

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

July 4, 2023

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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 Release 21. This ICR may be used to upgrade an existing Algol F installation at the Level 2.0 to Level 2.1. Alternatively, it may be used to install the Algol F Compiler and the Library where the Compiler and the 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 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 the date of compilation.

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

2.2 Library Enhancements

The Library modules, specifically all the modules 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 Algol F Compiler and Library

3.1 Planning

Obtain the INSTALL.ALGOL.F.XMI PC file which contains the Algol F data sets in XMI format.

The installation JCL and instructions are customized for an MVS 3.8 TK5 system. If the target system is configured differently then the JCL will require modification to suit the system environment.

3.2 Installation

Step 1. Upload the INSTALL.ALGOL.F.XMI PC file

Using IND\$FILE, or any other appropriate file transfer technique, upload the INSTALL.ALGOL.F.XMI PC file to the target TK5 environment ensuring the uploaded MVS data set has DCB parameters of RECFM=FB,LRECL=80,BLKSIZE=27920

Step 2. RECEIVE the Installation PDS.

Issue the following command at a TSO READY prompt:

```
RECEIVE INDS('INSTALL.ALGOL.F.XMI') NOPROMPT  
DSN('INSTALL.ALGOL.F') VOL(TK5002)
```

Step 3. Install the Algol F Compiler and Algol F Library

The Algol F libraries can now be extracted from the installation PDS using the RECEIVE command running in TSO batch mode.

Member \$INSTALL in the INSTALL.ALGOL.F data set contains the installation JCL. Customize this to conform to site standards and submit the job.

This job will copy the ALGOL F Compiler load modules to the SYS2.LINKLIB data set. The data set SYS1.ALGLIB will be deleted and then reallocated with additional space. The ALGOL F Library load modules will then be copied to the newly allocated SYS1.ALGLIB data set. The cataloged procedures, ALGOFC, ALGOFCG, ALGOFCL and ALGOFCLG, optimized for the MVS 3.8 environment, are copied to the SYS2.PROCLIB data set. The cataloged procedure ASMPROJ is also copied to the SYS2.PROCLIB data set for use, optionally, in building the Compiler and library from the provided source data sets. Four Installation Verification Programs, IEXSAMP1, IEXSAMP2, IEXSAMP3 and IEXSAMP4 are copied into the SYS1.SAMPLIB data set.

After the successful completion of this job the Algol F Compiler and Algol F Library have been installed. Section 3.4 discusses running the four Installation Verification Programs to verify the successful installation process.

3.3 Changing the Installation Default Compiler Options

The Algol F 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 Algol F 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 processing. 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 Algol F Library error handling module. The IEXSAMP4 job will execute for approximately four minutes on a 25 MIP MVS system. Samples of the expected output from all four jobs may be found in Appendix A, B, C and D.

4. Optional Materials

4.1 Building the Algol F Compiler and Algol F Library

The Algol F Compiler and the Algol F Library can be built from the installed source code libraries.

The build process for the Algol F Compiler is a two step process. Member ASMCALL in the ALGOL.F.COMPILER.CNTL data set contains the JCL to assemble all of the Algol F Compiler assembler source modules into an object library. Member LINKC in the ALGOL.F.COMPILER.CNTL data set contains the JCL and the Linkage Editor control statements to Link Edit the Algol F Compiler object modules to create the Algol F Compiler load module library.

The build process for the Algol F Library is similar to the build process for the Algol F Compiler in that it is a two step process. Member ASMRALL in the ALGOL.F.COMPILER.CNTL data set contains the JCL to assemble all of the Algol F Library assembler source modules into an object library. Member LINKRT in the ALGOL.F.COMPILER.CNTL data set contains the JCL and the Linkage Editor control statements to Link Edit the Algol F Library object modules to create the Algol F Library load modules.

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 T1IV1 ISSUED
13.34.17 JOB 9290 $HASP373 T1IV1 STARTED - INIT 6 - CLASS S - SYS SYSA
13.34.17 JOB 9290 IEF403I T1IV1 - STARTED - TIME=13.34.17
13.34.17 JOB 9290 IEFACTRT - Stepname Procstep Program Retcode
13.34.17 JOB 9290 T1IV1 IVP1 ALGOL ALGOL RC= 0000
13.34.17 JOB 9290 T1IV1 IVP1 LKED IEWL RC= 0000
13.34.18 JOB 9290 T1IV1 IVP1 GO GO RC= 0000
13.34.18 JOB 9290 T1IV1 AMBLIST AMBLIST RC= 0000
13.34.18 JOB 9290 IEF404I T1IV1 - ENDED - TIME=13.34.18
13.34.18 JOB 9290 $HASP395 T1IV1 ENDED

1 //T1IV1 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 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=&&GOSET(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=&&GOSET,DISP=(OLD,PASS) 00033001
20 XXALGLDD01 DD SYSOUT=* 00034001
21 XXSYSPRINT DD SYSOUT=* 00035001
22 XXSYSUT1 DD UNIT=VIO,SPACE=(1024,(20,10)) 00036001
23 //AMBLIST EXEC PGM=AMBLIST 00067001
*** 00068001
*** DEMONSTRATE LANGUAGE TRANSLATOR ID FOR ALGOL F 00069001
*** PROGRAMS AND TIME OF COMPILATION 00070001
*** 00071001
24 //SYSPRINT DD SYSOUT=* 00072001
25 //SYSLIB DD DSN=&&GOSET,DISP=(OLD,PASS) 00073001
26 //SYSIN DD * 00074001
STMT NO. MESSAGE

18 IEF686I DDNAME REFERRED TO ON DDNAME KEYWORD IN PRIOR STEP WAS NOT RESOLVED
IEF236I ALLOC. FOR T1IV1 ALGOL IVP1
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 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.SI0101 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.ALGLIB KEPT *-----64
IEF285I VOL SER NOS= MVSRES.
IEF285I SYS12230.T133417.RA000.T11V1.G0SET 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 STELIB
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.G0SET 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.G0SET          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.G0SET          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 ≠ 0 00021001
        AND K ≠ 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)

