Computing Systems Lab

IT69101

(Autumn 2010)

Assignment #9 03/11/2010

1. Find the recursive implementation of the following.

(a) Read *n* different symbols say English alphabets. Find the all permutations of the symbols you have read.

(b) Read *n* different symbols say English alphabets. Find the all combinations of the symbols you have read taking r symbols at a time, where $r = 1, 2, \ldots, n$.

2. **Dijkstra's algorithm**

Read any connected and weighted graph of *n* vertices and *m* number of edges, where *m*, $n > 0$. Store the graph using a suitable data structures.

Consider any vertex in the graph as a starting vertex. Find shortest distances from this starting vertex to any other vertex in the graph.

Hint: Use Dijkstra's algorithm following the greedy strategy.

3. **Coin Changing problem**

Given a set of denominations of the coins, say $C_1 > C_2 > \ldots > C_n$ such that $C_n = 1$. Given any amount *A*, the coin changing problem is to determine the minimum number of coins needed to make *A* in change.

You have to find a solution which is guaranteed to be optimal but solving is a polynomial time.

Hint: Solve the problem using Dynamic programming.

Last date of submission: 14/11/2010