CS542 Project : Link State Routing Simulation

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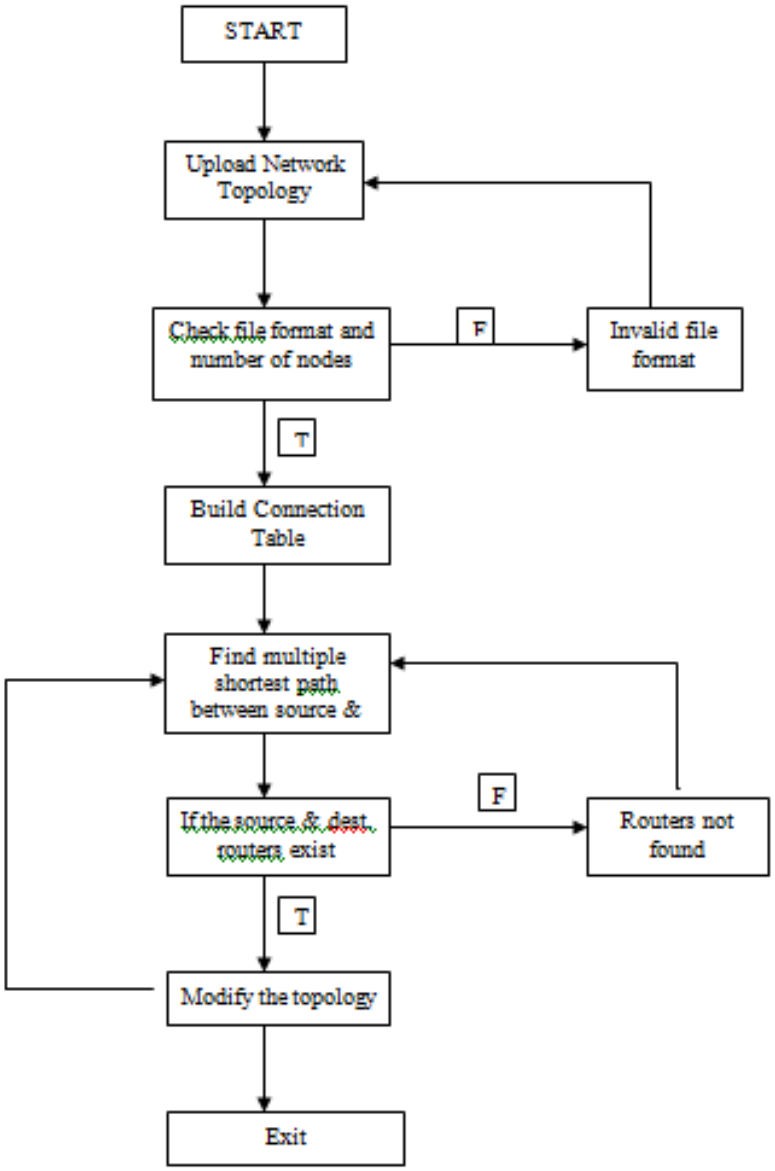
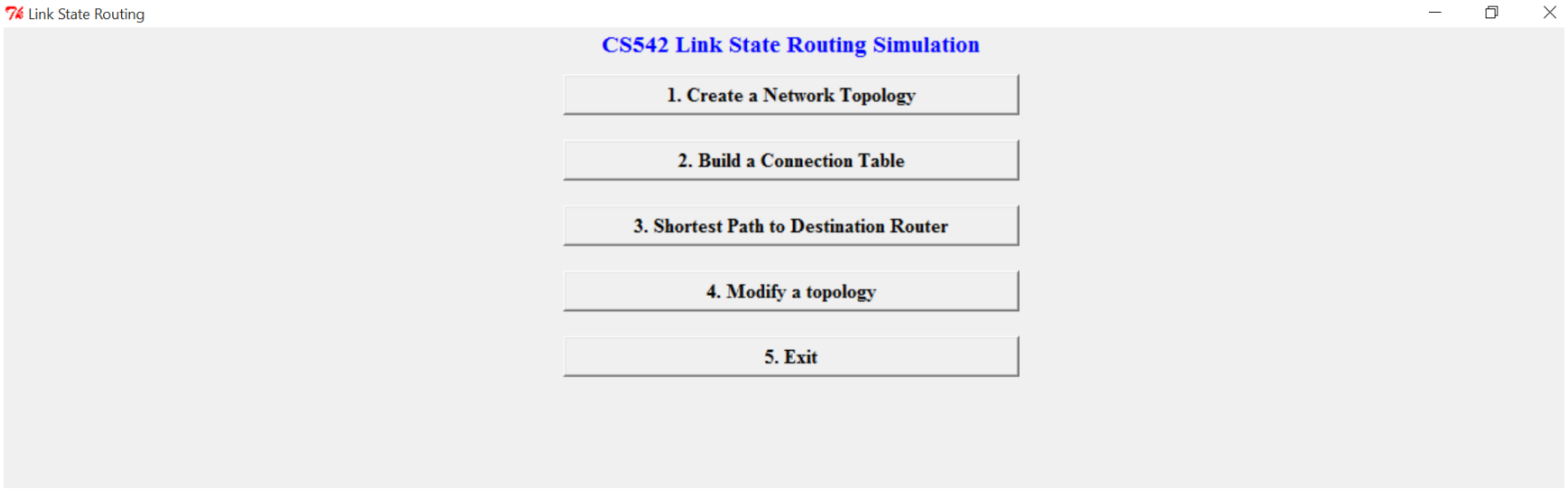
Introduction

- 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.
- Djiktra's shortest path algorithm is used to find the shortest path from each node to all other nodes.

