UNIT-3

DYNAMIC PROGRAMMING

General method-multistage graphs-all pair shortest path algorithm-0/1 knapsack and traveling salesman problem-chained matrix multiplication-approaches using recursion-memory functions

BASIC SEARCH AND TRAVERSAL TECHNIQUES

The techniques-and/or graphs-bi_connected components-depth first search-topological sorting-breadth first search.

DYNAMIC PROGRAMING

- The idea of dynamic programming is thus quite simple: avoid calculating the same thing twice, usually by keeping a table of known result that fills up a sub instances are solved.
- Divide and conquer is a top-down method.
- When a problem is solved by divide and conquer, we immediately attack the complete instance, which we then divide into smaller and smaller sub-instances as the algorithm progresses.
- Dynamic programming on the other hand is a bottom-up technique.
- We usually start with the smallest and hence the simplest sub- instances.
- By combining their solutions, we obtain the answers to sub-instances of increasing size, until finally we arrive at the solution of the original instances.
- The essential difference between the greedy method and dynamic programming is that the greedy method only one decision sequence is ever generated.
- In dynamic programming, many decision sequences may be generated. However, sequences containing sub-optimal sub-sequences can not be optimal and so will not be generated.