Question:1

Consider following hypothetical machine.

Processor has a signle data register.

Instructions and data are 16 bits.

Instruction format specifies 4 bit of opcode and 12 bits of for address reference.

Internal CPU registers

1. Program Counter
2. Instruction Register
3. Accumulator

Op-Codes are:

0001 = Add to AC from memory

0010 = Substract contents of memory from AC

0101 = Load AC from memory

0100 = Store AC to memory

Illustrate a program execution, showing relevant portions of memory and processor registers.

Substract the contents of memory location 502 from location 501 and store result in 501.

300: 5501	**PC =** 300
301:	**AC =**
302:	**IR =** 5501
501: 0004	
502: 0001	

Bonus Question: (2 marks)

Two more I/O instructions:

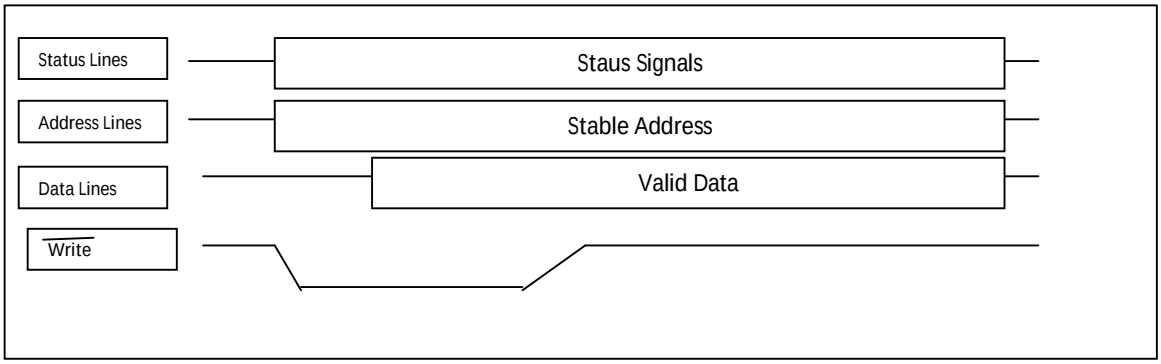
1. 0011 = Load AC from I/O
2. 0111 = Store AC to I/O

The twelve bit address identifies a particular I/O device. Show the program execution for following program:

- Load AC from device 5.
- Add contents of memory location 940.
- Store AC to device 6.

Question 2. Draw state diagram of instruction cycle. Explain any two of them 3 Marks

Question 3. Find error in this timing diagram. 2 Marks



Question 4. What do the following abbreviations stand for: 1 Mark

DMA

PC