Lab Assignment 05

// create a txt file named prac1.tcl

//type text below in the text file

Code:

```
set ns [new Simulator]
set nr [open out.tr w]
$ns trace-all $nr
set nf [open prac1.nam w]

$ns namtrace-all $nf
        proc finish { } {
        global ns nr nf
        $ns flush-trace
        close $nf
        close $nr
        exec nam prac1.nam &
exit 0
        }

for { set i 0 } { $i < 12} { incr i 1 } {
set n($i) [$ns node]}
```

```
for {set i 0} {$i < 8} {incr i} {
$ns duplex-link $n($i) $n([expr $i+1]) 1Mb 10ms DropTail }
$ns duplex-link $n(0) $n(8) 1Mb 10ms DropTail
$ns duplex-link $n(1) $n(10) 1Mb 10ms DropTail
$ns duplex-link $n(0) $n(9) 1Mb 10ms DropTail
$ns duplex-link $n(9) $n(11) 1Mb 10ms DropTail
$ns duplex-link $n(10) $n(11) 1Mb 10ms DropTail
$ns duplex-link $n(11) $n(5) 1Mb 10ms DropTail

set tcp0 [new Agent/TCP]
$ns attach-agent $n(0) $tcp0
set cbr0 [new Application/Traffic/CBR]
$cbr0 set packetSize_ 500
$cbr0 set  interval_ 0.005
$cbr0 attach-agent $tcp0
set sink0 [new Agent/TCPSink]
$ns attach-agent $n(5) $sink0
$ns connect $tcp0 $sink0

set tcp1 [new Agent/TCP]
$ns attach-agent $n(1) $tcp1
set cbr1 [new Application/Traffic/CBR]
$cbr1 set packetSize_ 500
$cbr1 set  interval_ 0.005
$cbr1 attach-agent $tcp1
set sink0 [new Agent/TCPSink]
```

```
$ns attach-agent $n(5) $sink0
$ns connect $tcp1 $sink0

$ns rtproto DV

$ns rtmodel-at 10.0 down $n(11) $n(5)
$ns rtmodel-at 15.0 down $n(7) $n(6)
$ns rtmodel-at 30.0 up $n(11) $n(5)
$ns rtmodel-at 20.0 up $n(7) $n(6)

$tcp0 set fid_ 1
$tcp1 set fid_ 2

$ns color 1 Red
$ns color 2 Green

$ns at 1.0 "$cbr0 start"
$ns at 2.0 "$cbr1 start"

$ns at 45 "finish"
$ns run
```

//open terminal

/type

// ns prac1.tcl

Theory:

for { set i 0 } { $i < 12} { incr i 1 } {

set n($i) [$ns node]

}

- This loop creates 12 nodes in the simulation environment and stores them in an array named n.

for {set i 0} {$i < 8} {incr i} {

$ns duplex-link $n($i) $n([expr $i+1]) 1Mb 10ms DropTail

}

- This loop creates duplex links between nodes in the simulation environment. It iterates from 0 to 7 (inclusive) and creates links between nodes indexed from 0 to 8.

