

ALGOL F

Level 2.1

360S-AL-531 ALGOL F Compiler
and
360S-LM-532 ALGOL F Library

Independent Component Release
for
MVS 3.8

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1. Introduction

1.1 Overview

The Algol F Level 2.1 Independent Component Release is a complete replacement of the previous release Level 2.0 which was a component of OS/360. This ICR may be used to upgrade an existing Algol F installation at the Level 2.0 to Level 2.1 or alternatively may be used to install the Algol F Compiler and Library where the Compiler and Library have not been previously installed. The ICR includes a number of programming enhancements to the Compiler and the Library. The Library routines have been updated for compatibility with the MVS JES2/3 environment.

2. Programming Enhancements

2.1 Compiler Enhancements

A new format heading now identifies the release level of the Compiler and the time and date of the compilation

Upper and lower case alphabetic characters may be used interchangeably in procedure names, identifier names and Algol Language defined symbols. All alphabetic characters are resolved to upper case except within strings where they retain their upper or lower case specification.

Examples

```
'begin'  
'Array'  
i  
ToTal
```

The range of alphabetic characters is extended to include the national characters \$, _, # and @. These national characters may be used wherever an alphabetic character is acceptable in procedure names and identifier names.

Examples

```
i_to_r  
#sum  
Amt$  
@curr
```

The standard Algol array subscript definition of enclosing square brackets is supported

Examples

```
'real' 'array' sum[0:10]  
k := sum[i]
```

The operator ** may be used in place of 'POWER'

Compiled Algol programs are identified by a translator ID of 360SAL531 and a date of compilation.

The semicolon count, wherever printed, is left zero suppressed for improved program readability.

2.2 Run Time Library Enhancements

The run time library routines, specifically all routines responsible for data management and the interface with the operating system are compatible with MVS programming standards. JES2/3 SYSIN datasets are Opened for input only without the Point option set in the DCB MACRF field. JES2/3 SYSOUT datasets are Opened for output only without the Point option set in the DCB MACRF field. Previous techniques to avoid ABENDs when processing SYSIN or SYSOUT datasets are no longer required.

The semicolon count, wherever printed, is left zero suppressed for improved program readability.

3. Installing the ICR

3.1 Planning

Obtain the ICR which is packaged in Hercules Emulated Tape (HET) format with a VOLSER of ALGOL.

The installation JCL and instructions are customized for an MVS 3.8 Turnkey system. If the target system is setup differently the JCL may require modification to suit the system environment.

The password for the Master Catalog of the target MVS system is required for the deletion and re-allocation of the SYS1.ALGLIB dataset.

3.2 Installation

Step 1.

The first dataset on the tape contains the installation JCL to install the remaining datasets on the tape. Download this JCL file using the IEBGENER utility to a dataset where the JCL may be edited and customized for the installation requirements and standards. An example job is shown below.

```
//LOADJCL JOB  ALGOL,'DOWNLOAD JCL',MSGLEVEL=(1,1), <-- CUSTOMIZE
//              CLASS=A,MSGCLASS=C                <-- CUSTOMIZE
//GENER   EXEC  PGM=IEBGENER
//SYSPRINT DD DUMMY
//SYSIN   DD   DUMMY
//SYSUT1  DD   DSN=ALGOLF.LVL210.JCL,LABEL=(1,SL,),DISP=OLD,
//              UNIT=3400-6,VOL=SER=ALGOLF        <-- CUSTOMIZE
//SYSUT2  DD   DSN=userid.work.cnt1(ALGJCL),disp=shr <-- CUSTOMIZE
```

Figure 1 Download Installation JCL

Step 2.

Edit the downloaded installation JCL to conform to installation standards and submit the job. The installation JCL is listed below.

```
//TIAI   JOB  111,'ALGOL F LVL2.1', <-- CUSTOMIZE FOR INSTALLATION
//              CLASS=S,MSGCLASS=C, <-- CUSTOMIZE FOR INSTALLATION
//              REGION=4096K,COND=(0,NE),MSGLEVEL=(1,1)
//*
//*      INSTALL
//*      ALGOL F LEVEL 2.1
//*      360S-AL-531 ALGOL F COMPILER
//*      AND
//*      360S-LM-532 ALGOL F LIBRARY
//*      INDEPENDENT COMPONENT RELEASE
//*
//*      BEFORE SUBMITTING THIS JOB CUSTOMIZE THE SYMBOLIC
//*      PARAMETERS TO CONFORM TO LOCAL STANDARDS
//*
//*      NOTE -
//*      THIS JOB WILL ISSUE TWO REQUESTS FOR THE
//*      MASTER CATALOG PASSWORD TO DELETE AND RE-ALLOCATE
//*      SYS1.ALGLIB
//*
//*      THIS JCL IS THE FIRST FILE ON THE DISTRIBUTION TAPE
//*
//*      DSN=ALGOLF.LVL210.JCL,LABEL=(1,SL,EXPDT=98000)
//*
//INSTALL PROC OLINK='SYS2.LINKLIB', <-- TARGET COMPILER LINKLIB
//              OLIB='SYS1.ALGLIB', <-- TARGET RESIDENT LIBRARY
//              OLUNIT='3350', <-- TARGET RESIDENT LIBRARY
//              OLVOL='MVSRES', <-- TARGET RESIDENT LIBRARY
//              OPROC='SYS2.PROCLIB', <-- TARGET PROCLIB
//              OSAMP='SYS1.SAMPLIB', <-- TARGET IVP SAMPLIB
//              SOUT='*', <-- SYSOUT CLASS, DLFT TO MSGCLASS
//              THLQ='ALGOLF', <-- ADD ADDTNL PREFIX IF REQUIRED
```

```

//          TUNIT='3400-6',          TAPE UNIT FOR DISTRIBUTION TAPE
//          TVOL='ALGOLF'           VOLSER OF DISTRIBUTION TAPE
//*
//*****
//*
//*          NAME: INSTALL ALGOL F LEVEL 2.1 ICR
//*
//*          DESC: INSTALL NEW VERSION OF ALGOL F AND ASSOC
//*                LIBRARIES FROM DISTRIBUTION TAPE
//*
//*****
//*
//*          DELETE SYS1.ALGLIB
//*
//DELETE EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//SYSIN DD DUMMY
//*
//*          LOAD ALL DATASETS
//*
//LOAD EXEC PGM=IEBCOPY,REGION=1024K
//SYSPRINT DD SYSOUT=&SOUT
//*
//INLINK DD DSN=&THLQ..LVL210.MOD,
//          UNIT=&TUNIT,VOL=(PRIVATE,RETAIN,SER=&TVOL),
//          LABEL=(2,SL,EXPDT=98000),DISP=(OLD,PASS)
//OUTLINK DD DSN=&OLINK,DISP=SHR          <--- TARGET LIB
//*
//INLIB DD DSN=&THLQ..LVL210.LIB,
//          UNIT=&TUNIT,VOL=(PRIVATE,RETAIN,SER=&TVOL),
//          LABEL=(3,SL,EXPDT=98000),DISP=(OLD,PASS)
//OUTLIB DD DSN=&OLIB,UNIT=&OLUNIT,          <--- TARGET LIB
//          VOL=SER=&OLVOL,SPACE=(TRK,(15,5,32)),
//          DISP=(,CATLG)
//*
//INPROC DD DSN=&THLQ..LVL210.PRC,
//          UNIT=&TUNIT,VOL=(PRIVATE,RETAIN,SER=&TVOL),
//          LABEL=(4,SL,EXPDT=98000),DISP=(OLD,PASS)
//OUTPROC DD DSN=&OPROC,DISP=SHR          <--- TARGET LIB
//*
//INSAMP DD DSN=&THLQ..LVL210.IVP,
//          UNIT=&TUNIT,VOL=(PRIVATE,RETAIN,SER=&TVOL),
//          LABEL=(5,SL,EXPDT=98000),DISP=(OLD,KEEP)
//OUTSAMP DD DSN=&OSAMP,DISP=SHR          <--- TARGET LIB
//*
//          PEND
//          EXEC INSTALL
//DELETE.SYSIN DD *
//          DELETE SYS1.ALGLIB PURGE
//          SET LASTCC = 0
//*
//LOAD.SYSIN DD *
//          COPY INDD=((INLINK,R)),OUTDD=OUTLINK
//          COPY INDD=((INLIB,R)),OUTDD=OUTLIB
//          COPY INDD=((INPROC,R)),OUTDD=OUTPROC
//          COPY INDD=((INSAMP,R)),OUTDD=OUTSAMP
//*
//

```

Figure 2 Installation JCL

3.3 Changing the Installation Default Compiler Options

The Algol Compiler has been configured with options suitable for the MVS 3.8 environment –

ALGOL PUNCH=NODECK,	X
TYPERUN=LOAD,	X
SORCODE=EBCDIC,	X
SORLIST=SOURCE,	X
PRECISN=SHORT	

The options may be changed by updating the Compiler options setting by use of the AMASPZAP utility program. Member IEXOPTNS in SYS1.SAMPLIB provides a sample job and an explanation of how to change the default options bit settings.

3.4 Running the Installation Verification Programs

The installation job installs four IVP programs (IEXSAMP1, IEXSAMP2, IEXSAMP3 and IEXSAMP4) into SYS1.SAMPLIB and the cataloged procedures to run them into SYS2.PROCLIB. Edit the JCL of the four jobs to conform to installation standards and submit them for execution. The IEXSAMP2 IVP will fail with a return code of 16 as a result of a deliberate divide by zero to prove the successful installation of the run time library error handling module. The IEXSAMP4 job will execute for approximately four minutes on a 25 MIP MVS system. The resulting output from all four jobs may be found in Appendix A, B, C and D.

4. Optional Materials

4.1 Machine Readable Program Source Material

The Assembler and Macro libraries for both the Algol F Level 2.1 Compiler and Library are available in unloaded PDS files distributed in HET format. The HET file may be downloaded from

TBA

4.2 Program Listings

Assembler listings of both the Algol F Level 2.1 Compiler and Library in PDF bookmarked files may be downloaded from

TBA

Appendix A. IVP IEXSAMP1 Listing

J E S 2 J O B L O G

```
13.34.17 JOB 9290 IEF677I WARNING MESSAGE(S) FOR JOB T11V1   ISSUED
13.34.17 JOB 9290 $HASP373 T11V1   STARTED - INIT 6 - CLASS S - SYS SYSA
13.34.17 JOB 9290 IEF403I T11V1 - STARTED - TIME=13.34.17
13.34.17 JOB 9290 IEFACRT - Stepname Procstep Program Retcode
13.34.17 JOB 9290 T11V1   IVP1   ALGOL   ALGOL   RC= 0000
13.34.17 JOB 9290 T11V1   IVP1   LKED    IEWL    RC= 0000
13.34.18 JOB 9290 T11V1   IVP1   GO      GO      RC= 0000
13.34.18 JOB 9290 T11V1   AMBLIST AMBLIST RC= 0000
13.34.18 JOB 9290 IEF404I T11V1 - ENDED - TIME=13.34.18
13.34.18 JOB 9290 $HASP395 T11V1   ENDED

 1 //T11V1 JOB 111,'ALGOL F LVL2.1', <-- CUSTOMIZE FOR SITE STANDARDS JOB 9290
// CLASS=S,MSGCLASS=C, <-- CUSTOMIZE FOR SITE STANDARDS 00002001
// REGION=1024K,COND=(0,NE),MSGLEVEL=(1,1) 00003001
*** 00004001
*** IBM Algol F Level 2.1 IVP 00005001
*** 00006001
*** 360S-AL-531 Algol F Compiler 00007001
*** and 00008001
*** 360S-LM-532 Algol F Library 00009001
*** 00010001
 2 //IVP1 EXEC ALGOFCLG,PARM.GO='TRACE' 00011001
*** 00001001
***** 00002001
*** 00003001
*** IBM ALGOL F LEVEL 2.1 00004001
*** 00005001
*** 360S-AL-531 ALGOL F COMPILER 00006001
*** AND 00007001
*** 360S-LM-532 ALGOL F LIBRARY 00008001
*** 00009001
*** COMPILE, LINK-EDIT AND EXECUTE A PROGRAM 00010001
*** 00011001
***** 00012001
*** 00013001
 3 XXALGOL EXEC PGM=ALGOL,REGION=1024K 00014001
 4 XXSYSPRINT DD SYSOUT=* 00015001
 5 XXSYSYPUNCH DD DUMMY 00016001
 6 XXSYSLIN DD DSN=&&OBJECT,UNIT=VIO,SPACE=(3200,(20,10)), 00017001
XX DISP=(,PASS) 00018001
 7 XXSYSUT1 DD UNIT=VIO,SPACE=(2048,(50,10)) 00019001
 8 XXSYSUT2 DD UNIT=VIO,SPACE=(2048,(50,10)) 00020001
 9 XXSYSUT3 DD UNIT=VIO,SPACE=(2048,(40,10)) 00021001
10 //ALGOL.SYSIN DD * 00022001
11 XXLKED EXEC PGM=IEWL,PARM='XREF,LIST,LET',COND=(5,LT,ALGOL), 00023001
XX REGION=1024K 00024001
12 XXSYSPRINT DD SYSOUT=* 00025001
13 XXSYSLIB DD DSN=SYS1.ALGLIB,DISP=SHR 00026001
14 XXSYSYSLMOD DD DSN=&&GOSET(GO),UNIT=VIO,DISP=(,PASS), 00027001
XX SPACE=(2048,(100,20,1)) 00028001
15 XXSYSUT1 DD UNIT=VIO,SPACE=(2048,(100,20)) 00029001
16 XXSYSLIN DD DSN=&&OBJECT,DISP=(OLD,DELETE) 00030001
17 XX DD DDNAME=SYSIN 00031001
18 XXGO EXEC PGM=GO,COND=((5,LT,ALGOL),(5,LT,LKED)), 00032001
XX REGION=1024K 00033001
19 XXSTEPLIB DD DSN=&&GOSET,DISP=(OLD,PASS) 00034001
20 XXALGLDD01 DD SYSOUT=* 00035001
21 XXSYSPRINT DD SYSOUT=* 00036001
22 XXSYSUT1 DD UNIT=VIO,SPACE=(1024,(20,10)) 00037001
23 //AMBLIST EXEC PGM=AMBLIST 00038001
*** 00039001
*** DEMONSTRATE LANGUAGE TRANSLATOR ID FOR ALGOL F 00040001
*** PROGRAMS AND TIME OF COMPILATION 00041001
*** 00042001
24 //SYSPRINT DD SYSOUT=* 00043001
25 //SYSLIB DD DSN=&&GOSET,DISP=(OLD,PASS) 00044001
26 //SYSIN DD * 00045001
STMT NO. MESSAGE
-
 18 IEF686I DDNAME REFERRED TO ON DDNAME KEYWORD IN PRIOR STEP WAS NOT RESOLVED
IEF236I ALLOC. FOR T11V1 ALGOL IVP1
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I DMY ALLOCATED TO SYSYPUNCH
IEF237I VIO ALLOCATED TO SYSLIN
IEF237I VIO ALLOCATED TO SYSUT1
```

```

IEF237I VIO ALLOCATED TO SYSUT2
IEF237I VIO ALLOCATED TO SYSUT3
IEF237I JES2 ALLOCATED TO SYSIN
IEF142I T11V1 ALGOL IVP1 - STEP WAS EXECUTED - COND CODE 0000
IEF285I JES2.JOB09290.S00103 SYSOUT
IEF285I SYS12230.T133417.RA000.T11V1.OBJECT PASSED *-----2
IEF285I SYS12230.T133417.RA000.T11V1.R0000001 DELETED *-----0
IEF285I SYS12230.T133417.RA000.T11V1.R0000002 DELETED *-----0
IEF285I SYS12230.T133417.RA000.T11V1.R0000003 DELETED *-----13
IEF285I JES2.JOB09290.S10101 SYSIN
IEF373I STEP /ALGOL / START 12230.1334
IEF374I STEP /ALGOL / STOP 12230.1334 CPU 0MIN 00.05SEC SRB 0MIN 00.00SEC VIRT 192K SYS 304K
*****
* 1. Jobstep of job: T11V1 Stepname: ALGOL Program name: ALGOL Executed on 17.08.12 from 13.34.17 to 13.34.17 *
* elapsed time 24:00:00,10 CPU-Identifier: SYSA Page-in: 0 *
* CPU time 00:00:00,05 Virtual Storage used: 192K Page-out: 0 *
* corr. CPU: 00:00:00,05 CPU time has been corrected by 1 / 1,0 multiplier *
*
* I/O Operation *
* Number of records read via DD * or DD DATA: 53 *
* DMY.....0 DMY.....0 FFF.....2 FFF.....0 FFF.....0 FFF.....13 DMY.....0 *
*
* Charge for step (w/o SYSOUT): 0,08 *
*****
IEF236I ALLOC. FOR T11V1 LKED IVP1
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I 148 ALLOCATED TO SYSLIB
IEF237I VIO ALLOCATED TO SYSLMOD
IEF237I VIO ALLOCATED TO SYSUT1
IEF237I VIO ALLOCATED TO SYSLIN
IEF237I DMY ALLOCATED TO
IEF142I T11V1 LKED IVP1 - STEP WAS EXECUTED - COND CODE 0000
IEF285I JES2.JOB09290.S00104 SYSOUT
IEF285I SYS1.AGLLIB KEPT *-----64
IEF285I VOL SER NOS= MVSRES.
IEF285I SYS12230.T133417.RA000.T11V1.GOSET PASSED *-----18
IEF285I SYS12230.T133417.RA000.T11V1.R0000004 DELETED *-----0
IEF285I SYS12230.T133417.RA000.T11V1.OBJECT DELETED *-----3
IEF373I STEP /LKED / START 12230.1334
IEF374I STEP /LKED / STOP 12230.1334 CPU 0MIN 00.05SEC SRB 0MIN 00.01SEC VIRT 1024K SYS 280K
*****
* 2. Jobstep of job: T11V1 Stepname: LKED Program name: IEWL Executed on 17.08.12 from 13.34.17 to 13.34.17 *
* elapsed time 24:00:00,08 CPU-Identifier: SYSA Page-in: 0 *
* CPU time 00:00:00,06 Virtual Storage used: 1024K Page-out: 0 *
* corr. CPU: 00:00:00,06 CPU time has been corrected by 1 / 1,0 multiplier *
*
* I/O Operation *
* Number of records read via DD * or DD DATA: 0 *
* DMY.....0 148.....64 FFF.....18 FFF.....0 FFF.....3 DMY.....0 *
*
* Charge for step (w/o SYSOUT): 0,10 *
*****
IEF236I ALLOC. FOR T11V1 GO IVP1
IEF237I VIO ALLOCATED TO STEPLIB
IEF237I JES2 ALLOCATED TO ALGLDD01
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I VIO ALLOCATED TO SYSUT1
IEF142I T11V1 GO IVP1 - STEP WAS EXECUTED - COND CODE 0000
IEF285I SYS12230.T133417.RA000.T11V1.GOSET PASSED *-----0
IEF285I JES2.JOB09290.S00105 SYSOUT
IEF285I JES2.JOB09290.S00106 SYSOUT
IEF285I SYS12230.T133417.RA000.T11V1.R0000005 DELETED *-----12
IEF373I STEP /GO / START 12230.1334
IEF374I STEP /GO / STOP 12230.1334 CPU 0MIN 00.05SEC SRB 0MIN 00.00SEC VIRT 28K SYS 300K
*****
* 3. Jobstep of job: T11V1 Stepname: GO Program name: GO Executed on 17.08.12 from 13.34.17 to 13.34.18 *
* elapsed time 24:00:00,07 CPU-Identifier: SYSA Page-in: 0 *
* CPU time 00:00:00,05 Virtual Storage used: 28K Page-out: 0 *
* corr. CPU: 00:00:00,05 CPU time has been corrected by 1 / 1,0 multiplier *
*
* I/O Operation *
* Number of records read via DD * or DD DATA: 0 *
* FFF.....0 DMY.....0 DMY.....0 FFF.....12 *
*
* Charge for step (w/o SYSOUT): 0,08 *
*****
IEF236I ALLOC. FOR T11V1 AMBLIST
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I VIO ALLOCATED TO SYSLIB
IEF237I JES2 ALLOCATED TO SYSIN
IEF142I T11V1 AMBLIST - STEP WAS EXECUTED - COND CODE 0000
IEF285I JES2.JOB09290.S00107 SYSOUT

