

User Manual

In this document we provide the workflow of our application implementing the link state routing topology and finding the shortest path between the source and destination using Dijkstra's Algorithm.

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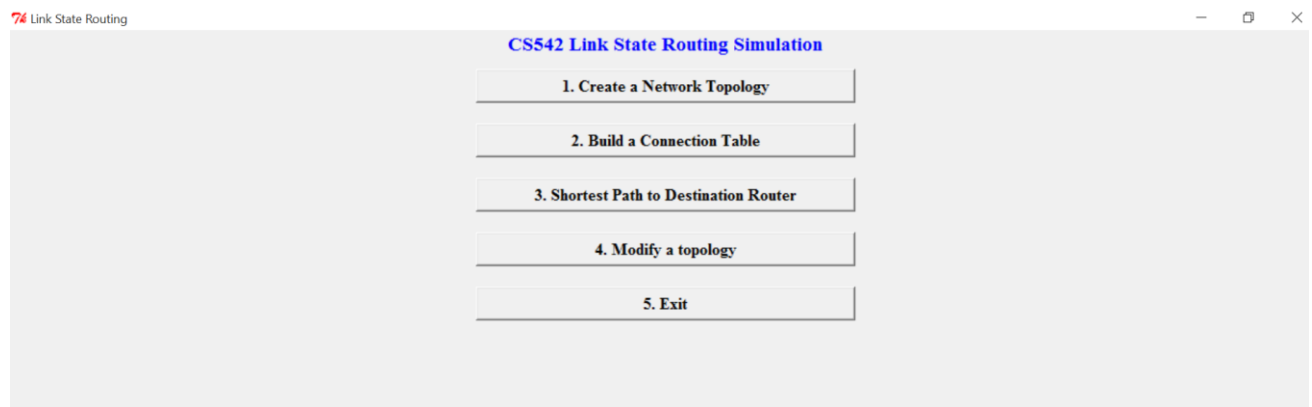
Command to run the simulation

The executable file can be run with the following command:

python CS542_LSR_Simulation.py

The following home screen will be displayed:

Welcome Screen:



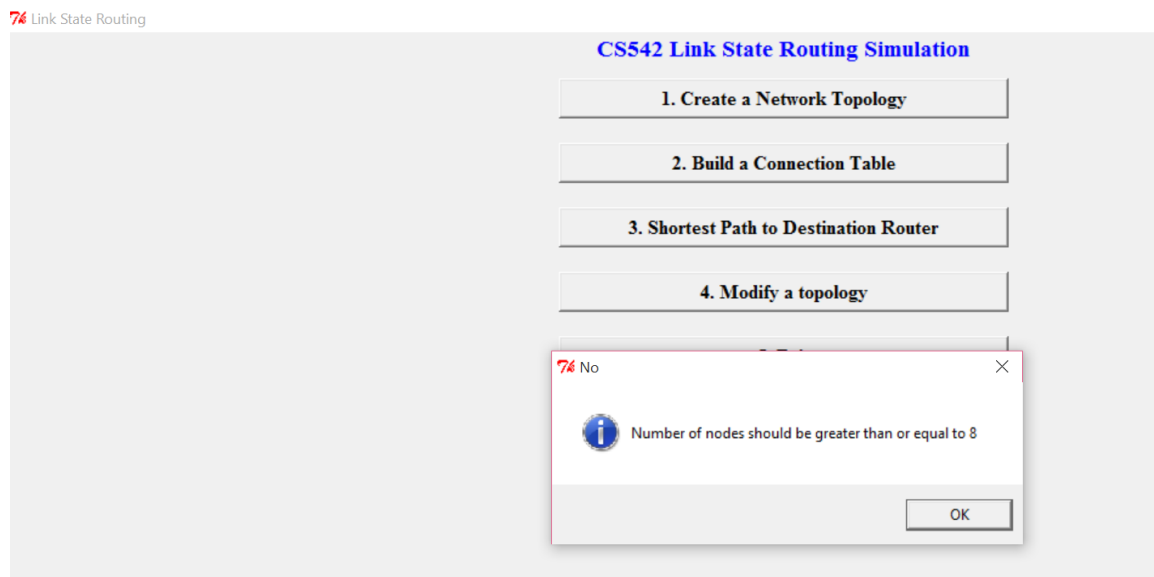
The following are available on the first screen:

1. Create Network Topology,
2. Build Connection Table
3. Shortest Path to Destination Router
4. Modify a topology
5. Exit.

