Ahsanullah University of Science & Technology

Department of Computer Science and Engineering

Course No : CSE 2214

Course Title : Assembly Language Programming Sessional

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Question 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.

Answer:

```
.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

END MAIN
```

Question 02:
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.

Answer:

```
.MODEL SMALL
.STACK 100H

.DATA

MSG_1 DB 10,13,'ENTER ANY STRING: $'

MSG_2 DB 10,13,'THE ENTERED STRING: $'

MSG_3 DB 10,13,'CONVERTED STRING: $'

P LABEL BYTE
M DB 0FFH
L DB ?
```

```
Q DB 0FFH DUP('$')
DATA ENDS

DISPLAY MACRO MSG
   MOV AH,9
   LEA DX,MSG
   INT 21H

ENDM


.CODE

MAIN PROC
   MOV AX,DATA
   MOV DS,AX

   DISPLAY MSG_1

   LEA DX,P
   MOV AH,0AH
   INT 21H

   DISPLAY MSG_2

   DISPLAY Q

   DISPLAY MSG_3

   LEA SI,Q

   MOV CL,L
   MOV CH,0
```

```
CHECK:
  CMP [SI],41H
  JB DONE

  CMP [SI],61H
  JB DONE

  CMP [SI],7BH
  JG DONE

  UPR:
  SUB [SI],20H
  JMP DONE

  DONE:
  INC SI
  LOOP CHECK

  DISPLAY Q

 MOV AH,4CH
 INT 21H

 MAIN ENDP

END MAIN
```