```

```

IEF285I  SYS12230.T133417.RA000.T11V1.GOSET      PASSED      *-----9
IEF285I  JES2.JOB09290.SI0102                   SYSIN
IEF373I  STEP /AMBLIST / START 12230.1334
IEF374I  STEP /AMBLIST / STOP 12230.1334 CPU      0MIN 00.02SEC SRB      0MIN 00.00SEC VIRT 1024K SYS 280K
*****
* 4. Jobstep of job: T11V1      Stepname: AMBLIST   Program name: AMBLIST   Executed on 17.08.12 from 13.34.18 to 13.34.18 *
*      elapsed time 24:00:00,07      CPU-identifier: SYSA      Page-in:      0      *
*      CPU time 00:00:00,02      Virtual Storage used: 1024K      Page-out:      0      *
*      corr. CPU: 00:00:00,02      CPU time has been corrected by 1 / 1,0 multiplier *
*
*      I/O Operation *
*      Number of records read via DD * or DD DATA: 1 *
*      DMY.....0 FFF.....9 DMY.....0 *
*
*      Charge for step (w/o SYSOUT): 0,03 *
*****
IEF285I  SYS12230.T133417.RA000.T11V1.GOSET      DELETED
IEF375I  JOB /T11V1 / START 12230.1334
IEF376I  JOB /T11V1 / STOP 12230.1334 CPU      0MIN 00.17SEC SRB      0MIN 00.01SEC

```

```
'BEGIN' 00013001
'COMMENT' TEST PROGRAM Q09 00014001
        MODIFIED FOR IBM ALGOL F LEVEL 2.1 IVP 00015001
        00016001
        GENERATE AND PRINTS THE FIRST TWENTY 00017001
        LINES OF PASCALS TRIANGLE 00018001
        00019001
        THE K TH ELEMENT P(K,J) OF THE J TH LINE SHOULD BE 00020001
        EQUAL TO THE SUM OF P(K-1,J-1) AND P(K,J-1) FOR K  $\neq$  0 00021001
        AND K  $\neq$  J. P(0,J)=P(J,J)=1 00022001
        THUS BY ADDING TWO BY TWO ALL ELEMENTS IN ONE LINE 00023001
        PLACING EACH SUM BELOW AND BETWEEN THE TWO ELEMENTS THE 00024001
        NEXT LINE OF PASCALS TRIANGLE COULD BE EXPANDED ; 00025001
        00026001
'INTEGER' l,k,n,i,m,Powerten; 00027001
1 'INTEGER' 'ARRAY' a[0:19]; 00028001
2 'BOOLEAN' c; 00029001
3 SYSACT(1,6,120); 00030001
4 SYSACT(1,8,62); 00031001
5 SYSACT(1,12,1); 00032001
6 SYSACT(1,2,56); 00033001
7 OUTSTRING (1,('Pascals Triangle')); 00034001
8 'FOR' l := 0 'STEP' 1 'UNTIL' 19 'DO' 00035001
8 'BEGIN' 00036001
8 SYSACT(1,14,3); 00037001
9 'IF' l < 19 'THEN' 00038001
9 SYSACT(1,2,58-3*1); 00039001
10 a[l] := 1; 00040001
11 'FOR' k := l-1 'STEP' -1 'UNTIL' 1 'DO' 00041001
11 a[k] := a[k-1] + a[k]; 00042001
12 'FOR' K :=0 'STEP' 1 'UNTIL' L 'DO' 00043001
12 'BEGIN' 00044001
12 c := 'TRUE'; 00045001
13 m := a[k]; 00046001
14 'FOR' I := 5 'STEP' -1 'UNTIL' 0 'DO' 00047001
14 'BEGIN' 00048001
14 Powerten := 10 ** I; 00049001
15 n := m /' Powerten; 00050001
16 m := m-n * Powerten; 00051001
17 'IF' n 'EQUAL' 0 'THEN' 00052001
17 'BEGIN' 00053001
17 'IF' c 'THEN' OUTSYMBOL (1,(' '),1) 00054001
17 'ELSE' OUTSYMBOL (1,('0'),1); 00055001
18 'END' 00056001
18 'ELSE' 00057001
18 'BEGIN' 00058001
18 c := 'FALSE'; 00059001
19 OUTSYMBOL(1,('123456789'),N); 00060001
20 'END' 00061001
20 'END' 00062001
20 'END' 00063001
20 'END' 00064001
20 'END' 00065001
```

IDENTIFIER TABLE											PAGE	2		
PBN	SC	PBN	NAME	TYPE	DM	DSP	NAME	TYPE	DM	DSP	NAME	TYPE	DM	DSP
		SURR			PR	LN			PR	LN			PR	LN
001	00000	000	A	I	A	01 030	C	B		048	I	I		024
			K	I		01C	L	I		018	M	I		028
			N	I		020	POWER	I		02C				

STORAGE REQUIREMENTS (DECIMAL) PAGE 3

OBJECT MODULE SIZE 1968 BYTES
 DATA STORAGE AREA SIZES
 PBN BYTES PBN BYTES PBN BYTES PBN BYTES
 001 132

F64-LEVEL LINKAGE EDITOR OPTIONS SPECIFIED XREF,LIST,LET
 DEFAULT OPTION(S) USED - SIZE=(1015808,516096)

CROSS REFERENCE TABLE

CONTROL SECTION			ENTRY							
NAME	ORIGIN	LENGTH	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
PROGRAM	00	7B0								
IHIFRIXP*	7B0	A0	IHIDSTAB	758	IHIENTIF	7A4				
IHIFSARA*	850	E70	IHIFRI	7B0						
IHIFSARB*	16C0	690	IHIFSAIN	164C						
IHIIOSTRG*	1D50	148								
IHIOSYMB*	1E98	138								
IHISYSCT*	1FD0	780								
IHIORTN*	2750	D70								
			IHIOROQ	2750	IHIOROP	2836	IHIORNX	2C04	IHIORCL	2E4C
			IHIORCP	2FF6	IHIORGP	30F8	IHIORCN	30FC	IHIIOREN	315C
			IHIIOREV	31DA	IHIIORED	3270	IHIORCI	3348	IHIORER	33CC
IHIERROR*	34C0	6E8								
IHIERMSG*	3BA8	9B8								
			IHIERM01	3C58						

LOCATION	REFERS TO SYMBOL	IN CONTROL SECTION	LOCATION	REFERS TO SYMBOL	IN CONTROL SECTION
690	IHISYSCT	IHISYSCT	6C8	IHIOSYMB	IHIOSYMB
6E4	IHIIOSTRG	IHIIOSTRG	6F4	IHIFRI	IHIFRIXP
1694	IHIFSARB	IHIFSARB	AE8	IHIERROR	IHIERROR
1648	IHIORER	IHIORTN	16A8	IHIORCP	IHIORTN
AFC	IHIORCP	IHIORTN	1644	IHIORGP	IHIORTN
1640	IHIIOREN	IHIORTN	163C	IHIOROQ	IHIORTN
1630	IHIIOREV	IHIORTN	1628	IHIORCI	IHIORTN
16B0	IHIORNX	IHIORTN	1634	IHIORNX	IHIORTN
B01	IHIORNX	IHIORTN	16B4	IHIORCL	IHIORTN
162C	IHIORCL	IHIORTN	16AC	IHIOROP	IHIORTN
1638	IHIOROP	IHIORTN	AF8	IHIOROP	IHIORTN
16A4	IHIENTIF	PROGRAM	8FC	IHIDSTAB	PROGRAM
16C5	IHIFSARA	IHIFSARA	3B90	IHIERM01	IHIERMSG
3B8C	IHIERMSG	IHIERMSG			

ENTRY ADDRESS 164C
 TOTAL LENGTH 4560
 ****GO DOES NOT EXIST BUT HAS BEEN ADDED TO DATA SET
 AUTHORIZATION CODE IS 0.

Pascals Triangle

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   1 3 3 1
  1 4 6 4 1
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 1 6 15 20 15 6 1
 1 7 21 35 35 21 7 1
 1 8 28 56 70 56 28 8 1
 1 9 36 84 126 126 84 36 9 1
 1 10 45 120 210 252 210 120 45 10 1
 1 11 55 165 330 462 462 330 165 55 11 1
 1 12 66 220 495 792 924 792 495 220 66 12 1
 1 13 78 286 715 1287 1716 1716 1287 715 286 78 13 1
 1 14 91 364 1001 2002 3003 3432 3003 2002 1001 364 91 14 1
 1 15 105 455 1365 3003 5005 6435 6435 5005 3003 1365 455 105 15 1
 1 16 120 560 1820 4368 8008 11440 12870 11440 8008 4368 1820 560 120 16 1
 1 17 136 680 2380 6188 12376 19448 24310 24310 19448 12376 6188 2380 680 136 17 1
 1 18 153 816 3060 8568 18564 31824 43758 48620 43758 31824 18564 8568 3060 816 153 18 1
 1 19 171 969 3876 11628 27132 50388 75582 92378 92378 75582 50388 27132 11628 3876 969 171 19 1
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ALGOL PROGRAM TRACE

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ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

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ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

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ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

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ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

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ALGOL PROGRAM TRACE

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ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

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ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

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ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

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ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

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ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

17	19	20	13	14	15	16	17	18	15	16	17	19
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14	15	16	17	18	15	16	17	18	15	16	17	18
15	16	17	18	15	16	17	18	15	16	17	19	20

END OF ALGOL PROGRAM EXECUTION

***** MODULE SUMMARY *****

MEMBER NAME GO

MAIN ENTRY POINT 00164C

** ALIASES **

SECONDARY ENTRY POINT ADDRESSES ASSOCIATED WITH ALIASES:

***** LINKAGE EDITOR ATTRIBUTES OF MODULE *****

**	BIT	STATUS	BIT	STATUS	BIT	STATUS	BIT	STATUS	**
	0	NOT-RENT	1	NOT-REUS	2	NOT-OVLY	3	NOT-TEST	
	4	NOT-OL	5	BLOCK	6	EXEC	7	MULTI-RCD	
	8	NOT-DC	9	ZERO-ORG	10	EP > ZERO	11	RLD	
	12	EDIT	13	NO-SYMS	14	F-LEVEL	15	NOT-REFR	

MODULE SSI: NONE
APFCODE 00000000

*****LOAD MODULE PROCESSED BY VS LINKAGE EDITOR
LISTIDR FOR LOAD MODULE GO

PAGE 0001

THIS LOAD MODULE CONTAINS NO INFORMATION SUPPLIED BY IMASPZAP

THIS LOAD MODULE WAS PRODUCED BY LINKAGE EDITOR 5752SC104 AT LEVEL 03.08 ON DAY 230 OF YEAR 12 AT 13:34:17.

