# SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

## Department of Electronics and Communication Engineering

## Laboratory Report Cover Sheet

## 18ECC303J – COMPUTER COMMUNICATION NETWORKS
### EVEN SEM 2022-23

Name    :

Reg No    :

Section    :

Venue    :

Experiment title : **Implementation of Link state Routing algorithm**

| PARTICULARS | MAX MARKS | MARKS OBTAINED |
|---|:---:|:---:|
| Pre lab & Post lab | 10 | |
| Lab performance | 15 | |
| Record | 05 | |
| Viva | 10 | |
| Total | **40** | |

## <u>Report Verification</u>

Staff Name:

Signature with date:

# 9. Implementation of Link state Routing algorithm.

## 9.1 Introduction:

To simulate the link state routing protocol to maintain routing tables as the traffic and topology of the network changes

## 9.2 Hardware Requirement

- 3PCs with NIU card
- Network Emulation Unit
- Jumper Cables

## 9.3 Background

The information available to a distance vector router has been compared to the information available from a road sign. Link state routing protocols are like a road map. A link state router cannot be fooled as easily into making bad routing decisions, because it has a complete picture of the network. The reason is that unlike the routing-by-rumor approach of distance vector, link state routers have firsthand information from all their peer[7] routers. Each router originates information about itself, its directly connected links, and the state of those links (hence the name). This information is passed around from router to router, each router making a copy of it, but never changing it. The ultimate objective is that every router has identical information about the internetwork, and each router will independently calculate its own best paths. Link state protocols, sometimes called *shortest path first* or *distributed database* protocols, are built around a well-known algorithm from graph theory, E. W. Dijkstra'a shortest path algorithm. Examples of link state routing protocols are:

- Open Shortest Path First (OSPF) for IP
- The ISO's Intermediate System to Intermediate System (IS-IS) for CLNS and IP
- DEC's DNA Phase V
- Novell's NetWare Link Services Protocol (NLSP)

Although link state protocols are rightly considered more complex than distance vector protocols, the basic functionality is not complex at all:
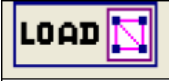
1. Each router establishes a relationship—an adjacency—with each of its neighbors.
2. Each router sends *link state advertisements* (LSAs), some
3. Each router stores a copy of all the LSAs it has seen in a database. If all works well, the databases in all routers should be identical.
4. The completed *topological database*, also called the *link state database*, describes a graph of the internetwork. Using the Dijkstra algorithm, each router calculates the shortest path to each network and enters this information into the route table.

## 9.4 Prelab Questions

1. Explain the procedure to calculate Shortest path in LSR protocol

2. What is the purpose of a topological database?

3. Why are sequence numbers important in link state protocols?

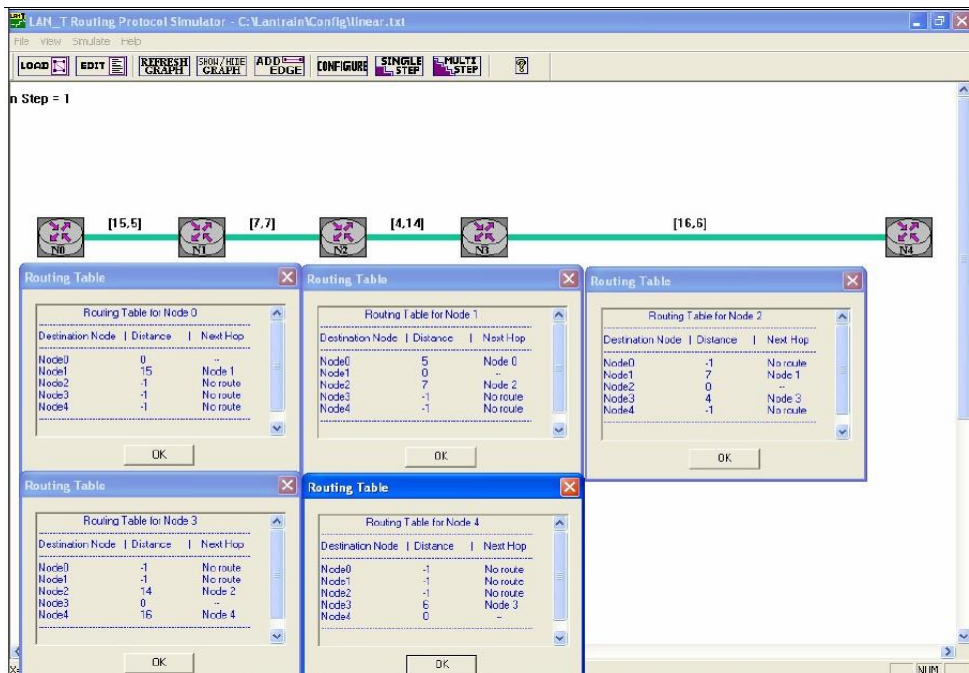4. What are the steps to create shortest path in lsr

