

**МИНОБРНАУКИ РОССИИ**  
**САНКТ-ПЕТЕРБУРГСКИЙ ГОСУДАРСТВЕННЫЙ**  
**ЭЛЕКТРОТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ**  
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**Кафедра МОЭВМ**

**ОТЧЕТ**  
**по лабораторной работе №11**  
**по дисциплине «Программирование на Ассемблере»**  
**Тема: МОДУЛЬ ДИНАМИЧЕСКОЙ СТРУКТУРЫ.**

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Дата выполнения работы:

13.12.2020

Санкт-Петербург

2020

## Цель работы.

Написать три программных модуля, загружающих друг друга с помощью LOAD/LINK.

## Ход работы.

В IBMUSER.SERGEEV.ASM(HELLOA) написана программа, которая запускает подзадачи В, С, D. Затем ждет определенный интервал времени по STIMER и ждет окончания подзадач по WAIT. Каждая подзадача выводит сообщение о своем старте и ждет интервал времени. Затем выдает POST. Подзадача В должна закончиться раньше, чем наступит WAIT в А. Остальные позже.

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      IBMUSER.SERGEEV.JOBLIB(JOB1) - 01.17      Columns 00001 00072
Command ==> Scroll ==> CSR
***** ***** Top of Data *****
==MSG> -Warning- The UNDO command is not available until you change
==MSG>          your edit profile using the command RECOVERY ON.
000100 //JOB1 JOB
000200 //STEP1A EXEC PROC=ASMACL
000300 //C.SYSIN DD DSN=IBMUSER.SERGEEV.ASM(HELLOA),DISP=SHR
000310 //C.SYSLIB DD DSN=SYS1.MACLIB,DISP=SHR
000400 //C.SYSPRINT DD DSN=IBMUSER.SERGEEV.LISTLIB(HELLOA),DISP=(MOD,KEEP)
000600 //L.SYSIN DD DUMMY
000700 //L.SYSLMOD DD DSN=IBMUSER.SERGEEV.LOADLIB(HELLOA),DISP=SHR
000900 //STEP1B EXEC PROC=ASMACL
001000 //C.SYSIN DD DSN=IBMUSER.SERGEEV.ASM(HELLOB),DISP=SHR
001010 //C.SYSLIB DD DSN=SYS1.MACLIB,DISP=SHR
001100 //C.SYSPRINT DD DSN=IBMUSER.SERGEEV.LISTLIB(HELLOB),DISP=(MOD,KEEP)
001300 //L.SYSIN DD DUMMY
001400 //L.SYSLMOD DD DSN=IBMUSER.SERGEEV.LOADLIB(HELLOB),DISP=SHR
001600 //STEP1C EXEC PROC=ASMACL
001700 //C.SYSIN DD DSN=IBMUSER.SERGEEV.ASM(HELLOC),DISP=SHR
001710 //C.SYSLIB DD DSN=SYS1.MACLIB,DISP=SHR
*EDIT
```

```

File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT          IBMUSER.SERGEV.JOBLIB(JOB1) - 01.17          Columns 00001 00072
Command ==>          Scroll ==> CSR
001800 //C.SYSPRINT DD DSN=IBMUSER.SERGEV.LISTLIB(HELLOC),DISP=(MOD,KEEP)
002000 //L.SYSIN DD DUMMY
002100 //L.SYSLMOD DD DSN=IBMUSER.SERGEV.LOADLIB(HELLOC),DISP=SHR
002300 //STEP1D EXEC PROC=ASMACL
002400 //C.SYSIN DD DSN=IBMUSER.SERGEV.ASM(HELLOD),DISP=SHR
002410 //C.SYSLIB DD DSN=SYS1.MACLIB,DISP=SHR
002500 //C.SYSPRINT DD DSN=IBMUSER.SERGEV.LISTLIB(HELLOD),DISP=(MOD,KEEP)
002700 //L.SYSIN DD DUMMY
002800 //L.SYSLMOD DD DSN=IBMUSER.SERGEV.LOADLIB(HELLOD),DISP=SHR
003000 //STEP2 EXEC PGM=HELLOA
003400 //STEPLIB DD DSN=IBMUSER.SERGEV.LOADLIB,DISP=SHR
***** ***** Bottom of Data *****

*EDIT

```

Рис 1-2 – Задание для программы

```

File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT          IBMUSER.SERGEV.ASM(HELLOA) - 01.06          Columns 00001 00072
Command ==>          Scroll ==> CSR
***** ***** Top of Data *****
==MSG> -Warning- The UNDO command is not available until you change
==MSG>          your edit profile using the command RECOVERY ON.
000001      YREGS
000002 HELLOA CSECT
000003      AMODE 31
000004      RMODE 24
000005      STM R14,R12,12(R13)
000006      LR R12,R15
000007      USING HELLOA,R12
000008      ST R13,SAVE+4
000009      LA R11,SAVE
000010      WTO 'A WORKING'
000011      WTO 'A JOIN B'
000012      ATTACH EP=HELLOB,PARAM=(ECBBPARM),ECB=ECBB
000013      ST R1,SAVEB
000014      WTO 'A JOIN C'
000015      ATTACH EP=HELLOC,PARAM=(ECBCPARM),ECB=ECBC
000016      ST R1,SAVEC

