

Date: 11/02/15

COMPUTER ORGANIZATION
AND ARCHITECTURE
(ETCS-204)

Submission Date:

18/02/15

BATCH: 4th Sem IT

ASSIGNMENT-3

M.M: 30 marks

Q.1: A computer uses a memory unit with 256K words of 32bits each. A binary instruction code is stored in one word of memory. The instruction has four parts: an indirect bit, an operation code, a register code part to specify one of 64 registers, and an address part.

(a.) How many bits are there in the operation code, the register code part, and the address part?

(b.) Draw the instruction word format and indicate the number of bits in each part.

(c.) How many bits are there in the data and address inputs of the memory? [3 marks]

Q.2: What is the difference between a direct and an indirect address instruction? How many references to memory are needed for each type of instruction to bring an operand into a processor register? [2 marks]

Q.3: The content of AC in the basic computer is hexadecimal A937, and the initial value of E is 1. Determine the contents of AC, E, PC, AR, and IR in hexadecimal after the execution of the CLA instruction. Repeat 11 more times, starting from each one of the register-reference instructions. The initial value of PC is hexadecimal 021. [5 marks]

Q.4: The content of PC in the basic computer is 3AF (all numbers are in hexadecimal). The content of AC is 7EC3. The content of memory at address 3AF is 932E. The content of memory at address 32E is 09AC. The content of memory at address 9AC is 8B9F.

(a.) What is the instruction that will be fetched & executed next? [2 marks]

(b.) Show the binary operation that will be performed in the AC when the instruction is executed. [3 marks]

(c.) Give the contents of registers PC, AR, DR, AC, and IR in hexadecimal and the values of E, I, and the sequence counter SC in binary at the end of the instruction cycle. [7 marks]

Q.5: (i) What is the difference between a microprocessor and a microprogram? Is it possible to design a microprocessor without a microprogram? Are all microprogrammed computers also microprocessors? [4 marks]

(ii) Explain the difference between hardwired control and microprogrammed control. Is it possible to have a hardwired control associated with a control memory? [2 marks]

(iii) Define the following: (a) microoperation; (b) microinstruction; (c) microprogram; (d) microcode [2 marks]