PAGE3

OBJECT MODULE SIZE1968 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						
			IHIFSAIN	164C						
IHIFSARB*	16C0	690								
IHIOSTRG*	1D50	148								
IHIOSYMB*	1E98	138								
IHISYSCT*	1FD0	780								
IHIORTN*	2750	D70								
			IHIIOROQ	2750	IHIIOROP	2836	IHIIORNX	2C04	IHIIORCL	2E4C
			IHIIORCP	2FF6	IHIIORGP	30F8	IHIIORCN	30FC	IHIIOREN	315C
			IHIIOREV	31DA	IHIIORED	3270	IHIIORCI	3348	IHIIORER	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	IHIOSTRG	IHIOSTRG	6F4	IHIFRI	IHIFRIXP
1694	IHIFSARB	IHIFSARB	AE8	IHIERROR	IHIERROR
1648	IHIORER	IHIORTN	16A8	IHIIORCP	IHIORTN
AFC	IHIIORCP	IHIORTN	1644	IHIIORGP	IHIORTN
1640	IHIIOREN	IHIORTN	163C	IHIIOROQ	IHIORTN
1630	IHIIOREV	IHIORTN	1628	IHIIORCI	IHIORTN
16B0	IHIIORNX	IHIORTN	1634	IHIIORNX	IHIORTN
B01	IHIIORNX	IHIORTN	16B4	IHIIORCL	IHIORTN
162C	IHIIORCL	IHIORTN	16AC	IHIIOROP	IHIORTN
1638	IHIIOROP	IHIORTN	AF8	IHIIOROP	IHIORTN
16A4	IHIENTIF	PROGRAM	8FC	IHIDSTAB	PROGRAM
16C5	IHIFSARA	IHIFSARA	3B90	IHIERM01	IHIERMSG
3B8C	IHIERMSG	IHIERMSG			
ENTRY ADDRESS	164C				

TOTAL LENGTH4560

****GO DOES NOT EXIST BUT HAS BEEN ADDED TO DATA SET

AUTHORIZATION CODE IS0.

Pascals Triangle

```

      1
    1  1
  1  2  1
1  3  3  1
  1  4  6  4  1
    1  5 10 10  5  1
      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

```

ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

GO	1	2	3	4	5	6	7	8	9	10	11	12	13
	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
	9	10	11	12	13	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	13	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	9	10	11	12	13	14	15
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ALGOL PROGRAM TRACE

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

ALGOL PROGRAM TRACE

MODULE SEMICOLON NUMBERS

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

LISTIDR MEMBER=GO

00075001

***** 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 IMASPPAP

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
IHIOSRG	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
IHIOSRG	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

```
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 IEFACTRT - 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

      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      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     XXSYSMOD  DD  DSN=&&GOSET(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=&&GOSET,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 T1IV2 ALGOL IVP2
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 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
IEF285I SYS12230.T133556.RA000.T1IV2.R0000003 DELETED *-----16
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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: T1IV2      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 T1IV2 LKED IVP2
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 T1IV2 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.T1IV2.GOSET          PASSED          *-----17
IEF285I  SYS12230.T133556.RA000.T1IV2.R0000004          DELETED          *-----0
IEF285I  SYS12230.T133556.RA000.T1IV2.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: T1IV2      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 T1IV2 GO IVP2
IEF237I VIO ALLOCATED TO STELIB
IEF237I JES2 ALLOCATED TO ALGLDD01
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I VIO ALLOCATED TO SYSUT1
IEF142I T1IV2 GO IVP2 - STEP WAS EXECUTED - COND CODE 0016
IEF285I  SYS12230.T133556.RA000.T1IV2.GOSET          PASSED          *-----0
IEF285I  JES2.JOB09291.S00104          SYSOUT
IEF285I  JES2.JOB09291.S00105          SYSOUT
IEF285I  SYS12230.T133556.RA000.T1IV2.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: T1IV2      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.T1IV2.GOSET          DELETED
IEF375I  JOB /T1IV2  / START 12230.1335
IEF376I  JOB /T1IV2  / 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

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	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	

STORAGE REQUIREMENTS (DECIMAL)

PAGE 3

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								
IHIFSARA*	730	E70	IHIDSTAB	6D8	IHIENTIF	724				
			IHIFSAIN	152C						
IHIFSARB*	15A0	690								
IHI000L*	1C30	1C8	IHI000AR	1C82						
IHISOREA*	1DF8	380	IHISORAR	1DF8	IHISOREL	1E38				
IHISYSCT*	2178	780								
IHIORTN*	28F8	D70	IHI000RQ	28F8	IHI000ROP	29DE	IHI000RNX	2DAC	IHI000RCL	2FF4
			IHI000RCP	319E	IHI000RGP	32A0	IHI000RCN	32A4	IHI000REN	3304
			IHI000REV	3382	IHI000RED	3418	IHI000RCI	34F0	IHI000RER	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	IHI000L	IHI000L	1574	IHIFSARB	IHIFSARB
9C8	IHIERROR	IHIERROR	1528	IHI000RER	IHI000RTN
1588	IHI000RCP	IHI000RTN	9DC	IHI000RCP	IHI000RTN
1524	IHI000ROP	IHI000RTN	1520	IHI000REN	IHI000RTN
151C	IHI000RQ	IHI000RTN	1510	IHI000REV	IHI000RTN
1508	IHI000RCI	IHI000RTN	1590	IHI000RNX	IHI000RTN
1514	IHI000RNX	IHI000RTN	9E1	IHI000RNX	IHI000RTN
1594	IHI000RCL	IHI000RTN	150C	IHI000RCL	IHI000RTN
158C	IHI000ROP	IHI000RTN	1518	IHI000ROP	IHI000RTN
9D8	IHI000ROP	IHI000RTN	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

```
11.09.37 JOB 2687 IEF677I WARNING MESSAGE(S) FOR JOB T1IV3 ISSUED
11.09.37 JOB 2687 $HASP373 T1IV3 STARTED - INIT 6 - CLASS S - SYS SYSA
11.09.37 JOB 2687 IEF403I T1IV3 - STARTED - TIME=11.09.37
11.09.38 JOB 2687 IEFACTRT - Stepname Procstep Program Retcode
11.09.38 JOB 2687 T1IV3 IVP3 ALGOL ALGOL RC= 0000
11.09.38 JOB 2687 T1IV3 IVP3 LKED IEWL RC= 0000
11.09.38 JOB 2687 T1IV3 IVP3 GO GO RC= 0000
11.09.38 JOB 2687 IEF404I T1IV3 - ENDED - TIME=11.09.38
11.09.38 JOB 2687 $HASP395 T1IV3 ENDED

1 //T1IV3 JOB 111,'ALGOL F LVL2.1', <-- CUSTOMIZE FOR SITE STANDARDS JOB 2687
// CLASS=S,MSGCLASS=C, <-- CUSTOMIZE FOR SITE STANDARDS 00002001
// REGION=8500K,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 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 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 XXSYSMOD DD DSN=&&GOSET(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=&&GOSET,DISP=(OLD,PASS) 00033001
20 XXALGLDD01 DD SYSOUT=* 00034001
21 XXSYSPRINT DD SYSOUT=* 00035001
22 XXSYSUT1 DD UNIT=VIO,SPACE=(1024,(20,10)) 00036001
23 //GO.SYSIN DD * 00091001
STMT NO. MESSAGE

