Problem Set 1

This problem set is from content covered in lecture 1-4

Note: numbers written in 0xabcd format are in hex.

Question 1:

Solve Exercise questions 1 to 15 and 20, 21 from Chapter 1 Bilal Hashmi.

Question 2:

I. What is a label and how does the assembler differentiates between code labels and data labels?
II. List the seven addressing modes available in the 8088 architecture.
III. ***Effective address*** is there resultant address of whatever is written in square brackets.
For example if bx=0x0100 then [bx+12] will generate effective address of 0x010C.
What is the effective address generated by the following instructions? Every instruction is independent of others.
Initially BX=0x0100, num1=0x1001, [num1]=0x0000, and SI=0x0100

    a. mov ax, [bx+12]

    b. mov ax, [bx+num1]

    c. mov ax, [num1+bx]

    d. mov ax, [bx+si]

IV. What is the effective address generated by the following combinations if they are valid. If not give reason.
Initially BX=0x0100, SI=0x0010, DI=0x0001, BP=0x0200, and SP=0xFFFF

    a. bx-si

    b. bx-bp

    c. bx+10

    d. bx-10

    e. bx+sp

    f. bx+di

V. Identify the problems in the following instructions and correct them by replacing them with one or two instruction having the same effect.
a. mov [02], [22]
b. mov [wordvar], 20
c. mov bx, al
d. mov ax, [si+di+100]

I. Write the value of register ax after each instruction. Assembling and running the code will help you solve the problem

[org 0x0100]
 	
mov ax, num1
mov ax, 0 ; set ax to zero see the effect of next instruction
mov ax, [num1]
mov ax, 0
mov al, [num1]
mov ax, 0
mov ah, [num1]
mov ax, 0
 	
mov ax, num2
mov ax, 0
mov ax, [num2]
mov ax, 0
mov al, [num2]
mov ax, 0
mov ah, [num2]
mov ax, 0
 	
mov ax, num3
mov ax, 0
mov ax, [num3]
mov ax, 0
mov al, [num3]
mov ax, 0
mov ah, [num3]
mov ax, 0
 	
mov ax, num3+1
mov ax, 0
mov ax, [num3+1]
mov ax, 0
mov al, [num3+1]
mov ax, 0
mov ah, [num3+1]
mov ax, 0
 	
mov ax, num3+2
mov ax, 0
mov ax, [num3+2]
mov ax, 0
mov al, [num3+2]
mov ax, 0
mov ah, [num3+2]
mov ax, 0
 	
mov ax, 0x4c00 ; terminate program
int 0x21
num1: dw 0102h
num2: db 03h
num3: dd 04050607h
	Value of ax?

I. Identify which of the following instruction assembly correctly, which ones give warning and which ones will give error. Assembling and running the code will help you solve the problem

```
a. mov num1, 1
b. mov [num1], 1
c. mov num1, 0A0Bh
d. mov ax, [num1]
e. mov byte [num1], 0A0Bh
f. mov byte [num1], 0Ah
g. mov word [num1], 0A0Bh
h. mov ax,[bx]
i. mov bx, [ax]
j. mov ax, [bx-10]
```

Consider num1 as follow

```
num1: dw 0
```

II. If following is the listing file of code, then what will be the size of .com file?

```
 1                                  [org 0x0100]
 2
 3 00000000 A1[1000]                    mov ax, [num1]
 4 00000003 8A1E[1200]                  mov bl, [num2]
 5 00000007 B700                        mov bh,0
 6 00000009 01D8                        add ax, bx
 7
 8
 9 0000000B B8004C                  mov ax, 0x4c00 ; terminate program
10 0000000E CD21                    int 0x21
11
12 00000010 0201                    num1: dw 0102h
13 00000012 03                      num2: db 03h
14 00000013 0000                    sum: dw 0
```

III. Complete the following code, instructions are given in comments

```
[org 0x0100]

      ;write your code here to add 8 numbers of num1 and num2
      ;store the result in sum
      ;hint: be careful of data type

mov ax, 0x4c00 ; terminate program
int 0x21
num1: dw 1, 2, 3, 4
num2: db 10, 11, 5, 6
sum: dw 0
```

IV. Identify the problem in following code. Assembling and running the code will help you identify the problem.

```
num1: dw 1,
num2: db 10
sum: dw 0

[org 0x0100]
       mov ax, [num1]
       mov bl, [num2]
       add ax, bx
       mov [sum], ax

       mov ax, 0x4c00 ; terminate program
       int 0x21
```