Assignment # 1

Assembly Language Programming

Sections C & D

**Note: Slide hard copy of your assignment in my office till 10th September 2015. No Plagiarism! It would result in an undefined behavior.**

1. What is the difference between carry and overflow flag? Enlist the rules when carry and overflow flags are set, each with an example. Also mention an example of the situation where both carry and overflow flag are set.
2. Suppose CS=1672 and IP=147E and DS=F119 then what should be the offset of DS to access the same memory location as CS:IP?
3. Give the value of the zero flag, the carry flag, the sign flag, and the overflow flag after execution of each line of the following instructions in sequence.

AX = 0x1254 and BX = 0x0FFF.

* 1. add ax, 0xEDAB

add ax, bx

add bx, 0xF001

* 1. mov dx, 0  
     dec dx
  2. mov cx, 695Fh  
     sub cx, A218h
  3. mov al, 0DFh  
     add al, 32h
  4. mov cx, 8000h  
     add cx, A69Fh
  5. ax, 0B6D4  
     add al, 0B3h
  6. mov ah, -56  
     add ah, -60
  7. mov cx, -4097  
     add cx, 1001h
  8. mov bx, 0x0123  
     mov ax, 0xFFFF  
     and ax, bx

1. Given that: CS=0x5645, DS=0x1000, ES=0x6783, SS=0x0FFF, BX=0x4567, SI=0x1000, DI=0x2000, BP=0x4500

Write the physical address of the memory locations read or written by the following instructions. All of them are independent of each other. ax=0 initially.

a) mov ax, [si]

b) mov ax, [bp]

c) mov ax, cs:[bp+20]

d) mov ax, [bx+si+10]

e) mov ss:[bx+di], ax

f) mov es:[bp+si+0x200], 20

1. What are the first and the last physical memory addresses accessible using the following segment values?
   1. E000
   2. 0FFF
   3. 1002
   4. 0001
   5. 1000
2. Identify and mention problems in the following instructions (if any) and correct them by replacing them with instruction(s) having the same effect if possible.
   1. mov 123, dh
   2. mov [a], 20
   3. inc ax, 1
   4. mov dx, si
   5. mov [12], [ 45]
   6. mov bx, al
   7. mov cx, 6F23458h
   8. sub al, 256
   9. mov dx, 7F65h
   10. mov ss, ds
   11. dec ip
   12. mov si, cl
   13. mov ax, [si+di+20]
   14. dec dx
   15. mov al,100h
3. If ax=8FFF and bx=0FFF and “cmp ax, bx” is executed, which of the following jumps will be taken? Each part is independent of others. Also give the value of Z, S, and C flags.
   1. jg greater
   2. jl smaller
   3. js above
   4. jb above
4. Write a code that calculates the maximum, minimum and average of an array of fixed size in one pass and places the three values in ax, cx and dx respectively at the end.
5. Write a program to search a particular element from an array using binary search. If the element is found set ax to one and otherwise to zero.
6. Write a program to calculate the factorial of a number where factorial is defined as:  
     
   *factorial(x) = x \* (x-1) \* (x-2) \* ……. \* 3 \* 2 \* 1*

*factorial(0) = 1*

Place the answer in ax register at the end.

1. Write a program to calculate the Fibonacci of a given number in a register. The Fibonacci of a number is defined thus:  
     
   *fibonacci(0) = 1  
   fibonacci(1) = 1  
   fibonacci(n) = fibonacci(n - 1) + fibonacci(n - 2)*

Place the answer in ax register at the end.

Good Luck…!!!