DEFENDING BLACK HOLE ATTACK IN MANET

FAHMID AL RIFAT
SUBMITTED BY : 1705087

OLDMEAD SECONDARY SCHOOL
SCIENCE CLASS

REFERENCE

CONCEPT AND ALGORITHM

ALGORITHM:

2014 - Prevention of Black Hole Attack in AODV Routing Algorithm of MANET Using Trust Based Computing
-Ashish Sharma , Dinesh Bhuriya , Upendra Singh , Sushma Singh
-International Journal of Computer Science and Information Technologies

2018 -A Secure and Trust based Approach to Mitigate Blackhole Attack on AODV based Manet
-mh Kamel , Ibrahim alameri , ameer N Onaizah

OVERALL:

2018 - Routing AODV Defending Black Hole Attack through NS3 in Manet
-Anupam Mishra , Rajeev Paulus , Aditi Agrawa
-International Journal of Computer Applications

SIMULATION:

2018 - Evaluation of MANET Routing Protocols under Black Hole Attack Using AODV and OLSR in NS3
-Abdellah Nabou , My Driss Laanaoui , Mohammed Ouzzif

REFERENCE - LINKS

CONCEPT AND ALGORITHM

ALGORITHM:

2014 - Microsoft Word - 84. adhoc ntetwork peper (psu.edu)
2018 - https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8054219

OVERALL:

2018 - https://www.researchgate.net/profile/Rajeev-Paulus/publication/327224082_Routing_AODV_Defending_Black_Hole_Attack_through_NS3_in_Manet/links/5b9eed56299bf13e6037c364/Routing-AODV-Defending-Black-Hole-Attack-through-NS3-in-Manet.pdf

SIMULATION:

2018 - https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8629603

NOWADAYS , MOST OF THE NETWORK SYSTEMS ARE DESIGNED TO WORK FAST. BUT THE RIGHT FORMAT IS, WE HAVE TO CHECK THAT HOW SECURE IT IS !!!

OLDMEAD SECONDARY SCHOOL

SCIENCE CLASS

MANET

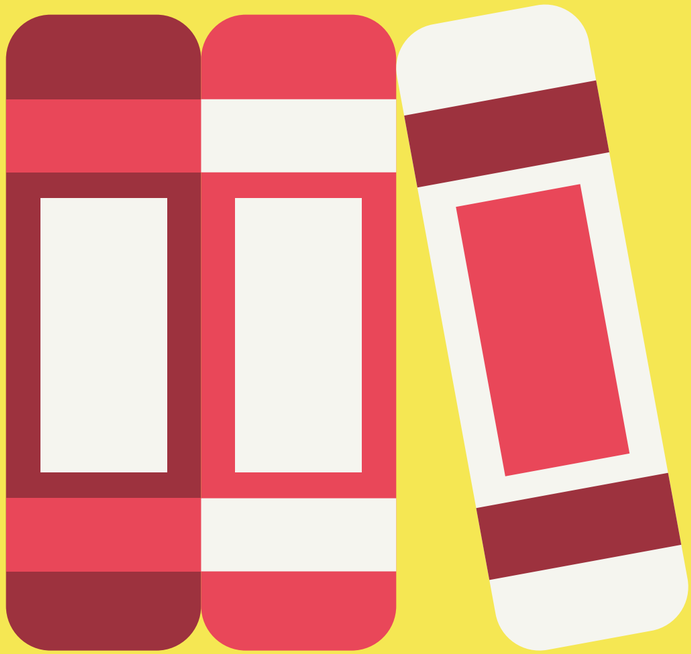
A **MOBILE AD HOC** NETWORK (MANET) IS A CONTINUOUSLY **SELF-CONFIGURING,** SELF-ORGANIZING, I**NFRASTRUCTURE-LESS** NETWORK OF MOBILE DEVICES CONNECTED WITHOUT WIRE

