

Syllabus for Assistant Computer Programmer

Digital Logic: Logic functions, Minimization, Design and synthesis of combinational and sequential circuits; Number representation and computer arithmetic (fixed and floating point),

Computer Organization and Architecture: Machine instructions and addressing modes, ALU and data-path, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Instruction pipelining, Cache and main memory, Secondary storage, K-Map.

Programming languages: Programming in C: elements of C-Tokens, identifiers, data types in C. Control structure in C. sequence, selection & iteration(s). structured data types in C- arrays, struct, union, string, and pointers.

O-O Programming Concepts: Class, object, instantiation, Inheritance, polymorphism and overloading.

C++ Programming: Elements of C++-Tokens, identifiers. Variables and constants, data types, operators, control statements. Functions parameter passing. Class and objects. Constructors and destructors. Overloading, inheritance, templates, exception handling.

Data Structures: Programming in C; Functions, Recursion, Parameter passing, Scope, Binding; Abstract data types, Arrays, Stacks, Queues, Linked Lists, Trees, Binary search trees, Binary heaps, Graph theory. Tree and graph traversals, Connected components, Spanning trees, Shortest paths; Hashing, Sorting, Searching.

Theory of Computation: Regular languages and finite automata, Context free languages and Push-down automata, Recursively enumerable sets and Turing machines, Undecidability.

Operating System: Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock, CPU scheduling, Belady's anomaly, Memory management and virtual memory, File systems, I/O systems, Protection and security.

Databases: ER-model, Relational model (relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Query languages (SQL), File structures (sequential files, indexing, B and B+ trees), Transactions and concurrency control.

Information Systems and Software Engineering: information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project, design, coding, testing, implementation, maintenance.

Computer Networks: ISO/OSI stack, LAN technologies (Ethernet, Token ring), Flow and error control techniques (error correcting & detecting, CRC), Routing algorithms, Congestion control, TCP/UDP and sockets, IP(v4), Application layer protocols (icmp, dns, smtp, pop, ftp, http); Basic concepts of hubs, switches, gateways, and routers. Network security - basic concepts of public key and private key cryptography, digital signature, firewalls.

Mobile communication: Introduction, Cellular system infrastructure, Registration, Handoff Parameters and Underlying support, Roaming Support Using Backbone to Mobile IP, Functions of Mobile IP, Mobile Node, Corresponding Node, Home Network, Foreign network, Home agent, Foreign Agent, care of Address, IP Packet Delivery, Agent Delivery, Agent Solicitation, Registration, Tunneling, Dynamic Host configuration protocol.

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