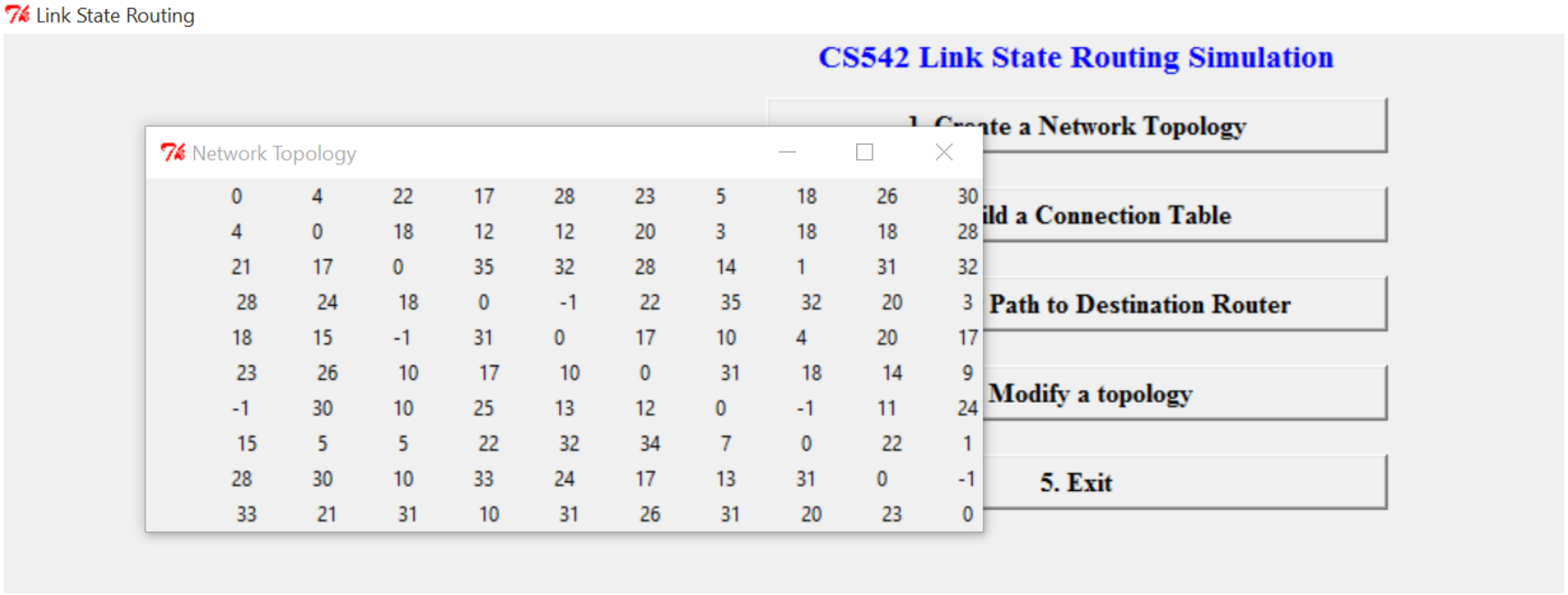
Work Flow


START
Upload Network Topology
Check file format and number of nodes
F
Invalid file format
T
Build Connection Table
Find multiple shortest path between source &
If the source & dest. routers exist
F
Routers not found
T
Modify the topology
Exit

