in the use of iterative methods for the solution of Partial Differential Equations has been revived. Also, the advent of multiprocessor computer systems, will lead many to reformulate much of the existing theory of numerical analysis. It is felt that Ada's portability and rich resources will play an important role in this re-kindled interest. The purpose of this paper is to discuss three different implementations of classical iterative methods for the solution of a numerical problem using several Ada tasks.

INDEX TERMS

IMPLEMENTATION MICROPROCESSORS NUMERICAL MANIPULATION
CONCURRENT PROGRAMMING

AVAILABLE FROM: THE AUTHOR

ADA AND STATISTICS

JONES, ARTHUR M.

DOCUMENT NUMBER: 5535 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 109-110

This paper demonstrates a method by which a small college computer science department can introduce Ada into the curriculum without the burden of costly additions to its faculty. It is suggested that such a department should enlist the support of non-computer science departments as conveyors of Ada in the Problem domain. The example cited here illustrates Ada as a vehicle to describe a statistical problem in data analysis.

INDEX TERMS

CURRICULA

AVAILABLE FROM: THE AUTHOR

ADA AS A PROGRAM DESIGN LANGUAGE - HAVE THE MAJOR ISSUES BEEN ADDRESSED AND ANSWERED?

BLASEWITZ, ROBERT M.

DOCUMENT NUMBER: 5536 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 111-114

In this paper various reasons are given for the use of program design language (PDL). Also discussed is the Ada Programming Language as a PDL. The objectives of the Ada language are summarized in this paper to illustrate the common thread of interest between the rationale for the Ada language and a common program design language based on Ada. An overview is also given that illustrates how some features that make Ada so desirable as a language also enforce its choice as a design language.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL)
AVAILABLE FROM: THE AUTHOR

ADA DESIGN LANGUAGE CONCERNS

GRAU, KAYE J.; COMER, EDWARD R.

DOCUMENT NUMBER: 5537 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 115-124

This paper examines key language concerns regarding Ada Design Languages (DL's) in regard to: life cycle applicability, the information expressed by an Ada DL, relationship of an Ada DL to the Ada language, extension of the Ada language through structured commentary and annotation, and the relationship between methodology and Ada Design Language. An assessment is made of the relative maturity of Ada DL's and of the obstacles to successful development of an Ada DL standard.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL) SPECIFICATION LANGUAGES
REQUIREMENTS LANGUAGE SOFTWARE LIFE CYCLE
AVAILABLE FROM: THE AUTHOR

SEEDING THE ADA SOFTWARE COMPONENTS INDUSTRY

BOWLES, DR. KENNETH L.

DOCUMENT NUMBER: 5538 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 125-128

The principle aim of the Ada effort is economic - particularly the enhancement of designer/programmer productivity in all parts of the software life-cycle. A shift in system design practice to widespread use of off-the-shelf large scale Ada software components would result in productivity gains exceeding a factor of ten - far more than likely to result from use of productivity enhancing software tools. To achieve widespread use of off-the-shelf Ada components requires establishment of a software components industry, and a shift in attitudes about education of system designers to use Ada. This paper reviews progress to date.

INDEX TERMS

REUSABILITY

AVAILABLE FROM: THE AUTHOR

ECONOMIC, SOCIAL, AND LEGAL ASPECT OF SOFTWARE IN THE FUTURE

FELDMAN, IRV

DOCUMENT NUMBER: 5539 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 129-131

This paper discusses the ways in which our economic, social and legal systems have been and will continue to be affected. In some cases restructuring of those systems will be required, thereby creating dislocation. There are many problems to be solved and most do not have easy solutions. Ada and the techniques it uses, will definitely play a part in helping to find these solutions.

INDEX TERMS

SOCIAL ISSUES LEGAL ISSUES ECONOMIC ISSUES

AVAILABLE FROM: THE AUTHOR

OPERATING SYSTEM INTERFACE FOR ADA INSTRUCTORS

FUHR, DONALD C.

DOCUMENT NUMBER: 5540 TYPE: PAPER

PROCEED. OF THE 2ND ANNUAL CONF. ON ADA TECHNOLOGY, PP. 132-138

This paper is intended to assist Ada instructors using the Digital VAX/VMS operating system. It gives a brief discussion of some features of the VAX/VMS operating system that do not appear in the Primer, but which someone doing extensive work on a VAX might find useful. It was not intended to be an exhaustive treatment, but to provide pointers to potentially useful functions and aid in understanding some of the performance-determining actions of the system. Syntax of the commands and other options not discussed here can be found in the Help library or in the complete system documentation. Broad knowledge of these topics help any user to work more efficiently and participate effectively in the overall management of the system for the benefit of all users.

INDEX TERMS

VMS

AVAILABLE FROM: THE AUTHOR

DESIGN AND IMPLEMENTATION OF PROGRAMMING LANGUAGESS, VOL. 54 LECTURE NOTES IN COMPUTER SCIENCE

U.S. DEPT. OF DEFENSE

DOCUMENT NUMBER: 5542 TYPE: TEXT

This report contains the proceedings of the DoD Sponsored Workshop "Design and Implementation of Programming Language" held on September 30 and October 1, 1976 at Cornell University in Ithaca, New York. The articles in this proceedings were part of the initial development of Ada as a single common programming language for military applications. The report is organized into five sections. The first is a brief review by David Fisher of the DoD's common programming language effort. Section II is a trasnscript of the discussion of data types. Section III is the discussion of parallel processing, machine dependence and program verification. Section IV is the discussion of specifications, optimization and run support systems. The papers throughout the transcripts of the discussions have been collected and appear in Section V. (author)

INDEX TERMS

IMPLEMENTATION TECHNOLOGY TRANSFER EMBEDDED LANGUAGES

AVAILABLE FROM: SPRINGER-VERLAG, INC., NEW YORK NY 10010

A NOTE ON "POINTERS"

EARNEST, C.P.

DOCUMENT NUMBER: 5543 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 86-101

One of the key issues in data structural models, and therefore in programming language design, is the way in which parts of dynamically constructed structures are interconnected. In programming languages, some sort of "pointer" mechanism is normally used for the purpose. No two languages have the same mechanisms, and the TINMAN D6 requirement calls for one not in any existing language. The issue is closely related to a number of others -- for example, the way in which a variable is connected to its value, a structure to its components, a formal parameter to an actual parameter. The issue is also related to the structural models used in database management systems, but these are mentioned only briefly in this paper. All the above aspects should be treated within a single general framework, and a possible one is outlined later in the paper. First, the problems to be solved are described, and a brief discussion is given of leading current mechanisms, and of the TINMAN requirement. This article was part of the initial development of Ada as a single common programming language for military applications. (author)

INDEX TERMS

POINTERS STRUCTURED DESIGN

SOME ISSUES IN DATA TYPES AND TYPE CHECKING

BROSGOL, BENJAMIN M.

DOCUMENT NUMBER: 5544 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 102-130

This paper presents a survey of issues which arise in contemporary High Order Languages in conjunction with the implementation of data types and type checking. Attention is paid to alternatives and tradeoffs in language features which realize various desirable goals regarding data types. Interactions between features are pointed out, and implementation techniques are discussed. This article was part of the initial development of Ada as a single common programming language for military applications. (author)

INDEX TERMS

IMPLEMENTATION DATA TYPES PROGRAMMING LANGUAGE

MODELS OF DATA OBJECTS AND DATA TYPES

NESTOR, JOHN R.

DOCUMENT NUMBER: 5545 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 131-170

Several models for data objects and for data type relationships are discussed and compared. The models for objects discussed are: (1) Representational models in which representations are visible; (2) Behavioral models in which representations are hidden; and (3) Operational models in which multiple hidden representations are permitted. For each model the handling of shared information as aggregates is discussed. Several kinds of type relationships are considered: mixed type operations, generic operations, polymorphic operations, representational relationships and component relationships. Two programming language models that permit objects having any of several types to be used in a single context are discussed: (1) Conversion models in which conversion functions are used; and (2) Lattice models in which bi-directional mappings are used. Finally some possible research directions for developing improved models are suggested. This article was part of the initial development of Ada as a single common programming language for military applications. (author)

INDEX TERMS

RELATIONAL DATA MODEL DATA TYPES MODELS

SPONSORS: U.S.NAVY,ELECTRONICS LAB'TORY CNTR,SAN DIEGO,CA 92152

ENCAPSULATED DATA TYPES AND GENERIC PROCEDURES

DEMERS, ALAN J.; DONAHUE, JAMES E.; TEITELBAUM, RAY T.; WILLIAMS, JOHN H.

DOCUMENT NUMBER: 5546 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 171-214

In this paper two programming language capabilities, encapsulated data types and polymorphic procedures, and their mutual dependence and effect on each other are considered. The paper is organized as follows: In section 1 the motivation behind studying these capabilities is given and some general questions are addressed on the research performed; In section 2, considered carefully is the meaning of such notions as data types, type checking and parameterized types; Section 3 presents an overview of various encapsulation mechanisms, and compares and contrasts their relative advantages and limitations. Finally, section 4 explores polymorphic constructs in general and generic procedures in particular. This article was part of the initial development of Ada as a single common

programming language for military applications. (author)

INDEX TERMS

DATA TYPES PROGRAMMING LANGUAGE

SPONSORS: NATIONAL SCIENCE FOUNDATION;
NATIONAL SCIENCE FOUNDATION;
ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

RUN-TIME CHECKING OF DATA ACCESS IN PASCAL-LIKE LANGUAGES

FISCHER, CHARLES N.; LEBLANC, RICHARD J.

DOCUMENT NUMBER: 5547 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 215-230

The techniques for run-time checking discussed in this paper were developed in the course of designing a PASCAL compiler for the UNIVAC 1110. The design of these techniques follows three basic principles: (1) Any existing language restriction should be checkable, either during compilation or at run-time; (2) Run-time checks should be efficient, limited to a few in-line instructions, if possible; and (3) If a particular language feature requires run-time checking, only usage of this feature should bear the extra overhead. Two features of PASCAL that require run-time checking will be considered: discriminated union (DU) types (records with variants) and pointer types. This article was part of the initial development of Ada as a single common programming language for military applications. (author)

INDEX TERMS

PASCAL OPTIMIZATION

A LANGUAGE DESIGN FOR STRUCTURED CONCURRENCY

DENNIS, JACK B.

DOCUMENT NUMBER: 5548 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 231-242

This article considers a limited context for the design of a programming language that includes support for representing concurrency of computation. The context is one that appears to be of great significance in forthcoming years: interconnected microcomputers. The language LSC (Language for Structured Concurrency) is formulated to include a kind of program unit called a system which is an interconnection of simpler units by links over which data values are passed. Thus, the units comprising a system may be readily assigned to different

microcomputers to distribute processing activities over system components in a balanced way. This article was part of the initial development of Ada as a single common programming language for military applications. (author)

INDEX TERMS

CONCURRENT PROGRAMMING MICRO COMPUTERS PROGRAMMING LANGUAGE
STRUCTURED PROGRAMMING

SPONSORS: NATIONAL SCIENCE FOUNDATION

LANGUAGE FEATURES FOR PARALLEL PROCESSING AND RESOURCE CONTROL

ANDREWS, GREGORY R.; MCGRAW, JAMES R.

DOCUMENT NUMBER: 5549 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 243-287

This paper presents a set of language features for describing processes and process interaction, gives examples of their use, and briefly discusses their relation to the goals. Two constructs, resources and protected variables, are introduced as the mechanisms for describing interaction. Resources are extensions of the monitor concept of Hoare; protected variables are global variables which can only be accessed by one process at a time. Two types of access control are introduced: restrictions on scope rules for static access, and capabilities for dynamic access. Examples include the interface to machine devices, files and virtual devices, device scheduling, device reservation, and buffer allocation. This article was part of the initial development of Ada as a single common programming language for military applications. (author)

INDEX TERMS

PARALLEL PROCESSING ACCESS-CONTROL MECHANISMS

SPONSORS: NATIONAL SCIENCE FOUNDATION;
NATIONAL SCIENCE FOUNDATION

SEPARATE DEFINITION AND COMPILATION IN LIS AND ITS IMPLEMENTATION

ICHBIAH, JEAN D.; FERRAN, GUY

DOCUMENT NUMBER: 5550 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 288-297

This paper presents the language entities introduced in the LIS language for separate definition and compilation. Instantiation and visibility rules are then

described. Finally, the main functions of the separate compilation system which manages the compilation units are reviewed. Separate compilation in LIS is an evolution from the earlier proposal in the SUE language. The main differences are in terms of the facilities offered for modularization-partitions, and in the explicit designation of the compilation units. This article was part of the initial development of Ada as a single common programming language for military applications. (author)

INDEX TERMS

LIS	IMPLEMENTATION	

REQUIREMENTS FOR REAL-TIME LANGUAGES

DREISBACH, TIMOTHY A.; WEISSMAN, LARRY

DOCUMENT NUMBER: 5551 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 298-312

"Real-time systems" is an all-encompassing term that includes systems from many diverse application areas. A common property of these systems is that they contain processing that must be completed under critical time constraints. The language requirements for real-time systems differ more in degree than in nature from the requirements for other systems. This paper discusses five categories of requirements at a fairly general level and describes specific requirements in each of the areas. The five categories are reliability, maintainability, power, efficiency, and portability. Requirements which differ significantly in degree for real-time systems, and language capabilities and features to meet those requirements are discussed. The paper does not propose specific features for the "ideal" real-time language, but points out the areas of concern. This article was part of the initial development of Ada as a single common programming language for military applications. (author)

INDEX TERMS

REAL-TIME SYSTEMS	REQUIREMENTS LANGUAGE	RELIABILITY
MAINTENANCE	PORTABILITY	EFFICIENCY

SPONSORS: ELECTRONIC SYSTEMS DIV., AFSC

REMARKS ON THE IMPACT OF PROGRAM VERIFICATION ON LANGUAGE DESIGN

LONDON, RALPH L.

DOCUMENT NUMBER: 5552 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 313-320

This paper discusses the impact of program verification on language design. Two programming language examples, Euclid and Alphard, are presented to show how their designs have been influenced by verification concerns. This article was part of the initial development of Ada as a single common programming language for military applications. (author)

INDEX TERMS

VERIFICATION LANGUAGE DESIGN EUCLID
ALPHARD

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

TARGET COMPUTER INDEPENDENT OPTIMIZATION PROCEDURES FOR METACOMPILERS

COHEN, PAUL M.

DOCUMENT NUMBER: 5553 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 321-334

Efficient use, by several computers, of a common high order language may be accomplished with cross-compiling techniques and a metacompiler which permits the development of the several compilers from a single computer program. This article describes the generic optimization which has been demonstrated on an experimental metacompiler called FLAG (Flexible Language Generator). A set of examples to illustrate the target computer's independent optimization are also provided in this paper. This article was part of the initial development of Ada as a single common programming language for military applications. (author)

INDEX TERMS

OPTIMIZATION COMPILER-COMPILERS

THE NEED FOR OPTIMIZATION STANDARDS

GOODENOUGH, JOHN B.

DOCUMENT NUMBER: 5554 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 335-344

The premise of this paper is that in writing programs for military systems, programming style is often strongly affected by a compiler's optimization behavior. The paper includes: some examples supporting this conclusion by

illustrating the style of optimization standards that should be applied to the DoD Common Language; a discussion on the interaction between language design decisions and optimization standards; some possible effects of optimization standards on compiler procurement procedures; and concludes with a brief analysis of the impact of these ideas on Common Language requirements as expressed in the TINMAN document. This article was part of the initial development of Ada as a single common programming language for military applications. (author)

INDEX TERMS

OPTIMIZATION	STANDARDS	LANGUAGE DESIGN

SPONSORS: U.S.ARMY

A REMINDER FOR LANGUAGE DESIGNERS

RICHARD, FREDERIC; LEDGARD, HENRY F.

DOCUMENT NUMBER: 5555 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 345-389

Current programming languages offer limited support in the development and maintenance of programs. These languages do not always account for the human limitations of their users. Notably, few languages really promote ease of readability. This paper suggests nine design principles for the development of readable high level languages. Each principle is backed up by a discussion and several examples. Among the issues discussed are the limitation of the overall complexity, the design of function and procedure facilities, the design of data type facilities, and the correspondence between syntax and semantics. This article was part of the initial development of Ada as a single common programming language for military applications. (author)

INDEX TERMS

LANGUAGE DESIGN	DESIGN METHODOLOGIES	PROGRAMMING LANGUAGE
PROGRAM VALIDATION	PROGRAM MAINTENANCE	

SPONSORS: U.S.ARMY RESEARCH OFFICE

PROGRAMMING LANGUAGE DESIGN ISSUES

CHEATHAM, T. E., JR.

DOCUMENT NUMBER: 5557 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 399-435

This paper looks at several issues in the design of a language like the DoD

Common Programming Language. In particular, focus is made on those issues which arise in considering tools to aid in the process of program development validation, and maintenance. This article was part of the initial development, of Ada as a single common programming language for military applications. (author)

INDEX TERMS

LANGUAGE DESIGN	DEVELOPMENT	SOFTWARE TOOLS
PROGRAM VALIDATION	PROGRAM MAINTENANCE	

PARALLEL PROCESSING AND MODULAR SOFTWARE CONSTRUCTION

JACKSON, K.

DOCUMENT NUMBER: 5558 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 436-443

The one common denominator in the software for all real time computer systems is that it consists of a set of co-operating parallel processes. This is true whether the parallelism is achieved by having many hardware processors or by multiplexing a single processor among many competing processes (pseudo-parallelism); it is also independent of the way the pseudo-parallelism is achieved, eg. interrupts, scheduler etc. It is therefore regretable that in the TINMAN document this topic receives only scant treatment. In fact only two sub-sections of the document are devoted to this topic. This paper stresses the importance of considering co-operating parallel processes early in the software design of a programming language. Starting from the parallel processing common denominator, the advantages of bringing this out into the open at as early as possible a stage in the software design are considered. The consequences of this approach are that the concept of 'the program' disappears and is replaced by a network of parallel processes and data areas. This enables a different and more flexible approach to software construction to be adopted. The language implications of this approach are quite minor but the advantages in terms of software quality and true modularity are very significant as also are the consequences on ease of management. This article was part of the initial development of Ada as a single common programming language for military applications. (author)

INDEX TERMS

PARALLEL PROCESSING	MODULAR PROGRAMMING	REAL-TIME SYSTEMS

THE TINMAN NEEDED CHARACTERISTICS

U.S. DEPT. OF DEFENSE

DOCUMENT NUMBER: 5559 TYPE: PAPER

PROCEED OF A DOD SPONSORED WORKSHOP ITHACA,OCT.76, PP. 445-496

This appendix provides a set of characteristics that an existing, modified or new language should have to staisfy the Department of Defense requirements for a Common High Order Computer Programming Language. The characteristics represent a synthesis of the requirements submitted by the Military Departments and are intended to be self-consistent and achievable with existing computer software and hardware technology. This article was part of the initial development of Ada as a single common programming language for military applications. (author)

INDEX TERMS

LANGUAGES LANGUAGE DESIGN LANGUAGE EVALUATION

ADA-EUROPE/ADATEC JOINT SYMPOSIUM AND TUTORIAL ON ADA

PAYTON, TERI F.

DOCUMENT NUMBER: 5562 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL III, ISSUE 2, PP. 35-45

This paper briefly discusses the papers presented at the Ada -Europe/AdaTEC symposium and tutorial on Ada which was sponsored by the Commission of the European Communities at the Borschette Conference Center in Brussels on March 14-17, 1983.

INDEX TERMS

TECHNOLOGY TRANSFER

CONSISTENCY CHECKING IN ADA AND ANNA: A TRANSFORMATIONAL APPROACH

BRUCKNER, BERNO-KRIEG

DOCUMENT NUMBER: 5563 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL III, ISSUE 2, PP. 46-54

The author of this article discusses verification tools and techniques for statically checking consistency with respect to constraints. He then discusses the generalized constraint concepts of ANNA-- a language developed at Stanford University for augmenting Ada programs with formal comments. He described the transformation of Ada constraints into ANNA annotations and then into basic Annita assertions to facilitate verification of Ada programs. (author)

INDEX TERMS

STATIC ANALYSIS TRANSFORMATION ASSERTIONS

A DISTRIBUTED KAPSE ARCHITECTURE

INVERARDI, P.; LEVI, G.; MONTANARI, U.; VALLARIO, G.N.