CSECT	TRANSLATOR	VR.MD	YR/DY
PROGRAM	360SAL531	02.01	12/230
IHIFRXP	X390ASM	31.04	12/230
IHIFSARA	X390ASM	31.04	12/230
IHIFSARB	X390ASM	31.04	12/230
IHIOSTRG	X390ASM	31.04	12/230
IHIOSYMB	X390ASM	31.04	12/230
IHISYSCT	X390ASM	31.04	12/230
IHIORTN	X390ASM	31.04	12/230
IHIERROR	X390ASM	31.04	12/230
IHIERMSG	X390ASM	31.04	12/230

CSECT	YR/DAY	USER DATA
IHIERMSG	12/230	360SLM532 V02 M01 ALGOL F LIBRARY
IHIERROR	12/230	360SLM532 V02 M01 ALGOL F LIBRARY
IHIFRXP	12/230	360SLM532 V02 M01 ALGOL F LIBRARY
IHIFSARA	12/230	360SLM532 V02 M01 ALGOL F LIBRARY
IHIFSARB	12/230	360SLM532 V02 M01 ALGOL F LIBRARY
IHIORTN	12/230	360SLM532 V02 M01 ALGOL F LIBRARY
IHIOSTRG	12/230	360SLM532 V02 M01 ALGOL F LIBRARY
IHIOSYMB	12/230	360SLM532 V02 M01 ALGOL F LIBRARY
IHISYSCT	12/230	360SLM532 V02 M01 ALGOL F LIBRARY

Appendix B. IVP IEXSAMP2 Listing

J E S 2 J O B L O G

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13.35.56 JOB 9291 IEF677I WARNING MESSAGE(S) FOR JOB T1IV2 ISSUED
13.35.56 JOB 9291 $HASP373 T1IV2 STARTED - INIT 6 - CLASS S - SYS SYSA
13.35.56 JOB 9291 IEF403I T1IV2 - STARTED - TIME=13.35.56
13.35.57 JOB 9291 IEFACRT - Stepname Procstep Program Retcode
13.35.57 JOB 9291 T1IV2 IVP2 ALGOL ALGOL RC= 0000
13.35.57 JOB 9291 T1IV2 IVP2 LKED IEWL RC= 0000
13.35.57 JOB 9291 T1IV2 IVP2 GO GO RC= 0016
13.35.57 JOB 9291 IEF404I T1IV2 - ENDED - TIME=13.35.57
13.35.57 JOB 9291 $HASP395 T1IV2 ENDED

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1 //T1IV2 JOB 111,'ALGOL F LVL2.1', <-- CUSTOMIZE FOR SITE STANDARDS JOB 9291
// CLASS=S,MSGCLASS=C, <-- CUSTOMIZE FOR SITE STANDARDS 00002001
// REGION=1024K,COND=(0,NE),MSGLEVEL=(1,1) 00003001
*** 00004001
*** IBM ALGOL F LEVEL 2.1 IVP 00005001
*** 00006001
*** 360S-AL-531 ALGOL F COMPILER 00007001
*** AND 00008001
*** 360S-LM-532 ALGOL F LIBRARY 00009001
*** 00010001
2 //IVP2 EXEC ALGOFCLG,PARM.GO='TRACE,DUMP' 00011001
*** 00001001
***** 00002001
*** 00003001
*** IBM ALGOL F LEVEL 2.1 00004001
*** 00005001
*** 360S-AL-531 ALGOL F COMPILER 00006001
*** AND 00007001
*** 360S-LM-532 ALGOL F LIBRARY 00008001
*** 00009001
*** COMPILE, LINK-EDIT AND EXECUTE A PROGRAM 00010001
*** 00011001
***** 00012001
*** 00013001
3 XXALGOL EXEC PGM=ALGOL,REGION=1024K 00014001
4 XXSYSRINT DD SYSOUT=* 00015001
5 XXSYPUNCH DD DUMMY 00016001
6 XXSYSLIN DD DSN=&&OBJECT,UNIT=VIO,SPACE=(3200,(20,10)), 00017001
XX DISP=(,PASS) 00018001
7 XXSYSUT1 DD UNIT=VIO,SPACE=(2048,(50,10)) 00019001
8 XXSYSUT2 DD UNIT=VIO,SPACE=(2048,(50,10)) 00020001
9 XXSYSUT3 DD UNIT=VIO,SPACE=(2048,(40,10)) 00021001
10 //ALGOL.SYSIN DD * 00012001
11 XXLKED EXEC PGM=IEWL,PARM='XREF,LIST,LET',COND=(5,LT,ALGOL), 00022001
XX REGION=1024K 00023001
12 XXSYSRINT DD SYSOUT=* 00024001
13 XXSYSLIB DD DSN=SYS1.ALGLIB,DISP=SHR 00025001
14 XXSYSLMOD DD DSN=&&GOSSET(GO),UNIT=VIO,DISP=(,PASS), 00026001
XX SPACE=(2048,(100,20,1)) 00027001
15 XXSYSUT1 DD UNIT=VIO,SPACE=(2048,(100,20)) 00028001
16 XXSYSLIN DD DSN=&&OBJECT,DISP=(OLD,DELETE) 00029001
17 XX DD DDNAME=SYSIN 00030001
18 XXGO EXEC PGM=GO,COND=((5,LT,ALGOL),(5,LT,LKED)), 00031001
XX REGION=1024K 00032001
19 XXSTEPLIB DD DSN=&&GOSSET,DISP=(OLD,PASS) 00033001
20 XXALGLDD01 DD SYSOUT=* 00034001
21 XXSYSRINT DD SYSOUT=* 00035001
22 XXSYSUT1 DD UNIT=VIO,SPACE=(1024,(20,10)) 00036001

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STMT NO. MESSAGE

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-
18 IEF686I DDNAME REFERRED TO ON DDNAME KEYWORD IN PRIOR STEP WAS NOT RESOLVED
IEF236I ALLOC. FOR T1IV2 ALGOL IVP2
IEF237I JES2 ALLOCATED TO SYSRINT
IEF237I DMY ALLOCATED TO SYPUNCH
IEF237I VIO ALLOCATED TO SYSLIN
IEF237I VIO ALLOCATED TO SYSUT1
IEF237I VIO ALLOCATED TO SYSUT2
IEF237I VIO ALLOCATED TO SYSUT3
IEF237I JES2 ALLOCATED TO SYSIN
IEF142I T1IV2 ALGOL IVP2 - STEP WAS EXECUTED - COND CODE 0000
IEF285I JES2.JOB09291.S00102 SYSOUT
IEF285I SYS12230.T133556.RA000.T1IV2.OBJECT PASSED *-----2
IEF285I SYS12230.T133556.RA000.T1IV2.R0000001 DELETED *-----0
IEF285I SYS12230.T133556.RA000.T1IV2.R0000002 DELETED *-----0

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IEF285I SYS12230.T133556.RA000.T11V2.R0000003 DELETED *-----16
IEF285I JES2.JOB09291.SI0101 SYSIN
IEF373I STEP /ALGOL / START 12230.1335
IEF374I STEP /ALGOL / STOP 12230.1335 CPU 0MIN 00.05SEC SRB 0MIN 00.00SEC VIRT 192K SYS 304K
*****
* 1. Jobstep of job: T11V2 Stepname: ALGOL Program name: ALGOL Executed on 17.08.12 from 13.35.56 to 13.35.57 *
* elapsed time 24:00:00,10 CPU-Identifier: SYSA Page-in: 0 *
* CPU time 00:00:00,05 Virtual Storage used: 192K Page-out: 0 *
* corr. CPU: 00:00:00,05 CPU time has been corrected by 1 / 1,0 multiplier *
* *
* I/O Operation *
* Number of records read via DD * or DD DATA: 36 *
* DMY.....0 DMY.....0 FFF.....2 FFF.....0 FFF.....0 FFF.....16 DMY.....0 *
* *
* Charge for step (w/o SYSOUT): 0,08 *
*****
IEF236I ALLOC. FOR T11V2 LKED IVP2
IEF237I JES2 ALLOCATED TO SYSRINT
IEF237I 148 ALLOCATED TO SYSLIB
IEF237I VIO ALLOCATED TO SYSLMOD
IEF237I VIO ALLOCATED TO SYSUT1
IEF237I VIO ALLOCATED TO SYSLIN
IEF237I DMY ALLOCATED TO
IEF142I T11V2 LKED IVP2 - STEP WAS EXECUTED - COND CODE 0000
IEF285I JES2.JOB09291.S00103 SYSOUT
IEF285I SYS1.ALGLIB KEPT *-----56
IEF285I VOL SER NOS= MVSRES.
IEF285I SYS12230.T133556.RA000.T11V2.GOSET PASSED *-----17
IEF285I SYS12230.T133556.RA000.T11V2.R0000004 DELETED *-----0
IEF285I SYS12230.T133556.RA000.T11V2.OBJECT DELETED *-----3
IEF373I STEP /LKED / START 12230.1335
IEF374I STEP /LKED / STOP 12230.1335 CPU 0MIN 00.05SEC SRB 0MIN 00.01SEC VIRT 1024K SYS 248K
*****
* 2. Jobstep of job: T11V2 Stepname: LKED Program name: IEWL Executed on 17.08.12 from 13.35.57 to 13.35.57 *
* elapsed time 24:00:00,07 CPU-Identifier: SYSA Page-in: 0 *
* CPU time 00:00:00,06 Virtual Storage used: 1024K Page-out: 0 *
* corr. CPU: 00:00:00,06 CPU time has been corrected by 1 / 1,0 multiplier *
* *
* I/O Operation *
* Number of records read via DD * or DD DATA: 0 *
* DMY.....0 148.....56 FFF.....17 FFF.....0 FFF.....3 DMY.....0 *
* *
* Charge for step (w/o SYSOUT): 0,10 *
*****
IEF236I ALLOC. FOR T11V2 GO IVP2
IEF237I VIO ALLOCATED TO STEPLIB
IEF237I JES2 ALLOCATED TO ALGLDD01
IEF237I JES2 ALLOCATED TO SYSRINT
IEF237I VIO ALLOCATED TO SYSUT1
IEF142I T11V2 GO IVP2 - STEP WAS EXECUTED - COND CODE 0016
IEF285I SYS12230.T133556.RA000.T11V2.GOSET PASSED *-----0
IEF285I JES2.JOB09291.S00104 SYSOUT
IEF285I JES2.JOB09291.S00105 SYSOUT
IEF285I SYS12230.T133556.RA000.T11V2.R0000005 DELETED *-----0
IEF373I STEP /GO / START 12230.1335
IEF374I STEP /GO / STOP 12230.1335 CPU 0MIN 00.02SEC SRB 0MIN 00.00SEC VIRT 28K SYS 280K
*****
* 3. Jobstep of job: T11V2 Stepname: GO Program name: GO Executed on 17.08.12 from 13.35.57 to 13.35.57 *
* elapsed time 24:00:00,04 CPU-Identifier: SYSA Page-in: 0 *
* CPU time 00:00:00,02 Virtual Storage used: 28K Page-out: 0 *
* corr. CPU: 00:00:00,02 CPU time has been corrected by 1 / 1,0 multiplier *
* *
* I/O Operation *
* Number of records read via DD * or DD DATA: 0 *
* FFF.....0 DMY.....0 DMY.....0 FFF.....0 *
* *
* Charge for step (w/o SYSOUT): 0,03 *
*****
IEF285I SYS12230.T133556.RA000.T11V2.GOSET DELETED
IEF375I JOB /T11V2 / START 12230.1335
IEF376I JOB /T11V2 / STOP 12230.1335 CPU 0MIN 00.12SEC SRB 0MIN 00.01SEC

```

```

      'BEGIN'                                00013001
      'COMMENT'                              00014001
      IBM ALGOL F LEVEL 2.1 IVP              00015001
      SAMPLE PROGRAM TO CREATE DELIBERATE DIVIDE BY ZERO ERROR 00016001
      TO DEMONSTRATE ALGOL RUN TIME DIAGNOSTIC INFORMATION; 00017001
      00018001
      'INTEGER' I;                           00019001
1     'REAL' A;                               00020001
2     'BOOLEAN' B;                           00021001
3     'INTEGER' 'ARRAY' IA[1:5];             00022001
4     'ARRAY' AR[0:3,2:8];                   00023001
5     'BOOLEAN' 'ARRAY' BA[0:1,1:3,3:7];     00024001
6     'INTEGER' 'PROCEDURE' IP;              00025001
7     IP := I + 5;                           00026001
8     'REAL' 'PROCEDURE' RP(A);              00027001
9     'VALUE' A;                             00028001
10    'INTEGER' A;                           00029001
11    RP := A*A;                             00030001
12    'PROCEDURE' P(A,B,C);                  00031001
13    'BOOLEAN' A;                           00032001
14    'REAL' B;                              00033001
15    'INTEGER' C;                           00034001
16    A:= B < C ;                           00035001
17    I := 1;                                00036001
18    A := 2.6;                              00037001
19    AR[1,1] := IP;                         00038001
20    AR[1,2] := RP(AR[1,1]);                00039001
21    P(BA[0,1,3],A,I);                      00040001
22    P(B,AR[1,2],IP);                      00041001
23    SYSACT(1,8,50);                       00042001
24    OUTREAL(1,AR[1,1]);                    00043001
25    OUTBOOLEAN(1,BA[0,1,3]);               00044001
26    OUTBOOLEAN(1,B);                       00045001
27    'COMMENT' DELIBERATE DIVIDE BY ZERO ERROR; 00046001
27    A := A/0;                              00047001
28    'END'                                  00048001

```

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IDENTIFIER TABLE														
PBN	SC	PBN	NAME	TYPE	DM	DSP	NAME	TYPE	DM	DSP	NAME	TYPE	DM	DSP
		SURR			PR	LN			PR	LN			PR	LN
001	00000	000	A	R		01C	AR	R A	02	03C	B	B		020
			BA	B A	03	058	I	I		018	IA	I A	01	024
			IP	I P	00	070	P	P	03	078	RP	R P	01	074
002	00006	001	IP	I P	00	070								
003	00008	001	A	I V		020	RP	R P	01	074				
004	00012	001	A	B N		018	B	R N		020	C	I N		028

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STORAGE REQUIREMENTS (DECIMAL)

OBJECT MODULE SIZE 1840 BYTES
 DATA STORAGE AREA SIZES

PBN	BYTES	PBN	BYTES	PBN	BYTES	PBN	BYTES	PBN	BYTES
001	136	002	32	003	40	004	60		

F64-LEVEL LINKAGE EDITOR OPTIONS SPECIFIED XREF,LIST,LET
 DEFAULT OPTION(S) USED - SIZE=(1015808,516096)

CROSS REFERENCE TABLE

CONTROL SECTION			ENTRY							
NAME	ORIGIN	LENGTH	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
PROGRAM	00	730	IHIDSTAB	608	IHIENTIF	724				
IHIFSARA*	730	E70	IHIFSAIN	152C						
IHIFSARB*	15A0	690	IHIOBOAR	1C82						
IHIOBOOL*	1C30	1C8	IHISORAR	1DF8	IHISOREL	1E38				
IHISOREA*	1DF8	380								
IHISYSCT*	2178	780	IHIIOREQ	28F8	IHIIOROP	29DE	IHIIORNX	2DAC	IHIIORCL	2FF4
IHIORTN*	28F8	D70	IHIIORCP	319E	IHIIORGP	32A0	IHIIORCN	32A4	IHIIOREN	3304
			IHIIOREV	3382	IHIIORED	3418	IHIIORCI	34F0	IHIIORER	3574
IHIERROR*	3668	6E8								
IHIERMSG*	3D50	9B8	IHIERM01	3E00						

LOCATION	REFERS TO SYMBOL	IN CONTROL SECTION	LOCATION	REFERS TO SYMBOL	IN CONTROL SECTION
61C	IHISYSCT	IHISYSCT	658	IHISOREL	IHISOREA
660	IHIOBOOL	IHIOBOOL	1574	IHIFSARB	IHIFSARB
9C8	IHIERROR	IHIERROR	1528	IHIORER	IHIORTN
1588	IHIIORCP	IHIORTN	9DC	IHIIORCP	IHIORTN
1524	IHIIORGP	IHIORTN	1520	IHIIOREN	IHIORTN
151C	IHIIOREQ	IHIORTN	1510	IHIIOREV	IHIORTN
1508	IHIIORCI	IHIORTN	1590	IHIIORNX	IHIORTN
1514	IHIIORNX	IHIORTN	9E1	IHIIORNX	IHIORTN
1594	IHIIORCL	IHIORTN	150C	IHIIORCL	IHIORTN
158C	IHIIOROP	IHIORTN	1518	IHIIOROP	IHIORTN
9D8	IHIIOROP	IHIORTN	1584	IHIENTIF	PROGRAM
7DC	IHIDSTAB	PROGRAM	15A5	IHIFSARA	IHIFSARA
3D38	IHIERM01	IHIERMSG	3D34	IHIERMSG	IHIERMSG

ENTRY ADDRESS 152C
 TOTAL LENGTH 4708
 ****GO DOES NOT EXIST BUT HAS BEEN ADDED TO DATA SET
 AUTHORIZATION CODE IS 0.

+6.000000'+00 'FALSE' 'FALSE'

IHI031I SC= 27 PSW= 078D000F 480A5F02 DIVISION BY ZERO, FLOATING POINT

MODULE = GO PROGRAM BLOCK NUMBER = 1 (BLOCK)

DECLARED IDENTIFIERS AND OBJECT TIME STACK

000018 00000001 4129999A 00000000 01000000 000A465C 000A4660 000A4674 00000014
000038 00000004 02000024 000A45E8 000A45F0 000A4660 00000070 0000001C 00000004
000058 0300003C 000A45C8 000A45D0 000A45EE 0000001E 0000000F 00000005 00000001
000078 000A460C 000A58FC 000A4698 400A593C

SMF DISPLACEMENT IN DSA = 000058 DECLARED ARRAY

000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000

SMF DISPLACEMENT IN DSA = 00003C DECLARED ARRAY

000000 00000000 00000000 00000000 00000000 00000000 00000000 41600000 42240000
000020 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000040 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000060 00000000 00000000 00000000 00000000

SMF DISPLACEMENT IN DSA = 000024 DECLARED ARRAY

000000 00000000 00000000 00000000 00000000 00000000

ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

GO 1 2 3 4 5 6 8 12 17 18 19 7 20
9 10 11 21 13 14 15 16 22 13 14 15 16
7 23 24 25 26 27

END OF ALGOL PROGRAM EXECUTION

Appendix C. IVP IEXSAMP3 Listing

J E S 2 J O B L O G