AODV

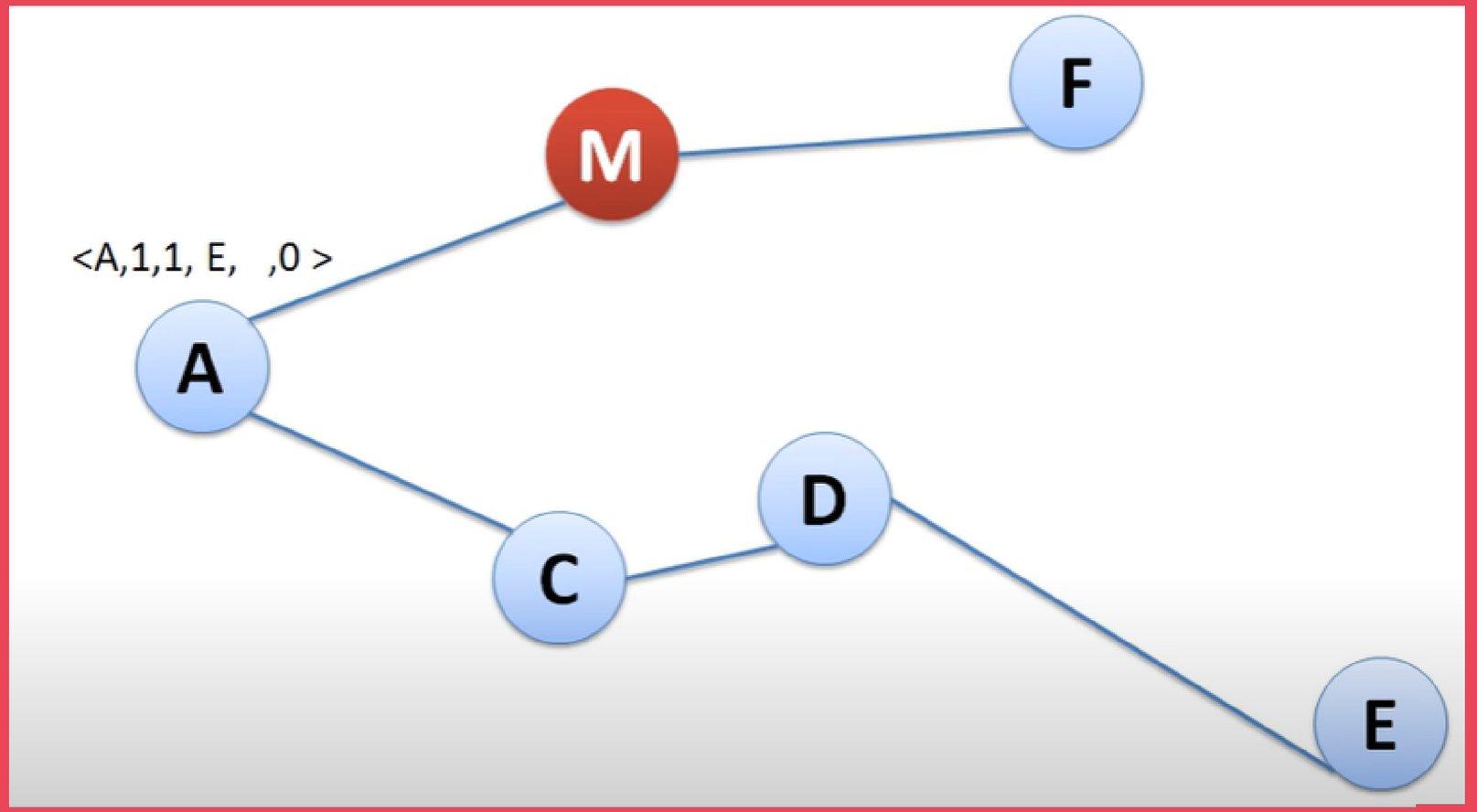
AODV (AD-HOC ON-DEMAND DISTANCE VECTOR) IS A LOOP-FREE ROUTING PROTOCOL FOR AD-HOC NETWORKS. IT IS DESIGNED TO BE **SELF-STARTING** IN AN ENVIRONMENT OF MOBILE NODES, WITHSTANDING A VARIETY OF NETWORK BEHAVIORS SUCH AS NODE **MOBILITY, LINK** FAILURES AND PACKET LOSSES

BLACK HOLE ATTACK

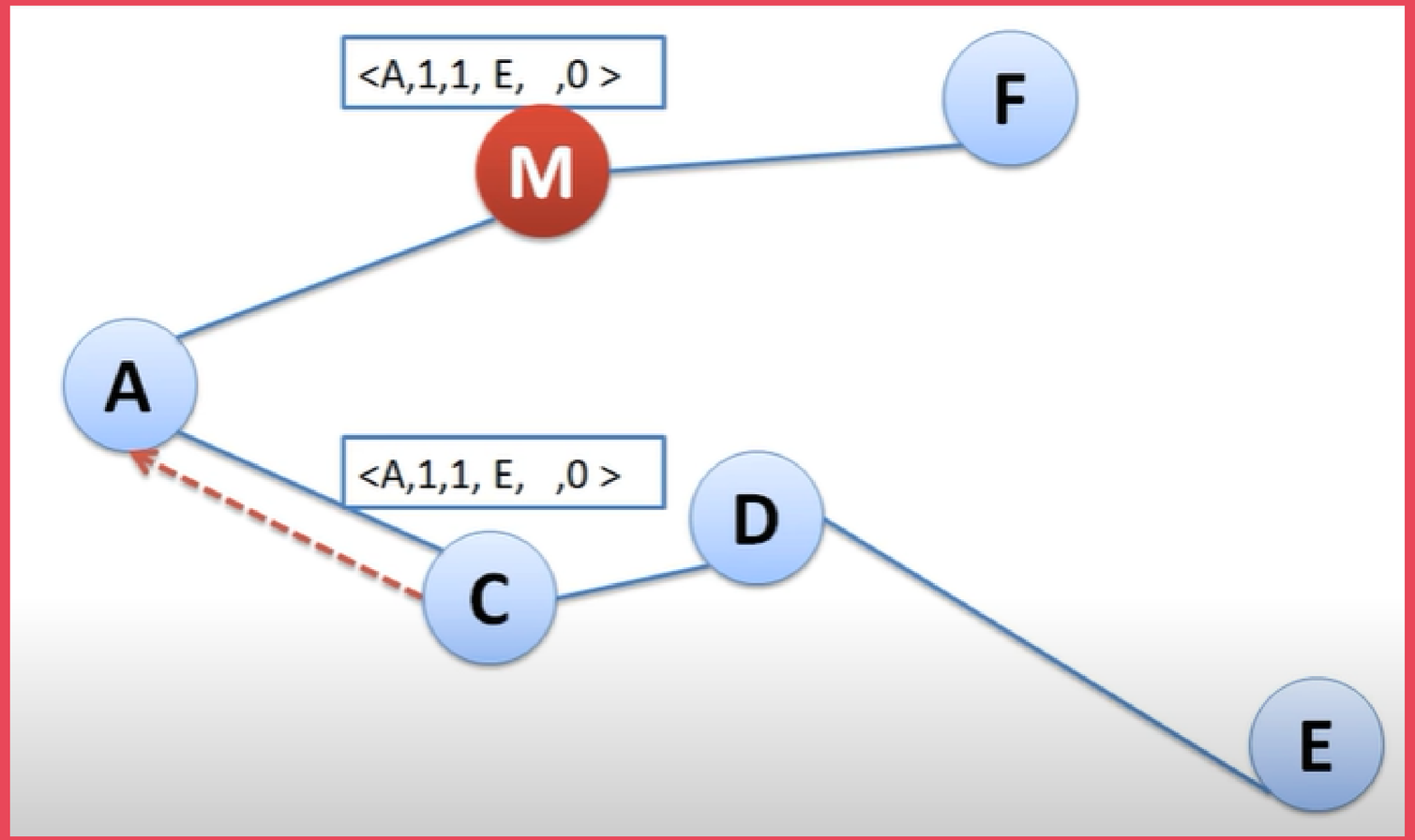
BLACK-HOLE ATTACKS OCCUR WHEN A ROUTER **DELETES ALL MESSAGES** IT IS SUPPOSED TO FORWARD