DOCUMENT NUMBER: 5564 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL III, ISSUE 2, PP. 54-61

U. Montanari of the University of Pisa discussed a distributed KAPSE architecture that is part of the Campus Net project funded by the Italian National Research Council and some Italian industries. The university, Olivetti and STET are collaborating on this local area network project. The project utilizes an intermediate distributed virtual machine (X-coded) with Ada as the high-level system language. Montanari stressed the need for dynamic reconfiguration in a distributed embedded application. The KAPSE is implemented with Ada plus a capability for dynamic reconfiguration. (author)

INDEX TERMS

EMBEDDED COMPUTER SYSTEMS ADA TOOL ENVIRONMENT
DISTRIBUTED PROCESSING

IMPLEMENTATION IMPLICATIONS OF ADA GENERICS

BRAY, GARY

DOCUMENT NUMBER: 5565 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL III, ISSUE 2, PP. 62-71

Generic program units as defined in Ada pose several important design issues for compilers, both in semantic analysis and in runtime implementation. Chief among these issues are separate compilation of generic bodies and the sharing of code among several instantiations of a generic. An implementation is described that allows separate compilation of generic bodies with full semantic checking and that automatically shares instance bodies based on the characteristics of the actual parameters. A single instance body is generated for each "instance class". Instance classes are formed by actual parameters with the same representation attributes. (author)

INDEX TERMS

COMPILERS IMPLEMENTATION DATA SEMANTICS

SPONSORS: U.S.AIR FORCE

ADA COMPILER QUALITY ASSURANCE

MOLICH, ROLF

DOCUMENT NUMBER: 5566 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL III, ISSUE 2, PP. 72-75

As part of the European Economic Community Portable Ada Programming System project, Dansk Datamatik Center (DDC) is presently developing a full Ada compiler for mini-computers. Rolf Molich of the Dansk Datamatik Center discussed quality assurance for the PAPS test compiler. The QA program is divided into: (a) preventive QA to design quality into the product via standards reviews and reporting, and (b) verification which tests that the resulting product meets certain measurable criteria. Rolf believes that in their situation it was beneficial to review documents but not to review code. Code reviews would lead to resistence by the software staff. (author)

INDEX TERMS

QUALITY ASSURANCE COMPILERS

SOME COMMENTS ON "EXPERIENCES WITH MATRIX MULTIPLICATION USING ADA TASKS"

HEKER, WOLF-DIETER

DOCUMENT NUMBER: 5567 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL III, ISSUE 2, 1 P.

This article discusses some errors and misunderstandings published in a paper by Fernandez et al in Ada Letters Volume 2, 5/83.

INDEX TERMS

TECHNOLOGY TRANSFER NUMERICAL MANIPULATION

MINIMAL HOST FOR THE KAPSE

WILDER, WILLIAM L.

DOCUMENT NUMBER: 5568 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL III, ISSUE 2, PP. 77-88

The concept of a minimal host for the Kernal Ada Programming Support Environment (KAPSE) is explored and several criteria for categorizing the minimal KAPSE host are collected. This criteria includes the users' view of the environment that the KAPSE has to support, the Instruction Set Architecture of the host, the host's hardware configuration, and the host machine's operating system. Some recommendations as to the actual requirements for the minimal KAPSE host are given and several interesting conclusions about the minimal host for the KAPSE are drawn. (author)

INDEX TERMS

ADA TOOL ENVIRONMENT ARCHITECTURE OPERATING SYSTEMS

ADA-EXTENDED STRUCTURE CHARTS

BECKER, LEE A.

DOCUMENT NUMBER: 5569 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL III, ISSUE 2, PP. 93-97

This paper discusses the motivation for the development of an Ada-based program design language (PDL). This article also discusses structure charts as a algorithm design tool. Finally, structure chart figures sufficient to represent Ada control structures are presented and exemplified in this paper.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL)
DESIGN TOOLS AND TECHNIQUES
STRUCTURED PROGRAMMING

ABOUT A PURE FORMAL PROBLEM IN ADA

KOHLER, CHRISTIAN

DOCUMENT NUMBER: 5570 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES, VOL 16, ISSUE 10, 2 P.

This short article consists of two examples that illustrate what the author asserts is a flaw in Ada. These examples are concerned with the relationship of a derived type to the operations of its parent type, especially when units are separately compiled.

INDEX TERMS

INFORMATION HIDING

SOFTWARE ENGINEERING WITH MODULA-2 AND ADA

WIENER, RICHARD S.; SINCOVEC, RICHARD F.

DOCUMENT NUMBER: 5607 TYPE: TEXT

This is a book on modern software engineering. The book is designed to be used by undergraduate students as well as practicing computer science and software development professionals. It is assumed that the reader has developed software in at least one high level language, preferably Pascal. Each stage of the software engineering process is examined in this book.

INDEX TERMS

MODULA
TOP DOWN TESTING
PROGRAMMING TECHNIQUES/METHODOLOGIES
DESIGN METHODOLOGIES
SOFTWARE ENGINEERING
SOFTWARE LIFE CYCLE
SOFTWARE TOOLS
BOTTOM-UP TESTING
MODULAR PROGRAMMING

AVAILABLE FROM: JOHN WILEY & SONS, 605 3RD AVE., N[illegible], NY 10016

PARALLEL PROGRAMMING IN ANSI STANDARD ADA

CHERRY, GEORGE W.

DOCUMENT NUMBER: 5633 TYPE: TEXT

This book is about parallel programming; its notation is ANSI standard Ada . It was written with nearly equal interest in parallel programming and in Ada. The topics discussed in this book are Petri-net graphs, parallel, independent processes, Ada rendezvous, and exception handling in parallel programs.

INDEX TERMS

PETRI NETS CONCURRENT PROGRAMMING DISTRIBUTED PROCESSING
FAULT TOLERANCE

AVAILABLE FROM: PRENTICE-HALL,200 OLD TAPPAN RD,OLD TAPPAN,NJ 07645

THE PROGRAMMING LANGUAGES: PASCAL, MODULA, CHILL, AND ADA

SMEDEMA, C.H.; MEDEMA, P.; BOASSON, M.

DOCUMENT NUMBER: 5634 TYPE: TEXT

"The Programming Languages: Pascal, Modula, Chill and Ada" takes four modern languages and details their evolution and relation to one another. Introduced in historical order, emphasis is put on the concepts of each language that are novel or different from the language that precedes it. Precise and informal, the book looks at and compares the facilities provided by the four languages with the help of many examples; it does not teach the languages themselves. New concepts are explained within the context of the relevant language.

INDEX TERMS

PASCAL MODULA CHILL
PROGRAMMING LANGUAGE

AVAILABLE FROM: PRENTICE-HALL,200 OLD TAPPAN RD,OLD TAPPAN,NJ 07645

ADA, COUNTESS OF LOVELACE, AND HER CONTRIBUTION TO COMPUTING

HUSKEY, VELMA R.; HUSKEY, HARRY D.

DOCUMENT NUMBER: 5636 TYPE: JOURNAL ARTICLE

ABACUS, VOL 1, ISSUE 2, PP. 22-29

The first part of this article describes how Charles Babbage's analytical engine talk was translated and how Lady Lovelace's notes of Babbage's planned machine were published. The second part gives a brief biography of Lady Ada Augusta, the Countess of Lovelace, with emphasis on the scientific aspects of her short and varied life. The final section deals with an evaluation of her contribution to the field of computing.

INDEX TERMS

HISTORY

CONCURRENT COMMUNICATION AND SYNCHRONIZATION MECHANISMS

WILLIAMSON, RONALD; HOROWITZ, ELLIS

DOCUMENT NUMBER: 5641 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE, VOL 14, ISSUE 2, PP. 135-152

The concepts of process and guarded command have become the basic building blocks in concurrent programming language design. In this paper, the authors deal with many of the proposed communication and synchronization primitives, and they compare them from the perspective of their implementability. The authors' evaluation treats four basic criteria: the length of synchronization, process termination, deadlock, and protocol complexity. Finally, in this article the authors mention the Ada programming language in parts of the discussion.

INDEX TERMS

IMPLEMENTATION	DISTRIBUTED PROCESSING	PARALLEL PROCESSING
CONCURRENT PROGRAMMING	LANGUAGE DESIGN	LANGUAGE EVALUATION

JOINT-SERVICE ACQUISITION MANAGEMENT INITIATIVES

BABEL, PHILIP S.

DOCUMENT NUMBER: 5653 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 15-18

Motivated by the high cost of mission-critical software development, one of the specific objectives of the STARS (Software Technology for Adaptable, Reliable Systems) program is to significantly increase software productivity through more effective use of existing techniques. One estimate suggests the DoD can improve software productivity by a factor of four by 1990 by using these existing techniques. The STARS program also has as its goal improving the quality, integrity, and adaptability of mission-critical software. One of these is the

area of Acquisition Management. Acquisition Management is the activity performed by the government organization chartered to acquire a defense system. This article provides an overview of activities to improve the area of Acquisition Management. This paper was presented at the 1st Annual Washington Ada Symposium.

INDEX TERMS

SOFTWARE TOOLS ACQUISITION MANAGEMENT

ADA FOUNDATION FOR WIS

GREENE, JOSEPH S. JR.; WHITAKER, LT. COL. WM. A

DOCUMENT NUMBER: 5654 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 19-25

The World-Wide Military Command and Control System (WWMCCS) Information System (WIS) is presently under development as a Joint Program. The software for this system is being developed using many advanced techniques: Ada , a "software first" strategy, a heavy investment in software tools, and a large emphasis on standardization, are among the many components of WIS. This article provides an overview of these features of the development effort.

INDEX TERMS

SOFTWARE TOOLS SOFTWARE ENGINEERING STANDARDS

GREAT EXPECTATIONS: ADA SOFTWARE ACQUISITION

BENDER, JAMES

DOCUMENT NUMBER: 5655 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 27-29

Ada is a powerful programming language developed to solve the problems of increased software development costs and failing quality; however, Ada's size, power, and complexity pose new problems and challenges for programmers and managers. The problems created by the advent of Ada can be categorized in three general areas: scarcity of well qualified, Ada-trained programmers and managers; lack of a mature Ada programming methodology; and lack of validated Ada compilers for most computers. The solutions to these problems require training for both programmers and managers, designing in Ada software development methodology, and disseminating information regarding the problems and solutions involved with developing Ada compilers. In time, these problems will be solved, but the solutions are taking longer than the architects of Ada originally

envisioned. The challenge is to solve the problems with using Ada before Ada is made obsolete by new technologies. (author)

INDEX TERMS

EDUCATION	COMPILERS	DESIGN METHODOLOGIES
REQUIREMENTS ENGINEERING METHODOLOGIES		ACQUISITION MANAGEMENT

THE DISTRIBUTED SOFTWARE ENGINEERING CONTROL PROCESS: AN ADA DEVELOPMENT ENVIRONMENT

DEMPSEY, JAMES B.

DOCUMENT NUMBER: 5656 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 31-37

The Distributed Software Engineering Control Process (DCP) is a WIS-JPMO, Technology Directorate prototype program. The database at each site holds fundamental information on software designs, code units, data elements and documentation for application systems. Any DCP user has the global ability to view and access the DCP data at all sites. An Encyclopedia-function allows all users to view the databases collectively as a common pool of potentially reusable objects. The Control Process standards for capturing and disseminating useful information about other Ada implementations fosters Ada program reuse among dispersed developers. The categories and content of information captured supports software life cycle management and large scale system development. (author)

INDEX TERMS

SOFTWARE TOOLS	RELATIONAL DATA MODEL	APPLICATIONS
REUSABILITY		

SPONSORS: WIS JOINT PROGRAM OFFICE, WASHINGTON,DC

THE FUTURE GOVERNMENT AND INDUSTRY SOFTWARE TOOLS TOOLS MARKETPLACE

REDWINE, SAMUEL T., JR.

DOCUMENT NUMBER: 5657 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 41-45

This paper examines how a market in software tools might be structured in order to encourage its quick development. In particular, the author thinks segmentation by means of standard interfaces will promote such development. CAIS (Common Ada Programming Support Environment Interface Set) and MIL-STD-SDS are

cited as examples of moving in this direction toward standardizing interfaces. Distribution/pricing mechanisms are also discussed briefly.

INDEX TERMS

ECONOMIC ISSUES SOFTWARE TOOLS

ADA AND THE MILITARY COMPUTER FAMILY (MCF)

FONASH, PETER M.

DOCUMENT NUMBER: 5658 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 47-51

The use of computers in every facet of life has introduced an almost overwhelming number of computer hardware and software combinations. This variety provides computer users with the ability to select a computer hardware/software configuration which is tailored to their particular needs, however, this diversity has a price. Each configuration is to some degree incompatible with any of the other different hardware/software configurations. This article briefly outlines some of the costs of this diversity and some of the programs that address this problem. This article was presented at the First Annual Washington Ada Symposium.

INDEX TERMS

SOFTWARE ISSUES SOFTWARE TOOLS STANDARDS
MILITARY COMPUTER FAMILY MANAGEMENT

THE NEED FOR NEW PROCUREMENT STRATEGIES FOR NEW SOFTWARE TECHNOLOGY

PROBERT, DR. THOMAS H.; SLUSARCZUK, MARKO M.G.

DOCUMENT NUMBER: 5659 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 55-58

The frequent cost overruns, schedule slippages, and poor performance often occurring in DoD (and other) software-based systems is almost always laid upon the doorstep of either the contractor, the DoD program management, or the applicable acquisition and procurement regulations. Sometimes one or more of these doorsteps is appropriate. In addition, the quality of the delivered system is often less at delivery time than a comparable system delivered with a strictly commercial orientation. The authors contend, however, that such simplistic fingerpointing may not always be justified. The resource problems associated with software development have been noted since the 1960's with notions of a "software crisis." The problem has been much studied since that

time and most of these studies have had some effect. However, the problem still persists. The authors identify areas of concern in the way in which Software Systems are procured. This paper was presented at the First Annual Washington Ada Symposium. (author)

INDEX TERMS

ACQUISITION MANAGEMENT
STANDARDS
SOFTWARE TOOLS
SOFTWARE DATABASE
SOFTWARE ENGINEERING

TEACHING ADA: A COMPARISON OF TWO APPROACHES

BAILEY, JOHN

DOCUMENT NUMBER: 5660 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 63-70

This paper describes an experimental comparison of two approaches to teaching the Ada language. The goal was to discover an effective way to teach students the use of the language as a vehicle to apply information hiding and data abstraction to software development. The fifty-four participants in the study were enrolled in an advanced undergraduate Ada class at the University of Maryland. Baseline data was gathered on every student, including programming aptitude scores. The class was then randomly divided into two sections. One section was taught the language features first, approximately in the order that they are presented in the language manual, and then shown how packages can be used to encapsulate objects, resources, and types when a system is first designed. The other section was taught these principles of encapsulation first by learning to use the Ada package to express designs before the lower-level language features were presented. The same set of lectures was eventually presented to both sections. (author)

INDEX TERMS

PROGRAMMER TRAINING
INFORMATION HIDING
SOFTWARE ENGINEERING
DATA ABSTRACTION

HOW TO BUY A COMPILER FROM A SMALL BUSINESS

EDWARDS, J.A.; MOWDAY, B.L.

DOCUMENT NUMBER: 5661 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 77-84

In 1981 General Dynamics undertook an avionics development program that focused on the application of military standards to processors, software, and communications protocols. An evaluation of existing Jovial J73 compiler toolsets

showed that none were capable of meeting the needs of the aggressive program. Consequently, a decision was made to acquire a support software system as part of the avionics project. This decision afforded both opportunities and risks. The acquisition process could address many deficiencies of special-created software for non-production environments. By not using existing software, though, General Dynamics assumed the risk of developing the compiler in parallel with the development of application programs. This last fact, as will be detailed later, has affected many of the decisions made regarding the avionics development and meant that constant pressure kept the compiler development in pace with the applications software needs. Implications for Ada are indicated. (author)

INDEX TERMS

COMPILERS ACQUISITION MANAGEMENT JOVIAL

CONSIDERATIONS IN ACQUIRING ADA COMPILERS

ZEIGLER, DR. STEPHEN F.

DOCUMENT NUMBER: 5662 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 85-90

In the near future Ada users may be faced with a new kind of decision: which Ada compiler to use for a given host/target combination. The selection of an Ada compiler is not entirely like the selection of a compiler for an older language, say FORTRAN. Ada represents something of a new philosophy, putting new pressures on its compilers and support environment. The authors discuss the Ada philosophy, the resulting compilation problems, and what to look for in a compiler in order to avoid these potential problems. Their intent is to expose the unusual aspects of Ada use, rather than to present traditional compiler evaluation criteria. (author)

INDEX TERMS

COMPILERS ACQUISITION MANAGEMENT

EXPERIENCE IN USING ADA TO IMPLEMENT A COMPILER

RYER, MICHAEL J.

DOCUMENT NUMBER: 5663 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 93-97

The author is the project manager of a large software development which uses Ada as both the design language and the implementation language. The paper

reports observations, warnings, and conclusions from the first two years of implementation, running from functional design through component testing. Areas discussed include coding conventions, the use of Ada for both design and coding, and compiler requirements. The Ada program library is seen as one key issue. The ability to accomplish work is as much affected by the program library facilities as it is by the raw throughput of the compiler. Program library facilities are tightly coupled to project configuration management as well. The paper touches briefly on optimization, and concludes that Ada is an effective language when supported by appropriate tools and planning. (author)

INDEX TERMS

COMPILERS	DESIGN	PROGRAM LIBRARY SYSTEMS
CONFIGURATION MANAGEMENT	OPTIMIZATION	

INSURING THAT ADA COMPILER SYSTEMS SATISFY USER NEEDS

RODRIGUES, JORGE E.

DOCUMENT NUMBER: 5664 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 99-100

The Ada Programming Language definition establishes requirements for the Compiler System that interact heavily with functions heretofore provided by the development environment and by the underlying runtime operating system. Two broad categories of requirements can be distinguished: Program Development requirements and Runtime requirements. Program Development requirements are those that impact the efficiency of the creation and maintenance of software written in the Ada programming language. Runtime requirements are those that impact the size and efficiency of the resulting translated programs. It is up to the Ada Compiler System implementors to address the issues raised by the language requirements. (author)

INDEX TERMS

COMPILERS

DESIGN METRICS AND ADA

SZULEWSKI, PAUL A.; SODANO, NANCY M.

DOCUMENT NUMBER: 5665 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 105-114

This paper reports on work done in investigating the use of Ada as a Program Design Language (PDL) and the evaluation of Ada designs with a design metric.

The first section provides background and describes the context for the work. The second section defines the Halstead metrics and discusses their application during the design phase. The third section discusses using Ada as a Program Design Language. The fourth section presents an example which illustrates the usefulness of the design metrics on the Ada PDL design medium. Finally, the conclusions of this work are presented. (author)

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL)
DESIGN TOOLS AND TECHNIQUES
COMPLEXITY MEASUREMENT
QUALITY ATTRIBUTES
OBJECT-ORIENTED DESIGN
SOFTWARE SCIENCE

CAN ADA BE USED FOR THE PROGRAM MANAGER'S SUPPORT SYSTEM (PMSS)?

SCHUTT, HAROLD J.

DOCUMENT NUMBER: 5666 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 115-117

A research project was initiated in 1982 by the Defense System Management College (DSMC) to see if Decision Support Systems (DSS) techniques can be applied in the defense program management arena to help fill this void. This project is called the Program Manager's Support System (PMSS). The research underway concerns the usefulness and application of DSS in DoD-wide defense systems acquisition and will have implications for all levels of decision-making in the DoD from the Secretary of Defense to the program or functional manager. The architecture development contractors evaluated the languages that could be used to develop the PMSS. This article reports on the comments and recommendations of the architecture contractors concerning the use of Ada for the PMSS. (author)

INDEX TERMS

MANAGEMENT TOOLS AND TECHNIQUES

VIEW-3 AND ADA: TOOLS FOR BUILDING SYSTEMS WITH MANY TASKS

KRATZER, ANN; SHERMAN, MARK S.

DOCUMENT NUMBER: 5667 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 121-127

This paper discusses some useful features for tools that are intended to be used for developing systems with multiple tasks. The authors include a description of

one tool that has been built, View-3. The authors also describe some problems that might be encountered when trying to fit this kind of tool into an APSE (Ada Programming Support Environment). This implementation of View-3 runs on a Vax/UNIX system and is written in C. (author)

INDEX TERMS

ADA TOOL ENVIRONMENT
UNIX
ACQUISITION MANAGEMENT
DISTRIBUTED PROCESSING
PARALLEL PROCESSING
PROCESS QUEUES
C LANGUAGE

USING ADA WITH A DATA FLOW LANGUAGE

VARNEY, R.C.; GROUNDWATER, N.P.; MURRAY, D.W.

