Aim: Write ns2 to test Simulated Application and Traffic generator application using topology.

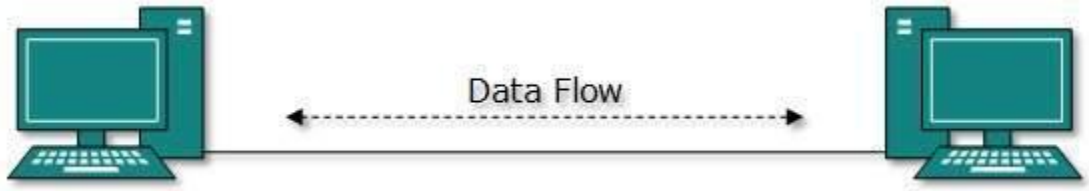
Theory:

What is Topology?

A Network Topology is the arrangement with which computer systems or network devices are connected to each other. Topologies may define both physical and logical aspects of the network. Both logical and physical topologies could be the same or different in the same network.

Point-to-Point

Point-to-point networks contain exactly two hosts such as computers, switches or routers, servers connected back to back using a single piece of cable. Often, the receiving end of one host is connected to the sending end of the other and vice-versa.



If the hosts are connected point-to-point logically, then they may have multiple intermediate devices. But the end hosts are unaware of the underlying network and see each other as if they are connected directly.

A. Star Topology

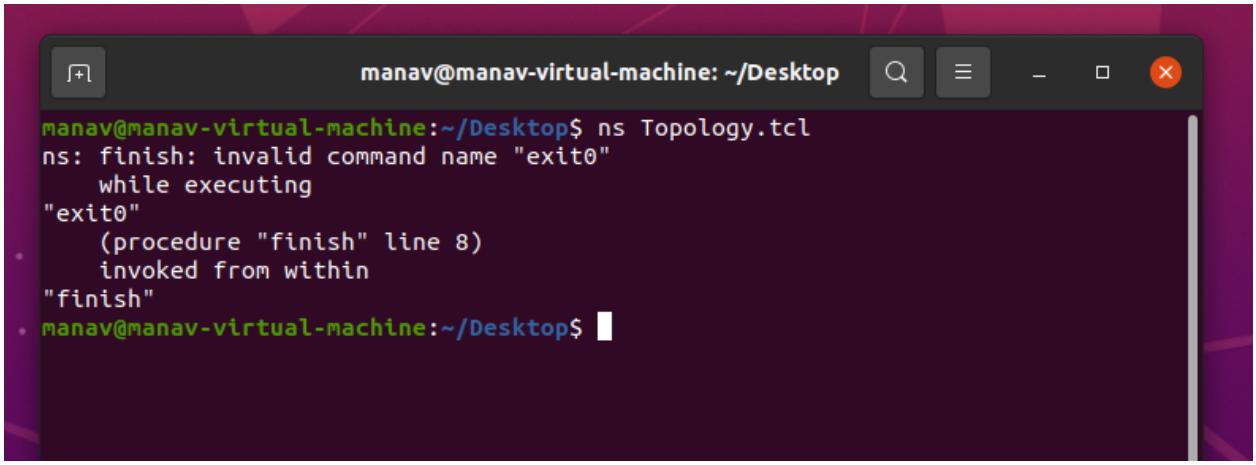
NS2 script/code:

