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MCS-012

MCA (Revised)

Term-End Examination

December, 2012 15316

MCS-012 : COMPUTER ORGANISATION & ASSEMBLY LANGUAGE PROGRAMMING

Time : 3 hours *Maximum Marks : 100*

(Weightage 75%)

Note : *Question no. 1 is* ***compulsory*** *and carries 40 marks. Attempt* ***any three*** *questions from the rest.*

1. (a) IEEE floating point representation for single precision number use the format as: signbit (1bit) Biased exponent (8 bits) significant. (23 bits) In this representation a floating point number, where 0<E<255 having any significant is equivalent to $\pm(1.N)\,2^{(E-127)}$ Using this format represent the following decimal numbers: (i) 0.125 (ii) 4 Now using the IEEE floating point single representation of the numbers. Perform the operations: $0.125+4$ and 0.125×4 6

(b) Simplify the following using Karnaugh's map: $F(A,B,C,D) = \Sigma(0,1,3,5,9,11,14)$. Draw the logic diagram for the resultant boolean expression using AND-OR-NOT gates. 6

(c) Consider a cache uses a direct mapping scheme. The size of main memory is 4 k Bytes and word size of cache is 2 bytes. The size of cache memory is 128 bytes. Find the following : 7

(i) The size of main memory address (assume each byte of main memory has an address)

(ii) Address of cache block

(iii) How a memory location address will be translated to cache address/block/location.

(iv) How can it be determined if the content of specified main memory address exist in cache.

(d) What are the different categories of micro-operations that may be carried out by CPU? 6

Explain each category of micro-operations giving one example for each.

(e) Explain any five characteristics of RISC machine. 5

(f) Write a program in 8086 assembly language to add the values stored in an arrary. You may assume that the array is in the memory having only four elements. You may also assume that the value stored in the array are positive integer values. Result may be stored in register AX. 6

(g) What addressing modes are most suitable for handling arrays? Give justification in support of your answer. 4

2. (a) Explain the process of error detection and correction with the help of suitable diagram. What is an error correction code? Using suitable example, explain how is it different from an error detection code ? 8

(b) Explain why Input/Output interface is needed in a computer. Also explain the functions of an Input/Output interface. 6

(c) How is the number of operand addresses in an instruction effect the size of a program? Explain this with the help of an example. Compare the characteristics of Accumulator based computer architecture to General purpose register architecture based computers. 6

3. (a) Explain the functioning of a master slave flip-flop with the help of suitable diagram. What are the advantages achieved using master-slave flip-flops. 6

(b) Explain the following memory schemes discussing why they are needed: 6

(i) Interleaved memory

(ii) Associative memory.

(c) What is the need of segment registers in 8086 microprocessor? How these registers help in 8

(i) calculating the address of next instruction

(ii) for accessing data

(iii) for dealing with stack in the 8086 microprocessor.

How can you initialise segment registers ?

4. (a) How is a ripple counter different from a synchronous counter? Draw the logic diagram of a 3-bit ripple counter and explain its functioning. 6

(b) Write a program in 8086 assembly language that changes a string having lower case alphabets into an upper case string. Both these strings are to be stored in the main memory. 6

(c) Compare the characteristics of unencoded micro-instructions to that of highly encoded micro-instructions. 6

(d) What is the need of immediate and register addressing ? 2

5. Explain the following giving one example/ diagram if needed. 20

(a) Use of INT21h for Input/Output in 8086 micro-processor.

(b) COM programs and EXE programs

(c) Wilkes control

(d) Input-Output processors

(e) DRAM CELL