UNIVERSITY OF EDINBURGH
Edinburgh Regional Computing Centre

User Note 18

September 1986

Title:

ERCC/CAST User Support For Programming Languages In Edinburgh University

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Software Support Category: n/a

Synopsis

This User Note gives a descriptive summary of the programming languages available on centrally managed machines in Edinburgh University, and of the user support provision for each. Where the same languages can be found on departmental facilities this is indicated also.

Keywords

ADA, ALGOL, Assembler, BASIC, BCPL, C, EMAS 2900, EMAS-3, Fortran 77, IMP, LISP, microcomputers, ML, Modula-2, Pascal, POP, POPLOG, programming languages, PROLOG, SIMULA 67, SNOBOL, UNIX, VAX

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Some Abbreviations

APM	Advanced Personal Machine
BSD	Berkeley Software Distribution
CUP	Cambridge University Press
IUCC	Inter-University Computing Committee
OUP	Oxford University Press
SSC	Software Support Category
UCSD	University of California at San Diego
UKC	University of Kent at Canterbury

1. Introduction

a. With the increase in both centrally managed and departmental computing facilities (including microcomputers) there is an increase in the number of programming languages in use. The purpose of this User Note is to:

- describe briefly the languages in use in Edinburgh University, showing primarily the centrally managed machines or other systems on which they can be found;

- state the position as at 1 September 1986 on the various aspects of user support for them, and on any management policy affecting them.

b. This User Note is a directory of languages by specific centrally managed machines although where a language is used on departmental machines also this is indicated - but by machine or system title and not by department. Only exceptionally are departments named. Anyone wishing to use departmental facilities must apply to the department concerned, and mention here is not an implied invitation. This is not an exhaustive list of languages in use at Edinburgh and it excludes any that are available only on departmental machines. An example of this is OCCAM which is used in the Dept of Computer Science.

2. Language Summaries

a. For each language a summary gives:

(1) **Description.** A brief description of the nature and main use of the language together with any standards or implementations on particular machines where these are likely to be of interest.

(2) **ERCC/CAST Policy.** Aspects of management of the software concerning its stability, changes in standard or implementations in use are given.

(3) **Machines/Operating Systems.** The machines on which the languages can be found are shown in two groups. Central (i.e. managed by ERCC) and Departmental (see 1.b. above). For departmental facilities the manufacturer's machine and operating system title are used, and where significant, the version or release number of the operating system is given also. In the case of the three EMAS services, the more familiar host machine titles are used. Hence the Amdahl with EMAS-3 appears as:

EMAS-A/EMAS-3

and the ICL 2976 and 2988 machines with EMAS 2900 appear as:

EMAS and BUSH/EMAS 2900.

Note: The Gould PN9080 is 'centrally managed' by ERCC for the School of Information Technology which retains control of 90% of the capacity of the machine. Only 10% of its capacity is therefore available for 'public' use.

(4) **Training.** Self-explanatory.

(5) **Advisory.** Self-explanatory.

(6) **User Information.** Self-explanatory.

b. Except where otherwise stated in the language summaries:

(1) **Training.** Course offerings for the next term are published at the end of each term in the Edinburgh Computing Newsletter, and all courses are normally given either at ERCC, 59 George Sq or in the Microcomputer Teaching Lab, Appleton Tower. For enquiries and bookings, ring ERCC Receptionist, 59 George Sq, 031-667 1011 Ext 2300.

(2) **Advisory.** "Limited advice" relates to the existing depth of Advisory expertise, rather than the number of Advisers with knowledge.

(3) **User Information.** Except for commercial items, or unless otherwise stated, copies of the documents mentioned can be obtained from: ERCC Receptionist, 59 George Sq. Tel: 031-667 1011 Ext 2300, and KB Advisory (Room 3205, JCMB). Tel: 031-667 1011 Ext 2976 & 2977.

3. User Support

The Appendix gives a summary of the user support categories or levels for each language. It is split into two because two systems of classification are in use:

a. Software Support Categories (SSC) For Languages on Centrally Managed Machines

The IUCC system of SSC ('A' to 'D') is used. It is fully described in User Note 15. The layout of the Appendix does not lend itself to showing also the reason for items being in categories below A, without complicating the presentation, but for all centrally managed facilities the reasons are given, for each item of software, in the 4th Edition (Sept 86) of User Note 15 (in preparation).

b. Language Support Levels For Microcomputers

The system used is as developed by the Edinburgh Microcomputer Policy Steering Committee and is described in User Note 88, June 86. Three levels P1 to P3 are used.