DOCUMENT NUMBER: 5668 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 129-141

In this paper, the authors discuss the combined use of both procedural and data flow languages. In particular the authors describe some aspects of an ongoing project where they have examined the programmer needs from a problem orientation and wherein Ada's use is considered in two parts of the design.

INDEX TERMS

DATAFLOW MACHINES

EXPERIMENTAL IMPLEMENTATION OF AN ADA TASKING RUN-TIME SYSTEM ON THE MULTIPROCESSOR COMPUTER CM

ARDO, ANDERS

DOCUMENT NUMBER: 5669 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 145-153

In this paper an experimental implementation of an Ada tasking run-time system is reported. The implementation was done on the multiprocessor computer. The run-time system implements almost full Ada tasking, thus demonstrating the feasibility of using Ada on a true multiprocessor. The paper further analyzes the tasking concept of Ada and gives a machine independent algorithmic specification of a tasking run-time system. The algorithmic specification defines a "standard" multiprocessor run-time system with a set of low-level run-time mechanisms supporting Ada tasking. The implementation of the mechanisms will then be the only machine-dependent parts of the run-time system. (author)

INDEX TERMS

DISTRIBUTED PROCESSING MULTIPROGRAMMING

IMPLEMENTING A RADAR DISPLAY WITH ADA ON A MICROCOMPUTER

HANHAM, S.D.; LEAVITT, R.P.

DOCUMENT NUMBER: 5670 TYPE: PAPER

WASHINGTON ADA SYMPOSIUM, '84 MARCH, PP. 155-163

This paper reports on the use of Ada to program an IBM-PC for the display of military radar data. Two compilers were used and compared: the Telesoft Ada Development Kit, and Janus Ada by R&R Software. Neither of these compilers is a full implementation of Ada. As yet, a validated Ada compiler for the IBM Personal Computer does not exist. This paper describes the problems and successes which were encountered during the course of the software development. In particular, the portability of the software from one development environment to the other is reviewed. Conclusions are drawn on the suitability of developing Ada code on a microcomputer and on the importance of compiler validation for software portability. (author)

INDEX TERMS

RADAR APPLICATIONS MICROPROCESSORS PORTABILITY

DEPARTMENT OF DEFENSE COMPUTER TECHNOLOGY (STUDY ANNEX)

U.S. DEPT. OF DEFENSE

DOCUMENT NUMBER: 5674 DOCUMENT DATE: 01/84 TYPE: TECHNICAL REPORT

This report consists of an overview of the plans for satisfying the Department of Defense's computing needs. Various Ada topics are discussed including the use of Ada in design, interface and Ada Program Support Environment issues, and transportability issues. The Software Technology for Adaptable, Reliable Systems (STARS) program is examined with emphasis on the Automated "Software Factory" concept, i.e. a library of tools. Mention is made of the next generation of computers as well as the effort to standardize computer architectures.

INDEX TERMS

SOFTWARE ENGINEERING ADA TOOL ENVIRONMENT MILITARY COMPUTER FAMILY
EMBEDDED COMPUTER SYSTEMS
FIFTH GENERATION COMPUTING SOFTWARE FACTORY

AVAILABLE FROM: THE AUTHOR

TRANSFORMING AN ADA PROGRAM UNIT TO SILICON AND VERIFYING ITS BEHAVIOR IN AN ADA ENVIRONMENT: A FIRST EXPERIMENT

ORGANICK, DR. ELLIOTT I.; CARTER, T. M.; MALONEY, M.P.; DAVIS, A.; HAYES, A.B.; KLASS, D.; LINDSTROM, GARY; NELSON, B.E.; SMITH, K.F.

DOCUMENT NUMBER: 5681 TYPE: JOURNAL ARTICLE

IEEE SOFTWARE, VOL 1, ISSUE 1, PP. 31-49

The authors describe their experience in transforming an Ada program unit to silicon and verifying its behavior in an Ada environment. They describe the history of their experiment and discuss their rationale for selecting Ada as a system modeling language. The experiment was intended to further the development of design methodologies and procedures for building systems that are truly heterogeneous (i.e., implementing systems following different choices of data abstraction realized in a variety of logic and circuit technologies).

INDEX TERMS

ARCHITECTURE DESIGN METHODOLOGIES SOFTWARE ENGINEERING

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

PROGRAMMING A DISTRIBUTED SYSTEM IN ADA

ROSSI, G.F.; ZICARI, R.

DOCUMENT NUMBER: 5686 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL AND ADA, VOL 2, ISSUE 5, PP. 26-29

This article addresses the problem of programming distributed systems within the framework of the Ada language (Ada80, Ada82, & Brosol, 82). The work is part of a large project (C-Net) sponsored by CNR, the Italian Research Council which involves several universities, research institutions, and corporations. The goal of the project is to provide tools and methodologies for designing locally distributed systems composed of heterogeneous physical nodes. A prototype implementation will be a campus net which supports both secretarial work and interactive programming environments. In this article, an outline of some basic assumptions concerning the nature of the distributed application systems to be programmed in Ada is given. Then, an approach for defining and programming a distributed application, based upon the Ada package, is described. In particular, the internode communication of the network is provided by primitives defined in a generic ad-hoc package, which are lower level than the Ada

rendezvous. Finally, a complete example of programming a simple distributed application is given. (author)

INDEX TERMS

DISTRIBUTED PROCESSING SOFTWARE ENGINEERING TOOLS AND TECHNIQUES

THE FIRST ADA COMPILER FAIR

HOFKIN, MARY K.

DOCUMENT NUMBER: 5687 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL AND ADA, VOL 2, ISSUE 5, PP.30-31

This article gives an overview of the first annual Ada Compiler Fair. It also presents a comparison of six different compilers.

INDEX TERMS

COMPILERS TECHNOLOGY TRANSFER TECHNOLOGY FORECAST

ADATEC REPORT

COLBORN, BONNIE

DOCUMENT NUMBER: 5688 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL AND ADA, VOL 2, ISSUE 5, P. 32

This article gives an overview of the topics discussed at the national Ada TEC meeting held in Cherry Hill, New Jersey from June 13-15, 1983.

INDEX TERMS

TECHNOLOGY TRANSFER TECHNOLOGY FORECAST

KEN BOWLES TALKS ABOUT ADA PART I

HOFKIN, MARY K.

DOCUMENT NUMBER: 5689 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL AND ADA, VOL 2, ISSUE 5, PP. 33-34

This article is an interview of Ken Bowles by Mary Hofkin in which Ken Bowles speaks of how he came to oversee the UCSD Pascal Project and how he became an Ada implementor. The conclusion to this article is presented in the November/December 1983 issue of the Journal of Pascal and Ada (see DAN 4451).

INDEX TERMS

HISTORY TECHNOLOGY TRANSFER TECHNOLOGY FORECAST

MODULAR SOFTWARE CONSTRUCTION AND OBJECT-ORIENTED DESIGN USING ADA

SINCOVEC, RICHARD F.; WIENER, RICHARD S.

DOCUMENT NUMBER: 5692 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL, ADA AND MODULA TWO, VOL 3, ISSUE 2, PP. 29-34

This paper describes a software development methodology which is referred to as modular software construction and object-oriented design. This powerful and modern approach to software development has recently gained tremendous currency with the advent of software engineering languages such as Ada and Modula-2. In this paper focus is made on the use of Ada in conjunction with this methodology. (author)

INDEX TERMS

MODULAR PROGRAMMING DESIGN METHODOLOGIES
DEVELOPMENTAL METHODOLOGIES OBJECT-ORIENTED DESIGN

A REVERSE POLISH CALCULATOR IN ADA

NORRIS, DAVID C.

DOCUMENT NUMBER: 5693 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL, ADA AND MODULA TWO, VOL 3, ISSUE 2, PP. 36-37

This article demonstrates a Reverse Polish Notation (RPN) calculator program, which is distributed as a demo program with the SuperSoft/Maranathu "A" (Ada subset) compiler. CALCULATOR compiles under version 3.00 of the compiler. (author)

INDEX TERMS

COMPILERS

A MESSENGER SERVICE IN ADA

RUBIN, SYLVAN; LEE, LISA

DOCUMENT NUMBER: 5697 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL, ADA AND MODULA TWO, VOL 3, ISSUE 3, 4 P.

One of the oldest methods of communication is the use of messengers to carry messages. This paper describes an application of this ancient paradigm to task intercommunication in a real-time Ada program. (author)

INDEX TERMS

REAL-TIME SYSTEMS CONCURRENT PROGRAMMING

TEACHING SOFTWARE ENGINEERING WITH ADA?

CORLISS, DR. GEORGE F.

DOCUMENT NUMBER: 5698 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL, ADA AND MODULA TWO, VOL 3, ISSUE 3, 3 P.

This paper reports on two formal panels and many informal discussions on the teaching of software engineering and the teaching of Ada at the Association for Computing Machinery Special Interest Group on Computer Science Education (ACM SIGCSE) Fifteenth Technical Symposium held in Philadelphia on February 16-17, 1984. The two panels were organized by Norman Cohen of Softech, Inc., and Don Booker of Pace University. The contributions to the discussions made by Robert Mathis (AJPO) and Jean Sammit (IBM) are especially acknowledged. This report is directed toward computer science educators who were not able to attend that symposium in order to spread the issues and results to a wider audience. (author)

INDEX TERMS

TECHNOLOGY TRANSFER

AN EXAMPLE OF ADA TASKING

LONGO, STEPHEN A.

DOCUMENT NUMBER: 5699 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL, ADA AND MODULA TWO, VOL 3, ISSUE 3, 2 P.

This article gives three ways that Ada tasking can be used to calculate mathematical expressions when the terms can be treated independently.

INDEX TERMS

MATHEMATICAL METHODOLOGIES

CONCURRENT PROGRAMMING IN THE ADA LANGUAGE: THE POLLING BIAS

GEHANI, NARAIN H.; CARGILL, T.A.

DOCUMENT NUMBER: 5731 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE, VOL 14, ISSUE 5, PP. 413-427

The rendezvous is an important concept in concurrent programming - two processes need to synchronize, i.e. rendezvous, to exchange information. The Ada programming language is the first programming language to use the rendezvous as the basis of its concurrent programming facilities. The authors' experience with rendezvous facilities in the Ada language shows that these facilities lead to and encourage the design of programs that poll. Polling is generally, but not always, undesirable because it is wasteful of system resources. Illustrated and examined in this article are the reasons for polling bias in the Ada language. This article gives suggestions on how to avoid polling programs, and suggests changes to the rendezvous facilities to eliminate the polling bias. The ramifications of these changes to the implementation of the Ada language are also discussed. Although the focus is on the rendezvous facilities in the Ada language, the analysis is also applicable to other languages. A polling bias can occur in any concurrent programming language based on the rendezvous mechanism if it does not provide appropriate facilities. (author)

INDEX TERMS

CONCURRENT PROGRAMMING SYNCHRONIZATION

EXCEPTION HANDLING - A STATIC APPROACH

KNUDSEN, JORGEN LINDSKOV

DOCUMENT NUMBER: 5732 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE, VOL 14, ISSUE 5, PP. 429-449

This paper presents a static approach to exception handling. The static approach is proposed as a consequence of an examination of existing language constructs for exception handling in which several trouble spots have been revealed. The static approach consists basically of one concept, namely the Sequel Concept. Although the Sequel Concept is sufficient to specify exception handling within a program, one additional concept is introduced, namely the derived definition concept that is introduced as a generalization of the derived type and generic concepts from Ada . The main advantages of the static approach are: first, that it is truly static as opposed to the existing language constructs in which dynamic association is used in some way or another; and, second, the language constructs for exception handling are simple, easy to implement and based on familiar concepts. (author)

INDEX TERMS

EXCEPTION HANDLING	STRUCTURED PROGRAMMING	CLU
CHILL	PL/I	LANGUAGE DESIGN
CONTROL STRUCTURES		

TWO IMPLEMENTATIONS OF THE ADA PROGRAM LIBRARY

BRIGGS, J.S.

DOCUMENT NUMBER: 5736 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE, VOL 14, ISSUE 5, PP. 491-500

The programming language Ada defines a separate compilation mechanism which must enforce the language rules in the same manner when compiling a program either in several units or as one compilation unit. Two implementations of the Ada program library required by this mechanism are described. Each has an associated compiler manager program which is the user's interface to the library. The first maintains a central map file containing the library structure. The second uses the UNIX tool make to maintain the library and permits more flexibility in the UNIX operating system environment. Higher level tools could use the second manager as a component part. (author)

INDEX TERMS

UNIX	IMPLEMENTATION	PROGRAM LIBRARY SYSTEMS
ADA TOOL ENVIRONMENT		

SYNTAX DIRECTED EDITOR ENVIRONMENT

KOSLOW, J.R.

DOCUMENT NUMBER: 5839 DOCUMENT DATE: 12/83 TYPE: DISSERTATION

This document describes the implementation and modification of a software development environment for a medium-sized computer based on a syntax directed editor. Although it was developed for use with the Ada programming language, most of the environment is driven by a language syntax description, and can therefore process virtually any current or future programming language. This environment is an extension of a prototype developed previously at the Air Force Institute of Technology. (author)

INDEX TERMS

SOFTWARE DEVELOPMENT ENVIRONMENTS EDITORS

AVAILABLE FROM: DEFENSE TECH INFO CNTR,CAMERON STN,ALEXANDRIA VA 22314
ORDER NUMBER: AD-A138009/6

ADA 1: AN ADA SUBSET COMPILER FOR THE AFIT SYNTAX DIRECTED PROGRAMMING ENVIRONMENT

MCCRACKEN, M.L.

DOCUMENT NUMBER: 5841 DOCUMENT DATE: 12/83 TYPE: DISSERTATION

This document describes the effort involved in moving the Ada compiler and interpreter developed as part of the AFIT syntax directed editor environment from a microcomputer to the VAX 11/780. As part of this effort, the compiler and interpreter were expanded to accept a larger subset of Ada . The compiler and interpreter work with an abstract syntax representation of a computer program produced by the syntax directed editor. This abstract representation, which is guaranteed to be syntactically correct, makes the compiler easier to write and understand. The compiler is a top-down compiler, but no backtracking is needed since the program is known to be syntactically correct. The interpreter is able to use the abstract representation to give the user an interactive display of the program during execution. Designs to allow overloading of names and operators, and passing parameters to subprograms are also presented. (author)

INDEX TERMS

COMPILERS SYNTAX GRAPHS ADA TOOL ENVIRONMENT

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A138027/8

UNIVERSAL ARITHMETIC PACKAGES

FISHER, GERALD A., JR.

DOCUMENT NUMBER: 5977 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL III, ISSUE 6, PP. 30-47

This article presents two Ada packages. The packages UNIVERSAL-INTEGER-ARITHMETIC and UNIVERSAL-REAL-ARITHMETIC, implement the arithmetic operation for the Ada universal-integer and universal-real types. Unlimited precision arithmetic is used for the universal-integer type and rational arithmetic for the universal-real type. The implementation is based on the universal arthmetic package written in SETL for the NYU Ada/ED compiler. The implementation presented here is not the most efficient. It is, however, quite general and requires no low level facilities. With some tuning these packages could be used within an Ada compiler to evaluate static expressions. They also provide an example of the use of Ada packages to support an abstract data type. (author)

INDEX TERMS

NUMERICAL MANIPULATION SETL

MORE ON BLOCK STRUCTURE: USING ADA

WINKLER, JURGEN F. H.

DOCUMENT NUMBER: 5978 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL III, ISSUE 6, PP. 48-56

This paper discusses the arrangement of blocks in programs and continues a discussion initiated in two papers by Hanson and Tennent. In addition to the nesting of blocks which was treated by Hanson and Tennent, the author discusses two more principles for the arrangement of blocks: the ordering of(the blocks of) parallel subprograms and the use of subunits. The three principles together yield a conceptual framework in which program structures can be characterized in a qualitative manner. The programming language Ada is used to formulate different variants of the examples already used by Hanson and Tennent. It is shown that Ada allows the formulation of the program structures recommended by Hanson as well as those recommended by Tennent. (author)

INDEX TERMS

MODULAR PROGRAMMING

USING ADA AND APSE TO SUPPORT DISTRIBUTED MULTIMICROPROCESSOR TARGETS

DAPRA, A.; GATTI, S.; CRESPI-REGHIZZI, S.; MADERNA, F.; BELCREDI, D.; NATALI, A.; STAMMERS, R.A.; TEDD, M.D.

DOCUMENT NUMBER: 5979 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL III, ISSUE 6, PP. 57-65

This article provides a detailed criticism of Ada and APSEs for distributed targets. A solution is sought that minimizes the restrictions on the use of the language and does not require any language change. Several changes to current APSE designs are suggested to describe the target hardware such that if the software is split into "virtual nodes" then these virtual nodes can be mapped onto physical nodes.

INDEX TERMS

ADA TOOL ENVIRONMENT DISTRIBUTED PROCESSING MICROPROCESSORS

WHEN TO USE PRIVATE TYPES

GARDNER, MICHAEL R.

DOCUMENT NUMBER: 5980 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL III, ISSUE 6, PP. 66-78

This article discusses the use of private or limited private types when programming in Ada . A short introduction is followed by a discussion of abstractions, information hiding, the mathematical theory of isomorphisms, and finally conclusions. The author concludes that a type should be private when the implementation is expected to change or if operations could be performed upon it which do not correspond to any operations on the objects the type is intended to model.

INDEX TERMS

PROGRAMMING DATA TYPES DATA STRUCTURES
INFORMATION HIDING

GUIDELINES FOR THE DESIGN OF LARGE MODULAR SCIENTIFIC LIBRARIES IN ADA

SYMM, G.T.; WICHMANN, BRIAN A.; KOK, J.; WINTER, D.T.

DOCUMENT NUMBER: 5848 DOCUMENT DATE: 08/83 TYPE: TECHNICAL REPORT

This report is a second interim technical report on a project, entitled "Guidelines for the Design of Large Scientific Libraries in Ada ", which is being pursued jointly by the Division of Information Technology and Computing, NPL, in the UK, and the Mathematisch Centrum, Amsterdam, in the Netherlands, with support from the Commission of the European Communities. A final report, entitled "Guidelines for the Design of Large Modular Scientific Libraries in Ada", will be produced around the end of 1983. (author)

INDEX TERMS

SYSTEM DESIGN SYSTEM DESIGN REQUIREMENTS
NUMERICAL MANIPULATION
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: N84-16840/0

A LIS COMPILER FOR GCOS-7

HENIN, BERNARD; COUPRIE, DANIEL; DOUSPIS, PIERRE

DOCUMENT NUMBER: 5902 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE, VOL 14, ISSUE 3, PP. 253-261

This paper describes the implementation of a LIS compiler for GCOS-7. LIS is a high level system implementation language developed at CII-Honeywell Bull during the middle 1970s, and experience with the language and its implementation have largely influenced the design of Ada . The design of the compiler was particularly aimed at efficient code generation. Design decisions concerning the run-time organization in relation to procedure call and separate compilation are discussed. The structure of the compiler is described. The articulation between the different phases of the code generator is emphasized. Experience with the bootstrap is related. (author)

INDEX TERMS

COMPILERS OPTIMIZERS

UNDERSTANDING ADA

SHUMATE, KENNETH A.

DOCUMENT NUMBER: 5972 TYPE: TEXT

The objective of this book is to provide a basic understanding of major Ada language features. It is intended to be a first book on Ada. Understanding Ada provides a simple introduction to Ada by first presenting the Pascal-like parts of Ada, then discussing improvements to Pascal, and finally introducing Ada's advanced features for encapsulation, error handling, and concurrent processing. Virtually the entire language is presented; however, the discussion is at an introductory level and avoids complex issues and subtle interactions. The material and style of presentation are based on Ada seminars taught by the author since 1981. The manuscript has been used both for Ada overview and for hands-on programming courses. The book is suitable for programmers beginning their study of Ada, or for technical managers who wish to understand major language issues. Each chapter contains an exercise for the reader. The exercises are intended to be easy. Each exercise is followed immediately by a solution and a discussion of the solution that addresses issues raised by the exercise. Each of the solutions is presented as a complete Ada program. The programs have been compiled and executed on Government validated versions of the NYU ANSI-Ada/Ed translator and the ROLM/Data General Ada compiler. (author)

INDEX TERMS

EDUCATION

AVAILABLE FROM: HARPER & ROW PUBLISHERS INC.

