UNIVERSITY OF KARACHI

ASSEMBLY LANGUAGE PROGRAMMING

BSCS-403

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UNIVERSITY OF KARACHI

NESTED LOOP USING STACK:

```
                        C:\L1.ASM
;NESTED LOOP USING STACK
DOSSEG   ;DOS SEGMENT
.MODEL SMALL ;MODEL DIRECTIVE
.STACK 100H  ;STACK SEGMENT DIRECTIVE
.DATA        ;USED TO DEFINE VARIABLES
.CODE        ;EXECUTABLE INSTRUCTION ARE WRITTEN
MAIN PROC
MOV AX,@DATA ;TO ACCESS IN.DATA
MOV DS,AX    ;HEAP MEMORY INITIALLIZE
MOV BX,1     ;TAKE REGISTER & INPUT VALUE 1
MOV CX,5     ;MAIN LOOP COUNT 5 TIMES
L1:
PUSH CX      ;VALUE 5 SAVE IN STACK FIRST
MOV CX,BX    ;VALUE IS 1,IT RUN 1 TIME,AND THEN INCREMENT BY AS MANY TIMES
L2:
MOV DX,'*'   ;* MOVE TO DATA REGISTER
MOV AH,2     ;PRINT *
INT 21H
LOOP L2      ;REPEAT LOOP 2
MOV DX,10    ;NEW LINE FEED
MOV AH,2
INT 21H
```

```
  File   Edit   Search   View   Options   Help
                          C:\L1.ASM
MOV CX,BX      ;VALUE IS 1,IT RUN 1 TIME,AND THEN INCREMENT BY AS MANY TIMES
L2:
MOV DX,'*'    ;* MOVE TO DATA REGISTER
MOV AH,2       ;PRINT *
INT 21H
LOOP L2        ;REPEAT LOOP 2
MOV DX,10      ;NEW LINE FEED
MOV AH,2
INT 21H
MOV DX,13      ;CARRIAGE RETURN
MOV AH,2
INT 21H
INC BX         ;INCREMENT IN BX,NEW VALUE
POP CX         ;POP OUT THE VALUE FROM STACK (WHICH IS 5)
LOOP L1        ;REPEATS LOOP 1
MOV AH,4CH    ;TO END THE REGISTER
INT 21H
MAIN ENDP
END MAIN       ;TO END THE  PROGRAM



 F1=Help                                        Line:35     Col:1
```

```
C:\>MASM L1.ASM;
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  51720 + 464824 Bytes symbol space free

     0 Warning Errors
     0 Severe  Errors

C:\>LINK L1.OBJ;

Microsoft (R) Overlay Linker  Version 3.60
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C:\>L1.EXE
*
**
***
****
*****

C:\>_
```

PROCEDURE (FOR ENTER KEY):

```
File  Edit  Search  View  Options  Help
                    C:\L2.ASM
                  ;PROCEDURE(FOR ENTER KEY)
DOSSEG  ;DOS SEGMENT
.MODEL SMALL ;MODEL DIRECTIVE
.STACK 100H  ;STACK SEGMENT DIRECTIVE
.DATA        ;USED TO DEFINE VARIABLES
STR1 DB 'HELLO FUTURE$'  ;INITIALIZE STRING1 USING DATA BYTE
STR2 DB 'NEVER GOODBYE$' ;INTIALIZE STRING2 USING DATA BYTE
STR3 DB 'FOCUS ON GODD$' ;INITIALIZE STRING3 USING DATA BYTE
.CODE        ;EXECUTABLE INSTRUCTION ARE WRITTEN
MAIN PROC
MOV AX,@DATA ;TO ACCESS IN .DATA
MOV DS,AX    ;HEAP MEMORY INITIALIZE
MOV DX,OFFSET STR1 ;TO HOLD THE BEGINNNING ADDRESS OF STR1 AND ACCESS IT
MOV AH,9     ;TO PRINT THE STRING
INT 21H
CALL ENTERKEY   ;CALL THE PROCEDURE OF ENTERKEY
MOV DX,OFFSET STR2 ;TO HOLD THE ADDRESS OF STR2 AND ACCESS IT
MOV AH,9     ;TO PRINT THE STRING
INT 21H
CALL ENTERKEY   ;AGAIN CALL THE PROCEDSURE OF ENTER KEY
MOV DX,OFFSET STR3  ;TO HOLD THE ADDRESS OF STR2 AND ACCESS IT
MOV AH,9     ;TO PRINT THE STRING
Commands for manipulating files
```

```
                          C:\L2.ASM
MOV DX,OFFSET STR1 ;TO HOLD THE BEGINNNING ADDRESS OF STR1 AND ACCESS IT
MOV AH,9      ;TO PRINT THE STRING
INT 21H
CALL ENTERKEY    ;CALL THE PROCEDURE OF ENTERKEY
MOV DX,OFFSET STR2 ;TO HOLD THE ADDRESS OF STR2 AND ACCESS IT
MOV AH,9      ;TO PRINT THE STRING
INT 21H
CALL ENTERKEY    ;AGAIN CALL THE PROCEDSURE OF ENTER KEY
MOV DX,OFFSET STR3  ;TO HOLD THE ADDRESS OF STR2 AND ACCESS IT
MOV AH,9      ;TO PRINT THE STRING
INT 21H
MAIN ENDP    ;END THE MAIN PROGRAM
ENTERKEY PROC   ;PROCEDURE STARTS
MOV DX,10    ;NEW LINE FEED
MOV AH,2
INT 21H
MOV DX,13    ;CARRIAGE RETURN
MOV AH,2
INT 21H
RET          ;RETURN
ENTERKEY ENDP ;END THE ENTERKEY PROCEDURE
END MAIN      ;TO END THE MAIN PROGRAM
```

