APNA COLLEGE

Sigma Batch

Data Structures and Algorithms &
MERN Stack Web Development

' Let not the fruit of action be your motive to action. Your concern is with action alone, not with the fruit of action. '

- The Bhagavad Gita

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APNA COLLEGE

DSA Overview

- Complete Java + Data Structures & Algorithms
- Live Doubt Assistance
- Student Community with TAs
- Live Resume Preparation & Mentorship sessions
- Library of Questions for Top Companies
- Coding Questions on all Important Topics (asked by Top Companies)

Live
+ VOD

300+
solved questions practice

Duration : 4 Months
Course access is for 2 Years

Topics

Java

APNA COLLEGE

CATEGORY	CHAPTERS	OVERVIEW
Basics of Programming	Flowcharts & Pseudocodes	what are flowcharts, pseudocodes, decision making using flowcharts, examples
	Variables & Data Types	Our first Java program, Variables and data types, Taking input/output, How java code runs?
	Conditional Statements	Introduction to if else, else if, Nested conditionals, switch
	Operators	arithmetic, relational, logical & assignment operators
Loops & Functions	For loop, While loop, Do-while loop	For loops, While loops, Do-while loops, Flow of execution of statements, break & continue, examples
	Patterns	Introduction to nested loops, basic to advanced patterns solved (butterfly, floyd's triangle, rhombus etc.)
	Functions	Introduction to functions, function calling, Pass by value, scope
Arrays	Introduction to Arrays	Introduction to arrays, arrays in memory, Passing arrays to functions, interview problems
	Searching & Sorting	Linear search, Binary search, Selection sort, Bubble sort, Insertion sort, count sort
2D Arrays & Strings	2D Arrays	2D arrays, 2D arrays in memory, Examples using 2D Arrays
	Strings	Introduction to strings & StringBuilder, storage of strings and their inbuilt functions

Data Structures & Algorithms (DSA)

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CATEGORY	CHAPTERS	OVERVIEW
Problem Solving Techniques	Recursion, Backtracking, Divide & Conquer	Introduction to recursion, Principle of mathematical induction, factorial, Fibonacci numbers, Recursion using arrays, Recursion using strings, Recursion using 2D arrays, backtrack, merge sort, quick sort
	Bit Manipulation	Binary number system, bitwise operators, operations on bits, fast exponentiation
	Time & Space Complexity	Order complexity analysis, Theoretical complexity analysis, Time complexity analysis of searching and recursive algorithms, Space complexity analysis of merge sort
	Greedy Algorithms	Introduction to greedy approach to problem solving, solving classical problems
Object-oriented programming	Basic to Advanced OOP	Objects & Classes, Creating objects, Getters, and setters, Constructors and related concepts, Inbuilt constructor and destructor, Example classes, Static members, Function overloading and related concepts, Abstraction, Encapsulation, Inheritance, Polymorphism, Abstract classes, Interfaces
Linear Data Structures	ArrayLists	Introduction to java collection framework, arrays, solved questions
	Linked lists	Linked list Introduction, Inserting node in linked list, Deleting node from linked list, Midpoint of linked list, Merge two sorted linked lists, merge sort of a linked list, Reversing a linked list
	Stacks and Queues	Stacks Introduction, Stack using arrays, Dynamic Stack class, Stack using linked list, Inbuilt stack, Queue using arrays, Dynamic queue class, circular queue

Data Structures & Algorithms (DSA)

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CATEGORY	CHAPTERS	OVERVIEW
Trees	Binary Trees & BST	Introduction to Binary Trees, Constructing the tree, Binary Tree traversals, Diameter of binary tree, height & LCA of the tree, Introduction to Binary Search Trees, Searching a node in BST, BST class, Inserting and Deleting nodes in BST, Types of balanced BSTs
Advanced Data Structures	Heaps/Priority Queues	Introduction to Heaps, Min/Max heaps, Heap Sort, Priority Queues, how to implement priority queues, Introduction to CBT(Complete Binary Trees) and its implementation, Insert and Delete operations in heaps, Implementing priority queues, In-built Priority Queue
	Hashing (Maps & Sets)	Introduction to Hashing, Hashmaps, Inbuilt Hashmap, Hashsets, In-built Hashsets, Hash functions, Insert and Delete operation implementation in hashmap/hashset, examples
	Tries	What are Tries, Creating a Trie node class, Insert, Search and Remove operation in Tries, Types of Tries, Questions on Tries
	Graphs	Introduction to Graphs, Graph Terminology, Graph implementation, Graph Traversals (DFS and BFS), Weighted and Directed Graphs, Minimum Spanning Trees, Cycle Detection in Graphs, Kruskal's algorithm, Prim's Algorithm, Dijkstra's algorithm, Bellman Ford Algorithm & a lot of questions
	Segment Trees	What are segment trees, Creation of segment trees, solving range queries
Dynamic Programming	DP & its Questions	Fundamentals of Dynamic Programming, Introduction to Memoization, Knapsack using DP, Factorial using DP, Fibonacci numbers using recursion, memoization and tabulation, Longest Common Subsequence (LCS) using recursion, Catalan's number, Edit distance using recursion, memoization and dynamic programming, Matrix Chain Multiplication and much more

APNA COLLEGE

Development Overview

- Complete Frontend Development
- Complete Backend Development
- Complete Database (SQL & MongoDB)
- Complete MERN Stack (MongoDB, Express, React, Node)
- Real Life and Industry Grade Projects
- LIVE sessions on how to get a job, resume, open source & more