ADA TARGET MACHINE OPERATING SYSTEM (ATMOS) REVIEW

ASHANY, RON; SEGALL, ZARY; SIEWIOREK, DAN

DOCUMENT NUMBER: 5973 DOCUMENT DATE: 06/84 TYPE: TECHNICAL REPORT

This study reports on the status of the Ada Target Machine Operating System (ATMOS). Concerns of coordinating a tri-service program such as this as well as the overlap with the STARS and MCFOS programs expressed. The author of this report wants to promote R & D programs with the services to promote ATMOS' goals. The ATMOS program also exploits research fallout from APSE studies.

INDEX TERMS

ADA TOOL ENVIRONMENT ARCHITECTURE OPERATING SYSTEMS

AVAILABLE FROM: AIRMICS, CALCULATOR BLDG,GA INST.TECHNOLOGY,ATLANTA,GA

SPONSORS: U.S. ARMY,AIRMICS,313 CALCULATOR BLDG,ATLANTA,GA

ADA PROGRAMMING STANDARDS AND GUIDELINES

DAILY, PAULAN D.; FOREMAN, JOHN T.

DOCUMENT NUMBER: 5981 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL III, ISSUE 6, PP. 79-94

This document describes coding practices used on an Ada project. The coding practices are specified as either "standards" (mandatory on this project) or "guidelines" (preferred, but not required). Naming conventions, declarations usage, and coding conventions are discussed.

INDEX TERMS

STANDARDS	MODERN PROGRAMMING PRACTICES

SPONSORS: NAVAL OCEAN SYSTEMS CENTER

PARALLEL PROGRAMMING- A BIBLIOGRAPHY

BELL, D.H.; KERRIDGE, J.M.; SIMPSON, D.; WILLIS, N.

DOCUMENT NUMBER: 5986 TYPE: TEXT

This book presents a bibliography of parallel programming source materials. Entries are limited to articles from the major journals and publications judged to be easily accessible to the computing community. Entries are not included from conference proceedings, research reports, books, or publications of special interest groups. The papers are classified under their major topic. The topics include: semaphores, message passing, locks, illustrative applications and algorithms, etc.

INDEX TERMS

CONCURRENT PROGRAMMING	ALGOL	MODULA
PL/I	PASCAL	EDISON

AVAILABLE FROM: JOHN WILEY & SONS, 605 3RD AVE., NY, NY 10016

PROBLEM-SOLVING PRINCIPLES FOR ADA PROGRAMMERS APPLIED LOGIC, PSYCHOLOGY , AND GRIT

LEWIS, WILLIAM E.

DOCUMENT NUMBER: 5990 TYPE: TEXT

This text is based upon the Reference Manual for the Ada Programming Language (Proposed Standard Document) that was printed by the United States Department of Defense in July 1980. Its aim is to provide a problem-solving background and alternative solution paths from among which the reader may choose. Chapter 1 introduces the basic building blocks of problem solving and provides some insights into the psychological influences involved. Chapter 2 consists of a set of independent "Prescriptions" in problem solving. Chapter 3 consists of a set of advanced "Prescriptions" in problem solving to augment the basic prescriptions in Chapter 2. Chapter 4 presents approaches for attacking more complicated problems for which the prescriptions of Chapters 2 and 3 may not provide an appropriate panacea. The concept of top-down programming is the main theme. A programming problem using the top-down approach is illustrated in six different programming languages. A second and more complex problem is also analyzed. Chapter 5 applies many of the problem-solving techniques discussed in previous chapters for the purpose of eliminating errors, or debugging a program. A set of debugging prescriptions is presented in the fashion of chapters 2 and 3. The programming examples are given in Ada but the terminology should be clear even to those without a detailed knowledge of this language. (author)

INDEX TERMS

PROBLEM REPORT ANALYSIS DEBUGGING
PROGRAMMING TECHNIQUES/METHODOLOGIES
AVAILABLE FROM: HAYDEN BOOK CO. 10 MULHOLLAND DR. HASBROUCK HGTS. NJ

A LALR (1) GRAMMAR FOR ANSI ADA

FISHER, GERALD A., JR.; CHARLES, PHILIPPE

DOCUMENT NUMBER: 5991 TYPE: PAPER

ACM ADA LETTERS, VOL III, ISSUE 4, PP. 37-50

This paper presents an Ada grammar suitable for input to a LALR parser generator. The grammar is organized in the same order as the syntax summary in appendix E of the ANSI ADA REFERENCE MANUAL. The grammar has been processed by the New York University Parser Generator and tested against version 1.3 of the ACVC Test Suite.

INDEX TERMS

LANGUAGE STRUCTURE

A COMMAND INTERPRETER FOR ADA

WHEELER, THOMAS J.

DOCUMENT NUMBER: 5992 TYPE: PAPER

ACM ADA LETTERS, VOL III, ISSUE 4, PP. 51-61

A command interpreter interfaces to the user, accepts commands, and calls a procedure which performs the command. If one would like to add a procedure without recompiling the command interpreter, then the command interpreter must be able to call a procedure without knowing its name at compile-time. This article describes an Ada program that functions as such a command interpreter.

INDEX TERMS

OPERATING SYSTEM DESIGN

ADA DESIGN, JOVIAL IMPLEMENTATION

BEIN, EDWARD

DOCUMENT NUMBER: 5993 TYPE: PAPER

ACM ADA LETTERS, VOL III, ISSUE 4, PP. 62-69

This paper presents a style guide for designing a system in Ada which it will implement in Jovial (J73) and assembly language. The purpose of the guide is to promote the creation of system designs in Ada that will have straightforward Jovial implementations. The paper describes the rationale for the constraints presented and basic strategies for implementing Ada facilities in Jovial.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL) JOVIAL
PROGRAMMING

ADA PACKAGES AND THE USER'S CONCEPTUAL MODEL

MAC AN AIRCHINNIGN, MIKE

DOCUMENT NUMBER: 5994 TYPE: PAPER

ACM ADA LETTERS, VOL III, ISSUE 4, PP. 70-77

In Ada packages that are correct implementations of abstract data types, the only operations available on the data types are precisely those made externally available to the user in the visible part of the package specification. A formal specification and classification of the user of such Ada packages is proposed in this article. Associated with each user is an UCM (User's Conceptual Model). In an Ada Programming Support Environment (APSE) it is envisaged that one of the key tools will be an UIMS (User Interface Management System) which will function for Ada programmers much as Data Base Management Systems (DBMS) currently function for data base users. A complex number Ada package is used as an example.

INDEX TERMS

ADA TOOL ENVIRONMENT

A COMPARATIVE STUDY OF CHILL AND ADA ON THE BASIS OF DENOTATIONAL DESCRIPTIONS

MEILING, ERIK; PALM, STEEN U.

DOCUMENT NUMBER: 5995 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL III, ISSUE 4, PP. 78-91

This article describes an investigation into the feasibility of including support for the language CHILL in an Ada Programming Support Environment (APSE). For instance, CHILL and Ada compilers might share common backends. The investigation proceeded by comparing formal definitions of the CHILL and Ada programming languages.

INDEX TERMS

CHILL ADA TOOL ENVIRONMENT

SPONSORS: COMMISSION OF THE EUROPEAN COMMUNITIES

PROJECT SPERBER BACKGROUND, STATUS, FUTURE PLANS

PLOEDEREDER, ERHARD PH.D

DOCUMENT NUMBER: 5996 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL III, ISSUE 4, PP. 92-98

Project SPERBER is concerned with the development of a high-quality software environment facilitating the development of software written in Ada or Basic Pearl. It is to be used for the design, implementation, maintenance and enhancement of embedded system software. This presentation elaborates on the background that led to project SPERBER, presents its current status, and outlines future plans. It also provides an overview of the system structure from

the viewpoint of a user. (author)

INDEX TERMS

ADA TOOL ENVIRONMENT PEARL
EMBEDDED COMPUTER SYSTEMS DESIGN IMPLEMENTATION
MAINTENANCE

SPONSORS: BUNDESAMT FUR WEHRTECHNIK UND BESCHAFFUNG,KOBLENZ,GER.

THE ROLE OF ADA IN REAL TIME EMBEDDED APPLICATIONS

PHILLIPS, STEPHEN P.; STEVENSON, PETER R.

DOCUMENT NUMBER: 5997 TYPE: PAPER

ACM ADA LETTERS, VOL III, ISSUE 4, PP. 99-111

This paper discusses executive software requirements peculiar to real time embedded systems, such as spacecraft, missile and avionics, and the role of Ada in meeting those requirements. In these applications, the cyclical executive has traditionally played a large role because of its ability to work efficiently with resource and frequency constraints. The Ada pragma provides a way to implement this type of executive in a way that can be efficient and easy to use. Pragmas of this type could become a standard for the avionics community. (author)

INDEX TERMS

AVIONICS APPLICATIONS COMMAND, CONTROL, & COMMUNICATION
REAL-TIME SYSTEMS EMBEDDED COMPUTER SYSTEMS

A PROBLEM WITH ADA AND RESOURCE ALLOCATION

WELLINGS, A.J.; KEEFE, D.; TOMLINSON, G.M.

DOCUMENT NUMBER: 5998 TYPE: PAPER

ACM ADA LETTERS, VOL III, ISSUE 4, PP. 112-124

Ada has been described as being suitable for the implementation of resource management algorithms. The authors explore four possible solutions to the problem of allocating a number of resources from a pool. They conclude that no ready method presents itself which avoids race conditions and is robust in the face of the failure of requesting tasks. (author)

INDEX TERMS

CONCURRENT PROGRAMMING DISTRIBUTED PROCESSING

AD-A169 589 ADA (TRADE NAME) BIBLIOGRAPHY VOLUME 3(U) IIT RESEARCH INST LANHAM MD FEB 86 MDA903-83-C-0306 2/3

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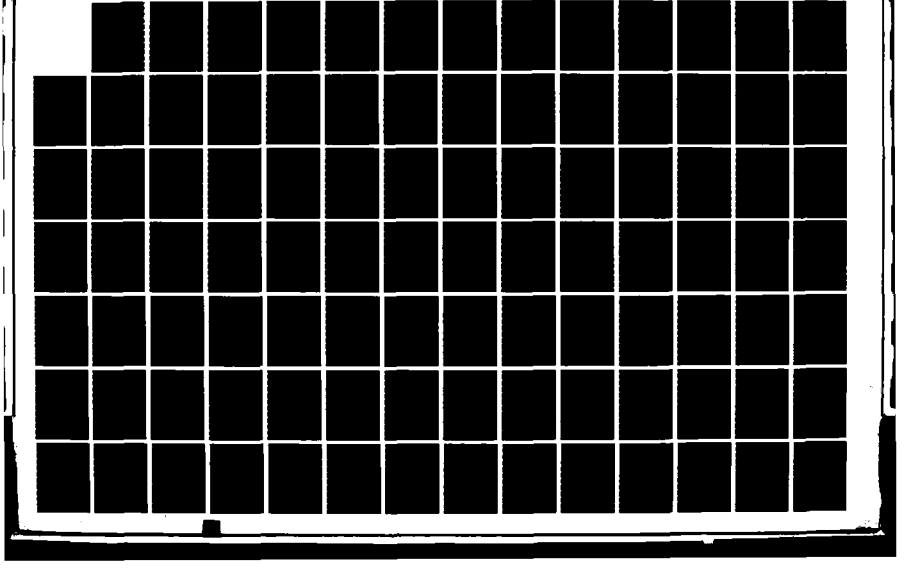

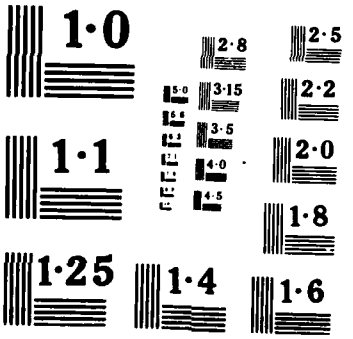
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NPL REPORT: ADA-EUROPE GUIDELINES FOR ADA COMPILER SPECIFICATION AND SELECTION

WICHMAN, P.A.; NISSEN, J.C.D.

DOCUMENT NUMBER: 5999 TYPE: PAPER

ACM ADA LETTERS, VOL III, ISSUE 5, PP. 50-62

This article was produced by the Ada -Europe Portability Working Group. It is intended to provide guidelines for potential Ada compiler customers. There is a commonly held view that to specify a compiler one only needs to state the language to be accepted, the target on which compiled programs are to run, and the host on which the compiler is to run. This view may be reinforced by having the language standardized, and by validation of the compiler. This guide intends to show how much more may need to be specified, for example the programming support environment. (author)

INDEX TERMS

COMPILERS ADA TOOL ENVIRONMENT

A PACKAGE FOR SPECIFYING ADA PROGRAMS

PYLE, I.C.

DOCUMENT NUMBER: 6000 TYPE: PAPER

ACM ADA LETTERS, VOL III, ISSUE 5, PP. 63-68

This paper describes one of the several methods currently being investigated for incorporating specifications into an Ada program. The underlying principle of this method is that a sequence of statements (as in a procedure body) can be semantically specified in three parts: a precondition (describing the relations between relevant variables on starting to execute the sequence of statements), a postcondition (describing the relations between relevant variables on completing execution of the sequence of statements) and an effect (describing the relations between these two states). Each of these three relations can be expressed in an Ada-like notation, by declaring appropriate subprograms in the declarative part preceding the sequence of statements. (author)

INDEX TERMS

PROGRAM CORRECTNESS VERIFICATION

A SIMPLE ADA COMPILER INVALIDATION TEST

ARDO, ANDERS; PHILIPSON, LARS

DOCUMENT NUMBER: 6001 TYPE: PAPER

ACM ADA LETTERS, VOL III, ISSUE 5, PP. 69-74

This paper describes a program which tests a number of the advanced features of Ada . Among the things tested are separate compilation, overloading, generics, aggregates, tasking and various real time facilities. The program can be used to get a quick assessment of the completeness of a non-validated Ada compiler. Also included is a revision that corrects two errors in the original program. (author)

INDEX TERMS

COMPILERS VALIDATION

PECULIARITIES OF ADA

BENGEL, G.G.

DOCUMENT NUMBER: 6002 TYPE: PAPER

ACM ADA LETTERS, VOL III, ISSUE 5, PP. 75-81

Ada is a powerful and complex programming language. Through the size and complexity of the language there are some peculiarities and inconsistencies in Ada which confuse a beginner to the language. These peculiarities thus act as a barrier to the user who really wants a simple solution to a simple problem. A list of these peculiarities helps a non-experienced Ada programmer to master the complexity of Ada. In this work the inconsistencies of Ada are listed and the different meanings and concepts of reserved words in various contexts are explained. (author)

INDEX TERMS

LANGUAGE STRUCTURE

FUNDAMENTALS OF PROGRAMMING LANGUAGES

HOROWITZ, ELLIS

DOCUMENT NUMBER: 6004 TYPE: TEXT

This book takes a fundamentally different point of view from traditional books

on programming languages. The best possible way to study and understand today's programming languages is by focusing on a few essential concepts. These concepts form the outline for this book and include such topics as variables, expressions, statements, typing scope, procedures, data types, exception handling, and concurrency. By understanding what these concepts are and how they are realized in different programming languages, one arrives at a level of comprehension far greater than one gets by writing some programs in a few languages. Moreover, knowledge of these concepts provides a framework for understanding future language designs. Numerous examples from Ada , Pascal, LISP, and other programming languages are included. This book is a study of the complexities of programming languages. (author)

INDEX TERMS

PASCAL	LISP	
PROGRAMMING TECHNIQUES/METHODOLOGIES		CONCURRENT PROGRAMMING
FUNCTIONAL PROGRAMMING	OBJECT-ORIENTED DESIGN	
SNOBOL (AND SNOBOL EXTENSIONS)		DATA FLOWGRAPHS

AVAILABLE FROM: COMPUTER SCIENCE PRESS,11 TAFT COURT ROCKVILLE, MD 208

INTEL 432/670 ADA BENCHMARK PERFORMANCE EVALUATION IN THE MULTIPROCESSOR/MULTIPROCESS ENVIRONMENT

ROGERS, THEODORE F. JR.; KARADIMITROPOULOS, I.A.

DOCUMENT NUMBER: 6005 DOCUMENT DATE: 06/83 TYPE: DISSERTATION

The INTEL 432/670 microcomputer system contains the 1APX 432 microprocessor which executes compiled Ada programs. This thesis contains performance evaluation of the INTEL 432/670 system in a multiprocessor/multiprocess environment. Benchmark programs from the Computer Family Architecture study are encoded in the Ada Programming Language and compiled on a host VAX 11/780 before being downloaded to INTEL MDS 800 for further transfer to the intel 432/670 system for execution. The historical development of computer architectures as well as a systematic description of the INTEL 432/670 system are included. (author)

INDEX TERMS

PERFORMANCE EVALUATION	DISTRIBUTED PROCESSING	ARCHITECTURAL FAMILIES

AVAILABLE FROM: DEFENSE TECH INFO CNTR,CAMERON STN,ALEXANDRIA VA 22314
ORDER NUMBER: AD-A132774

AN EFFICIENT IMPLEMENTATION OF VISIBILITY IN ADA

BLOWER, M.I.

DOCUMENT NUMBER: 6006 TYPE: PAPER

INTERMETRIC'S ADA UPDATE, VOL 11, 11 P.

This paper discusses the efficient implementation of Ada's visibility requirements. A scope stack and an unstructured name space are used to facilitate separate compilation and ensure that each Ada declaration takes a constant unit of time. Visibility issues affect practically every aspect of semantic analysis in Ada: declarations, statements, expressions, and separate compilation. The design of the symbol table package is, thus, a critical one. This paper discusses the design goals of the symbol table for the Ada Integrated Environment (AIE) bootstrap compiler front end, and how they were influenced by the Ada language. Since the compiler is being heavily used by the AIE project, ample data is available with which to measure symbol table performance. (author)

INDEX TERMS

ADA TOOL ENVIRONMENT DESIGN TOOLS AND TECHNIQUES
IMPLEMENTATION

ADAM: AN ADA-BASED LANGUAGE FOR MULTIPROCESSING

LUCKHAM, DAVID C.; VON HENKE, F.W.; LARSEN, H.J.; STEVENSON, D.R.

DOCUMENT NUMBER: 6017 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE, VOL 14, ISSUE 7, PP. 605-642;

Adam is a high-level language for parallel processing. It is intended for programming resource scheduling applications, in particular supervisory packages for run-time scheduling of multiprocessing systems. An important design goal was to provide support for implementation of Ada and its run-time environment. Adam has been used to implement Ada task supervision and also as a high-level target language for compilation of Ada tasking. This paper gives an overview of Adam and examples of its use. Emphasis is placed on the differences from Ada. Experience using Adam to build the experimental Ada system is evaluated. Design of a run-time supervisor in Adam is discussed in detail. (author)

INDEX TERMS

IMPLEMENTATION IMPLEMENTATION IMPLEMENTATION
IMPLEMENTATION

SPONSORS: ADVANCED RESEARCH PROJECTS AGENCY, ARLINGTON, VA;

ADVANCED RESEARCH PROJECTS AGENCY, ARLINGTON, VA

USING ADA FOR DISCRETE EVENT SIMULATION

BRUNO, GIORGIO

DOCUMENT NUMBER: 6018 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE, VOL 14, ISSUE 7, PP. 685-695;

The process interaction approach is proposed for developing a discrete simulation environment in Ada . The introduction of simulation facilities in Ada not only concerns the classical aspect of model building, but allows a new class of problems to be tackled, that is the testing of correctness of programs intended for real-time applications. In this paper attention is focused on the presentation of the process scheduling in the simulation context and on the definition of standard forms of interactions among processes. Simulation facilities are organized by making use of Ada's structuring concepts. (author)

INDEX TERMS

IMPLEMENTATION

SPONSORS: ITALIAN NATIONAL RESEARCH COUNCIL

COMPARING SOFTWARE DEVELOPMENT METHODOLOGIES FOR ADA: A STUDY PLAN

FREEMAN, PETER; WASSERMAN, ANTHONY I.; HOUGHTON, RAYMOND C., JR

DOCUMENT NUMBER: 6029 TYPE: JOURNAL ARTICLE

SOFTWARE ENGINEERING NOTES (ACM SIGSOFT), VOL 9, ISSUE 4, PP. 22-55

This paper outlines a study that was proposed as one of the early activities in the Support Systems Task area of the DoD STARS (Software Technology for Adaptable, Reliable Systems) Program. The study's key objective is to determine how well various software development methodologies help structure systems built in Ada as measured by the ease of maintenance of the resulting system. A comparative study is described (modeled after the typical DoD software procurement) and a rationale for some aspects of the study is presented. (author)

INDEX TERMS

DEVELOPMENTAL METHODOLOGIES
SOFTWARE ENGINEERING TOOLS AND TECHNIQUES
VERIFICATION
DATA COLLECTION
MAINTAINABILITY
VALIDATION

SPONSORS: U.S.DEPT. OF DEFENSE, THE PENTAGON, WASH.,DC

CAPITAL-INTENSIVE SOFTWARE TECHNOLOGY

WEGNER, PETER

DOCUMENT NUMBER: 6031 TYPE: JOURNAL ARTICLE

IEEE SOFTWARE, VOL 1, ISSUE 3, PP. 7-45

Capital is a commodity which can be used time and again to produce other commodities, reusability being the key element in this definition. The author examines recent trends as a movement towards capital-intensive software technology. He considers (1) software components, (2) models of programming (such as the life-cycle model, prototyping, etc.), (3) knowledge engineering, and (4) Ada as a case study of a capital-insensive technology.