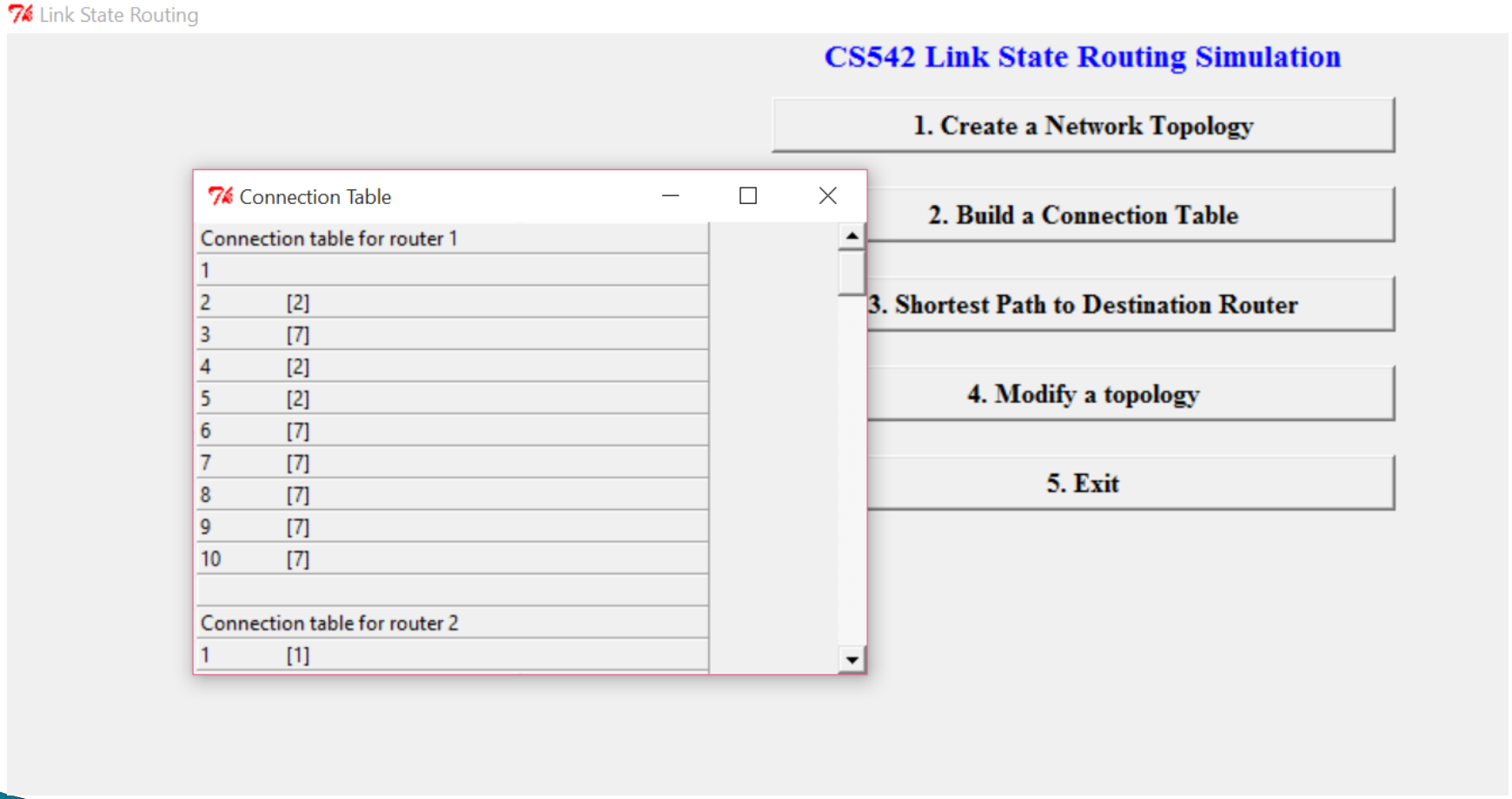
Welcome Screen



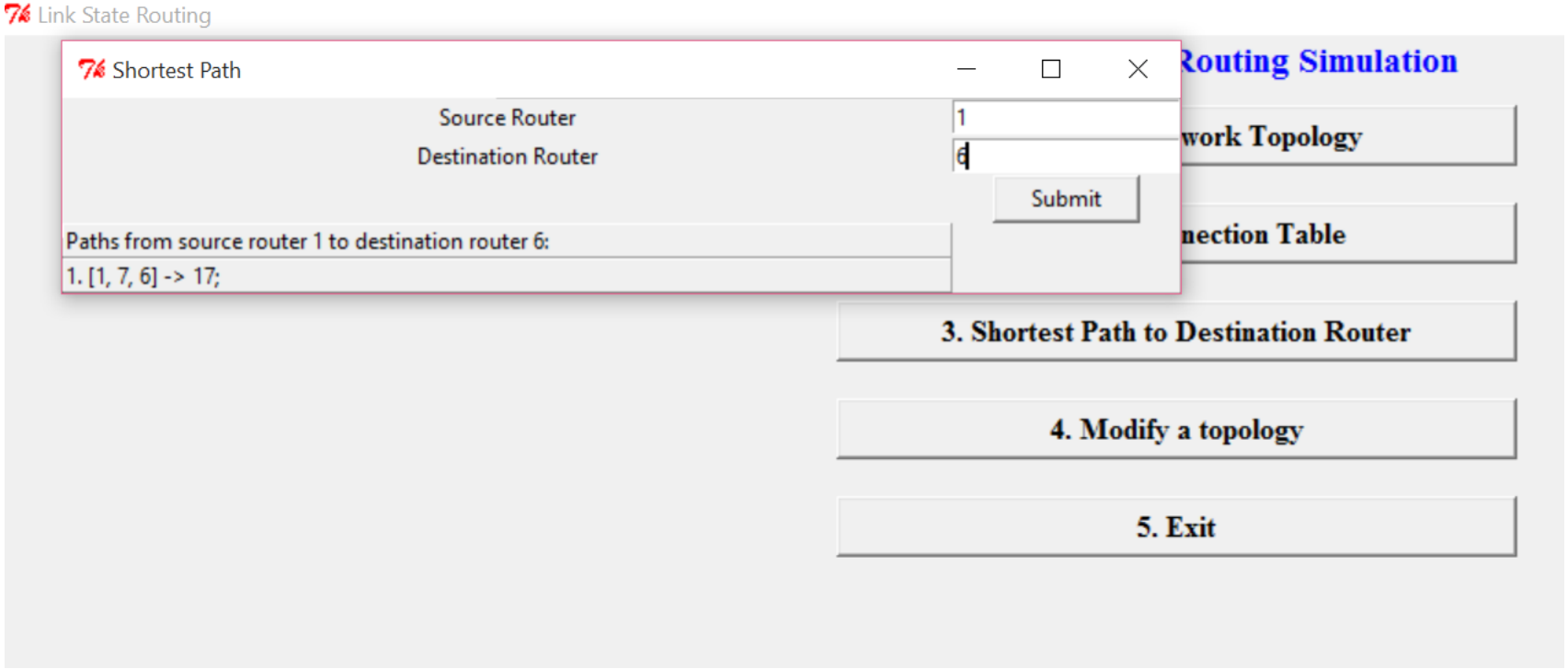
Create Network Topology



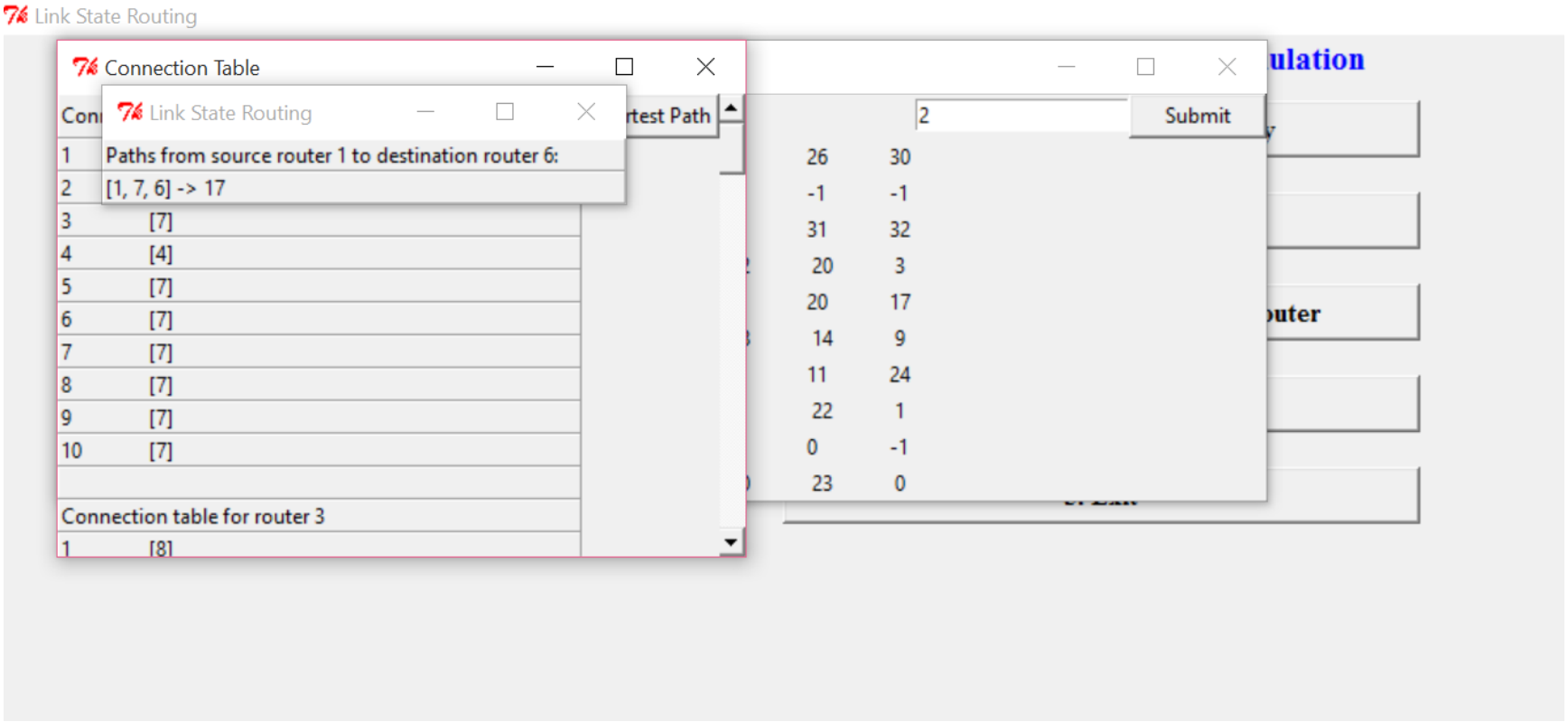
