Subject:	**Networking Lab (ITL401)**		
Class:	**SE IT / Semester – IV (CBCGS) / Academic year: 2017-18**		
Name of Student:	**Kazi Jawwad A Rahim**		
Roll No:	**28**	**Date of performance (DOP) :**	
Experiment No:	**04**	**Date of checking (DOC) :**	
Title: Implementation of Specific Network topology with respect to Number of nodes and physical layer configuration.			
Marks:		**Teacher's Signature:**	

1. Aim: To Understand and implement Star and Ring topology.

2. Prerequisites:

Knowledge of

1. Network Topology
2. NS2 node and link commands

3. Hardware Requirements:

1. PC with minimum 2GB RAM

4. Software Requirements:

1. Linux (Ubuntu 10.04)
2. ns-2.34 package
3. Gedit

5. Learning Objectives:

1. To get familiar with Initialization and termination aspects of network simulator.
2. To understand defining the network nodes, links, queues and topology.
3. To understand the agents and Network Animator (NAM) and tracing.

6. Course Objectives Applicable: LO 1, LO 2

7. Program Outcomes Applicable: PO2, PO4

8. Program Education Objectives Applicable: 1

9. Theory:

Startopology.tcl

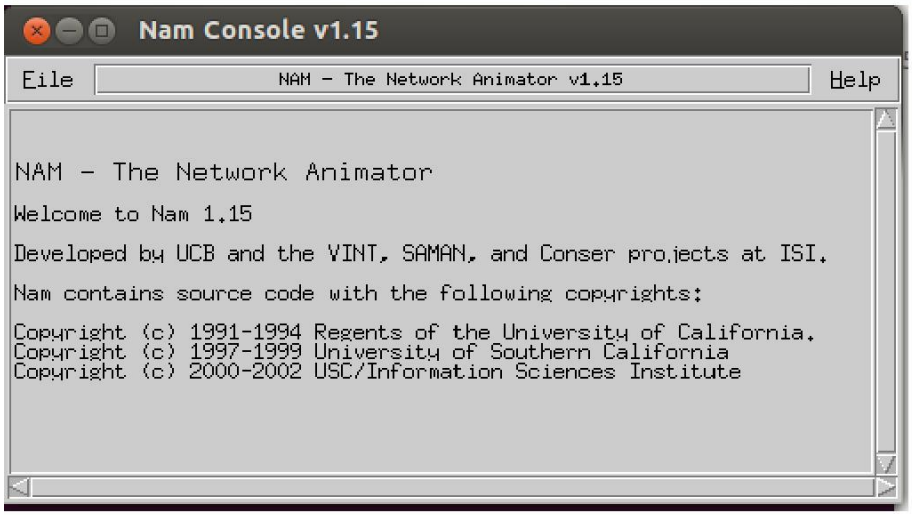
```
#*********************************************************************#
#Aim : To monitor traffic for Star topology using NS2
#*********************************************************************#

#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]
```