```
13.37.17 JOB 9292 IEF677I WARNING MESSAGE(S) FOR JOB T11V3   ISSUED
13.37.17 JOB 9292 $HASP373 T11V3   STARTED - INIT 6 - CLASS S - SYS SYSA
13.37.17 JOB 9292 IEF403I T11V3 - STARTED - TIME=13.37.17
13.37.18 JOB 9292 IEFACRT - Stepname Procstep Program Retcode
13.37.18 JOB 9292 T11V3   IVP3   ALGOL   ALGOL   RC= 0000
13.37.18 JOB 9292 T11V3   IVP3   LKED   IEWL   RC= 0000
13.37.18 JOB 9292 T11V3   IVP3   GO     GO     RC= 0000
13.37.18 JOB 9292 IEF404I T11V3 - ENDED - TIME=13.37.18
13.37.18 JOB 9292 $HASP395 T11V3   ENDED
```

```
1 //T11V3 JOB 111,'ALGOL F LVL2.1', <-- CUSTOMIZE FOR SITE STANDARDS JOB 9292
// CLASS=S,MSGCLASS=C, <-- CUSTOMIZE FOR SITE STANDARDS 00002001
// REGION=1024K,COND=(0,NE),MSGLEVEL=(1,1) 00003001
*** 00004001
*** IBM ALGOL F LEVEL 2.1 IVP 00005001
*** 00006001
*** 360S-AL-531 ALGOL F COMPILER 00007001
*** AND 00008001
*** 360S-LM-532 ALGOL F LIBRARY 00009001
*** 00010001
2 //IVP3 EXEC ALGOFCLG,PARM.GO='TRACE' 00011001
*** 00010001
***** 00002001
*** 00003001
*** IBM ALGOL F LEVEL 2.1 00004001
*** 00005001
*** 360S-AL-531 ALGOL F COMPILER 00006001
*** AND 00007001
*** 360S-LM-532 ALGOL F LIBRARY 00008001
*** 00009001
*** COMPILE, LINK-EDIT AND EXECUTE A PROGRAM 00010001
*** 00011001
***** 00012001
*** 00013001
3 XXALGOL EXEC PGM=ALGOL,REGION=1024K 00014001
4 XXSYSPRINT DD SYSOUT=* 00015001
5 XXSYPUNCH DD DUMMY 00016001
6 XXSYSLIN DD DSN=&&OBJECT,UNIT=VIO,SPACE=(3200,(20,10)), 00017001
XX DISP=(,PASS) 00018001
7 XXSYSUT1 DD UNIT=VIO,SPACE=(2048,(50,10)) 00019001
8 XXSYSUT2 DD UNIT=VIO,SPACE=(2048,(50,10)) 00020001
9 XXSYSUT3 DD UNIT=VIO,SPACE=(2048,(40,10)) 00021001
10 //ALGOL.SYSIN DD * 00012001
11 XXLKED EXEC PGM=IEWL,PARM='XREF,LIST,LET',COND=(5,LT,ALGOL), 00022001
XX REGION=1024K 00023001
12 XXSYSPRINT DD SYSOUT=* 00024001
13 XXSYSLIB DD DSN=SYS1.ALGLIB,DISP=SHR 00025001
14 XXSYSLMOD DD DSN=&&GOSSET(GO),UNIT=VIO,DISP=(,PASS), 00026001
XX SPACE=(2048,(100,20,1)) 00027001
15 XXSYSUT1 DD UNIT=VIO,SPACE=(2048,(100,20)) 00028001
16 XXSYSLIN DD DSN=&&OBJECT,DISP=(OLD,DELETE) 00029001
17 XX DD DDNAME=SYSIN 00030001
18 XXGO EXEC PGM=GO,COND=((5,LT,ALGOL),(5,LT,LKED)), 00031001
XX REGION=1024K 00032001
19 XXSTEPLIB DD DSN=&&GOSSET,DISP=(OLD,PASS) 00033001
20 XXALGLDD01 DD SYSOUT=* 00034001
21 XXSYSPRINT DD SYSOUT=* 00035001
22 XXSYSUT1 DD UNIT=VIO,SPACE=(1024,(20,10)) 00036001
```

STMT NO. MESSAGE

```
18 IEF686I DDNAME REFERRED TO ON DDNAME KEYWORD IN PRIOR STEP WAS NOT RESOLVED
IEF236I ALLOC. FOR T11V3 ALGOL IVP3
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I DMY ALLOCATED TO SYPUNCH
IEF237I VIO ALLOCATED TO SYSLIN
IEF237I VIO ALLOCATED TO SYSUT1
IEF237I VIO ALLOCATED TO SYSUT2
IEF237I VIO ALLOCATED TO SYSUT3
IEF237I JES2 ALLOCATED TO SYSIN
IEF142I T11V3 ALGOL IVP3 - STEP WAS EXECUTED - COND CODE 0000
IEF285I JES2.JOB09292.S00102 SYSPRINT
IEF285I SYS12230.T133717.RA000.T11V3.OBJECT PASSED *-----2
IEF285I SYS12230.T133717.RA000.T11V3.R0000001 DELETED *-----0
IEF285I SYS12230.T133717.RA000.T11V3.R0000002 DELETED *-----0
IEF285I SYS12230.T133717.RA000.T11V3.R0000003 DELETED *-----10
```

```

IEF285I JES2.JOB09292.SI0101          SYSIN
IEF373I STEP /ALGOL / START 12230.1337
IEF374I STEP /ALGOL / STOP 12230.1337 CPU  0MIN 00.05SEC SRB  0MIN 00.00SEC VIRT 192K SYS  304K
*****
* 1. Jobstep of job: T1IV3      Stepname: ALGOL      Program name: ALGOL      Executed on 17.08.12 from 13.37.17 to 13.37.18 *
*      elapsed time 24:00:00,10      CPU-Identifier: SYSA      Page-in: 0 *
*      CPU time 00:00:00,05      Virtual Storage used: 192K      Page-out: 0 *
*      corr. CPU: 00:00:00,05      CPU time has been corrected by 1 / 1,0 multiplier *
*
*      I/O Operation *
*      Number of records read via DD * or DD DATA: 67 *
*      DMY.....0 DMY.....0 FFF.....2 FFF.....0 FFF.....0 FFF.....10 DMY.....0 *
*
*      Charge for step (w/o SYSOUT): 0,08 *
*****
IEF236I ALLOC. FOR T1IV3 LKED IVP3
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I 148 ALLOCATED TO SYSLIB
IEF237I VIO ALLOCATED TO SYSLMOD
IEF237I VIO ALLOCATED TO SYSUT1
IEF237I VIO ALLOCATED TO SYSLIN
IEF237I DMY ALLOCATED TO
IEF142I T1IV3 LKED IVP3 - STEP WAS EXECUTED - COND CODE 0000
IEF285I JES2.JOB09292.S00103          SYSOUT
IEF285I SYS1.ALGLIB          KEPT          *-----55
IEF285I VOL SER NOS= MVSRES.
IEF285I SYS12230.T133717.RA000.T1IV3.GOSET          PASSED          *-----18
IEF285I SYS12230.T133717.RA000.T1IV3.R0000004      DELETED          *-----0
IEF285I SYS12230.T133717.RA000.T1IV3.OBJECT      DELETED          *-----3
IEF373I STEP /LKED / START 12230.1337
IEF374I STEP /LKED / STOP 12230.1337 CPU  0MIN 00.05SEC SRB  0MIN 00.01SEC VIRT 1024K SYS  244K
*****
* 2. Jobstep of job: T1IV3      Stepname: LKED      Program name: IEWL      Executed on 17.08.12 from 13.37.18 to 13.37.18 *
*      elapsed time 24:00:00,07      CPU-Identifier: SYSA      Page-in: 0 *
*      CPU time 00:00:00,06      Virtual Storage used: 1024K      Page-out: 0 *
*      corr. CPU: 00:00:00,06      CPU time has been corrected by 1 / 1,0 multiplier *
*
*      I/O Operation *
*      Number of records read via DD * or DD DATA: 0 *
*      DMY.....0 148.....55 FFF.....18 FFF.....0 FFF.....3 DMY.....0 *
*
*      Charge for step (w/o SYSOUT): 0,10 *
*****
IEF236I ALLOC. FOR T1IV3 GO IVP3
IEF237I VIO ALLOCATED TO STEPLIB
IEF237I JES2 ALLOCATED TO ALGLDD01
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I VIO ALLOCATED TO SYSUT1
IEF142I T1IV3 GO IVP3 - STEP WAS EXECUTED - COND CODE 0000
IEF285I SYS12230.T133717.RA000.T1IV3.GOSET          PASSED          *-----0
IEF285I JES2.JOB09292.S00104          SYSOUT
IEF285I JES2.JOB09292.S00105          SYSOUT
IEF285I SYS12230.T133717.RA000.T1IV3.R0000005      DELETED          *-----18
IEF373I STEP /GO / START 12230.1337
IEF374I STEP /GO / STOP 12230.1337 CPU  0MIN 00.06SEC SRB  0MIN 00.00SEC VIRT 32K SYS  284K
*****
* 3. Jobstep of job: T1IV3      Stepname: GO      Program name: GO      Executed on 17.08.12 from 13.37.18 to 13.37.18 *
*      elapsed time 24:00:00,08      CPU-Identifier: SYSA      Page-in: 0 *
*      CPU time 00:00:00,06      Virtual Storage used: 32K      Page-out: 0 *
*      corr. CPU: 00:00:00,06      CPU time has been corrected by 1 / 1,0 multiplier *
*
*      I/O Operation *
*      Number of records read via DD * or DD DATA: 0 *
*      FFF.....0 DMY.....0 DMY.....0 FFF.....18 *
*
*      Charge for step (w/o SYSOUT): 0,10 *
*****
IEF285I SYS12230.T133717.RA000.T1IV3.GOSET          DELETED
IEF375I JOB /T1IV3 / START 12230.1337
IEF376I JOB /T1IV3 / STOP 12230.1337 CPU  0MIN 00.16SEC SRB  0MIN 00.01SEC

```

```
'BEGIN' 00013001
'COMMENT' 00014001
////////////////////////////////////
// NAME: PETER M. MAURER 00015001
// Program: Sieve of Eratosthenes 00016001
// DUE: NEVER 00017001
// LANGUAGE: ALGOL 60 ALA IBM ALGOL F 00018001
// IBM Algol F IVP Contribution 00019001
// by the kind permission of PETER M. MAURER 00020001
////////////////////////////////////
; 00021001
'COMMENT' Define the Sieve Data Structure ; 00022001
'INTEGER' 'ARRAY' Candidates [0:1000]; 00023001
1 'INTEGER' i,j,k; 00024001
2 'COMMENT' Set line-length = 120, Set lines-per-page = 62, OPEN; 00025001
2 SYSACT(1,6,120); 00026001
3 SYSACT(1,8,62); 00027001
4 SYSACT(1,12,1); 00028001
5 'COMMENT' 1000 to protect against strict evaluation of and ; 00029001
5 'FOR' i := 0 'STEP' 1 'UNTIL' 1000 'DO' 00030001
5 'BEGIN' 00031001
5 'COMMENT' everything is potentially prime 00032001
5 until proven otherwise ; 00033001
5 Candidates[i] := 1; 00034001
6 'END'; 00035001
7 'COMMENT' Neither 1 nor 0 is Prime, so flag them off ; 00036001
7 Candidates[0] := 0; 00037001
8 Candidates[1] := 0; 00038001
9 'COMMENT' Start the Sieve with the Integer 0 ; 00039001
9 i := 0; 00040001
10 'FOR' i := i 'WHILE' i 'LESS' 1000 'DO' 00041001
10 'BEGIN' 00042001
10 'COMMENT' Advance to the next un-crossed out. ; 00043001
10 'COMMENT' this number must be a prime; 00044001
10 'FOR' i := i 'WHILE' i 'LESS' 1000 00045001
10 'AND' Candidates[i] 'EQUAL' 0 'DO' 00046001
10 'BEGIN' 00047001
10 i := i+1; 00048001
11 'END'; 00049001
12 'COMMENT' insure against running off the end; 00050001
12 'IF' i 'LESS' 1000 'THEN' 00051001
12 'BEGIN' 00052001
12 'COMMENT' Cross out all multiples of the Prime.; 00053001
12 j := 2; 00054001
13 k := j*i; 00055001
14 'FOR' k := k 'WHILE' k 'LESS' 1000 'DO' 00056001
14 'BEGIN' 00057001
14 Candidates[k] := 0; 00058001
15 j := j + 1; 00059001
16 k := j*i; 00060001
17 'END'; 00061001
18 'COMMENT' Advance to the next candidate ; 00062001
18 i := i+1; 00063001
19 'END' 00064001
```

```
19      'END';                                00067001
20      'COMMENT' All uncrossed out numbers are prime; 00068001
20      'COMMENT' Print all Primes ;             00069001
20      'FOR' i := 0 'STEP' 1 'UNTIL' 999 'DO'    00070001
20      'BEGIN'                                   00071001
20      'IF' Candidates[i] /= 0 'THEN'           00072001
20      'BEGIN'                                   00073001
20          OUTINTEGER(1,i);                     00074001
21          OUTSTRING(1,(' Is Prime')));         00075001
22          SYSACT(1,14,1)                       00076001
22      'END'                                     00077001
22      'END'                                     00078001
22      'END'                                     00079001
```

IDENTIFIER TABLE												PAGE 3
PBN	SC	PBN	NAME	TYPE	DM	DSP	NAME	TYPE	DM	DSP		
		SURR			PR	LN			PR	LN		
001	00000	000	CANDID K	I I	01	018 038	I	I		030	J	I 034

STORAGE REQUIREMENTS (DECIMAL)

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OBJECT MODULE SIZE 1656 BYTES
 DATA STORAGE AREA SIZES
 PBN BYTES PBN BYTES PBN BYTES PBN BYTES PBN BYTES
 001 80

F64-LEVEL LINKAGE EDITOR OPTIONS SPECIFIED XREF,LIST,LET
 DEFAULT OPTION(S) USED - SIZE=(1015808,516096)

CROSS REFERENCE TABLE

CONTROL SECTION			ENTRY							
NAME	ORIGIN	LENGTH	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
PROGRAM	00	678								
IHIFSARA*	678	E70	IHIDSTAB	620	IHIENTIF	66C				
			IHIFSAIN	1474						
IHIFSARB*	14E8	690								
IHIOINTE*	1B78	1F8								
			IHIOINAR	1B78	IHIOINTG	1BB8				
IHIOSTRG*	1D70	148								
IHISYSCT*	1EB8	780								
IHIORTN*	2638	D70								
			IHIIOROQ	2638	IHIIOROP	271E	IHIORNX	2AEC	IHIIORCL	2D34
			IHIIORCP	2EDE	IHIIORGP	2FE0	IHIORCN	2FE4	IHIIOREN	3044
			IHIIOREV	30C2	IHIIORED	3158	IHIORCI	3230	IHIIORER	32B4
IHIERROR*	33A8	6E8								
IHIERMSG*	3A90	9B8								
			IHIERM01	3B40						

LOCATION	REFERS TO	SYMBOL	IN CONTROL SECTION	LOCATION	REFERS TO	SYMBOL	IN CONTROL SECTION
558		IHISYSCT	IHISYSCT	598		IHIOINTG	IHIOINTE
5AC		IHIOSTRG	IHIOSTRG	14BC		IHIFSARB	IHIFSARB
910		IHIERROR	IHIERROR	1470		IHIORER	IHIORTN
14D0		IHIORCP	IHIORTN	924		IHIORCP	IHIORTN
146C		IHIIORGP	IHIORTN	1468		IHIIOREN	IHIORTN
1464		IHIIOROQ	IHIORTN	1458		IHIIOREV	IHIORTN
1450		IHIORCI	IHIORTN	14D8		IHIORNX	IHIORTN
145C		IHIORNX	IHIORTN	929		IHIORNX	IHIORTN
14DC		IHIORCL	IHIORTN	1454		IHIORCL	IHIORTN
14D4		IHIOROP	IHIORTN	1460		IHIOROP	IHIORTN
920		IHIOROP	IHIORTN	14CC		IHIENTIF	PROGRAM
724		IHIDSTAB	PROGRAM	14ED		IHIFSARA	IHIFSARA
3A78		IHIERM01	IHIERMSG	3A74		IHIERMSG	IHIERMSG

ENTRY ADDRESS 1474

TOTAL LENGTH 4448

****GO DOES NOT EXIST BUT HAS BEEN ADDED TO DATA SET
 AUTHORIZATION CODE IS 0.

+2 Is Prime
+3 Is Prime
+5 Is Prime
+7 Is Prime
+11 Is Prime
+13 Is Prime
+17 Is Prime
+19 Is Prime
+23 Is Prime
+29 Is Prime
+31 Is Prime
+37 Is Prime
+41 Is Prime
+43 Is Prime
+47 Is Prime
+53 Is Prime
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ALGOL PROGRAM TRACE

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ALGOL PROGRAM TRACE

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ALGOL PROGRAM TRACE

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ALGOL PROGRAM TRACE

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ALGOL PROGRAM TRACE

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ALGOL PROGRAM TRACE

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ALGOL PROGRAM TRACE

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ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

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ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

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ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

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ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

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END OF ALGOL PROGRAM EXECUTION

Appendix D. IVP IEXSAMP4 Listing

J E S 2 J O B L O G