Build Connection Table



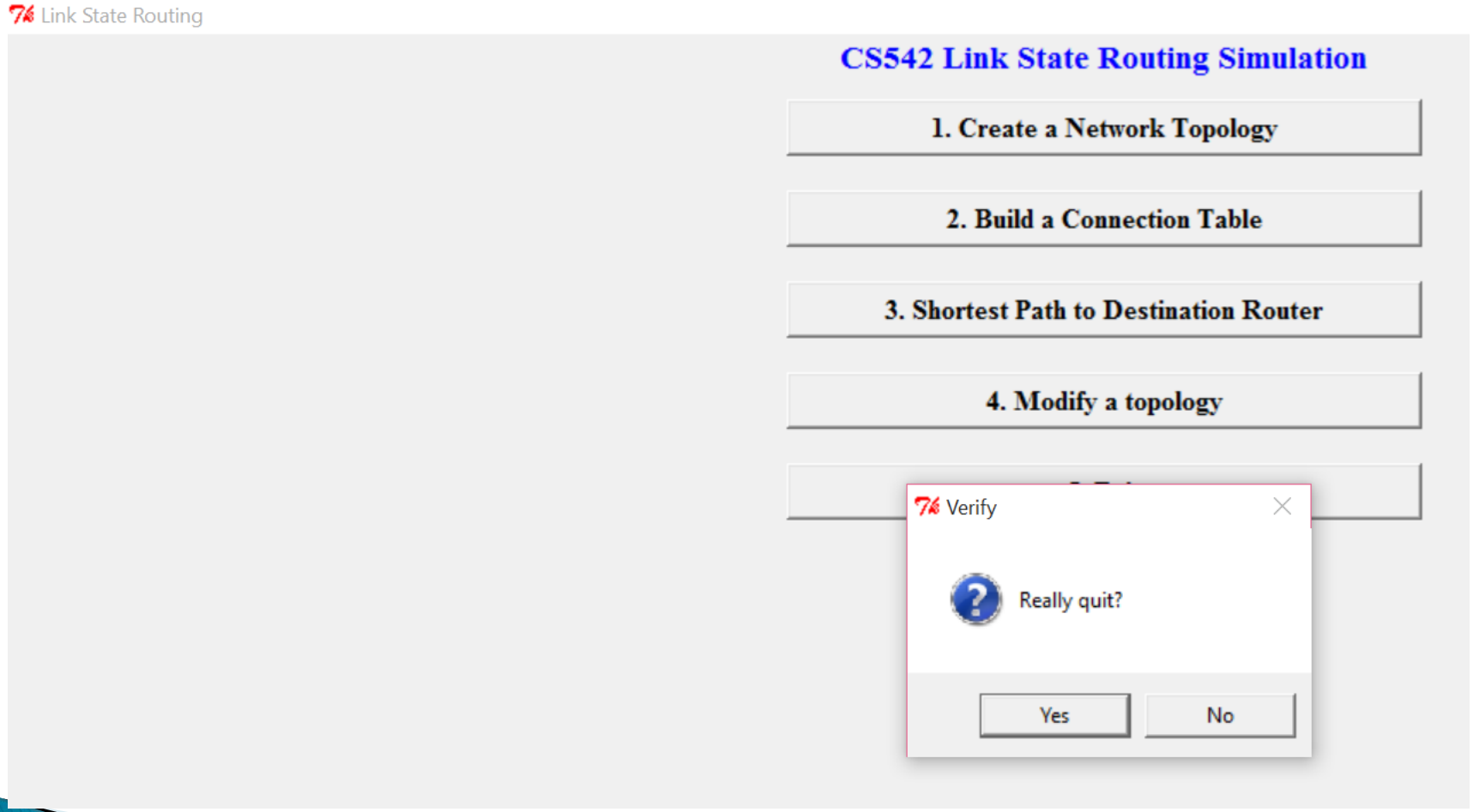
Shortest Path



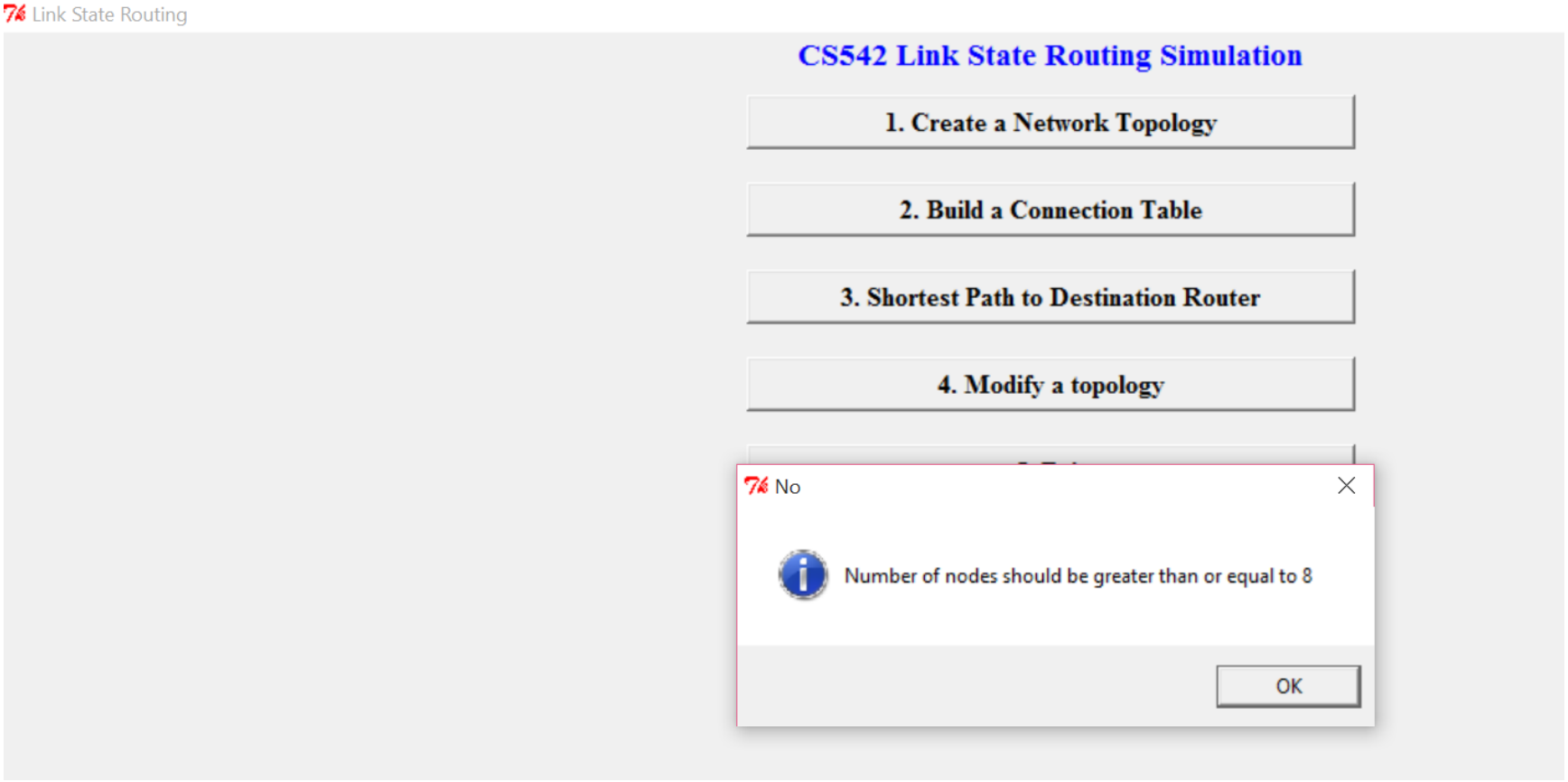
Modify Topology



Exit


