CODOJO

Data Structures and Algorithms

1. Understanding Basic Data Structures (Classes 1-10) - Topics covered:

- What is a Data Structure?
- Variables and Constants
- Introduction to Lists/Arrays and Stacks

Project Idea: Create a school supplies inventory system using lists and arrays, allowing adding, removing, and displaying items.

2. Introduction to Arrays (Classes 11-20) - Topics covered:

- Single-Dimensional Arrays
- Multi-Dimensional Arrays
- Array Operations (insertion, deletion, etc.)

Project Idea: Develop a grade-book system where students' grades are stored in arrays, and students can view their average, highest, and lowest marks.

3. Basic Operations on Data (Classes 21-30) - Topics covered:

- Searching for Elements in an Array
- Finding the Maximum and Minimum Value in a List
- Reversing an Array
- Counting Occurrences of Elements

Project Idea: Write a program to input a list of numbers, then search for a specific number, and extend the program to find the highest and lowest numbers.

4. Learning Recursion Basics (Classes 31-40) - Topics covered:

- What is Recursion?
- Writing Recursive Functions
- Recursion in Problem Solving (factorial, Fibonacci sequence)

Project Idea: Write a recursive program to compute the factorial of a number, displaying results step-by-step.

5. Problem-Solving with Fun Examples (Classes 41-50) - Topics covered:

- Combining Data Structures and Algorithms
- Fun Problem-Solving Challenges (maze-solving, puzzles)

Project Idea: Develop a game where the player must navigate through a maze using the shortest path algorithm. Use arrays to represent the maze.

Additional Projects for Fun and Learning:

- Tic-Tac-Toe Game: Use arrays to develop a simple Tic-Tac-Toe game where students play against each other or a basic AI.
- Library Management System: Create a system where students can add, remove, and search for books in a library using an array of book titles.
- Simple Calculator: Build a calculator that takes two numbers and applies operations like addition, subtraction, multiplication, and division using recursion.

The Codojo Promise

Kids who do well in coding, do much better at school!