National University
of Computer and Emerging Sciences
Chiniot-Faisalabad Campus

Assignment # 1

Submission Guidelines

1) **Solve the assignment on word or any other software and submit the assignment on google classroom**
2) **Submit before the deadline to avoid any issues**
3) **This assignment holds 100 marks, weightage of each question is mentioned**
4) **As always, plagiarism will result in zero marks**

Q1) What are the segments that memory is divided in the 8088 architecture, write their names and names of their corresponding offset registers. **(5)**

Q2) Write a program in assembly language to calculate the square of any number placed inside AX, use of MUL is not allowed. **(5)**

Q3) How does Intel 8086 microprocessor convert a 16 bit logical address pair into a 20 bit physical address? Show with an example. **(5)**

Q4) How can the following flags be affected? Write instructions to set and clear their values. **(5)**

i) Carry Flag

ii) Zero Flag

ii) Overflow Flag

Q5) What are the contents of memory locations 100, 101, 102, and 103 if the word 0xE32A is stored at offset 100 and the word 0xB801 is stored at offset 102? **(5)**

Q6) What is the difference between little endian and big endian formats? Which format is used by the Intel 8088 microprocessor? **(5)**

Q7) What are the first and the last physical memory addresses accessible using the following segment values? **(10)**

i) 0AB0
ii) 0F5F
iii) 1002
iv) 0101
v) E010

Q8) Give the value of the zero flag, the carry flag, the sign flag, and the overflow flag after each of the following instructions if AX is initialized with 0x1254 and BX is initialized with 0x0FFF. **(5)**

i) add ax, 0xEDAB
ii) add ax, bx
iii) add bx, 0xF001

Q9) How much memory (RAM) can be accommodated in MBs by processors that have an address bus of length 16, 32 and 64 bit respectively?. **(5)**

Q10) Parity bit checks for single-bit errors. It's an extra bit added to a string of binary code to ensure data integrity. Electronic voting has been introduced in Pakistan and Ali is a strong candidate for being elected as Mayor. His current vote count is 1023(1111111111). Unfortunately, a high energy proton from space hits the processor of one of the voting machines causing two of the bits to flip in ax register. Thus, changing Ali's vote count to 983 (1111010111) and giving lead to his opponent. Will parity bit detect error here? Justify your answer. **(5)**

Q 11) What were the reasons behind the introduction of segmentation in the 8088 microprocessor architecture? How did segmentation address the limitations of earlier memory management approaches? **(5)**

Q 12) 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 **(10)**

a. bx-si

b. bx-bp

c. bx+10

e. bx+sp

f. bx+di

Q 13) Write an assembly language program that calculates the first 5 numbers of the Fibonacci sequence and stores them in consecutive memory locations. Use only the ADD and MOV instructions. **(10)**

Q 14) Write an assembly program that calculates the sum of an array of 5 integers. Assume the array is stored in consecutive memory locations starting at a known address. **(10)**

Q 15) Write an assembly program that multiplies a positive integer with 5 using repeated addition. The integer is initially stored in a memory location. The result should be stored in another memory location. **(10)**