HOW DOES THE PROBLEM OCCURS?



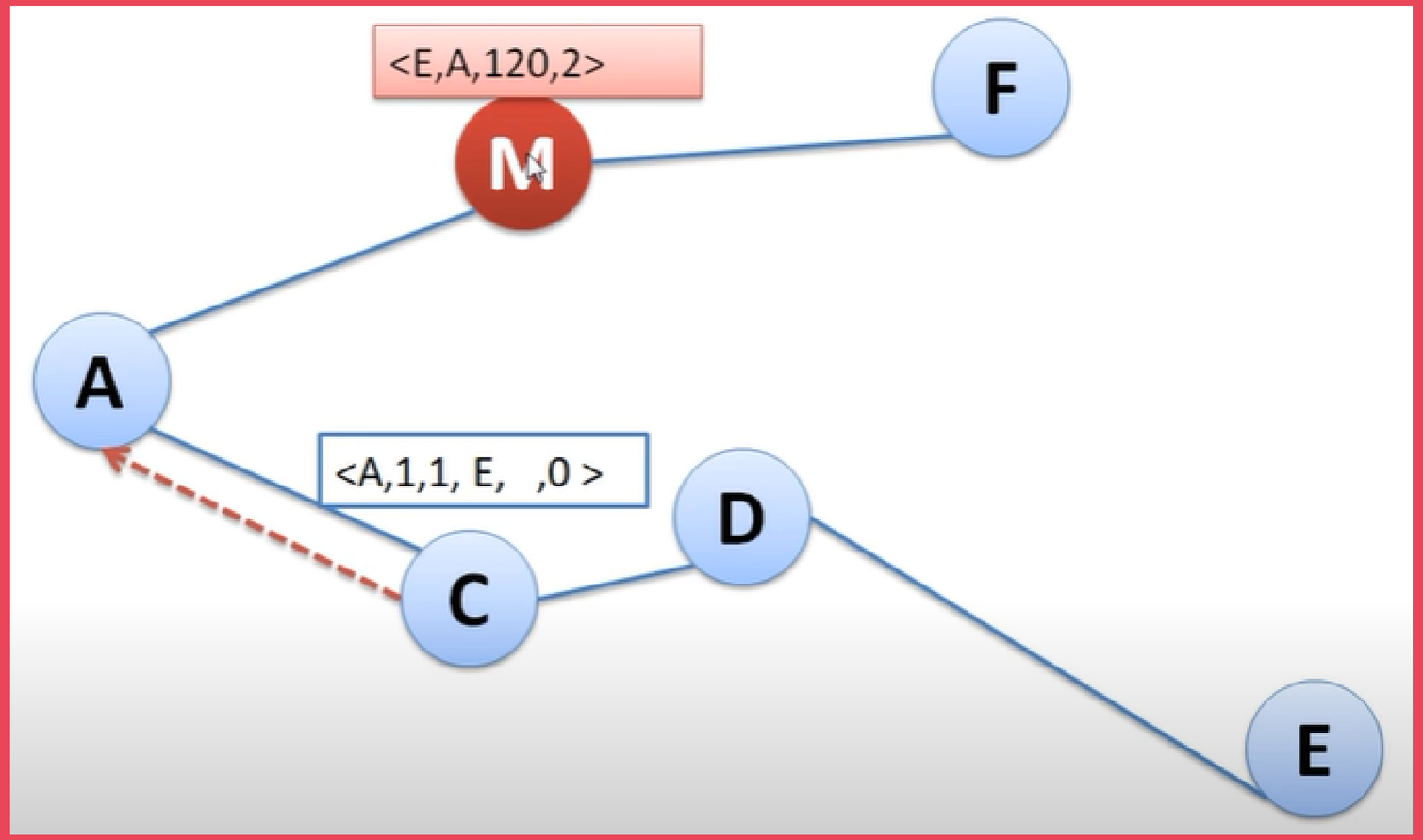
HOW DOES THE PROBLEM OCCURS?