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
Verify
Really quit?
Yes
No

Validations



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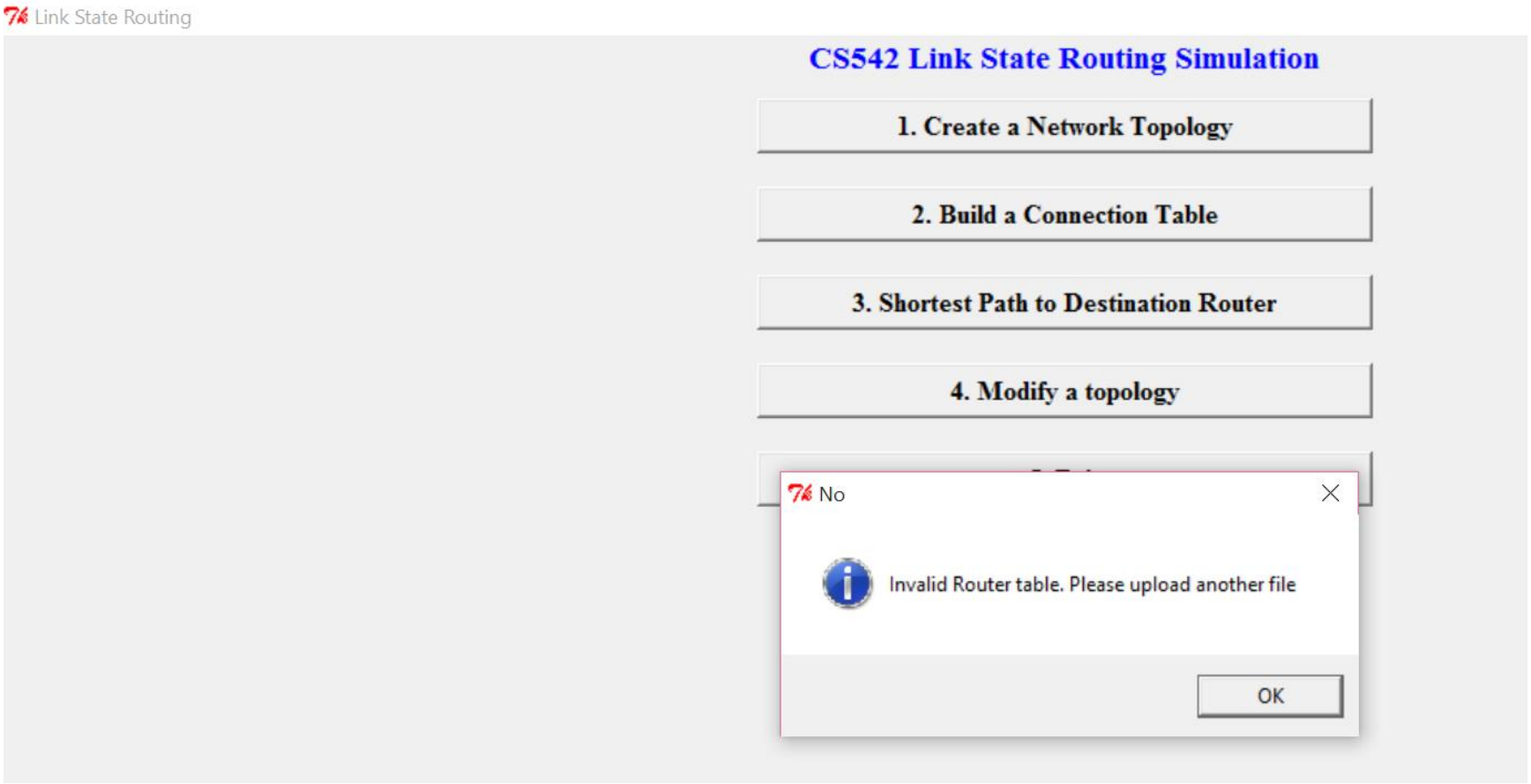