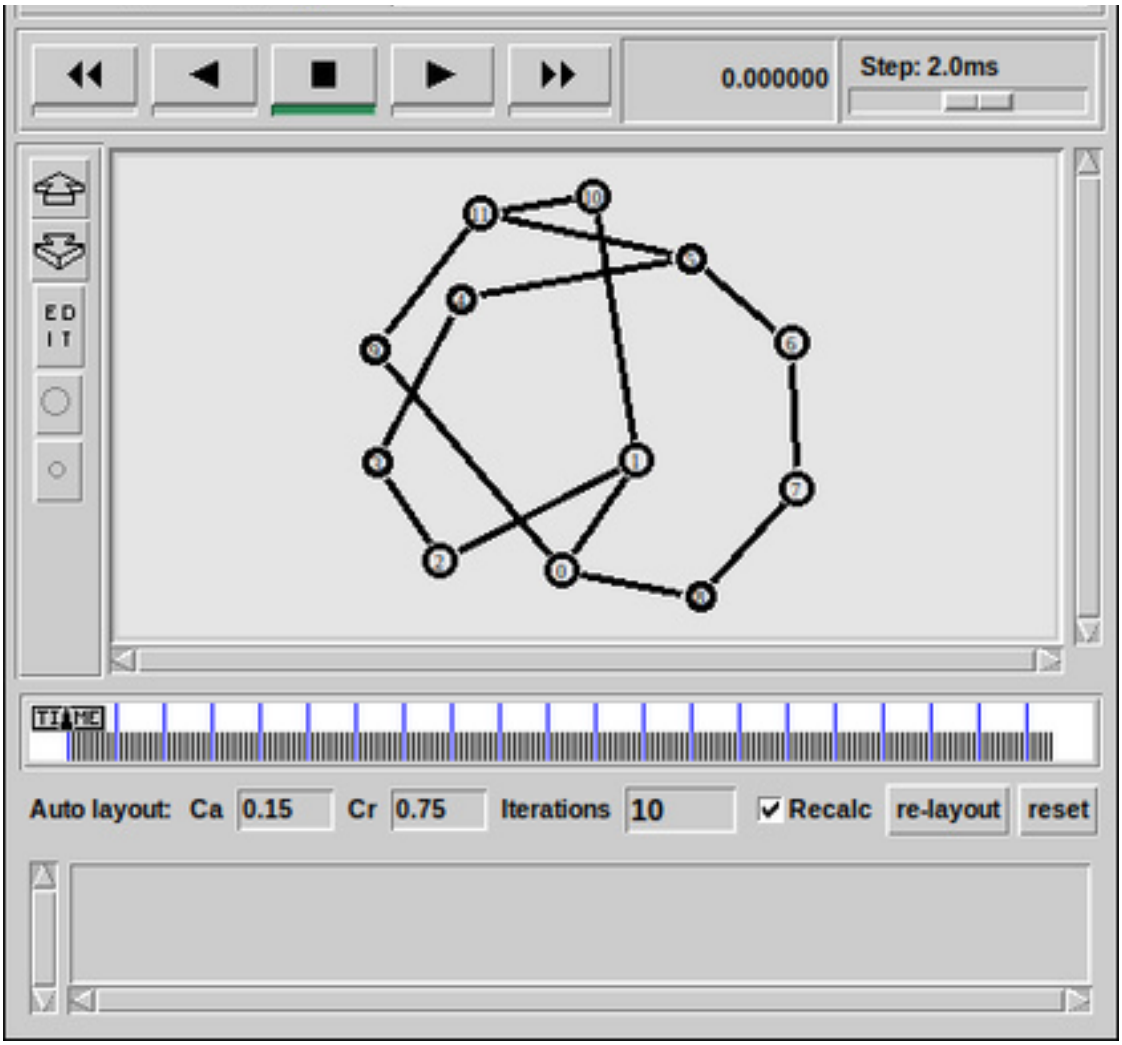
$ns rtproto DV

- This line sets the routing protocol to Distance Vector (DV).

