



Department of CIS

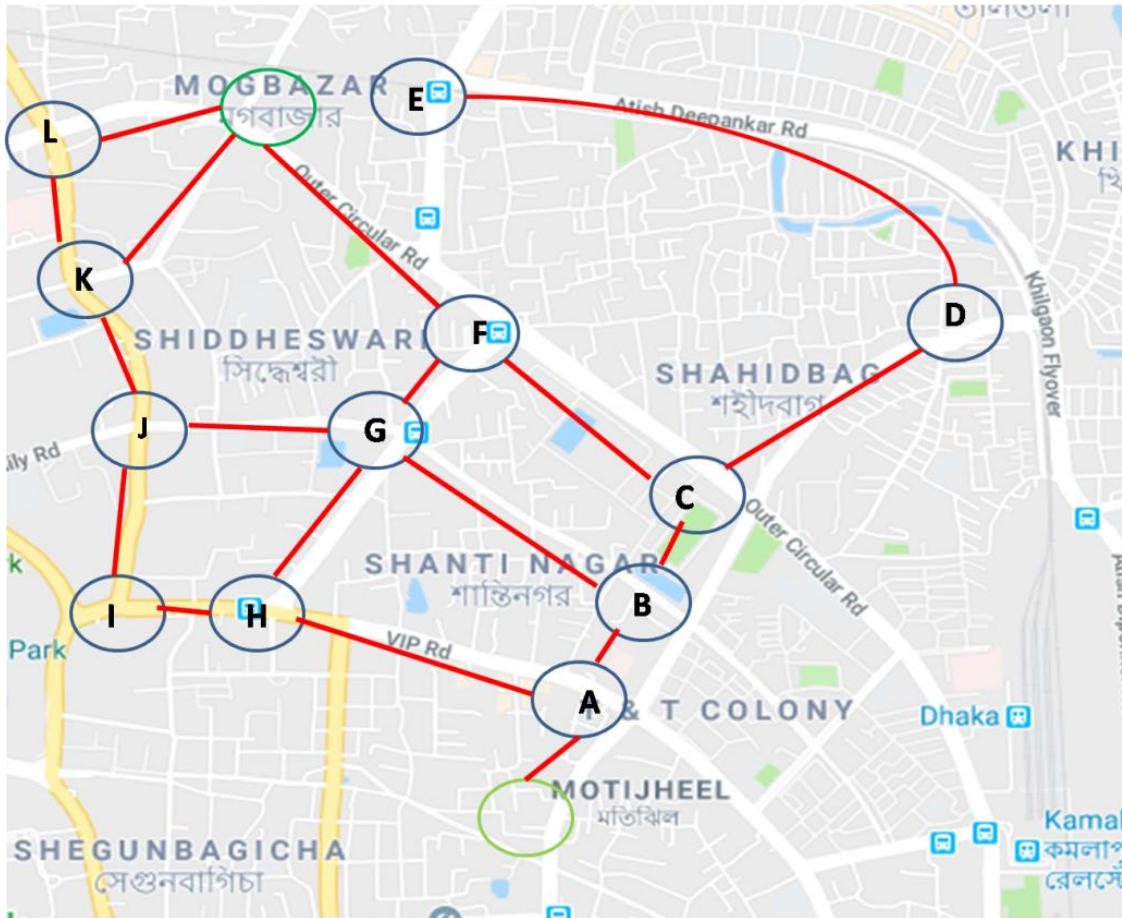
Subject: Algorithm
Fall 2020

Question

A portion of the map of Dhaka is given in the picture.

There are 2 mother nodes **Motijheel**, which is the source, and **Moghbazar** the destination. **The other nodes from A to L represent intersections.** There are **multiple routes** to reach from source to destination. The table below shows the weights of each route which represent **the level of traffic. The higher the value, higher the traffic.**

Vertex 1	Vertex 2	Traffic Level
Motijheel	A	4
A	B	3
A	H	2
B	G	6
H	I	7
B	C	5
C	F	3
C	D	7
D	E	2
F	G	1
F	MOGHBAZAR	3
G	H	4
G	J	7
I	J	1
J	K	4
K	L	6
K	MOGHBAZAR	7
L	MOGHBAZAR	2



Theory Part (35 Marks) -

Task 1 (Design): 15 marks

Design an algorithm to find the best route for the problem above. Your algorithm should not manually check every edge in the graph, rather it should opt for a greedy approach.

Task 2 (Simulation): 15 marks

Simulate the algorithm you have written for the given test case.

Task 3 (Critical Evaluation): 5 marks

What is the time complexity would you find in your algorithm? Describe the implications of the time complexity.

Lab Part (25 Marks) –

Task 1 (15 Marks):

Write the Java Code for the problem based on your algorithm.

Task 2 (7 Marks):

BFS is an algorithm that also gives the shortest path between source and destination.

Why can we not use BFS in this situation?

Task 3 (3 Marks):

Mention any alternate algorithms that might be used to solve this problem without resorting to a greedy approach and compare its time complexity with the algorithm that you used.

Submission Guidelines:

- Your submission should be in the form of a single word-processed document (**.doc** or **.docx**) that includes any necessary diagrams.
- Naming of the file as **example: 183-16-315.docx**
- **Marks will be deduced accordingly if any plagiarism of work is provided.**

DEADLINE: 15th December, 2020