

# U19CS076 MIT ASSIGNMENT 10

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**Write 8086 Program for the following:**

**1. Program to add two numbers.**

**a) 16 bit addition**

```
;Assignment 10 q1 16 bit addition
```

```
dosseg
```

```
model small
```

```
.8086
```

```
.data
```

```
p1 dw 02A0H
```

```
p2 dw 0222H
```

```
p3 dw ?
```

```
.code
```

```
mov ax,@data
```

```
mov ds,ax
```

```
mov ax,p1
```

```
mov bx,p2
```

```
add ax,bx
```

```
mov p3,ax
```

mov ax,4c00h

int 21h

end

```
-u
076A:0000 B8B07      MOV     AX,076B
076A:0003 8ED8      MOV     DS,AX
076A:0005 A10600     MOV     AX,[0006]
076A:0008 8B1E0800   MOV     BX,[0008]
076A:000C 03C3      ADD     AX,BX
076A:000E A30A00     MOV     [000A],AX
076A:0011 B8004C     MOV     AX,4C00
076A:0014 CD21      INT     21
076A:0016 A00222     MOV     AL,[2202]
076A:0019 0200      ADD     AL,[BX+SI]
076A:001B 0000      ADD     [BX+SI],AL
076A:001D 810E00000000 OR      WORD PTR [0000],0000
-d
076A:0000 BB 6B 07 8E D8 A1 06 00-8B 1E 08 00 03 C3 A3 0A .k.....
076A:0010 00 B8 00 4C CD 21 A0 02-22 02 00 00 00 81 0E 00 ...L.!...".....
076A:0020 00 00 00 81 0E 10 00 02-00 81 0E 00 00 00 00 82 .....
076A:0030 0E FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0040 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0050 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0060 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0070 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
```

## b) 32 bit addition

;Assignment 10 q1 32 bit addition

dosseg

model small

.8086

.data

n11 dw 1234H

n12 dw 03A0H

n21 dw 0ABCH

n22 dw 0FFFH

n31 dw ?

n32 dw ?

car db ?

.code

mov ax,@data

mov ds,ax

mov dl,00h

mov ax,n12

mov bx,n22

add ax,bx

mov n32,ax

mov ax,n11

mov bx,n21

adc ax,bx

mov n31,ax

jnc move

inc dl

move: mov car,dl

mov ax,4c00h

int 21h

end

```

C:\TASM>debug q1b.exe
-u
076A:0000 B86C07      MOV     AX,076C
076A:0003 8ED8        MOV     DS,AX
076A:0005 B200        MOV     DL,00
076A:0007 A10E00      MOV     AX,[000E]
076A:000A 8B1E1200     MOV     BX,[0012]
076A:000E 03C3        ADD     AX,BX
076A:0010 A31600      MOV     [0016],AX
076A:0013 A10C00      MOV     AX,[000C]
076A:0016 8B1E1000     MOV     BX,[0010]
076A:001A 13C3        ADC     AX,BX
076A:001C A31400      MOV     [0014],AX
076A:001F 7302        JNB     0023
-d
076A:0000  B8 6C 07 8E D8 B2 00 A1-0E 00 8B 1E 12 00 03 C3  .l.....
076A:0010  A3 16 00 A1 0C 00 8B 1E-10 00 13 C3 A3 14 00 73  .....s
076A:0020  02 FE C2 88 16 18 00 B8-00 4C CD 21 34 12 A0 03  .....L.4...
076A:0030  BC 0A FF 0F FF FF FF FF-FF FF FF FF FF FF FF  .....
076A:0040  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF  .....
076A:0050  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF  .....
076A:0060  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF  .....
076A:0070  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF  .....

```

**c) 32 bit addition using DD directives.**

;Assignment 10 q1 32 bit addition using dd

dosseg

model small

.8086

.data

n1 dd 123403A0H

n2 dd 0ABC0FFFH

n3 dd ?

car db ?