**9.5 Procedure:**

1. Double click on LanT Routing Simulator icon from the desktop.

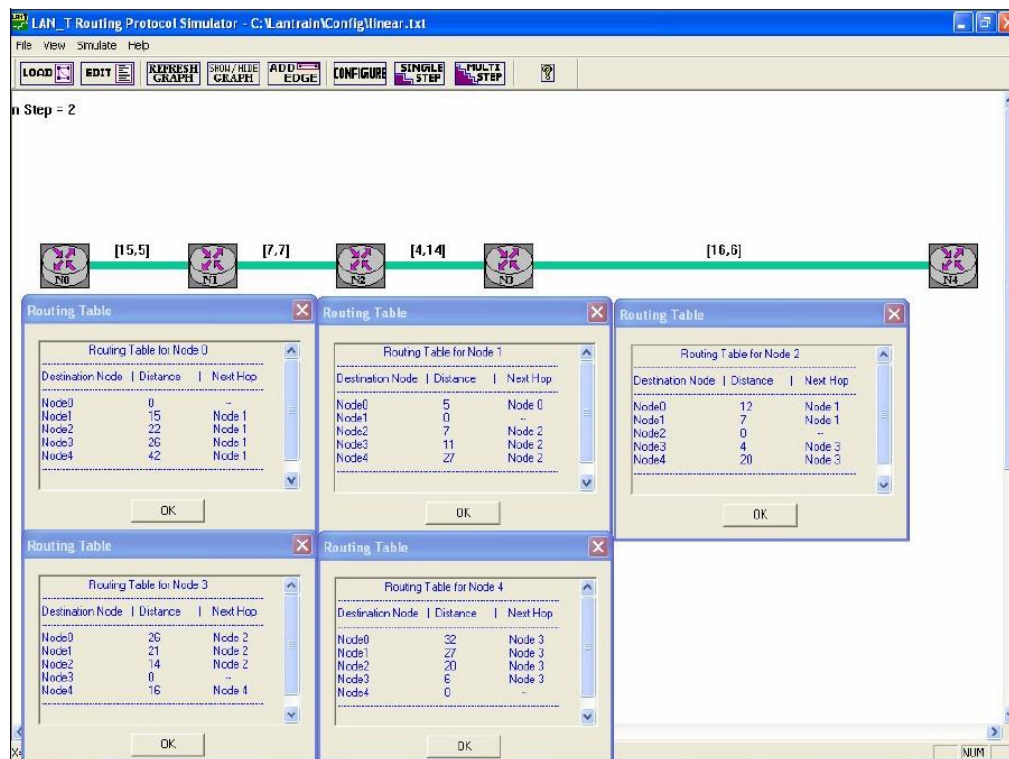2. Click button and browse open C:\Lantrain\Config\linear.txt.

3. Click button and select Link state algorithm
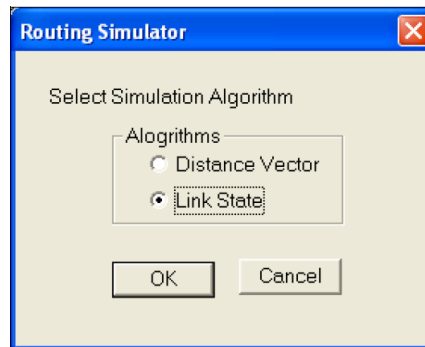


4. Click on the nodes to obtain the routing table.



5. Click the  button to update the routing table. Routing table of entire nodes gets updated after a single hopping. This is one of the advantages of Link state algorithm over Distance vector algorithm.