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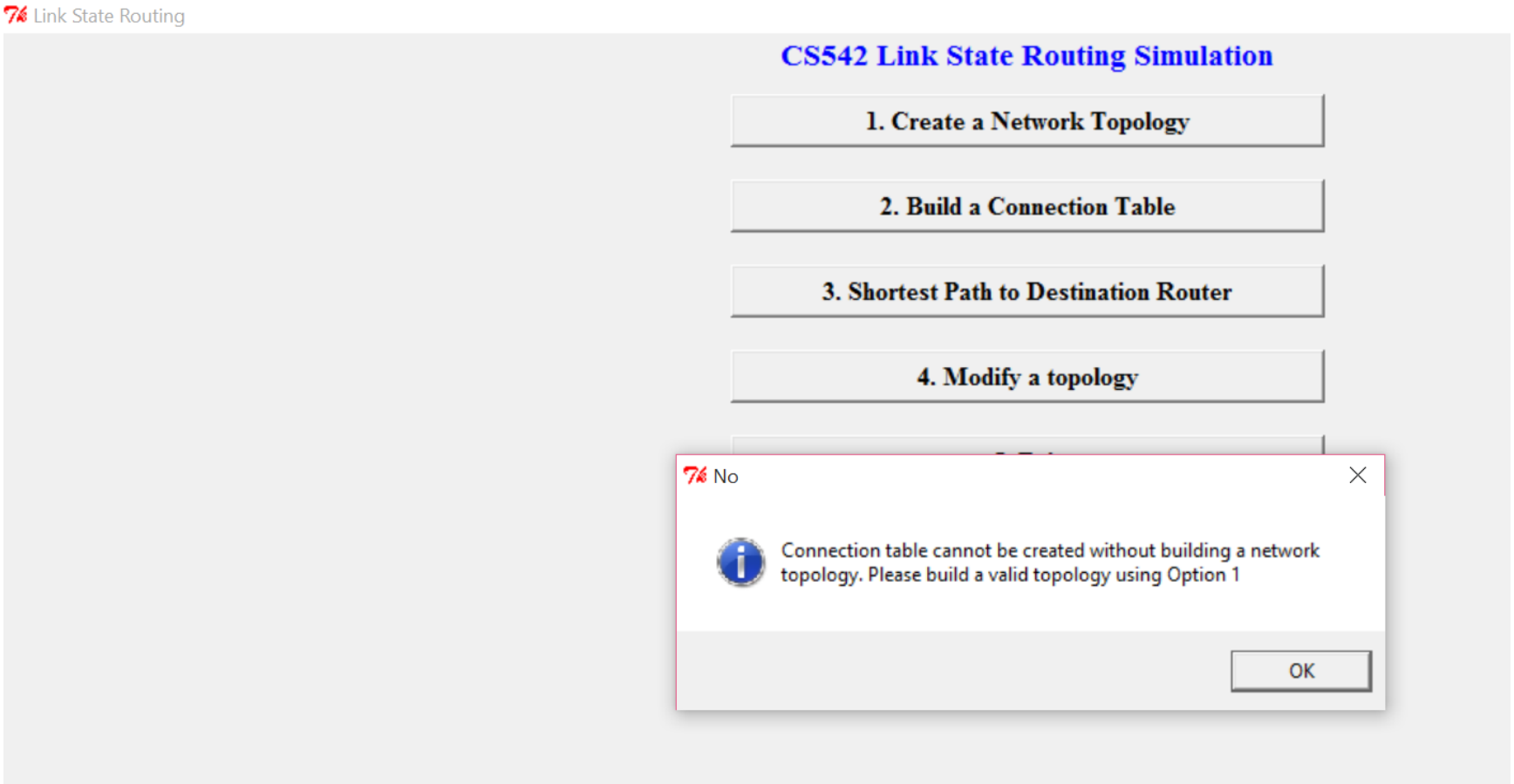