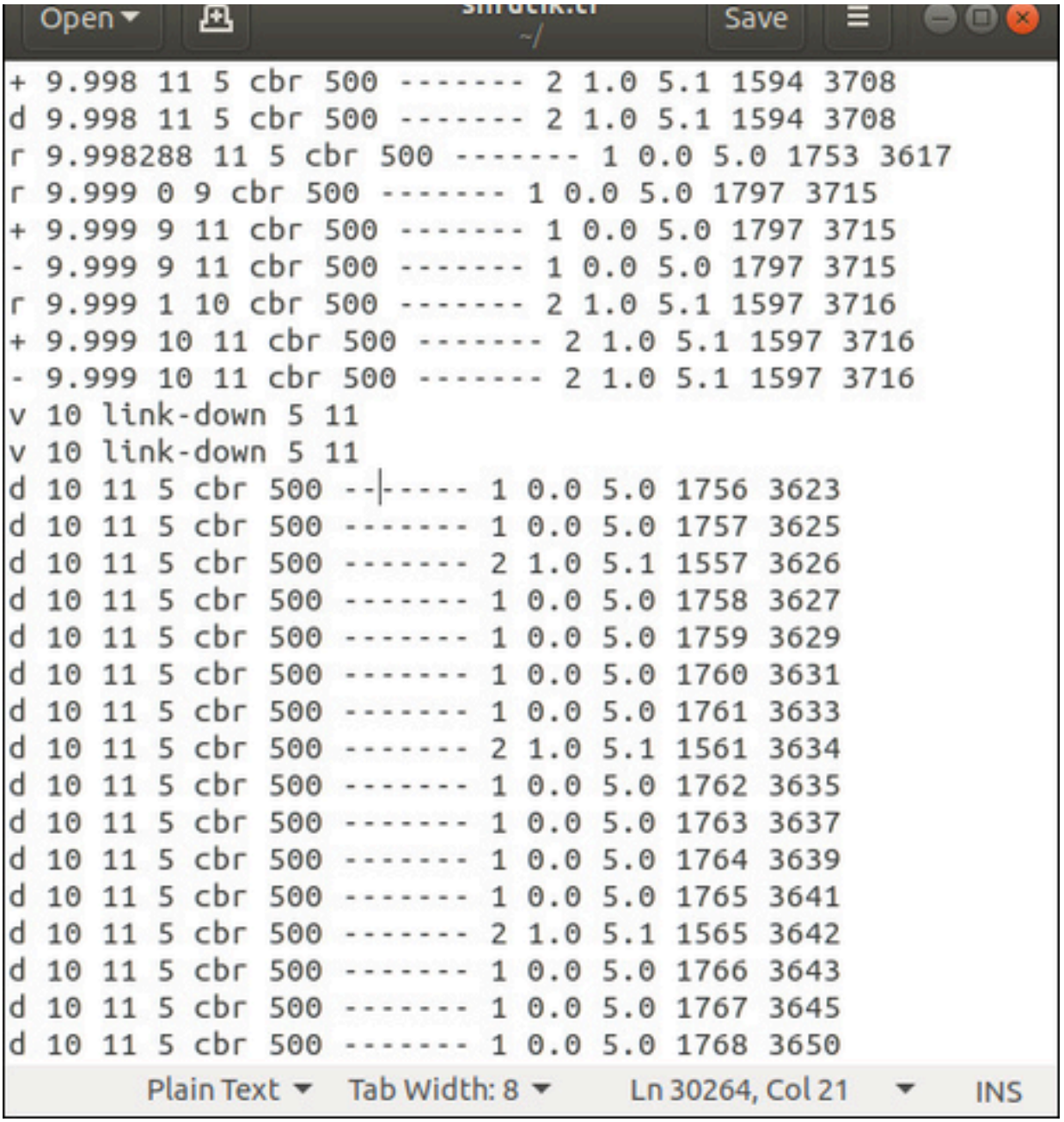
$ns rtmodel-at <time> <direction> $n(<node>) $n(<node>)

- This line specifies changes in the network topology at specific times. It's used to model routing changes.

Output:


0.000000
Step: 2.0ms
EDIT
TIME
Auto layout: Ca 0.15 Cr 0.75 Iterations 10 Recalc re-layout reset

out.tr file:


Open
Save
+ 9.998 11 5 cbr 500 ------- 2 1.0 5.1 1594 3708
d 9.998 11 5 cbr 500 ------- 2 1.0 5.1 1594 3708
r 9.998288 11 5 cbr 500 ------- 1 0.0 5.0 1753 3617
r 9.999 0 9 cbr 500 ------- 1 0.0 5.0 1797 3715
+ 9.999 9 11 cbr 500 ------- 1 0.0 5.0 1797 3715
- 9.999 9 11 cbr 500 ------- 1 0.0 5.0 1797 3715
r 9.999 1 10 cbr 500 ------- 2 1.0 5.1 1597 3716
+ 9.999 10 11 cbr 500 ------- 2 1.0 5.1 1597 3716
- 9.999 10 11 cbr 500 ------- 2 1.0 5.1 1597 3716
v 10 link-down 5 11
v 10 link-down 5 11
d 10 11 5 cbr 500 ------- 1 0.0 5.0 1756 3623
d 10 11 5 cbr 500 ------- 1 0.0 5.0 1757 3625
d 10 11 5 cbr 500 ------- 2 1.0 5.1 1557 3626
d 10 11 5 cbr 500 ------- 1 0.0 5.0 1758 3627
d 10 11 5 cbr 500 ------- 1 0.0 5.0 1759 3629
d 10 11 5 cbr 500 ------- 1 0.0 5.0 1760 3631
d 10 11 5 cbr 500 ------- 1 0.0 5.0 1761 3633
d 10 11 5 cbr 500 ------- 2 1.0 5.1 1561 3634
d 10 11 5 cbr 500 ------- 1 0.0 5.0 1762 3635
d 10 11 5 cbr 500 ------- 1 0.0 5.0 1763 3637
d 10 11 5 cbr 500 ------- 1 0.0 5.0 1764 3639
d 10 11 5 cbr 500 ------- 1 0.0 5.0 1765 3641
d 10 11 5 cbr 500 ------- 2 1.0 5.1 1565 3642
d 10 11 5 cbr 500 ------- 1 0.0 5.0 1766 3643
d 10 11 5 cbr 500 ------- 1 0.0 5.0 1767 3645
d 10 11 5 cbr 500 ------- 1 0.0 5.0 1768 3650
Plain Text
Tab Width: 8
Ln 30264, Col 21
INS

```
- 14.997 4 5 cbr 500 ------- 2 1.0 5.1 2591 5820
r 14.998 8 7 cbr 500 ------- 1 0.0 5.0 2794 5825
+ 14.998 7 6 cbr 500 ------- 1 0.0 5.0 2794 5825
- 14.998 7 6 cbr 500 ------- 1 0.0 5.0 2794 5825
r 14.998 2 3 cbr 500 ------- 2 1.0 5.1 2594 5826
+ 14.998 3 4 cbr 500 ------- 2 1.0 5.1 2594 5826
- 14.998 3 4 cbr 500 ------- 2 1.0 5.1 2594 5826
r 14.999 0 8 cbr 500 ------- 1 0.0 5.0 2797 5831
+ 14.999 8 7 cbr 500 ------- 1 0.0 5.0 2797 5831
- 14.999 8 7 cbr 500 ------- 1 0.0 5.0 2797 5831
r 14.999 1 2 cbr 500 ------- 2 1.0 5.1 2597 5832
+ 14.999 2 3 cbr 500 ------- 2 1.0 5.1 2597 5832
- 14.999 2 3 cbr 500 ------- 2 1.0 5.1 2597 5832
v 15 link-down 6 7
v 15 link-down 6 7
d 15 7 6 cbr 500 ------- 1 0.0 5.0 2792 5821
d 15 7 6 cbr 500 ------- 1 0.0 5.0 2793 5823
d 15 7 6 cbr 500 ------- 1 0.0 5.0 2794 5825
v 15 link-down 7 6
v 15 link-down 7 6
+ 15 6 5 rtProtoDV 12 ------- 0 6.1 5.3 -1 5837
+ 15 7 8 rtProtoDV 12 ------- 0 7.1 8.1 -1 5838
- 15 7 8 rtProtoDV 12 ------- 0 7.1 8.1 -1 5838
+ 15 0 8 cbr 500 ------- 1 0.0 5.0 2800 5839
- 15 0 8 cbr 500 ------- 1 0.0 5.0 2800 5839
+ 15 1 2 cbr 500 ------- 2 1.0 5.1 2600 5840
```

