



RC Å REGNECENTRALEN

RC SYSTEM LIBRARY · FALKONERALLE 1 · DK-2000 COPENHAGEN F

RCSL No : 31-D327
Edition : August 1974
Author :

Title : RC 4000 Basic Software Bibliography

Keywords : RC 4000, Basic Software

Abstract : This bibliography identifies and describes the current RC 4000 Basic Software which is supported and maintained by Regnecentralen. 22 pages.

1. General Information

This bibliography describes the current Basic Software *). By reviewing the contents of this paper, the reader may select items of interest for his installation.

The description of the software system is in Sections 2 and 3 divided into the following main categories:

- . RC 4000 Reference Manual
- . Monitor 3
- . File Processor
- . FP Utility Programs
- . Operating Systems
- . Assembler
- . Editor
- . Compilers
- . Mathematical and Statistical Library
- . Sort/Merge Systems

Section 2 lists the basic software according to the above-mentioned categories whereas Section 3 elaborates Section 2 by means of abstracts.

To keep this bibliography up-to-date, additions and other modifications are distributed in 'RC 4000 BULLETIN' (issued every 3 months, provided changes have occurred during that period).

- *) Software programs are classified as
- a) Basic Software, supported and maintained by RC, free of charge,
 - b) Priced Software, supported and maintained by RC, at certain costs,
 - c) User Group Software, with no maintenance responsibility for RC.

2. List of Basic Software

RC 4000 REFERENCE MANUAL

55-D1 RC 4000 Computer Reference Manual

MONITOR 3

55-D140 Multiprogramming System
 31-D37 Definition of External Processes
 31-D300 Monitor 3

FILE PROCESSOR

31-D106 System 3 Utility Programs, Part One
 31-D233 System 3 Utility Programs, Part Two

Catalog Handling Programs

31-D279 Backfile
 31-D234 Catsort
 31-D235 Clear
 31-D236 Entry
 31-D237 Lookup
 31-D238 Nextfile
 31-D239 Rename
 31-D240 Scope
 31-D241 Search
 31-D242 Set

Data Handling Programs

31-D243 Binin
 31-D244 Binout
 31-D245 Copy
 31-D246 Head
 31-D247 Load
 31-D248 Message
 31-D249 Move
 31-D250 Print
 31-D251 Save

Job Control Programs

31-D252 Account
 31-D253 Bossjob
 31-D254 Change
 31-D255 Claim
 31-D256 Convert
 31-D257 Corelock
 31-D258 Coreopen
 31-D259 End
 31-D260 Finis
 31-D261 I
 31-D262 If
 31-D263 Kit
 31-D264 Mode
 31-D265 Mount
 31-D266 Mountspec
 31-D267 Newjob
 31-D268 O

31-D269 Online
 31-D270 Opcomm
 31-D271 Opmess
 31-D272 Release
 31-D273 Repeat
 31-D274 Replace
 31-D275 Ring
 31-D276 Skip
 31-D277 Suspend
 31-D278 Timer

 31-D320 System 3 Utility Programs, Part Three

OPERATING SYSTEMS

31-D310 Boss 2, User's Manual
 31-D230 Boss 2, Operator's Manual
 31-D313 Boss 2, Installation and Maintenance

ASSEMBLER

55-D18 Slang Assembler

EDITOR

55-D22 Editor
 55-D101 New Version of the Editor

COMPILERS

GSL 247 Revised Report on the Algorithmic Language Algol 60
 31-D322 Algol 6
 28-D2 Tofrom
 31-D72 Outchar, Outtext, Outinteger, Outdate, and Movestring
 31-D103 RC 4000 Fortran
 31-D199 Code Procedures and Run Time Organization of Algol 5
 Programs
 31-D210 Examples of Code Procedures and Stack Pictures

MATHEMATICAL AND STATISTICAL LIBRARY

General Information

55-D63 Introduction to the Mathematical and Statistical Program Library

Approximation

31-D129 Fit

Extrema

53-M18 Minimum

Fourier

31-D3 Fft

Functions

53-M3 Bessel Functions - $I_n(x)$ and $K_n(x)$

53-M2 Bessel Functions - $J_n(x)$ and $Y_n(x)$

53-M8 Beta

55-D58 Gamma

Integration

55-D48 Adapint

Linear Equations and Matrices

55-D60 Decompose, Solve
55-D57 Eberlein
53-M7 Householder
53-M5 Invertsymb
55-D61 Jacobi
53-M17 Solineq
53-M6 Solvesymb
31-D224 runge kutta

