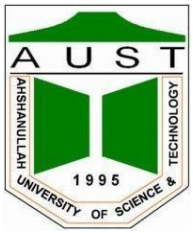

Ahsanullah University of Science & Technology

Department of Computer Science & Engineering

Course No : **CSE2214**
Course Title : **Assembly Language Programming Sessional**
Assignment No : **10**

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Submitted To : **Ms. Tahsin Aziz & Md. Siam Ansary**

Submitted By-

Group : **A1**
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Section : **A**

01 Suppose the class records are stored as follows:
CLASS
DB 'MARY ALLEN' ,67,45,98,33
DB 'SCOTT BAYLIS',70,56,87,44
DB 'GEORGE FRANK',82,72,89,40
DB 'SAM WONG',78,76,92,60
Each name occupies 12 bytes. Write a program to print the name of each student and his or her average (truncated to an integer) for the four exams.

Solution:

```
.MODEL SMALL
 .STACK 100H

 .DATA
   PROMPT_1   DB  'The Class Marks are as follows : ',0DH,0AH,'$'
   PROMPT_2   DB  0DH,0AH,'The Average Marks of Students are as follows : ',0DH,0AH,'$'

   AVERAGE  DW  4 DUP(0)

    CLASS   DB  'Mary Allen  ',67,45,98,33
          DB  'Scott Baylis',70,56,87,44
          DB  'George Frank',82,72,89,40
          DB  'Sam Wong    ',78,76,92,60

 .CODE
  MAIN PROC
    MOV AX, @DATA
    MOV DS, AX

    LEA DX, PROMPT_1
    MOV AH, 9
    INT 21H

    LEA SI, CLASS
    MOV BH, 4
    MOV BL, 16

    CALL PRINT_2D_ARRAY

    LEA DI, AVERAGE
    LEA SI, CLASS
    ADD SI, 12
```

```
MOV CX, 4

@COMPUTE_AVERAGE:
 XOR AX, AX
 MOV DX, 4

 @SUM:
  XOR BH, BH
  MOV BL, [SI]

  ADD AX, BX

  INC SI
  DEC DX
 JNZ @SUM

 MOV BX, 4
 DIV BX

 MOV [DI], AX
 ADD DI, 2
 ADD SI, 12
LOOP @COMPUTE_AVERAGE

LEA DX, PROMPT_2
MOV AH, 9
INT 21H

LEA SI, AVERAGE
LEA DI, CLASS
MOV CX, 4

@PRINT_RESULT:
 MOV BX, 12
 MOV AH, 2

 @NAME:
  MOV DL, [DI]
  INT 21H

  INC DI
```

```
    DEC BX
   JNZ @NAME

   MOV DL, 20H
   INT 21H

   MOV DL, ":"
   INT 21H

   MOV DL, 20H
   INT 21H

   XOR AH, AH
   MOV AL, [SI]

   CALL OUTDEC

   MOV AH, 2
   MOV DL, 0DH
   INT 21H

   MOV DL, 0AH
   INT 21H

   ADD SI, 2
   ADD DI, 4
  LOOP @PRINT_RESULT

  MOV AH, 4CH
  INT 21H
 MAIN ENDP


PRINT_2D_ARRAY PROC


 PUSH AX
 PUSH CX
 PUSH DX
 PUSH SI
```

```
MOV CX, BX

@OUTER_LOOP:
 MOV CL, BL
 MOV AH, 2

 @PRINT_NAME:
  MOV DL, [SI]
  INT 21H

  INC SI
  DEC CL

 CMP CL, 4
JG @PRINT_NAME

MOV DL, 20H
INT 21H

@INNER_LOOP:
  MOV AH, 2
  MOV DL, 20H
  INT 21H

  XOR AH, AH
  MOV AL, [SI]

  CALL OUTDEC

  INC SI
  DEC CL
JNZ @INNER_LOOP

MOV AH, 2
MOV DL, 0DH
INT 21H

MOV DL, 0AH
INT 21H

DEC CH
```

```
  JNZ @OUTER_LOOP

  POP SI
  POP DX
  POP CX
  POP AX

  RET
PRINT_2D_ARRAY ENDP

OUTDEC PROC

  PUSH BX
  PUSH CX
  PUSH DX

  XOR CX, CX
  MOV BX, 10

  @OUTPUT:
    XOR DX, DX
    DIV BX
    PUSH DX
    INC CX
    OR AX, AX
  JNE @OUTPUT

  MOV AH, 2

  @DISPLAY:
    POP DX
    OR DL, 30H
    INT 21H
  LOOP @DISPLAY
  POP DX
  POP CX
  POP BX

  RET
OUTDEC ENDP
```

Question 2:

Write a program that uses XLAT to

(a) read a line of text, and

(b) print it on the next line with all small letters converted to capitals.

The input line may contain any characters - small letters, capital letters, digit, characters, punctuation and so on.

Solution:

```
.MODEL SMALL
.STACK 100H
.DATA


   MSG DB 'ENTER TEXT: $'
   MSG2 DB 'IN UPPERCASE: $'
   TEXT DB 100 DUP ('$')

   TABLE DB 97 DUP (' '), 'ABCDEFGHIJKLMNOPQRSTUVWXYZ'


.CODE


   MAIN PROC
```

```
MOV AX, @DATA
MOV DS, AX

MOV AH, 9
LEA DX, MSG
INT 21H

LEA SI, TEXT

INPUT:
   MOV AH, 1
   INT 21H

   CMP AL, 13D
   JE END_INPUT

   CMP AL, 'a'
   JL BOTTOM
   CMP AL, 'z'
   JG BOTTOM
```

```
        LEA BX, TABLE
        XLAT

        BOTTOM:
            MOV [SI], AL
            INC SI

        JMP INPUT
    END_INPUT:

    CALL NEWL

    MOV AH, 9
    LEA DX, MSG2
    INT 21H
    LEA DX, TEXT
    INT 21H

    MOV AH, 4CH
    INT 21H
MAIN ENDP

PROC NEWL
    MOV AH, 2
```

```
    MOV DL, 10D
    INT 21H
    MOV DL, 13D
    INT 21H
    RET
  NEWL ENDP

END MAIN
```