It will be seen that languages do not necessarily have the same category or level of support across all machines. The categorisation systems are explained in the documents just referred to but briefly: the category or level allotted is determined by the degree to which ERCC can, or feels it does, or should, meet several criteria. In centrally managed systems these are User Information, Advice, Training and Maintenance (of the software). Clearly the amount of use of an item is a management consideration in choosing not to satisfy some criteria. In some cases ERCC is not fully in control as in 'external' software (for example the VAX Fortran compiler) and cannot itself set the maintenance priority as it can with locally produced software. In the case of microcomputer software similar but different criteria and considerations are taken into account. In ERCC's application of the IUCC scheme (Part 1 of the Appendix) the SSC is a statement of a minimum level of service. An item may be given a support category below 'A' for one reason only, say Maintenance, whilst existing User Information and Advisory expertise allows a higher level of support to be actually delivered in these areas.

Advisory user support is given for users of languages on departmental systems (other than microcomputers) where they are identical with centrally managed systems. On microcomputers ERCC necessarily has to limit its support activities to the languages running on the operating systems shown in Appendix B. Advisory staff will try to assist on languages and systems outside this range, but not as a formally offered service.

4. Re-issues

Because the information in this User Note will change from time to time it is intended to revise and re-issue it twice yearly, on 1 March and 1 September as nominal publication dates.

5. User Comment

This User Note it is now believed to be substantially complete and accurate, and to avoid further loss of time it is being published as it is here. User comment on the scope, contents, accuracy, presentation and usefulness of this User Note will be welcome and should be sent to Neil Hamilton-Smith, ERCC, The King's Buildings, Mayfield Rd, Edinburgh EH9 3JZ. Tel: 031-667 1081 Ext 2976/7 by 31 January 1987 at the latest, for consideration in preparing the March 1987 issue.

DESCRIPTION

Ada is the state of the art language for the implementation of large-scale, real-time and embedded systems. The key features are: standardisation, reliability and maintainability, reusable software packages, programmer productivity and embedded system support. The strong typing allows abstractions to be constructed faithfully and the concurrent features enhance the development of the abstractions. This is useful for some areas of simulation work.

ERCC/CAST POLICY

The Ada project is formally called ASET (Ada and Software Engineering Technology) and is run by ERCC as a self-funding unit whose existence depends upon its income. Hence it cannot be guaranteed that the support of Ada will continue beyond the financial viability of ASET. Anyone wishing to investigate Ada should contact:
Iain Richmond, ASET Project Officer, ERCC, 59 George Sq, Edinburgh EH8 9JU.
Tel 031-667 1011 Ext 6753 or 2300.

MACHINES/OPERATING SYSTEMS

Central	Departmental
Data General MV4000 (Rolm Compiler)	Geography Dept VAX/VMS

TRAINING

ASET commercial courses:

Introduction to Ada Programming)	Contact:
Object Oriented Design)	as above
Advanced Ada Features)	under
Ada Project Workshops)	Policy.
Ada Conversion Course)	

Note: These courses are available at reduced rates for members of Edinburgh University.

ADVISORY

Richard Beeby (address as above. Tel: 031-667 1011 Ext 6518) provides advice to users of Ada.

USER INFORMATION

Commercial

Ada - Language, Compiler & Bibliography, Ed M.Rogers, CUP (essential reading).

Programming in Ada, 2nd Edn, Barnes, Addison Wesley.

Software Engineering with Ada, Booch, Benjamin Cummings.

DESCRIPTION

A high level algorithmic language now mainly of historic interest.

ERCC/CAST POLICY

The compiler on EMAS is at a low level of support as it is rarely used. There are no plans to implement it on new systems. Pascal is the preferred language for teaching and publication of algorithms.

MACHINES/OPERATING SYSTEMS

Central	Departmental
EMAS-A/EMAS-3 (Algol 60)	VAX/VMS (Algol 68 & S Algol)
EMAS & BUSH/EMAS 2900 (Algol 60)	

TRAINING

No scheduled courses, but the Training Group can offer occasional courses if requested.

ADVISORY

ERCC on-demand personal call or telephone service at:

- KB Advisory, (Room 3205, JCM Building, The King's Buildings).
  Tel: 031-667 1081 Ext 2976 & 2977.
- ERCC, 59 George Sq. Tel: 031-667 1011 Ext 2300.

Normal Hours: 0930-1230 and 1400-1700; Monday - Friday. Variations are published in the Edinburgh Computing Newsletter and EMAS Alert.

