COEN 311 – Computer Organization and Software

Department of Electrical and Computer Engineering

Assignment 3, Fall 2022

Due: Nov. 25, 2022
In this assignment, you will answer the following questions. Write your answer in the exact place:

Your Information:	
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Grade:	

Question 1	**Grade**
2- Write an assembly program with the following components. • Consider two values: 12F0 and 0A00 • Write a subroutine and pass the above values to the subroutine by stack. • The subroutine multiplies the two values and returns the result back to the main program using stack. • Analyze the stack and its contents for each subroutine if SP= FFFA H immediately before the first CALL in the main function.	**50**

```
section .data
        x dw 4848   ;define x as 12f0h
        y dw 2560  ; define y as 0a00h
section .text
        global_start

_start:
        MOV ESP, FFFAH ; initialize esp to fffah
        PUSH [X] ; push x onto stack
        PUSH [Y] ; push y onto stack

        CALL _multiply ; call multiplication subroutine
        ADD ESP, 2 ; reposition at top of stack
        POP [y] ; pop value from stack into y
        HLT

_multiply:

        ADD ESP, 4

        POP BX ; pop from stack into bx
        POP AX

        MUL BX
```

PUSH AX **SUB ESP, 6** **RET**	

Question 2	**Grade**
What operation is performed by the instruction sequence that follows? Show me the content of the Status register and AH after executing the code. **Assume (DS) = 0100, (SI) = 0200 H, [200H]=A5H** **MOV AH, [SI]** **SAHF** **ANSWER:** **The first instruction moves value at address 01200H (DS:SI) into AH.** **The SAHF (store AH into flags) instruction transfers bits b7, b6, b4,b2 and b0 from register AH into SF,ZF,AF,PF and CF respectively. In this case the A5H is moved to AH. Then AH will be transferred to flag registers.** **SF=1** **ZF=0** **AF=0** **PF=1** **CF=1**	**20**

Question 3	**Grade**

Assume the values are unsigned, what happens to ZF and CF status flags after the following instructions are executed? Assume that they are both initially cleared.
MOV BX, 1111H
MOV AX, BBBB H
CMP BX, AX
ANSWER:
CMP compares destination and source and sets ZF =1 if both are equal.
In this case ZF=0 .
And if destination less than source CF = 1.
In this case CF =1
	30

Grading Policy:
The assignment score is out of 100 points. Here are some aspects that may lead to points deduction:

- The answers are missing.
- Missing steps.
- Inappropriate data to answer your question.
- Do your best to include exhaustive details, the final answer alone is not enough to get points.
- Collaborate on the individual assignment.