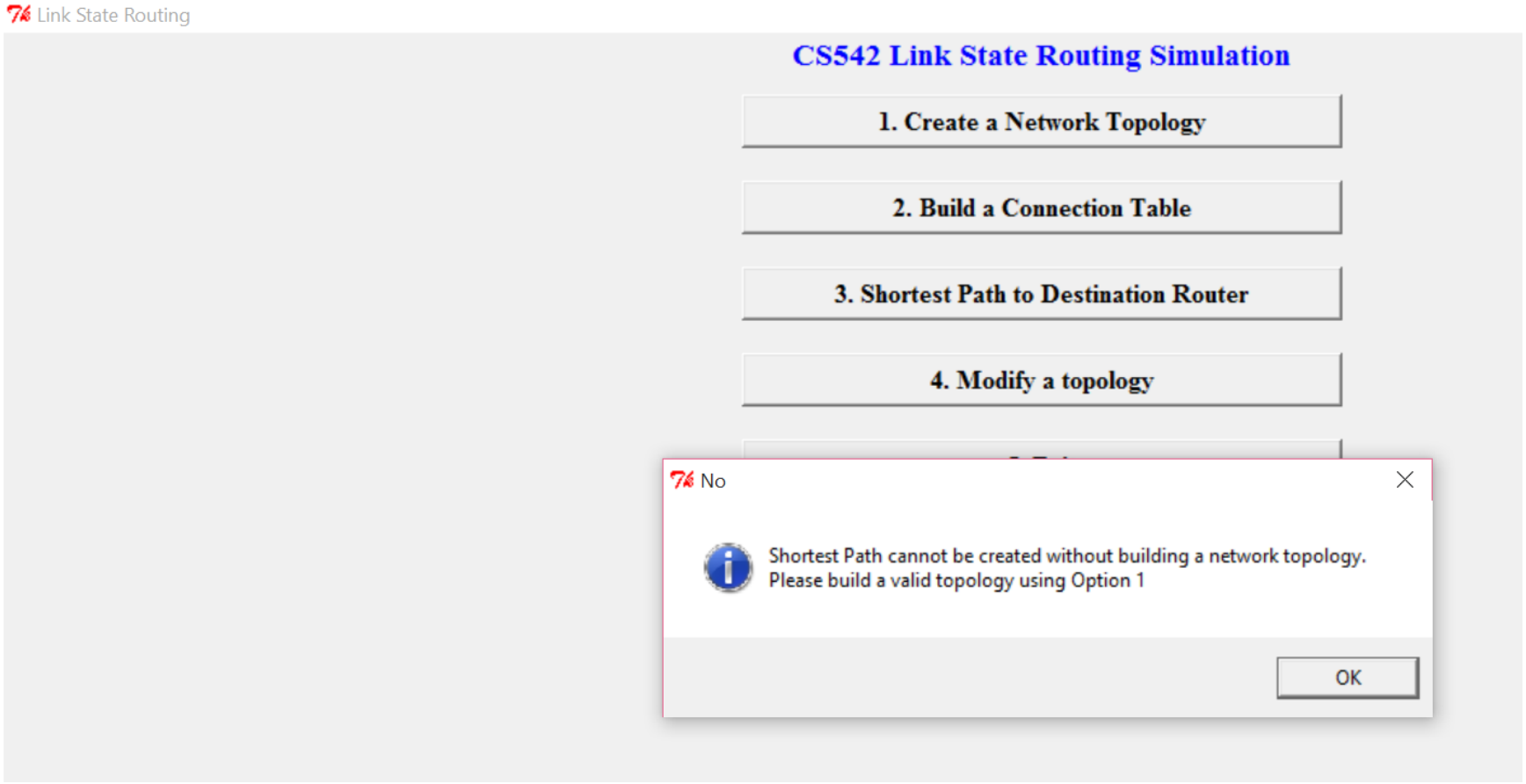
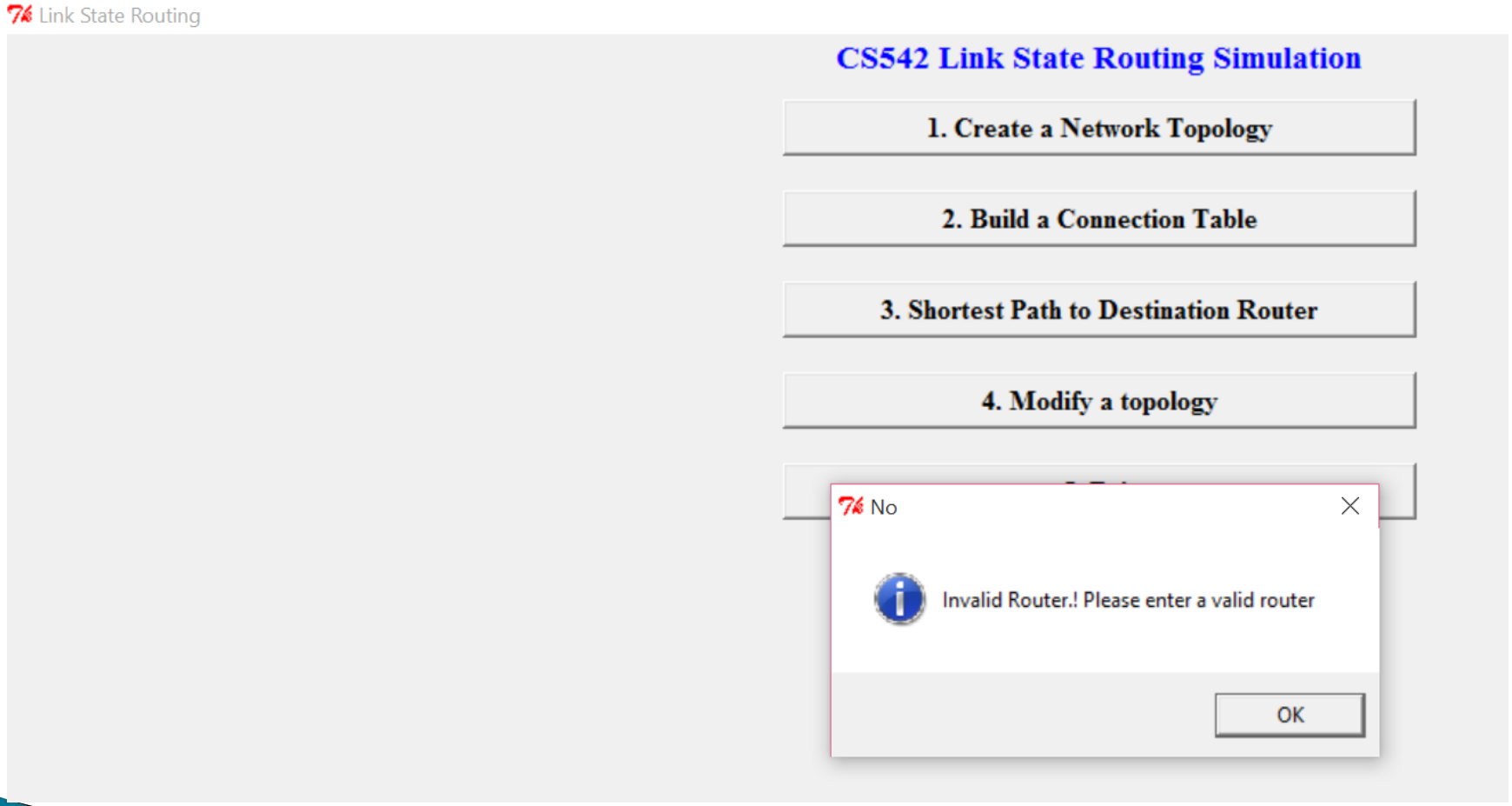