Count to Infinity problem:

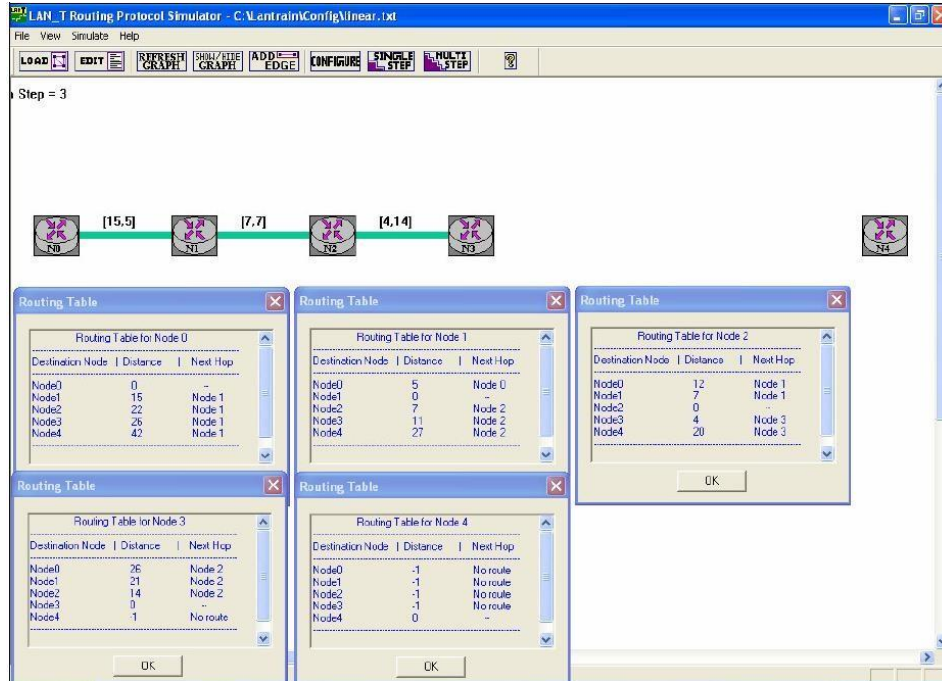6. Click on the green colour line lying between N3 and N4.

7. Enter forward and reverse weights as -1 to disconnect N4 from the other nodes.
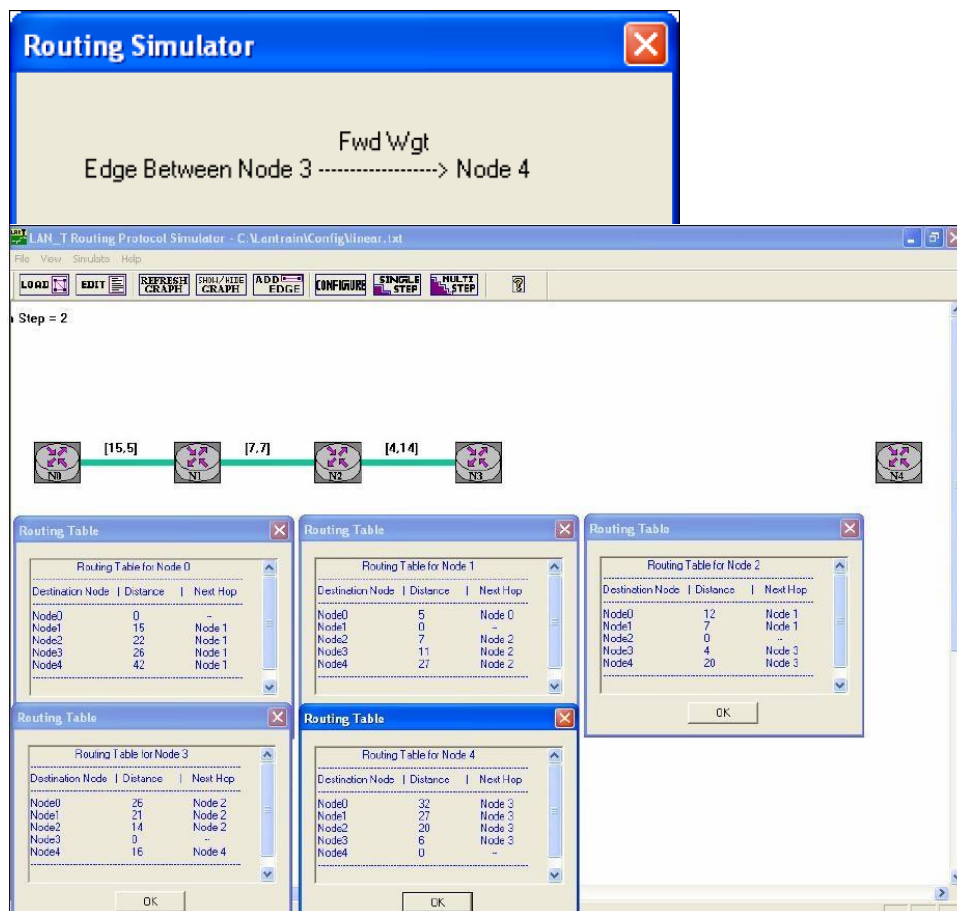
8. Observe the routing table. The values are not changed as it's not updated.