Service also by electronic mail to ADVICE.

USER INFORMATION

The Edinburgh ALGOL Language Manual, ERCC, June 76.

Edinburgh ALGOL Language Manual Update 1, ERCC, Aug 77.

Training Group Lecture Notes (from Training Group).

DESCRIPTION

EMAS 2900. The Macro Assembler Programming Language for 2900s (MAPLE) was mounted on EMAS by UKC and is available in KNTLIB. A small number of special procedures have been imported by this method but interfacing with EMAS requires expertise and effort and assistance should be sought.

Microcomputers

BBC. The BBC microcomputer comes with an assembler incorporated in the Basic interpreter, but for writing large programs the System ADE assembler is preferred.

Intel 8086 family of microprocessors. The Microsoft assembler is preferred.

ERCC/CAST POLICY

The use of Assembler languages on central machines is discouraged, but is appropriate for some real-time applications on microcomputers.

MACHINES/OPERATING SYSTEMS

Central	Departmental
EMAS & BUSH/EMAS 2900	BBC/MOS
	Intel 8086 based machines

TRAINING

None.

ADVISORY

None.

USER INFORMATION

The published ICL documents on MAPLE are the only source of language information. A brief note on interfacing is available from the Central Systems Group (EMAS 2900 System Note 9).

DESCRIPTION

BASIC was designed as a language easy to learn and use. It is much used on some microcomputers which are usually supplied with a BASIC interpreter of some kind, rather than a compiler. There is no accepted standard and portability is often poor. Because it often lacks structure BASIC is unsuitable for large programs.

EMAS 2900. - Implementation provided by UKC.

Microcomputers

BBC. The Acorn version of Basic, as supplied on the BBC microcomputer (Models B and Master) is fully supported.

ERCC/CAST POLICY

EMAS-3. No intention to provide.

MACHINES/OPERATING SYSTEMS

Central	Departmental
EMAS & BUSH/EMAS 2900	Supported Microcomputer Versions: BBC/MOS

TRAINING

Some awareness content in BBC Micro courses. No dedicated courses scheduled.

ADVISORY

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- KB Advisory, (Room 3205, JCM Building, The King's Buildings). Tel: 031-667 1081 Ext 2976 & 2977.

- ERCC, 59 George Sq. Tel: 031-667 1011 Ext 2300.

Normal Hours: 0930-1230 and 1400-1700; Monday - Friday. Variations are published in the Edinburgh Computing Newsletter and EMAS Alert.

Service also by electronic mail to ADVICE.

USER INFORMATION

A Guide to BASIC-K, UKC, Aug 80.

BASIC-K User Manual, UKC, Aug 80.

Some brief introductory notes (from Training Group).

(Cont)

Microcomputers (Commercial)

Apricot Microsoft Pack.

BASIC, Microsoft.

BASIC Programming Reference Manual, Apple Computers, Inc.

BASIC Reference Manual, SofTech Microsystems, Inc.

BBC User Guide.

Sirius 1 Reference Manual for BASIC-86, Sirius Systems Technology, Inc.

The Applesoft Tutorial, Apple Computers Inc.

DESCRIPTION

BCPL was designed in Cambridge in 1967 and has been implemented on a wide variety of computers. It is used for systems programming applications (operating systems; compilers, text-processors, etc). Much of the flavour of the language is the result of one design aim: to provide only one internal data type - the bit pattern. BCPL is the precursor of C.

EMAS 2900. The implementation is by R.D.Eager, UKC.

ERCC/CAST POLICY

EMAS-3. BCPL will be provided only if UKC implements it. This will not happen if UKC decides not to run EMAS on IBM-type hardware.

MACHINES/OPERATING SYSTEMS

EMAS & BUSH/EMAS 2900

TRAINING

None.

ADVISORY

Limited advice available. In the first instance ring: KB Advisory (Room 3205, JCM Building, The King's Buildings). Tel: 031-667 1081 Ext 2976 & 2977, or ERCC Receptionist, 59 George Sq. Tel: 031-667 1011 Ext 2300, or use electronic mail to ADVICE.

USER INFORMATION

BCPL - EMAS Users Manual, R.D.Eager, UKC Note Doc/EMAS/K3.9/1, Mar 80.

BCPL - Language Manual, R.D.Eager, UKC Note Doc/REF/K3.9/1, July 77.