F1=Help   Line:13   Col:31

```
C:\>EDIT L2.ASM

C:\>MASM L2.ASM;
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  51680 + 464864 Bytes symbol space free

      0 Warning Errors
      0 Severe  Errors

C:\>LINK L2.OBJ;

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C:\>L2.EXE
HELLO FUTURE
NEVER GOODBYE
FOCUS ON GODD
```

TO PRINT STRING USING MACRO:

```
 File   Edit   Search   View   Options   Help
                    C:\L3.ASM
;TO PRINT STRING USING MACRO
DOSSEG  ;DOS SEGMENT
PRINT MACRO P1    ;MAKE MACRO FOR PRINTING
MOV DX,OFFSET P1  ;PASS PARAMETER
MOV AH,9
INT 21H
ENDM           ;END MACRO
.MODEL SMALL   ;MODEL DIRECTIVE
.STACK 100H    ;STACK SEGMENT DIRECTIVE
.DATA          ;USED TO DEFINE VARAIBLES
STR1 DB 'SET $ '      ;INTIALIZE STR1
STR2 DB 'YOURSLF $ ' ;INITIALIZE SRT2
STR3 DB 'FREE $ '     ;INITILIZE STR3
.CODE          ;EXECUTABLE INSTRUCTUION ARE WRITTEN
MAIN PROC
MOV AX,@DATA   ;TO ACCESS IN.DATA
MOV DS,AX      ;HEAP MEMEORY INTIALIZE
PRINT STR1
PRINT STR2
PRINT STR3
MOV AH,4CH     ;TO END THE REGISTER
INT 21H
 F1=Help                                    Line:1    Col:1
```

```
 File   Edit   Search   View   Options   Help
                    ┌─────────── C:\L3.ASM ───────────┐
MOV DX,OFFSET P1   ;PASS PARAMETER                                    ↑
MOV AH,9
INT 21H
ENDM             ;END MACRO
.MODEL SMALL    ;MODEL DIRECTIVE
.STACK 100H     ;STACK SEGMENT DIRECTIVE
.DATA           ;USED TO DEFINE VARAIBLES
STR1 DB 'SET $ '      ;INTIALIZE STR1
STR2 DB 'YOURSLF $ ' ;INITIALIZE SRT2
STR3 DB 'FREE $ '    ;INITILIZE STR3
.CODE           ;EXECUTABLE INSTRUCTUION ARE WRITTEN
MAIN PROC
MOV AX,@DATA   ;TO ACCESS IN.DATA
MOV DS,AX      ;HEAP MEMEORY INTIALIZE
PRINT STR1
PRINT STR2
PRINT STR3
MOV AH,4CH      ;TO END THE REGISTER
INT 21H
MAIN ENDP
END MAIN        ;TO END THE PROGRAM
                                                                     ↓
 F1=Help                                    │ Line:25     Col:1
```

```
C:\>EDIT L3.ASM

C:\>MASM L3.ASM;
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  51676 + 464868 Bytes symbol space free

     0 Warning Errors
     0 Severe  Errors

C:\>LINK L3.OBJ;

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C:\>L3.EXE
SET YOURSLF FREE
C:\>
```