Roots and Zeroes

53-M4 Pzero
53-M1 Zero1(x,F,a,b,eps)

Statistical

53-S1 Data Survey, Part 1 and Appendix
53-S7 Recordinput, Part 1 and Appendix

SORT/MERGE SYSTEMS

55-D66 Sorting in Algol 5
55-D99 Indexed Sequential Files in RC 4000 Algol
31-D198 Magnetic Tape System MTS 2
31-D228 Heapsort
28-D3 mdsort

3. Abstracts

RC 4000 REFERENCE MANUAL

RC 4000 Computer Reference Manual

RCSL No. 55-D1

This manual provides basic programming and operating information for programmers and users of the RC 4000 computer.

A summary of the RC 4000 is given in Chapter 1. Chapter 2 describes the considerations that guided the design of the computer. Chapters 3 to 9 contain specifications of word formats, storage addressing, arithmetic, multiprogramming features, and input/output control. Chapters 10 to 12 summarize the functions of the standard peripheral devices and the panels for operator control and engineering maintenance. Chapters 13 and 14 complete the picture with an exact definition of the instruction execution; the basic instruction cycle and all operations are described in an extended Algol language. (85 pages).

MONITOR 3

Multiprogramming System

RCSL No. 55-D140

This manual defines the functions of the monitor and the basic operating system called s. This system allows users to initiate and control parallel program execution from typewriter consoles. The manual is divided into four parts.

Part 1 is a general description that explains the philosophy and structure of the multiprogramming system. Part 2 contains the definition of monitor functions which is of interest mainly to programmers coding in assembly language. Part 3 describes the initialization of the catalog of files on the backing store (drum and/or disc). Part 4 explains the necessary commands for initialization of the basic operating system s, and this should be studied by those who are to operate the system from consoles. Conventions for input/output are published in the manual Definition of External Processes. (159 pages).

Definition of External Processes

RCSL No. 31-D37

Input/Output conventions for programs in assembly language are defined in this publication. The publication also contains an alphabetic list of current available external processes with references to the peripheral devices they control. A separate paper is issued for each external process, and the RCSL numbers for these papers are listed in this publication. (1 page).

Monitor 3

RCSL No. 31-D300

This manual describes version 3 of the RC 4000 Monitor. The manual should be read in conjunction with the publication 'Multiprogramming System' (55-D140). It specifies all monitor calls, monitor tables, process descriptions etc. (38 pages).

FILE PROCESSOR

System 3 Utility Programs, Part One
RCSL No. 31-D106

This publication is a major revision of the File Processor, User's Manual, RCSL No. 55-D21, describing the system 3 version of the file processor. (51 pages).

System 3 Utility Programs, Part Two
RCSL No. 31-D233

This manual contains a detailed description of the File Processor utility programs. These programs are grouped according to their function in 3 classes, namely catalog handling, data handling, and job control. The complete list is as follows:

Catalog handling Programs

Backfile

RCSL No. 31-D279

Subtracts one from the file number (unless it is 0) in the tails of the entries specified and signals reach of file 0. (1 page).

Catsort

RCSL No. 31-D234

Lists on current output selected parts of the main catalog (or any subcatalog) sorted according to the parameters. At last also total number of entries and segments output are listed. (3 pages).

Clear

RCSL No. 31-D235

Removes catalog entries with name and scope as specified. (2 pages).

Entry

RCSL No. 31-D236

Creates or changes a catalog entry according to the parameters in the call. The program is a supplement to the program SET and is used when one wants to set some of the elements in the entry tail by copying from the tails of other catalog entries. (3 pages).

Lookup

RCSL No. 31-D237

Finds and lists catalog entries with specified name. (2 pages).

Nextfile

RCSL No. 31-D238

Adds one to the file number in the tails of the catalog entries specified. (1 page).