INDEX TERMS

CONCURRENT PROGRAMMING	ECONOMIC ISSUES	SOFTWARE TOOLS
PROGRAMMING LANGUAGE	DATA STRUCTURES	SOFTWARE LIFE CYCLE
MODIFIABILITY	EFFICIENCY	DESIGN
REUSABILITY	SOFTWARE DEVELOPMENT ENVIRONMENTS	
PRODUCTIVITY	MAINTENANCE	ARTIFICIAL INTELLIGENCE

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA;
ADVANCED RESEARCH PROJECTS AGENCY, ARLINGTON, VA;
IBM,TJ WATSON RESEARCH CTR,YORKTOWN HEIGHTS,NY 10598

OBJECT ORIENTED DESIGN VS STRUCTURED DESIGN -- A STUDENT'S PERSPECTIVE

JAMSA, KRIS A.

DOCUMENT NUMBER: 6043 TYPE: PAPER

SOFTWARE ENGINEERING NOTES (ACM SIGSOFT), VOL 9, ISSUE 1, PP. 43-49

This paper discusses the advantages that structured design has over object-oriented design. The author favors structured design and presents a hierarchically organized collection of processes in order to emphasize the advantages of a graphic approach to design. The steps involved in object-oriented design, as well as an illustration of Ada packages, are presented. The author suggests that object oriented design places a burden on the designer at the interface stage due to its graphic shortcomings.

INDEX TERMS

DESIGN METHODOLOGIES OBJECT-ORIENTED DESIGN STRUCTURED DESIGN

PROFILE: ALSYS, INC.

JOURNAL STAFF

DOCUMENT NUMBER: 6044 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL, ADA AND MODULA TWO, VOL 3, ISSUE 4, PP. 22-26

This article presents a brief overview of ALSYS, Inc., an offshoot of ALSYS, S.A. which was founded by Jean Ichbiah, Ada's principle designer. ALSYS produces products for three major Ada markets: educational material, compilers(both machine-independent compiler-development kits needing backends for specific machines and full Ada compilers for standard processors), and software components.

INDEX TERMS

COMPILERS EDUCATION

AN ADA PRETTY-PRINTER

NORRIS, DAVID C.

DOCUMENT NUMBER: 6045 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL, ADA AND MODULA TWO, VOL 3, ISSUE 4, PP. 29-33

A pretty-printer is a program which takes as input an otherwise poorly formatted program and outputs the same program. The "new" program is formatted to adhere to standardized language conventions and is not altered either syntactically or semantically. This article describes an Ada pretty-printer. The pretty-printer follows the conventions set forth in the MIL-STD-1815A. Source code for the program is included in the article. (author)

INDEX TERMS

SOFTWARE TOOLS

CALCULATING FUNCTIONS USING ADA

LONGO, STEPHEN A.

DOCUMENT NUMBER: 6046 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL, ADA AND MODULA TWO, VOL 3, ISSUE 4, PP. 34-36

This article presents Ada source code for approximating trigonometric, logarithmic, and exponential functions. The approximation is calculated by using the first few terms of Taylor series representations of these functions.

INDEX TERMS

NUMERICAL MANIPULATION

MODULA-2 & ADA: A COMPARISON OF FOUR FEATURES

MCALHANY, ELIZABETH B.; CAMPBELL, MARK D.

DOCUMENT NUMBER: 6047 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL, ADA AND MODULA TWO, VOL 3, ISSUE 4, PP. 37-48

This article compares Ada and Modula-2 language constructs with respect to compilation units, exception handling, input/output, and concurrency concerns. Ada and Modula-2 are similiar in their treatment of separately compilable modules; Modula-2 relies on the operating system to handle exceptions while Ada allows the programmer to explicitly specify how exceptions should be handled. Both languages provide standard I/O capabilities, however, Modula-2 seems to possess more powerful I/O resources. Both languages offer multi-tasking facilities, but Ada provides more powerful constructs than the classical tools provided by Modula-2.

INDEX TERMS

MODULA	MODULAR PROGRAMMING	MODULARITY
EXCEPTION HANDLING	PARALLEL PROCESSING	CONCURRENT PROGRAMMING

INTERIM ADA-TO-PASCAL TRANSLATION TOOL: LANGUAGE REFERENCE MANUAL

CRONSBERG, SID

DOCUMENT NUMBER: 6065 DOCUMENT DATE: 05/82 TYPE: INSTRUCTION

This manual describes the subset of the programming language Ada supported by the Interim Ada-to-Pascal Translation Tool. The manual follows the format of chapters 1 through 14 of the Reference Manual for the Ada Programming Language dated July 1980 (Ada Reference Manual). This manual references the Ada Reference Manual for the features that the Translation Tool does support, and details any restrictions put on these features. The Backus-Naur Form notation in this document describes the legal Ada language features supported by the translation tool. It is suggested that the user compare the supported language features with the full Ada features before using them. (author)

INDEX TERMS

PASCAL	LANGUAGE STRUCTURE	TRANSLATORS

AVAILABLE FROM: SOFTECH, INC., 460 TOTTEN POND RD, WALTHAM, MA 02154

ADA BIBLIOGRAPHY

NORRIS, DAVID C.

DOCUMENT NUMBER: 6083 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL, ADA AND MODULA TWO, VOL 3, ISSUE 5, PP. 15-16

This article contains seven reviews of Ada texts. Texts on software engineering that limit their discussion about Ada to illustrative examples, books on very specialized subjects such as DIANA and concurrent programming, and introductory texts are included in this bibliography. Each of the texts were written after the MIL-STD-1815A was introduced. The reviewer provides recommendations for selecting the appropriate text.

INDEX TERMS

EDUCATION	PROGRAMMING	CONCURRENT PROGRAMMING
SOFTWARE ENGINEERING	SYSTEM DESIGN	MODULA

A SPECIFICATION TECHNIQUE FOR THE COMMON APSE INTERFACE SET

LINDQUIST, DR. TIMOTHY E; FACEMIRE, JEFFREY L.; KAFURA, DENNIS G.

DOCUMENT NUMBER: 6084 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL, ADA AND MODULA TWO, VOL 3, ISSUE 5, PP. 25-52

This report demonstrates an approach to specifying kernel Ada support environment interface components. The objectives are to provide a mechanism which allows the building of an understandable and complete specification for

validation that is relatively easy to construct. In meeting these objectives, an Abstract Machine approach has been modified and applied to a functional description of kernel operations. After explaining the approach and their motivation for choosing it, the author discusses its utility. Interactions among kernel operations and pragmatic implementation limits are also discussed. (author)

INDEX TERMS

ADA TOOL ENVIRONMENT SPECIFICATION TOOLS AND TECHNIQUES

SPONSORS: OFFICE OF NAVAL RESEARCH,QUINCY ST.,ARLINGTON,VA 22217

ADA ORIENTATION FOR MANAGERS - L101 TEACHER'S GUIDE

STAFF AUTHOR, SOFTECH,INC. TOTTEN POND RD,WALTHAM,MA 02154

DOCUMENT NUMBER: 6098 DOCUMENT DATE: 05/84 TYPE: TECHNICAL REPORT

This report is one in a series of teaching modules of slides and instructor notes. The module contains material to conduct an introduction to Ada for a management-oriented class. The module is intended to take one day to present. In addition to providing an overview of the Ada language, the material is intended to provide an appreciation of and information related to the entire Ada effort.

INDEX TERMS

EDUCATION CURRICULA
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A141846/6

SPONSORS: U.S.ARMY COMM-ELECTRONICS CMD(CECOM), FT. MONMOUTH, NJ

INTRODUCTION TO ADA, A HIGHER ORDER LANGUAGE L103 TEACHER'S GUIDE

STAFF AUTHOR, SOFTECH,INC. TOTTEN POND RD,WALTHAM,MA 02154

DOCUMENT NUMBER: 6099 DOCUMENT DATE: 05/84 TYPE: TECHNICAL REPORT

This report is one in a series of teachers' modules. This module is designed for a course intended to introduce Higher Order Languages (HOLS) to Assembly language programmers. Ada is used as an example HOL and much of the syntax of Ada is taught here. The report consists of a series of viewgraphs and teacher notes.

INDEX TERMS

EDUCATION ASSEMBLY LANGUAGE
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

ORDER NUMBER: AD-A141848/2

SPONSORS: U.S.ARMY COMM-ELECTRONICS CMD(CECOM), FT. MONMOUTH, NJ

ADA TECHNICAL OVERVIEW - L102 TEACHER'S GUIDE

STAFF AUTHOR, SOFTECH,INC. TOTTEN POND RD,WALTHAM,MA 02154

DOCUMENT NUMBER: 6100 DOCUMENT DATE: 05/84 TYPE: TECHNICAL REPORT

This report is a module for teachers. A course based on this material will provide students with a reading knowledge of Ada and a good foundation for continued learning. The approach is learning about Ada through Ada examples. Syntax is not stressed or even covered. Rather, concepts and an intuitive feel for the language are provided. The report consists of viewgraphs and explanatory material for the teacher.

INDEX TERMS

EDUCATION
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A141862/3

SPONSORS: U.S.ARMY COMM-ELECTRONICS CMD(CECOM), FT. MONMOUTH, NJ

ADA PRIMER

STAFF AUTHOR, SOFTECH,INC. TOTTEN POND RD,WALTHAM,MA 02154

DOCUMENT NUMBER: 6102 DOCUMENT DATE: 01/84 TYPE: TECHNICAL REPORT

This workbook is one of a series of reports that provide material for a suggested Ada curriculum. This workbook could be used for a course on the syntax and semantics of the "Pascal Subset" of Ada. This report is organized as a series of tutorial sections alternating with exercises.

INDEX TERMS

EDUCATION PROGRAMMING
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A140660/2

SPONSORS: U.S.ARMY, CENTACS,ECOM,FT.MONMOUTH,NJ 07703

ADA CASE STUDIES II

STAFF AUTHOR, SOFTECH,INC. TOTTEN POND RD,WALTHAM,MA 02154

DOCUMENT NUMBER: 6105 DOCUMENT DATE: 01/84 TYPE: TECHNICAL REPORT

This report presents case studies on different aspects of the Ada language.

These aspects include naming conventions, types, coding paradigms, exceptions, and program structure. The objectives of this work are to explore Ada issues and to gain insight into the characteristics of a life cycle design methodology that would promote effective use of Ada.

INDEX TERMS

EDUCATION SOFTWARE ENGINEERING STANDARDS
MODERN PROGRAMMING PRACTICES
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A140818/6

EXPERIENCES PORTING PASCAL SOURCE FROM A MICRO COMPUTER TO A VAX

MAYER, HERBERT

DOCUMENT NUMBER: 6114 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES, VOL 19, ISSUE 9, PP. 16-20

This paper presents the problems encountered when rehosting a Pascal project from an Intel 8086-based micro computer to a VAX 11/780. The paper also presents expected problems that the rehost successfully handled due to some surprising characteristics of the target computer. The Pascal project is a compiler for a subset of Ada .

INDEX TERMS

PASCAL PORTABILITY

PRACTICAL EXPERIENCES WITH AUTOMATIC REPAIR OF SYNTACTICAL ERRORS OR SYNTACTICAL ERROR REPAIR IN THE DAS COMPILER

KATWIJK, J. VAN

DOCUMENT NUMBER: 6115 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES, VOL 19, ISSUE 9, PP. 37-48

This article discusses some practical experiences with error-repair methods. In this context, an error repair method is a means by which a compiler can correct certain errors in the code it parses. Two methods were investigated for use in a compiler for an Ada subset, the DAS (Delft Ada subset), compiler. The method finally used is the natural synthesis of those two methods.

INDEX TERMS

COMPILERS FAULT TOLERANCE FAULT CORRECTION

A REVISED STONEMAN FOR DISTRIBUTED ADA SUPPORT ENVIRONMENTS

GOODWIN, JEREMY P.

DOCUMENT NUMBER: 6119 DOCUMENT DATE: 01/84 TYPE: TECHNICAL REPORT

This paper extends the conceptual model of the "STONEMAN" document to more completely model the interfaces and protocols that exist in the Ada Programming Support Environment (APSE). A previous extensions to the STONEMAN are reviewed, and an updated model is proposed. The new model is shown to meet the guidelines set forth in STONEMAN, and to include subsequent ideas as well. The new model is then applied to the problem of user communication with an APSE, and it is shown how the new model extends to include distributed APSEs as well as single host APSEs. The issue of security enforcement, as a necessary subset of dynamic verification, is also included in the new model. (author)

INDEX TERMS

PROGRAMMING LANGUAGE ADA TOOL ENVIRONMENT
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A137940
REPORT NUMBER: CS830010

SPONSORS: OFFICE OF NAVAL RESEARCH,QUINCY ST.,ARLINGTON,VA 22217

ABSTRACT TYPES, ADA PACKAGES, AND THE TEACHING OF DATA STRUCTURES

FELDMAN, MICHAEL B.

DOCUMENT NUMBER: 6134 TYPE: JOURNAL ARTICLE

ACM SIGCSE BULLETIN, VOL 16, ISSUE 1, PP. 183-189

This paper describes a course in Data Structures offered to upper-division undergraduates and beginning graduate students. In addition to the usual data-structures topics, the course places a strong emphasis on software engineering principles, especially the implementation of abstract data types using Ada packages. Two programming project series are presented; documentation requirements are described in some detail. Attention is paid to the problem of translating high-level design concepts, as embodied in Ada, into the more limited data structures and modularization features of earlier languages. (author)

INDEX TERMS

CURRICULA	DATA TYPES	DATA STRUCTURES
SOFTWARE ENGINEERING	DESIGN	REUSABILITY

MIL-STD-SDS REVIEW ISSUES: ADA AND DESIGN METHODOLOGIES

FISCHER, HERMAN

DOCUMENT NUMBER: 6135 TYPE: PAPER

ACM ADA LETTERS, VOL 4, ISSUE 1, PP. 7-16

A number of industry reviewers met at the October 1983 AdaTEC meeting to review the "Proposed Military Standard, Defense System Software Development (DoD-STD-SDS)." The standard was reviewed for compatibility with Ada . In addition, reviewers provided comments on sections of the standard which related to design methodologies. This article is a report on the AdaTEC review. The author distilled the recommendations relating to two (of the 44) issues, #7--Ada, and #13--Design Methodologies. Comments were reported as a statement of the problem, discussion, and a recommendation.

INDEX TERMS

STANDARDIZATION	PROGRAM DESIGN METHODOLOGIES
DESIGN TOOLS AND TECHNIQUES	
DEVELOPMENTAL METHODOLOGIES	

AVAILABLE FROM: ACM,INC., 1133 AVE. OF AMERICAS, NY,NY 10036

MONITORING AN ADA SOFTWARE DEVELOPMENT

BASILI, VICTOR R.; CHANG, SHIH; GANNON, JOHN; KATZ, ELIZABETH; PANLILIO-YAP, MONINA N.; RAMSEY, CONNIE LOGGIA; ZELKOWITZ, MARVIN V.; BAILEY, JOHN; KRUESI, ELIZABETH; SHEPPARD, SYLVIA

DOCUMENT NUMBER: 6136 TYPE: PAPER

ACM ADA LETTERS, VOL 4, ISSUE 1, PP. 32-39

This paper describes an experiment in training and applying Ada to a real world (and previously developed) software project. The experiment consisted of training a group of programmers (having different levels of experience) in the use of Ada. After training, they were to design, code and test a software project. Since this project had previously been developed in FORTRAN, the new Ada program could be compared with the previous version and inferences made.

Some interesting results include that training is a crucial factor in this process; and it is not enough to use Ada as a programming language if the basic software design continues (implicitly) to be a FORTRAN-oriented design. (author)

INDEX TERMS

EDUCATION	SOFTWARE ENGINEERING	DATA ANALYSIS
DATA COLLECTION	PERSONNEL MANAGEMENT	DATA ABSTRACTION
FORTRAN		

AVAILABLE FROM: ACM,INC., 1133 AVE. OF AMERICAS, NY,NY 10036

SPONSORS: OFFICE OF NAVAL RESEARCH,QUINCY ST.,ARLINGTON,VA 22217

A PERFECT HASH FUNCTION FOR ADA RESERVED WORDS

WOLVERTON, DAVID ALAN

DOCUMENT NUMBER: 6137 TYPE: PAPER

ACM ADA LETTERS, VOL 4, ISSUE 1, PP. 40-44

A fast perfect hash function is presented which allows the 63 Ada reserved words to be differentiated quickly from other Ada identifiers. Such functions are potentially useful in improving the performance of software that processes the text of Ada programs.

INDEX TERMS

SOFTWARE TOOLS

AVAILABLE FROM: ACM,INC., 1133 AVE. OF AMERICAS, NY,NY 10036

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

ADA EDUCATION IS A MOVING TARGET

BERARD, EDWARD V.

DOCUMENT NUMBER: 6138 TYPE: PAPER

ACM ADA LETTERS, VOL 4, ISSUE 1, PP. 45-49

The author describes the "line-by-line" style of programming which he asserts is common among FORTRAN, COBOL, and Assembly language programmers. The developing shortage of programmers will make such a style inappropriate in the coming decades. Instead the author advocates a "tools to build tools" approach. Ada was designed with this philosophy in mind. Thus, Ada education must not merely concentrate on syntax, but must convey this philosophy and the advanced software engineering techniques needed to implement it.

INDEX TERMS

ECONOMIC ISSUES SOFTWARE ENGINEERING EDUCATION
PROGRAMMING

AVAILABLE FROM: ACM,INC., 1133 AVE. OF AMERICAS, NY,NY 10036

ON UNLIMITED TYPES AND RELIABILITY OF ADA PROGRAMS

LLAMOSI, ALBERT; BOTELLA, PERE; OREJAS, FERNANDO

DOCUMENT NUMBER: 6139 TYPE: PAPER

ACM ADA LETTERS, VOL 4, ISSUE 1, PP. 50-60

The decision to mix two such different concepts as assignment and test for equality in the same feature of Ada language is submitted to criticism. Its consequences on reliability and modifiability of programs are considered and some methodological conclusions are drawn out in this article. The authors conclude putting together equality test and assignment into the limited/unlimited declaration was a truly wrong design decision. (author)

INDEX TERMS

RELIABILITY MODIFIABILITY LANGUAGE DESIGN
DATA ABSTRACTION MODULES
AVAILABLE FROM: ACM,INC., 1133 AVE. OF AMERICAS, NY,NY 10036

ANSI STANDARD ADA - QUICK REFERENCE SHEET

SMITH, DAVID A.

DOCUMENT NUMBER: 6140 TYPE: PAPER

ACM ADA LETTERS, VOL 4, ISSUE 1, PP. 61-66

The Ada grammar is represented here in syntax graph notation. This grammar also incorporates a few rules considered semantic. The package specifications for the predefined packages Standard, System, and Text-IO have also been included. Information about the predefined attributes and pragmas has also been highly condensed. (author)

INDEX TERMS

LANGUAGE STRUCTURE
AVAILABLE FROM: ACM,INC., 1133 AVE. OF AMERICAS, NY,NY 10036

ADA AS A PROGRAM DESCRIPTION LANGUAGE (PDL): A PROJECT SOFTWARE MANAGEMENT PERSPECTIVE

BOND, RODNEY M.

