Data Structures and Algorithms

In order to succeed in solving technical DS&A interview problems, you should go through the following steps:

1. Categorize the problem. Which data structures are applicable? Which algorithms are applicable?

(Abstract Data Types and) Data Structures

List

- Linked List

Tree

Map

Stack

Queue

Algorithms

Dynamic Programming (DP)

DP is a method of solving a complicated problem by breaking it into simpler subproblems using recursion. For DP to be a viable solution method, the problem must have:

1. **optimal substructure** (the optimal solution must be obtainable by combination of optimal solutions to subproblems); and
2. **overlapping subproblems** (the solutions to subproblems can be reused in later computations).

DP can be done either:

1. **top-down** (start with the complicated problem, break it into subproblems, solve those subproblems recursively, store their solutions in a cache for later use); or
2. **bottom-up** (start with the simplest subproblems—the base cases—and use their solutions to solve progressively larger problems until you get to the original complicated problem).

The Dijkstra, Bellman-Ford, and Floyd-Warshall algorithms all use DP.