Rename

RCSL No. 31-D239

Changes the names of catalog entries as specified. (1 page).

Scope

RCSL No. 31-D240

Changes the scope of catalog entries as specified in the call of the program. (2 pages).

Search

RCSL No. 31-D241

Finds and lists all catalog entries with a given scope. (2 pages).

Set

RCSL No. 31-D242

Creates a new catalog entry or changes an already existing entry according to the parameters. The entry is created with scope temp. (2 pages).

Data Handling Programs

Binin

RCSL No. 31-D243

The program can input files generated by the program BINOUT. The programs BININ and BINOUT are primarily used when binary files are stored on paper tape. (5 pages).

Binout

RCSL No. 31-D244

The program can output catalog entries and contents of files in a format which may be input by the program BININ or the program INITIALIZE CATALOG (cf. ref. 3). The program can furthermore output autoload tapes. (5 pages).

Copy

RCSL No. 31-D245

Copies one or several text files into another file and calculates the number of characters copied and the sum of their ISO values. The program can be used instead of EDIT if only a simple copying is wanted. Furthermore the program may be used for check reading of text files (e.g. texts punched on paper tape). (2 pages).

Head

RCSL No. 31-D246

Prints a number of form feeds and a page head containing the name of the job and the date. (1 page).

Load

RCSL No. 31-D247

The program can input catalog entries and bs-files from a magnetic tape file generated by the program SAVE. (5 pages).

Message

RCSL No. 31-D248

May be used (together with HEAD) to make nice headings on the output. The parameter list in the call of message is simply output when the program is called. (1 page).

Move

RCSL No. 31-D249

Performs blockwise copying of files on backing storage or magnetic tape. (3 pages).

Print

RCSL No. 31-D250

Prints from a backing storage area or directly from the core store with specified formats. The program is primarily intended for printing of dumped core areas. (6 pages).

Save

RCSL No. 31-D251

The program can output catalog entries and bs files to a magnetic tape file for later reestablishment by the program LOAD. (7 pages).

Job Control Programs

Account

RCSL 31-D252

Sends an account message to the parent (the operating system) who is then expected to produce a record in the account file. Only used when jobs running under BOSS wants to produce special account information (cf. the Boss User Manual, ref. 1, ch. 10). (1 page).

Bossjob

RCSL No. 31-D253

Sends a newjob message to BOSS (the internal process named BOSS) demanding the specified file enrolled as job file in an off line job. In this way a job running under another operating system may create a BOSS job. The actual job continues with the next FP-command. Further details are found in section 1.7, internal jobs in the BOSS User Manual. (1 page).

Change

RCSL No. 31-D254

Sends a change paper message to the parent (the operating system). The program is only used when a job executed under BOSS uses job controlled printer. (cf. the Boss User Manual ref. 1, ch. 6.3 and ch. 10). Output on printer from a job running under BOSS is normally made either by printing on current output or as off-line printing initiated by the FP-command CONVERT. (1 page).

Claim

RCSL No. 31-D255

Lists the bs-area claims of the process. (2 pages).

Convert

RCSL No. 31-D256

Sends a convert message to the parent (the operating system) who is then expected to output the specified text file on the printer with the specified paper type. A file with scope login is not accepted and the file must not be in use (for instance the file must not be current output). Each convert operation performed by BOSS2 requires a cbuffer which must be reserved in the job specification (cf. the BOSS2 Manual ch. 6). (2 pages).

Corelock

RCSL No. 31-D257

Sends a corelock message to the parent (the operating system) demanding that the job should stay in core the specified number of seconds. This feature is only used in connection with process control devices producing data with a high rate, cf. the BOSS2 User Manual ch. 9.3. (1 page).

Coreopen

RCSL No. 31-D258

Sends a coreopen message to the parent (the operating system) signaling the end of a corelock period (cf. the program CORELOCK). The program is only used on process control installations. (1 page).

End

RCSL No. 31-D259

Returns current input to the previous current input at the position where it was left. (1 page).

Finis

RCSL No. 31-D260

Finis terminates the job. (1 page).

I

RCSL No. 31-D261

Selects a new file as current input. The former file may later be resumed at the position where it was left (for instance by a call of END). (2 pages).

