GATE CS Progress Tracker

Computer Science and Information Technology

Section 1: Engineering Mathematics

- ☐ Propositional and First Order Logic
- ☐ Sets, Relations, Functions
- ☐ Partial Orders and Lattices
- ☐ Monoids and Groups
- ☐ Graphs: Connectivity, Matching, Colouring
- ☐ Combinatorics: Counting, Recurrence, Generating Functions
- ☐ Matrices, Determinants
- ☐ System of Linear Equations
- ☐ Eigenvalues and Eigenvectors
- ☐ LU Decomposition
- ☐ Limits, Continuity, Differentiability
- ☐ Maxima and Minima, MVT
- ☐ Integration
- ☐ Probability and Random Variables
- ☐ Distributions: Uniform, Normal, etc.
- ☐ Mean, Median, Mode, SD
- ☐ Conditional Probability and Bayes Theorem

Section 2: Digital Logic

- ☐ Boolean Algebra
- ☐ Combinational Circuits
- ☐ Sequential Circuits
- ☐ Minimization Techniques
- ☐ Number Representations
- ☐ Fixed and Floating Point Arithmetic

Section 3: Computer Organization and Architecture

- ☐ Machine Instructions and Addressing Modes
- ☐ ALU, Datapath and Control Unit
- ☐ Instruction Pipelining and Hazards
- ☐ Memory Hierarchy: Cache, RAM, Storage
- ☐ I/O Interface, Interrupt, DMA

Section 4: Programming and Data Structures

- ☐ Programming in C
- ☐ Recursion
- ☐ Arrays, Stacks, Queues
- ☐ Linked Lists
- ☐ Trees and Binary Trees
- ☐ Binary Search Trees

- ☐ Binary Heaps
- ☐ Graphs

Section 5: Algorithms

- ☐ Searching, Sorting, Hashing
- ☐ Time and Space Complexity
- ☐ Greedy Algorithms
- ☐ Dynamic Programming
- ☐ Divide and Conquer
- ☐ Graph Traversals (BFS/DFS)
- ☐ MST: Prim's and Kruskal's
- ☐ Shortest Paths: Dijkstra, Floyd, Bellman-Ford

Section 6: Theory of Computation

- ☐ Regular Expressions, Finite Automata
- ☐ CFGs and PDA
- ☐ Regular vs Context-Free Languages
- ☐ Pumping Lemmas
- ☐ Turing Machines
- ☐ Undecidability

Section 7: Compiler Design

- ☐ Lexical Analysis
- ☐ Parsing (LL/LR)
- ☐ Syntax-Directed Translation
- ☐ Runtime Environments
- ☐ Intermediate Code Generation
- ☐ Local Optimizations
- ☐ Data Flow Analysis: Liveness, Constant Propagation, CSE

Section 8: Operating Systems

- ☐ System Calls
- ☐ Processes and Threads
- ☐ IPC, Concurrency and Synchronization
- ☐ Deadlocks
- ☐ CPU and I/O Scheduling
- ☐ Memory Management and Virtual Memory
- ☐ File Systems

Section 9: Databases

- ☐ ER Model
- ☐ Relational Model and Algebra
- ☐ Tuple Calculus, SQL
- ☐ Constraints and Normalization

- ☐ File Organization and Indexing (B/B+ trees)
- ☐ Transactions and Concurrency Control

Section 10: Computer Networks

- ☐ OSI and TCP/IP Models
- ☐ Switching: Packet, Circuit, Virtual Circuit
- ☐ Data Link Layer: Framing, MAC, Ethernet
- ☐ Routing: SPF, Flooding, DV, LS
- ☐ IP Addressing, IPv4, CIDR, NAT
- ☐ IP Support: ARP, DHCP, ICMP
- ☐ Transport: UDP, TCP, Congestion, Sockets
- ☐ Application Layer: DNS, HTTP, FTP, SMTP