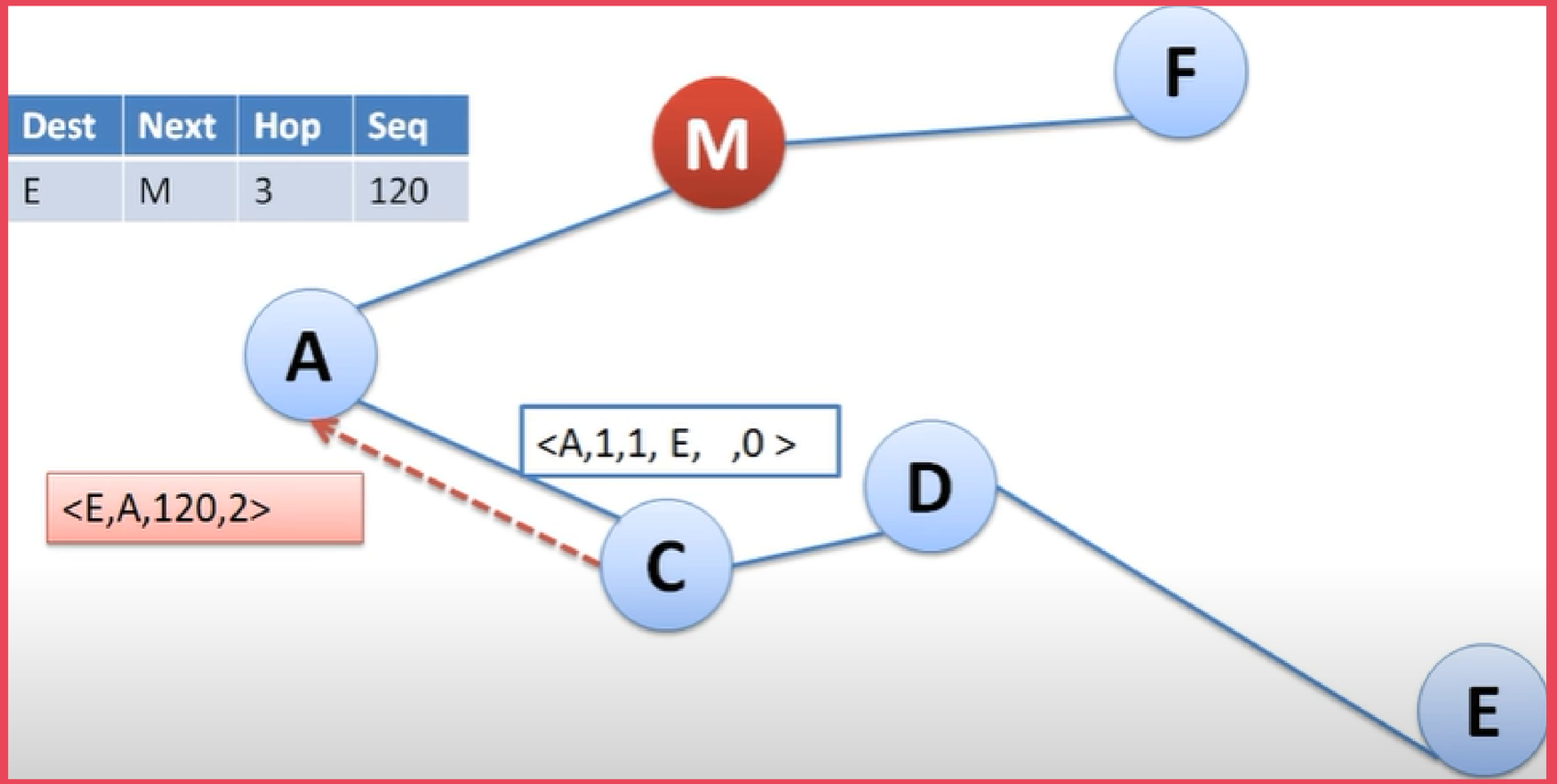
OLDMEAD SECONDARY SCHOOL

SCIENCE CLASS

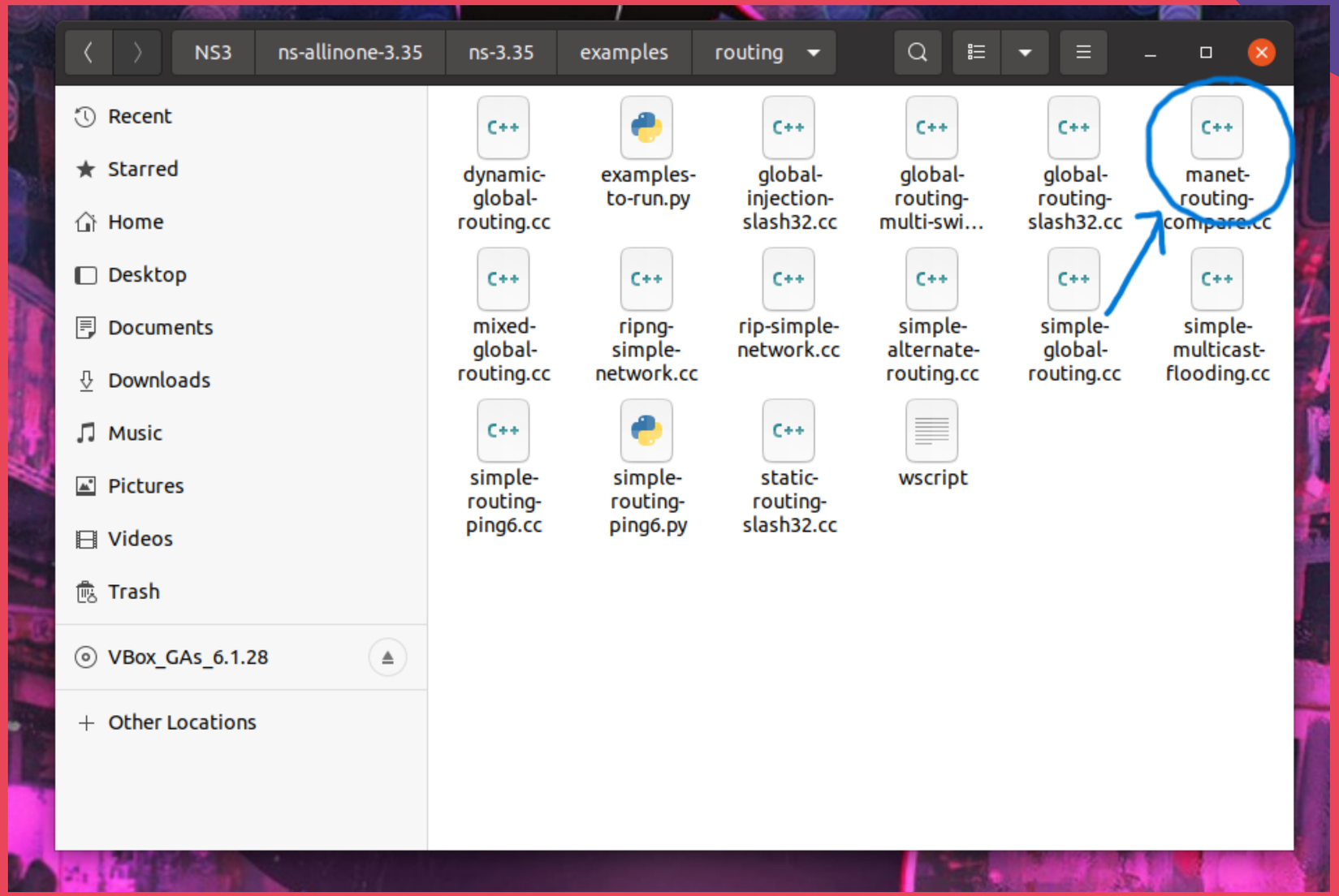
HOW DOES THE PROBLEM OCCURS?



