LOADGNUS

Examining the Information
in a Loadmodule Library

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Chapter 1

INTRODUCTION

After routines are processed by the Fortran compiler or other language translator, the resulting "object code" can be saved by the Linkage Editor in a loadmodule library. The system routines, such as COS, SQRT and the various READ and WRITE routines, are all saved in this form, and are loaded when a program is run, without the expense and bother of compilation. Much of the production code which has been developed as SLAC is used in the same way. It is not necessary, for instance, to recompile the thousands of lines of code in HPAK or KIOWA every time you want to make a histogram, because the corresponding loadmodule libraries are available.

The contents of a loadmodule library are normally accessed only by the linkage editor or the loader, and the information they contain is not easily available. Some of the information, such as "who calls whom", can be determined from the linkage editor output, but it is not in useful form. Some of the information, such as the date that a routine was compiled, is not put out at all.

LOADGNUS will read a loadmodule or an entire library, and write various information in a form which is fairly easy to read. The format of the output is similar to that of program GOODGNUS (see CGTM No. 198), and postprocessor programs and execfiles which have been written for GOODGNUS can also be used for LOADGNUS.

Chapter 2

INPUT

The input is very simple. The job must contain a STEPLIB
DD to point to the dataset containing the LOADGNUS program,
a SYSLIB DD pointing to your loadmodule library, and a SYS-
PUNCH DD for output.   Output lines are never more than 80
characters long.   The EXEC statement should have a PARM
field which contains the input parameters for LOADGNUS.

2.1   JCL

```
//UUUJOB JOB UUU$GG,TIME=(,15),REGION=30K
//          EXEC   PGM=LOADGNUS,REGION=30K,
//  PARM='list of input parameters'
//STEPLIB  DD     DSN=WYL.CG.RBC.LOADMODS,DISP=SHR
//SYSLIB   DD     DSN=WYL.your.loadmodule.library,DISP=SHR
//SYSPUNCH DD     SYSOUT=A
```

2.2   LIST OF INPUT PARAMETERS

Parameter	Default Value
[NO]CALL	NOCALL
[NO]COMMON	NOCOMMON
[NO]AUTO,[NO]NCAL	NOAUTO,NCAL
[NO]DUMP	NODUMP
[NO]ENTRY	NOENTRY
[NO]DATE	NODATE
[NO]DEBUG	NODEBUG
DDNAME=ddname	DDNAME=SYSLIB
MEMBER=membername M=membername	MEMBER=MAIN
ALL	

2.3   DESCRIPTION OF INPUT PARAMETERS

CALL | NOCALL

The CALL parameter signifies that each external reference (e.g. Fortran CALL or external function) will produce a line of output. The NOCALL parameter suppresses these lines.

COMMON | NOCOMMON

The COMMON parameter specifies that each reference in each routine to a common block will produce a line of output. The NOCOMMON parameter suppresses these lines.

ENTRY | NOENTRY

The ENTRY parameter specifies that each subroutine name or entry point in each routine will produce a line of output. The NOENTRY parameter suppresses these lines.

AUTO | NOAUTO
NCAL | NONCAL

The AUTO parameter specifies that LOADGNUS will search the library or libraries in the SYSLIB loadmodule library in an attempt to satisfy all external references, in the same way that the linkage editor and the loader do. NOAUTO specifies that this automatic extension of the list of members will not be performed, and only the members explicitly requested by a MEMBER= or by the ALL parameter parameter will be examined.

'NCAL' is the same as 'NOAUTO'.   'NONCAL' is the same as 'AUTO'.

DUMP | NODUMP

DUMP specifies that each record (except TXT records) from a loadmodule will be dumped in hex format in the output as it is read in. NODUMP suppresses this output.

DATE | NODATE

DATE specifies that the information from the IDR records will be put out. This includes information about the linkage editing process that created the loadmodule, such as the date it was created and the version of the linkage editor; information about the compiler or assembler that created the object code; and information that the user may have inserted into loadmodule with an IDENTIFY instruction to the linkage editor.

DEBUG | NODEBUG

This parameter is useful for program development and debugging. It is not of general interest.

DDNAME=name

If you dislike the name SYSLIB for some reason, you can change the ddname for the statement which defines the input loadmodule.

MEMBER=membername | M=membername

The member mentioned in a M= or MEMBER= parameter is added to the list of library members to be used. (This list may be extended by the external references in the processed routines, if the AUTO parameter is in effect.) The entire parameter may be repeated as often as necessary, e.g. PARM=(M=SUB1,M=SUB2,M=FUNCT3).