```
13.38.53 JOB 9293 IEF677I WARNING MESSAGE(S) FOR JOB T11V4   ISSUED
13.38.53 JOB 9293 $HASP373 T11V4   STARTED - INIT 6 - CLASS S - SYS SYSA
13.38.53 JOB 9293 IEF403I T11V4 - STARTED - TIME=13.38.53
13.38.53 JOB 9293 IEFACTRT - Stepname Procstep Program Retcode
13.38.53 JOB 9293 T11V4   IVP4   ALGOL   ALGOL   RC= 0000
13.38.53 JOB 9293 T11V4   IVP4   LKED   IEWL   RC= 0000
13.38.53 JOB 9293 T11V4   ASMTIM ASM   IFOX00 RC= 0000
13.38.54 JOB 9293 T11V4   ASMTIM LKED   IEWL   RC= 0000
13.42.09 JOB 9293 T11V4   GOIVP4   GO     RC= 0000
13.42.09 JOB 9293 IEF404I T11V4 - ENDED - TIME=13.42.09
13.42.09 JOB 9293 $HASP395 T11V4   ENDED

 1 //T11V4 JOB 111,'ALGOL F LVL2.1', <-- CUSTOMIZE FOR SITE STANDARDS JOB 9293
// CLASS=S,MSGCLASS=C, <-- CUSTOMIZE FOR SITE STANDARDS 00002001
// REGION=1024K,COND=(0,NE),MSGLEVEL=(1,1) 00003001
*** 00004001
*** IBM Algol F Level 2.1 IVP 00005001
*** 00006001
*** 360S-AL-531 Algol F Compiler 00007001
*** and 00008001
*** 360S-LM-532 Algol F Library 00009001
*** 00010001
 2 //IVP4 EXEC ALGOFCL 00011001
*** 00001001
***** 00002001
*** 00003001
*** IBM ALGOL F LEVEL 2.1 00004001
*** 00005001
*** 360S-AL-531 ALGOL F COMPILER 00006001
*** AND 00007001
*** 360S-LM-532 ALGOL F LIBRARY 00008001
*** 00009001
*** COMPILE AND LINK-EDIT A PROGRAM 00010001
*** 00011001
***** 00012001
*** 00013001
 3 XXALGOL EXEC PGM=ALGOL,REGION=1024K 00014001
 4 XXSYSPRINT DD SYSOUT=* 00015001
 5 XXSYSPUNCH DD DUMMY 00016001
 6 XXSYSLIN DD DSN=&&OBJECT,UNIT=VIO,SPACE=(3200,(20,10)), 00017001
  XX DISP=(,PASS) 00018001
 7 XXSYSUT1 DD UNIT=VIO,SPACE=(2048,(50,10)) 00019001
 8 XXSYSUT2 DD UNIT=VIO,SPACE=(2048,(50,10)) 00020001
 9 XXSYSUT3 DD UNIT=VIO,SPACE=(2048,(40,10)) 00021001
10 //ALGOL.SYSIN DD * 00012001
11 XXLKED EXEC PGM=IEWL,PARM='XREF,LIST,LET',COND=(5,LT,ALGOL), 00022001
  XX REGION=1024K 00023001
12 XXSYSPRINT DD SYSOUT=* 00024001
13 XXSYSLIB DD DSN=SYS1.ALGLIB,DISP=SHR 00025001
14 XXSYSLMOD DD DSN=&&GOSSET(GO),UNIT=VIO,DISP=(,PASS), 00026001
  XX SPACE=(2048,(100,20,1)) 00027001
15 XXSYSUT1 DD UNIT=VIO,SPACE=(2048,(100,20)) 00028001
16 XXSYSLIN DD DSN=&&OBJECT,DISP=(OLD,DELETE) 00029001
17 XX DD DDNAME=SYSIN 00030001
18 //ASMTIM EXEC ASMFCL 00789001
19 XXASMFCL PROC SOUT='*' 00000107
20 XXASM EXEC PGM=IFOX00,PARM=OBJ,REGION=512K 00000204
21 //ASM.SYSLIB DD DSN=SYS1.MACLIB,DISP=SHR 00790001
  X/SYSLIB DD DSN=SYS1.MACLIB,DISP=SHR 00000307
22 // DD DSN=SYS1.AMODGEN,DISP=SHR 00791001
  X/ DD DSN=SYS1.AMODGEN,DISP=SHR 00000407
23 XXSYSUT1 DD UNIT=VIO,SPACE=(TRK,(30,30)) 00000504
24 XXSYSUT2 DD UNIT=VIO,SPACE=(TRK,(30,30)) 00000604
25 XXSYSUT3 DD UNIT=VIO,SPACE=(TRK,(30,30)) 00000704
26 XXSYSPRINT DD SYSOUT=&SOUT 00000805
27 XXSYSPUNCH DD DUMMY 00000904
28 XXSYSGO DD DSN=&&OBJECT,UNIT=VIO,SPACE=(TRK,(3,30)), 00001004
  XX DISP=(MOD,PASS) 00001104
29 //ASM.SYSIN DD * 00792001
30 XXLKED EXEC PGM=IEWL,PARM='XREF,LET,LIST,NCAL',REGION=2048K, 00001204
  XX COND=(8,LT,ASM) 00001304
31 XXSYSPRINT DD SYSOUT=&SOUT 00001406
32 XXSYSUT1 DD UNIT=VIO,SPACE=(2024,(50,20)) 00001506
33 XXSYSLIN DD DSN=&&OBJECT,DISP=(OLD,DELETE) 00001604
34 XX DD DDNAME=SYSIN 00001704
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35 //LKED.SYSLMOD DD DSN=&&GOSSET(CPUTIM),DISP=(OLD,PASS) 00882001
X/SYSLMOD DD DSN=&&GOSSET(GO),UNIT=SYSDA,SPACE=(2048,(50,20,1)), 00001804
XX DISP=(MOD,PASS) 00001904
36 //GOIVP4 EXEC PGM=GO 00883001
37 //STEPLIB DD DSN=&&GOSSET,DISP=(OLD,PASS) 00884001
38 //ALGLDD01 DD SYSOUT=* 00885001
39 //SYSPRINT DD SYSOUT=* 00886001
40 //SYSUT1 DD UNIT=VIO,SPACE=(1024,(20,10)) 00887001
STMT NO. MESSAGE
-
26 IEF653I SUBSTITUTION JCL - SYSOUT=*
31 IEF653I SUBSTITUTION JCL - SYSOUT=*
18 IEF686I DDNAME REFERRED TO ON DDNAME KEYWORD IN PRIOR STEP WAS NOT RESOLVED
36 IEF686I DDNAME REFERRED TO ON DDNAME KEYWORD IN PRIOR STEP WAS NOT RESOLVED
IEF236I ALLOC. FOR T11V4 ALGOL IVP4
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I DMY ALLOCATED TO SYSPUNCH
IEF237I VIO ALLOCATED TO SYSLIN
IEF237I VIO ALLOCATED TO SYSUT1
IEF237I VIO ALLOCATED TO SYSUT2
IEF237I VIO ALLOCATED TO SYSUT3
IEF237I JES2 ALLOCATED TO SYSIN
IEF142I T11V4 ALGOL IVP4 - STEP WAS EXECUTED - COND CODE 0000
IEF285I JES2.JOB09293.S00103 SYSOUT
IEF285I SYS12230.T133853.RA000.T11V4.OBJECT PASSED *-----17
IEF285I SYS12230.T133853.RA000.T11V4.R0000001 DELETED *-----11
IEF285I SYS12230.T133853.RA000.T11V4.R0000002 DELETED *-----17
IEF285I SYS12230.T133853.RA000.T11V4.R0000003 DELETED *-----77
IEF285I JES2.JOB09293.SI0101 SYSIN
IEF373I STEP /ALGOL / START 12230.1338
IEF374I STEP /ALGOL / STOP 12230.1338 CPU 0MIN 00.11SEC SRB 0MIN 00.01SEC VIRT 192K SYS 308K
*****
* 1. Jobstep of job: T11V4 Stepname: ALGOL Program name: ALGOL Executed on 17.08.12 from 13.38.53 to 13.38.53 *
* elapsed time 24:00:00,15 CPU-Identifier: SYSA Page-in: 0 *
* CPU time 00:00:00,12 Virtual Storage used: 192K Page-out: 0 *
* corr. CPU: 00:00:00,12 CPU time has been corrected by 1 / 1,0 multiplier *
* *
* I/O Operation *
* Number of records read via DD * or DD DATA: 775 *
* DMY.....0 DMY.....0 FFF.....17 FFF.....11 FFF.....17 FFF.....77 DMY.....0 *
* *
* Charge for step (w/o SYSOUT): 0,20 *
*****
IEF236I ALLOC. FOR T11V4 LKED IVP4
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I 148 ALLOCATED TO SYSLIB
IEF237I VIO ALLOCATED TO SYSLMOD
IEF237I VIO ALLOCATED TO SYSUT1
IEF237I VIO ALLOCATED TO SYSLIN
IEF237I DMY ALLOCATED TO
IEF142I T11V4 LKED IVP4 - STEP WAS EXECUTED - COND CODE 0000
IEF285I JES2.JOB09293.S00104 SYSOUT
IEF285I SYS1.ALGLIB KEPT *-----107
IEF285I VOL SER NOS= MVSRES.
IEF285I SYS12230.T133853.RA000.T11V4.GOSSET PASSED *-----26
IEF285I SYS12230.T133853.RA000.T11V4.R0000004 DELETED *-----0
IEF285I SYS12230.T133853.RA000.T11V4.OBJECT DELETED *-----18
IEF373I STEP /LKED / START 12230.1338
IEF374I STEP /LKED / STOP 12230.1338 CPU 0MIN 00.07SEC SRB 0MIN 00.01SEC VIRT 1024K SYS 280K
*****
* 2. Jobstep of job: T11V4 Stepname: LKED Program name: IEWL Executed on 17.08.12 from 13.38.53 to 13.38.53 *
* elapsed time 24:00:00,09 CPU-Identifier: SYSA Page-in: 0 *
* CPU time 00:00:00,08 Virtual Storage used: 1024K Page-out: 0 *
* corr. CPU: 00:00:00,08 CPU time has been corrected by 1 / 1,0 multiplier *
* *
* I/O Operation *
* Number of records read via DD * or DD DATA: 0 *
* DMY.....0 148.....107 FFF.....26 FFF.....0 FFF.....18 DMY.....0 *
* *
* Charge for step (w/o SYSOUT): 0,13 *
*****
IEF236I ALLOC. FOR T11V4 ASM ASMTIM
IEF237I 148 ALLOCATED TO SYSLIB
IEF237I 248 ALLOCATED TO
IEF237I VIO ALLOCATED TO SYSUT1
IEF237I VIO ALLOCATED TO SYSUT2
IEF237I VIO ALLOCATED TO SYSUT3
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I DMY ALLOCATED TO SYSPUNCH
IEF237I VIO ALLOCATED TO SYSGO
IEF237I JES2 ALLOCATED TO SYSIN
IEF142I T11V4 ASM ASMTIM - STEP WAS EXECUTED - COND CODE 0000

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```

IEF285I  SYS1.MACLIB                                KEPT          *-----4
IEF285I  VOL SER NOS= MVSRES.
IEF285I  SYS1.AMODGEN                                KEPT          *-----7
IEF285I  VOL SER NOS= MVSDLB.
IEF285I  SYS12230.T133853.RA000.T11V4.R0000005    DELETED       *-----31
IEF285I  SYS12230.T133853.RA000.T11V4.R0000006    DELETED       *-----15
IEF285I  SYS12230.T133853.RA000.T11V4.R0000007    DELETED       *-----8
IEF285I  JES2.JOB09293.S00105                      SYSOUT
IEF285I  SYS12230.T133853.RA000.T11V4.OBJECT      PASSED        *-----7
IEF285I  JES2.JOB09293.S10102                      SYSIN
IEF373I  STEP /ASM / START 12230.1338
IEF374I  STEP /ASM / STOP 12230.1338 CPU 0MIN 00.17SEC SRB 0MIN 00.00SEC VIRT 1024K SYS 344K
*****
* 3. Jobstep of job: T11V4 Stepname: ASM Program name: IFOX00 Executed on 17.08.12 from 13.38.53 to 13.38.53 *
* elapsed time 24:00:00,30 CPU-Identifier: SYSA Page-in: 0 *
* CPU time 00:00:00,17 Virtual Storage used: 1024K Page-out: 0 *
* corr. CPU: 00:00:00,17 CPU time has been corrected by 1 / 1,0 multiplier *
*
* I/O Operation *
* Number of records read via DD * or DD DATA: 88 *
* 148.....4 248.....7 FFF.....31 FFF.....15 FFF.....8 DMY.....0 DMY.....0 FFF.....7 DMY.....0 *
*
* Charge for step (w/o SYSOUT): 0,28 *
*****
IEF236I  ALLOC. FOR T11V4 LKED ASMTIM
IEF237I  JES2 ALLOCATED TO SYSPRINT
IEF237I  VIO ALLOCATED TO SYSUT1
IEF237I  VIO ALLOCATED TO SYSLIN
IEF237I  DMY ALLOCATED TO
IEF237I  VIO ALLOCATED TO SYSLMOD
IEF142I  T11V4 LKED ASMTIM - STEP WAS EXECUTED - COND CODE 0000
IEF285I  JES2.JOB09293.S00106                      SYSOUT
IEF285I  SYS12230.T133853.RA000.T11V4.R0000008    DELETED       *-----0
IEF285I  SYS12230.T133853.RA000.T11V4.OBJECT      DELETED       *-----8
IEF285I  SYS12230.T133853.RA000.T11V4.GOSET       PASSED        *-----10
IEF373I  STEP /LKED / START 12230.1338
IEF374I  STEP /LKED / STOP 12230.1338 CPU 0MIN 00.03SEC SRB 0MIN 00.00SEC VIRT 1024K SYS 280K
*****
* 4. Jobstep of job: T11V4 Stepname: LKED Program name: IEWL Executed on 17.08.12 from 13.38.53 to 13.38.54 *
* elapsed time 24:00:00,04 CPU-Identifier: SYSA Page-in: 0 *
* CPU time 00:00:00,03 Virtual Storage used: 1024K Page-out: 0 *
* corr. CPU: 00:00:00,03 CPU time has been corrected by 1 / 1,0 multiplier *
*
* I/O Operation *
* Number of records read via DD * or DD DATA: 0 *
* DMY.....0 FFF.....0 FFF.....8 DMY.....0 FFF.....10 *
*
* Charge for step (w/o SYSOUT): 0,05 *
*****
IEF236I  ALLOC. FOR T11V4 GOIVP4
IEF237I  VIO ALLOCATED TO STEPLIB
IEF237I  JES2 ALLOCATED TO ALGLDD01
IEF237I  JES2 ALLOCATED TO SYSPRINT
IEF237I  VIO ALLOCATED TO SYSUT1
IEF142I  T11V4 GOIVP4 - STEP WAS EXECUTED - COND CODE 0000
IEF285I  SYS12230.T133853.RA000.T11V4.GOSET       PASSED        *-----0
IEF285I  JES2.JOB09293.S00107                      SYSOUT
IEF285I  JES2.JOB09293.S00108                      SYSOUT
IEF285I  SYS12230.T133853.RA000.T11V4.R0000009    DELETED       *-----0
IEF373I  STEP /GOIVP4 / START 12230.1338
IEF374I  STEP /GOIVP4 / STOP 12230.1342 CPU 3MIN 15.31SEC SRB 0MIN 00.00SEC VIRT 56K SYS 280K
*****
* 5. Jobstep of job: T11V4 Stepname: GOIVP4 Program name: GO Executed on 17.08.12 from 13.38.54 to 13.42.09 *
* elapsed time 24:03:15,49 CPU-Identifier: SYSA Page-in: 0 *
* CPU time 00:03:15,31 Virtual Storage used: 56K Page-out: 0 *
* corr. CPU: 00:03:15,31 CPU time has been corrected by 1 / 1,0 multiplier *
*
* I/O Operation *
* Number of records read via DD * or DD DATA: 0 *
* FFF.....0 DMY.....0 DMY.....0 FFF.....0 *
*
* Charge for step (w/o SYSOUT): 325,51 *
*****
IEF285I  SYS12230.T133853.RA000.T11V4.GOSET       DELETED
IEF375I  JOB /T11V4 / START 12230.1338
IEF376I  JOB /T11V4 / STOP 12230.1342 CPU 3MIN 15.69SEC SRB 0MIN 00.02SEC

```