HOW DOES THE PROBLEM OCCURS?



MANET ROUTING EXAMPLE



OLDMEAD SECONDARY SCHOOL

SCIENCE CLASS

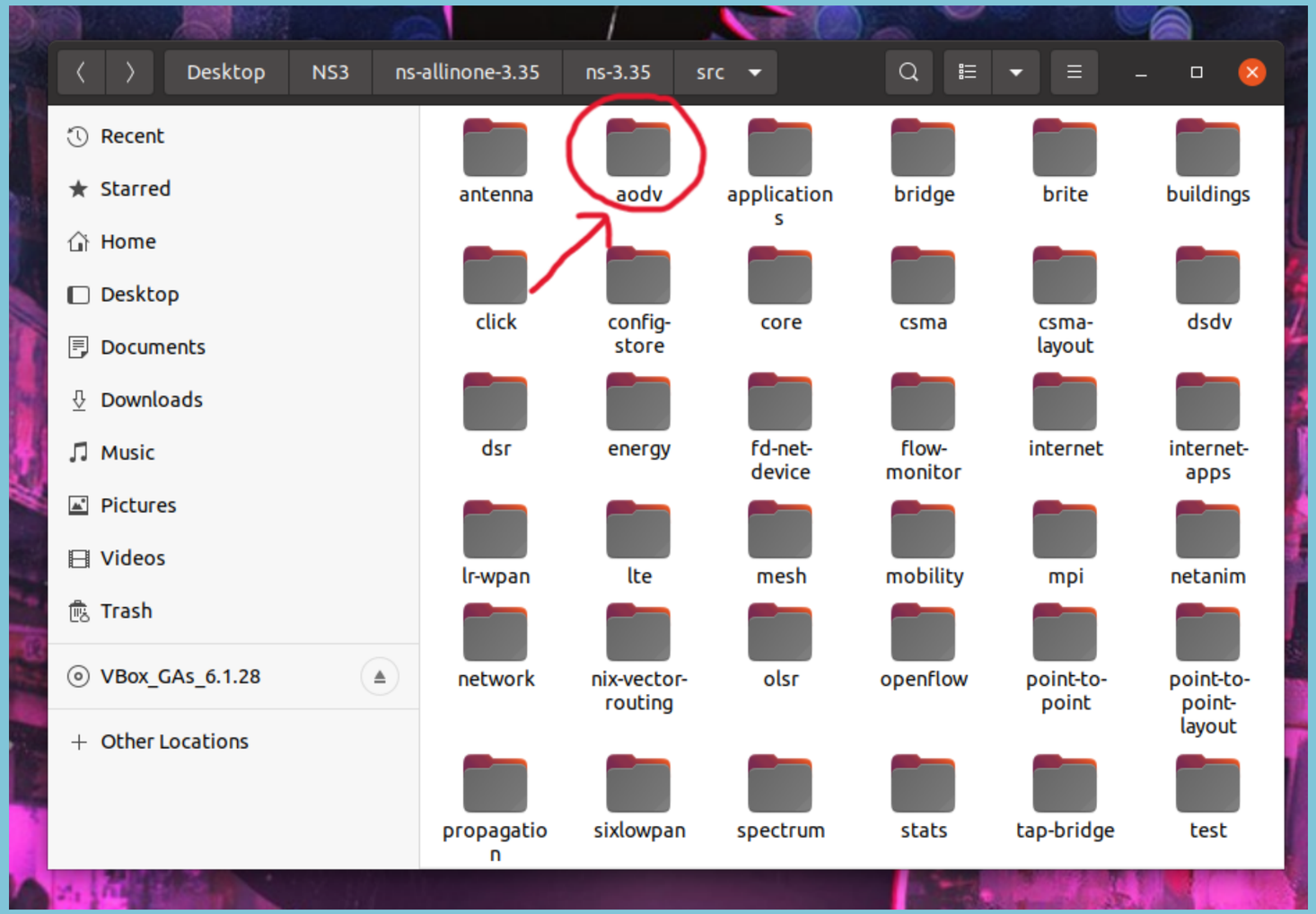
ADDING BLACK WHOLE NODE

```
//  Enable AODV
  AodvHelper aodv;
  AodvHelper malicious_aodv;


  // Set up internet stack
  InternetStackHelper internet;
  internet.SetRoutingHelper (aodv);
  internet.Install (not_malicious);

  malicious_aodv.Set("IsMalicious",BooleanValue(true));
  internet.SetRoutingHelper (malicious_aodv);
  internet.Install (malicious);
```

