I Sem. M.A. M.Sc. Computer Science Exam. Dec, 2014
First/Third Semester
Pages (01) to (04)

(40)

M.A. M.Sc. Computer Science (First Sem) Exam Nov/Dec.2015
Third Semester
Pages (01) to (04)

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MCS 101 2001241

COMPUTER ARCHITECTURE

Unit I

Representation of Information: Introduction to computer system, computer generations, number systems (conversions and arithmetic operations), r's and (r-1)'s complements, integer and floating point representation, overflow and underflow, character codes (BCD, EBCDIC, ASCII, Gray, 2421 etc.), error detection and correction codes (hamming code, checksum), Boolean Algebra (definition and axioms), Karnaugh-map simplification (1-5 variables), logic gates.

Unit II

Combinational Circuits: (half adder, full adder, half subtractor, full subtractor, encoders, decoders, multiplexers, demultiplexers, adder-subtractor).

Sequential circuits: types of sequential circuits, flip-flops, registers (buffer register, shift register, controlled shift register, bi-directional shift register), counters (ripple counter, synchronous counter, ring counter, up and down counter), construction of combinational and sequential circuits.

Unit III

Memory Organization: Semiconductor Memory (RAM (static and dynamic), ROM, PROM, EPROM, EEPROM), cache memory organization (associative mapping, direct mapping, set associative mapping), associative memory, magnetic memory (floppy disk, magnetic disks and tape), optical memory (CD-ROM, WROM, Erasable Optical Disk), Virtual memory organization: Address space and memory space, Address mapping using pages.

Unit IV

Introduction to Microprocessor 8085 and 8086: characteristics of microprocessor, block diagram and pin diagram of 8085 and 8086,addressing modes and instruction set of 8085 and 8086, comparison of 8085 and 8086, assembly language of 8086 (variable declaration, array, conditional statement, looping)

Unit V

Interfacing: Input-Output Interface (I/O bus and interface modules, I/O versus memory bus, Isolated versus memory mapped I/O), Asynchronous data transfer (Strobe Control, Hand Shaking), Modes of transfer (Programmed I/O, Interrupt Initiated I/O, DMA (Direct Memory Access)), Bit-slice microprocessor.

Text Books:

1. Computer System Architecture by M. Morris Mano.
2. Digital Logic and computer design by M. Morris Mano.

Reference Books:

1. Digital Computer Electronics by Malvino Brown
2. Digital Computer Fundamentals by Bartee
3. Microprocessor X86 programming by K R. Venugopal.
4. Structured Computer Organization by Tanenbaum.
5. Advanced microprocessors and peripherals by Ray And Bhurchandi.
6. Computer Fundamentals by B. Ram.

MCS 102 **DISCRETE MATHEMATICS WITH DATA STRUCTURE**

Unit I

Logic: propositions, the conditional and the biconditional statements, conjunctive and disjunctive normal forms and simplification. Sets: Introduction, Operations on sets, finite and infinite sets, countability of sets, mathematical induction and recursion, Principal of inclusion and exclusion.

Relation: Introduction, properties of relation, equivalence relation, partial order relation, lattices, Pigeon Hole principle and its examples. Functions: Introduction, injective and surjective functions, inverse functions, composition of functions.

Unit II

Introduction to data structures: concept of data structures, data structure operations, algorithms, time and space analysis of algorithms, memory representation of arrays. Stacks and Queues: Introduction to stack and operations on stack, stack applications: infix, postfix, prefix, recursion, Tower of Hanoi, Introduction to queues and operations on queues, circular queues, dequeues.

Unit III

Linked List: Introduction to linked list, Representation in memory, Header nodes, doubly linked list, circular linked list, Operations on linked list- traversing, insertion, deletion, searching and concatenation.

Unit IV

Trees: definition & concepts, binary trees, representation of binary tree in memory, traversal of binary tree: inorder, preorder & postorder, binary search tree, heap, general trees, conversion of general trees to binary trees, minimal spanning tree, Kruskal and Prim's algorithm to find a minimal spanning tree.