If

RCSL No. 31-D262

Makes the execution of the next FP-command conditioned by the values of one (or several) mode bits. The condition may reflect the success of the latest program executed as the ok (and warning) bits are set at program end. Mode bits may also be set by the program MODE. (2 pages).

Kit

RCSL No. 31-D263

Sends a mount disc message to the parent (the operating system) demanding a disc kit with a specified name to be mounted on a specified disc unit (cf. the Boss User Manual ch. 4.3). (1 page).

Mode

RCSL No. 31-D264

Sets the FP mode bits as specified in the call and may thereby change the working cycle of FP. (1 page).

Mount

RCSL No. 31-D265

Sends a mount message to the parent (the operating system) who is then expected to ask the operator to mount the tape reel (cf. the Boss User Manual ch. 5 and 10). The program does not await the mounting. (2 pages).

Mountspec

RCSL No. 31-D266

Sends a mount special message to the parent (the operating system) asking for the mounting of a specified magnetic tape reel on a specified station (cf. the Boss Manual ch. 5 and 10). (1 page).

Newjob

RCSL No. 31-D267

Sends a newjob message to the parent (the operating system) demanding the specified file enrolled as job file in a new off line job i.e. in this way a new job is created. The actual job continues with the next FP-command. Further details are found in section 1.7, internal jobs, in the Boss User Manual. (1 page).

□

RCSL No. 31-D268

Selects a new file as current output. (2 pages).

Online

RCSL No. 31-D269

Turns the job into the conversational mode where the current input to the job is typed on the terminal at run time. A conversational job is very resource demanding and the user must have a special option in the user catalog (cf. the BOSS User Manual ch. 3.5). (1 page).

Opcomm

RCSL No. 31-D270

Sends the parameter list in the call as a print message to the parent (the operating system) with request for an answer from the operator and types the answer (when received) on current output (cf. the Boss User Manual ch. 10). (2 pages).

Opmess

RCSL No. 31-D271

Sends the parameter list in the call as a print message to the parent (the operating system). If the operating system is BOSS the message is typed on the main console (cf. the Boss User Manual ch. 10). (1 page).

Release

RCSL No. 31-D272

Sends a release message to the parent (the operating system) releasing a certain magnetic tape reel (cf. the Boss User Manual ch. 5 and 10). (1 page).

Repeat

RCSL No. 31-D273

The program makes it possible to repeat (a specified number of times) a series of FP-commands placed in brackets. (2 pages).

Replace

RCSL No. 31-D274

Sends a replace message to the parent (the operating system) defining a file as replacement for the current job file. After termination of the job BOSS2 will create a new job with the same name and the specified file as job file. (1 page).

Ring

RCSL No. 31-D275

Sends a mount ring message to the parent (the operating system). The program is normally not used as the software sends the mount ring message automatically when needed. (1 page).

Skip

RCSL No. 31-D276

Bypasses parts of current input as specified in the parameter list. (2 pages).

Suspend

RCSL No. 31-D277

Sends a suspend message to the parent (the operating system) asking for suspension of the specified magnetic tape reel. This is relevant for worktapes only. The station is now available for mounting of another tape reel, but the suspended worktape is still reserved for the job until it terminates or releases the tape reel. Each suspend operation uses a suspend buffer. (cf. the BOSS2 User Manual, ch. 5 and 10). (1 page).

Timer

RCSL 31-D278

Sends a timer message to the parent (the operating system) demanding a provoked interrupt after a certain time (cf. the Boss User Manual ch. 10). (1 page).

System 3 Utility Programs, Part Three

RCSL No. 31-D320

This part of the utility program manual is a guide to the programming of utility programs in machine code. It concentrates around the relations between the program and the File Processor (FP) with special emphasis on the use of the FP input/output system. A knowledge of the RC 4000 machine code is assumed. (62 pages).

OPERATING SYSTEMS**Basic Operating System, s**

A description of this operating system is found in Part 4 of the manual 'Multiprogramming System' (55-D140) listed under the heading MONITOR 3.