DOCUMENT NUMBER: 6141 TYPE: PAPER

ACM ADA LETTERS, VOL 4, ISSUE 1, PP. 67-73

This paper is based on the author's experience in using SDDL, Software Design and Documentation Language. It shows how the use of Ada as a PDL would have affected a specific project and identifies issues which must be addressed when using any PDL. In all previous tasks, an initial problem with instituting the use of a PDL was that sufficient training was not available to overcome the inertia associated with the transfer of a new technology into practice. Learning the capabilities of tools rarely provides enough information to allow the creative use of the tools within specific project environments and constraints. The tools appear either too rigorously structured to be applied creatively, or are too flexible to easily identify a converging path to an application methodology.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL) TECHNOLOGY TRANSFER
FORTRAN MANAGEMENT

AVAILABLE FROM: ACM,INC., 1133 AVE. OF AMERICAS, NY,NY 10036

EVALUATION OF AUTOMATED CONFIGURATION MANAGEMENT TOOLS IN ADA PROGRAMMING SUPPORT ENVIRONMENTS

ORNDORFF, M.S.

DOCUMENT NUMBER: 6151 DOCUMENT DATE: 03/84 TYPE: TECHNICAL REPORT

In this thesis, the author develops criteria useful for evaluating the ability of tools in Ada environments to support configuration management. In trying to define configuration management, the author approaches the problem from both management and designers' viewpoints. In addition, the author examines the traditional definition of the software life cycle with respect to its inadequacy for describing incremental development and rapid prototyping. From this background, the author is able to develop requirements and evaluation criteria for configuration management which are used to evaluate the Army's Ada Programming Support Environment, the Ada Language System (ALS).

INDEX TERMS

CONFIGURATION MANAGEMENT ADA TOOL ENVIRONMENT SOFTWARE LIFE CYCLE
PROTOTYPES VERIFICATION VALIDATION

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A140982/0

REPORT NUMBER: AFIT/GCS/EE/84M-1

REQUIREMENTS ANALYSIS FOR ADA COMPILERS

WALLIS, PETER J. L.; WICHMANN, BRIAN A.

DOCUMENT NUMBER: 6156 TYPE: JOURNAL ARTICLE

COMMUNICATIONS OF THE ACM, VOL 27, ISSUE 1, PP. 37-41

This paper reviews the issues raised by the drafting of a general requirements analysis specification for Ada compilers by the Portability Working Group of Ada Europe. Issues reviewed include: language related issues, machine-specific features, portability, user interfaces and facilities, performance and capacity, compiler and run time interfaces, rehosting and retargeting issues. Although the work reported in this paper was intended primarily to keep European supplies and users of Ada compilers, the results should be of value to the worldwide Ada market.

INDEX TERMS

SPECIFICATIONS REQUIREMENTS COMPILERS

SPONSORS: COMMISSION OF THE EUROPEAN COMMUNITIES

ADA: PAST, PRESENT, FUTURE: AN INTERVIEW WITH JEAN ICHBIAH, THE PRINCIPLE DESIGNER OF ADA

STAFF AUTHOR

DOCUMENT NUMBER: 6171 TYPE: JOURNAL ARTICLE

COMMUNICATIONS OF THE ACM, VOL 27, ISSUE 10, PP. 990-997

This article records an interview with Jean Ichbiah, the principal designer of Ada . Ichbiah discusses the evolution of Ada, evaluates its success so far, and speculates on its future. Some of the questions asked are: "How did the DoD come to sponsor a new computer language?"; "Who defined Ada's requirements?"; "Is the DoD using using Ada right now?"; " Will Ada substantially reduce programming cost?"

INDEX TERMS

LANGUAGE EVALUATION
TECHNOLOGY FORECAST
FORTRAN
PASCAL
LANGUAGE DESIGN
PORTABILITY
PL/I
C LANGUAGE
LANGUAGE STRUCTURE
DESIGN
ALGOL

DHRYSTONE: A SYNTHETIC SYSTEMS PROGRAMMING BENCHMARK

WEICKER, REINHOLD P.

DOCUMENT NUMBER: 6172 TYPE: JOURNAL ARTICLE

COMMUNICATIONS OF THE ACM, VOL 27, ISSUE 10, PP. 1013-030

This paper describes a synthetic programming benchmark program called DHRYSTONE. This benchmark can be used to check whether a computer architecture can efficiently execute those features of a programming language that are most frequently used in programs written to perform systems programming applications. Data used to build the benchmark is summarized and compared in the paper. The author has written an Ada version of the benchmark, which appears in the appendix. He states that the Ada program is designed in a way that should make it possible to develop versions for several different programming languages.

INDEX TERMS

TESTING	PROGRAM TESTING	LANGUAGE EVALUATION
AUTOMATED PROGRAM ANALYSIS		ARCHITECTURE
DATA COLLECTION	DATA TYPES	DATA STRUCTURES
STATISTICAL SOFTWARE	PROGRAMMING	

TIMIMG STUDIES USING A SYNTHETIC WHETSTONE BENCHMARK

HARBAUGH, SAM; FORAKIS, JOHN A.

DOCUMENT NUMBER: 6174 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL 4, ISSUE 2, PP. 23-34

This article describes a project which performed timing studies comparing the compile and execution times of the synthetic Whetstone benchmark program written in different languages and compiled and run in different environments. The languages used were FORTRAN 77, PASCAL and Ada . The environments used were the VAX-11/780, the Data General MV/4000 and MV/10000, and their respective software. (author)

INDEX TERMS

FORTRAN	PASCAL	LANGUAGE EVALUATION
EFFICIENCY		

INTERFACING WITH REAL ENVIRONMENTS FROM ADA PROGRAMS

FANTECHI, A.

DOCUMENT NUMBER: 6175 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL 4, ISSUE 2, PP. 35-43

The features provided by the Ada language to interface objects belonging to non-Ada real environments are summarized and discussed in this paper. Some suggestions are given towards the proper use of these features in real environments. (author)

INDEX TERMS

REAL-TIME SYSTEMS ADA TOOL ENVIRONMENT ARCHITECTURE

WRITING DIAGNOSTIC SOFTWARE IN ADA

VAN DER LINDEN, PETER

DOCUMENT NUMBER: 6176 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL 4, ISSUE 2, PP. 44-53

This paper desribes the VERIFY 432 package, which was written in Ada , and which evaluates the hardware status of an HIS 432 board system or an integrated MULTIBOX computer. Some observations are made on the possibility of building a knowledge base into this software, to upgrade to an expert system. A hardware diagnostic package would usually be written in a low-level language, perhaps even utilizing special-purpose microcode functions. However, the authors' experience demonstrated that Ada is suitable for implementing this kind of testing suite, and has many features which especially facilitate more general systems programming. Some of the particular advantages of using Ada are pointed out, as well as areas in which the language could have provided more assistance than it did. (author)

INDEX TERMS

ARCHITECTURE EXPERT SYSTEMS
VERIFICATION TOOLS AND TECHNIQUES TESTING

EXPERIENCE WITH ADA FOR THE GRAPHICAL KERNEL SYSTEM

GILROY, KATHLEEN

DOCUMENT NUMBER: 6177 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL 4, ISSUE 2, PP. 54-64

This paper describes the effort to produce an Ada language binding to the Graphical Kernel System (GKS) and to implement a subset of the GKS functionality in Ada. It presents an overview of the GKS/Ada project, discusses some of the issues raised during development of the GKS software, describes the results of a post-coding analysis comparing the binding and prototype code, and comments on the lessons drawn from this experience. (author)

INDEX TERMS

GRAPHICS APPLICATIONS STANDARDS

SPONSORS: WIS JOINT PROGRAM OFFICE, WASHINGTON,DC

ADA LANGUAGE MAINTENANCE, A LOOK AT WHAT IS GOING ON

DEWAR, ROBERT B.K.

DOCUMENT NUMBER: 6176 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL 4, ISSUE 2, PP. 65-76

With any computer language, the process of language design is not complete with the issue of a formal standard. The production of new revised Ada standards is only one aspect of language maintenance. The other aspect, which is perhaps even more important, is the maintenance of the current standard, involving such tasks as: (1) Clarifying points where the standard is clear, but the wording could be regarded as misleading. (2) In cases where the standard fails to specify which of two possible interpretations is valid, deciding whether to specify one or the other, or to explicitly allow either. (3) In cases where the manual is inconsistent, deciding which of two possible interpretations is required. (4) In cases where the manual is clear but says something very different from what was intended, or something which has unforseen intolerable consequences, making it clear what is intended. This article describes the organizational structure for performing, and examples of, this second aspect of maintenance of the Ada language. (author)

INDEX TERMS

STANDARDS

ADA PUBLICATIONS

ROMANOWSKY, HELEN

DOCUMENT NUMBER: 6179 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL 4, ISSUE 2, PP. 78-95

This article is a cumulative list of reports, articles, and textbooks on Ada which have been accumulated since the May/June 1983 issue of Ada Letters. 21 categories are listed and include: "Ada" and other languages, and Software Engineering, Environments, Tasking Facilities, and as a Design Language. (author)

INDEX TERMS

EDUCATION	PROGRAMMING LANGUAGE	SOFTWARE ENGINEERING
COMPILERS	DESIGN	ADA TOOL ENVIRONMENT

THE ADA RUNTIME KIT (ARK)

LOMUTO, NICO; RAJEEN, S.; GROVER, V.

DOCUMENT NUMBER: 6187 TYPE: PAPER

REAL-TIME SYSTEMS NEWSLETTER, VOL 2, ISSUE 2, PP. 27-33

This article summarizes the research performed to date by Softech, Inc. to develop a set of options ("kit") a user may choose to form his own Ada run-time environment. The presence in Ada of high-level concurrent programming constructs (called tasks) requires that, at least for embedded systems running on a bare machine, operating system functions be provided by the language implementation, as part of the run-time system. The research is based on Softech's work on Ada Language System (ALS). The rationale being followed is that the real-time user should not have to be concerned with details of the "executive." It would be desireable to standardize the underlying operating system (or run-time support system) so that the user may concentrate on the application at hand. (author)

INDEX TERMS

MEMORY MANAGEMENT	VIRTUALIZATION	FAULT TOLERANCE
APPLICATION-ORIENTED LANGUAGES		

REAL-TIME OPERATING SYSTEM EXPERIENCE

COLE, OLIVER; NORTH, STEVEN

DOCUMENT NUMBER: 6192 TYPE: PAPER

REAL-TIME SYSTEMS NEWSLETTER, VOL 2, ISSUE 2, PP. 58-62

The first half of this paper is a case study of SPL/I, high-order real-time language developed at the Naval Research Laboratories, Washington, DC in 1973. It was originally designed as a demonstration to prove that a high-order language could be used for the development of a real-time system. The second half of the paper discusses how the experiences with SPL/I are used to support the design of a real-time system using Ada .

INDEX TERMS

OPERATING SYSTEMS	REAL-TIME SYSTEMS	DISTRIBUTED PROCESSING
RELIABILITY	FAULT TOLERANCE	

ADA AS A REAL-TIME OPERATIONS SYSTEM

EMERY, DAVID E.

DOCUMENT NUMBER: 6198 TYPE: PAPER

REAL-TIME SYSTEMS NEWSLETTER, VOL 2, ISSUE 1, PP. 29-33

Ada contains many constructs which are usually found in Real-Time Operating Systems. For this reason, it can be considered a real-time operating system in its own right. To perform these real-time services, Ada requires a complex runtime support library, which resembles the kernel of a real-time operating system. This paper discusses Ada's use as a language for real-time programming. (author)

INDEX TERMS

REAL-TIME SYSTEMS

ADA COMPILER VALIDATION SUMMARY REPORT: TELESOFT ADA COMPILER, VERSION 2.0A2 FOR SUN 120 MOTOROLA M68010 USING 4.2 BSD UNIX-SUN VER 1.1

SOFTECH, INC.

DOCUMENT NUMBER: 6207 DOCUMENT DATE: 08/10/84 TYPE: TECHNICAL REPORT

The TeleSoft Compiler (TeleSoft Ada), version 2.0a2, for the Sun 120 Motorola

M68010, using 4.2 BSD UNIX - Sun Version 1.1, was tested with version 1.3 of the Ada Compiler validation Capability (ACVC) validation tests. Version 1.3 of the test suite contained 1989 tests, of which 1668 were applicable to this implementation. Of the applicable tests, 61 were withdrawn due to errors in the tests. All of the remaining 1607 applicable correct tests were passed. (author)

INDEX TERMS

COMPILERS VALIDATION
AVAILABLE FROM: THE AUTHOR

SPONSORS: U.S.A.F. ASD,WRIGHT-PATTERSON AFB, OH

AN ADA LANGUAGE PRIMER, PART I

SAIB, SABINA H.

DOCUMENT NUMBER: 6214 TYPE: JOURNAL ARTICLE

BYTE, VOL 9, ISSUE 6, PP. 131-135

This article is the first of a two-part introduction to Ada . Very basic examples are shown that illustrate the manner in which packages and procedures fit together. The reader will gain some understanding of the Ada program structure from this article. A brief survey of partial Ada compilers available for microcomputers is also included.

INDEX TERMS

EDUCATION MICRO COMPUTERS

AN ADA LANGUAGE PRIMER, PART II

SAIB, SABINA H.

DOCUMENT NUMBER: 6215 TYPE: JOURNAL ARTICLE

BYTE, VOL 9, ISSUE 6, 14 P.

This article is the second of a two-part introduction to Ada . More complicated examples than those in the first part are presented. These examples illustrate Ada's notion of types, flow of control constructs, and provide a simple interface with the user. One of the partial Ada compilers for microprocessors, Janus Ada, is reviewed.

INDEX TERMS

EDUCATION MICRO COMPUTERS COMPILERS

TRANSITIONS TO ADA: AN INCREMENTAL APPROACH

BROWN, D.H.J.

DOCUMENT NUMBER: 6216 TYPE: PAPER

COMPUTER JOURNAL,THE, VOL 27, ISSUE 1, PP. 37-41

Software producers currently use a wide variety of programming tools and management aids for software systems development. The High Order Language Working Group of the US Department of Defense has placed as much emphasis on the provision of a co-ordinated Ada Programming Support Environment (APSE) as on the language design itself. A technique for ensuring programmer productivity during the transition period to APSE usage is outlined. The technique involves incremental replacement of functional components of the extant environment with those of the APSE. (author)

INDEX TERMS

ADA TOOL ENVIRONMENT PRODUCTIVITY

SPONSORS: ROYAL RADAR AND SIGNALS ESTABLISHMENT

PROGRAMMING IN ADA (SECOND EDITION)

BARNES, J.G.P.

DOCUMENT NUMBER: 6217 TYPE: TEXT

This book covers all aspects of Ada but does not explore every pathological situation. Its purpose is to teach the reader the effect of and intended use of the features of Ada. In a few areas the discussion is incomplete; these are fixed point arithmetic, machine dependent programming, and input-output. Most sections contain exercises. Solutions to all the exercises are found at the end of the book. Chapters on the following topics are included: history and technical background, various Ada concepts, lexical style, types, control structures, exceptions, generics, and tasking.

INDEX TERMS

EDUCATION EMBEDDED COMPUTER SYSTEMS
PROGRAMMING EXCEPTION HANDLING DESIGN
SYNTAX GRAPHS

AVAILABLE FROM: ADDISON-WESLEY PUBLISHING CO., READING, MA 01867

ABSTRACTION TECHNIQUES IN MODERN PROGRAMMING LANGUAGES

SHAW, MARY

DOCUMENT NUMBER: 6218 TYPE: JOURNAL ARTICLE

IEEE SOFTWARE, VOL 1, ISSUE 4, PP. 10-26

This article begins by reviewing the ideas about program development and analysis that have heavily influenced the development of current programming language techniques. Many of these ideas are currently interesting as well as historically important. The authors then survey the ideas from recent research projects that are influencing modern software practice. The changes in program organization that have been stimulated by these ideas are illustrated by developing a small example in three different languages - FORTRAN, Pascal, and Ada . Finally, we assess the status and the potential of current abstraction techniques. (author)

INDEX TERMS

STRUCTURED DESIGN	TOP-DOWN PROGRAMMING	MODULAR PROGRAMMING
ABSTRACT DATA TYPES	DATA ABSTRACTION	PASCAL
FORTRAN		

SPONSORS: NATIONAL SCIENCE FOUNDATION;
U.S.A.F. AVIONICS LAB,W-PAFB,OH 45433;
DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

SOFTWARE PROTOTYPING USING THE SETL PROGRAMMING LANGUAGE

KRUCHTEN, PHILIPPE; SCHONBERG, EDMOND; SCHWARTZ, JACOB

DOCUMENT NUMBER: 6220 TYPE: JOURNAL ARTICLE

IEEE SOFTWARE, VOL 1, ISSUE 4, PP. 66-75

This article describes the use of SETL, a prototyping language, in construction of the New York University Ada /Ed interpreter. SETL is as language that takes much of its philosophy and appearance from set theory.

INDEX TERMS

PROTOTYPES	PROGRAMMING LANGUAGE	INTERPRETERS
TRANSLATORS		

SPONSORS: US ARMY CENTACS/CORADCOM FT. MONMOUTH,NJ;
OFFICE OF NAVAL RESEARCH,QUINCY ST.,ARLINGTON,VA 22217;
ADA JT. PROG. OFF., ARLINGTON, VA 22209;

NATIONAL SCIENCE FOUNDATION

UNORTHOGONALITIES IN THE IDENTIFICATION RULES IN ADA

BACH, IVAN

DOCUMENT NUMBER: 6224 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL IV, ISSUE 3, PP. 37-43

In Ada , the identification, i.e. the determination of the corresponding defining occurrence for each applied occurence turns out to be one of the most delicate problems of compilation. In Ada the concept of packages together with the use clause alters visibility rules. Overloading has been extended to any subprogram including enumeration literals. In addition, the identification is further complicated by derivation, i.e., by the introduction of derived subprograms. This article explains that the visibility rules in Ada are not well defined and orthogonal. This is partly due to some concepts which introduce totally different visibility and/or overloading resolution rules sometimes leading to contradictions. (author)

INDEX TERMS

LANGUAGE STRUCTURE COMPILERS

ON THE IMPLEMENTATION AND USE OF ADA ON FAULT-TOLERANT DISTRIBUTED SYSTEMS

KNIGHT, JOHN C.; URQUHART, JOHN I.A.

DOCUMENT NUMBER: 6225 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS, VOL IV, ISSUE 3, PP. 53-64

This article begins by looking at the general problem of tolerating hardware failure. In section II the authors present some motivation for considering distributed systems where hardware failure must be tolerated, and define in detail the failures the authors will consider. In section III the authors look at the general problem of providing service after processor failure; the facilities needed are described in section IV. In the remainder of the paper the authors turn our attention from the general problem to the problem of building fault - tolerant systems using Ada . The considerable difficulties that arise when such systems are programmed in Ada are discussed in section V. The authors show in sections VI and VII that these difficulties can be overcome by careful programming and by making extensive additions to a normal execution time support system for Ada. These additions make no changes to the language syntax and their use in Ada is discussed in section VIII. (author)

INDEX TERMS

RELIABILITY DISTRIBUTED PROCESSING FAULT TOLERANCE

SPONSORS: NATIONAL AERONAUTICS & SPACE ADMINSTRATION

ADA BIBLIOGRAPHY: VOLUME II

IIT RESEARCH INSTITUTE

DOCUMENT NUMBER: 6229 DOCUMENT DATE: 03/84 TYPE: BIBLIOGRAPHY

This bibliography contains citations for documents pertaining to the history, development, progress and use of the Ada language. It also contains comprehensive author and subject indices which provide a cross reference to the appropriate document citation. The citations in this volume represent all documents added to the Ada Bibliographic Database since the publication of Volume I (DAN 4610) in May 1983. (author)

INDEX TERMS

SOFTWARE TOOL SYSTEMS DEVELOPMENT HISTORY

AVAILABLE FROM: DATA & ANALYSIS CENTER FOR SOFTWARE (DACS)

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209

DYNAMIC STRING FUNCTIONS IN ADA

RUBIN, SYLVAN

DOCUMENT NUMBER: 6242 TYPE: JOURNAL ARTICLE

JOURNAL OF PASCAL, ADA AND MODULA TWO, VOL 3, ISSUE 6, 4 P.

