

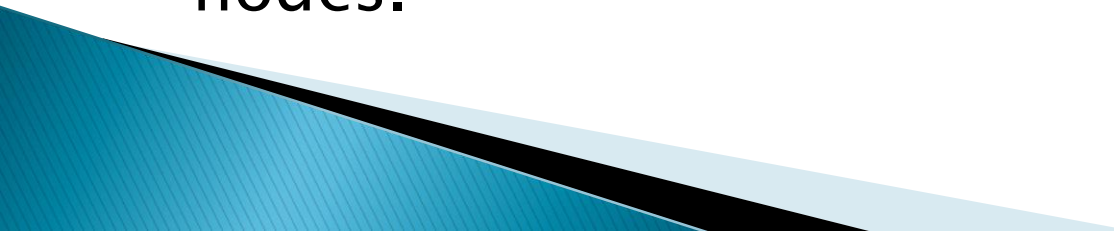
CS542 Project : Link State Routing Simulation

Team Members :

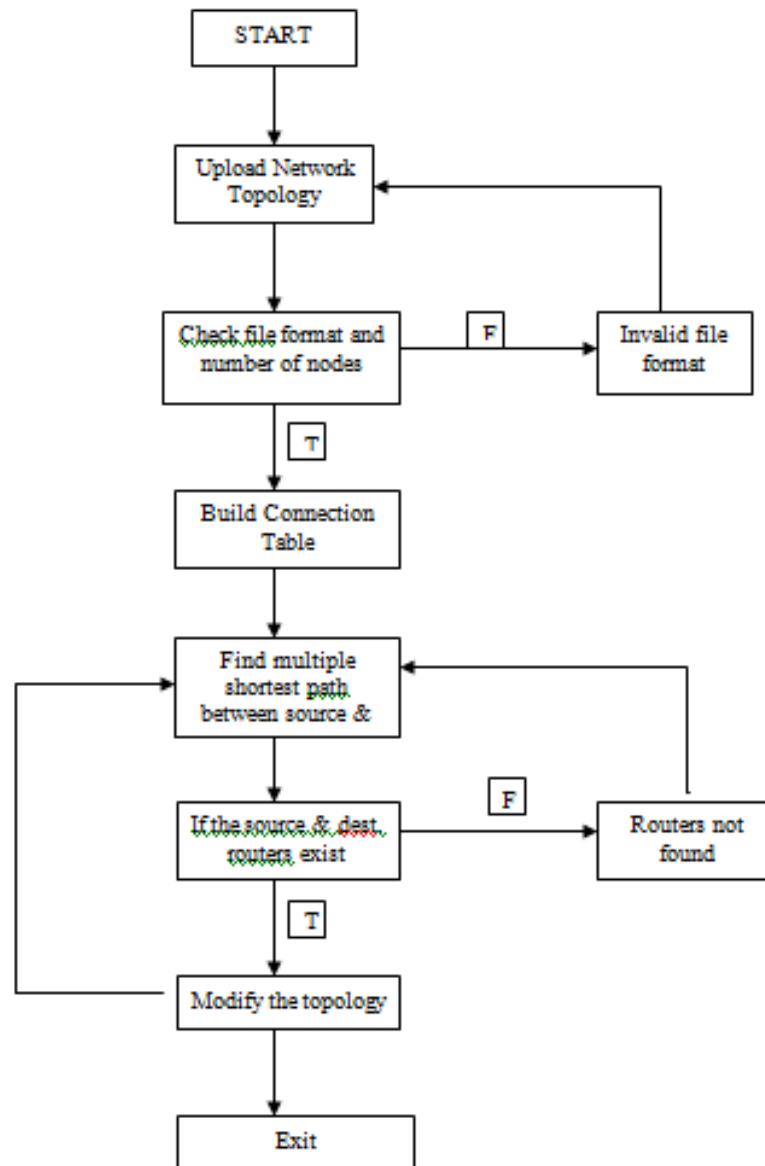
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Introduction

- ▶ Link-state routing protocols are one of the two main classes of routing protocols used in packet switching networks for computer communications, the other being distance-vector routing protocols.
 - ▶ The basic concept of link state routing is that each node constructs a map of network topology in the form of graph. Thus after this construction, the node can calculate the best logical path from itself to all possible destination in the network.
 - ▶ Dijkstra's shortest path algorithm is used to find the shortest path from each node to all other nodes.
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Work Flow



Welcome Screen

74 Link State Routing

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CS542 Link State Routing Simulation

1. Create a Network Topology

2. Build a Connection Table

3. Shortest Path to Destination Router

4. Modify a topology

5. Exit

Create Network Topology

7% Link State Routing

CS542 Link State Routing Simulation

7% Network Topology

0	4	22	17	28	23	5	18	26	30
4	0	18	12	12	20	3	18	18	28
21	17	0	35	32	28	14	1	31	32
28	24	18	0	-1	22	35	32	20	3
18	15	-1	31	0	17	10	4	20	17
23	26	10	17	10	0	31	18	14	9
-1	30	10	25	13	12	0	-1	11	24
15	5	5	22	32	34	7	0	22	1
28	30	10	33	24	17	13	31	0	-1
33	21	31	10	31	26	31	20	23	0