-
18 IEF686I DDNAME REFERRED TO ON DDNAME KEYWORD IN PRIOR STEP WAS NOT RESOLVED
IEF236I ALLOC. FOR T1IV3 ALGOL IVP3
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 T1IV3 ALGOL IVP3 - STEP WAS EXECUTED - COND CODE 0000
IEF285I JES2.JOB02687.S00103 SYSOUT
IEF285I SYS14353.T110937.RA000.T1IV3.OBJECT PASSED *-----2
IEF285I SYS14353.T110937.RA000.T1IV3.R0000001 DELETED *-----0
IEF285I SYS14353.T110937.RA000.T1IV3.R0000002 DELETED *-----0
IEF285I SYS14353.T110937.RA000.T1IV3.R0000003 DELETED *-----13
IEF285I JES2.JOB02687.SI0101 SYSIN
IEF373I STEP /ALGOL / START 14353.1109
IEF374I STEP /ALGOL / STOP 14353.1109 CPU 0MIN 00.05SEC SRB 0MIN 00.00SEC VIRT 192K SYS 296K
*****
*****
* 1. Jobstep of job: T1IV3 Stepname: ALGOL Program name: ALGOL Executed on 19.12.14 from 11.09.37 to
11.09.38 *
* elapsed time 24:00:00,09 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: 77
*
* 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 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.JOB02687.S00104 SYSOUT
IEF285I SYS1.ALGLIB KEPT *-----72
IEF285I VOL SER NOS= MVSRES.
IEF285I SYS14353.T110937.RA000.T1IV3.GOSET PASSED *-----19
IEF285I SYS14353.T110937.RA000.T1IV3.R0000004 DELETED *-----0
IEF285I SYS14353.T110937.RA000.T1IV3.OBJECT DELETED *-----3
IEF373I STEP /LKED / START 14353.1109
IEF374I STEP /LKED / STOP 14353.1109 CPU 0MIN 00.05SEC SRB 0MIN 00.01SEC VIRT 1028K SYS 264K
*****
*****
* 2. Jobstep of job: T1IV3 Stepname: LKED Program name: IEWL Executed on 19.12.14 from 11.09.38 to
11.09.38 *
* elapsed time 24:00:00,10 CPU-Identifier: SYSA Page-in: 0
*
* CPU time 00:00:00,06 Virtual Storage used: 1028K 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.....72 FFF.....19 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
IEF237I JES2 ALLOCATED TO SYSIN
IEF142I T1IV3 GO IVP3 - STEP WAS EXECUTED - COND CODE 0000
IEF285I  SYS14353.T110937.RA000.T1IV3.GOSET          PASSED          *-----0
IEF285I  JES2.JOB02687.S00105                      SYSOUT
IEF285I  JES2.JOB02687.S00106                      SYSOUT
IEF285I  SYS14353.T110937.RA000.T1IV3.R0000005      DELETED          *-----0
IEF285I  JES2.JOB02687.SI0102                      SYSIN
IEF373I STEP /GO          / START 14353.1109
IEF374I STEP /GO          / STOP  14353.1109 CPU    0MIN 00.33SEC SRB    0MIN 00.00SEC VIRT 8228K SYS   280K
*****
*****
*      3. Jobstep of job: T1IV3          Stepname: GO          Program name: GO          Executed on 19.12.14 from 11.09.38 to
11.09.38 *
*      elapsed time 24:00:00,34          CPU-Identifier: SYSA          Page-in:          0
*
*      CPU time 00:00:00,33          Virtual Storage used: 8228K          Page-out:          0
*
*      corr. CPU: 00:00:00,33 CPU time has been corrected by 1 / 1,0 multiplier
*
*
*      I/O Operation
*
*      Number of records read via DD * or DD DATA:          1
*
*      FFF.....0 DMY.....0 DMY.....0 FFF.....0 DMY.....0
*
*
*
*      Charge for step (w/o SYSOUT):          0,55
*
*****
*****
IEF285I  SYS14353.T110937.RA000.T1IV3.GOSET          DELETED
IEF375I  JOB /T1IV3 / START 14353.1109
IEF376I  JOB /T1IV3 / STOP 14353.1109 CPU    0MIN 00.43SEC SRB    0MIN 00.01SEC

```