```
'BEGIN' 00013001
'COMMENT' Basic Statement Times for Algol 60 00014001
          B A Wichmann 00015001
          National Physics laboratory 00016001
          Teddington, Middlesex 00017001
          November 1973; 00018001
          00019001
'COMMENT' Modified for IBM Algol F Level 2.1 IVP 00020001
          This program will execute for aproximately 4 minutes 00021001
          on an MVS 3.8 system running on a Hercules 3.07 00022001
          system averaging 25 mips. 00023001
          00024001
          Timings are guidelines only due to the PC, Windows 00025001
          and the Hercules timer implementations and will 00026001
          therefore vary for each execution; 00027001
          00028001
'REAL' x, y, z; 00029001
1 'INTEGER' i, j, n, k, l, m, case; 00030001
2 'INTEGER' 'ARRAY' e1[1:1], e2[1:1,1:1], e3[1:1,1:1,1:1]; 00031001
3 00032001
3 'PROCEDURE' p0; 00033001
4 ; 00034001
5 00035001
5 'PROCEDURE' p1(x); 00036001
6 'VALUE' x; 00037001
7 'REAL' x; 00038001
8 ; 00039001
9 00040001
9 'PROCEDURE' p2(x,y); 00041001
10 'VALUE' x, y; 00042001
11 'REAL' x, y; 00043001
12 ; 00044001
13 00045001
13 'PROCEDURE' p3(x,y,z); 00046001
14 'VALUE' x, y, z; 00047001
15 'REAL' x, y, z; 00048001
16 ; 00049001
17 00050001
17 'INTEGER' 'ARRAY' #TT[1:43]; 00051001
18 00052001
18 'PROCEDURE' printt; 00053001
19 'BEGIN' 00054001
19 'INTEGER' i; 00055001
20 'REAL' x, mix, loop; 00056001
21 'COMMENT' calculate time differences; 00057001
21 'FOR' i := 43 'STEP' -1 'UNTIL' 2 'DO' 00058001
21 'BEGIN' 00059001
21 #TT[i] := #TT[i] - #TT[i-1]; 00060001
22 'COMMENT' subtract previous accum cpu time 00061001
22 to derive case timing; 00062001
22 'END'; 00063001
23 'FOR' i := 2 'STEP' 1 'UNTIL' 42 'DO' 00064001
23 'BEGIN' 00065001
23 #TT[i] := (#TT[i] - #TT[43]) / ((n * 10) / 1000); 00066001
```

```
24          'COMMENT' subtract loop overhead and          00067001
24          convert to picoseconds;                      00068001
24          'END';                                       00069001
25          'COMMENT' Print results;                     00070001
25          SYSACT(1,14,1);                              00071001
26          OUTINTEGER(1,#TT[2]);                        00072001
27          OUTSTRING(1,('x := 1.0 '));                  00073001
28          SYSACT(1,14,1);                              00074001
29          OUTINTEGER(1,#TT[3]);                        00075001
30          OUTSTRING(1,('x := 1 '));                    00076001
31          SYSACT(1,14,1);                              00077001
32          OUTINTEGER(1,#TT[4]);                        00078001
33          OUTSTRING(1,('x := y '));                   00079001
34          SYSACT(1,14,1);                              00080001
35          OUTINTEGER(1,#TT[5]);                        00081001
36          OUTSTRING(1,('x := y + z'));                 00082001
37          SYSACT(1,14,1);                              00083001
38          OUTINTEGER(1,#TT[6]);                        00084001
39          OUTSTRING(1,('x := y * z'));                 00085001
40          SYSACT(1,14,1);                              00086001
41          OUTINTEGER(1,#TT[7]);                        00087001
42          OUTSTRING(1,('x := y / z'));                 00088001
43          SYSACT(1,14,1);                              00089001
44          OUTINTEGER(1,#TT[8]);                        00090001
45          OUTSTRING(1,('k := 1'));                    00091001
46          SYSACT(1,14,1);                              00092001
47          OUTINTEGER(1,#TT[9]);                        00093001
48          OUTSTRING(1,('k := 1.0'));                  00094001
49          SYSACT(1,14,1);                              00095001
50          OUTINTEGER(1,#TT[10]);                       00096001
51          OUTSTRING(1,('k := 1 + m'));                 00097001
52          SYSACT(1,14,1);                              00098001
53          OUTINTEGER(1,#TT[11]);                       00099001
54          OUTSTRING(1,('k := 1 * m'));                 00100001
55          SYSACT(1,14,1);                              00101001
56          OUTINTEGER(1,#TT[12]);                       00102001
57          OUTSTRING(1,('k := 1 / m'));                 00103001
58          SYSACT(1,14,1);                              00104001
59          OUTINTEGER(1,#TT[13]);                       00105001
60          OUTSTRING(1,('k := 1'));                    00106001
61          SYSACT(1,14,1);                              00107001
62          OUTINTEGER(1,#TT[14]);                       00108001
63          OUTSTRING(1,('x := 1'));                    00109001
64          SYSACT(1,14,1);                              00110001
65          OUTINTEGER(1,#TT[15]);                       00111001
66          OUTSTRING(1,('l := y'));                    00112001
67          SYSACT(1,14,1);                              00113001
68          OUTINTEGER(1,#TT[16]);                       00114001
69          OUTSTRING(1,('x := y ** 2'));                00115001
70          SYSACT(1,14,1);                              00116001
71          OUTINTEGER(1,#TT[17]);                       00117001
72          OUTSTRING(1,('x := y ** 3'));                00118001
73          SYSACT(1,14,1);                              00119001
74          OUTINTEGER(1,#TT[18]);                       00120001
```

SC	SOURCE STATEMENT	
75	OUTSTRING(1,('x := y ** z'));	00121001
76	SYSACT(1,14,1);	00122001
77	OUTINTEGER(1,#TT[19]);	00123001
78	OUTSTRING(1,('e1[1] := 1'));	00124001
79	SYSACT(1,14,1);	00125001
80	OUTINTEGER(1,#TT[20]);	00126001
81	OUTSTRING(1,('e2[1,1] := 1'));	00127001
82	SYSACT(1,14,1);	00128001
83	OUTINTEGER(1,#TT[21]);	00129001
84	OUTSTRING(1,('e3[1,1,1] := 1'));	00130001
85	SYSACT(1,14,1);	00131001
86	OUTINTEGER(1,#TT[22]);	00132001
87	OUTSTRING(1,('l := e1[1]'));	00133001
88	SYSACT(1,14,1);	00134001
89	OUTINTEGER(1,#TT[23]);	00135001
90	OUTSTRING(1,('begin real a; end'));	00136001
91	SYSACT(1,14,1);	00137001
92	OUTINTEGER(1,#TT[24]);	00138001
93	OUTSTRING(1,('begin real a[1:1]; end'));	00139001
94	SYSACT(1,14,1);	00140001
95	OUTINTEGER(1,#TT[25]);	00141001
96	OUTSTRING(1,('begin real a[1:500]; end'));	00142001
97	SYSACT(1,14,1);	00143001
98	OUTINTEGER(1,#TT[26]);	00144001
99	OUTSTRING(1,('begin real a[1:1,1:1]; end'));	00145001
100	SYSACT(1,14,1);	00146001
101	OUTINTEGER(1,#TT[27]);	00147001
102	OUTSTRING(1,('begin real a[1:1,1:1,1:1]; end'));	00148001
103	SYSACT(1,14,1);	00149001
104	OUTINTEGER(1,#TT[28]);	00150001
105	OUTSTRING(1,('begin goto lab; lab: end'));	00151001
106	SYSACT(1,14,1);	00152001
107	OUTINTEGER(1,#TT[29]);	00153001
108	OUTSTRING(1,('begin switch s := q; goto s[1]; q: end'));	00154001
109	SYSACT(1,14,1);	00155001
110	OUTINTEGER(1,#TT[30]);	00156001
111	OUTSTRING(1,('x := sin(y)'));	00157001
112	SYSACT(1,14,1);	00158001
113	OUTINTEGER(1,#TT[31]);	00159001
114	OUTSTRING(1,('x := cos(y)'));	00160001
115	SYSACT(1,14,1);	00161001
116	OUTINTEGER(1,#TT[32]);	00162001
117	OUTSTRING(1,('x := abs(y)'));	00163001
118	SYSACT(1,14,1);	00164001
119	OUTINTEGER(1,#TT[33]);	00165001
120	OUTSTRING(1,('x := exp(y)'));	00166001
121	SYSACT(1,14,1);	00167001
122	OUTINTEGER(1,#TT[34]);	00168001
123	OUTSTRING(1,('x := ln(y)'));	00169001
124	SYSACT(1,14,1);	00170001
125	OUTINTEGER(1,#TT[35]);	00171001
126	OUTSTRING(1,('x := sqrt(y)'));	00172001
127	SYSACT(1,14,1);	00173001
128	OUTINTEGER(1,#TT[36]);	00174001

```
129         OUTSTRING(1,('x := arctan(y)'));          00175001
130         SYSACT(1,14,1);                            00176001
131         OUTINTEGER(1,#TT[37]);                      00177001
132         OUTSTRING(1,('x := sign(y)'));             00178001
133         SYSACT(1,14,1);                            00179001
134         OUTINTEGER(1,#TT[38]);                      00180001
135         OUTSTRING(1,('x := entier(y)'));           00181001
136         SYSACT(1,14,1);                            00182001
137         OUTINTEGER(1,#TT[39]);                      00183001
138         OUTSTRING(1,('p0'));                       00184001
139         SYSACT(1,14,1);                            00185001
140         OUTINTEGER(1,#TT[40]);                      00186001
141         OUTSTRING(1,('p1(x)'));                    00187001
142         SYSACT(1,14,1);                            00188001
143         OUTINTEGER(1,#TT[41]);                      00189001
144         OUTSTRING(1,('p2(x,y)'));                  00190001
145         SYSACT(1,14,1);                            00191001
146         OUTINTEGER(1,#TT[42]);                      00192001
147         OUTSTRING(1,('p3(x,y,z)'));                00193001
148         'COMMENT' print DO loop overhead;           00194001
148         SYSACT(1,14,1);                            00195001
149         OUTINTEGER(1,#TT[43]);                      00196001
150         OUTSTRING(1,('DO Loop overhead'));          00197001
151         'END';                                       00198001
152         'INTEGERS' 'PROCEDURE' CPUTIM; 'CODE';       00199001
153         'INTEGERS' 'PROCEDURE' CPUTIM; 'CODE';       00200001
154         'COMMENT' Procedure that returns the current accumulated
154         job step processor time in microseconds in the 00201001
154         MVS 3.8J environment;                        00202001
154         'COMMENT' Set line-length = 120, Set lines-per-page = 62, OPEN; 00203001
154         SYSACT(1,6,120);                            00204001
154         SYSACT(1,8,62);                              00205001
155         SYSACT(1,12,1);                             00206001
156         SYSACT(1,2,10);                             00207001
157         OUTSTRING (1,('Algol F Statement Timings')); 00208001
158         SYSACT(1,14,1);                             00209001
159         OUTSTRING(1,('Picoseconds Statement'));      00210001
160         x := y := z := 1.0;                          00211001
161         l := k := m := 1;                            00212001
162         e1[1] := 1;                                  00213001
163         case := 1;                                   00214001
164         'COMMENT' Case 01;                            00215001
165         n := 100000;                                 00216001
166         'COMMENT' n should be given a large enough value
166         for the resolution of the clock not to      00217001
166         be a limiting factor to the accuracy.       00218001
166         If n is made too large then processor time  00219001
166         is wasted;                                   00220001
166         #TT[1] := CPUTIM;                             00221001
167         'COMMENT' #TT[1] equals program initialization overhead; 00222001
167         'COMMENT' #TT[1] equals program initialization overhead; 00223001
167         'COMMENT' #TT[1] equals program initialization overhead; 00224001
167         'COMMENT' #TT[1] equals program initialization overhead; 00225001
167         'COMMENT' #TT[1] equals program initialization overhead; 00226001
167         'COMMENT' #TT[1] equals program initialization overhead; 00227001
167         'COMMENT' #TT[1] equals program initialization overhead; 00228001
```

```
167         'COMMENT' Case 02;                                00229001
167     case := case + 1;                                    00230001
168     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'                00231001
168         'BEGIN'                                          00232001
168             x := 1.0; x := 1.0; x := 1.0; x := 1.0; x := 1.0; 00233001
173             x := 1.0; x := 1.0; x := 1.0; x := 1.0; x := 1.0; 00234001
178         'END';                                          00235001
179     #TT[case] := CPUTIM;                                  00236001
180                                                         00237001
180     case := case + 1;                                    00238001
181     'COMMENT' Case 03;                                    00239001
181     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'                00240001
181         'BEGIN'                                          00241001
181             x := 1; x := 1; x := 1; x := 1; x := 1;          00242001
186             x := 1; x := 1; x := 1; x := 1; x := 1;          00243001
191         'END';                                          00244001
192     #TT[case] := CPUTIM;                                  00245001
193                                                         00246001
193     case := case + 1;                                    00247001
194     'COMMENT' Case 04;                                    00248001
194     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'                00249001
194         'BEGIN'                                          00250001
194             x := y; x := y; x := y; x := y;                00251001
198             x := y; x := y; x := y; x := y;                00252001
202             x := y; x := y; x := y; x := y;                00253001
206             x := y;                                        00254001
207         'END';                                          00255001
208     #TT[case] := CPUTIM;                                  00256001
209                                                         00257001
209     case := case + 1;                                    00258001
210     'COMMENT' Case 05;                                    00259001
210     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'                00260001
210         'BEGIN'                                          00261001
210             x := y + z; x := y + z; x := y + z; x := y + z; 00262001
214             x := y + z; x := y + z; x := y + z; x := y + z; 00263001
218             x := y + z; x := y + z;                        00264001
220         'END';                                          00265001
221     #TT[case] := CPUTIM;                                  00266001
222                                                         00267001
222     case := case + 1;                                    00268001
223     'COMMENT' Case 06;                                    00269001
223     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'                00270001
223         'BEGIN'                                          00271001
223             x := y * z; x := y * z; x := y * z; x := y * z; 00272001
227             x := y * z; x := y * z; x := y * z; x := y * z; 00273001
231             x := y * z; x := y * z;                        00274001
233         'END';                                          00275001
234     #TT[case] := CPUTIM;                                  00276001
235                                                         00277001
235     case := case + 1;                                    00278001
236     'COMMENT' Case 07;                                    00279001
236     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'                00280001
236         'BEGIN'                                          00281001
236             x := y/z; x := y/z; x := y/z; x := y/z;          00282001
```



```
240         x := y/z; x := y/z; x := y/z; x := y/z;          00283001
244         x := y/z; x := y/z;                              00284001
246         'END';                                           00285001
247         #TT[case] := CPUTIM;                               00286001
248                                                     00287001
249         case := case + 1;                                   00288001
249         'COMMENT' Case 08;                                 00289001
249         'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'              00290001
249         'BEGIN'                                           00291001
249             k := 1; k := 1; k := 1; k := 1;              00292001
253             k := 1; k := 1; k := 1; k := 1;              00293001
257             k := 1; k := 1;                               00294001
259         'END';                                           00295001
260         #TT[case] := CPUTIM;                               00296001
261                                                     00297001
262         case := case + 1;                                   00298001
262         'COMMENT' Case 09;                                 00299001
262         'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'              00300001
262         'BEGIN'                                           00301001
262             k := 1.0; k := 1.0; k := 1.0; k := 1.0;      00302001
266             k := 1.0; k := 1.0; k := 1.0; k := 1.0;      00303001
270             k := 1.0; k := 1.0;                          00304001
272         'END';                                           00305001
273         #TT[case] := CPUTIM;                               00306001
274                                                     00307001
275         case := case + 1;                                   00308001
275         'COMMENT' Case 10;                                 00309001
275         'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'              00310001
275         'BEGIN'                                           00311001
275             k := l + m; k := l + m;                       00312001
277             k := l + m; k := l + m;                       00313001
279             k := l + m; k := l + m;                       00314001
281             k := l + m; k := l + m;                       00315001
283             k := l + m; k := l + m;                       00316001
285         'END';                                           00317001
286         #TT[case] := CPUTIM;                               00318001
287                                                     00319001
288         case := case + 1;                                   00320001
288         'COMMENT' Case 11;                                 00321001
288         'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'              00322001
288         'BEGIN'                                           00323001
288             k := l * m; k := l * m; k := l * m;          00324001
291             k := l * m; k := l * m; k := l * m;          00325001
294             k := l * m; k := l * m; k := l * m;          00326001
297             k := l * m;                                    00327001
298         'END';                                           00328001
299         #TT[case] := CPUTIM;                               00329001
300                                                     00330001
301         case := case + 1;                                   00331001
301         'COMMENT' Case 12;                                 00332001
301         'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'              00333001
301         'BEGIN'                                           00334001
301             k := l / m; k := l / m; k := l / m;          00335001
304             k := l / m; k := l / m; k := l / m;          00336001
```