*EDIT

```

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      IBMUSER.SERGEV.ASM(HELLOA) - 01.08      Columns 00001 00072
Command ==> Scroll ==> CSR
000017    WTO 'A JOIN D'
000018    ATTACH EP=HELLOD,PARAM=(ECBDPARAM),ECB=ECBD
000019    ST R1,SAVE
000020    WTO 'A TIMER STARTED'
000021    STIMER WAIT,DINTVL=TIMER
000022    WTO 'A TIMER ENDED'
000023    WAIT 3,ECBLIST=ECBLST
000024    WTO 'A END'
000025    L R13,SAVE+4
000026    LM R14,R12,12(R13)
000027    LA R15,0
000028    BR R14
000029    SAVE DS 18F
000030    TIMER DC CL8'00000300'
000031    TABLE DC C'0123456789ABCDEF'
000032    ECBB DC F'0'
000033    ECBC DC F'0'
000034    ECBD DC F'0'
000035    ECBBPARAM DC A(ECBB)
*EDIT
```

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      IBMUSER.SERGEV.ASM(HELLOA) - 01.08      Columns 00001 00072
Command ==> Scroll ==> CSR
000036    ECBCPARAM DC A(ECBC)
000037    ECBDPARAM DC A(ECBD)
000038    ECBLST DC A(ECBB)
000039          DC A(ECBC)
000040          DC X'80'
000041          DC AL3(ECBD)
000042    SAVEB DS F
000043    SAVEC DS F
000044    SAVED DS F
000045    END HELLOA
***** ***** Bottom of Data *****
*EDIT
```

Рис. 3-5 – Модуль А

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      IBMUSER.SERGEV.ASM(HELLOB) - 01.06      Columns 00001 00072
Command ==> Scroll ==> CSR
***** ***** Top of Data *****
==MSG> -Warning- The UNDO command is not available until you change
==MSG>          your edit profile using the command RECOVERY ON.
000001      YREGS
000002 HELLOB CSECT
000003      AMODE 31
000004      RMODE 24
000005      STM R14,R12,12(R13)
000006      LR R12,R15
000007      USING HELLOB,R12
000008      ST R13,SAVE+4
000009      LA R11,SAVE
000010      L R7,0(R1)
000011      L R7,0(R7)
000012      WTO 'B WORKING'
000013      WTO 'B TIMER START'
000014      STIMER WAIT,DINTVL=TIMER
000015      WTO 'B TIMER END'
000016      BAS R5,PRT
*EDIT
```

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      IBMUSER.SERGEV.ASM(HELLOB) - 01.06      Columns 00001 00072
Command ==> Scroll ==> CSR
000017      WTO 'B POST SENT'
000018      POST (R7),X'B'
000019      WTO 'B POST DONE'
000020      BAS R5,PRT
000021      L R13,SAVE+4
000022      LM R14,R12,12(R13)
000023      LA R15,0
000024      BR R14
000025 PRT DS 0H
000026      L R4,0(R7)
000027      ST R4,ECBDAT
000028      UNPK ECBHEX,ECBDAT
000029      OI ECBHEX+6,X'F0'
000030      TR ECBHEX,TOHEX
000031      OI ECBDAT+3,X'F0'
000032      TR ECBDAT+3(1),TOHEX
000033      MVC LASTSYM,ECBDAT+3
000034      WTO TEXT=ECBTXT
000035      BR R5
*EDIT
```

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      IBMUSER.SERGEEV.ASM(HELLOB) - 01.07      Columns 00001 00072
Command ==> Scroll ==> CSR
000036 SAVE DS 18F
000037 ECBDAT DS F
000038 ECBTXT DC XL2'18'
000039         DC C'ECB IN B: '
000040 ECBHEX DS CL7
000041 LASTSYM DS CL1
000042 TOHEX DS XL256
000043         ORG TOHEX+C'0'
000044         DC C'0123456789ABCDEF'
000045 TIMER DC CL8'00000075'
000046     END HELLOB
***** ***** Bottom of Data *****

*EDIT
```

Рис. 6-8 – Модуль В

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      IBMUSER.SERGEEV.ASM(HELLOC) - 01.04      Columns 00001 00072
Command ==> Scroll ==> CSR
***** ***** Top of Data *****
==MSG> -Warning- The UNDO command is not available until you change
==MSG>         your edit profile using the command RECOVERY ON.
000001     YREGS
000002 HELLOC CSECT
000003     AMODE 31
000004     RMODE 24
000005     STM R14,R12,12(R13)
000006     LR R12,R15
000007     USING HELLOC,R12
000008     ST R13,SAVE+4
000009     LA R11,SAVE
000010     L R7,0(R1)
000011     L R7,0(R7)
000012     WTO 'C WORKING'
000013     WTO 'C TIMER START'
000014     STIMER WAIT,DINTVL=TIMER
000015     WTO 'C TIMER END'
000016     BAS R5,PRT