```

'BEGIN'                                00013001
'COMMENT'                              00014001
//////////////////////////////////// 00015001
// NAME: PETER M. MAURER              00016001
// PROGRAM: SIEVE OF ERATOSTHENES     00017001
// DUE: NEVER                         00018001
// LANGUAGE: ALGOL 60 ALA IBM 360     00019001
//                                    00020001
// Changes:                           00021001
// - Juergen Winkelmann, 2014/07/12, Performance and Output 00022001
// Optimization                       00023001
//////////////////////////////////// 00024001
;                                     00025001
'COMMENT' DEFINE THE SIEVE DATA STRUCTURE ; 00026001
'BOOLEAN' 'ARRAY' CANDIDATES[0:8400000]; 00027001
1 'INTEGER' I,J,K,LIMIT;              00028001
2 'COMMENT' SET LINE-LENGTH=120,SET LINES-PER-PAGE=62,OPEN; 00029001
2 SYSACT(1,6,120);                    00030001
3 SYSACT(1,8,62);                     00031001
4 SYSACT(1,12,1);                     00032001
5 ININTEGER(0,LIMIT);                 00033001
6 'FOR' I := 0 'STEP' 1 'UNTIL' LIMIT 'DO' 00034001
6 'BEGIN'                             00035001
6 'COMMENT' EVERYTHING IS POTENTIALLY PRIME 00036001
6 UNTIL PROVEN OTHERWISE ;            00037001
6 CANDIDATES[I] := 'TRUE';            00038001
7 'END';                              00039001
8 'COMMENT' NEITHER 1 NOR 0 IS PRIME, SO FLAG THEM OFF ; 00040001
8 CANDIDATES[0] := 'FALSE';           00041001
9 CANDIDATES[1] := 'FALSE';           00042001
10 'COMMENT' START THE SIEVE WITH THE INTEGER 0 ; 00043001
10 I := 0;                            00044001
11 K := 0;                            00045001
12 'FOR' I := I 'WHILE' K 'LESS' LIMIT 'DO' 00046001
12 'BEGIN'                             00047001
12 'COMMENT' ADVANCE TO THE NEXT UN-CROSSED OUT. ; 00048001
12 'COMMENT' THIS NUMBER MUST BE A PRIME; 00049001
12 'FOR' I := I 'WHILE' K 'LESS' LIMIT 00050001
12 'AND' 'NOT' CANDIDATES[I] 'DO'      00051001
12 'BEGIN'                             00052001
12 I := I+1;                           00053001
13 K := I*I;                           00054001
14 'END';                              00055001
15 'COMMENT' INSURE AGAINST RUNNING OFF THE END; 00056001
15 'IF' K 'LESS' LIMIT 'THEN'          00057001
15 'BEGIN'                             00058001
15 'COMMENT' CROSS OUT ALL MULTIPLES OF THE PRIME.; 00059001
15 'FOR' K := K 'WHILE' K 'LESS' LIMIT 'DO' 00060001
15 'BEGIN'                             00061001
15 CANDIDATES[K] := 'FALSE';           00062001
16 K := K+I;                           00063001
17 'END';                              00064001
18 'COMMENT' ADVANCE TO THE NEXT CANDIDATE ; 00065001
18 I := I+1;                           00066001

```

19	K := I*I;	00067001
20	'END'	00068001
20	'END';	00069001
21	'COMMENT' ALL UNCROSSED OUT NUMBERS ARE PRIME;	00070001
21	'COMMENT' PRINT ALL PRIMES ;	00071001
21	J := 0;	00072001
22	K := 0;	00073001
23	'FOR' I := 0 'STEP' 1 'UNTIL' LIMIT-1 'DO'	00074001
23	'BEGIN'	00075001
23	'IF' CANDIDATES[I] 'THEN'	00076001
23	'BEGIN'	00077001
23	J := J + 1;	00078001
24	K := K + 1;	00079001
25	OUTINTEGER(1,I);	00080001
26	'IF' J 'EQUAL' 9 'THEN' J := 0;	00081001
27	'END';	00082001
28	'END';	00083001
29	'IF' J 'NOTEQUAL' 0 'THEN' SYSACT(1,14,1);	00084001
30	SYSACT(1,14,1);	00085001
31	OUTINTEGER(1,K);	00086001
32	OUTSTRING(1,(' primes found'));	00087001
33	SYSACT(1,14,1);	00088001
34	'END'	00089001

IDENTIFIER TABLE														PAGE	3
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	CANDID	B A	01	018	I	I	030	J	I		034		
			K	I		038	LIMIT	I	03C						

STORAGE REQUIREMENTS (DECIMAL) PAGE 4

OBJECT MODULE SIZE 1992 BYTES
 DATA STORAGE AREA SIZES
 PBN BYTES PBN BYTES PBN BYTES PBN BYTES
 001 104

F64-LEVEL LINKAGE EDITOR OPTIONS SPECIFIED XREF,LIST,LET
 DEFAULT OPTION(S) USED - SIZE=(1017856,516096)

CROSS REFERENCE TABLE

CONTROL SECTION			ENTRY							
NAME	ORIGIN	LENGTH	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
PROGRAM	00	7C8								
IHIFSARA*	7C8	E68	IHIDSTAB	770	IHIENTIF	7BC				
			IHIFSAIN	15BC						
IHIFSARB*	1630	670								
IHIIDECM*	1CA0	6D0								
			IHIIDEAI	1CA0	IHIIDEII	1CE4	IHIIDEIR	1D28		
IHIOINTE*	2370	1F8								
			IHIOINAR	2370	IHIOINTG	23B0				
IHIOSTRG*	2568	148								
IHISYSCT*	26B0	788								
IHIORTN*	2E38	D18								
			IHIIOROQ	2E38	IHIIOROP	2F04	IHIIORNX	32B4	IHIIORCL	3518
			IHIIORCP	36CE	IHIIORGP	37BC	IHIIORCN	37C0	IHIIOREN	3824
			IHIIOREV	38A0	IHIIORED	3934	IHIIORCI	39E0	IHIIORER	3A64
IHIERROR*	3B50	6E8								
IHIERMSG*	4238	9B8								
			IHIERM01	42E8						
IHIPTTAB*	4BF0	108								

LOCATION	REFERS TO	SYMBOL	IN CONTROL SECTION	LOCATION	REFERS TO	SYMBOL	IN CONTROL SECTION
6A0		IHISYSCT	IHISYSCT	6C4		IHIIDEII	IHIIDECM
6E0		IHIOINTG	IHIOINTE	6F4		IHIOSTRG	IHIOSTRG
1604		IHIFSARB	IHIFSARB	A60		IHIERROR	IHIERROR
874		IHIDSTAB	PROGRAM	15B8		IHIIORER	IHIORTN
1618		IHIIORCP	IHIORTN	A74		IHIIORCP	IHIORTN
15B4		IHIIORGP	IHIORTN	15B0		IHIIOREN	IHIORTN
15AC		IHIIOROQ	IHIORTN	15A0		IHIIOREV	IHIORTN
1598		IHIIORCI	IHIORTN	1620		IHIIORNX	IHIORTN
15A4		IHIIORNX	IHIORTN	A79		IHIIORNX	IHIORTN
1624		IHIIORCL	IHIORTN	159C		IHIIORCL	IHIORTN
161C		IHIIOROP	IHIORTN	15A8		IHIIOROP	IHIORTN
A70		IHIIOROP	IHIORTN	1614		IHIENTIF	PROGRAM