Create Network Topology

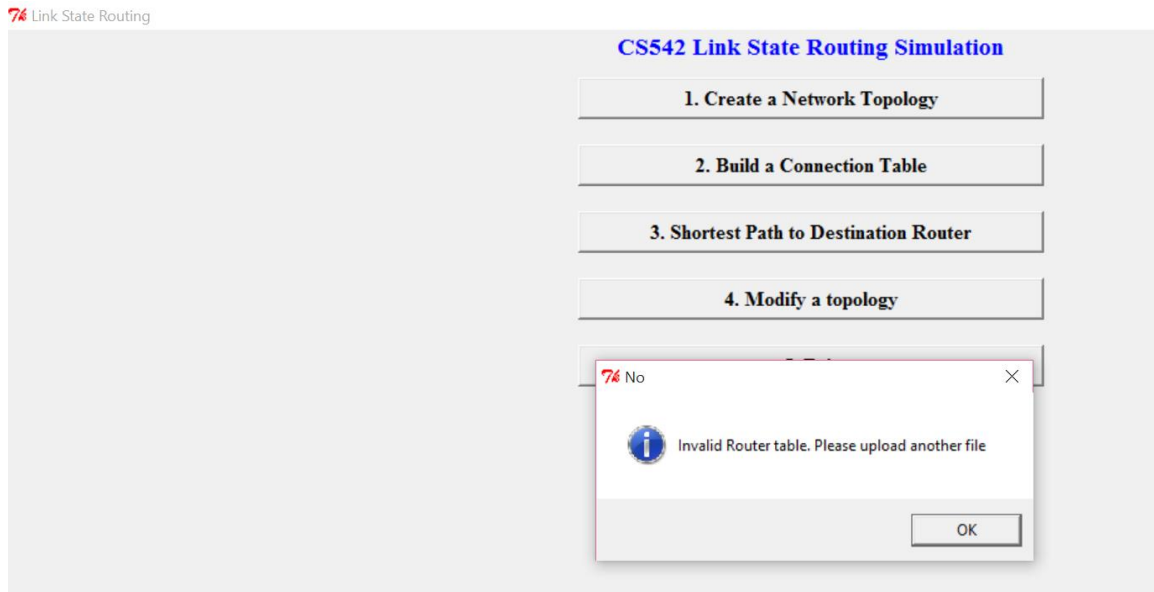
- a. When the user clicks this button, user can upload a topology matrix representing the graph containing the cost of traversing between two routers.
- b. The topology uploaded should be of 8 nodes and in-case the topology matrix contains less than 8 nodes , then an error will be displayed to reupload the topology matrix of the required size.

ERROR: Number of nodes should be greater than or equal to 8

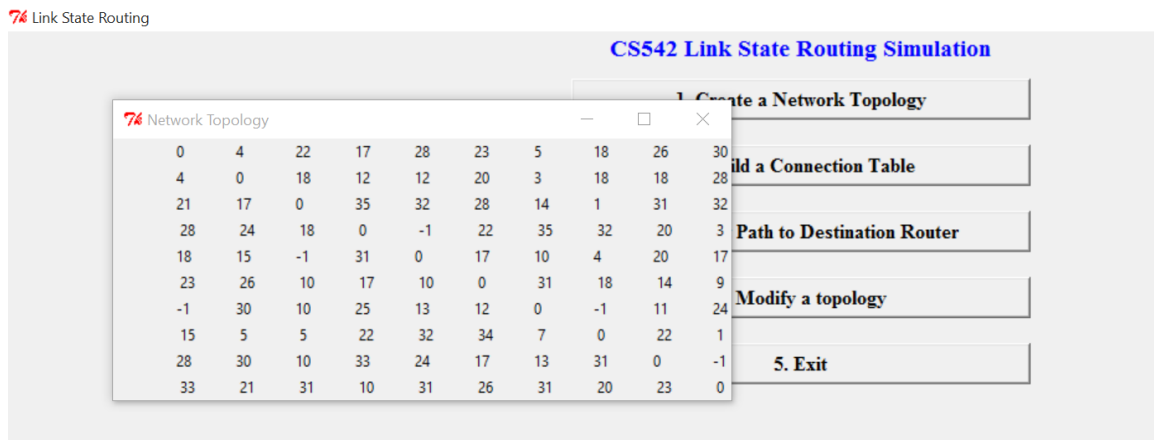


- c. Also the file containing the topology matrix should be present in an .txt file or the application will show up an error to upload correct file