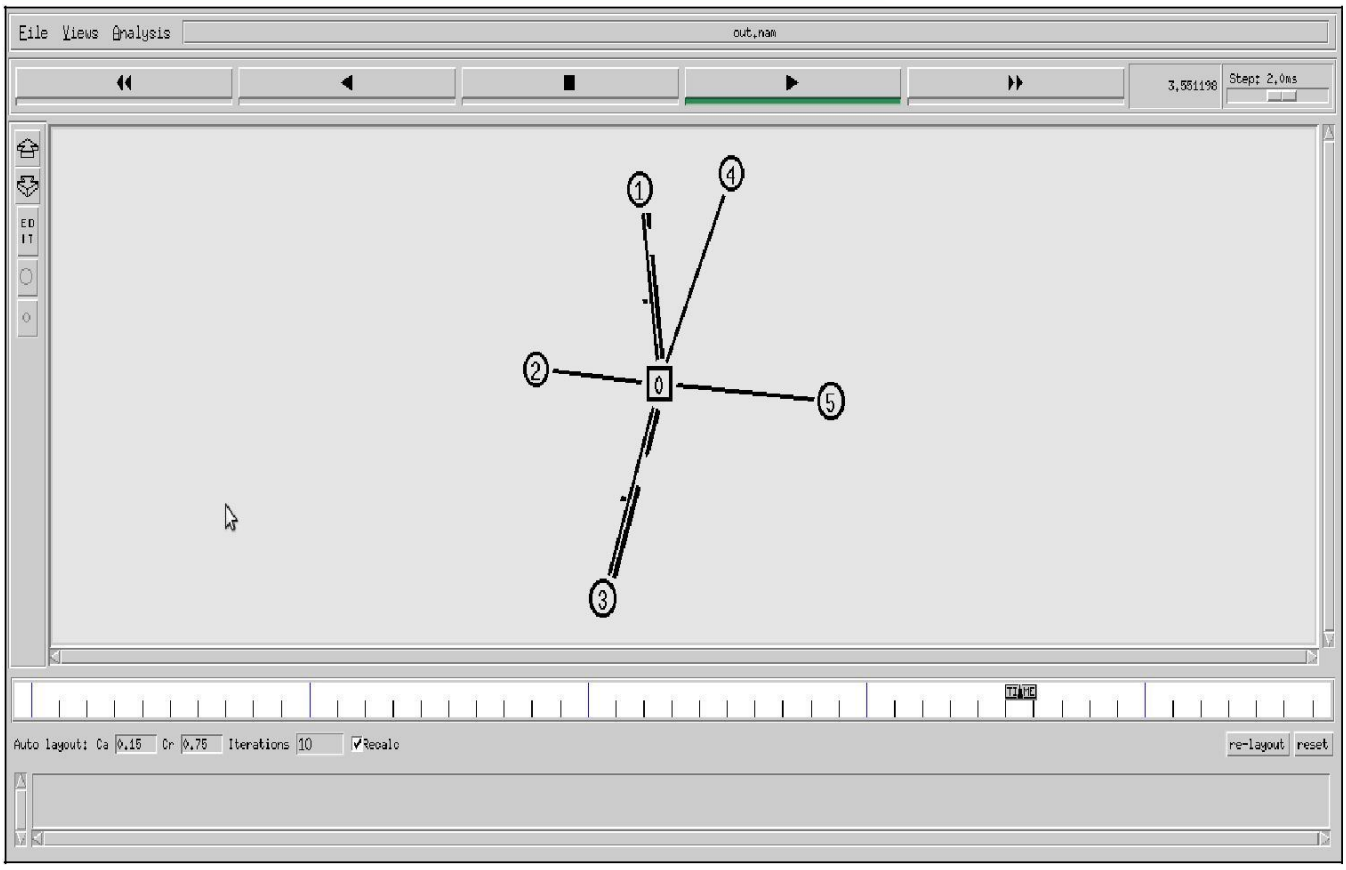
```
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]
set n5 [$ns node]


#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:

```
students@ubuntu:~$ ns startopology.tcl
ns: finish: invalid command name "exit0"
    while executing
"exit0"
    (procedure "finish" line 8)
    invoked from within
"finish"
students@ubuntu:~$ ns startopology.tcl
ns: finish: invalid command name "exit0"
    while executing
"exit0"
    (procedure "finish" line 8)
    invoked from within
"finish"
students@ubuntu:~$
```





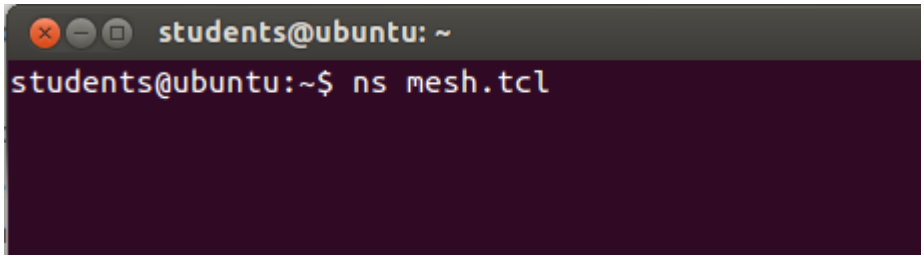
MeshTopology.tcl

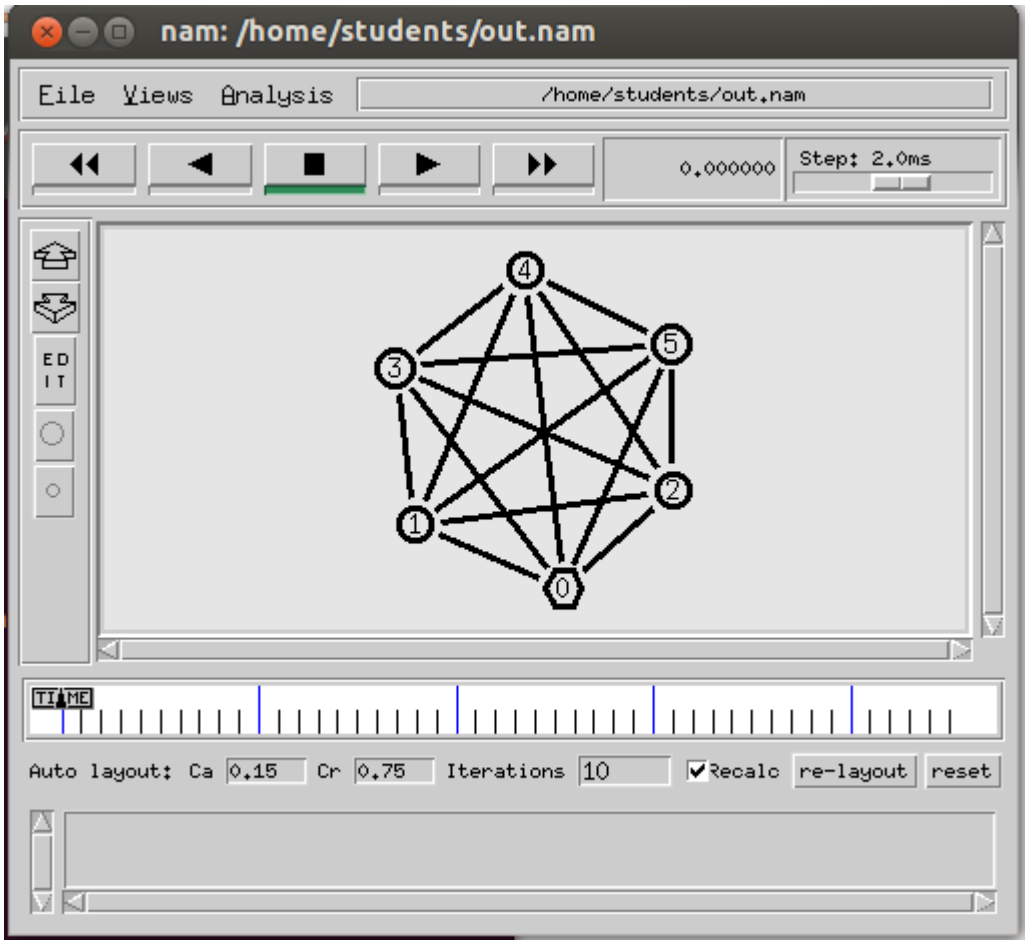
```
#Create a simulator object
set ns [new Simulator]

#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 hexagon
```

```
#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 $n1 $n2 1Mb 10ms DropTail
$ns duplex-link $n1 $n3 1Mb 10ms DropTail
$ns duplex-link $n1 $n4 1Mb 10ms DropTail
$ns duplex-link $n1 $n5 1Mb 10ms DropTail
$ns duplex-link $n2 $n3 1Mb 10ms DropTail
$ns duplex-link $n2 $n4 1Mb 10ms DropTail
$ns duplex-link $n2 $n5 1Mb 10ms DropTail
$ns duplex-link $n3 $n5 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

#Create a TCP agent and attach it to node n0
set tcp0 [new Agent/TCP]
$tcp0 set class_ 1
$ns attach-agent $n0 $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:


students@ubuntu: ~
students@ubuntu:~$ ns mesh.tcl


nam: /home/students/out.nam
Eile Views Analysis
/home/students/out.nam
0.000000
Step: 2.0ms
ED IT
TIME
Auto layout: Ca 0.15 Cr 0.75 Iterations 10
Recalc
re-layout
reset

13. Experiment/Assignment Evaluation

SR	Parameters	Weight	Excellent	Good	Average	Poor	Not as per requirement
		Scale Factor ->	5	4	3	2	0
1	Technical Understanding	25					
2	Performance / Execution	25					
3	Question Answers	20					
4	Punctuality	20					
5	Presentation	10					
	Total out of 100 --> #(to be converted as per term-work evaluation applicable to the subject)		**∑ (Weight * Scale Factor)/5 = _____**				

References:

[1] http://www.jgyan.com/ns2/trace-file.php
[2] http://slogix.in/how-to-create-nodes-in-ns2
[3] http://www.jgyan.com/ns2/link%20command.php

Viva Questions

1. What is topology?
2. What are the types of topology?
3. What are the different types of agent?
4. Explain the format of trace file.