1. Create a Network Topology

2. Build a Connection Table

3. Path to Destination Router

4. Modify a topology

5. Exit

Build Connection Table

7% Link State Routing

CS542 Link State Routing Simulation

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5. Exit

7% Connection Table

Connection table for router 1

1	
2	[2]
3	[7]
4	[2]
5	[2]
6	[7]
7	[7]
8	[7]
9	[7]
10	[7]

Connection table for router 2

1	[1]
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Shortest Path

7% Link State Routing

7% Shortest Path

Source Router

Destination Router

1

6

Submit

Paths from source router 1 to destination router 6:
1. [1, 7, 6] -> 17;

Routing Simulation

work Topology

nection Table

3. Shortest Path to Destination Router

4. Modify a topology

5. Exit

Modify Topology

7% Link State Routing

7% Connection Table	
Con	7% Link State Routing
1	Paths from source router 1 to destination router 6:
2	[1, 7, 6] -> 17
3	[7]
4	[4]
5	[7]
6	[7]
7	[7]
8	[7]
9	[7]
10	[7]
Connection table for router 3	
1	[8]

7% Calculation	
2	Submit
26	30
-1	-1
31	32
20	3
20	17
14	9
11	24
22	1
0	-1
23	0

Exit

7% Link State Routing

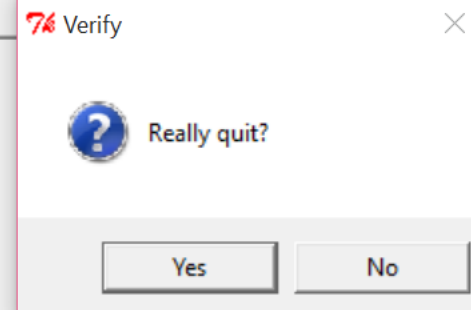
CS542 Link State Routing Simulation

1. Create a Network Topology

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4. Modify a topology



Validations

7% Link State Routing

CS542 Link State Routing Simulation

1. Create a Network Topology

2. Build a Connection Table

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4. Modify a topology

7% No



Number of nodes should be greater than or equal to 8

OK

Validations

7% Link State Routing

CS542 Link State Routing Simulation

1. Create a Network Topology

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4. Modify a topology

7% No



Invalid Router table. Please upload another file

OK

Validations

7% Link State Routing

CS542 Link State Routing Simulation

1. Create a Network Topology

2. Build a Connection Table

3. Shortest Path to Destination Router

4. Modify a topology

7% No



Connection table cannot be created without building a network topology. Please build a valid topology using Option 1

OK

Validations

7/6 Link State Routing

CS542 Link State Routing Simulation

1. Create a Network Topology

2. Build a Connection Table

3. Shortest Path to Destination Router

4. Modify a topology

7/6 No



Shortest Path cannot be created without building a network topology.
Please build a valid topology using Option 1

OK

Validations

7% Link State Routing

CS542 Link State Routing Simulation

1. Create a Network Topology

2. Build a Connection Table

3. Shortest Path to Destination Router

4. Modify a topology

7% No



Invalid Router.! Please enter a valid router

OK

Validations

7% Link State Routing

CS542 Link State Routing Simulation

1. Create a Network Topology

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4. Modify a topology

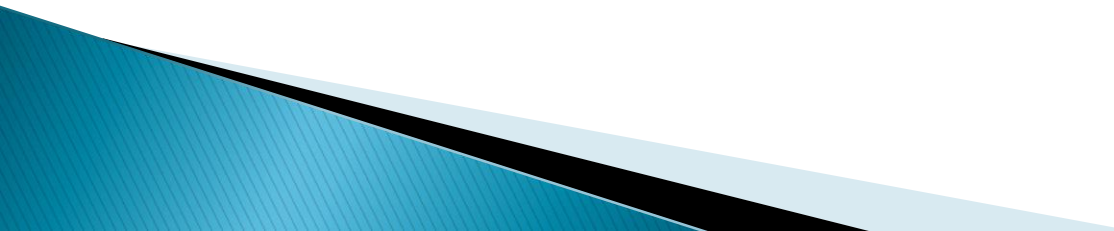
7% No



Topology cannot be modified without building a network topology.
Please build a valid topology using Option 1

OK

Additional Features

- ▶ The user can input a topology file only with 8 or more than 8 number of nodes. In case the nodes are lesser than 8 the user is prompted to upload a file with 8 or more number of nodes.
 - ▶ Dijkstra's algorithm is used to calculate the shortest path between the source node to the destination node
 - ▶ In case multiple paths are present with the same cost the algorithm calculates multiple paths and displays all of them with the cost associated to it.
 - ▶ In case a router fails the user has the ability to remove the router. Once the router is removed the shortest path(s) is recomputed between the source and the destination router.
 - ▶ In case the source or the destination router is deleted, the user is asked to input either the source or the destination router and the shortest path(s) are recomputed.
 - ▶ A complete GUI is implemented to help the user simulate the link state algorithm
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Conclusion

- ▶ The implemented application works for topology having minimum 8 nodes.
 - ▶ With each node having information of its linked node cost, the application can find shortest path from user entered source to destination
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