.code

mov ax,@data

```
mov ds,ax
```

```
mov dl,00h
```

```
mov ax,word ptr n1
```

```
mov bx,word ptr n2
```

```
add ax,bx
```

```
mov word ptr n3,ax
```

```
mov ax,word ptr n1+2
```

```
mov bx,word ptr n2+2
```

```
adc ax,bx
```

```
mov word ptr n3+2,ax
```

```
jnc move
```

```
inc dl
```

```
move: mov car,dl
```

```
mov ax,4c00h
```

```
int 21h
```

```
end
```

```

C:\TASM>debug q1c.exe
-u
076A:0000 B86C07      MOV     AX,076C
076A:0003 8ED8          MOV     DS,AX
076A:0005 B200          MOV     DL,00
076A:0007 A10C00      MOV     AX,[000C]
076A:000A 8B1E1000     MOV     BX,[0010]
076A:000E 03C3          ADD     AX,BX
076A:0010 A31400      MOV     [0014],AX
076A:0013 A10E00      MOV     AX,[000E]
076A:0016 8B1E1200     MOV     BX,[0012]
076A:001A 13C3          ADC     AX,BX
076A:001C A31600      MOV     [0016],AX
076A:001F 7302          JNB     0023
-d
076A:0000 B8 6C 07 8E D8 B2 00 A1-0C 00 8B 1E 10 00 03 C3 .l.....
076A:0010 A3 14 00 A1 0E 00 8B 1E-12 00 13 C3 A3 16 00 73 .....s
076A:0020 02 FE C2 8B 16 18 00 B8-00 4C CD 21 A0 03 34 12 .....L.!..4.
076A:0030 FF 0F BC 0A FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0040 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0050 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0060 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0070 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....

```

## 2. Program to subtract two numbers.

### a) 16 bit subtraction

;Assignment 10 q1 16 bit addition

dosseg

model small

.8086

.data

p1 dw 12A2H

p2 dw 0222H

p3 dw ?

.code

mov ax,@data

mov ds,ax

mov ax,p1

mov bx,p2

sub ax,bx

mov p3,ax

mov ax,4c00h

int 21h

end

C:\TASM>debug q2a.exe

-u

```
076A:0000 B86B07      MOV     AX,076B
076A:0003 8ED8          MOV     DS,AX
076A:0005 A10600      MOV     AX,[0006]
076A:0008 8B1E0800    MOV     BX,[0008]
076A:000C 2BC3        SUB     AX,BX
076A:000E A30A00      MOV     [000A],AX
076A:0011 B8004C      MOV     AX,4C00
076A:0014 CD21      INT     21
076A:0016 A21222      MOV     [2212],AL
076A:0019 0200        ADD     AL,[BX+SI]
076A:001B 0000        ADD     [BX+SI],AL
076A:001D 810E00000000 OR      WORD PTR [0000],0000
```

-d

```
076A:0000 B8 6B 07 8E D8 A1 06 00-8B 1E 08 00 2B C3 A3 0A .k.....+...
076A:0010 00 B8 00 4C CD 21 A2 12-22 02 00 00 00 81 0E 00 ...L.!..."....
076A:0020 00 00 00 81 0E 10 00 02-00 81 0E 00 00 00 00 82 .....
076A:0030 0E FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0040 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0050 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0060 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0070 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
```

## **b) 32 bit subtraction**

;Assignment 10 q1 32 bit Subtraction

dosseg

model small

.8086

.data

n1 dd 123403A0H

n2 dd 0ABC0FFFH

n3 dd ?

car db ?

.code

mov ax,@data

mov ds,ax

mov di,00h

mov ax,word ptr n1

mov bx,word ptr n2

sub ax,bx

mov word ptr n3,ax

mov ax,word ptr n1+2

mov bx,word ptr n2+2

sbb ax,bx

mov word ptr n3+2,ax

jnc move



inc dl

move: mov car,dl

mov ax,4c00h

int 21h

end

```
C:\TASM>debug q2b.exe
-u
076A:0000 B86C07      MOV     AX,076C
076A:0003 8ED8      MOV     DS,AX
076A:0005 B200      MOV     DL,00
076A:0007 A10C00      MOV     AX,[000C]
076A:000A 8B1E1000    MOV     BX,[0010]
076A:000E 2BC3      SUB     AX,BX
076A:0010 A31400      MOV     [0014],AX
076A:0013 A10E00      MOV     AX,[000E]
076A:0016 8B1E1200    MOV     BX,[0012]
076A:001A 1BC3      SBB     AX,BX
076A:001C A31600      MOV     [0016],AX
076A:001F 7302      JNB     0023
-d
076A:0000 B8 6C 07 8E D8 B2 00 A1-0C 00 8B 1E 10 00 2B C3 .l.....+.
076A:0010 A3 14 00 A1 0E 00 8B 1E-12 00 1B C3 A3 16 00 73 .....s
076A:0020 02 FE C2 88 16 18 00 B8-00 4C CD 21 A0 03 34 12 .....L.!..4.
076A:0030 FF 0F BC 0A FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0040 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0050 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0060 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0070 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....

```

### 3. Program to multiply signed 16-bit numbers

;Assignment 10 q3 16 bit signed multiplication

dosseg

model small

.8086

.data

p1 dw 8005H

p2 dw 00FFH

p3 dw ?