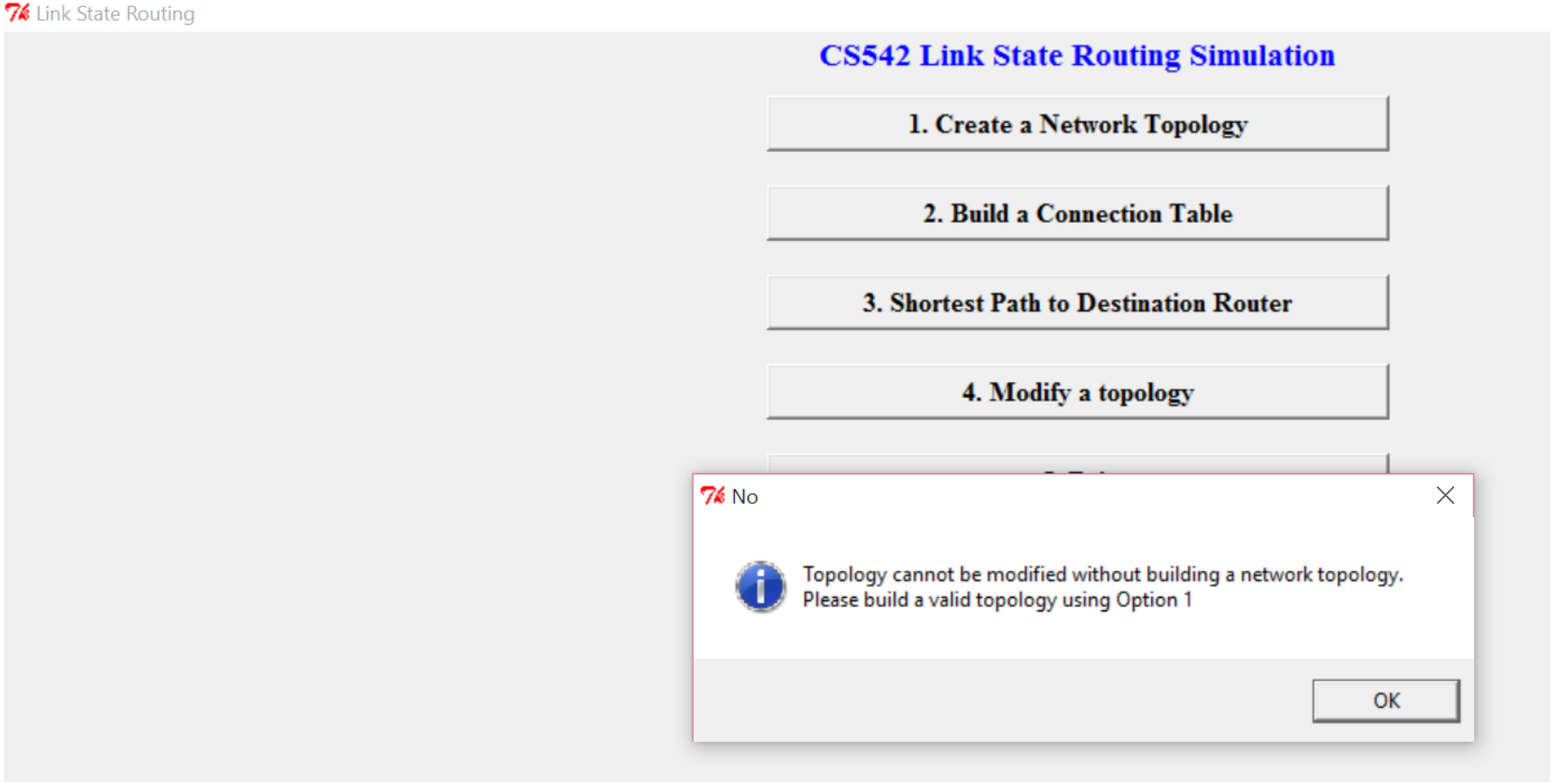
Validations



Validations



Validations



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.
- Djiktra's algorithm is used to calculate the shortest path between the source node to the destination node
- Incase 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

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