Experiment No: 2

Aim: Implement transmission of ping messages/trace route over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion.

Program:

```
set ns [ new Simulator ]
set nf [ open lab2.nam w ]
$ns namtrace-all $nf
set tf [ open lab2.tr w ]
$ns trace-all $tf
set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]
set n5 [$ns node]

$ns duplex-link $n0 $n4 1005Mb 1ms DropTail
$ns duplex-link $n1 $n4 50Mb 1ms DropTail
$ns duplex-link $n2 $n4 2000Mb 1ms DropTail
$ns duplex-link $n3 $n4 200Mb 1ms DropTail
$ns duplex-link $n4 $n5 1Mb 1ms DropTail

set p1 [new Agent/Ping]       # letters A and P should be capital
$ns attach-agent $n0 $p1
$p1 set packetSize_ 50000
$p1 set interval_ 0.0001

set p2 [new Agent/Ping]       # letters A and P should be capital
$ns attach-agent $n1 $p2

set p3 [new Agent/Ping]       # letters A and P should be capital
$ns attach-agent $n2 $p3
$p3 set packetSize_ 30000
$p3 set interval_ 0.00001


set p4 [new Agent/Ping]       # letters A and P should be capital
$ns attach-agent $n3 $p4

set p5 [new Agent/Ping]       # letters A and P should be capital
$ns attach-agent $n5 $p5

$ns queue-limit $n0 $n4 5
$ns queue-limit $n2 $n4 3
$ns queue-limit $n4 $n5 2
```

```
Agent/Ping instproc recv {from rtt} {
$self instvar node_
puts "node [$nod e_ id]received answer from $from with round trip time $rtt msec"
}
# please provide space between $node_ and id. No space between $ and from. No space
between and $ and rtt */

$ns connect $p1 $p5
$ns connect $p3 $p4

proc finish { } {
global ns nf tf
$ns flush-trace
close $nf
close $tf
exec nam lab2.nam &
exit 0
}
$ns at 0.1 "$p1 send"
$ns at 0.2 "$p1 send"
$ns at 0.3 "$p1 send"
$ns at 0.4 "$p1 send"
$ns at 0.5 "$p1 send"
$ns at 0.6 "$p1 send"
$ns at 0.7 "$p1 send"
$ns at 0.8 "$p1 send"
$ns at 0.9 "$p1 send"
$ns at 1.0 "$p1 send"
$ns at 1.1 "$p1 send"
$ns at 1.2 "$p1 send"
$ns at 1.3 "$p1 send"
$ns at 1.4 "$p1 send"
$ns at 1.5 "$p1 send"
$ns at 1.6 "$p1 send"
$ns at 1.7 "$p1 send"
$ns at 1.8 "$p1 send"
$ns at 1.9 "$p1 send"
$ns at 2.0 "$p1 send"
$ns at 2.1 "$p1 send"
$ns at 2.2 "$p1 send"
$ns at 2.3 "$p1 send"
$ns at 2.4 "$p1 send"
$ns at 2.5 "$p1 send"
$ns at 2.6 "$p1 send"
$ns at 2.7 "$p1 send"
$ns at 2.8 "$p1 send"
$ns at 2.9 "$p1 send"

$ns at 0.1 "$p3 send"
```

```
$ns at 0.2 "$p3 send"
$ns at 0.3 "$p3 send"
$ns at 0.4 "$p3 send"
$ns at 0.5 "$p3 send"
$ns at 0.6 "$p3 send"
$ns at 0.7 "$p3 send"
$ns at 0.8 "$p3 send"
$ns at 0.9 "$p3 send"
$ns at 1.0 "$p3 send"
$ns at 1.1 "$p3 send"
$ns at 1.2 "$p3 send"
$ns at 1.3 "$p3 send"
$ns at 1.4 "$p3 send"
$ns at 1.5 "$p3 send"
$ns at 1.6 "$p3 send"
$ns at 1.7 "$p3 send"
$ns at 1.8 "$p3 send"
$ns at 1.9 "$p3 send"
$ns at 2.0 "$p3 send"
$ns at 2.1 "$p3 send"
$ns at 2.2 "$p3 send"
$ns at 2.3 "$p3 send"
$ns at 2.4 "$p3 send"
$ns at 2.5 "$p3 send"
$ns at 2.6 "$p3 send"
$ns at 2.7 "$p3 send"
$ns at 2.8 "$p3 send"
$ns at 2.9 "$p3 send"
$ns at 3.0 "finish"
$ns run
```