BCPLXREF - A cross-reference utility for BCPL programs, R.D.Eager, UKC Note Doc/EMAS.K3.9/2, Feb 80

Commercial

BCPL - The Language and its Compiler, Richards and Whitby-Strevens, CUP.

DESCRIPTION

A systems programming language with many low-level features. C was used to write UNIX. It is much used in UNIX environments, and as the language in which to write portable applications packages. An absence of restrictions makes it potentially very efficient for a wide range of tasks and it is becoming available on an increasing number of systems. Based originally on concepts by Kernighan and Ritchie, an ANSI standard is being developed.

EMAS versions. Both will be high quality versions conforming to the new ANSI standard, to be published shortly. Both are intended primarily for the import of software from environments where C is the natural implementation language.

UNIX. All UNIX machines have the original Kernighan and Ritchie C compiler with its standard I/O library.

VAX/VMS version. The "standard C" of Kernighan and Ritchie. There are many extensions using VMS facilities; for example, it is supported by a run-time library.

ERCC/CAST POLICY

EMAS 2900 implementation. Available now.)
EMAS-3 implementation. Available shortly) Both are intended as major EMAS languages.

GEC Series 63 implementation)
Gould PN9080 implementation) These compilers are maintained under commercial contracts and ERCC has no control over the speed of maintenance.
VAX implementation)

MACHINES/OPERATING SYSTEMS

Central
EMAS-A/EMAS-3 (shortly)
EMAS & BUSH/EMAS 2900
GEC Series 63/UNIX (UX 63, System V)
GOULD PN9080/UNIX (UTX 32, 4.2 BSD)
VAX/VMS

Departmental
APM
DEC PDP 11
GEC Series 63
Gould PN6000
Hewlett-Packard HP 9000
Masscomp
PERQ
Pyramid
SUN
Tandy
Torch
VAX/UNIX
VAX/VMS
Whitechapel MG1

Various microcomputer systems

(Cont)

TRAINING

A regular ERCC course may be offered if there is sufficient demand. Vacancies are available on ASET commercial courses at reduced rates for members of Edinburgh University (see p18-6 for details of ASET).

ADVISORY

ERCC on-demand personal call or telephone service at:

- KB Advisory, (Room 3205, JCM Building, The King's Buildings). Tel: 031-667 1081 Ext 2976 & 2977.

- ERCC, 59 George Sq. Tel: 031-667 1011 Ext 2300.

Normal Hours: 0930-1230 and 1400-1700; Monday - Friday. Variations are published in the Edinburgh Computing Newsletter and EMAS Alert.

Service also by electronic mail to ADVICE.

USER INFORMATION

The Standard C Programming Language Compiler, ERCC User Note 63, Apr 85.

Commercial

The C Programming Language, Kernighan & Ritchie, Prentice Hall.

Programming in VAX-11 C, DEC Ltd.

Understanding C, Hunter, Sybex Inc.

DESCRIPTION

Fortran 77 is a scientifically oriented, general purpose language. It has an international standard rigorously applied on many computers which ensures minimum problems with portability. Its facilities are a considerable improvement on those of its predecessor Fortran 66. It is good for writing programs, but not as good for teaching as, for example, Pascal.

EMAS implementations. These are written to the full ANSI standard and include a number of extensions to assist the import of programs developed on other systems, particularly IBM and VAX.

UNIX systems Both GEC & Gould systems have the AT & T implementation of Fortran 77.

VAX/VMS implementation has many optional extensions and a run-time library.

Microcomputers. On supported MS-DOS, PC-DOS machines the compiler is the Ryan/McFarlane Fortran 77 ("RM Fortran") sold by IBM as the Professional Fortran compiler.

ERCC/CAST POLICY

Fortran 77 is recommended as the most widely applicable language, particularly for programs to be moved to or from EMAS. The EMAS 2900 and EMAS-3 compilers are fully supported.

Gould PN9080. In late-1986 the Berkeley implementation will be replaced by a new compiler from Gould based on Edinburgh Fortran 77.

GEC Series 63 implementation)
Gould PN9080 implementation) These compilers are maintained under commercial contracts and ERCC has no control over the speed of maintenance.
VAX implementation)

MACHINES/OPERATING SYSTEMS

Central
EMAS-A/EMAS-3
EMAS & BUSH/EMAS 2900
GEC Series 63/UNIX (UX 63, SYSTEM V)
Gould PN9080/UNIX (UTX 32, 4.2 BSD)
VAX/VMS

Departmental
DEC PDP-11
GEC Series 63
Gould PN6000
HP 9000
Masscomp
PERQ
Pyramid
SUN
Tandy
Torch
VAX/UNIX
VAX/VMS
Whitechapel MG1
Supported microcomputer versions:
MS-DOS/PC-DOS (RM Fortran)
p-System (UCSD Fortran)

(Cont)

TRAINING

Termly courses - EMAS based.