Boss 2, User's Manual

RCSL No. 31-D310

This manual describes the operating system Boss 2 as seen from the programmers point of view. The main goals of Boss 2 are to ensure a fast and reliable execution of off-line jobs (batch), while at the same time serving many terminals in a restricted time sharing mode and a modest number

of terminals (about 10 to 15) in full time sharing mode. Boss 2 handles a maximum of 50 terminals plus one tape reader batch and one card batch, with a maximum of 20 jobs actually running or temporarily suspended. About 40 jobs more may be in the initial or terminal stages of the execution, for example performing on-line editing or spooling input/output. Boss 2 is designed for small or medium scale installations with seriously limited resources. Especially, backing store space will often be a bottle neck. As a consequence, Boss makes great efforts to ensure that a job will have sufficient resources, once started. Every user has his own file catalog and his own amount of permanent space on the backing store, and thus need not worry about other users. He may choose explicitly among various backing store units like drum, disc, and exchangeable disc kit. All backing store files are extendable, and the system will automatically cut the files to minimize the space used. From a terminal, it is possible to perform on-line editing of arbitrary files on backing store, with a response time of practically zero. Output to terminals and printers is spooled, which means that the output is stored temporarily on the disc. Small jobs may always bypass large jobs, thus enabling a short turn-around time for the former. Two jobs may reside in core store simultaneously. (76 pages).

Boss 2, Operator's Manual

RCSL No. 31-D230

This manual describes how the operator starts Boss 2, loads and runs jobs, handles peripheral devices, and closes down Boss again. The manual contains one chapter for each kind of device, describing the ordinary communication concerning that device. Especially, chapter 3 contains the complete description of all commands from the operator to Boss. Chapter 11 contains a list of all messages from Boss to the operator. The operator should have some knowledge of the system from the user's point of view. (31 pages).

Boss 2, Installation and Maintenance

RCSL No. 31-D313

This manual explains how a Boss 2 version is generated for a particular installation. The system generation itself is very simple, but some background information is necessary in order to utilize the resources fully. Some maintenance information is also presented, especially concerning the user catalog, the accounting, and the testoutput. The manual consists of rather independent chapters written as the need arose and the time allowed. Thus the manual does not pretend to be complete, but we expect it to grow as new chapters are added gradually. (60 pages).

ASSEMBLER

Slang Assembler

RCSL No. 55-D18

This manual is a description of Slang - the symbolic assembly language for the RC 4000 computer. The present version of the assembler, called Slang 3, is designed to operate under the RC 4000 Multiprogramming system and the File Processor.

Chapter 1 contains a general description of the language. Chapter 2 introduces the basic constituents of Slang, which are: numbers, identifiers, expressions, instructions, textstrings, and directives. The overall structure of Slang programs is defined in Chapter 3 which explains the specification of bytes, words, and double words as well as the concepts of block and segment. The syntax of the language is defined by means of the Backus notation.

The manual is concluded by a description in Chapter 4 of the operation of the Slang 3 assembler. (38 pages).

EDITOR

Editor

RCSL No. 55-D22

This manual provides information on the use of the editor command language. The editor operates under the RC 4000 Multiprogramming System and the File Processor.

The editor can be used both on-line and off-line. In on-line mode, the programmer types one or more editor commands on his console while he at the same time ensures that the editing is performed correctly. In off-line mode the editing is performed as a job in a batch, with all the corrections prepared beforehand.

The editor copies lines from the source document to the object document while at the same time modifying the text in accordance with the editor commands. A pointer keeps track of the number of lines copied to the object document. The editor includes commands for

- moving the pointer forward or backward a specified number of lines
- moving the pointer forward until a specified string of characters is met.
- insertion or deletion of lines
- replacing a text string within a line with another text string
- global replacement of a text string
- printing o - a number of lines in the vicinity of the correction

(25 pages).

New version of the Editor

RCSL No. 55-D101

This publication is a supplement to Editor (55-D22) and describes some new features which have been incorporated in the Editor. (3 pages).

COMPILERS

Revised Report on the Algorithmic Language Algol 60
RCSL No. 82-GSL 247

This manual gives a complete defining description of Algol 60. It is a basic manual to Algol 6 (RCSL 31-D322). (43 pages).

Algol 6

RCSL No. 31-D322

This manual is a revision of the Algol 5 manual (RCSL 55-D141) introducing among others the terms 'Fields' and 'Longs'.