Ada provides a built-in string data type. It is a one-dimensional array of characters, and (like all array type declarations in Ada) its size must be defined before any strong variables can be instantiated by an Ada program. Experience with text processing applications, such as editing or database software, shows that a dynamic string data type is often advantageous in the implementation of such programs, because the maximum lengths of text elements in some applications is not predictable. A dynamic string variable, as provided in some languages, may accept a string value of any length, limited only by the system's physical resources. The authors of this article have developed a string package for Ada, including a dynamic string data type and a basic set of string functions to operate on dynamic string variables. (author)

INDEX TERMS

TEXT-PROCESSING APPLICATIONS SOFTWARE TOOLS

LEARN TO THINK IN ADA

JONES, DO-WHILE

DOCUMENT NUMBER: 6264 TYPE: JOURNAL ARTICLE

COMPUTER LANGUAGE, VOL 1, ISSUE 3, PP. 47-49

This article displays three solutions to a sample problem. One is in Basic and the last two are in Ada . By comparing the two Ada solutions, one of which is merely a translation of the Basic solution, the author discusses Ada programming style. He argues that Ada style will contribute more maintainable and readable programs and is different from the habitual style of those who program in older languages. The author concludes that Ada is a language that makes it easy to write good programs if the programmer can break away from the programming style acquired through using older languages.

INDEX TERMS

MAINTAINABILITY SELF-DESCRIPTIVENESS PROGRAMMING

YEARLY REPORT FOR PROGRAMMING PRODUCTIVITY ENHANCEMENT BY THE USE OF APPLICATION GENERATORS

HOROWITZ, ELLIS

DOCUMENT NUMBER: 6325 DOCUMENT DATE: 08/84 TYPE: TECHNICAL REPORT

This document, a yearly report, provides a broad overview of a project using Ada to develop an office automation program. Relational database features were added in an extension to Ada. Man/machine interactions were a main concern of the investigators. They were especially interested in providing non procedural capabilities to specify forms/screens for interacting with the user.

INDEX TERMS

HUMAN ENGINEERING RELATIONAL DATA MODEL

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A145623/5
REPORT NUMBER: AFOSR-TR-84-0813

NYU ADA/ED USER'S GUIDE · VERSION 1.4 FOR VAX/VMS SYSTEMS

STAFF AUTHOR, COURANT INST. NEW YORK UNIV.,251 MERCER ST.NY,NY 10012

DOCUMENT NUMBER: 6434 DOCUMENT DATE: 07/01/84 . TYPE: TECHNICAL REPORT

This is the User's Guide for the NYU Ada/Ed Translator, Version 1.41, which was validated by the Ada Validation Facility during July 1984. The design goal of the NYU Ada/Ed has been to produce a complete language Ada System which is faithful in all respects to the language definition and that can serve as an operational definition of Ada, to be perused by language designer, implementors, and users. The design and implementation of Ada/Ed was initiated at a point when the language was not completely defined or understood, and has culminated on the first fully validated ANSI-Ada translator.

INDEX TERMS

ADA TOOL ENVIRONMENT PROGRAMMING AIDS SOFTWARE FACTORY
USABILITY
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A146759/6
REPORT NUMBER: DOD/DF-85/002A

SPONSORS: U.S.ARMY COMM-ELECTRONICS CMD(CECOM), FT. MONMOUTH, NJ

AUTOMATING SOFTWARE DESIGN METRICS

SZULEWSKI, PAUL A.; SODANO, NANCY M.; ROSNER, A.J.; DEWOLF, J.B.

DOCUMENT NUMBER: 6458 DOCUMENT DATE: 02/84 TYPE: TECHNICAL REPORT

The Rome Air Development Center has developed the Software Quality Framework as a means to specify software quality goals and measure software quality. Much of the work to date has focused on metrics applicable to software code. This report describes an effort undertaken to measure the quality of software products earlier in the software development life cycle, during the design phase, and to automate the capture of metric data from design media. Metrics of software quality, primarily those related to the criterion simplicity (or conversely, complexity), were reviewed. This review includes those metrics previously developed in the Software Quality Framework. Two metrics, Halstead's Software Science and McCabe's Cyclomatic Complexity were chosen for their amenability to measurement during design and their potential for automation. Two design media were used: Design Aids for Real-Time Systems (DARTS), an experimental automated design tool developed at the Charles Stark Draper Laboratory; and Ada as a program design language (PDL). (author)

INDEX TERMS

AUTOMATIC DATA COLLECTION		COMPLEXITY MEASUREMENT
DEVELOPMENTAL METHODOLOGIES		HALSTEAD'S LAW
MODELS	PROGRAM COMPLEXITY	
SOFTWARE ENGINEERING TOOLS AND TECHNIQUES		
PROGRAM CONTROL LANGUAGE (PDL)		QUALITY METRICS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A145869/4
REPORT NUMBER: RADC-TR-84-27

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

REAL-TIME LANGUAGES FOR PROCESS CONTROL

SCARROW, A.; WALTERS, S.L.

DOCUMENT NUMBER: 6468 DOCUMENT DATE: 02/84 TYPE: TECHNICAL REPORT

This report forms the first part of a survey of real-time programming languages for process control. It starts out by briefly outlining the features required for process control and for real-time programming languages. Then follows with a brief look at the types of programming languages currently used in process control applications. The major part of the report consists of summaries of the features/facilities available in a number of general purpose real-time programming languages. A glossary of programming terms is included to help those readers with little or no programming experience. Terms appearing in this glossary are marked with in the text when they are first used in the report. (author)

INDEX TERMS

LANGUAGES	PROCESS	REAL-TIME SYSTEMS
CORAL	PASCAL	MODULA
PL/I		

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: PB84-234319
REPORT NUMBER: LR-481(CON)

ADA TRAINING CURRICULUM: PROGRAMMING METHODOLOGY - M203 TEACHER'S GUIDE

STAFF AUTHOR, SOFTECH,INC. TOTTEN POND RD,WALTHAM,MA 02154

DOCUMENT NUMBER: 6482 DOCUMENT DATE: 07/84 TYPE: INSTRUCTION

This is a teacher's manual for M303 (Programming Methodology), where M303 is a course in Softech's Ada training curriculum. The course contains five distinct sections. They are: the introduction, structured programming, coding style, ensuring reliability, and the review.

INDEX TERMS

STRUCTURED PROGRAMMING EDUCATION
SOFTWARE ENGINEERING METHODOLOGIES PROGRAMS
RELIABILITY

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A143581/7

SPONSORS: U.S.ARMY COMM-ELECTRONICS CMD(CECOM), FT. MONMOUTH, NJ

PROPOSAL FOR STANDARD BASIC FUNCTIONS IN ADA

KOK, J.; SYMM, G.T.

DOCUMENT NUMBER: 6499 DOCUMENT DATE: 06/84 TYPE: TECHNICAL REPORT

The report contains a proposal for a standard basic mathematical functions package for scientific computation in Ada . The package is transportable to machines with different floating-point types and its availability will enhance the portability of numerical software. (author)

INDEX TERMS

PROGRAM LIBRARY SYSTEMS
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: PB85-118701

INTERFACING ADA WITH OTHER PROGRAMMING LANGUAGES IN THE ROLM/DG ADA DEVELOPMENT ENVIRONMENT (ADE)

PETERSON, A. SPENCER

DOCUMENT NUMBER: 6522 TYPE: MONOGRAPH

The Ada language provides the capability to use non-Ada object code in an Ada program by the use of pragma INTERFACE. Programs have been run to test and verify this implementation for two languages, FORTRAN 77 and ROLM/DG ECLIPSE(1) assembly language. This paper discusses the capabilities and limitations of language interfacing within the ADE(2). It specifies the Ada constructs necessary to use non-Ada code in an Ada unit. It identifies the types which are directly compatible, other types which are totally incompatible or require special handling, such as the mechanisms needed to pass arrays between Ada and FORTRAN 77. A list of general practices which allow an Ada program to use the non-Ada code and still keep to good Ada programming techniques (strong typing, exception handling, etc.) is also discussed. Several examples of code which use language interfaces are discussed and sample code segments are included in the appendices. (author) (1)ECLIPSE is a U.S. registered trademark of Data General Corporation. (2)ADE is a trademark of ROLM Corporation.

INDEX TERMS

SOFTWARE ENGINEERING	SOFTWARE ENGINEERING TOOLS AND TECHNIQUES
FORTRAN	SOFTWARE DEVELOPMENT ENVIRONMENTS

AVAILABLE FROM: THE AUTHOR

ADA JOINT PROGRAM OFFICE OBJECTIVES AND PROGRESS-THROUGH 1983

KRAMER, J.F. JR.; MCDONALD, C.W.

DOCUMENT NUMBER: 6765 DOCUMENT DATE: 09/84 TYPE: TECHNICAL REPORT

In 1975 the Department of Defense (DoD) began the process of standardizing the high order languages used to write software for embedded computers. The first step was to form a High Order Language (HOL) working group to identify the DoD's requirements for computer programming languages to evaluate the existing languages, and to recommend the implementation and control of a "minimal set." Although an interim set of languages was established, none were considered to be a long-term solution to the DoD's programming needs. Therefore, an international request for proposals was issued for a new common language. The final requirements document, STEELMAN, served as the standard for the selection of the new DoD HOL. In 1979, this new language developed by CII-Honeywell Bull, was named Ada in honor of Augusta Ada Byron, the Countess of Lovelace. On 12 December 1980, the Under Secretary of Defense for Research and Engineering established the Ada Joint Program Office (AJPO) to manage the DoD's effort to implement, introduce and provide lifecycle support for Ada. This paper outlines past, present, and future objectives of the AJPO. (author)

INDEX TERMS

DEVELOPMENT CYCLE	SOFTWARE ENGINEERING METHODOLOGIES
SOFTWARE ENGINEERING ENVIRONMENTS	RELIABILITY
PORTABILITY	ADAPTABILITY

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A149436/8

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209

ADA TASKING AND EXCEPTIONS: A FORMAL DEFINITION

GONZALEZ, CAPT. DEAN W.

DOCUMENT NUMBER: 6898 DOCUMENT DATE: 1985 TYPE: DISSERTATION

The formal language definition method used by Niklaus Wirth to describe the Euler programming language is applied to the Ada tasking and exception mechanisms. Packages are also included to the extent that they interact with tasks. A brief overview of each mechanism is given, accompanied by a detailed explanation of salient portions of the Euler method. The two phases of the

definition, translation and execution, are detailed in the appendices followed by examples. Minutiae important tot he design of a complementary sequential definition are detailed.

INDEX TERMS

EXCEPTION HANDLING DISTRIBUTED PROCESSING
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A151618
REPORT NUMBER: AFIT/C1/NR-85-28T

INDEX TERMS

SOFTWARE ENGINEERING	SOFTWARE ENGINEERING TOOLS AND TECHNIQUES
FORTRAN	SOFTWARE DEVELOPMENT ENVIRONMENTS

AVAILABLE FROM: THE AUTHOR

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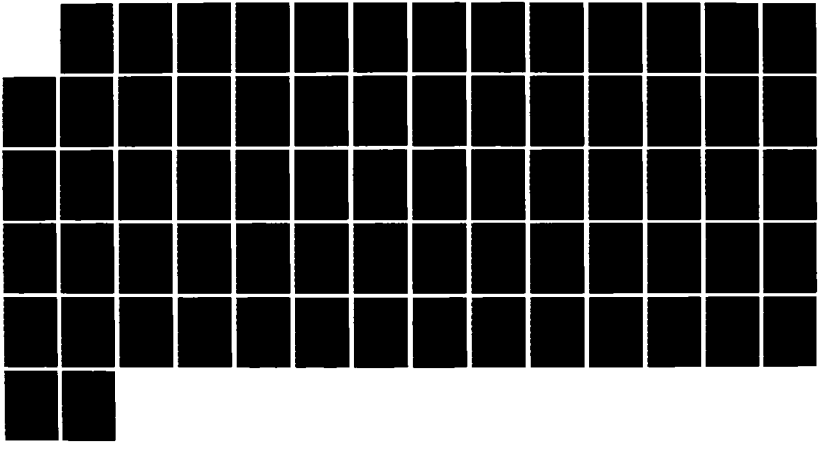

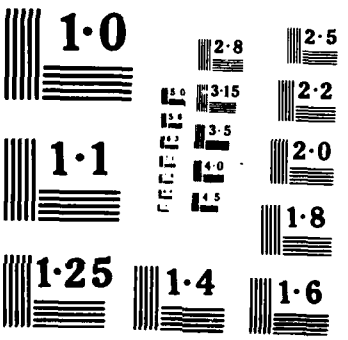
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3395-01 3403-01 3404-01 3405-01 3406-01 3408-01 3409-01
3413-01 3414-01 3418-01 3424-01 3435-01 3437-01 3441-01
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4674-02 4685-02 5400-03 5421-03 5472-03 5527-03 5528-03
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3396-01 3408-01 3453-01 3462-01 3609-01 3614-01 3917-01
4104-01 4112-01 4118-01 4142-01 4251-02 4270-02 4271-02
4287-03 4305-01 4315-01 4332-01 4335-01 4336-01 4337-01
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4112-01 4133-01 4314-01 4338-01 4603-02 4631-02 4637-02
5270-03 5661-03 5993-03

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3429-01 3446-01 3554-01 3581-01 3582-01 3583-01 3584-01
3585-01 3586-01 3590-01 3591-01 3592-01 3594-01 3595-01
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3988-02 3995-02 3996-02 4023-01 4034-01 4104-01 4123-01
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2688-01 3249-01 3250-01 3251-01 3252-01 3253-01 3259-01
3275-01 3284-01 3285-01 3288-01 3289-01 3290-01 3291-01
3292-01 3293-01 3298-01 3302-01 3318-01 3321-01 3371-01
3373-01 3377-01 3385-01 3387-01 3388-01 3389-01 3391-01
3404-01 3408-01 3409-01 3418-01 3432-01 3433-01 3434-01
3554-01 3638-01 3700-01 3771-01 3888-02 3913-01 3992-02
3993-02 3999-02 4164-01 4308-01 4314-01 4344-01 4345-01
4403-02 4404-02 4415-02 4431-02 4587-02 4610-02 4612-02
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5552-03 5554-03 5555-03 5557-03 5559-03 5641-03 5732-03
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2684-01 2688-01 2707-01 2722-01 2915-01 3084-01 3222-01
3313-01 3318-01 3371-01 3387-01 3388-01 3391-01 3397-01
3406-01 3411-01 3413-01 3424-01 3609-01 3611-01 3701-01
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4297-01 4306-01 4308-01 4309-01 4323-01 4344-01 4345-01
4349-01 4366-02 4368-02 4369-02 4403-02 4404-02 4415-02
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2071-01 3268-01 3396-01 3408-01 3432-01 3458-01 3509-01
3584-01 4299-01 4331-01 4335-01 4336-01 4337-01 4674-02
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0736-01 2010-01 4045-02 4103-03 4299-01 4335-01

MAINTENANCE TOOLS AND TECHNIQUES
3354-01 3430-01 3460-01 4163-02 4615-02 4656-02 4664-02
4718-02

MANAGEMENT
3432-01 3593-01 4610-02 4796-02 5658-03 6141-03

MANAGEMENT TOOLS AND TECHNIQUES
3253-01 3419-01 3426-01 3458-01 3460-01 3607-01 4415-02
4568-02 4673-02 5666-03

MATHEMATICAL METHODOLOGIES
5699-03

MEMORY MANAGEMENT
2821-01 3265-01 3316-01 3416-01 3444-01 3613-01 3910-01
3983-02 4125-01 4191-01 4197-01 4327-01 4413-02 4538-02
4682-02 4683-02 5421-03 5485-03 6187-03

MESA
3841-02 4199-02

METALANGUAGES
4787-02 4791-02

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3006-01 3254-01 3397-01 3608-01 3610-01 3612-01 3613-01
4096-01 4152-01 4264-01 4279-01 4431-02 5485-03 5488-03
5513-03 5548-03 6214-03 6215-03

MICROCODE
4503-02 4628-02

MICROPROCESSORS
3265-01 3296-01 3416-01 3611-01 4034-01 4278-01 4533-02
4611-02 4637-02 5370-03 5400-03 5421-03 5485-03 5534-03
5670-03 5979-03

MICROPROGRAMS
3265-01 3453-01 3614-01 4428-02

MILITARY COMPUTER FAMILY
4252-02 4553-02 4574-02 4590-02 5658-03 5674-03

MINICOMPUTERS
4352-01 5485-03

MODELLING AND SIMULATION TOOLS
3440-01 3460-01 4143-01 4193-01 4401-02 4402-02 4502-02
4503-02 4568-02 4616-02 4669-02 4787-02 5277-02 5278-02
5279-02

MODELS
4568-02 5545-03 6458-03

MODERN PROGRAMMING PRACTICES
4314-01 5407-03 5408-03 5472-03 5981-03 6105-03

MODIFIABILITY
3259-01 3917-01 6031-03 6139-03

MODIFICATION
4045-02 4190-01

MODIFICATION PROCEDURES
2612-01 4615-02

MODULA
1664-01 2014-01 3554-01 4199-02 4527-02 4528-02 4792-02
5516-03 5607-03 5634-03 5986-03 6047-03 6083-03 6468-03

MODULAR DECOMPOSITION
3866-02 4375-02 4531-02

MODULAR PROGRAMMING
4659-02 5558-03 5607-03 5692-03 5978-03 6047-03 6218-03

MODULARITY
1183-01 2156-01 2294-01 3263-01 3306-01 3366-01 3461-01
3611-01 3841-02 3919-01 4152-01 4191-01 4279-01 4426-02
4659-02 4669-02 4716-02 4736-02 4817-02 6047-03

MODULARIZATION
3613-01 4527-02 4531-02 4786-02 5143-02 5207-03

MODULES
2014-01 3357-01 3385-01 3454-01 3583-01 4328-01 4670-02
6139-03

MONITORS
3310-01 3315-01 3638-01 3841-02 4172-01 4173-01 4193-01
4413-02 4527-02 4616-02 4775-03 4792-02

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3456-01

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4431-02 5669-03

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2651-01 2921-01 3408-01 4527-02

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4642-03

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4118-01 4133-01 4252-02 4275-01 4582-02 5228-03 5270-03
5485-03

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3006-01 3422-01 4663-02

NUCLEAR REACTOR APPLICATIONS
4076-02

NUMERICAL MANIPULATION
3441-01 4311-01 4670-02 4687-02 4747-02 5514-03 5533-03
5534-03 5567-03 5848-03 5977-03 6046-03

OBJECT-ORIENTED DESIGN
5665-03 5692-03 6004-03 6043-03

OPERATING SYSTEM DESIGN
4678-03 5992-03

OPERATING SYSTEMS
2861-01 3409-01 3418-01 3419-01 3584-01 4346-01 4533-02
4568-02 5400-03 5531-03 5568-03 5973-03 6192-03

OPTIMIZATION
2774-01 3398-01 3408-01 4110-01 4162-01 4411-02 5521-03
5547-03 5553-03 5554-03 5663-03

OPTIMIZERS
2774-01 4110-01 5258-02 5902-03

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5132-03

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4279-01

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5403-03

PARALLEL PROCESSING
4775-03 5452-03 5549-03 5558-03 5641-03 5667-03 6047-03

PARTITIONING
4425-02

PASCAL
1619-01 2014-01 2426-01 2620-01 2684-01 2916-01 3084-01
3310-01 3313-01 3321-01 3377-01 3388-01 3391-01 3395-01
3399-01 3403-01 3404-01 3406-01 3416-01 3418-01 3437-01
3441-01 3611-01 3771-01 3866-02 3919-01 3983-02 4027-01
4034-01 4110-01 4169-01 4190-01 4250-02 4309-01 4317-01
4318-01 4333-01 4360-02 4403-02 4404-02 4431-02 4527-02
4528-02 4610-02 4631-02 4659-02 4792-02 5147-02 5148-02
5207-03 5279-02 5474-03 5475-03 5547-03 5634-03 5986-03
6004-03 6065-03 6114-03 6171-03 6174-03 6218-03 6468-03

PEARL
4318-01 4403-02 4404-02 4414-02 4431-02 4631-02 5996-03

PERFORMANCE
4110-01 4328-01 4329-01

PERFORMANCE EVALUATION
4682-02 6005-03

PERSONNEL MANAGEMENT
6136-03

PETRI NETS
5633-03

PL/I
2620-01 3084-01 3437-01 3887-02 4631-02 5147-02 5732-03
5986-03 6171-03 6468-03

POINTERS
5543-03

PORTABILITY
2280-01 3088-01 3252-01 3253-01 3263-01 3417-01 3420-01
3421-01 3427-01 3434-01 3450-01 3461-01 3582-01 3583-01
3585-01 3586-01 3587-01 3588-01 3589-01 3590-01 3591-01
3593-01 3594-01 3595-01 3597-01 3598-01 3599-01 3602-01
3604-01 3609-01 3610-01 4171-01 4175-01 4264-01 4279-01
4311-01 4324-01 4346-01 4380-02 4418-02 4537-02 4583-03
4587-02 4623-02 4625-02 4653-02 4658-02 4677-02 4844-03
5363-03 5528-03 5529-03 5551-03 5670-03 6114-03 6171-03
6765-03

