



## **AHSANULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY**

### **Department of Computer Science and Engineering**

**Course No** : CSE 2214  
**Course Title** : Assembly Language Programming Sessional  
**Assignment no** : 07

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

#### **Submitted By:**

**Group** : A1  
**Name** : Nusrat Jahan  
**Id** : 18.01.04.020  
**Section** : A

Question no: 01

Question: Write a program that prompts the user to enter a character, and in subsequent lines prints its ASCII code in binary and the number of 1 bits in its ASCII code.

Solution:

```
.MODEL SMALL

.STACK 100H

.DATA
    M1 DB 'ENTER A CHARACTER :','$'
    M2 DB 0AH,0DH,'THE ASCII CODE OF '
    C1 DB ?, ' IN BINARY IS :','$'
    M3 DB 0AH,0DH,'THE NUMBER OF 1 BITS IS:'
    C2 DB ?, '$'

.CODE

    MAIN PROC

        MOV AX,@DATA
        MOV DS,AX

        LEA DX,M1

        MOV AH,9

        INT 21H

        MOV AH,1

        INT 21H

        MOV BL,AL

        MOV C1,AL

        LEA DX,M2

        MOV AH,9
```

```
INT 21H  
MOV BH,0  
MOV CX,8  
MOV AH,2
```

L1:

```
SHL BL,1  
JC L2  
MOV DL,'0'  
INT 21H  
JMP L3
```

L2:

```
MOV DL,'1'  
INT 21H  
INC BH
```

L3:

```
LOOP L1  
ADD BH,30H  
MOV C2,BH  
LEA DX,M3  
MOV AH,9  
INT 21H  
MOV AH,4CH  
INT 21H
```

MAIN ENDP

END MAIN

## Question no: 02

Question: Write a program that prompts the user to type a hex number of four hex digits or less, and outputs it in binary on the next line. If the user enters an illegal character, he or she should be prompted to begin again. Accept only uppercase letters. Your program may ignore any input beyond four characters.

### Solution:

```
.MODEL SMALL
.STACK 100H
.DATA
    M1 DB 0AH,0DH,'TYPE A HEXA NUMBER (0 - FFFF) : ','$'
    M2 DB 0AH,0DH,'IN BINARY IT IS : ','$'
    M3 DB 0AH,0DH,'ILLEGAL HEXA DIGIT, TRY AGAIN : ','$'
.CODE
    MAIN PROC
        MOV AX,@DATA
        MOV DS,AX
        LEA DX,M1
        MOV AH,9
        INT 21H
    START:
        XOR BX,BX
        MOV CL,4
        MOV AH,1
        INT 21H
```

WHILE:

```
CMP AL,0DH
JE END_WHILE
CMP AL,'0'
JL ERR
CMP AL,'9'
JG LETTER
AND AL,0FH
JMP SHIFT
```

LETTER:

```
CMP AL,'F'
JG ERR
CMP AL,'A'
JL ERR
SUB AL,37H
```

SHIFT:

```
SHL BX,CL
OR BL,AL
INT 21H
JMP WHILE
```

END\_WHILE:

```
LEA DX,M2
MOV AH,9
INT 21H
MOV CX,16
MOV AH,2
```

SHOW:

SHL BX,1

JC ONE

MOV DL,'0'

INT 21H

JMP DISPLAY

ONE:

MOV DL,'1'

INT 21H

DISPLAY:

LOOP SHOW

JMP OUT

ERR:

LEA DX,M3

MOV AH,9

INT 21H

JMP START

OUT:

MOV AH,4CH

INT 21H

MAIN ENDP

END MAIN

### Question no: 03

Question: Write a program that prompts the user to enter two unsigned hex numbers, 0 to FFFFh, and prints their sum in hex on the next line. If the user enters an illegal character, he or she should be prompted to begin again. Your program should be able to handle the possibility of unsigned overflow. Each input ends with a carriage return.