This manual provides the programmer with the information needed to use the Algol 6 compiler. The compiler is designed to operate under the RC 4000 Multiprogramming System and the File processor.

The manual consists of 3 rather different parts:

1. Chapters 2 to 5 follow section by section the Revised Report on the Algorithmic Language Algol 60, and give changes in syntax and semantics relative to Algol 60.
2. Chapters 6, 7, and 8 serve as an introduction to the input/output system, to the facilities for programming of operating systems, and finally, to the coupling of the Algol system to the surroundings.
3. Chapter 9 and appendices A, B, and C constitute the part used in daily programming. Therefore, Chapter 9 is an alphabetic list of all standard identifiers and operators, provided with realistic examples.

A basic knowledge of the Algol 60 language is assumed. (168 pages).

Tofrom

RCSL No. 28-D2

This code procedure is intended as a replacement of the for/do loops, commonly used to move data in core store.

The procedure is particularly useful when great amounts of data must be moved and when the size of the moved area, measured in bytes is not a multiple of 4.

The procedure can be called from a program coded in Algol or Fortran. (3 pages).

Outchar, Outtext, Outinteger, Outdate, and Movestring
RCSL No. 31-D72

These five code procedures have the following functions:

- Outchar outputs a character in accordance with the given ISO value.
- Outtext outputs on a document a text string as specified in the call.
- Outinteger outputs on a document an integer with a format specified in the call.
- Outdate outputs on a document a date with a fixed format.
- Movestring moves either a layout or a text string.

The procedures can be called from a program coded in Algol or Fortran. (6 pages).

RC 4000 Fortran
RCSL No. 31-D103

This publication is a user's manual for the FORTRAN compiler for the RC 4000. The compiler is designed to operate under the RC 4000 Multiprogramming System and the File Processor.

The definition of the RC 4000 FORTRAN language is based on the ISO Recommendation, R1539: PROGRAMMING LANGUAGE FORTRAN.

However, the manual may be used independently of this publication.

The following subjects are covered:

1. Chapter 1 describes the external and internal representations, character set, types of variables and their characteristics.
2. Chapters 2 to 4 contain a description of the basic statement types and the treatment of arithmetical expressions and assignments.
3. Chapter 5 gives an extensive description of the input/output system, covering the standard READ/WRITE system and a set of procedures for record handling.
4. Chapter 6 covers the main structure of an executable program and the mutual communication between program units. The chapter describes further the possibilities of including procedures programmed in Algol and assembler code.
5. Appendix A contains a formal definition of the RC 4000 FORTRAN language, primarily intended for reference, when the user is familiar with the language.
7. Appendices B, C, and D contain a description of the operation of the compiler, an alphabetic list of error diagnostics, and a description of program execution with possible run time alarms.
8. Finally Appendix E contains a survey of the available library routines of the system.

Code Procedures and Run Time Organization of Algol 5 Programs.
RCSL No. 31-D199

This report is intended for use chiefly by programmers who are to program Algol procedures written in the assembly language Slang. A description of the run time organization of an Algol program is also given. Fortran subroutines and programs are organized almost identical to Algol procedures and programs. (84 pages).

Examples of Code Procedures

RCSL No. 31-D210

This report is intended as a supplement to RCSL No. 31-D199. In order to help the programmer to make his first code procedures, a few very simple and commented examples are given. Also commented stacks and translated algol programs are shown. (35 pages).

MATHEMATICAL AND STATISTICAL LIBRARY

Introduction to the Mathematical and Statistical Program Library

RCSL No. 55-D63

This publication describes the purpose and the administration of the mathematical and statistical program library. (5 pages).

Fit

RCSL No. 31-D129

Program Tape: 53-MF19 (ISO Text)

Subject: Approximation

This external Algol procedure calculates the coefficients of a weighted least square polynomial approximation by means of orthogonal polynomials. (8 pages).

Minimum

RCSL No. 53-M18

Program Tape: 53-MF18 (ISO Text)

Subject: Extrema

This external Algol procedure calculates extrema of a differentiable function in n variables. (17 pages).