ALL

    ALL means that all members of the loadmodule library are
to be processed.   In the case of concatenated libraries in
the SYSLIB DD statement, the ALL function processes the mem-
bers of the first library only.

Chapter 3

EXAMPLE

3.1 INPUT

```
//UUUJOB JOB  UUU$GG,TIME=(,15),REGION=30K
//          EXEC   PGM=LOADGNUS,REGION=30K,
//    PARM='MEMBER=GOGEN,DATE,CALL,AUTO,COMMON'
//STEPLIB  DD     DSN=WYL.CG.RBC.LOADMODS,DISP=SHR
//SYSLIB   DD     DSN=WYL.CG.PUB.SAGEMODS,DISP=SHR
//SYSPUNCH DD     SYSOUT=A
```

3.2 DISCUSSION

The PARM field in this JCL tells the program to start with the member GOGEN in the given library, which happens to contain the subroutines for the Monte-Carlo routines known collectively as SAGE.

'DATE' tells the program to print out information about the compiler and linkage editor, and results in the '$DATE$' lines in the output.

'CALL' requests information about subroutine and function references, and results in the 'CALL' lines.

'COMMON' requests information about common blocks, and results in the 'COMN' lines.

The first line in the output shows that member GOGEN was put in the library by version 1 level 6 of the Linkage Editor on the 87th day of 1979.

The second line shows that subroutine GOGEN in member GOGEN was compiled by the Fortran H (Extended) version 1 level 1. This version of the compiler did not put the date information in right.

The third line shows that subroutine GOGEN in member GOGEN refers to common block /SAGEXX/

The fourth line shows that subroutine GOGEN calls subroutine GO.

In general, external references are identified by the word 'CALL' or 'COMN' in columns 62-65 of the output. Calls are labeled with the name of the routine starting in column 28 and common names start in column 19. In some cases, LOADGNUS is able to identify an external reference, but is unable to determine what kind it is. In this case, columns 62-65 contain 'XTRN', and the name of the external is put in both fields.

3.3   <u>OUTPUT</u>

```
GOGEN                   $DATE$ LINKEDIT        V01L06 79.087
GOGEN       GOGEN       $DATE$ FORTH(EXT       V01L01 00.00
GOGEN       GOGEN       SAGEXX                                      COMN
GOGEN       GOGEN              GO                                   CALL
GOGEN       GOGEN              GO                                   CALL
GOGEN       GOGEN              RY                                   CALL
GOGEN       GOGEN              RO                                   CALL
GO                      $DATE$ LINKEDIT        V01L06 79.087
GO          GO          $DATE$ FORTH(EXT       V01L01 00.00
GO          GO          SAGEXX                                      COMN
GO          GO          SAGECM                                      COMN
GO          GO          SAGEIN                                      COMN
GO          GO          SAGELL                                      COMN
GO          GO          SAGEWT                                      COMN
GO          GO                 COS                                  CALL
GO          GO                 EXP                                  CALL
GO          GO                 RAZ                                  CALL
GO          GO                 SIN                                  CALL
GO          GO                 TAN                                  CALL
GO          GO                 ALOG                                 CALL
GO          GO                 ATAN                                 CALL
GO          GO                 ORDR                                 CALL
GO          GO                 RAND                                 CALL
GO          GO                 SQRT                                 CALL
GO          GO                 FRXPR#                               CALL
GO          GO                 FRXPI#                               CALL
GO          GO                 IBCOM#                               CALL
GO          GO          SAGECM                                      COMN
GO          GO          SAGEWT                                      COMN
G0                      $DATE$ LINKEDIT        V01L06 79.087
G0          G0          $DATE$ FORTH(EXT       V01L01 00.00
G0          G0          SAGEIN                                      COMN
G0          G0                 GO                                   CALL
RY                      $DATE$ LINKEDIT        V01L06 79.087
RY          RY          $DATE$ FORTH(EXT       V01L01 00.00
RY          RY          SAGEXX                                      COMN
RY          RY          SAGEIN                                      COMN
RY          RY          SAGECM                                      COMN
RY          RY                 SAGERR                               CALL
RO                      $DATE$ LINKEDIT        V01L06 79.087
RO          RO          $DATE$ FORTH(EXT       V01L01 00.00
```

```
RO        RO        SAGEIN                              COMN
RO        RO                  RY                        CALL
RAZ                 $DATE$ LINKEDIT      VO1L06 79.087
RAZ       RAZ       $DATE$ FORTH(EXT     VO1L01 00.00
RAZ       RAZ              COS                          CALL
RAZ       RAZ              SIN                          CALL
RAZ       RAZ              RAND                         CALL
RAZ       RAZ              SQRT                         CALL
```