Fundamentals of Algorithms
CS502-Fall 2011

ASSIGNMENT #4

Deadline

Your assignment must be uploaded/submitted at or before **17h January, 2012**

Uploading instructions

Please view the **assignment submission process** document provided to you by the Virtual University to upload the assignment.

Rules for Marking

It should be clear that your assignment will not get any credit if:

- The assignment is submitted after due date.
- The submitted assignment does not compile or run.
- **The assignment is copied.**

Objectives

This assignment will help you to understand the concepts of Graph theory particularly application level of Prim's and Kruskal's algorithms.

Guidelines

1. In order to attempt this assignment you should have full command on Lecture # 33 to Lecture # 37
2. In order to solve this assignment you should have strong concepts about following topics

- Strong Connected Components
- Prim's Algorithm
- Kruskal 's Algorithm

Recommended book for solving assignment

Cormen, Leiserson, Rivest, and Stein (CLRS) 2001, **Introduction to Algorithms**, (2nd ed.) McGraw Hill.

Estimated Time 5 hours

To understand the theme of both questions 120 minutes.Question1 parts “a” solution implementation maximum time is 90 minutes and for part “b” solution implementation maximum time is 90 minutes. It all depends upon your sheer concentration and devotion towards your lecture listening.

- ***Question# 1*** **(10+10)**

A multinational company has started a project to launch its Branches in different countries and the company is going to start its Business and initially its network will be developed for six countries i.e. Pakistan ,Saudi Arabia, China, Austria ,Japan , and Brunei Darussalam .These countries may be named as a, b, c, d, e ,f respectively and Company has planned to establish the Communication Channels for its proper smooth business .The cost is given in the following table to establish the communication link .Which Communication Channels will be developed to ensure that all countries are connected so that the total cost of the Mega Project is minimized?

Branches	Cost in $ Billion
a-b	0.95
a-c	1.2
a-d	1.1
a-e	1.5
a-f	2.5
b-c	2.6
b-d	2.3
b-e	2.1
b-f	2.2
c-d	3.1
c-e	3.2
c-f	1.7
d-e	1.9
d-f	0.85
e-f	3.5

Hint: Model this problem using the weighted graph where **Vertices** represent Country *Branches*, **Edges** represent possible *Channel* link and the weights on edges are represented by costs of that channel.
a) First apply Prims Algorithm
b) Second apply Kruskal*'s algorithm*

To solve this problem you must use these two algorithms.
BEST OF LUCK
GIFT FOR NEW YEAR WITH NEW THINKINGS AND DIMENSIONS.