.code

mov ax,@data

mov ds,ax

mov ax,p1

mov bx,p2

imul bx

mov p3,ax

mov ax,4c00h

int 21h

end

```

C:\TASM>debug q3.exe
-u
076A:0000 B8B07      MOV     AX,076B
076A:0003 8ED8      MOV     DS,AX
076A:0005 A10600      MOV     AX,[0006]
076A:0008 8B1E0800      MOV     BX,[0008]
076A:000C F7EB      IMUL    BX
076A:000E A30A00      MOV     [000A],AX
076A:0011 B8004C      MOV     AX,4C00
076A:0014 CD21      INT     21
076A:0016 0580FF      ADD     AX,FF80
076A:0019 0000      ADD     [BX+SI],AL
076A:001B 0000      ADD     [BX+SI],AL
076A:001D 810E00000000 OR      WORD PTR [0000],0000
-d
076A:0000 BB 6B 07 8E D8 A1 06 00-8B 1E 08 00 F7 EB A3 0A .k.....
076A:0010 00 B8 00 4C CD 21 05 80-FF 00 00 00 00 81 0E 00 ...L.!.....
076A:0020 00 00 00 81 0E 10 00 02-00 81 0E 00 00 00 00 82 .....
076A:0030 0E FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0040 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0050 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0060 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0070 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....

```

4. Program to multiply unsigned 16-bit numbers

;Assignment 10 q3 16 bit signed multiplication

dosseg

model small

.8086

.data

p1 dw 00A5H

p2 dw 003FH

p3 dw ?

.code

mov ax,@data

mov ds,ax

mov ax,p1

mov bx,p2

mul bx

mov p3,ax

mov ax,4c00h

int 21h

end

C:\TASM>debug q4.exe

-u

```
076A:0000 B8B07      MOV     AX,076B
076A:0003 8ED8      MOV     DS,AX
076A:0005 A10600     MOV     AX,[0006]
076A:0008 8B1E0800   MOV     BX,[0008]
076A:000C F7E3      MUL     BX
076A:000E A30A00     MOV     [000A],AX
076A:0011 B8004C     MOV     AX,4C00
076A:0014 CD21      INT     21
076A:0016 A5        MOVSW
076A:0017 003F      ADD     [BX],BH
076A:0019 0000      ADD     [BX+SI],AL
076A:001B 0000      ADD     [BX+SI],AL
076A:001D 810E00000000 OR     WORD PTR [0000],0000
```

-d

```
076A:0000 B8 6B 07 8E D8 A1 06 00-8B 1E 08 00 F7 E3 A3 0A .k.....
076A:0010 00 B8 00 4C CD 21 A5 00-3F 00 00 00 00 81 0E 00 ...L.!...?.....
076A:0020 00 00 00 81 0E 10 00 02-00 81 0E 00 00 00 00 82 .....
076A:0030 0E FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0040 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0050 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0060 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0070 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
-
```

## 5. Program for division of unsigned 8-bit numbers

;Assignment10 q5

; 8 bit unsigned division

dosseg

model small

.8086

.data

p1 db 0A5H

p2 db 03FH

q db ?

r db ?

.code

mov ax,@data

mov ds,ax

mov al,p1

mov bl,p2

mov ah,00h

div bl

mov q,al

mov r,ah

mov ax,4c00h

int 21h

end

```
-u
076A:0000 B8B07      MOV     AX,076B
076A:0003 8ED8      MOV     DS,AX
076A:0005 A00C00     MOV     AL,[000C]
076A:0008 8A1E0D00   MOV     BL,[000D]
076A:000C B400      MOV     AH,00
076A:000E F6F3      DIV     BL
076A:0010 A20E00     MOV     [000E],AL
076A:0013 88260F00   MOV     [000F],AH
076A:0017 B8004C     MOV     AX,4C00
076A:001A CD21      INT     21
076A:001C A5        MOVSX
076A:001D 3F        AAS
076A:001E 0E        PUSH    CS
076A:001F 0000      ADD     [BX+SI],AL
-d
076A:0000 BB 6B 07 8E D8 A0 0C 00-8A 1E 0D 00 B4 00 F6 F3 .k.....
076A:0010 A2 0E 00 88 26 0F 00 B8-00 4C CD 21 A5 3F 0E 00 ....&....L.!.?..
076A:0020 00 00 00 81 0E 10 00 02-00 81 0E 00 00 00 82 .....
076A:0030 0E FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0040 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0050 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0060 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0070 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
-
```

6. Program for division of unsigned 16-bit numbers

;Assignment 10 q6 16 bit unsigned division

dosseg

model small

.8086

.data

p1 dw 80A5H

p2 dw 003FH

p3 dw ?

p4 dw ?

```

.code

mov ax,@data

mov ds,ax


mov ax,p1

mov bx,p2

div bx

mov p3,ax

mov p4,dx


mov ax,4c00h

int 21h

end