ERROR: Invalid Router table. Please upload another file

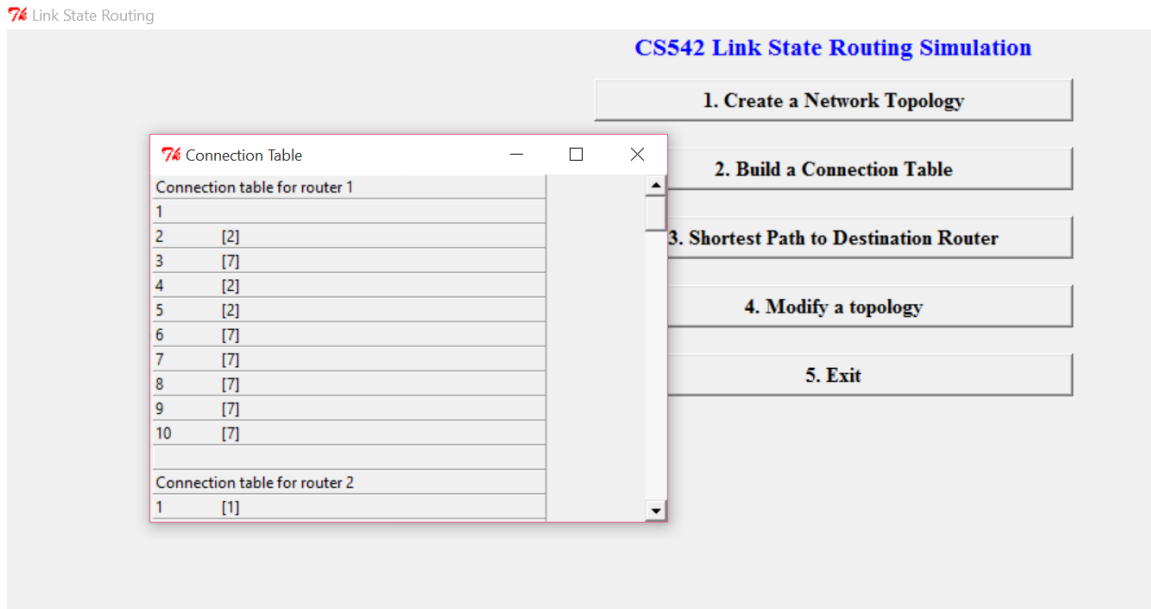


- d. On successfully uploading the txt file with the topology matrix , the application will be show the network topology written in the file.



Build Connection Table

- a. After uploading the file using the first option, when the user clicks on this button, the application will display the connection table i.e the next router that will be used by each router to reach upto its destination

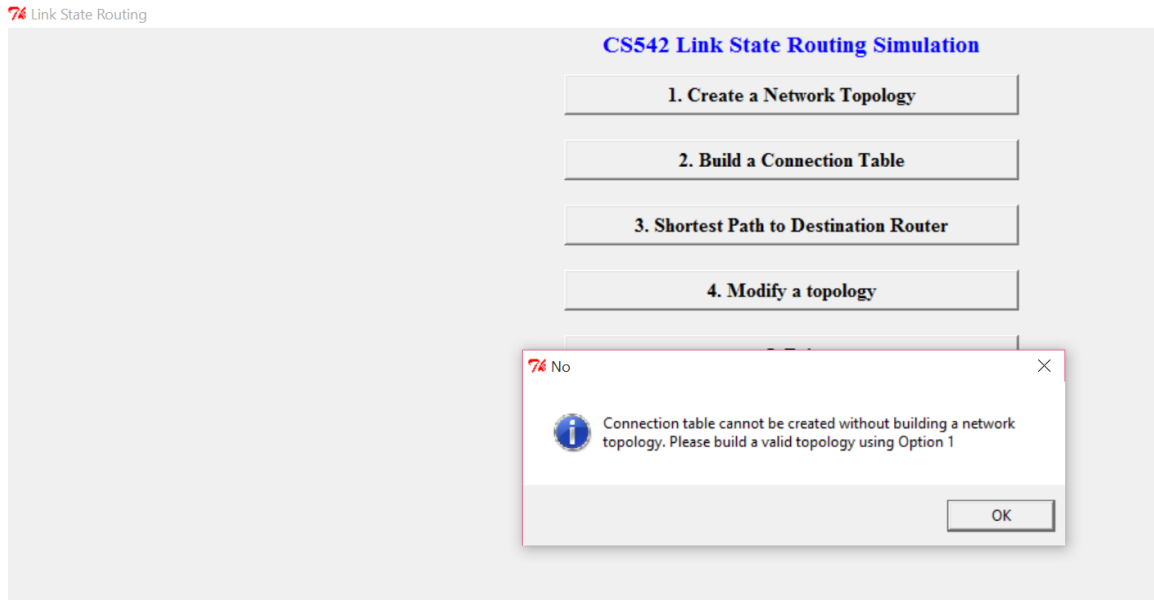


In the above screenshot, For connection table of Router 1 , the next path it will use to reach router 3 will be router 7.