PREPROCESSORS
3088-01 3460-01 4169-01 4307-01

PROBLEM REPORT ANALYSIS
3433-01 5990-03

PROCEDURES
2492-01 3311-01 3408-01 3463-01 3887-02 4297-01 4307-01
4308-01 4310-01 4344-01 4365-02 4620-02 4654-02

PROCESS
3841-02 4186-01 4296-01 4400-02 4792-02 6468-03

PROCESS DESIGN LANGUAGE (PDL)
4425-02 4529-02

PROCESS QUEUES
3369-01 5667-03

PRODUCT SAFETY
3434-01 4132-01

PRODUCTIVITY
2893-01 3268-01 3272-01 3354-01 3593-01 4350-01 4610-02
4615-02 4639-02 4668-02 4674-02 4748-02 5437-03 6031-03
6216-03

PRODUCTIVITY FACTORS
4668-02

PROGRAM ANALYSIS
3419-01 4568-02

PROGRAM COMPLEXITY
5402-03 6458-03

PROGRAM CONTROL LANGUAGE (PDL)
3004-01 3014-01 3273-01 3280-01 3346-01 3357-01 3456-01
3701-01 3913-01 3919-01 4100-01 4122-01 4163-02 4166-01
4167-01 4168-01 4169-01 4170-01 4270-02 4274-01 4347-01
4349-01 4377-02 4403-02 4428-02 4530-02 4534-02 4542-02
4610-02 4633-02 4635-02 4640-02 4672-02 5410-03 5536-03
5537-03 5569-03 5665-03 5993-03 6141-03 6458-03

PROGRAM CORRECTNESS
6000-03

PROGRAM DESIGN
4789-02

PROGRAM DESIGN METHODOLOGIES
4672-02 4682-02 5155-02 6135-03

PROGRAM LIBRARY SYSTEMS
3355-01 3426-01 4104-01 4580-02 4626-02 4833-02 4837-02
4838-02 4840-02 5663-03 5736-03 6499-03

PROGRAM MAINTENANCE
2612-01 3431-02 4615-02 5555-03 5557-03

PROGRAM SYNTHESIS
4837-02 4838-02

PROGRAM TESTING
4568-02 6172-03

PROGRAM TRANSFORMATIONS
3455-01 4428-02

PROGRAM UNDERSTANDING
4681-02 5407-03 5408-03

PROGRAM VALIDATION
3198-01 5555-03 5557-03

PROGRAMMER PRODUCTIVITY
0736-01 2620-01 4663-02 4668-02

PROGRAMMER TRAINING
3014-01 3280-01 3354-01 3460-01 3461-01 3914-01 4056-02
4127-01 4271-02 4272-02 4299-01 4377-02 4418-02 4568-02
4629-02 4653-02 4667-02 4672-02 4676-02 4975-03 5518-03
5519-03 5522-03 5524-03 5525-03 5660-03

PROGRAMMING
3308-01 4791-02 5475-03 5980-03 5993-03 6083-03 6102-03
6138-03 6172-03 6217-03 6264-03

PROGRAMMING AIDS
2081-01 2612-01 2953-01 3252-01 3254-01 3275-01 3276-01
3279-01 3294-01 3295-01 3356-01 3401-01 3419-01 3426-01
4789-02 5153-02 6434-03

PROGRAMMING LANGUAGE
0465-01 0733-01 0822-01 1130-01 1181-01 1618-01 1647-01
2081-01 2280-01 2341-01 2546-01 2651-01 2681-01 2821-01
2915-01 2916-01 3252-01 3278-01 3279-01 3288-01 3289-01
3290-01 3291-01 3322-01 3337-02 3354-01 3357-01 3358-01
3359-01 3360-01 3361-01 3362-01 3363-01 3364-01 3365-01
3366-01 3367-01 3368-01 3369-01 3370-01 3372-01 3373-01
3377-01 3378-01 3380-01 3385-01 3386-01 3387-01 3388-01
3389-01 3390-01 3391-01 3397-01 3398-01 3399-01 3400-01
3401-01 3402-01 3403-01 3404-01 3405-01 3406-01 3407-01
3408-01 3409-01 3410-01 3411-01 3412-01 3413-01 3414-01
3415-01 3416-01 3417-01 3418-01 3419-01 3420-01 3421-01
3423-01 3424-01 3425-01 3427-01 3457-01 3458-01 3461-01
3609-01 3614-01 3700-01 4126-01 4133-01 4162-01 4200-02
4271-02 4272-02 4295-01 4488-03 4507-03 5144-02 5228-03
5368-03 5405-03 5410-03 5411-03 5544-03 5546-03 5548-03
5555-03 5634-03 6031-03 6119-03 6179-03 6220-03

PROGRAMMING TECHNIQUES/METHODOLOGIES
2341-01 2612-01 4200-02 4249-02 4415-02 4424-02 4426-02
4428-02 4430-02 4431-02 4636-02 4645-02 4650-02 4672-02
4685-02 4792-02 4844-03 5143-02 5148-02 5364-03 5407-03
5408-03 5472-03 5607-03 5990-03 6004-03

PROGRAMS
3262-01 3307-01 3308-01 6482-03

PROJECT MANAGEMENT SURVEYS
4056-02 4271-02 4272-02

PROTOCOLS
3006-01 3443-01 4034-01 4305-01 4307-01 4632-02 4638-02

PROTOTYPES
2546-01 4056-02 4274-01 4348-01 4428-02 4680-02 4683-02
4791-02 4867-02 5527-03 5530-03 6151-03 6220-03

QUALITY
3268-01 3432-01 3597-01

QUALITY ASSURANCE
3429-01 3430-01 3486-02 3882-02 3988-02 3989-03 3990-02
3991-02 3995-02 4165-01 4326-02 4327-01 4328-01 4329-01
4330-01 4343-01 4407-02 4536-02 4545-02 4546-02 4547-02
4549-02 4550-02 4551-02 4552-02 4553-02 4574-02 4579-02
4580-02 4584-02 4585-02 4588-02 4589-02 4590-02 4602-02
4604-02 4605-02 4606-02 4607-02 4608-02 4609-02 4618-02
4652-02 4674-02 4825-03 4833-02 4840-02 4843-02 5364-03
5444-03 5566-03

QUALITY ATTRIBUTES
0387-01 2010-01 3593-01 4639-02 5665-03

QUALITY METRICS
3593-01 4568-02 4673-02 4682-02 6458-03

QUERY LANGUAGES
4630-02

QUEUING
2676-01 2921-01 3266-01 3368-01 3433-01 3457-01 4186-01
4401-02 4413-02

RADAR APPLICATIONS
4270-02 4315-01 5670-03

REAL-TIME SYSTEMS
2014-01 2651-01 2921-01 3251-01 3309-01 3400-01 3416-01
3999-02 4076-02 4167-01 4305-01 4314-01 4315-01 4414-02
4415-02 4430-02 4431-02 4527-02 4528-02 4532-02 4818-03
5485-03 5527-03 5531-03 5551-03 5558-03 5697-03 5997-03
6175-03 6192-03 6198-03 6468-03

RECOVERY
3198-01 3442-01 4318-01 4360-02 4380-02 4411-02 4752-02

RECURSION
3456-01 4671-02 5409-03

RELATIONAL DATA MODEL
3088-01 4411-02 5545-03 5656-03 6325-03

RELIABILITY
2010-01 2294-01 2492-01 2893-01 3251-01 3259-01 3403-01
3405-01 3408-01 3434-01 3461-01 3612-01 3917-01 4112-01
4132-01 4188-01 4568-02 4639-02 4674-02 5551-03 6139-03
6192-03 6225-03 6482-03 6765-03

RELIABILITY--DIFFERENCES OF OPINION
5437-03

REQUIREMENTS
0387-01 0465-01 0736-01 2498-01 3430-01 3432-01 3700-01
3995-02 4326-02 4327-01 4328-01 4329-01 4330-01 4343-01
4371-02 4372-02 4374-02 4376-02 4380-02 4536-02 4545-02
4546-02 4547-02 4549-02 4550-02 4551-02 4552-02 4553-02
4574-02 4579-02 4580-02 4584-02 4585-02 4588-02 4589-02
4590-02 4602-02 4604-02 4605-02 4606-02 4607-02 4608-02
4609-02 4633-02 4635-02 4640-02 4641-02 4652-02 4675-02
6156-03

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2547-01 3431-02 4270-02 4452-02

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4372-02

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5655-03

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5537-03 5551-03

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3451-01 4410-02

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5496-03

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5228-03

REUSABILITY
3337-02 3434-01 3509-01 3598-01 3608-01 3614-01 4059-02
4162-01 4428-02 4647-02 4796-02 5538-03 5656-03 6031-03
6134-03

ROBUSTNESS
3837-02 4112-01

ROLLBACK
3442-01

RTL/2
4403-02 4404-02 4527-02 4631-02

SCHEDULE ESTIMATION
4568-02

SCHEDULING
2722-01 2921-01 3251-01 3385-01 3400-01 3408-01 3454-01
3457-01 3841-02 4171-01 4173-01 4186-01 4672-02 5370-03
6017-03

SECURITY
4639-02 5515-03

SELF-DESCRIPTIVENESS
6264-03

SEMANOL
2428-01 3314-01 4338-01 4403-02 4610-02

SETL
2546-01 5977-03

SIMSCRIPT
5279-02

SIMULA
4059-02 4095-01 4400-02 4402-02 4581-02 4631-02 4683-02

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4401-02 5279-02 6018-03

SIMULATORS
4380-02 4669-02

SMALLTALK
4059-02 4095-01 4718-02

SNOBOL (AND SNOBOL EXTENSIONS)
3084-01 6004-03

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5539-03

SOFTWARE
4568-02

SOFTWARE DATABASE
5659-03

SOFTWARE DEVELOPMENT ENVIRONMENTS
5839-03 6031-03 6522-03

SOFTWARE ENGINEERING
0465-01 5364-03 5437-03 5607-03 5659-03 5660-03 5674-03
5681-03 6083-03 6134-03 6136-03 6138-03 6179-03 6522-03

SOFTWARE ENGINEERING ENVIRONMENTS
6765-03

SOFTWARE ENGINEERING FACILITY
3386-01

SOFTWARE ENGINEERING METHODOLOGIES
6482-03 6765-03

SOFTWARE ENGINEERING PROJECT MANAGEMENT
3280-01 4142-01 4568-02

SOFTWARE ENGINEERING STANDARDS
5654-03 6105-03

SOFTWARE ENGINEERING TOOLS AND TECHNIQUES
2547-01 3954-02 4122-01 4415-02 4683-02 4796-02 5686-03
6029-03 6458-03 6522-03

SOFTWARE FACTORY
5674-03 6434-03

SOFTWARE ISSUES
5658-03

SOFTWARE LIBRARY MANAGEMENT SYSTEM
4689-02

SOFTWARE LIFE CYCLE
2547-01 3432-01 3462-01 4132-01 4270-02 4331-01 4415-02
4428-02 4529-02 5365-03 5496-03 5537-03 5607-03 6031-03
6151-03

SOFTWARE PHYSICS
4682-02

SOFTWARE SCIENCE
5456-03 5665-03

SOFTWARE TOOL SYSTEMS
2341-01 2463-01 2612-01 2953-01 3245-02 3249-01 3252-01
3253-01 3254-01 3258-01 3273-01 3275-01 3276-01 3277-01
3294-01 3295-01 3355-01 3356-01 3371-01 3390-01 3401-01
3419-01 3425-01 3426-01 3427-01 3428-01 3429-01 3432-01
3446-01 3451-01 3456-01 3458-01 3460-01 3483-02 3486-02
3581-01 3582-01 3583-01 3584-01 3585-01 3586-01 3587-01
3589-01 3590-01 3591-01 3592-01 3594-01 3595-01 3596-01
3598-01 3599-01 3600-01 3601-01 3602-01 3603-01 3604-01
3605-01 3607-01 3882-02 3919-01 3984-02 3988-02 3989-03
3990-02 3991-02 3994-02 3995-02 3996-02 4056-02 4097-02
4104-01 4123-01 4124-01 4125-01 4142-01 4160-01 4162-01
4163-02 4165-01 4168-01 4174-01 4175-01 4179-01 4185-01
4189-01 4190-01 4271-02 4294-01 4300-01 4302-01 4305-01
4324-01 4325-01 4326-02 4327-01 4328-01 4329-01 4330-01
4332-01 4334-01 4353-01 4366-02 4374-02 4380-02 4403-02
4404-02 4407-02 4408-02 4409-02 4415-02 4416-02 4421-02
4428-02 4429-02 4431-02 4433-02 4529-02 4534-02 4536-02
4537-02 4539-02 4545-02 4546-02 4547-02 4548-02 4549-02
4550-02 4551-02 4552-02 4553-02 4568-02 4574-02 4579-02
4580-02 4584-02 4585-02 4588-02 4589-02 4590-02 4602-02
4604-02 4605-02 4606-02 4607-02 4608-02 4609-02 4610-02
4618-02 4621-02 4623-02 4624-02 4625-02 4636-02 4645-02
4649-02 4652-02 4653-02 4656-02 4658-02 4660-02 4663-02
4674-02 4675-02 4677-02 4684-02 4689-02 4716-02 4718-02
4736-02 4747-02 4748-02 4788-02 4825-03 4834-02 5144-02
5204-03 5207-03 5532-03 6229-03

SOFTWARE TOOLS
2426-01 2547-01 2620-01 3252-01 3272-01 3300-01 3354-01
3372-01 3463-01 3597-01 3614-01 4279-01 4309-01 4337-01
4672-02 5141-02 5557-03 5607-03 5653-03 5654-03 5656-03
5657-03 5658-03 5659-03 6031-03 6045-03 6137-03 6242-03

SPECIFICATION LANGUAGES
3440-01 3967-02 4027-01 4034-01 4332-01 5204-03 5537-03

SPECIFICATION TOOLS AND TECHNIQUES
2426-01 4718-02 5401-03 6084-03

SPECIFICATIONS
3262-01 3429-01 3430-01 3607-01 3967-02 4034-01 4190-01
4310-01 4325-01 4326-02 4327-01 4328-01 4329-01 4330-01
4343-01 4425-02 4638-02 4786-02 5204-03 6156-03

SPL (SYMBOL PROGRAMMING LANGUAGE)
4631-02

STACKS
3303-01 3316-01 3398-01 3444-01 3456-01 3910-01

STANDARDIZATION
1031-01 1089-01 3253-01 3272-01 3354-01 3373-01 3380-01
3396-01 3406-01 3431-02 3432-01 3434-01 3483-02 3587-01
3595-01 3596-01 3605-01 3614-01 3983-02 3985-02 3994-02
3998-02 4091-02 4125-01 4132-01 4251-02 4252-02 4287-03
4367-02 4420-02 4534-02 4634-02 4653-02 5270-03 5390-03
6135-03

STANDARDS
1031-01 2010-01 2341-01 2684-01 3337-02 3386-01 3408-01
3420-01 4124-01 4126-01 4160-01 4265-01 4279-01 4324-01
4340-01 4372-02 4380-02 4625-02 5228-03 5403-03 5554-03
5658-03 5659-03 5981-03 6177-03 6178-03

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3987-02

STATE MACHINES
3455-01

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3419-01 3954-02 4182-01 4332-01 4790-02 5563-03

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6172-03

STEPWISE REFINEMENT
3866-02 3987-02 4375-02 4428-02 4531-02 4629-02 5402-03
5406-03

STRONG TYPING
5403-03

STRUCTURED DESIGN
2294-01 3999-02 4166-01 4167-01 5141-02 5543-03 6043-03
6218-03

STRUCTURED PROGRAMMING
3638-01 3999-02 4195-01 4659-02 4672-02 4790-02 5277-02
5278-02 5404-03 5421-03 5548-03 5569-03 5732-03 6482-03

STRUCTURED PROGRAMMING LANGUAGE
2341-01 3983-02 4791-02 5143-02

STRUCTUREDNESS
4101-01 4195-01

SUPERVISORY PROGRAM
3454-01 4171-01

SYNCHRONIZATION
2651-01 2676-01 2722-01 2921-01 3266-01 3367-01 3369-01
3385-01 3397-01 3405-01 3408-01 3416-01 3433-01 3457-01
3837-02 3954-02 4178-01 4183-01 4192-01 4307-01 4310-01
4411-02 4413-02 4527-02 4792-02 5731-03

SYNTAX GRAPHS
3270-01 4298-01 4301-01 4321-01 4679-02 4790-02 5841-03
6217-03

SYSTEM ARCHITECTURE
3253-01 4305-01 4380-02 5485-03 5528-03

SYSTEM DESIGN
1182-01 3346-01 3386-01 3427-01 3431-02 3440-01 3999-02
4132-01 4371-02 4375-02 4377-02 4568-02 4672-02 4680-02
5513-03 5848-03 6083-03

SYSTEM DESIGN REQUIREMENTS
3427-01 3428-01 3430-01 5475-03 5848-03

SYSTEM ENGINEERING LANGUAGE
3297-01

SYSTEM INTEGRATION
4675-02

SYSTEM STRUCTURING
3999-02

SYSTEM TESTING
4132-01

SYSTEM VALIDATION
5372-03 5373-03 5374-03 5375-03

TECHNOLOGY FORECAST
4451-03 5437-03 5687-03 5688-03 5689-03 6171-03

TECHNOLOGY TRANSFER
2893-01 3914-01 4133-01 4339-01 4350-01 4380-02 4451-03
4621-02 4674-02 4676-02 4677-02 4692-02 4796-02 5423-03
5542-03 5562-03 5567-03 5687-03 5688-03 5689-03 5698-03
6141-03

TELECOMMUNICATIONS APPLICATIONS
1182-01

TEST DATA GENERATION
3255-01

TEST LANGUAGES
4664-02

TEST METHODOLOGIES
4843-02 5444-03

TESTEDNESS
3638-01

TESTING
3222-01 3295-01 3300-01 3355-01 3390-01 3397-01 3431-02
3441-01 3442-01 3448-01 3554-01 3638-01 3882-02 4328-01
4329-01 4610-02 4615-02 4652-02 5428-03 6172-03 6176-03

TEXT-PROCESSING APPLICATIONS
4834-02 5488-03 6242-03

TOOL TAXONOMIES
3419-01

TOP DOWN DESIGN
3441-01 3866-02 4297-01 4298-01

TOP DOWN DEVELOPMENT
4790-02 5277-02 5278-02

TOP DOWN TESTING
5607-03

TOP-DOWN IMPLEMENTATION
3274-01 5527-03

TOP-DOWN PROGRAMMING
2071-01 4297-01 6218-03

TOTAL CORRECTNESS
4671-02

TRANSFORMATION
3419-01 4172-01 4413-02 4620-02 4638-02 4787-02 4790-02
5563-03

TRANSLATORS
2546-01 2612-01 2688-01 2774-01 3221-01 3312-01 3313-01
3390-01 3408-01 3417-01 3434-01 3460-01 3461-01 4153-02
4250-02 4603-02 4655-02 4788-02 6065-03 6220-03

TRI-SERVICE
1031-01 1089-01 1181-01 1182-01 3278-01 3321-01 3378-01
4418-02

UNIX
3268-01 3448-01 3591-01 4097-02 4189-01 4194-01 4279-01
4529-02 4585-02 4609-02 4615-02 4718-02 5667-03 5736-03

USABILITY
4132-01 4191-01 5434-03

USER-INTERACTIVE SYSTEMS
2612-01 3416-01 3456-01 4354-01 4406-02 4645-02

VALIDATION
3255-01 3386-01 3431-02 3607-01 3882-02 3971-03 4182-01
4313-01 4324-01 4340-01 4341-01 4342-01 4380-02 4610-02
4660-02 4672-02 5107-03 5371-03 5454-03 5497-03 6001-03
6029-03 6151-03 6207-03

VERIFICATION
3198-01 3262-01 3305-01 3306-01 3403-01 3431-02 3607-01
3882-02 4023-01 4308-01 4331-01 4503-02 4615-02 5552-03
6000-03 6029-03 6151-03

VERIFICATION TOOLS AND TECHNIQUES
4027-01 4029-01 4034-01 4427-02 4718-02 5452-03 6176-03

VIRTUAL MACHINES
3265-01 3316-01 3395-01 3460-01 3996-02 4196-01 4327-01
4581-02 4583-03 4617-02 4663-02 4787-02

VIRTUALIZATION
6187-03

VMS
5540-03

WEAPONS SYSTEMS APPLICATIONS

END

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