Department of CIS

Subject: Algorithm

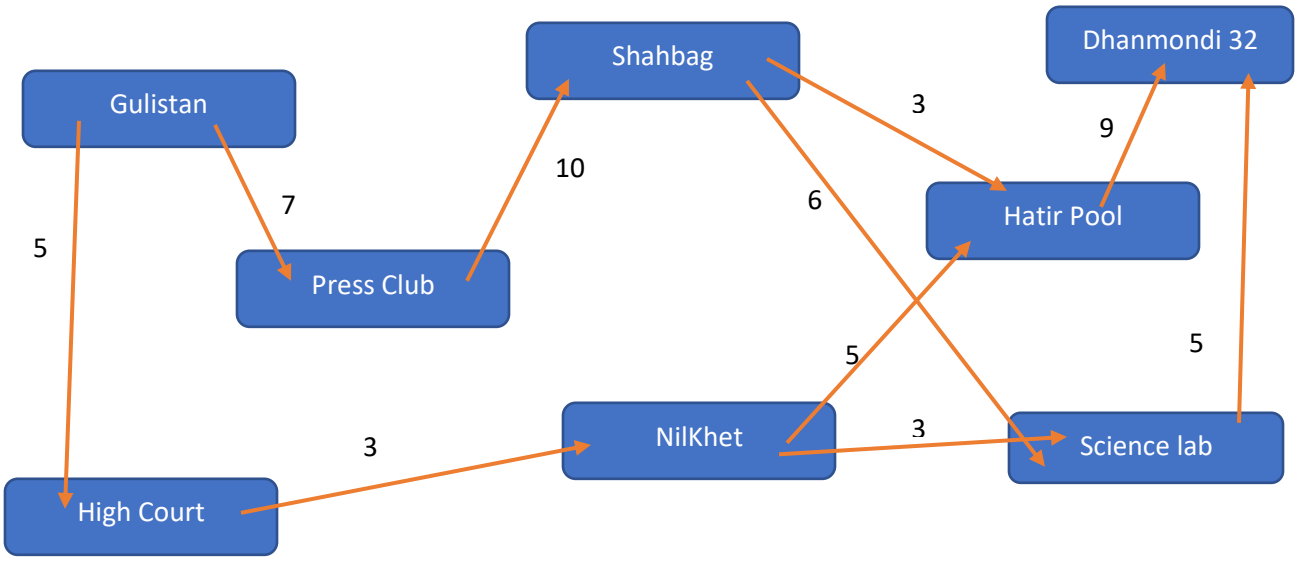
Assignment Title: Find My Way

Summer 2018

Every day travelling makes Minhaj bored due to heavy traffic. It becomes more painful for him when there is any function at evening after office and he must have to join it. For getting-rid of this, Minhaj finds a way, he has prepared maps of the various places in which he frequently goes and measured the average delay at each of the various traffic points in these regions. He wants to find the routes between specified points in these places which minimize his delay at traffic points and he has requested you to help him to calculate it.

For solving this problem Minhaj will provide you with a map. In that map there will be number of places having traffic point and average delay among the points (in seconds). Each time he will provide a point from where he will start his journey. Your work is to calculate minimum delay time from the starting point to each of the other point on that map. And when he will enter a destination your program will show him the minimum delay from starting point to destination point and also print the path form source to destination.

Suppose consider the graph:



Consider that Minhaj wants to start his journey from Gulistan. Then you first task is to calculate the minimum delay to all the places from Gulistan. As we see delay of the traffic are given. Then ask Minhaj that where he wants to go. The show him the distance form Starting point to destination point minimum delay and also the path he should travel.

Task -1 (50 Marks)

1. First describe with example how you can implement the map in you program.
2. Which data structure you are going to use to implement the map in your program, justify your reason with valid description.
3. Are you going to solve the problem using any algorithm? if yes then describe briefly: why you have chosen that, how it works and describe its time complexity.
4. Write the algorithm you are using.

Task -2 (50 Marks)

Write a program that will solve the above mention problem.

Input:

1. Take input the map (graph) information in your program, vertices and edges
2. Take source and destination vertex as input

Output:

1. Print the delay information of each of the vertex
2. Print the path from source vertex to destination vertex