COMPUTER NETWORK LABORATORY

Assignment 4

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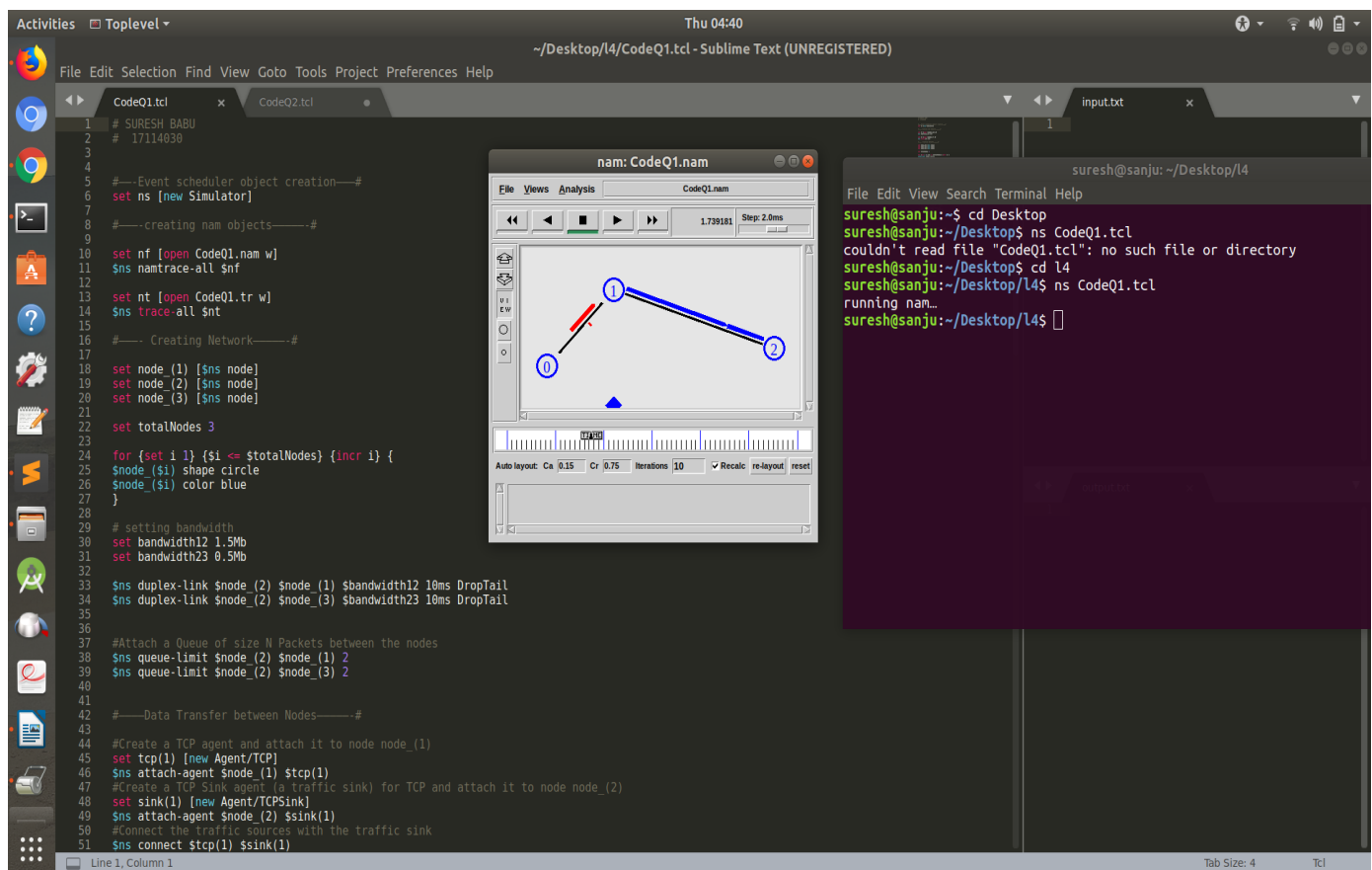
17114030

Btech. 3rd year CSE

Q1.   Write
a Network Simulator (NS2) code to simulate a three
node network with
duplex links among them as shown in figure. Show the
topology using NAM.
Study the variation in number of packets dropped with
the variation of the queue size in the nodes and with
the variation of the bandwidth of the links.

FUNCTIONS AND DATA STRUCTURES USED

- **set function** to create nodes and a finish procedure to exit files

- **duplex-link** to create links between two links

- creating TCP agents and attaching them to respective nodes

- creating a CBR traffic source and connecting it to TCP agents and set its packet_size and interval.

- queue_limit to limit the number of packets for a link.

- **run function** to run the TCL program

~/Desktop/l4/CodeQ1.tcl - Sublime Text (UNREGISTERED)