*EDIT
```

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      IBMUSER.SERGEEV.ASM(HELLOC) - 01.04      Columns 00001 00072
Command ==> Scroll ==> CSR
000017    WTO 'C POST SENT'
000018    POST (7),X'C'
000019    WTO 'C POST DONE'
000020    BAS R5,PRT
000021    L R13,SAVE+4
000022    LM R14,R12,12(R13)
000023    LA R15,0
000024    BR R14
000025 PRT DS 0H
000026    L R4,0(R7)
000027    ST R4,ECBDAT
000028    UNPK ECBHEX,ECBDAT
000029    OI ECBHEX+6,X'F0'
000030    TR ECBHEX,TOHEX
000031    OI ECBDAT+3,X'F0'
000032    TR ECBDAT+3(1),TOHEX
000033    MVC LASTSYM,ECBDAT+3
000034    WTO TEXT=ECBTXT
000035    BR R5
*EDIT
```

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      IBMUSER.SERGEEV.ASM(HELLOC) - 01.05      Columns 00001 00072
Command ==> Scroll ==> CSR
000036 SAVE DS 18F
000037 ECBDAT DS F
000038 ECBTXT DC XL2'18'
000039      DC C'ECB IN C: '
000040 ECBHEX DS CL7
000041 LASTSYM DS CL1
000042 TOHEX DS XL256
000043      ORG TOHEX+C'0'
000044      DC C'0123456789ABCDEF'
000045 TIMER DC CL8'00000500'
000046 END HELLOC
***** ***** Bottom of Data *****
*EDIT
```

Рис. 9-11 – Модуль C

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      IBMUSER.SERGEV.ASM(HELLOD) - 01.04      Columns 00001 00072
Command ==> Scroll ==> CSR
***** Top of Data *****
==MSG> -Warning- The UNDO command is not available until you change
==MSG> your edit profile using the command RECOVERY ON.
000001      YREGS
000002 HELLOD CSECT
000003      AMODE 31
000004      RMODE 24
000005      STM R14,R12,12(R13)
000006      LR R12,R15
000007      USING HELLOD,R12
000008      ST R13,SAVE+4
000009      LA R11,SAVE
000010      L R7,0(R1)
000011      L R7,0(R7)
000012      WTO 'D WORKING'
000013      WTO 'D TIMER START'
000014      STIMER WAIT,DINTVL=TIMER
000015      WTO 'D TIMER END'
000016      BAS R5,PRT
*EDIT
```

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      IBMUSER.SERGEV.ASM(HELLOD) - 01.04      Columns 00001 00072
Command ==> Scroll ==> CSR
000017      WTO 'D POST SENT'
000018      POST (7),X'D'
000019      WTO 'D POST DONE'
000020      BAS R5,PRT
000021      L R13,SAVE+4
000022      LM R14,R12,12(R13)
000023      LA R15,0
000024      BR R14
000025 PRT DS 0H
000026      L R4,0(R7)
000027      ST R4,ECBDAT
000028      UNPK ECBHEX,ECBDAT
000029      OI ECBHEX+6,X'F0'
000030      TR ECBHEX,TOHEX
000031      OI ECBDAT+3,X'F0'
000032      TR ECBDAT+3(1),TOHEX
000033      MVC LASTSYM,ECBDAT+3
000034      WTO TEXT=ECBTXT
000035      BR R5
*EDIT
```



```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      IBMUSER.SERGEEV.ASM(HELLOD) - 01.05      Columns 00001 00072
Command ==> Scroll ==> CSR
000036 SAVE DS 18F
000037 ECBDAT DS F
000038 ECBTXT DC XL2'18'
000039      DC C'ECB IN D: '
000040 ECBHEX DS CL7
000041 LASTSYM DS CL1
000042 TOHEX DS XL256
000043      ORG TOHEX+C'0'
000044      DC C'0123456789ABCDEF'
000045 TIMER DC CL8'00000750'
000046      END HELLOD
***** ***** Bottom of Data *****

*EDIT
```

Рис. 12-14 – Модуль D

```
A WORKING
A JOIN B
A JOIN C

A JOIN D
A TIMER STARTED
B WORKING
B TIMER START
D WORKING
C WORKING
D TIMER START
C TIMER START
B TIMER END
ECB IN B: 00000000
B POST SENT
B POST DONE
ECB IN B: 4000000B
A TIMER ENDED
C TIMER END
ECB IN C: 808BEC68
C POST SENT
C POST DONE
ECB IN C: 4000000C

D TIMER END
ECB IN D: 808BEC68
D POST SENT
A END
D POST DONE
ECB IN D: 4000000D
```

Рис. 15-17 – Вывод сообщений

**Вывод.**

В ходе выполнения лабораторной работы были написаны три программных модуля, загружающих друг друга с помощью LOAD/LINK.