```
307          k := 1 / m; k := 1 / m; k := 1 / m;          00337001
310          k := 1 / m;                                00338001
311          'END';                                     00339001
312          #TT[case] := CPUTIM;                       00340001
313                                                    00341001
314          case := case + 1;                           00342001
314          'COMMENT' Case 13;                         00343001
314          'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'       00344001
314          'BEGIN'                                    00345001
314              k := 1; k := 1; k := 1;               00346001
317              k := 1; k := 1; k := 1;               00347001
320              k := 1; k := 1; k := 1;               00348001
323              k := 1; k := 1; k := 1;               00349001
326              k := 1;                               00350001
327          'END';                                     00351001
328          #TT[case] := CPUTIM;                       00352001
329                                                    00353001
329          case := case + 1;                           00354001
330          'COMMENT' Case 14;                         00355001
330          'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'       00356001
330          'BEGIN'                                    00357001
330              x := 1; x := 1; x := 1; x := 1;       00358001
334              x := 1; x := 1; x := 1; x := 1;       00359001
338              x := 1; x := 1;                       00360001
340          'END';                                     00361001
341          #TT[case] := CPUTIM;                       00362001
342                                                    00363001
342          case := case + 1;                           00364001
343          'COMMENT' Case 15;                         00365001
343          'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'       00366001
343          'BEGIN'                                    00367001
343              l := y; l := y; l := y;               00368001
346              l := y; l := y; l := y;               00369001
349              l := y; l := y; l := y;               00370001
352              l := y;                               00371001
353          'END';                                     00372001
354          #TT[case] := CPUTIM;                       00373001
355                                                    00374001
355          case := case + 1;                           00375001
356          'COMMENT' Case 16;                         00376001
356          'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'       00377001
356          'BEGIN'                                    00378001
356              x := y ** 2; x := y ** 2;              00379001
358              x := y ** 2; x := y ** 2;              00380001
360              x := y ** 2; x := y ** 2;              00381001
362              x := y ** 2; x := y ** 2;              00382001
364              x := y ** 2; x := y ** 2;              00383001
366          'END';                                     00384001
367          #TT[case] := CPUTIM;                       00385001
368                                                    00386001
368          case := case + 1;                           00387001
369          'COMMENT' Case 17;                         00388001
369          'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'       00389001
369          'BEGIN'                                    00390001
```

```
369         x := y ** 3; x := y ** 3;          00391001
371         x := y ** 3; x := y ** 3;          00392001
373         x := y ** 3; x := y ** 3;          00393001
375         x := y ** 3; x := y ** 3;          00394001
377         x := y ** 3; x := y ** 3;          00395001
379         'END';                               00396001
380     #TT[case] := CPUTIM;                       00397001
381                                           00398001
382     case := case + 1;                           00399001
382     'COMMENT' Case 18;                          00400001
382     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'        00401001
382     'BEGIN'                                       00402001
382         x := y ** z;      x := y ** z;          00403001
384         x := y ** z;      x := y ** z;          00404001
386         x := y ** z;      x := y ** z;          00405001
388         x := y ** z;      x := y ** z;          00406001
390         x := y ** z;      x := y ** z;          00407001
392     'END';                                       00408001
393     #TT[case] := CPUTIM;                       00409001
394                                           00410001
394     case := case + 1;                           00411001
395     'COMMENT' Case 19;                          00412001
395     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'        00413001
395     'BEGIN'                                       00414001
395         e1[1] := 1; e1[1] := 1; e1[1] := 1;      00415001
398         e1[1] := 1; e1[1] := 1; e1[1] := 1;      00416001
401         e1[1] := 1; e1[1] := 1; e1[1] := 1;      00417001
404         e1[1] := 1;                               00418001
405     'END';                                       00419001
406     #TT[case] := CPUTIM;                       00420001
407                                           00421001
407     case := case + 1;                           00422001
408     'COMMENT' Case 20;                          00423001
408     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'        00424001
408     'BEGIN'                                       00425001
408         e2[1,1]:= 1; e2[1,1]:= 1; e2[1,1]:= 1;    00426001
411         e2[1,1]:= 1; e2[1,1]:= 1; e2[1,1]:= 1;    00427001
414         e2[1,1]:= 1; e2[1,1]:= 1; e2[1,1]:= 1;    00428001
417         e2[1,1]:= 1; e2[1,1]:= 1;                 00429001
419     'END';                                       00430001
420     #TT[case] := CPUTIM;                       00431001
421                                           00432001
421     case := case + 1;                           00433001
422     'COMMENT' Case 21;                          00434001
422     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'        00435001
422     'BEGIN'                                       00436001
422         e3[1,1,1]:= 1; e3[1,1,1] := 1;           00437001
424         e3[1,1,1]:= 1; e3[1,1,1] := 1;           00438001
426         e3[1,1,1]:= 1; e3[1,1,1] := 1;           00439001
428         e3[1,1,1]:= 1; e3[1,1,1] := 1;           00440001
430         e3[1,1,1]:= 1; e3[1,1,1] := 1;           00441001
432     'END';                                       00442001
433     #TT[case] := CPUTIM;                       00443001
434                                           00444001
```

SC	SOURCE STATEMENT	
434	case := case + 1;	00445001
435	'COMMENT' Case 22;	00446001
435	'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'	00447001
435	'BEGIN'	00448001
435	l := e1[1]; l := e1[1]; l := e1[1];	00449001
438	l := e1[1]; l := e1[1]; l := e1[1];	00450001
441	l := e1[1]; l := e1[1]; l := e1[1];	00451001
444	l := e1[1];	00452001
445	'END';	00453001
446	#TT[case] := CPUTIM;	00454001
447		00455001
447	case := case + 1;	00456001
448	'COMMENT' Case 23;	00457001
448	'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'	00458001
448	'BEGIN'	00459001
448	'BEGIN'	00460001
448	'REAL' a;	00461001
449	'END';	00462001
450	'BEGIN'	00463001
450	'REAL' a;	00464001
451	'END';	00465001
452	'BEGIN'	00466001
452	'REAL' a;	00467001
453	'END';	00468001
454	'BEGIN'	00469001
454	'REAL' a;	00470001
455	'END';	00471001
456	'BEGIN'	00472001
456	'REAL' a;	00473001
457	'END';	00474001
458	'END';	00475001
459	#TT[case] := CPUTIM;	00476001
460		00477001
460	case := case + 1;	00478001
461	'COMMENT' Case 24;	00479001
461	'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'	00480001
461	'BEGIN'	00481001
461	'BEGIN'	00482001
461	'ARRAY' a[1:1];	00483001
462	'END';	00484001
463	'END';	00485001
464	#TT[case] := CPUTIM;	00486001
465		00487001
465	case := case + 1;	00488001
466	'COMMENT' Case 25;	00489001
466	'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'	00490001
466	'BEGIN'	00491001
466	'BEGIN'	00492001
466	'ARRAY' a[1:500];	00493001
467	'END';	00494001
468	'END';	00495001
469	#TT[case] := CPUTIM;	00496001
470		00497001
470	case := case + 1;	00498001

```

471         'COMMENT' Case 26;                                00499001
471         'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'            00500001
471         'BEGIN'                                          00501001
471             'BEGIN'                                      00502001
471                 'ARRAY' a[1:1,1:1];                    00503001
472             'END';                                       00504001
473         'END';                                           00505001
474         #TT[case] := CPUTIM;                              00506001
475                                         00507001
475         case := case + 1;                                  00508001
476         'COMMENT' Case 27;                                00509001
476         'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'            00510001
476         'BEGIN'                                          00511001
476             'BEGIN'                                      00512001
476                 'ARRAY' a[1:1,1:1,1:1];                00513001
477             'END';                                       00514001
478         'END';                                           00515001
479         #TT[case] := CPUTIM;                              00516001
480                                         00517001
480         case := case + 1;                                  00518001
481         'COMMENT' Case 28;                                00519001
481         'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'            00520001
481         'BEGIN'                                          00521001
481             'GOTO' 10;                                     00522001
482             10; ;                                         00523001
483             'GOTO' 11;                                     00524001
484             11; ;                                         00525001
485             'GOTO' 12;                                     00526001
486             12; ;                                         00527001
487             'GOTO' 13;                                     00528001
488             13; ;                                         00529001
489             'GOTO' 14;                                     00530001
490             14; ;                                         00531001
491             'GOTO' 15;                                     00532001
492             15; ;                                         00533001
493             'GOTO' 16;                                     00534001
494             16; ;                                         00535001
495             'GOTO' 17;                                     00536001
496             17; ;                                         00537001
497             'GOTO' 18;                                     00538001
498             18; ;                                         00539001
499             'GOTO' 19;                                     00540001
500             19; ;                                         00541001
501             p0;                                           00542001
502         'END';                                           00543001
503         #TT[case] := CPUTIM;                              00544001
504                                         00545001
504         case := case + 1;                                  00546001
505         'COMMENT' Case 29;                                00547001
505         'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO'            00548001
505         'BEGIN'                                          00549001
505             'BEGIN'                                      00550001
505                 'SWITCH' s := q; 'GOTO' s[1];          00551001
507                 q; ;                                     00552001

```

```

508         'END';                                00553001
509         'END';                                00554001
510         #TT[case] := CPUTIM;                  00555001
511                                                00556001
511         case := case + 1;                      00557001
512         'COMMENT' Case 30;                    00558001
512         'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00559001
512         'BEGIN'                               00560001
512             x := sin(y);                      00561001
513             x := sin(y);                      00562001
514             x := sin(y);                      00563001
515             x := sin(y);                      00564001
516             x := sin(y);                      00565001
517             x := sin(y);                      00566001
518             x := sin(y);                      00567001
519             x := sin(y);                      00568001
520             x := sin(y);                      00569001
521             x := sin(y);                      00570001
522         'END';                                00571001
523         #TT[case] := CPUTIM;                  00572001
524                                                00573001
524         case := case + 1;                      00574001
525         'COMMENT' Case 31;                    00575001
525         'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00576001
525         'BEGIN'                               00577001
525             x := cos(y);                      00578001
526             x := cos(y);                      00579001
527             x := cos(y);                      00580001
528             x := cos(y);                      00581001
529             x := cos(y);                      00582001
530             x := cos(y);                      00583001
531             x := cos(y);                      00584001
532             x := cos(y);                      00585001
533             x := cos(y);                      00586001
534             x := cos(y);                      00587001
535         'END';                                00588001
536         #TT[case] := CPUTIM;                  00589001
537                                                00590001
537         case := case + 1;                      00591001
538         'COMMENT' Case 32;                    00592001
538         'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00593001
538         'BEGIN'                               00594001
538             x := abs(y); x := abs(y); x := abs(y); 00595001
541             x := abs(y); x := abs(y); x := abs(y); 00596001
544             x := abs(y); x := abs(y); x := abs(y); 00597001
547             x := abs(y);                      00598001
548         'END';                                00599001
549         #TT[case] := CPUTIM;                  00600001
550                                                00601001
550         case := case + 1;                      00602001
551         'COMMENT' Case 33;                    00603001
551         'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00604001
551         'BEGIN'                               00605001
551             x := exp(y);                      00606001

```

```
552         x := exp(y);          00607001
553         x := exp(y);          00608001
554         x := exp(y);          00609001
555         x := exp(y);          00610001
556         x := exp(y);          00611001
557         x := exp(y);          00612001
558         x := exp(y);          00613001
559         x := exp(y);          00614001
560         x := exp(y);          00615001
561         'END';                00616001
562     #TT[case] := CPUTIM;      00617001
563                                     00618001
564     case := case + 1;         00619001
565     'COMMENT' Case 34;        00620001
566     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00621001
567     'BEGIN'                   00622001
568         x := ln(y);           00623001
569         x := ln(y);           00624001
570         x := ln(y);           00625001
571         x := ln(y);           00626001
572         x := ln(y);           00627001
573         x := ln(y);           00628001
574         x := ln(y);           00629001
575         x := ln(y);           00630001
576         x := ln(y);           00631001
577         x := ln(y);           00632001
578     'END';                    00633001
579     #TT[case] := CPUTIM;      00634001
580                                     00635001
581     case := case + 1;         00636001
582     'COMMENT' Case 35;        00637001
583     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00638001
584     'BEGIN'                   00639001
585         x := sqrt(y);         00640001
586         x := sqrt(y);         00641001
587         x := sqrt(y);         00642001
588         x := sqrt(y);         00643001
589         x := sqrt(y);         00644001
590         x := sqrt(y);         00645001
591         x := sqrt(y);         00646001
592         x := sqrt(y);         00647001
593         x := sqrt(y);         00648001
594         x := sqrt(y);         00649001
595     'END';                    00650001
596     #TT[case] := CPUTIM;      00651001
597                                     00652001
598     case := case + 1;         00653001
599     'COMMENT' Case 36;        00654001
600     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00655001
601     'BEGIN'                   00656001
602         x := arctan(y);       00657001
603         x := arctan(y);       00658001
604         x := arctan(y);       00659001
605         x := arctan(y);       00660001
```

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594         x := arctan(y);          00661001
595         x := arctan(y);          00662001
596         x := arctan(y);          00663001
597         x := arctan(y);          00664001
598         x := arctan(y);          00665001
599         x := arctan(y);          00666001
600     'END';                          00667001
601     #TT[case] := CPUTIM;           00668001
602                                         00669001
603     case := case + 1;              00670001
604     'COMMENT' Case 37;             00671001
605     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00672001
606     'BEGIN'                          00673001
607         x := sign(y); x := sign(y); x := sign(y); 00674001
608         x := sign(y); x := sign(y); x := sign(y); 00675001
609         x := sign(y); x := sign(y); x := sign(y); 00676001
610         x := sign(y);              00677001
611     'END';                          00678001
612     #TT[case] := CPUTIM;           00679001
613                                         00680001
614     case := case + 1;              00681001
615     'COMMENT' Case 38;             00682001
616     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00683001
617     'BEGIN'                          00684001
618         x := entier(y); x := entier(y); 00685001
619         x := entier(y); x := entier(y); 00686001
620         x := entier(y); x := entier(y); 00687001
621         x := entier(y); x := entier(y); 00688001
622         x := entier(y); x := entier(y); 00689001
623     'END';                          00690001
624     #TT[case] := CPUTIM;           00691001
625                                         00692001
626     case := case + 1;              00693001
627     'COMMENT' Case 39;             00694001
628     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00695001
629     'BEGIN'                          00696001
630         p0;                          00697001
631         p0;                          00698001
632         p0;                          00699001
633         p0;                          00700001
634         p0;                          00701001
635         p0;                          00702001
636         p0;                          00703001
637         p0;                          00704001
638         p0;                          00705001
639         p0;                          00706001
640     'END';                          00707001
641     #TT[case] := CPUTIM;           00708001
642                                         00709001
643     case := case + 1;              00710001
644     'COMMENT' Case 40;             00711001
645     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00712001
646     'BEGIN'                          00713001
647         p1(x);                       00714001

