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. Work out the answers by hand, then assemble and run the code to check your answers.

[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 assemble correctly, which ones give warning and which ones will give error.

```
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 run the code might NOT reveal the problem.

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

       mov ax, 0x4c00 ; terminate program
       int 0x21

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