Sheet 1

1. State another way to increase the processing power of the CPU other than increasing the frequency.

2. Which of the following instructions cannot be coded in 8086 Assembly language? Give the reason why not, if any.

   (a) MOV AX,27
   (b) MOV AL,97F
   (c) MOV DS,9BF2
   (d) MOV CX,397
   (e) MOV 81,9516
   (f) MOV CS,3490
   (g) MOV DS,BX
   (h) MOV BX,CS
   (i) MOV CH,AX
   (j) MOV AX,23FB9
   (k) MOV CS,BH
   (l) MOV AX,DL

3. If an instruction that needs to be fetched is in physical memory location 389F2 and CS = 2700, does the code segment range include it or not? If not, what value should be assigned to CS if the IP must be = 1282?

4. Assume that SP = FF2EH, AX = 3291H, BX = F43CH, and CX = 09. Find the content of the stack and stack pointer after the execution of each of the following instructions.

   ```
   PUSH AX
   PUSH BX
   POP AX
   PUSH CX
   POP BX
   ```

5. What is the function of the following code? Suggest a one-liner replacement for this code snippet.

   ```
   PUSH AX
   PUSH BX
   POP AX
   POP BX
   ```

6. What is the main disadvantage of the stack as temporary storage compared to having a large number of registers inside the CPU?

7. Find the status of the CF, PF, AF, ZF, and SF for the following operations.

(a) MOV BL,9FH
    ADD BL,61H

(b) MOV AL,23H
    ADD AL,97H

(c) MOV DX,10FFH
    ADD DX,1

8. Assume that the registers have the following values (all in hex) and that CS=1000, DS = 2000, SS = 3000, SI = 4000, DI : 5000, BX = 6080, BP = 7000, AX=25FF, CX = 8791, and DX = 1299. Calculate the physical address of the memory where the operand is stored and the contents of the memory locations in each of the following addressing examples.
   (a) MOV [SI],AL
   (b) MOV [SI+BX+8],AH
   (c) MOV [BX],AX
   (d) MOV [DI+6],BX
   (e) MOV [DI][BX]+28,CX
   (f) MOV [BP][SI]+10,DX

9. Make the following programs:
   a) Calculate the sum of the first ten numbers of Fibonacci series and store the result in r0.
   b) Calculate the sum of the numbers 1: N where N is stored in r1. Store the result in r0.
   c) Perform the following:
      i) Find three methods to multiply a number (0x28) in r0 by two.
      ii) There is no divide instruction in the ARM processor. Divide the same number (0x28) by four.
      iii) Store your results in different registers.

Hint: Use whatever you have! Cheat sheet or online documentation, Just get your code running!