Video self-teaching material (from Training Group).

ADVISORY

ERCC on-demand personal call or telephone service at:

- KB Advisory, (Room 3205, JCM Building, The King's Buildings). Tel: 031-667 1081 Ext 2976 & 2977.

- ERCC, 59 George Sq. Tel: 031-667 1011 Ext 2300.

Normal Hours: 0930-1230 and 1400-1700; Monday - Friday. Variations are published in the Edinburgh Computing Newsletter and EMAS Alert.

Service also by electronic mail to ADVICE.

USER INFORMATION

The Edinburgh Fortran 77 Language Manual, ERCC Feb 85.

DAP User Interface Commands, ERCC User Note 1, Nov 84.

DAP Fortran Summary Guide, ERCC User Note 5, Mar 85.

Background Work on EMAS 2900, ERCC User Note 53, May 85.

Moving to Fortran 77 from Earlier Dialects of Fortran, ERCC User Note 57, Sept 85.

Structured Fortran, Ellis, Computing Services, Sheffield University.

Training Group Lecture Notes (from Training Group).

UX63 Fortran 77 Reference Manual

Microcomputers

Fortran Compilers for the IBM PC, Adie, ERCC Evaluation Report, Aug 85.

Commercial

Gould UTX32 Fortran 77 Reference Manual

Apple Fortran, Languages Reference Manual, Apple Computers Inc.

Fortran-77 Reference Manual, SofTech Microsystems Inc (for p-System).

DESCRIPTION

IMP is a systems programming language designed for the implementation of the portable operating system EMAS. It aims for a high standard of machine independence as well as good quality object code. Programs written in IMP will be highly portable within the Edinburgh environment but difficult to move out of it. It is the prime language for interfacing with EMAS.

EMAS-3 implementation	)
	) Both are IMP 80
EMAS-2900 implementation	)
VAX/VMS implementation	)
	) Both are IMP 77
VAX/UNIX implementation	)

ERCC/CAST POLICY

IMP will be retained for the life-time of EMAS. In view of the large amount of software written in IMP and the small amount of effort required to port the compiler, it seems likely that IMP will be made available on EMAS replacement services from 1990 onwards.

MACHINES/OPERATING SYSTEMS

Central	Departmental
EMAS-A/EMAS-3	APM
EMAS & BUSH/EMAS 2900	VAX/VMS
Gould PN9080/UNIX (UTX 32, 4.2 BSD)	VAX/UNIX
- an IMP80 compiler should become available during the 1986-87 academic year	

TRAINING

No scheduled courses, but Training Group can offer occasional courses if requested.

ADVISORY

ERCC on-demand personal call or telephone service at:

- KB Advisory, (Room 3205, JCM Building, The King's Buildings). Tel: 031-667 1081 Ext 2976 & 2977.

- ERCC, 59 George Sq. Tel: 031-667-1011 Ext 2300.

Normal Hours: 0930-1230 and 1400-1700; Monday - Friday. Variations are published in the Edinburgh Computing Newsletter and EMAS Alert.

Service also by electronic mail to ADVICE.

(Cont)

The IMP 80 Language, ERCC, Dec 82.

IMP80 on EMAS 2900: Differences from IMP9, ERCC User Note 2, Apr 84.

Background Work on EMAS 2900, ERCC User Note 53, May 85.

Moving IMP programs to EMAS-3, ERCC User Note 58, June 86.

The IMP 77 Language, Robertson, Dept of Computer Science Internal Report, May 83 (from Dept of Computer Science).

Training Group Lecture Notes (from Training Group).

DESCRIPTION

LISP is the main Artificial Intelligence (AI) language. Three dialects are in use in Edinburgh:

Franz LISP is a widely used dialect bundled with 4.2 BSD UNIX and as such is suitable for package import/export. It is being promoted as the interim standard for LISP in the UK.

Common LISP is the evolving international standard and is being incorporated in the POPLOG language system (see under POPLOG).

CU LISP was developed at Cambridge University.