500+ video lectures

12+ Hours of Live Sessions

Duration : 4.5 Months
Course access is for 2 Years

Topics

Frontend

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CATEGORY	CHAPTERS	OVERVIEW
Introduction	What is Web? Client-Server Architecture Setting Developer Environment	Understanding how and who built the web General architecture used by websites; requires & response Setting our environment on our laptop/computer where we'll do coding
HTML	Structure Tags in HTML Block v/s Inline Tables Forms	How to create the structure of a web page Learning about various tags in HTML like <h1>, <p>, <a>, <img> etc Understand the difference between inline and block HTML elements Learn to create tables in HTML Learn about forms and form fields
Intro to CSS	Introduction	What is CSS & how to use it in HTML, different styles of writing
Selectors in CSS	Understanding Selectors Selector Specificity	Element, Class & Id selectors etc., combinators, pseudo classes, pseudo elements, specificity in CSS Understanding the specificity & priority of CSS selectors

Frontend

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CATEGORY	CHAPTERS	OVERVIEW
Styling with CSS	Box Model	Understanding the CSS box model
	CSS Units	Learning about various CSS units used to style HTML elements, absolute & relative
More CSS	CSS Transition	Understanding element transitions in CSS along with shorthand
	CSS Transforms	Understanding element transformations in CSS along with shorthand
Flexbox	Intro to Flex	Understanding flexbox layout, cross axis, main axis etc.
	Flex properties	flexbox direction, justify content, align items, align self, flexwrap, flex sizing,etc.
Responsive Designs	Media Queries	Learn about Media Queries & Viewport
Bootstrap	Frontend frameworks	What are frontend frameworks and how to use one
	Components	Using various bootstrap elements like Navbar, buttons, cards etc
	Layouts(Grid system)	Learning about grid system of bootstrap
Tailwind CSS	What is Tailwind?	Understanding Tailwind as a Framework

Frontend

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CATEGORY	CHAPTERS	OVERVIEW
Tailwind CSS	Components	Covering button, navbar, fonts, margin, padding etc.
	Creating Responsive Designs	Understanding responsiveness in tailwind, @apply, @layer etc.
Major Project	CSS Major Project	Focus on using concepts we have learn to build our project
Starting with Javascript	Intro to JS	What is JS and use of JS
	Variables, operators, conditional, loops	Learning the basics of the language
Functions and Arrays in JS	Scope	Understanding scope in JS
	Functions expressions v/s Function declaration	Difference between function expression and declaration
	Arrays and its usage	What are arrays and using array functions like splice, slice etc.
Objects and Timing Events	Intro to Objects	What are objects, how to create them and using different notations to access object's data
	Object functions	Learn to iterate over objects, delete object properties, creating nested objects
Understanding DOM	DOM	Understanding DOM, what it is, how to access elements from the DOM

Frontend

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CATEGORY	CHAPTERS	OVERVIEW
Understanding DOM	Events	How to manipulate DOM events in JS
Closures	IIFE	What are immediately invoked function expressions
	Closures	What are closures and its application
	Arrow functions	Learning about arrow functions and bindings in arrow functions
Constructors and Prototypes	“this” keyword	How does the “this” keyword works in JS
	Prototypes	Discussing what are prototypes in JS, why do we use them and its application
	Class	Learning about using classes in JS and how to deal with class inheritance in JS
Ashyncronous JavaScript	Promises, Callback	What are promises and callbacks in Javascript, Why to use
	Timed Events	What is setTimeout, Event loops in javascript
	Async Await	What are Async Await in Javascript, Why that is important
Ajax	Intro to AJAX	What are async requests, what is API and JSON

Frontend

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CATEGORY	CHAPTERS	OVERVIEW
Promises	Handling promises	What is a promise, how do we use promises and chaining promises
Git	Intro to Git Branches Git workflow	What is git and why it's helpful Exploring branches in Git. How to create branches. Understanding push, commits, pull requests and using git for teams and individual
Terminal	Mastering Terminal	Directories, Commands, paths, operations on files etc.
Major Project	JS Major Project	Create something classic by using the concept learn in JS

Backend

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CATEGORY	CHAPTERS	OVERVIEW
Node.js	Intro to Node	Introduction to the course, hello world with nodejs
	Setting up	Setting up tools and the project
Writing Our First Server	Intro to servers	What are servers and how one can use them
	Setting up node server	Beginning the project by setting up the very first node server
	nodemon	Introducing nodemon to monitor changes made to the server
Creating Express Apps	MVC	MVC architecture for our server
	Express	What are frameworks, using express with node
	Ejs	What are template engines, setting up and working with Ejs
	Middleware	What is a middleware and how to use one
Intro to Databases	Database	What are databases & why do we need them
	SQL	what is SQL, SQL queries etc.
MongoDb	MongoDB	What is MongoDB, how to use it and setting up MongoDB for the project
	DB operations	CRUD operations for MongoDB

Backend

CATEGORY	CHAPTERS	OVERVIEW
MongoDb	Mongoose	Linking MongoDB using Mongoose
Mega Project	Working on our Mega Project	APIs, error handling, validation, express router, authentication, deployment & many more concepts to be covered

React

CATEGORY	CHAPTERS	OVERVIEW
React	Components, Styling & more	What is React, installation, react components, styling in react, component lifecycle methods, Material UI etc.
React Project	React based Project	Using the concepts we have learnt to build our project

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Lectures will be uploaded on **Alternate** Days

Till then, keep learning & keep exploring ❤️

Start Date : 28th October, 2024