File Edit Selection Find View Goto Tools Project Preferences Help

CodeQ1.tcl   ✕   CodeQ2.tcl   ●   input.txt   ✕

```tcl
1   # SURESH BABU
2   #  17114030
3
4
5   #——Event scheduler object creation——#
6   set ns [new Simulator]
7
8   #——creating nam objects——-#
9
10  set nf [open CodeQ1.nam w]
11  $ns namtrace-all $nf
12
13  set nt [open CodeQ1.tr w]
14  $ns trace-all $nt
15
16  #——- Creating Network——-#
17
18  set node_(1) [$ns node]
19  set node_(2) [$ns node]
20  set node_(3) [$ns node]
21
22  set totalNodes 3
23
24  for {set i 1} {$i <= $totalNodes} {incr i} {
25  $node_($i) shape circle
26  $node_($i) color blue
27  }
28
29  # setting bandwidth
30  set bandwidth12 1.5Mb
31  set bandwidth23 0.5Mb
32
33  $ns duplex-link $node_(2) $node_(1) $bandwidth12 10ms DropTail
34  $ns duplex-link $node_(2) $node_(3) $bandwidth23 10ms DropTail
35
36
37  #Attach a Queue of size N Packets between the nodes
38  $ns queue-limit $node_(2) $node_(1) 2
39  $ns queue-limit $node_(2) $node_(3) 2
40
41
42  #——Data Transfer between Nodes——-#
43
44  #Create a TCP agent and attach it to node node_(1)
45  set tcp(1) [new Agent/TCP]
46  $ns attach-agent $node_(1) $tcp(1)
47  #Create a TCP Sink agent (a traffic sink) for TCP and attach it to node node_(2)
48  set sink(1) [new Agent/TCPSink]
49  $ns attach-agent $node_(2) $sink(1)
50  #Connect the traffic sources with the traffic sink
51  $ns connect $tcp(1) $sink(1)
```

nam: CodeQ1.nam

File Views Analysis   CodeQ1.nam

1.739181   Step: 2.0ms

Auto layout: Ca 0.15 Cr 0.75 Iterations 10 ✓ Recalc re-layout reset

suresh@sanju: ~/Desktop/l4

File Edit View Search Terminal Help

```
suresh@sanju:~$ cd Desktop
suresh@sanju:~/Desktop$ ns CodeQ1.tcl
couldn't read file "CodeQ1.tcl": no such file or directory
suresh@sanju:~/Desktop$ cd l4
suresh@sanju:~/Desktop/l4$ ns CodeQ1.tcl
running nam…
suresh@sanju:~/Desktop/l4$ 
```

Line 1, Column 1   Tab Size: 4   Tcl

Q2. Write a Network Simulator (NS2) code to simulate the transmission of ping messages over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion. Study the variation in number of packets dropped with the variation of the queue size in the nodes and with the variation of the bandwidth of the links.

FUNCTIONS AND DATA STRUCTURES USED

- **set function** to create nodes and a finish procedure to exit files

- **duplex-link** to create links between two links and allow data to transmit through both nodes

- **Agent/Ping** to send ping requests and receive ping answer by creating ping_agents.
- queue_limit to limit the number of packets for a link.

- creating TCP agents and attaching them to respective nodes

- **connect()** to connect two ping_agents.
- creating a CBR traffic source and connecting it to TCP agents and set its packet_size and interval.

- **run function** to run the TCL program

Activities Toplevel ▾   Thu 04:59

~/Desktop/CodeQ2.tcl • - Sublime Text (UNREGISTERED)

File Edit Selection Find View Goto Tools Project Preferences Help

CodeQ1.tcl   CodeQ2.tcl   input.txt

```tcl
1
2
3    #—-Event scheduler object creation—-#
4    set ns [new Simulator]
5
6    puts "Enter the test number: "
7    gets stdin fileNo
8
9    puts "Enter the number of packets: "
10   gets stdin pack
11   puts "Enter the queue length of 0-2"
12   gets stdin qLen_0_2
13   puts "Enter the queue length of 2-3"
14   gets stdin qLen_2_3
15   puts "Enter the queue length of 3-4: "
16   gets stdin qLen_3_4
17   puts "Enter the queue length of 5-3: "
18   gets stdin qLen_5_3
19   puts "Enter the queue length of 3-2: "
20   gets stdin qLen_3_2
21   puts "Enter the queue length of 2-1: "
22   gets stdin qLen_2_1
23
24   puts "Enter the bandwidth of 0-2: "
25   gets stdin band_0_2
26   puts "Enter the bandwidth of 2-3: "
27   gets stdin band_2_3
28   puts "Enter the bandwidth of 3-4: "
29   gets stdin band_3_4
30   puts "Enter the bandwidth of 5-3:"
31   gets stdin band_5_3
32   puts "Enter the bandwidth of 2-1: "
33   gets stdin band_2_1
34
35   #—-creating nam objects—-#
36
37   set nf [open CodeQ2.nam w]
38   $ns namtrace-all $nf
39
40   set nt [open CodeQ2_$fileNo.tr w]
41   $ns trace-all $nt
42
43   #—- Creating Network—-#
44
45   set node_(0) [$ns node]
46   set node_(1) [$ns node]
47   set node_(2) [$ns node]
48   set node_(3) [$ns node]
49   set node_(4) [$ns node]
50   set node_(5) [$ns node]
```

Line 1, Column 1   Tab Size: 4   Tcl

nam: /home/suresh/Desktop/l4/CodeQ2.nam

File Views Analysis   /home/suresh/Desktop/l4/CodeQ2.nam

0.500979   Step: 2.0ms

Auto layout: Ca 0.15   Cr 0.75   Iterations 10   ☑ Recalc re-layout reset

suresh@sanju: ~/Desktop/l4

File Edit View Search Terminal Help

```
2
Enter the queue length of 5-3:
11
Enter the queue length of 3-2:
3
Enter the queue length of 2-1:
10
Enter the bandwidth of 0-2:
5Mb
Enter the bandwidth of 2-3:
0.5Mb
Enter the bandwidth of 3-4:
0.1Mb
Enter the bandwidth of 5-3:
10Mb
Enter the bandwidth of 2-1:
1Mb
node 5 received ping answer from  1 with round-trip-time 450.4 ms.
node 5 received ping answer from  1 with round-trip-time 546.4 ms.
node 5 received ping answer from  1 with round-trip-time 642.4 ms.
node 0 received ping answer from  4 with round-trip-time 794.2 ms.
node 0 received ping answer from  4 with round-trip-time 1194.2 ms.
running nam…
suresh@sanju:~/Desktop/l4$ 
```

https://github.com/Suresh9293/computer_network_l4/tree/master