SOLUTION

-INTENTIONAL FAKE RREQ
-FAKE RREP DETECT
-TRUST TABLE
-CLUSTARING
-ETC

THE PLACE WHERE TO UPDATE



OLDMEAD SECONDARY SCHOOL

SCIENCE CLASS

ADDING RATING TABLE

I. Pending packet table

Packet ID	Next Hop	Expiry Time	Packet Destination

- Packet ID: ID of packet sent.
- Next Hop: Address of next hop node
- Expiry Time: Time-to-live of packet
- Packet Destination: Address of destination node.

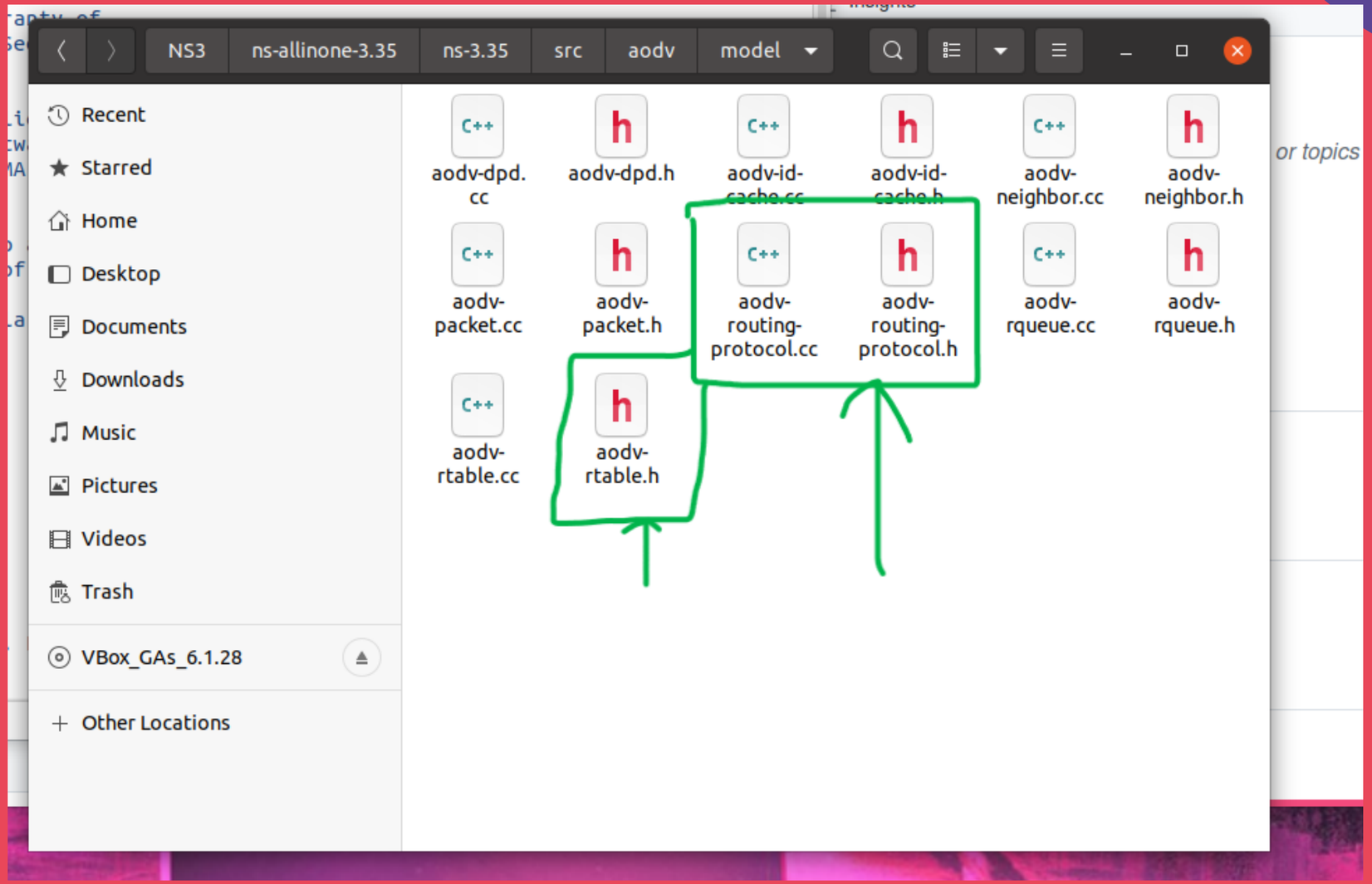
There are also four fields in node rating table, Node Address, Packet drops, Packet forwards and Misbehave. This table updated corresponding to pending packet table.

