Utilizing a program loaded into the user program area to load another module in the same user program area

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UTILIZING A PROGRAM LOADED INTO THE USER PROGRAM AREA TO LOAD ANOTHER MODULE IN THE SAME USER PROGRAM AREA

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It is known [*] that a program loaded into the User Program Area can load, via SVC 202, only programs to be allocated in the Transient Program Area and not programs to be allocated in the same User Program Area.

For example, a user program can call system functions like RENAME, LISTFILE, ERASE, etc. (hold in files MODULE loaded, one by one, in the Transient Program Area) but can not load other functions like EDIT, COPYFILE, SORT, etc. (hold in files MODULE which are loaded in the User Program Area and therefore overlap the calling program, so that a correct reentry is impossible). To allow any program to use also this second type function, the following procedure can be adopted:

1. The main program (MAIN) is loaded not at the HEX 20000 but, at a higher address, for example:

```
LOAD MAIN (ORIGIN 50000)
```

2. The program (or a subroutine, at any level) saves the content of the following addresses of the NUCON table of CMS:

```
MAINHIGH
MAINSTRT
MAINLIST
FREELOWE
```

3. Two addresses are modified. The load address of the main program, eventually rounded at integer page address, is stored at FREELOWE location, and an address of a few pages lower (say 5 for example) is stored at MAINHIGH location.

4. An SVC 202 is issued to load the required MODULE (for example, EDIT of a file); the loading is executed starting from the beginning of the User Program Area (20000 hex). The loaded MODULE does not overlap the calling program. If there is not enough space, the system issues the usual error message, and control is correctly returned to the calling user program.

5. At the exit of the MODULE (FILE or QUIT subcommands for EDIT), the user program takes the control again and restores in NUCON the four addresses previously saved, in order to allow the regular development of eventual GETMAIN or FREEMAIN operations. In one example, the main program is in FORTRAN, and must be loaded at Hexadecimal address 50000.

UTILIZING A PROGRAM LOADED INTO THE USER PROGRAM AREA TO LOAD ANOTHER MODULE IN THE SAME USER PROGRAM AREA - Continued

The operations at point 2 are performed by the subroutine SAVNUC. The operations at point 3 are performed by the subroutine CNGNUC. Subroutine CMS (not printed here) simply performs the SVC 202 operation (point 4). The operations at point 5 are performed by the subroutine RESNUC.

```
C FORTRAN MAIN PROGRAM (OR SUBROUTINE AT ANY LEVEL)
- - - - -
- - - - -
DATA LOADAD /Z00050000/
- - - - -
- - - - -
- - - - -
CALL SAVNUC
CALL CNGNUC (LOADAD)
CALL CMS('EDIT    ','FILE    ','FT01F001','A1      ')
CALL RESNUC
- - - - -
- - - - -
- - - - -

END
```

```
 * ASSEMBLER MAIN STORAGE MANAGEMENT SUBROUTINES

                CSECT
                ENTRY SAVNUC
                ENTRY CNGNUC
                ENTRY RESNUC
                USING *, 12
                USING NUCON,0
      SAVNUC    STM   14,12,12(13)
                LR    12,15
                PRINT NOGEN
                MVC   OLFREELW(4),FREELOWE
                MVC   OLMAINHI(4),MAINHIGH
                MVC   OLMAINST(4),MAINSTRT
                MVC   OLMAINLS(4),MAINLIST
                LM    14,12,12(13)
                BR    14
                DS    OD
       CNGNUC   STM   14,12,12(13)
                LA    12,CNGNUC-SAVNUC
                SR    15,12
                LR    12,15
                L     2,0(1)
                L     2,0(2)
                N     2,PAGE
                ST    2,FREELOWE
                S     2,FIVEPAGE
                ST    2,MAINHIGH
```

UTILIZING A PROGRAM LOADED INTO THE USER PROGRAM AREA TO LOAD ANOTHER MODULE IN THE SAME USER PROGRAM AREA - Continued

```
                  LM     14,12,12(13)
                  BR     14
                  DS     OD
         RESNUC   STM    14,12,12(13)
                  LA     12,RESNUC-SAVNUC
                  SR     15,12
                  LR     12,15
                  MVC    MAINHIGH(4),OLMAINHI
                  MVC    MAINSTRT(4),OLMAINST
                  MVC    MAINLIST(4),OLMAINLS
                  MVC    FREELOWE(4),OLFREELW
                  LM     14,12,12(13)
                  BR     14
                  DS     OD
        OLFREELW  DS     1F
        OLMAINHI  DS     1F
        OLMAINST  DS     1F
        OLMAINLS  DS     1F
        FIVEPAGE  DC     XL4'00005000'
        PAGE      DC     XL4'FFFFF000'
                  NUCON
                  END
```

[*] IBM Virtual Machine Facility/370: "Conversational Monitor System (CMS)", Program Logic SY20-0771-1, page 53.