

① Principle of optimality.

① A problem is said to satisfy the principle of optimality, if the subproblems of an optimal solution of a problem are themselves optimal solution for their subproblems.

② Define DFS

① It is an algorithm for traversing or searching tree or graph data structures.

The algorithm starts at root node and visits each branch before backtracking.

③ Define BFS

① It is an algorithm for traversing tree or graph data structures.

The algorithm visits and marks all nodes in a graph in breadthwise fashion.

④ Applications of DFS

① scheduling problems, topological sorting, cycle detection in graphs & solving puzzles with one solution.

⑤ Applications of BFS

① crawlers in search engine.

② GPS navigation systems.

③ Broadcasting

④ Peer to Peer Networking.

- ⑥ Distinguish the breadth & depth first searches
- ① BFS uses Queue data structures for finding shortest path.
- DFS " stack " " " " " " "

⑦ Define biconnected graph?

① A connected graph that does not broke into disconnected pieces by deleting any single vertex.

⑧ Define biconnected components?

① A connected subgraph that cannot be broken into disconnected pieces by deleting any single node.

⑨ Define strongly connected graph?

① A directed graph is called as strongly connected, if there is a path in each direction b/w each pair of vertices of graph.

⑩ Define strongly connected components?

① It is the portion of a directed graph in which there is a path from each vertex to another vertex.

⑪ Define articulation point?

① A vertex whose removal from the graph increases its no. of connected components.

(12) Specify the graph traversal techniques

(A) DFS, BFS

In case of rooted binary trees, three recursive traversal tech are widely used:

(a) Inorder traversal

(b) Preorder "

(c) Post order "

(13) Diff b/w greedy & dynamic Approach.

(A) greedy: ① we make whatever choice seems best at the moment in the hope that it will lead to global optimal solution.. Ex: ~~0/1 knapsack~~ fractional knapsack. ② more efficient

Dynamic: ① we make decision at each step w.r.t current problem & solution to previously solved sub problem to calculate optimal solution.

Ex: 0/1 Knapsack

② Less efficient

(14) Diff Dynamic & divide & Conquer approaches

(A)

Dynamic

① partitions a problem into overlapping sub problems

② used by matrix chain multiplication & optimal BST

Divide & Conquer

① partitions a problem into independent smaller sub problems.

② used by merge sort, quick sort & binary search

⑮ What is travelling salesperson problem.

① It is an algorithmic problem tasked with finding shortest route b/w a set of points & locations that must be visited.

⑮ Define 0/1 knapsack problem

① 0/1 knapsack problem mean that the items are either completely or no items are filled in a knapsack.

⑮ What is multistage graph problem.

① This problem is to find the path, with minimum cost from Source 's' to sink 't'.

⑮ Define reliability design problem.

① the problem is to design a system, that is composed of several devices connected in series.

⑮ Define longest common subsequence problem.

① It is the problem of finding the longest subsequence, that is common to all sequences in a set of sequences.

②② What is dominance rule

①A The rule is established in order to reduce the solution space of a problem by adding new constraints to it.