

Mmicroprocessors and interfacing assignment

Submission date : January 15, 2015 E.C

1. List the right sequence of operations the cpu performs when the following external events occur
 - a. The reset input pin is held low for 5 clock cycles
 - b. The NMI pin is pulled low
 - c. The INTR pin is pulled low
2. The 8086 has 6byte instruction queue
 - a. Using a flow chart show the operation logic of the queue
 - b. Assuming all instructions are 32-bit long, how many clock cycles would the CPU save by using the queue?
3. Identify the addressing mode for each of the following instructions (1-6). Determine the values of the variables value and char at the end of the instructions.

Const equ 0dh

.data

Value dw ?

Char db ?

Array db 0,0,5,2

1. Mov value, 100
 2. Mov cx, array [si]
 3. Mov char, 'a'
 4. Add char, const
 5. Xor cx, cx
 6. Add value, cx
4. For each of the following instructions the initial values are given. Determine the contents after the instruction are executed:

	Before	instruction	after
I.	AX = 3456h Cx = 08F4h All flags = 0	ADD al, cl	ax, cx, CF, OF, ZF
II.	Bx = 3805h ax = 2034h CF =ZF = 0	DIV bl	ax, ZF, PF
III.	DX = F031h AX = C240h SF=1, CF =OF=0	IMUL DX	DX, AX, SF, OF, CF

5. Write a complete 8086 assembly language program to prompt the radius of a circle and to display its area and circumference. Allow 8-bit integer values.
6. Write a complete 8086 assembly language program to prompt the values of x, y and z and display the value of the expression $2\pi(x-y) + z$. Allow for 16 bit integer values.
7. Suppose we have a two player game. The game works in the following sequence:
 - 8086 prompts player1 to enter a 6 character secrete code
 - 8086 receives and saves the secrete code
 - 8686 prompts player2 to guess player1's secrete code
 - (it allows only 5 guesses, after the fifth guess if the ce=ode is incorrect the 8086 displays "sorry, the code you entered is wrong, start new game?"
 - if the y key is pressed the sequence repeats again, else the system doesn't respond
 Write a complete assembly language program to implement this game, comment you code as appropriate.
8. Given the following C++ code fragment. Convert it in to 8086 assembly language program.


```

Int Sum = 0;
Int Count = 10;
While (sum < 20 || count >= 0)
{
    Sum = sum + count
    Count—
}
      
```
9. Why direct memory access (DMA) is preferred to programmed data transfer in applications requiring transfer of large amount of data?
10. Data transfer can be synchronous, asynchronous (with handshake) or interrupt driven. Given below are three typical peripheral devices to be interfaced with the 8086 MPU. Which transfer scheme is "best" for each of these devices, justify your answer
 - a) A standard keyboard
 - b) A serial flash memory
 - c) A communication modem (e.g. RS-232)
11. The following two memory chips are to be interfaced to the 8086 MPU. Draw a schematic diagram containing the 8086, address and data latches, address decoder and the memory devices given below with all the interconnections.
 - i) An 8K EEPROM (27C64) to store the BIOS and user programs
 - ii) A 16K SRAM (SR16) to hold temporary working data (starting address = 3C000h)