9. Click the single step button ![SINGLE STEP].

8. Observe the routing table. The values are not changed as it's not updated.

9. Click the single step button **SINGLE STEP** .

10. Now you could see the routing table for each nodes been updated. This is the advantage of 'Link state algorithm' over 'Distance vector algorithm'.
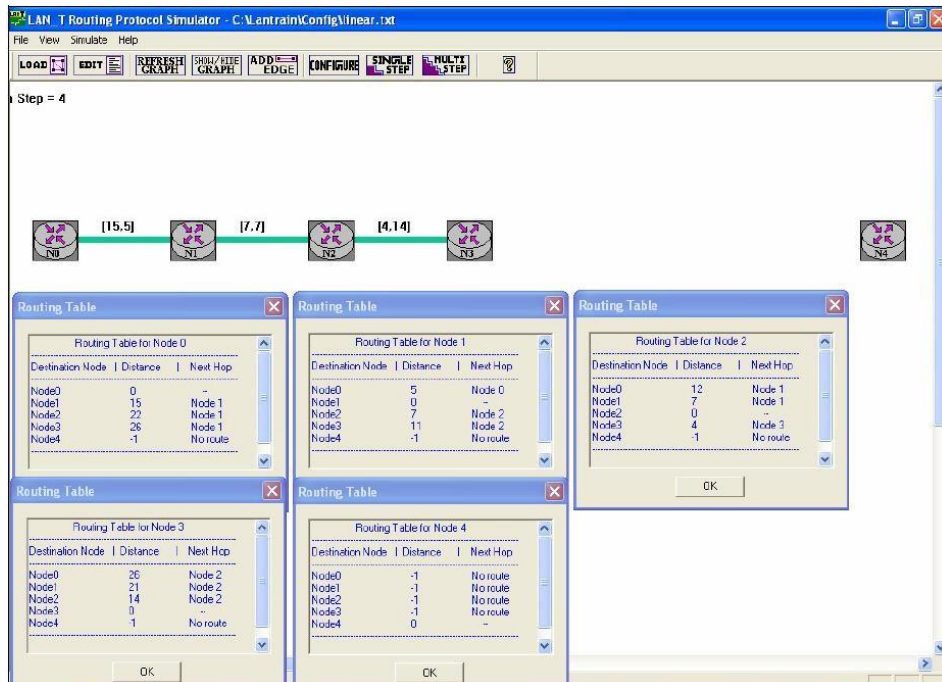
**9.6 Post Lab Questions**

1. What are the differences between distance vector and link state routing protocols?

2. Explain the Steps involved in building a Routing Table using Dijkstra's Algorithm

3. Can topology be built using partial knowledge of the each node? If yes explain why?

4. What are the steps to create shortest path in link state routing?

5. What are the disadvantages of Link state routing?

**<u>RESULT</u>**