This is represented as 3 : {7}

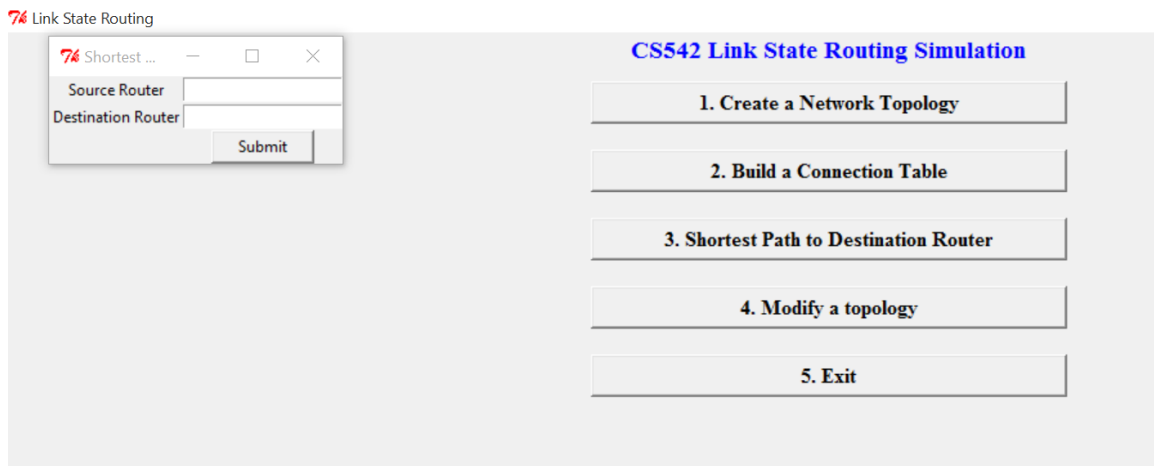
- b. If the user clicks on the "Build Connection table" before uploading the file from the first option , then the application will throw an error to upload the file before building the connection table.

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



Shortest Path to Destination Router

- User can use this option to find the shortest path from source router to destination router.
- When the user clicks on this button, an dialog box will pop up to enter the source and the destination router.



- When the user enters those values, the application will display the shortest path i.e. the path that needs the least cost to reach from the user entered source router to user entered destination router.

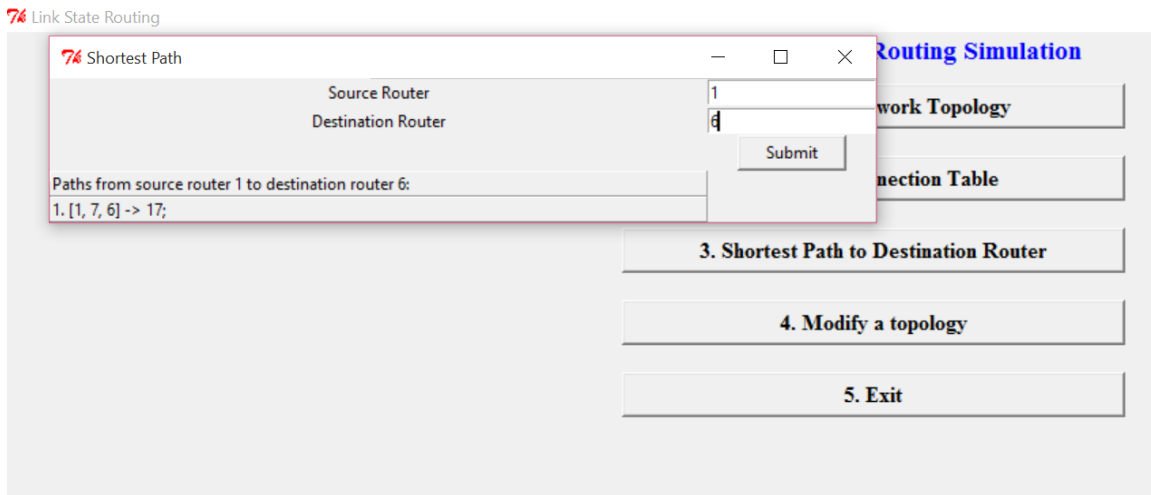
For ex: Source Router = 1

Destination Router = 6

The application output will be "Paths from source router to destination router is"