1635		IHIFSARA	IHIFSARA	21B8		IHIPTTAB	IHIPTTAB
4220		IHIERM01	IHIERMSG	421C		IHIERMSG	IHIERMSG

ENTRY ADDRESS 15BC

TOTAL LENGTH 4CF8

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

+2	+3	+5	+7	+11	+13	+17	+19	+23
+29	+31	+37	+41	+43	+47	+53	+59	+61
+67	+71	+73	+79	+83	+89	+97	+101	+103
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+80671	+80677	+80681	+80683	+80687	+80701	+80713	+80737	+80747
+80749	+80761	+80777	+80779	+80783	+80789	+80803	+80809	+80819
+80831	+80833	+80849	+80863	+80897	+80909	+80911	+80917	+80923
+80929	+80933	+80953	+80963	+80989	+81001	+81013	+81017	+81019
+81023	+81031	+81041	+81043	+81047	+81049	+81071	+81077	+81083
+81097	+81101	+81119	+81131	+81157	+81163	+81173	+81181	+81197
+81199	+81203	+81223	+81233	+81239	+81281	+81283	+81293	+81299
+81307	+81331	+81343	+81349	+81353	+81359	+81371	+81373	+81401
+81409	+81421	+81439	+81457	+81463	+81509	+81517	+81527	+81533
+81547	+81551	+81553	+81559	+81563	+81569	+81611	+81619	+81629
+81637	+81647	+81649	+81667	+81671	+81677	+81689	+81701	+81703
+81707	+81727	+81737	+81749	+81761	+81769	+81773	+81799	+81817
+81839	+81847	+81853	+81869	+81883	+81899	+81901	+81919	+81929
+81931	+81937	+81943	+81953	+81967	+81971	+81973	+82003	+82007
+82009	+82013	+82021	+82031	+82037	+82039	+82051	+82067	+82073
+82129	+82139	+82141	+82153	+82163	+82171	+82183	+82189	+82193
+82207	+82217	+82219	+82223	+82231	+82237	+82241	+82261	+82267
+82279	+82301	+82307	+82339	+82349	+82351	+82361	+82373	+82387
+82393	+82421	+82457	+82463	+82469	+82471	+82483	+82487	+82493
+82499	+82507	+82529	+82531	+82549	+82559	+82561	+82567	+82571
+82591	+82601	+82609	+82613	+82619	+82633	+82651	+82657	+82699
+82721	+82723	+82727	+82729	+82757	+82759	+82763	+82781	+82787
+82793	+82799	+82811	+82813	+82837	+82847	+82883	+82889	+82891
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+83047	+83059	+83063	+83071	+83077	+83089	+83093	+83101	+83117
+83137	+83177	+83203	+83207	+83219	+83221	+83227	+83231	+83233
+83243	+83257	+83267	+83269	+83273	+83299	+83311	+83339	+83341
+83357	+83383	+83389	+83399	+83401	+83407	+83417	+83423	+83431
+83437	+83443	+83449	+83459	+83471	+83477	+83497	+83537	+83557
+83561	+83563	+83579	+83591	+83597	+83609	+83617	+83621	+83639
+83641	+83653	+83663	+83689	+83701	+83717	+83719	+83737	+83761
+83773	+83777	+83791	+83813	+83833	+83843	+83857	+83869	+83873
+83891	+83903	+83911	+83921	+83933	+83939	+83969	+83983	+83987
+84011	+84017	+84047	+84053	+84059	+84061	+84067	+84089	+84121
+84127	+84131	+84137	+84143	+84163	+84179	+84181	+84191	+84199
+84211	+84221	+84223	+84229	+84239	+84247	+84263	+84299	+84307
+84313	+84317	+84319	+84347	+84349	+84377	+84389	+84391	+84401
+84407	+84421	+84431	+84437	+84443	+84449	+84457	+84463	+84467
+84481	+84499	+84503	+84509	+84521	+84523	+84533	+84551	+84559
+84589	+84629	+84631	+84649	+84653	+84659	+84673	+84691	+84697
+84701	+84713	+84719	+84731	+84737	+84751	+84761	+84787	+84793
+84809	+84811	+84827	+84857	+84859	+84869	+84871	+84913	+84919
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+85121	+85133	+85147	+85159	+85193	+85199	+85201	+85213	+85223
+85229	+85237	+85243	+85247	+85259	+85297	+85303	+85313	+85331
+85333	+85361	+85363	+85369	+85381	+85411	+85427	+85429	+85439
+85447	+85451	+85453	+85469	+85487	+85513	+85517	+85523	+85531
+85549	+85571	+85577	+85597	+85601	+85607	+85619	+85621	+85627
+85639	+85643	+85661	+85667	+85669	+85691	+85703	+85711	+85717
+85733	+85751	+85781	+85793	+85817	+85819	+85829	+85831	+85837
+85843	+85847	+85853	+85889	+85903	+85909	+85931	+85933	+85991
+85999	+86011	+86017	+86027	+86029	+86069	+86077	+86083	+86111

+86113	+86117	+86131	+86137	+86143	+86161	+86171	+86179	+86183
+86197	+86201	+86209	+86239	+86243	+86249	+86257	+86263	+86269
+86287	+86291	+86293	+86297	+86311	+86323	+86341	+86351	+86353
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+86539	+86561	+86573	+86579	+86587	+86599	+86627	+86629	+86677
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+87223	+87251	+87253	+87257	+87277	+87281	+87293	+87299	+87313
+87317	+87323	+87337	+87359	+87383	+87403	+87407	+87421	+87427
+87433	+87443	+87473	+87481	+87491	+87509	+87511	+87517	+87523
+87539	+87541	+87547	+87553	+87557	+87559	+87583	+87587	+87589
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+87683	+87691	+87697	+87701	+87719	+87721	+87739	+87743	+87751
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+87881	+87887	+87911	+87917	+87931	+87943	+87959	+87961	+87973
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+88093	+88117	+88129	+88169	+88177	+88211	+88223	+88237	+88241
+88259	+88261	+88289	+88301	+88321	+88327	+88337	+88339	+88379
+88397	+88411	+88423	+88427	+88463	+88469	+88471	+88493	+88499
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+88919	+88937	+88951	+88969	+88993	+88997	+89003	+89009	+89017
+89021	+89041	+89051	+89057	+89069	+89071	+89083	+89087	+89101
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+89213	+89227	+89231	+89237	+89261	+89269	+89273	+89293	+89303
+89317	+89329	+89363	+89371	+89381	+89387	+89393	+89399	+89413
+89417	+89431	+89443	+89449	+89459	+89477	+89491	+89501	+89513
+89519	+89521	+89527	+89533	+89561	+89563	+89567	+89591	+89597
+89599	+89603	+89611	+89627	+89633	+89653	+89657	+89659	+89669