I. Node rating table

Node Address	Packet Drops	Packet Forwards	Misbehave

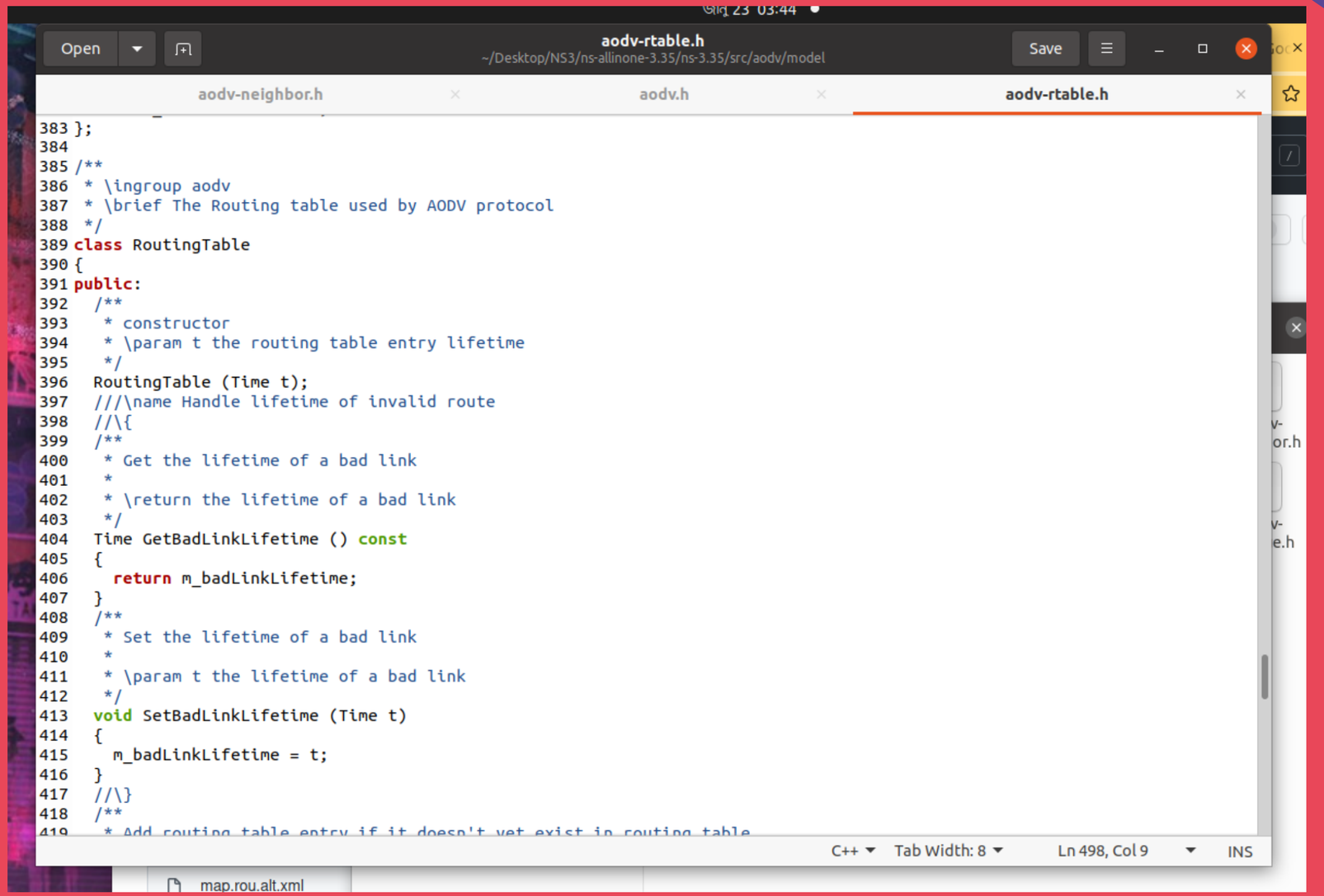
- Node Address: Address of next hop node.
- Packet Drops: Counter for counting the dropped packet.
- Packet Forwards: Counter for counting the forwarded packet.
- Misbehave: It has two values 0 and 1, 0 for well behaving node, 1 for misbehaving