Graphs: various definitions, diagraphs, multigraphs and weighted graphs, path and circuits, Eulerian path and circuits, Hamiltonian paths and circuits, planner graphs.

Unit V

Searching & Sorting: sequential searching, binary searching, insertion sort, selection sort, quick sort, bubble sort, heap sort, merge sort, radix sort, comparison of sorting methods.

String processing: string storage, string operations, word processing: replacement, insertion, deletion, pattern matching algorithms.

Note – Implementation of algorithms through C.

Text Books:

1. Data Structure and Program Design by Robert Kruse.
2. Data Structures by Seymour Lipschutz, Schaum Outline Series
3. Discrete Mathematics by K.D.Joshi
4. Discrete Mathematics Structure for Computer Science by B. Kolman, and R.C. Busby, IInd Edition, Prentice Hall of India Pvt. Ltd. New Delhi.

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MSc(CS) Item

MCS 103

OPERATING SYSTEM

Unit I

Operating system: concept, definition, types: on-line system, off-line system, spooling, buffering, multiprogramming, multitasking, multiuser system, multiprocessing, batch processing system, time sharing systems, parallel systems, distributed systems, real time systems. Operating system services: system calls and system program.

Unit II

File concepts-file support, access methods, allocation methods, directory systems, process concept, process scheduling, scheduling concepts, algorithms evaluation techniques, NTFS, HFFS, AFS.

Unit III

Memory Management- monitors, swapping, MFT, MVT, compaction, paging, segmentation, paged segmentation, segmented paging, multilevel paging. Virtual Memory - demand paging, overlays, page replacement algorithms, thrashing, disk & drum scheduling: FCFS, SSTF, SCAN, C-SCAN, Look, C-Look.

Unit IV

Deadlock- problem, prevention, avoidance, detection, recovery, concurrent processes, precedence graph, critical section problem, semaphores & its implementations, introduction to networks and distributed systems, distributed coordination

Unit V

Architecture of Unix O.S.: introduction to system concept buffer cache, buffer headers, structure of buffer pool, buffer retrieval, reading and writing disk blocks, advantage and disadvantage of buffer cache, i-node, structure of regular files, directories, conversion of path name to an inside, super block i-mode assignment to new file, allocation of disk blocks.

Text Books:

1. Operating systems concepts by Silberschatz.
2. The design of the UNIX operating system by Maurice J. Bach

Reference Book:

1. Operating systems by Andrew S. Tanenbaum

Difficult to read

Kapers
10-11-17

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MCS 104 **OBJECT ORIENTED PROGRAMMING WITH C++**

Unit I

Oops fundamentals: Oops vs. procedural programming, Oops terminology, data abstraction, data- hiding, class, object and methods, inheritance, polymorphism.

Unit II

General C and C++ programs: including files, declaration and definition of variables, basic types, array, structures, conditional operators, operator precedence, and statements: if-else, case and loops. Functions, call by reference, call by value. Introduction to pointers, pointer arithmetic.

Unit III

Implementation of features of Oops in C++ (a): overloaded operator and functions, inline function, friend function, key words eg. new, type conversions.

Unit IV

Implementation of features of Oops in C++ (b): derived classes, constructor and destructor, overriding, inherited member functions, multiple inheritance, this pointer, virtual functions and polymorphism.

Unit V

File Handling: classes for file stream operations, opening and closing a file, file opening modes, file pointers and their manipulations sequential access, random access, error handling, command line arguments. Exception Handling: basics of exception handling, handling mechanism, throwing mechanism, catching mechanism, rethrowing an exception.

Text Books:

1. ANSI C++ by Balagurswamay.
2. Let us C by Kanetkar

Reference Books:

1. Object oriented programming in Microsoft C++ by Robert Lafore, Galgotia publication.
2. ANSI C by Balaguruswamy.