ERCC/CAST POLICY

MACHINES/OPERATING SYSTEMS

Central	Departmental
GEC Series 63/UNIX (UX 63, System V)	Gould PN6000
- CU LISP, Franz LISP compatibility	Pyramid
package and Common LISP (via POPLOG)	SUN
Gould PN9080/UNIX (UTX-32, 4.2 BSD)	VAX/UNIX
- Franz LISP and Common LISP	VAX/VMS
	Whitechapel MG1

TRAINING

None.

ADVISORY

None at ERCC. Some assistance can be provided by the AI Applications Institute (subject to availability of time). Queries by electronic mail only to R.Rae @ Edinburgh.

USER INFORMATION

Gould Common LISP User's Guide

The Franz LISP manual

GEC Series 63 LISP(Cambridge) Users Manual

Commercial

LISP, 2nd Edn, Winston & Horn, Addison Wesley (teaching).

LISPcraft, Wilensky, Norton (excellent for Franz Lisp).

Common LISP, Steele, The Digital Press, (reference document for Common Lisp).

DESCRIPTION

Standard ML is an interactive functional programming language. Functions (including higher-order) can be passed as parameters, returned as values and embedded in data structures. Standard ML allows many bugs in programs to be caught at compile time. A correctly typed program is guaranteed to be free from run-time type errors, making run-time type checking unnecessary.

ERCC/CAST POLICY

MACHINES/OPERATING SYSTEMS

Central	Departmental
Gould PN9080/UNIX (UTX-32, 4.2 BSD) (Version 3.0)	APM
	VAX/UNIX
	VAX/VMS

TRAINING

None.

ADVISORY

None in ERCC. Some assistance can be provided by the Dept of Computer Science (subject to availability of time). Queries by electronic mail to kevin@cstvax.

USER INFORMATION

Standard ML, Harper, Macqueen and Milner, Mar 86.

LFCS Report Series ECS-LFCS-86-2 (from LFCS, Dept of Computer Science).

DESCRIPTION

A Pascal-like language with improved structures, co-routines, data type handling and store-mapping facilities.

ERCC/CAST POLICY

The VMS version of this compiler is not under any formal maintenance contract, and any error rectification is likely to be very slow, if at all.

The Unix version is supported by Imperial College, London.

MACHINES/OPERATING SYSTEMS

Central	Departmental
VAX/VMS	VAX/VMS
GEC Series 63/UNIX (UX63, System V)	

TRAINING

Vacancies are available on ASET commercial courses at reduced rates for members of Edinburgh University (see p18-6 for details of ASET).

ADVISORY

None.

USER INFORMATION

On-line User Guide and limited on-line HELP.

Commercial

Programming in Modula-2, Wirth, Springer-Verlag.

DESCRIPTION

A high-level programming language now established internationally as the first choice for teaching. However, following publication of the ISO standard the language is being used increasingly for serious medium-scale applications programming, particularly where portability is important. Pascal is promoted in the UK by the SERC and Alvey Programme as a principal implementation language.

EMAS 2900 implementation is externally produced.

EMAS-3 implementation. A high-quality, ISO standard compiler is being prepared.

GEC Series 63 implementation is to ISO standard.

Gould PN9080 implementations are Berkeley Pascal, and a third party ISO standard compiler.

VAX/VMS implementation is ISO/ANSI compatible with many extensions.

Microcomputers

MS-DOS/PC-DOS: Prospero Pro Pascal is the only compiler supported.

p-System. There is only one compiler: UCSD. This is not to ISO standard.

ERCC/CAST POLICY

Pascal is the recommended language for teaching purposes.

Gould PN9080. In late-1986 the Berkeley UNIX implementation will be replaced by a new ISO compiler from Gould based on UMIST and Edinburgh developments.

GEC Series 63 implementation) These compilers are maintained under
Gould PN9080 implementation) commercial contracts and ERCC has no
VAX implementation) control over the speed of maintenance.

MACHINES/OPERATING SYSTEMS

Central
EMAS-A/EMAS-3 (Oct.86)
EMAS & BUSH/EMAS 2900
GEC Series 63/UNIX (UX 63, System V)
Gould PN 9080/UNIX (UTX 32, 4.2 BSD)
VAX/VMS

Departmental
APM
DEC PDP-11
GEC Series 63
Gould PN6000
Hewlett Packard HP 9000
Masscomp
PERQ
Pyramid
SUN
Tandy
Torch
VAX/VMS
Supported microcomputer versions:
MS-DOS/PC-DOS (Pro Pascal).

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TRAINING

Introductory course, termly (SIRIUS/p-System based). Video self-teaching course (from Training Group). EMAS-3 based course may be offered in 87/88.