ADDING RATING TABLE



OLDMEAD SECONDARY SCHOOL
SCIENCE CLASS

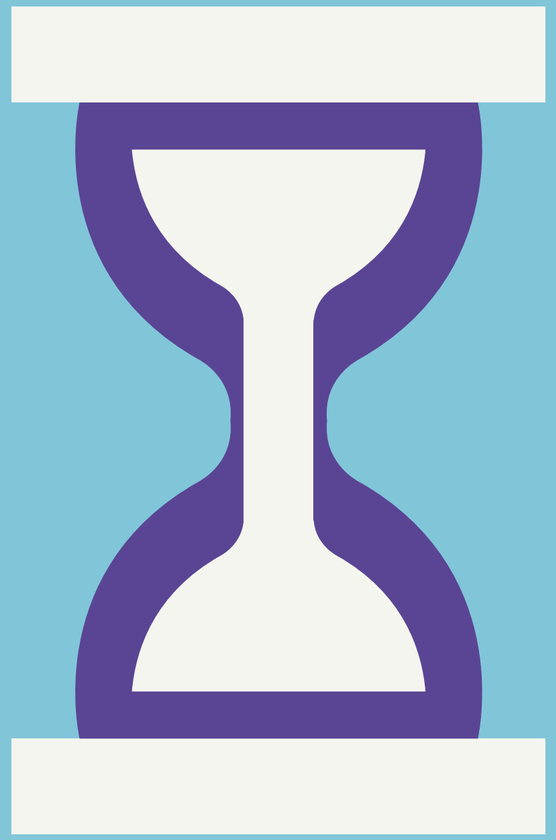
ADDING RATING TABLE



OLDMEAD SECONDARY SCHOOL

SCIENCE CLASS

THE ALGORITHM

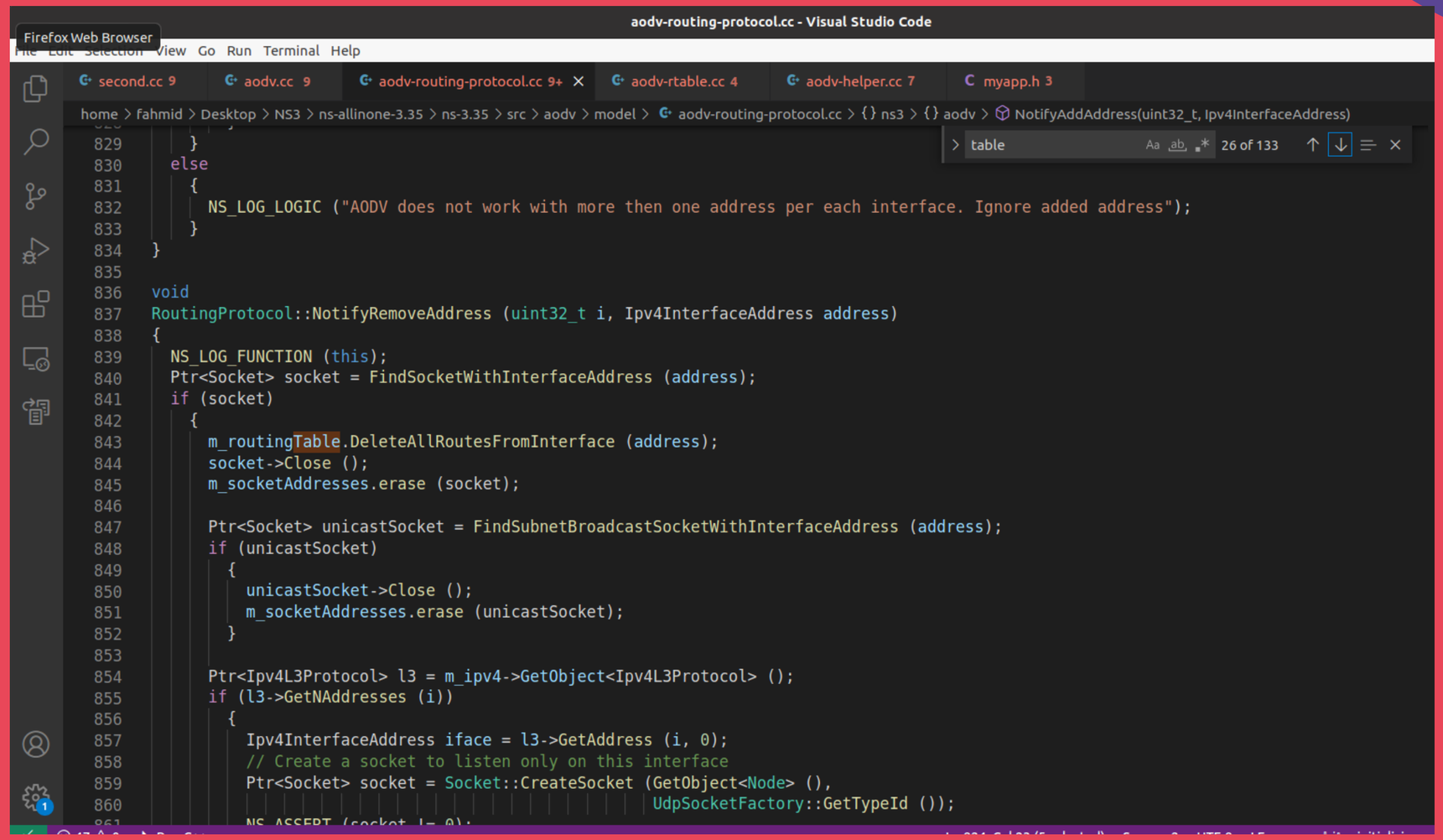


I. Pending packet table

Introduced mechanism proposed an algorithm is as follows:

1. Data packet forwarded or sent.
2. Copy and keep the data packet in pending packet table until it is expired or forwarded
3. If (data packet forwarded)
{
Increment the corresponding forwarded packet in the node-rating table and remove the data packet from pending packet table
}
4. If (data packet expires in the pending packet table)
{
Increment the corresponding dropped packet in the node-rating table and removes the data packet from pending packet table.
If (dropped packet > threshold (th1)) then
{
If ((dropped packet / forwarded packet) > threshold (th1))
{
Node is misbehaving.
Promiscuous node locally tells all the node of its wireless range that particular node is misbehaving node.
Discard RREP message coming from the misbehaving node
}
}
}

ADDING RATING TABLE AND ALGO



EXPECTATIONS AND OUTCOMES

01 . Packet Delivery Ratio

A decrease in PDR is seen at the same time that is a black hole attack on AODV . we can see which is a successful increment in the PDR of modified AODV

02. Average Throughput

Throughtput is decreases due to black hole attack but without black hole it is increases in modified routing AODVsee which is a successful increment in the PDR of modified AODV

EXPECTATIONS AND OUTCOMES

03 . Average End-to-End delay

Average End to End Delay with black hole attack is much higher than without black hole attack in AODV routing protocol.

04. Packet Drop Ratio

It is the ratio of the data lost at destination to those generated by the CBR sources . It increases as data travel much distance than before

SOFTWARE WE USED

NET-ANIM

NetAnim is an offline animator based on the Qt toolkit. It currently animates the simulation using an XML

WIRESRK

Wireshark is the world's foremost and widely-used network protocol analyzer. It lets you see what's happening on your network at a microscopic level

TRACEME TRICS

TraceMetrics is a trace file analyzer for Network Simulator 3 (ns-3).

THANK YOU !! ☺

OLDMEAD SECONDARY SCHOOL

SCIENCE CLASS