Graph Algorithms

(1) Dijktra's shortest path algorithm

(2) Prim's Algorithm for finding spanning tree from a weighted graph

Greedy algorithms which are correct

Coin Changing Problem

Suppose that, in a certain country, the coin denominations are

$1, $4, $5, $10.

You want to design an algorithm such that you can make change of any X dollars using the fewest number of coins.

Greedy Algorithm X=9 (5,4)

Step1: create an empty bag

Step2. while (x>0)

greedy choice

{ Find the largest coin C at most X.

put C in the bag

set x=x-c

}

Step 3: return coins in the bag

Brute force approach

(1) Compute all possible subsets of the coins whose sum is X

(2) Find the size for each subset

(3) Choose the subject containing min. number of coins.

Greedy does not always work .

Dijktra's shortest path algorithm