ADVISORY

ERCC on-demand personal call or telephone service at:

- KB Advisory, (Room 3205, JCM Building, The King's Buildings). Tel: 031-667 1081 Ext 2976 & 2977.
- ERCC, 59 George Sq. Tel: 031-667 1011 Ext 2300.

Normal Hours: 0930-1230 and 1400-1700; Monday - Friday. Variations are published in the Edinburgh Computing Newsletter and EMAS Alert.

Service also by electronic mail to ADVICE.

USER INFORMATION

Compiling Pascal Programs on EMAS 2900, ERCC User Note 6, Feb 83.

Pascal Compilers for PC-DOS, Moran, ERCC Evaluation Report, Aug 85.

Training Group Lecture Notes (from Training Group).

Berkeley Pascal User's Manual

HCR/Pascal Programmers' Manual

UX63 ISO Pascal User Guide

Commercial

With the growing interest in the programming language Pascal in and out of the University, a subset (by no means exhaustive) of recommended publications is outlined below, both for the novice and the sophisticated user.

A Practical Introduction to Pascal - with BS6192, Wilson & Addyman, Macmillan, 1982.
Well written, with carefully chosen examples. Comes easily in the category of a "best buy".
Includes the text of the ISO Standard definition of Pascal.

Introduction to Pascal, Welsh & Elder, Prentice Hall, Second Edition, 1983.
Written with superb clarity and includes several case studies where the style of programming goes hand in hand with current methods of structured programming and stepwise refinement. This second edition conforms to the ISO standard Pascal definition.

Programming in PASCAL, Grogono, P., Addison-Wesley, Second edition.
Comprehensive coverage of the language, suitable for those who can already program.

An Introduction to Methodical Programming, Findlay, W., and Watt, D.A., Pitman, 1978.
Good examples, and comes recommended as "a comprehensive and

thoughtful treatment which combines teaching of PASCAL with the principles of program construction".

Programming via Pascal, Rohl, J.S. and Barrett, H.J.,
Cambridge University Press, 1980.
A good textbook around which a lecture course might be constructed.
Excellent syntax diagrams.

Pascal User Manual and Report, Jensen & Wirth, Third edition, 1985,
Springer-Verlag.
A revised edition of the original user manual and report,
now updated to align with the ISO Standard.

Apple Pascal Reference Manual, Apple Computers Inc.

Pro Pascal User Manual, Prospero Software Ltd.

The USCD Pascal Handbook, Clark & Koehler, Prentice Hall. Non-standard Pascal.

UCSD p-System, Version IV User's Manual, SofTech Microsystems Inc.

DESCRIPTION

POPLOG is a multi-language AI based programming environment which allows the inter-working of three languages: POP, Prolog and Common LISP. Although intended initially as a teaching tool it is now widely used by AI researchers in the UK, and there is considerable commercial interest.

POPLOG is available for VAX systems and Sun Workstations under licence from Sussex University.

ERCC/CAST POLICY

POPLOG is provided at present in order to make POP and Common LISP available. Serious Prolog users should consider the use of NIP (see under Prolog). Edinburgh is dependent upon external bodies for the development and maintenance of POPLOG, and cannot control the speed of error investigation or rectification.

MACHINES/OPERATING SYSTEMS

Central	Departmental
GEC Series 63/UNIX (UX 63, System V)	Sun Workstations
	GEC Series 63
	VAX/UNIX
	VAX/VMS

TRAINING

None.

ADVISORY

None in ERCC. Some assistance can be provided by the AI Applications Institute (subject to availability of time). Queries by electronic mail only to R.Rae @ Edinburgh.

USER INFORMATION

Commercial

POP-11 - A Practical Language for Artificial Intelligence, Barrett, Ramsay & Sloman, Ellis Harwood.

DESCRIPTION

Prolog is a powerful programming language based on first order predicate calculus. Several implementations are available; the most prominent being:

Edinburgh Prolog, the new implementation (NIP). Produced by the AI Applications Institute within Edinburgh University for the Alvey Programme. It provides a portable system with acceptable run-time speed, which may be customised to individual architecture.

C-Prolog produced by EdCAAD within Edinburgh University (Dept of Architecture). It provides a portable interpreted system written in C.