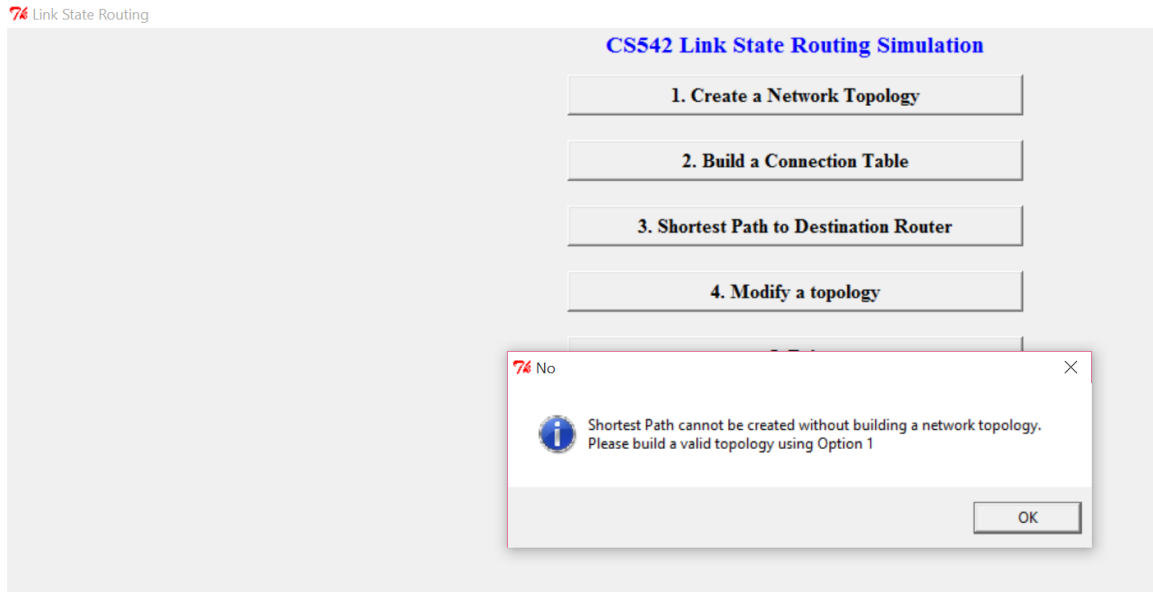
1. [1,7,6] = 17;

Here the least cost to reach from source router to destination router is 17.



- The application will also display multiple paths if there exist any having the same cost 17.
- Thus the application has the functionality to display multiple shortest paths.
- Similar to Option 2 , if the user clicks this button before uploading a valid topology matrix, then the application will display the error to upload the matrix before allowing it to find the shortest path.