### Solution:

```
.MODEL SMALL
.STACK 100H
.DATA
    M1 DB 0AH,0DH,'ENTER THE FIRST HEXA NUMBER (0-FFFF):$'
    M2 DB 0AH,0DH,'ENTER THE SECOND HEXA NUMBER (0-FFFF):$'
    M3 DB 0AH,0DH,'THE SUM IN HEXA IS: $'
    M4 DB 0AH,0DH,'ILLEGAL HEXA DIGIT, TRY AGAIN :','$'
    COUNT DB 4
    VALUE DW ?
.CODE
    MAIN PROC
        MOV AX,@DATA
        MOV DS,AX
        LEA DX,M1
        MOV AH,9
        INT 21H
        CALL READ
        MOV VALUE,BX
```

```
LEA DX,M2
MOV AH,9
INT 21H
CALL READ
LEA DX,M3
MOV AH,9
INT 21H
ADD BX,VALUE
JC SHOWCY
MOV AH,2
MOV DL,'0'
INT 21H
JMP NEXT
```

SHOWCY:

```
MOV AH,2
MOV DL,'1'
INT 21H
```

NEXT:

```
CALL SHOW
MOV AH,4CH
INT 21H
```

MAIN ENDP

READ PROC

```
XOR BX,BX
MOV CL,4
MOV AH,1
INT 21H
```



WHILE:

CMP AL,0DH

JE END\_W

CMP AL,'0'

JL ERR

CMP AL, '9'

JG LETTER

AND AL,0FH

JMP SHIFT

LETTER:

CMP AL,'F'

JG ERR

CMP AL,'A'

JL ERR

SUB AL,37H

SHIFT:

SHL BX,CL

OR BL,AL

INT 21H

JMP WHILE

ERR:

LEA DX,M4

MOV AH,9

INT 21H

JMP READ

END\_W:

RET

READ ENDP

SHOW PROC

MOV CL,4

START:

MOV DL,BH

SHR DL,CL

CMP DL,9

JG LETTER1

ADD DL,30H

JMP SHOW1

LETTER1:

ADD DL,37H

SHOW1:

MOV AH,2

INT 21H

ROL BX,CL

DEC COUNT

CMP COUNT,0

JNE START

RET

SHOW ENDP

END MAIN

Question no: 04

Question: Write a program that prompts the user to enter a string of decimal digits, ending with a carriage return, and prints their sum in hex on the next line. If the user enters an illegal character, he or she should be prompted to begin again.

Solution:

```
.MODEL SMALL
.STACK 100H
.DATA
    M1 DB 0AH, 'ENTER A DECIMAL DIGIT STRING :$'
    M2 DB 0AH, 'THE SUM OF THE DIGIT IN HEX IS: $'
    M3 DB 0AH, 0DH, 'ILLEGAL CHARACTER, TRY AGAIN :', '$'
    COUNT DB 4
.CODE
    MAIN PROC
        MOV AX, @DATA
        MOV DS, AX
        LEA DX, M1
        MOV AH, 9
        INT 21H
        CALL READ
        LEA DX, M2
        MOV AH, 9
        INT 21H
        CALL SHOW
        MOV AH, 4CH
```

INT 21H

MAIN ENDP

READ PROC

READ\_START:

XOR BX,BX

WHILE:

MOV AH,1

INT 21H

CMP AL,0DH

JE END\_W

CMP AL,'0'

JL ERROR

CMP AL, '9'

JG ERROR

AND AL,0FH

CBW

ADD BX,AX

JMP WHILE

ERROR:

LEA DX,M3

MOV AH,9

INT 21H

JMP READ\_START

END\_W:

RET

READ ENDP

SHOW PROC

MOV CL,4

START:

MOV DL,BH

SHR DL,CL

CMP DL,9

JG LETTER1

ADD DL,30H

JMP SHOW1

LETTER1:

ADD DL,37H

SHOW1:

MOV AH,2

INT 21H

ROL BX,CL

DEC COUNT

CMP COUNT,0

JNE START

RET

SHOW ENDP

END MAIN