+89671	+89681	+89689	+89753	+89759	+89767	+89779	+89783	+89797
+89809	+89819	+89821	+89833	+89839	+89849	+89867	+89891	+89897
+89899	+89909	+89917	+89923	+89939	+89959	+89963	+89977	+89983
+89989	+90001	+90007	+90011	+90017	+90019	+90023	+90031	+90053
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+90163	+90173	+90187	+90191	+90197	+90199	+90203	+90217	+90227
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+90547	+90583	+90599	+90617	+90619	+90631	+90641	+90647	+90659
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+90803	+90821	+90823	+90833	+90841	+90847	+90863	+90887	+90901
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+91199	+91229	+91237	+91243	+91249	+91253	+91283	+91291	+91297
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+91621	+91631	+91639	+91673	+91691	+91703	+91711	+91733	+91753
+91757	+91771	+91781	+91801	+91807	+91811	+91813	+91823	+91837
+91841	+91867	+91873	+91909	+91921	+91939	+91943	+91951	+91957
+91961	+91967	+91969	+91997	+92003	+92009	+92033	+92041	+92051
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+92179	+92189	+92203	+92219	+92221	+92227	+92233	+92237	+92243
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+92419	+92431	+92459	+92461	+92467	+92479	+92489	+92503	+92507
+92551	+92557	+92567	+92569	+92581	+92593	+92623	+92627	+92639
+92641	+92647	+92657	+92669	+92671	+92681	+92683	+92693	+92699
+92707	+92717	+92723	+92737	+92753	+92761	+92767	+92779	+92789
+92791	+92801	+92809	+92821	+92831	+92849	+92857	+92861	+92863
+92867	+92893	+92899	+92921	+92927	+92941	+92951	+92957	+92959
+92987	+92993	+93001	+93047	+93053	+93059	+93077	+93083	+93089
+93097	+93103	+93113	+93131	+93133	+93139	+93151	+93169	+93179
+93187	+93199	+93229	+93239	+93241	+93251	+93253	+93257	+93263
+93281	+93283	+93287	+93307	+93319	+93323	+93329	+93337	+93371
+93377	+93383	+93407	+93419	+93427	+93463	+93479	+93481	+93487
+93491	+93493	+93497	+93503	+93523	+93529	+93553	+93557	+93559
+93563	+93581	+93601	+93607	+93629	+93637	+93683	+93701	+93703
+93719	+93739	+93761	+93763	+93787	+93809	+93811	+93827	+93851
+93871	+93887	+93889	+93893	+93901	+93911	+93913	+93923	+93937
+93941	+93949	+93967	+93971	+93979	+93983	+93997	+94007	+94009
+94033	+94049	+94057	+94063	+94079	+94099	+94109	+94111	+94117
+94121	+94151	+94153	+94169	+94201	+94207	+94219	+94229	+94253
+94261	+94273	+94291	+94307	+94309	+94321	+94327	+94331	+94343
+94349	+94351	+94379	+94397	+94399	+94421	+94427	+94433	+94439
+94441	+94447	+94463	+94477	+94483	+94513	+94529	+94531	+94541
+94543	+94547	+94559	+94561	+94573	+94583	+94597	+94603	+94613
+94621	+94649	+94651	+94687	+94693	+94709	+94723	+94727	+94747
+94771	+94777	+94781	+94789	+94793	+94811	+94819	+94823	+94837
+94841	+94847	+94849	+94873	+94889	+94903	+94907	+94933	+94949
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+95143	+95153	+95177	+95189	+95191	+95203	+95213	+95219	+95231
+95233	+95239	+95257	+95261	+95267	+95273	+95279	+95287	+95311
+95317	+95327	+95339	+95369	+95383	+95393	+95401	+95413	+95419
+95429	+95441	+95443	+95461	+95467	+95471	+95479	+95483	+95507
+95527	+95531	+95539	+95549	+95561	+95569	+95581	+95597	+95603
+95617	+95621	+95629	+95633	+95651	+95701	+95707	+95713	+95717
+95723	+95731	+95737	+95747	+95773	+95783	+95789	+95791	+95801
+95803	+95813	+95819	+95857	+95869	+95873	+95881	+95891	+95911
+95917	+95923	+95929	+95947	+95957	+95959	+95971	+95987	+95989
+96001	+96013	+96017	+96043	+96053	+96059	+96079	+96097	+96137
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+96233	+96259	+96263	+96269	+96281	+96289	+96293	+96323	+96329
+96331	+96337	+96353	+96377	+96401	+96419	+96431	+96443	+96451
+96457	+96461	+96469	+96479	+96487	+96493	+96497	+96517	+96527
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+96851	+96857	+96893	+96907	+96911	+96931	+96953	+96959	+96973
+96979	+96989	+96997	+97001	+97003	+97007	+97021	+97039	+97073
+97081	+97103	+97117	+97127	+97151	+97157	+97159	+97169	+97171
+97177	+97187	+97213	+97231	+97241	+97259	+97283	+97301	+97303
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+97429	+97441	+97453	+97459	+97463	+97499	+97501	+97511	+97523
+97547	+97549	+97553	+97561	+97571	+97577	+97579	+97583	+97607
+97609	+97613	+97649	+97651	+97673	+97687	+97711	+97729	+97771
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+97859	+97861	+97871	+97879	+97883	+97919	+97927	+97931	+97943
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+98221	+98227	+98251	+98257	+98269	+98297	+98299	+98317	+98321
+98323	+98327	+98347	+98369	+98377	+98387	+98389	+98407	+98411
+98419	+98429	+98443	+98453	+98459	+98467	+98473	+98479	+98491
+98507	+98519	+98533	+98543	+98561	+98563	+98573	+98597	+98621
+98627	+98639	+98641	+98663	+98669	+98689	+98711	+98713	+98717
+98729	+98731	+98737	+98773	+98779	+98801	+98807	+98809	+98837

+98849	+98867	+98869	+98873	+98887	+98893	+98897	+98899	+98909
+98911	+98927	+98929	+98939	+98947	+98953	+98963	+98981	+98993
+98999	+99013	+99017	+99023	+99041	+99053	+99079	+99083	+99089
+99103	+99109	+99119	+99131	+99133	+99137	+99139	+99149	+99173
+99181	+99191	+99223	+99233	+99241	+99251	+99257	+99259	+99277
+99289	+99317	+99347	+99349	+99367	+99371	+99377	+99391	+99397
+99401	+99409	+99431	+99439	+99469	+99487	+99497	+99523	+99527