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

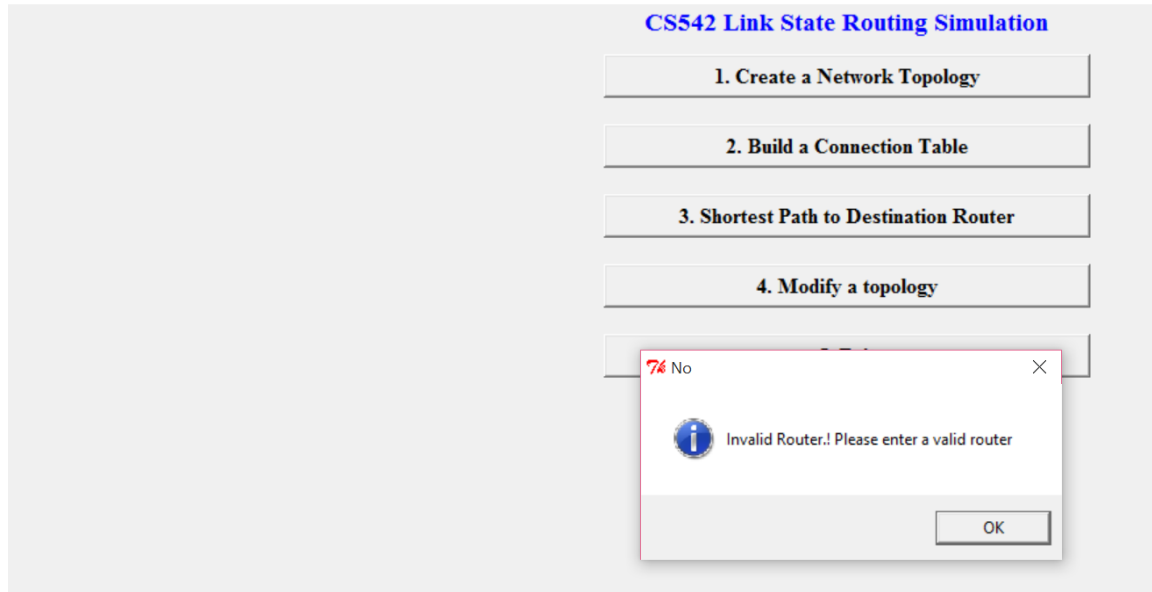


Modify Topology

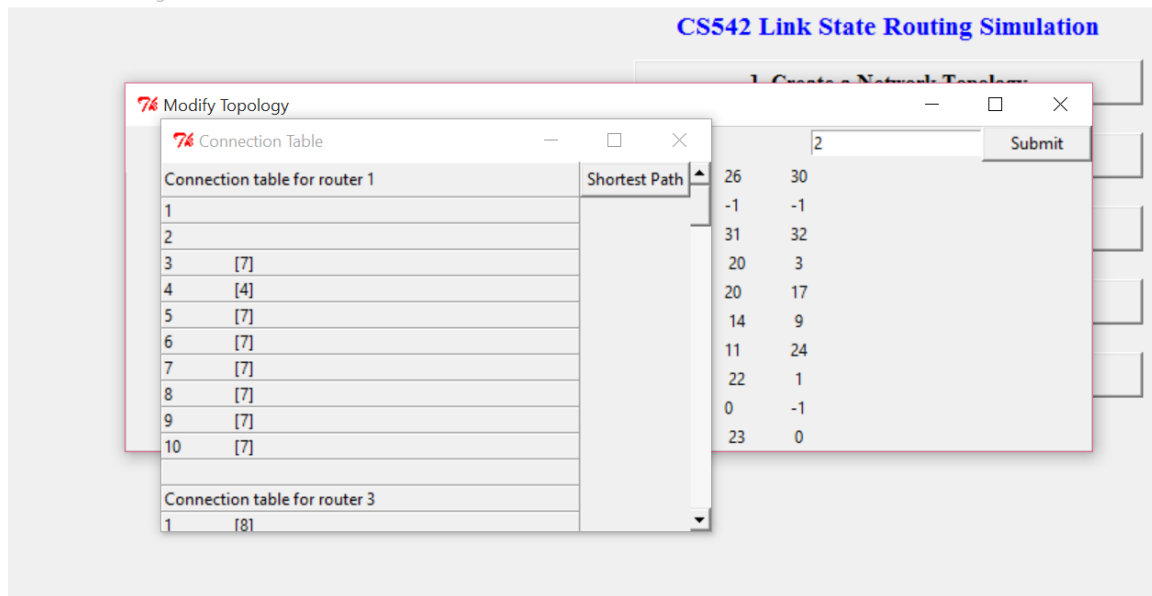
- This option can be used to modify the uploaded topology matrix. The modifications represent shutting down or deleting an router.
- When the user clicks on this button , an dialog box will pop up to enter the router to be deleted.



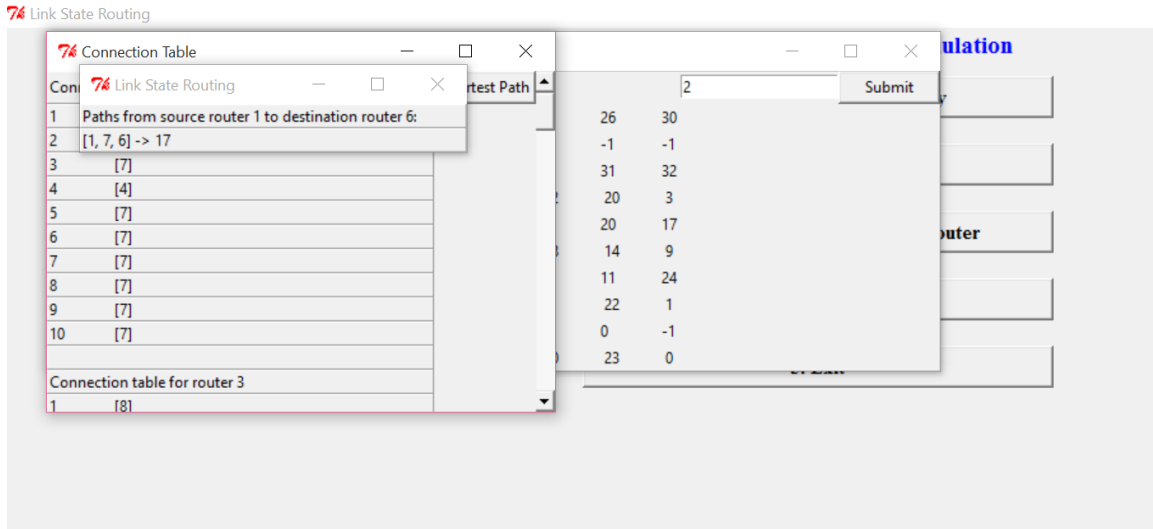
- If the user enters the router which does not exist in the topology matrix, then the application will display the error message to enter an valid router to be deleted.



- d. Once the topology matrix is modified the application will show up the updated topology matrix with all the paths removed from the deleted router to other routers. Also the updated router will be displayed.