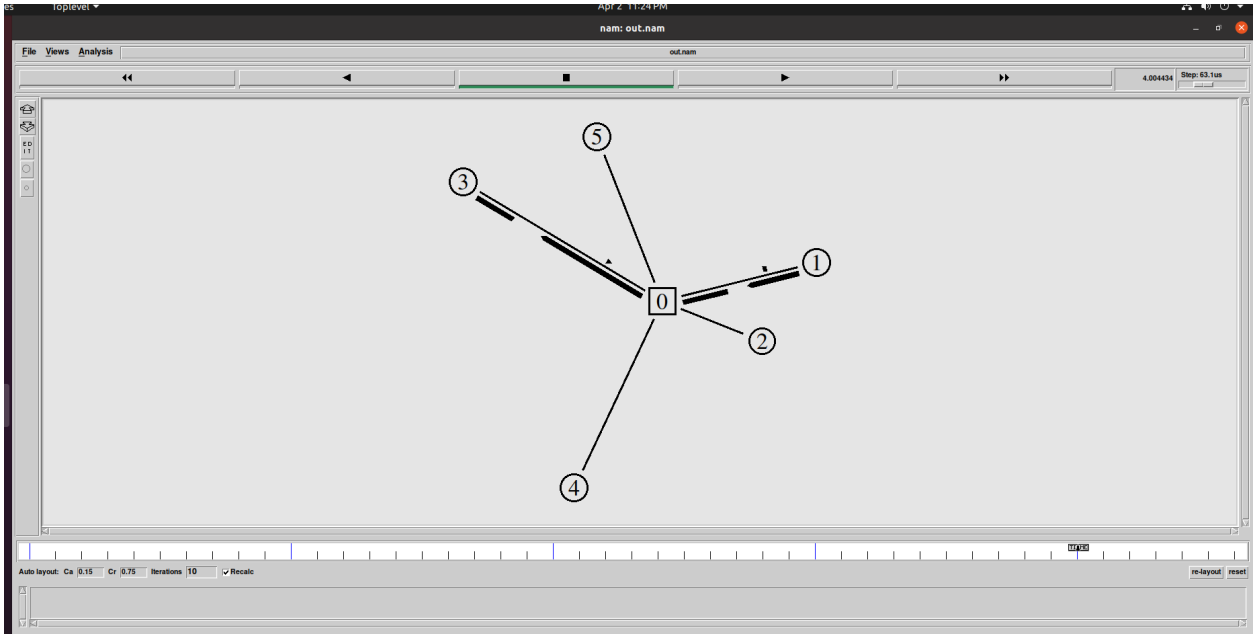
```
#Create a simulator object
set ns [new Simulator]

#Open the nam trace file
set nf [open out.nam w]
$ns namtrace-all $nf

#Define a 'finish' procedure
proc finish {} {
```

```
    global ns nf
    $ns flush-trace
    #Close the trace file
    close $nf
    #Executenam on the trace file
    exec nam out.nam &
    exit0
}


#Create four nodes
set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]
set n5 [$ns node]


#Change the shape of center node in a star topology
$n0 shape square

#Create links between the nodes
$ns duplex-link $n0 $n1 1Mb 10ms DropTail
$ns duplex-link $n0 $n2 1Mb 10ms DropTail
$ns duplex-link $n0 $n3 1Mb 10ms DropTail
$ns duplex-link $n0 $n4 1Mb 10ms DropTail
$ns duplex-link $n0 $n5 1Mb 10ms DropTail


#Create a TCP agent and attach it to node n0
set tcp0 [new Agent/TCP]
$tcp0 set class_ 1
$ns attach-agent $n1 $tcp0
#Create a TCP Sink agent (a traffic sink) for TCP and attach it to node n3
```

```
set sink0 [new Agent/TCPSink]
$ns attach-agent $n3 $sink0
#Connect the traffic sources with the traffic sink
$ns connect $tcp0 $sink0


# Create a CBR traffic source and attach it to tcp0
set cbr0 [new Application/Traffic/CBR]
$cbr0 set packetSize_ 500
$cbr0 set interval_ 0.01
$cbr0 attach-agent $tcp0

#Schedule events for the CBR agents
$ns at 0.5 "$cbr0 start"
$ns at 4.5 "$cbr0 stop"


#Call the finish procedure after 5 seconds of simulation time
$ns at 5.0 "finish"

#Run the simulation
$ns run
```

Output:





B. Ring Topology

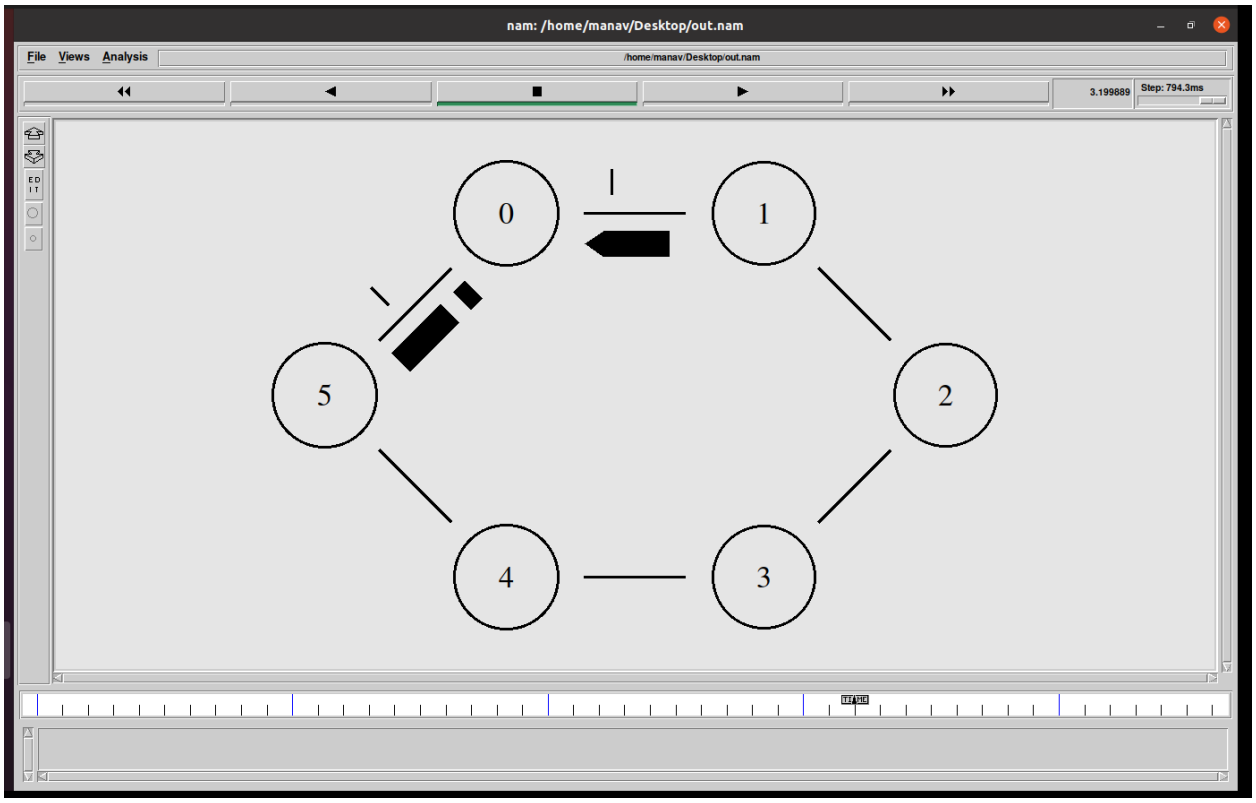
NS2 script/code:

```
#Create a simulator object
set ns [new Simulator]
#Open the nam trace file
set nf [open out.nam w]

$ns namtrace-all $nf
#Define a &#39;finish&#39; procedure
proc finish {} {
global ns nf
$ns flush-trace
#Close the trace file
close $nf
#Executenam on the trace file
exec nam out.nam &
exit 0
}
#Create four nodes
set n0 [$ns node]
```

```
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]
set n5 [$ns node]
#Create links between the nodes
$ns duplex-link $n0 $n1 1Mb 10ms DropTail
$ns duplex-link $n1 $n2 1Mb 10ms DropTail
$ns duplex-link $n2 $n3 1Mb 10ms DropTail
$ns duplex-link $n3 $n4 1Mb 10ms DropTail
$ns duplex-link $n4 $n5 1Mb 10ms DropTail
$ns duplex-link $n5 $n0 1Mb 10ms DropTail
#give positions to nodes (for NAM)
$ns duplex-link-op $n0 $n1 orient right
$ns duplex-link-op $n1 $n2 orient right-down
$ns duplex-link-op $n2 $n3 orient left-down
$ns duplex-link-op $n3 $n4 orient left
$ns duplex-link-op $n4 $n5 orient left-up
$ns duplex-link-op $n5 $n0 orient right-up

#Create a TCP agent and attach it to node n0
set tcp0 [new Agent/TCP]
$tcp0 set class_ 1
$ns attach-agent $n1 $tcp0
#Create a TCP Sink agent (a traffic sink) for TCP and attach it to node n3
set sink0 [new Agent/TCPSink]
$ns attach-agent $n5 $sink0

#Connect the traffic sources with the traffic sink
$ns connect $tcp0 $sink0
# Create a CBR traffic source and attach it to tcp0
set cbr0 [new Application/Traffic/CBR]
$cbr0 set packetSize_ 500
$cbr0 set interval_ 0.01
$cbr0 attach-agent $tcp0
```

```
#Schedule events for the CBR agents
$ns at 0.5 "$cbr0 start"
$ns at 4.5 "$cbr0 stop"
#Call the finish procedure after 5 seconds of simulation time
$ns at 5.0 "finish"
#Run the simulation
$ns run
```

Output:



Conclusion:

We have performed the network simulation using topology.