Fft

RCSL No. 31-D3

Program Tape: 31-T1 (ISO Text)

Subject: Fourier

This external Algol procedure calculates the Fourier sum by means of the Cooley-Tukey algorithm (the Fast Fourier Transform). (5 pages).

Bessel Functions - $I_n(x)$ and $K_n(x)$

RCSL No. 53-M3

Program Tape: 53-MT3 (ISO Text)

Subject: Bessel Function

This external Algol procedure calculates by recurrence the values of the modified Bessel functions $I_0(x)$, $I_1(x)$, ..., $I_n(x)$ and $K_0(x)$, $K_1(x)$, ..., $K_n(x)$. (5 pages).

Bessel Functions - $J_n(x)$ and $Y_n(x)$

RCSL No. 53-M2

Program Tape: 53-MT2 (ISO Text)

Subject: Bessel Function

This external Algol procedure calculates the Bessel functions $J_0(x)$, $J_1(x)$, ..., $J_n(x)$ and $Y_0(x)$, $Y_1(x)$, ..., $Y_n(x)$. (5 pages).

Beta Function

RCSL No. 53-M8

Program Tape: 53-MT8 (ISO Text)

Subject: Beta Function

This external Algol procedure calculates the Beta function by means of integration. (6 pages).

Gamma

RCSL No. 55-D58

Program Tape: 53-MT11 (ISO Text)

Subject: Gamma Function

This external Algol procedure calculates the Gamma function for real or positive integer arguments. (5 pages).

Adapint

RCSL No. 55-D48

Program Tape: 53-MT10 (ISO Text)

Subject: Integration

This external Algol procedure calculates the integral of a function $f(x)$ given in an interval (a,b) by means of 7-point formula and adaptive control of the subdivisions of (a,b) with respect to the desired accuracy. (5 pages).

Decompose, Solve

RCSL No. 55-D60

Program Tape: 31-T94 (flexo-slang)

Subject: Linear Equations and Matrices

This Algol code procedure performs a triangular decomposition of an arbitrary non-singular matrix. One set of equations can then be solved by Solve. (8 pages).

Eberlein

RCSL No. 55-D57

Program Tape: 53-MT12 (ISO Text)

Subject: Linear Equations and Matrices

This external Algol procedure solves the eigenproblem for a real matrix by means of a sequence of Jacobi - like transformations. (25 pages).

Householder

RCSL No. 53-M7

Program Tape: 53-MT7 (ISO Text)

Subject: Linear Equations and Matrices

This external Algol procedure calculates eigenvalues and if wanted the corresponding eigenvectors of a symmetric matrix by the method of Householder. (18 pages).

Invertsym

RCSL No. 53-M5

Program Tape: 53-MT5 (ISO Text)

Subject: Linear Equations and Matrices

This external Algol procedure inverts a symmetric matrix. Only the lower half of the matrix need be stored. (10 pages).

Jacobi

RCSL No. 55-D61

Program Tape: 53-MT14 (ISO Text)

Subject: Linear Equations and Matrices

This external Algol procedure calculates all the eigenvalues and, if wanted, the corresponding eigenvectors of a symmetric matrix by the method of Jacobi. (9 pages).

Solineq

RCSL No. 63-M17

Program Tape: 53-MT17 (ISO Text)

Subject: Linear Equations and Matrices

This external Algol procedure solves a system of linear equations after test of input data. (9 pages).

Solvesym

RCSL No. 53-M6

Program Tape: 53-MT6 (ISO Text)

Subject: Linear Equations and Matrices

This external Algol procedure solves a set of n linear algebraic equations with symmetrical coefficient matrix. Only the lower half of the matrix has to be supplied. (7 pages).

runge kutta

RCSL No. 31-D224

Program tape: 31-T102

Subject: Differential Equations

runge kutta solves a system of first ordinary differential equations with given initial values by a fifth order Runge-Kutta method with variable step size, error-control, and flexible exit conditions. (20 pages).

Pzero

RCSL No. 53-M4

Program Tape: 53-MT4 (ISO Text)

Subject: Roots and Zeroes

This external Algol procedure calculates all roots, complex or real, of 2nd, 3rd, and 4th order polynomials with real coefficients. (15 pages).