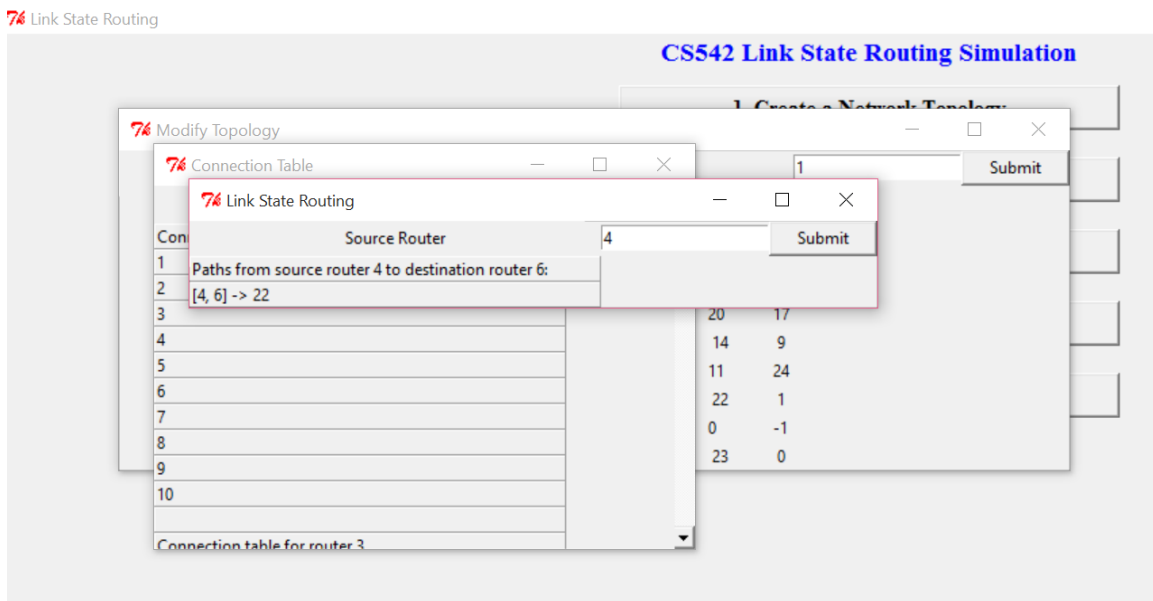


- e. Once the topology matrix is modified, user can find the shortest which will display the shortest costing path from source to destination without usage of the deleted router that user entered by modifying the topology. Here the source and the destination router will be same as the one used earlier when user clicked option 3.

