EE213 Computer Organization and Assembly Language
Quiz I _**Section H**_Fall 2019
September 18, 2019
Paper-B _SOLVED

1. Given the code snippet below, assuming the given data segment starts at **1912 FFC1**h, answer the following questions. **[06 Points]**

```
.data
     var1          BYTE  2 DUP(12h,01h,11h),0
     var2          WORD  2 DUP (360Fh,1301h,141h)
     var3          DWORD 0FCC21h, $
.code
     MOV           ESI, OFFSET [var1 + 0Ch]        ;ESI = 1912 FFCD
     MOV           EAX, DWORD PTR [ESI]            ;EAX = 0136 0F01
     MOV           EBX, DWORD PTR [var3+4]         ;EBX = 1912 FFD8
     ADD           WORD PTR [EBX], 2               ;[1912FFD8] = DAh
     MOV           EDX, EAX                        ;EDX = 0136 0F01
     XCHG          DH,   DL                        ;EDX = 0136 010F
     SUB           ESI, 4                          ;ESI = 1912 FFC9
     XCHG          AX,   WORD PTR [ESI]            ;EAX = 0136 0136
                                                   ;[1912 FFC9] = 01
                                                   ;[1912 FFCA] = 0F
```

var1	1912 FFC1	12	var2	1912 FFC8	0F		1912 FFCF	36	1912 FFD6	0F
	1912 FFC2	01		1912 FFC9	36		1912 FFD0	01	1912 FFD7	00
	1912 FFC3	11		1912 FFCA	01		1912 FFD1	13	1912 FFD8	D8
	1912 FFC4	12		1912 FFCB	13		1912 FFD2	41	1912 FFD9	FF
	1912 FFC5	01		1912 FFCC	41		1912 FFD3	01	1912 FFDA	12
	1912 FFC6	11		1912 FFCD	01	var3	1912 FFD4	21	1912 FFDB	19
	1912 FFC7	00		1912 FFCE	0F		1912 FFD5	CC		

A. What does **EAX**, and **EDX** contain after the above code gets executed? **[02 Points]**

EAX = 0136 0136h
EDX = 0136 010Fh

B. Draw out whole the **data segment** (byte by byte) after above code gets executed. **[06 Points]**

var1	1912 FFC1	12	var2	1912 FFC8	0F		1912 FFCF	36	1912 FFD6	0F
	1912 FFC2	01		1912 FFC9	**01**		1912 FFD0	01	1912 FFD7	00
	1912 FFC3	11		1912 FFCA	**0F**		1912 FFD1	13	1912 FFD8	**DA**
	1912 FFC4	12		1912 FFCB	13		1912 FFD2	41	1912 FFD9	**FF**
	1912 FFC5	01		1912 FFCC	41		1912 FFD3	01	1912 FFDA	12
	1912 FFC6	11		1912 FFCD	01	var3	1912 FFD4	21	1912 FFDB	19
	1912 FFC7	00		1912 FFCE	0F		1912 FFD5	CC		

2. Briefly elaborate the purpose of each of the following components with example. **[04 Points]**

1. Instruction Queue **2.** Parity Flag (PF) **3.** `MOVSX` Instruction **4.** ESS Register

1. The ESS (Extended Stack Segment) register contains the stack segment number (base addresses).

2. After loading the instructions of executable program are maintained in a queue on the memory, the **Instruction Queue**. Instructions are fetched for execution from this instruction queue.

3. The **Parity** flag (PF) is set if the least-significant byte in the result contains an even number of 1 bits.

```
mov         bl,10001111b
sub         bl,10000000b          ;SF =1
```

4. The **MOVSX** instruction (move with sign-extend) copies the contents of a source operand into a destination operand and fills the upper half of the destination with a copy of the source operand's sign bit.

```
mov         bl,10001111b
movsx       ax,bl             ; sign extension
```