+99529	+99551	+99559	+99563	+99571	+99577	+99581	+99607	+99611
+99623	+99643	+99661	+99667	+99679	+99689	+99707	+99709	+99713
+99719	+99721	+99733	+99761	+99767	+99787	+99793	+99809	+99817
+99823	+99829	+99833	+99839	+99859	+99871	+99877	+99881	+99901
+99907	+99923	+99929	+99961	+99971	+99989	+99991		

+9592 primes found

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 XXSYSPPRINT DD SYSOUT=* 00015001
5 XXSYSPPUNCH 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 XXSYSPPRINT DD SYSOUT=* 00024001
13 XXSYSLIB DD DSN=SYS1.ALGLIB,DISP=SHR 00025001
14 XXSYSLOAD DD DSN=&&GOSET(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 XXSYSPPRINT DD SYSOUT=&SOUT 00000805
27 XXSYSPPUNCH 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 XXSYSPPRINT 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=&&GOSET(CPUTIM),DISP=(OLD,PASS) 00882001
X/SYSLMOD DD DSN=&&GOSET(GO),UNIT=SYSDA,SPACE=(2048,(50,20,1)), 00001804
XX DISP=(MOD,PASS) 00001904
36 //GOIVP4 EXEC PGM=GO 00883001
37 //STEPLIB DD DSN=&&GOSET,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.GOSET 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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IEF2851 SYS1.MACLIB                                KEPT          *-----4
IEF2851 VOL SER NOS= MVSRES.
IEF2851 SYS1.AMODGEN                                KEPT          *-----7
IEF2851 VOL SER NOS= MVSDLB.
IEF2851 SYS12230.T133853.RA000.T11V4.R0000005    DELETED        *-----31
IEF2851 SYS12230.T133853.RA000.T11V4.R0000006    DELETED        *-----15
IEF2851 SYS12230.T133853.RA000.T11V4.R0000007    DELETED        *-----8
IEF2851 JES2.JOB09293.S00105                      SYSOUT
IEF2851 SYS12230.T133853.RA000.T11V4.OBJECT      PASSED         *-----7
IEF2851 JES2.JOB09293.SI0102                      SYSIN
IEF3731 STEP /ASM / START 12230.1338
IEF3741 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 *
*****
IEF2361 ALLOC. FOR T11V4 LKED ASMTIM
IEF2371 JES2 ALLOCATED TO SYSPRINT
IEF2371 VIO ALLOCATED TO SYSUT1
IEF2371 VIO ALLOCATED TO SYSLIN
IEF2371 DMY ALLOCATED TO
IEF2371 VIO ALLOCATED TO SYSLMOD
IEF1421 T11V4 LKED ASMTIM - STEP WAS EXECUTED - COND CODE 0000
IEF2851 JES2.JOB09293.S00106                      SYSOUT
IEF2851 SYS12230.T133853.RA000.T11V4.R0000008    DELETED        *-----0
IEF2851 SYS12230.T133853.RA000.T11V4.OBJECT      DELETED        *-----8
IEF2851 SYS12230.T133853.RA000.T11V4.G0SET       PASSED         *-----10
IEF3731 STEP /LKED / START 12230.1338
IEF3741 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 *
*****
IEF2361 ALLOC. FOR T11V4 GOIVP4
IEF2371 VIO ALLOCATED TO STEPLIB
IEF2371 JES2 ALLOCATED TO ALGLDD01
IEF2371 JES2 ALLOCATED TO SYSPRINT
IEF2371 VIO ALLOCATED TO SYSUT1
IEF1421 T11V4 GOIVP4 - STEP WAS EXECUTED - COND CODE 0000
IEF2851 SYS12230.T133853.RA000.T11V4.G0SET       PASSED         *-----0
IEF2851 JES2.JOB09293.S00107                      SYSOUT
IEF2851 JES2.JOB09293.S00108                      SYSOUT
IEF2851 SYS12230.T133853.RA000.T11V4.R0000009    DELETED        *-----0
IEF3731 STEP /GOIVP4 / START 12230.1338
IEF3741 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 *
*****
IEF2851 SYS12230.T133853.RA000.T11V4.G0SET       DELETED
IEF3751 JOB /T11V4 / START 12230.1338
IEF3761 JOB /T11V4 / STOP 12230.1342 CPU 3MIN 15.69SEC SRB 0MIN 00.02SEC

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'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 approximately 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

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SC	SOURCE STATEMENT	
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

SC	SOURCE STATEMENT	
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		00199001
152	'INTEGER' 'PROCEDURE' CPUTIM; 'CODE';	00200001
154	'COMMENT' Procedure that returns the current accumulated	00201001
154	job step processor time in microseconds in the	00202001
154	MVS 3.8J environment;	00203001
154		00204001
154	'COMMENT' Set line-length = 120, Set lines-per-page = 62, OPEN;	00205001
154	SYSACT(1,6,120);	00206001
155	SYSACT(1,8,62);	00207001
156	SYSACT(1,12,1);	00208001
157	SYSACT(1,2,10);	00209001
158	OUTSTRING (1,('Algol F Statement Timings'));	00210001
159	SYSACT(1,14,1);	00211001
160	OUTSTRING(1,('Picoseconds Statement'));	00212001
161		00213001
161	x := y := z := 1.0;	00214001
162	l := k := m := 1;	00215001
163	e1[1] := 1;	00216001
164	case := 1;	00217001
165		00218001
165	'COMMENT' Case 01;	00219001
165	n := 100000;	00220001
166	'COMMENT' n should be given a large enough value	00221001
166	for the resolution of the clock not to	00222001
166	be a limiting factor to the accuracy.	00223001
166	If n is made too large then processor time	00224001
166	is wasted;	00225001
166	#TT[1] := CPUTIM;	00226001
167	'COMMENT' #TT[1] equals program initialization overhead;	00227001
167		00228001

SC	SOURCE STATEMENT	
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
248      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
261      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
274      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
287      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
300      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
```