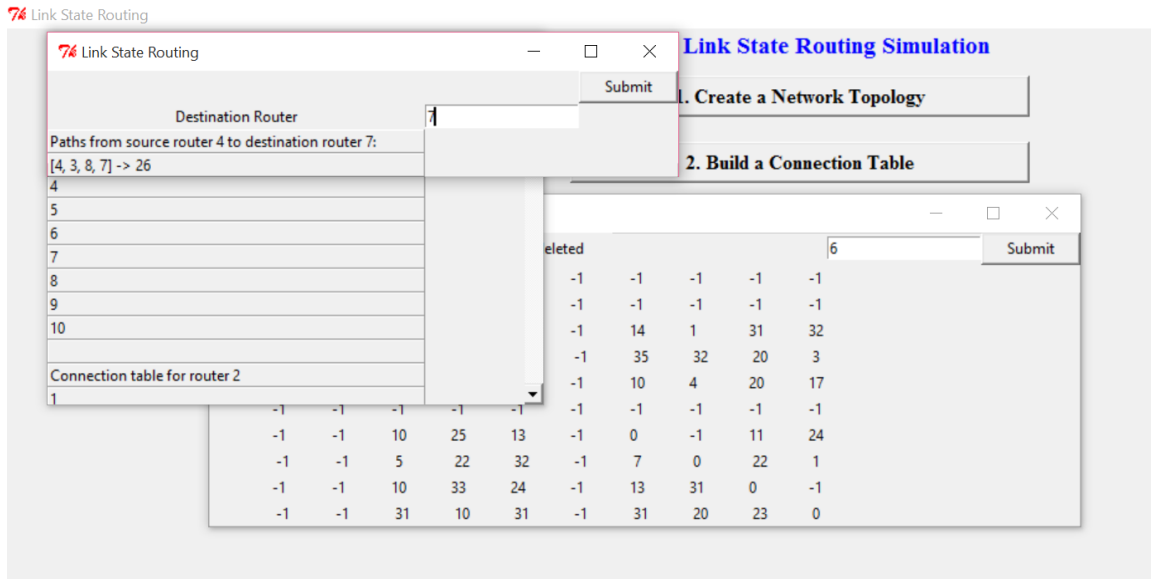


f. There are three scenarios that can arise while modifying the topology,

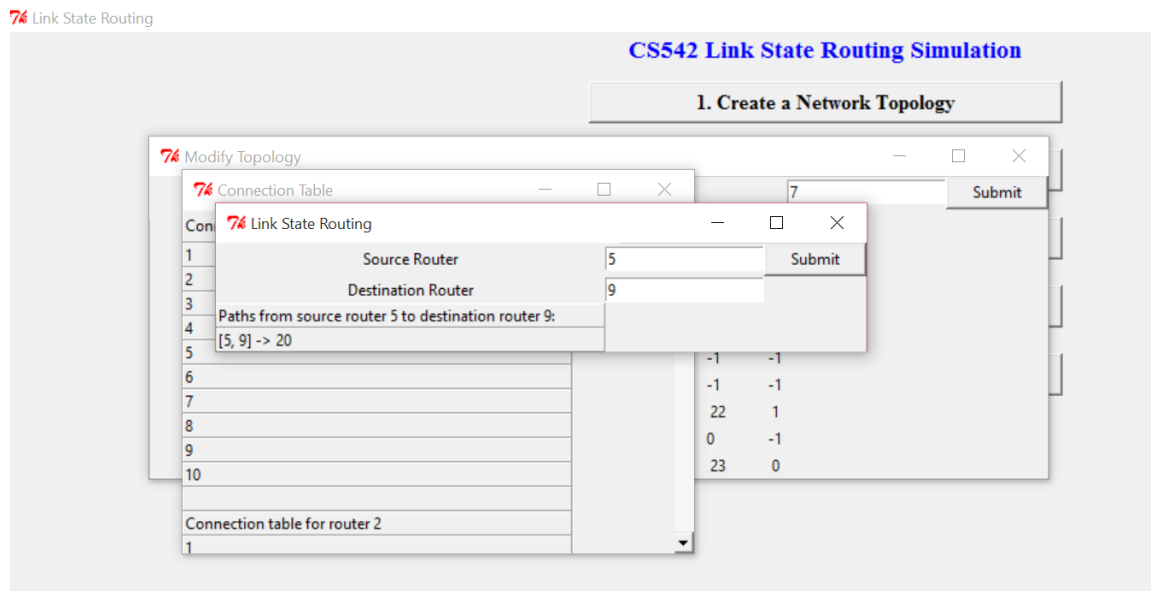
Scenario 1: if the user deletes the source router that was earlier used to find the shortest path, then after deleting the router, when user again finds new shortest path, the user will be notified to enter the source router again and the destination router will be same as the earlier one.



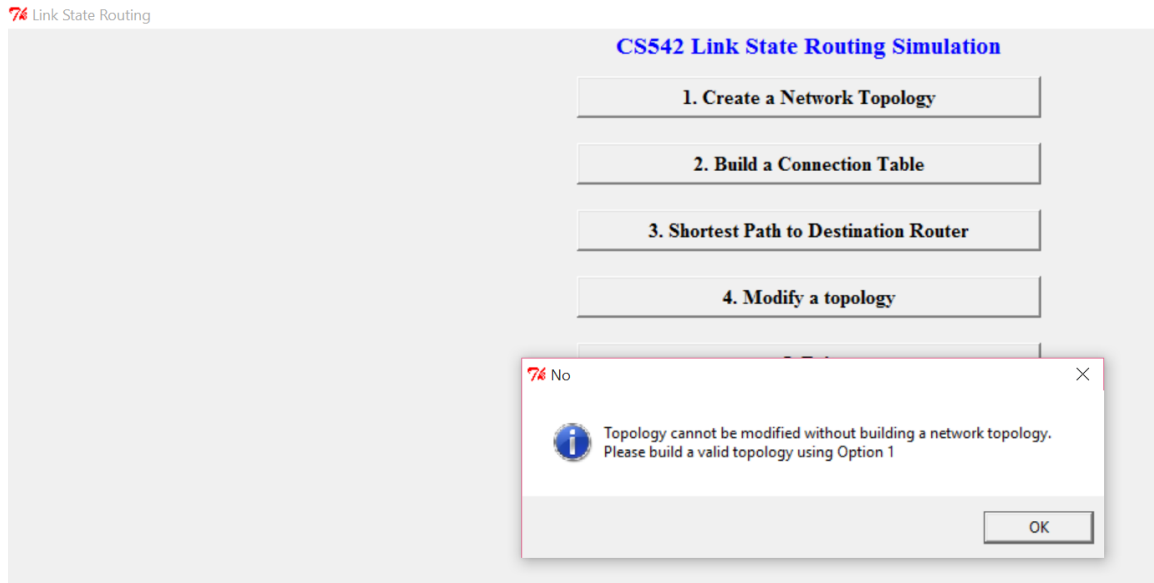
Scenario 2: If the user deletes the destination router that was earlier used to find the shortest path, then after deleting the router, when user again clicks to find new shortest path, the user will be notified to enter the destination router again and the source router will be same as the earlier one.



Scenario 3: If the user deletes the source and the destination router in succession, then while finding the shortest path, the user will be asked to enter the source and destination router both for which the shortest path needs to be found



- g. On starting the application if the user clicks this option before uploading the topology, the application will display an error to upload the topology matrix before modifying it.



Exit

The application can be quit using this option.

