**Assignment 3**

**Transportation Simulation and Modelling**

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Q1 Find the Shortest path from Node 1 to Node 6.

| node | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| step 0 | 0 | | | | | | | | |
| step 1 | | 6 | 2 | | | | | | |
| step 2 | | | | 8 | | | | | |
| step 3 | | | | | 11 | | | | |
| step 4 | | | | | | 13 | | 17 | |
| step 5 | | | | | | | 18 | | |
| step 6 | | | | | | | | | 20 |

0-1-3-4-7-8

Q2,3 Run the C++ shortest path code for the network below and print screen your output.

| agent_id | from_node | to_node | shortest_pat | shortest_path_node_seq |
|---|---|---|---|---|
| 1 | 0 | 1 | 6 | 0;1; |
| 2 | 0 | 2 | 2 | 0;2; |
| 3 | 1 | 2 | 5 | 1;2; |
| 4 | 1 | 3 | 2 | 1;3; |
| 5 | 2 | 3 | 8 | 2;3; |
| 6 | 2 | 4 | 10 | 2;4; |
| 7 | 2 | 7 | 16 | 2;4;7; |
| 8 | 3 | 4 | 3 | 3;4; |
| 9 | 3 | 5 | 5 | 3;4;5; |
| 10 | 4 | 5 | 2 | 4;5; |
| 11 | 4 | 7 | 6 | 4;7; |
| 12 | 5 | 6 | 5 | 5;6; |
| 13 | 5 | 7 | 7 | 5;7; |
| 14 | 6 | 8 | 4 | 6;8; |
| 15 | 7 | 8 | 3 | 7;8; |

Q4

Route for vehicle 1:

Depot -> Node 8 Load(20) -> Node 9 Load(27) -> Node 10 Load(84) -> Depot Load(84)

Distance of the route: 64.96m

Load of the vehicle for route 1: 84

Route for vehicle 2:

Depot -> Node 5 Load(30) -> Node 6 Load(75) -> Node 7 Load(98) -> Depot (98)

Distance of the route: 45.56m

Load of the route: 98

Route for vehicle 3:

Depot -> Node 4 Load(23) -> Node 2 Load(42) -> Node 3 Load(76) -> Node 1 Load(100) -> Depot

Distance of the route: 55.77m

Load of the route: 100

Route for vehicle 4:

Depot -> 15 Load(9) -> 14 Load(27) -> 13 Load(42) -> 11 Load(85) -> 12 Load(100) -> Depot

Distance of the route: 65.14m

Load of the route: 100

Total Distance of all routes: 231.42m