ERCC/CAST POLICY

MACHINES/OPERATING SYSTEMS

Central		Departmental
EMAS & BUSH/EMAS 2900		Gould PN6000
GEC Series 63/UNIX (UX 63, System V)	(C-Prolog & NIP)	PERQ/PNX
Gould PN9080/UNIX (UTX32, 4.2 BSD)	(NIP)	SUN Workstations
VAX/VMS	(C-Prolog)	VAX/UNIX (Berkeley)
		VAX/VMS
		Whitechapel MG1

TRAINING

Some awareness content in Computer Methods course. Possibility of scheduled courses if sufficient demand.

ADVISORY

None in ERCC. Some assistance can be provided by the AI Applications Institute (subject to availability of time). Queries by electronic mail only to R.Rae @ Edinburgh.

USER INFORMATION

ERCC Newsletter article, Sept 82.

UX63 C-Prolog

Edinburgh Prolog Users Manual

Commercial

Programming in Prolog, Clocksin & Mellish, Springer-Verlag.

DESCRIPTION

A high level general purpose language based on Algol 60, with features for co-routines, list processing and simulation. It introduced the concept of object-oriented programming. It is fully standardised on all machines.

An externally produced version for VAX/UNIX is available.

EMAS-3. An externally produced version (under VSS) is being made available. This is licensed only for non-profit making educational and research use.

EMAS-2900 (in TSTLIB).

VAX/VMS. Externally produced version available.

ERCC/CAST POLICY

Simula is the preferred language for discrete event simulation.

MACHINES/OPERATING SYSTEMS

Central	Departmental
EMAS-A/EMAS-3	VAX/VMS
EMAS & BUSH/EMAS 2900	

TRAINING

Some awareness content in Computer Methods course. Possibility of scheduled courses if sufficient demand.

ADVISORY

None in ERCC.

USER INFORMATION

2900 SIMULA Language Manual, ERCC, June 84.

Commercial

An Introduction to Programming with SIMULA, R.Pooley, Blackwell.

SIMULA Begin, G.Birtwhistle, Studentlitteratur, Lunt, Sweden.

DESCRIPTION

Snobol is a language for string manipulation; developed at Bell Laboratories in 1962. Extensions have made it a useful tool in such areas as compilation techniques, machine simulation, symbolic mathematics and linguistics.

EMAS-2900 implementation comes from UKC.

ERCC/CAST POLICY

EMAS-3. It is not known whether an implementation will be provided, even if UKC decides to run EMAS-3.

MACHINES/OPERATING SYSTEMS

EMAS & BUSH/EMAS 2900

Gould PN9080/UNIX (UTX-32, 4.2 BSD)

TRAINING

None.

ADVISORY

None.

USER INFORMATION

Snobol, M.J.Garside, UKC Note Doc/EMAS K3.6/1, Sept 83

Commercial

The Snobol 4 Programming Language, 2 Edn, Griswold, Poage & Polonsky, Second edition, Prentice Hall, 1971.

Computers and Linguistics, Butler, Blackwells, 1985. For a lengthy introduction to SNOBOL.

SNOBOL Programming for the Humanities, Hockey, OUP, 1986.

APPENDIX

ERCC/CAST SOFTWARE SUPPORT CATEGORIES

OR

SUPPORT LEVELS

FOR PROGRAMMING LANGUAGES

Part 1 - Languages on Centrally Managed Machines and Systems

Language \ Machine	EMAS-A	EMAS & BUSH	Data General MV4000	GEC Series 63	Gould PN9080	VAX
OS	EMAS-3	EMAS 2900	AOS	UNIX V	UNIX 4.2	VMS
Ada			B			
ALGOL-60	C	C				
Assembler		D				
BASIC		D				
BCPL		D				
C	(a)	C		B	B	B
Fortran 77	A	A		B	B	B
IMP	B	B			(a)	
LISP				D	D	
ML					D	
MODULA-2				D		D
Pascal	(a)	C		C	C	C
POPLOG/POP				D		
Prolog		D		D	D	D
SIMULA 67	(a)	D				D
SNOBOL		D			D	

(a) These compilers should be available shortly, and may be introduced at a lower SSC before being upgraded later.

For explanations of Software Support Categories see User Note 15.

APPENDIX

ERCC/CAST SOFTWARE SUPPORT CATEGORIES

OR

SUPPORT LEVELS

FOR PROGRAMMING LANGUAGES

Part 2 - Languages on Microcomputers

Language \ Machine or OS	BBC/MOS	MS-DOS PC-DOS	p-System
BASIC	P1		
Fortran (RM)		P2	
Fortran (UCSD)			P2
Pascal (UCSD)			P1
Pro Pascal (Prospero)		P2	

For explanations of Support Levels see User Note 88.