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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
313      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

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```
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
```

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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

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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

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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

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```

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
602     case := case + 1;             00670001
603     'COMMENT' Case 37;            00671001
603     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00672001
603     'BEGIN'                        00673001
603         x := sign(y); x := sign(y); x := sign(y); 00674001
606         x := sign(y); x := sign(y); x := sign(y); 00675001
609         x := sign(y); x := sign(y); x := sign(y); 00676001
612         x := sign(y);            00677001
613     'END';                        00678001
614     #TT[case] := CPUTIM;          00679001
615                                     00680001
615     case := case + 1;             00681001
616     'COMMENT' Case 38;            00682001
616     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00683001
616     'BEGIN'                        00684001
616         x := entier(y); x := entier(y); 00685001
618         x := entier(y); x := entier(y); 00686001
620         x := entier(y); x := entier(y); 00687001
622         x := entier(y); x := entier(y); 00688001
624         x := entier(y); x := entier(y); 00689001
626     'END';                        00690001
627     #TT[case] := CPUTIM;          00691001
628                                     00692001
628     case := case + 1;             00693001
629     'COMMENT' Case 39;            00694001
629     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00695001
629     'BEGIN'                        00696001
629         p0;                       00697001
630         p0;                       00698001
631         p0;                       00699001
632         p0;                       00700001
633         p0;                       00701001
634         p0;                       00702001
635         p0;                       00703001
636         p0;                       00704001
637         p0;                       00705001
638         p0;                       00706001
639     'END';                        00707001
640     #TT[case] := CPUTIM;          00708001
641                                     00709001
641     case := case + 1;             00710001
642     'COMMENT' Case 40;            00711001
642     'FOR' i := 1 'STEP' 1 'UNTIL' n 'DO' 00712001
642     'BEGIN'                        00713001
642         p1(x);                    00714001

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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		00784001
692	printt;	00785001
693		00786001
693	'END';	00787001

IDENTIFIER TABLE														PAGE 16			
PBN	SC	PBN SURR	NAME	TYPE	DM PR	DSP LN	NAME	TYPE	DM PR	DSP LN	NAME	TYPE	DM PR	DSP 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)

PAGE 17

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								
IHIFRIXP*	7438	A0	IHIDSTAB	71E8	IHIENTIF	742C				
			IHIFRI	7438						
IHI0INTE*	74D8	1F8	IHI0INAR	74D8	IHI0INTG	7518				
IHI0STRG*	76D0	148								
IHISATAN*	7818	E0	IHISAT	7818						
IHISEXPT*	78F8	138	IHISEX	78F8						

IHISLOGM*	7A30	E8											
IHISSCSN*	7B18	140	IHISLO	7A30									
IHISSQRT*	7C58	C8	IHISSCC	7B18	IHISSCS	7B52							
IHISYSCT*	7D20	780	IHISSQ	7C58									
IHIFRRXP*	84A0	F8											
IHIFSARA*	8598	E70	IHIFRR	84A0									
IHIFSARB*	9408	690	IHIFSAIN	9394									
IHIORTN*	9A98	D70											
			IHIIOROQ	9A98	IHIIOROP	9B7E	IHIIORNX	9F4C	IHIIORCL	A194			
			IHIIORCP	A33E	IHIIORGP	A440	IHIIORCN	A444	IHIIOREN	A4A4			
			IHIIOREV	A522	IHIIORED	A5B8	IHIIORCI	A690	IHIIORER	A714			
IHIERROR*	A808	6E8											
IHIERMSG*	AEF0	9B8											
			IHIERM01	AFA0									

LOCATION	REFERS TO	SYMBOL	IN CONTROL	SECTION	LOCATION	REFERS TO	SYMBOL	IN CONTROL	SECTION
6D88		IHISYSCT		IHISYSCT	6D8C		IHISSQ		IHISSQRT
6D90		IHISSCS		IHISSCSN	6D94		IHISSCC		IHISSCSN
6D98		IHISAT		IHISATAN	6D9C		IHISLO		IHISLOGM
6DA0		IHISEX		IHISEXPT	6DC8		IHIINTG		IHIIOINTE
6DDC		IHIOSTRG		IHIOSTRG	6DEC		IHIFRI		IHIFRIXP
6DF0		IHIFRR		IHIFRRXP	8590		IHISEX		IHISEXPT
858C		IHISLO		IHISLOGM	93DC		IHIFSARB		IHIFSARB
8830		IHIERROR		IHIERROR	9390		IHIORER		IHIORTN
93F0		IHIIORCP		IHIORTN	8844		IHIIORCP		IHIORTN
938C		IHIIORGP		IHIORTN	9388		IHIIOREN		IHIORTN
9384		IHIIOROQ		IHIORTN	9378		IHIIOREV		IHIORTN
9370		IHIIORCI		IHIORTN	93F8		IHIIORNX		IHIORTN
937C		IHIIORNX		IHIORTN	8849		IHIIORNX		IHIORTN
93FC		IHIIORCL		IHIORTN	9374		IHIIORCL		IHIORTN
93F4		IHIIOROP		IHIORTN	9380		IHIIOROP		IHIORTN
8840		IHIIOROP		IHIORTN	93EC		IHIENTIF		PROGRAM
8644		IHIDSTAB		PROGRAM	940D		IHIFSARA		IHIFSARA
AED8		IHIERM01		IHIERMSG	AED4		IHIERMSG		IHIERMSG

ENTRY ADDRESS 9394

TOTAL LENGTH B8A8

*****GO DOES NOT EXIST BUT HAS BEEN ADDED TO DATA SET

AUTHORIZATION CODE IS 0.

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 *                                00796001
      4 *                                FUNCTION -
      5 *                                RETURN THE ACCUMULATED STEP CPU TIME IN MICROSECONDS WHEN
      6 *                                CALLED AS AN ALGOL F FUNCTION DECLARED AS -
      7 *                                'INTEGER' 'PROCEDURE' CPUTIM; 'CODE';
      8 *                                THIS ALGOL F FUNCTION IS DESIGNED TO OPERATE IN THE
      9 *                                MVS 3.8 ENVIRONMENT
     10 *                                ENVIRONMENT -
     11 *                                SEE OS/360 ALGOL F PROGRAMMERS GUIDE GC33-4000 FOR A
     12 *                                DESCRIPTION OF THE INVOKING ENVIRONMENT
     13 *                                STATUS -
     14 *                                THIS FUNCTION IS SERIALLY REUSEABLE BUT NOT
     15 *                                RECURSIVE OR REENTRANT
     16 *                                RECURSIVE OR REENTRANT
     17 *                                00809001
000000 18 CPUTIM CSECT                                00810001
     19 *                                00811001
     20 *                                FSA OFFSETS
     21 *                                00812001
     22 *                                00813001
     23 *                                00814001
0000D4 22 CAP1 EQU X'0D4'                                00815001
0000D8 23 CAP2 EQU X'0D8'                                00816001
0000DC 24 PROLOGFP EQU X'0DC'                                00817001
0000E4 25 RETPROG EQU X'0E4'                                00818001
0000E8 26 EPILOGP EQU X'0E8'                                00819001
0000F4 27 CSWE1 EQU X'0F4'                                00820001
001118 28 VALUCALL EQU X'118'                                00821001
     29 *                                00822001
000000 30 USING PBTAB,R11                                00823001
     31 *                                00824001
     32 *                                PROGRAM BLOCK TABLE
     33 *                                00825001
000000 00000000 34 PBTAB DC A(0)                                00826001
000004 C3D7E4E3 35 DC CL4'CPUT' NAME                                00827001
000008 00000000 36 DC A(0)                                00828001
00000C 0020 37 DC H'32' L'DSA FOR TYPED PROCEDURE (FUNCTION) 00829001
00000E 08 38 DC X'08' TYPE PROCEDURE INTEGER                                00830001
00000F 00 39 DC AL1(0) NUMBER OF FORMAL PARAMETERS                                00831001
     40 *                                00832001
     41 *                                ENTRY BLOCK
     42 *                                00833001
000010 00000000 43 CPUENT DC A(PBTAB)                                00834001
000014 00000000 44 DC A(0)                                00835001
000018 0000001C 45 DC A(CPUCODE)                                00836001
     46 *                                00837001
     47 *                                ESTABLISH ADDRESSABILITY TO THE PSA, ASCB
     48 *                                00838001
000000 49 USING PSA,R0                                00839001
000000 50 USING ASCB,R4                                00840001
     51 *                                00841001
00001C 47F0 B036 00036 52 CPUCODE B CPUCODEA                                00842001
     53 *                                00843001
000020 15 54 DC AL1(L'ID)                                00844001
     55 ID DC C'CPUTIM &SYSDATE &SYSTIME'                                00845001
000021 C3D7E4E3C9D440F0 56+ID DC C'CPUTIM 08/17/12 13.38'                                00846001

```

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,ASCB SRBT+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,ASCB SRBT 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	
ASCBEST	00008	00000040	00619	00060	
ASCBSEBT	00008	000000C8	00778	00061 00064	
CPUCODE	00004	0000001C	00052	00045	
CPUCODEA	00004	00000036	00058	00052	
CPUCODEB	00004	0000004E	00064	00062	
CPUEUT	00004	00000010	00043	00003	
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	
FLCPOPSW	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)

SYSPARM()

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 := 1 + m
+327 k := 1 * m
+1638 k := 1 / m
+164 k := 1
+492 x := 1
+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 DO Loop overhead

END OF ALGOL PROGRAM EXECUTION

```