```

```

C:\TASM>debug Q6.exe
-u
076A:0000 B8B07      MOV     AX,076B
076A:0003 8ED8      MOV     DS,AX
076A:0005 A10A00      MOV     AX,[000A]
076A:0008 8B1E0C00     MOV     BX,[000C]
076A:000C F7F3      DIV     BX
076A:000E A30E00      MOV     [000E],AX
076A:0011 89161000     MOV     [0010],DX
076A:0015 B8004C      MOV     AX,4C00
076A:0018 CD21      INT     21
076A:001A A5          MOVSX
076A:001B 803F00      CMP     BYTE PTR [BX],00
076A:001E 0E          PUSH    CS
076A:001F 0000      ADD     [BX+SI],AL
-d
076A:0000  B8 6B 07 8E D8 A1 0A 00-8B 1E 0C 00 F7 F3 A3 0E  .k.....
076A:0010  00 89 16 10 00 B8 00 4C-CD 21 A5 80 3F 00 0E 00  .....L.!...?...
076A:0020  00 00 00 81 0E 10 00 02-00 81 0E 00 00 00 00 82  .....
076A:0030  0E FF FF FF FF FF FF FF-FF FF FF FF FF FF FF  .....
076A:0040  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF  .....
076A:0050  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF  .....
076A:0060  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF  .....
076A:0070  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF  .....

```

## 7. Program for division of signed 8-bit numbers

;Problem 7

Dosseg

model small

.8086

.stack 10h

.data

a db -03H

b db 05H

c dw ?

.code

start:

mov ax,@data

mov ds,ax

mov al,a

cbw

idiv b

mov c,ax

mov ah,4ch

int 21h



end

```
-u
076A:0000 BB6B07      MOV     AX,076B
076A:0003 8ED8        MOV     DS,AX
076A:0005 A00400      MOV     AL,[0004]
076A:0008 98          CBW
076A:0009 F63E0500     IDIV    BYTE PTR [0005]
076A:000D A30600      MOV     [0006],AX
076A:0010 B44C        MOV     AH,4C
076A:0012 CD21      INT     21
076A:0014 FD      STD
076A:0015 05007F     ADD     AX,7F00
076A:0018 0E      PUSH    CS
076A:0019 0000      ADD     [BX+SI],AL
076A:001B 0000      ADD     [BX+SI],AL
076A:001D 820E000000    OR      BYTE PTR [0000],00
-d
076A:0000 B8 6B 07 8E D8 A0 04 00-98 F6 3E 05 00 A3 06 00 .k.....>.....
076A:0010 B4 4C CD 21 FD 05 00 7F-0E 00 00 00 00 82 0E 00 .L.!.....
076A:0020 00 00 00 82 0E 10 00 02-00 82 0E 00 00 00 FF FF .....
076A:0030 0E FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0040 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0050 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0060 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
076A:0070 FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF .....
```

## 8. Program for division of signed 16-bit number

;Problem 8

.model small

.8086

.stack 10h

.data

a dw -3ff0h

b dw 0511h

c dw ?

r dw ?

.code

start:

mov ax,@data

mov ds,ax

mov ax,a

cwd

idiv b

mov c,ax

mov r,dx

mov ah,4ch

int 21h

end start

C:\TASM>debug q8.exe

-u

```
076A:0000 B86B07      MOV     AX,076B
076A:0003 8ED8             MOV     DS,AX
076A:0005 A10800          MOV     AX,[0008]
076A:0008 99              CWD
076A:0009 F73E0A00        IDIV    WORD PTR [000A]
076A:000D A30C00          MOV     [000C],AX
076A:0010 89160E00        MOV     [000E],DX
076A:0014 B44C             MOV     AH,4C
076A:0016 CD21             INT     21
076A:0018 10C0             ADC     AL,AL
076A:001A 1105             ADC     [DI],AX
076A:001C 00B10E00        ADD     [BX+DI+000E],AL
```

-d

```
076A:0000  B8 6B 07 8E D8 A1 08 00-99 F7 3E 0A 00 A3 0C 00  .k.....>.....
076A:0010  89 16 0E 00 B4 4C CD 21-10 C0 11 05 00 81 0E 00  ....L.!.!.....
076A:0020  00 00 00 81 0E 10 00 02-00 81 0E 00 00 00 FF FF  .....
076A:0030  0E FF FF FF FF FF FF FF-FF FF FF FF FF FF FF  .....
076A:0040  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF  .....
076A:0050  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF  .....
076A:0060  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF  .....
076A:0070  FF FF FF FF FF FF FF FF-FF FF FF FF FF FF FF  .....
-
```