```



```

643         p1(x);                00715001
644         p1(x);                00716001
645         p1(x);                00717001
646         p1(x);                00718001
647         p1(x);                00719001
648         p1(x);                00720001
649         p1(x);                00721001
650         p1(x);                00722001
651         p1(x);                00723001
652         'END';                00724001
653     #TT[case] := CPUTIM;      00725001
654                                     00726001
655     case := case + 1;         00727001
656         'COMMENT' Case 41;    00728001
657     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00729001
658     'BEGIN'                  00730001
659         p2(x,y);             00731001
660         p2(x,y);             00732001
661         p2(x,y);             00733001
662         p2(x,y);             00734001
663         p2(x,y);             00735001
664         p2(x,y);             00736001
665         p2(x,y);             00737001
666         p2(x,y);             00738001
667         p2(x,y);             00739001
668         p2(x,y);             00740001
669     'END';                00741001
670     #TT[case] := CPUTIM;      00742001
671                                     00743001
672     case := case + 1;         00744001
673         'COMMENT' Case 42;    00745001
674     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00746001
675     'BEGIN'                  00747001
676         p3(x,y,z);           00748001
677         p3(x,y,z);           00749001
678         p3(x,y,z);           00750001
679         p3(x,y,z);           00751001
680         p3(x,y,z);           00752001
681         p3(x,y,z);           00753001
682         p3(x,y,z);           00754001
683         p3(x,y,z);           00755001
684         p3(x,y,z);           00756001
685         p3(x,y,z);           00757001
686     'END';                00758001
687     #TT[case] := CPUTIM;      00759001
688                                     00760001
689     case := case + 1;         00761001
690         'COMMENT' Case 43;    00762001
691     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00763001
692     ;                        00764001
693     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00765001
694     ;                        00766001
695     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00767001
696     ;                        00768001

```

```
684 'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00769001
684 ; 00770001
685 'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00771001
685 ; 00772001
686 'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00773001
686 ; 00774001
687 'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00775001
687 ; 00776001
688 'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00777001
688 ; 00778001
689 'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00779001
689 ; 00780001
690 'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00781001
690 ; 00782001
691 #TT[case] := CPUTIM; 00783001
692 printt; 00784001
693 'END'; 00785001
693 00786001
693 00787001
```

IDENTIFIER TABLE														
PBN	SC	PBN	NAME	TYPE	DM	DSP	NAME	TYPE	DM	DSP	NAME	TYPE	DM	DSP
		SURR			PR	LN			PR	LN			PR	LN
001	00000	000	CASE	I		03C	CPUTIM	I P C	00	084	E1	I A	01	040
			E2	I A	02	058	E3	I A	03	074	I	I		024
			J	I		028	K	I		030	L	I		034
			L0	L		088	L1	L		08C	L2	L		090
			L3	L		094	L4	L		098	L5	L		09C
			L6	L		0A0	L7	L		0A4	L8	L		0A8
			L9	L		0AC	M	I		038	N	I		02C
			P0	P	00	070	P1	P	01	074	P2	P	02	078
			P3	P	03	07C	PRINTT	P	00	080	X	R		018
			Y	R		01C	Z	R		020	#TT	I A	01	094
002	00003	001												
003	00005	001	X	R V		018								
004	00009	001	X	R V		018	Y	R V		020				
005	00013	001	X	R V		018	Y	R V		020	Z	R V		028
006	00018	001	I	I		018	LOOP	R		024	MIX	R		020
			X	R		01C								
007	00152	001	CPUTIM	I P C	00	084								
008	00448	001	A	R		018								
009	00450	001	A	R		018								
010	00452	001	A	R		018								
011	00454	001	A	R		018								
012	00456	001	A	R		018								
013	00461	001	A	R A	01	018								
014	00466	001	A	R A	01	018								
015	00471	001	A	R A	02	018								
016	00476	001	A	R A	03	018								
017	00505	001	Q	L		0B4	S	S	01	0B0				

STORAGE REQUIREMENTS (DECIMAL)

OBJECT MODULE SIZE 29752 BYTES

DATA STORAGE AREA SIZES

PBN	BYTES	PBN	BYTES	PBN	BYTES	PBN	BYTES	PBN	BYTES
001	348	002	24	003	32	004	40	005	48
006	92	007	32	008	28	009	28	010	28
011	28	012	28	013	56	014	56	015	64
016	72	017	24						

F64-LEVEL LINKAGE EDITOR OPTIONS SPECIFIED XREF,LIST,LET
 DEFAULT OPTION(S) USED - SIZE=(1015808,516096)

CROSS REFERENCE TABLE

CONTROL SECTION			ENTRY							
NAME	ORIGIN	LENGTH	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
PROGRAM	00	7438	IHIDSTAB	71E8	IHIENTIF	742C				
IHIFRIXP*	7438	A0	IHIFRI	7438						
IHI0INTE*	74D8	1F8	IHI0INAR	74D8	IHI0INTG	7518				
IHI0STRG*	76D0	148								
IHISATAN*	7818	E0	IHISAT	7818						
IHISEXPT*	78F8	138	IHISEX	78F8						

SYMBOL TYPE ID ADDR LENGTH LDID ASM 0201 13.38 08/17/12
 CPUTIM SD 0001 000000 0000AC

CPU CPUTIM - ALGOL F FUNCTION TO RETURN ACCUMULATED STEP CPU TIME PAGE 2

LOC	OBJECT CODE	ADDR1	ADDR2	STMT	SOURCE STATEMENT	ASM 0201 13.38 08/17/12
				2 *		00795001
				3 *	FUNCTION -	00796001
				4 *	RETURN THE ACCUMULATED STEP CPU TIME IN MICROSECONDS WHEN	00797001
				5 *	CALLED AS AN ALGOL F FUNCTION DECLARED AS -	00798001
				6 *	'INTEGER' 'PROCEDURE' CPUTIM; 'CODE';	00799001
				7 *	THIS ALGOL F FUNCTION IS DESIGNED TO OPERATE IN THE	00800001
				8 *	MVS 3.8 ENVIRONMENT	00801001
				9 *		00802001
				10 *	ENVIRONMENT -	00803001
				11 *	SEE OS/360 ALGOL F PROGRAMMERS GUIDE GC33-4000 FOR A	00804001
				12 *	DESCRIPTION OF THE INVOKING ENVIRONMENT	00805001
				13 *		00806001
				14 *	STATUS -	00807001
				15 *	THIS FUNCTION IS SERIALLY REUSEABLE BUT NOT	00808001
				16 *	RECURSIVE OR REENTRANT	00809001
				17 *		00810001
000000				18	CPUTIM CSECT	00811001
				19 *		00812001
				20 *	FSA OFFSETS	00813001
				21 *		00814001
	000D4			22	CAP1 EQU X'0D4'	00815001
	000D8			23	CAP2 EQU X'0D8'	00816001
	000DC			24	PROLOGFP EQU X'0DC'	00817001
	000E4			25	RETPROG EQU X'0E4'	00818001
	000E8			26	EPILOGP EQU X'0E8'	00819001
	000F4			27	CSWE1 EQU X'0F4'	00820001
	00118			28	VALUCALL EQU X'118'	00821001
				29 *		00822001
	00000			30	USING PBTAB,R11	00823001
				31 *		00824001
				32 *	PROGRAM BLOCK TABLE	00825001
				33 *		00826001
000000 00000000				34	PBTAB DC A(0)	00827001
000004 C3D7E4E3				35	DC CL4'CPUT' NAME	00828001
000008 00000000				36	DC A(0)	00829001
00000C 0020				37	DC H'32' L'DSA FOR TYPED PROCEDURE (FUNCTION)	00830001
00000E 08				38	DC X'08' TYPE PROCEDURE INTEGER	00831001
00000F 00				39	DC AL1(0) NUMBER OF FORMAL PARAMETERS	00832001
				40 *		00833001
				41 *	ENTRY BLOCK	00834001
				42 *		00835001
000010 00000000				43	CPUENT DC A(PBTAB)	00836001
000014 00000000				44	DC A(0)	00837001
000018 0000001C				45	DC A(CPUCODE)	00838001
				46 *		00839001
				47 *	ESTABLISH ADDRESSABILITY TO THE PSA, ASCB	00840001
				48 *		00841001
	00000			49	USING PSA,R0	00842001
	00000			50	USING ASCB,R4	00843001
				51 *		00844001
00001C 47F0 B036 00036				52	CPUCODE B CPUCODEA	00845001
				53 *		00846001
000020 15				54	DC AL1(L'ID)	00847001
				55	ID DC C'CPUTIM &SYSDATE &SYSTIME'	00848001
000021 C3D7E4E3C9D440F0				56+ID	DC C'CPUTIM 08/17/12 13.38'	00848001

LOC	OBJECT CODE	ADDR1	ADDR2	STMT	SOURCE STATEMENT	ASM 0201 13.38 08/17/12
				57 *		00849001
000036	90EA B070	00070		58	CPUCODEA STM R14,R10,SAVEAREA+12	00850001
00003A	5840 0224	00224		59	L R4,PSAAOLD R4 -> CURRENT ASCB	00851001
00003E	9823 4040	00040		60	LM R2,R3,ASCBEJST ACCUM STEP TCB CPU TIME	00852001
000042	5E30 40CC	000CC		61	AL R3,ASCBSRBT+4 ADD ACCUM SRB CPU TIME	00853001
000046	47C0 B04E	0004E		62	BC 12,CPUCODEB OVERFLOW ? NO, BRANCH	00854001
00004A	4120 2001	00001		63	LA R2,1(,R2) YES, ADD CARRY	00855001
00004E	5A20 40C8	000C8		64	CPUCODEB A R2,ASCBSRBT TOTAL CPU TIME (TCB + SRB)	00856001
000052	8C20 000C	0000C		65	SRDL R2,(63-51) SHIFT TO CONVERT TO MICROSECONDS	00857001
000056	5030 A018	00018		66	ST R3,24(,R10) STORE RESULT IN DSA+24	00858001
00005A	98EA B070	00070		67	LM R14,R10,SAVEAREA+12	00859001
00005E	47F0 D0E8	000E8		68	B EPILOGP(,R13) RETURN VIA EPILOG CODE IN FSA	00860001
				69 *		00861001
000062	0000					
000064	0000000000000000			70	SAVEAREA DC 18F'0'	00862001
				71 *		00863001
				72	PRINT NOGEN	00864001
				73 *		00865001
				74 *	PREFIXED SAVE AREA	00866001
				75 *		00867001
				76	IHAPSA	00868001
				544 *		00869001
				545 *	ADDRESS SPACE CONTROL BLOCK	00870001
				546 *		00871001
				547	IHAASCB	00872001
				780 *		00873001
				781	PRINT GEN	00874001
				782 *		00875001
				783 *	REGISTER EQUATES	00876001
				784 *		00877001
				785	IEZREGS	00878001
	00000	786+R0			EQU 0	00000600
	00001	787+R1			EQU 1	00000700
	00002	788+R2			EQU 2	00000800
	00003	789+R3			EQU 3	00000900
	00004	790+R4			EQU 4	00001000
	00005	791+R5			EQU 5	00001100
	00006	792+R6			EQU 6	00001200
	00007	793+R7			EQU 7	00001300
	00008	794+R8			EQU 8	00001400
	00009	795+R9			EQU 9	00001500
	0000A	796+R10			EQU 10	00001600
	0000B	797+R11			EQU 11	00001700
	0000C	798+R12			EQU 12	00001800
	0000D	799+R13			EQU 13	00001900
	0000E	800+R14			EQU 14	00002000
	0000F	801+R15			EQU 15	00002100
				802 *		00879001
000010				803	END CPUENT	00880001

POS. ID	REL. ID	FLAGS	ADDRESS	ASM 0201 13.38 08/17/12
0001	0001	0C	000010	
0001	0001	0C	000018	

SYMBOL	LEN	VALUE	DEFN	REFERENCES	ASM 0201 13.38 08/17/12
ASCB	00001	00000000	00564	00050	
ASCBEJST	00008	00000040	00619	00060	
ASCBSRBT	00008	000000C8	00778	00061 00064	
CPUCODE	00004	0000001C	00052	00045	
CPUCODEA	00004	00000036	00058	00052	
CPUCODEB	00004	0000004E	00064	00062	
CPUENT	00004	00000010	00043	00083	
EPILOGP	00001	000000E8	00026	00068	
FLCEICOD	00002	00000086	00150	00151	
FLCENPSW	00004	00000058	00129	00131	
FLCEOPSW	00008	00000018	00112	00113	
FLCINPSW	00004	00000078	00142	00144	
FLCIOPSW	00008	00000038	00120	00121	
FLCIPPSW	00008	00000000	00103	00106	
FLCMNPSW	00004	00000070	00138	00141	
FLCMOPSW	00008	00000030	00118	00119	
FLCPICOD	00002	0000008E	00170	00171	
FLCPIILC	00001	0000008D	00164	00169	
FLCPNPSW	00004	00000068	00135	00137	
FLCPOPSPW	00008	00000028	00116	00117	
FLCSNPSW	00004	00000060	00132	00134	
FLCSOPSW	00008	00000020	00114	00115	
FLCSVCN	00002	0000008A	00160	00161	
FLCSVILC	00001	00000089	00155	00159	
FLCTIMER	00004	00000050	00126	00127	
ID	00021	00000021	00056	00054	
PBTAB	00004	00000000	00034	00030 00043	
PSA	00001	00000000	00101	00049 00313 00318	
PSAAOLD	00004	00000224	00250	00059	
PSAIPCDM	00001	0000026C	00319	00318	
PSAIPCRM	00001	00000264	00314	00313	
PSATNEW	00004	00000218	00246	00247	
R0	00001	00000000	00786	00049	
R10	00001	0000000A	00796	00058 00066 00067	
R11	00001	0000000B	00797	00030	
R13	00001	0000000D	00799	00068	
R14	00001	0000000E	00800	00058 00067	
R2	00001	00000002	00788	00060 00063 00064 00065	
R3	00001	00000003	00789	00060 00061 00066	
R4	00001	00000004	00790	00050 00059	
SAVEAREA	00004	00000064	00070	00058 00067	

ASM 0201 13.38 08/17/12

NO STATEMENTS FLAGGED IN THIS ASSEMBLY

HIGHEST SEVERITY WAS 0

OPTIONS FOR THIS ASSEMBLY

ALIGN, ALOGIC, BUFSIZE(STD), DECK, ESD, FLAG(0), LINECOUNT(55), LIST, NOMCALL, YFLAG, WORKSIZE(2097152)

NOMLOGIC, NONUMBER, OBJECT, NORENT, RLD, NOSTMT, NOLIBMAC, NOTERMAL, NOTEST, XREF(SHORT)

SYSARM()

WORK FILE BUFFER SIZE/NUMBER =19066/ 1

TOTAL RECORDS READ FROM SYSTEM INPUT 88

TOTAL RECORDS READ FROM SYSTEM LIBRARY 762

TOTAL RECORDS PUNCHED 7

TOTAL RECORDS PRINTED 172

F64-LEVEL LINKAGE EDITOR OPTIONS SPECIFIED XREF,LET,LIST,NCAL
DEFAULT OPTION(S) USED - SIZE=(1015808,516096)

CROSS REFERENCE TABLE

CONTROL SECTION			ENTRY							
NAME	ORIGIN	LENGTH	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
CPUTIM	00	AC								
LOCATION	REFERS TO SYMBOL	IN CONTROL SECTION	LOCATION	REFERS TO SYMBOL	IN CONTROL SECTION					
ENTRY ADDRESS		10								
TOTAL LENGTH		B0								
***CPUTIM	DOES NOT EXIST	BUT HAS BEEN ADDED TO DATA SET								
AUTHORIZATION CODE IS		0.								

Algol F Statement Timings

Picoseconds	Statement
+14	x := 1.0
+492	x := 1
+327	x := y
+164	x := y + z
+164	x := y * z
+163	x := y / z
+164	k := 1
+655	k := 1.0
+164	k := l + m
+327	k := l * m
+1638	k := l / m
+164	k := l
+492	x := l
+659	l := y
+818	x := y ** 2
+820	x := y ** 3
+2625	x := y ** z
+164	e1[1] := 1
+328	e2[1,1] := 1
+163	e3[1,1,1] := 1
+328	l := e1[1]
+13454	begin real a; end
+5732	begin real a[1:1]; end
+8846	begin real a[1:500]; end
+5896	begin real a[1:1,1:1]; end
+5898	begin real a[1:1,1:1,1:1]; end
+3112	begin goto lab; lab: end
+2783	begin switch s := q; goto s[1]; q: end
+1638	x := sin(y)
+1473	x := cos(y)
+164	x := abs(y)
+1309	x := exp(y)
+1310	x := ln(y)
+982	x := sqrt(y)
+1475	x := arctan(y)
+491	x := sign(y)
+983	x := entier(y)
+27542	p0
+31601	p1(x)
+33736	p2(x,y)
+35911	p3(x,y,z)
0	D0 Loop overhead

END OF ALGOL PROGRAM EXECUTION