Zero 1 (x,F,a,b,eps)

RCSL No. 53-M1

Program Tape: 53-MT1 (ISO Text)

Subject: Roots and Zeroes

This external Algol procedure evaluates one zero of an arbitrary real function. The method is based on regula falsi and bisection combined with an adaptive parameter giving the weights of regula falsi and bisection. (8 pages).

Data Survey, Part 1 and Appendix

RCSL No. 53-S1

Program Tape: 53-ST1 (ISO Text)

Subject: Statistical

This Algol program performs a simple statistical description of a number of observations of an arbitrary number of variables. The description of one variable consists of a histogram, and fractile diagrams may be drawn in the normal and exponential distribution. The program has facilities for specifying group-limits, transgenerations, and subsets of a variable. (26 pages).

Recordinput, Part 1 and Appendix

RCSL No. 53-S7

Program Tape: 53-ST7 (ISO Text)

Subject: Statistical

This external Algol procedure reads one input paper tape containing a number of records. The records are syntactically checked and will be delivered on a backing store for later inspection. Only syntactical errors are detected, whereas semantics have to be checked in a later scan of the output file. (31 pages).

SORT/MERGE SYSTEMS

Sorting in Algol 5

RCSL No. 55-D66

Program Tape: 31-T54 (Binary)

Subject: Internal Sorting

This publication describes 7 external Algol procedures for internal sorting and merging. These fundamental procedures are designed to be used by sort/merge programs available for magnetic tape and disc. (28 pages).

Indexed Sequential Files in RC 4000 Algol

RCSL No. 55-D99

Program Tape: 31-T75 (Binary)

Subject: Creation, Searching, and Deletion of Files on Drums and Discs.

An indexed sequential file is basically a sequential file, stored on a random access medium (drum or disc), and augmented by one or more levels of index tables to facilitate random access to records specified by a key.

With two levels, buckets and blocks, the search for a record with a specific key proceeds as follows:

A search for the key in the bucket table, which is common for the whole file, will yield a part of the file, the bucket, in which to continue the search.

Each bucket is preceeded by a block table and a search in this will yield a part of the bucket, the block, in which the record may be found.

The inherent characteristics for this type of files are:

1. Fast sequential processing of the whole file, comparable to a straight forward sequential file,
2. Fast random access for inspecting and updating of records specified by their keys
3. Fast deletion of records
4. Slow insertion of new records in a file, especially when the file is pretty full.

This paper describes the RC 4000 Algol implementation of an indexed sequential file organisation with two levels of index tables.

The system can be regarded as an extension of the set of the high level zone procedures and works within the same framework. It consists of a set of procedures to set up and process an indexed sequential file in an existing backing storage document which has been opened in a zone. (32 pages).

Magnetic Tape System MTS 2.

RCSL No. 31-D198

Program Tape: 31-T100 (Binary)

Subject: Creation and Check of Labels on Magnetic Tapes.

The Magnetic Tape System is a set of procedures for administering labelled files on magnetic tapes in Algol and Fortran programs.

The MTS 2 procedures create and check the file labels and substitute thus the algol standard procedures open, close, and setposition. The data transfer itself is performed by means of the standard procedures inrec and outrec, or by means of two extensions of these, invar and outvar better suited for handling files with variable record length.

MTS 2 administers three file types:

Single-volume and Multi-volume files,

Multi-file volume,

but not multi-file multi-volume.

The labels follow the ISO standard which is completely identical with the USA standard and the ECMA standard. (30 pages).

Heapsort

RCSL No. 31-D228

Program Tape: 31-T74 (Binary)

Subject: Magnetic Tape Sort/Merge

Heapsort sorts the records of a number of files on a number of Magnetic tapes. The files may have MTS labels (confer RCSL No. 31-D30) or no labels. The records may have fixed or variable length.

Heapsort is an Algol 6 program using the standard procedures described in RCSL No. 55-D66. (10 pages).

Mdsort

RCSL No. 28-D3

Program Tape: 31-T77 (Binary)

Subject: Disc Sorting Program

Mdsort is a sorting program intended for fast sorting of records stored on one disc file. The records may have fixed or variable length. The program uses the procedure Mdsortproc. (8 pages).