***AWK file*:** *(Open a new editor using "gedit or vi command" and write awk file and save with ".awk" extension)*

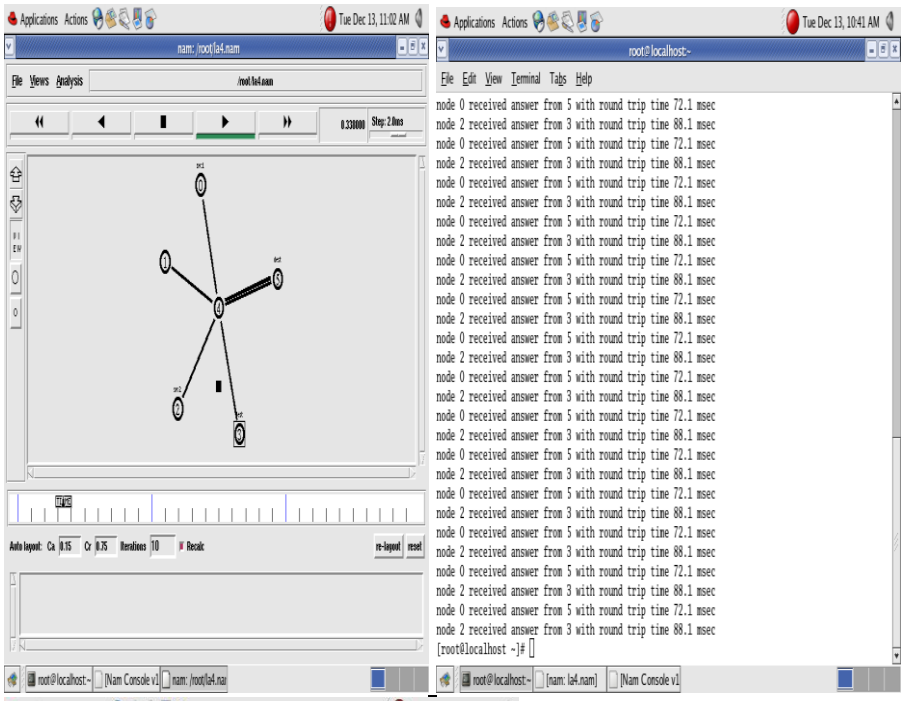
```
BEGIN{
drop=0;
}
{
 if($1= ="d" )
  {
   drop++;
   }
}
END{
printf("Total number of %s packets dropped due to congestion =%d\n",$5,drop);
}
```

Steps for execution (When using gedit as editor):

1) *Open gedit editor and type program. Program name should have the extension " **.tcl** "*
   [root@localhost ~]# gedit lab2.tcl
2) *Open gedit editor and type **awk** program. Program name should have the extension "**.awk** "*
   [root@localhost ~]# gedit lab2.awk
3) *Run the simulation program*
   [root@localhost~]# ns lab2.tcl
   i) *Here **"ns"** indicates network simulator. We get the topology shown in the snapshot.*
   ii) *Now press the play button in the simulation window and the simulation will begins.*
4) *After simulation is completed run **awk file** to see the output ,*
   [root@localhost~]# awk –f lab2.awk lab2.tr
5) *To see the trace file contents open the file as ,*
   [root@localhost~]# gedit lab2.tr

Steps for execution (When using vi as editor):

1) *Open vi editor and type program. Program name should have the extension " **.tcl** "*
   [root@localhost ~]# vi lab2.tcl
2) *Save the program by pressing **"ESC key"** first, followed by **"Shift and :"** keys simultaneously and type **"wq"** and press **Enter key**.*
3) *Open vi editor and type **awk** program. Program name should have the extension "**.awk** "*
   [root@localhost ~]# vi lab2.awk
4) *Save the program by pressing **"ESC key"** first, followed by **"Shift and :"** keys simultaneously and type **"wq"** and press **Enter key**.*
5) *Run the simulation program*
   [root@localhost~]# ns lab2.tcl
   i) *Here **"ns"** indicates network simulator. We get the topology shown in the snapshot.*
   ii) *Now press the play button in the simulation window and the simulation will begins.*
6) *After simulation is completed run **awk file** to see the output ,*
   [root@localhost~]# awk –f lab2.awk lab2.tr
7) *To see the trace file contents open the file as ,*
   [root@localhost~]# vi lab2.tr



Topology **Output**