Plain Text ▾ Tab Width: 8 ▾ Ln 123277, Col 5 ▾ INS

```
r 19.999 0 1 cbr 500 ------- 1 0.0 5.0 3797 7934
+ 19.999 1 2 cbr 500 ------- 1 0.0 5.0 3797 7934
- 19.999096 1 2 cbr 500 ------- 1 0.0 5.0 3758 7854
r 19.999288 2 3 cbr 500 ------- 1 0.0 5.0 3753 7841
+ 19.999288 3 4 cbr 500 ------- 1 0.0 5.0 3753 7841
r 19.999384 4 5 cbr 500 ------- 1 0.0 5.0 3747 7829
- 19.999384 3 4 cbr 500 ------- 1 0.0 5.0 3753 7841
v 20 link-up 6 7
v 20 link-up 6 7
v 20 link-up 7 6
v 20 link-up 7 6
+ 20 6 5 rtProtoDV 12 ------- 0 6.1 5.3 -1 7942
- 20 6 5 rtProtoDV 12 ------- 0 6.1 5.3 -1 7942
+ 20 6 7 rtProtoDV 12 ------- 0 6.1 7.1 -1 7943
- 20 6 7 rtProtoDV 12 ------- 0 6.1 7.1 -1 7943
+ 20 7 6 rtProtoDV 12 ------- 0 7.1 6.1 -1 7944
- 20 7 6 rtProtoDV 12 ------- 0 7.1 6.1 -1 7944
+ 20 7 8 rtProtoDV 12 ------- 0 7.1 8.1 -1 7945
- 20 7 8 rtProtoDV 12 ------- 0 7.1 8.1 -1 7945
+ 20 0 1 cbr 500 ------- 1 0.0 5.0 3800 7946
- 20 0 1 cbr 500 ------- 1 0.0 5.0 3800 7946
+ 20 1 2 cbr 500 ------- 2 1.0 5.1 3600 7947
r 20.001096 1 2 cbr 500 ------- 1 0.0 5.0 3756 7847
+ 20.001096 2 3 cbr 500 ------- 1 0.0 5.0 3756 7847
r 20.001288 3 4 cbr 500 ------- 1 0.0 5.0 3750 7835
```

```
+ 29.998 7 6 cbr 500 ------- 1 0.0 5.0 5794 12100
- 29.998 7 6 cbr 500 ------- 1 0.0 5.0 5794 12100
r 29.998 2 3 cbr 500 ------- 2 1.0 5.1 5594 12101
+ 29.998 3 4 cbr 500 ------- 2 1.0 5.1 5594 12101
- 29.998 3 4 cbr 500 ------- 2 1.0 5.1 5594 12101
r 29.999 0 8 cbr 500 ------- 1 0.0 5.0 5797 12106
+ 29.999 8 7 cbr 500 ------- 1 0.0 5.0 5797 12106
- 29.999 8 7 cbr 500 ------- 1 0.0 5.0 5797 12106
r 29.999 1 2 cbr 500 ------- 2 1.0 5.1 5597 12107
+ 29.999 2 3 cbr 500 ------- 2 1.0 5.1 5597 12107
- 29.999 2 3 cbr 500 ------- 2 1.0 5.1 5597 12107
+ 30 0 8 cbr 500 ------- 1 0.0 5.0 5800 12112
- 30 0 8 cbr 500 ------- 1 0.0 5.0 5800 12112
+ 30 1 2 cbr 500 ------- 2 1.0 5.1 5600 12113
- 30 1 2 cbr 500 ------- 2 1.0 5.1 5600 12113
v 30 link-up 5 11
v 30 link-up 5 11
v 30 link-up 11 5
v 30 link-up 11 5
+ 30 5 4 rtProtoDV 12 ------- 0 5.3 4.1 -1 12114
- 30 5 4 rtProtoDV 12 ------- 0 5.3 4.1 -1 12114
+ 30 5 6 rtProtoDV 12 ------- 0 5.3 6.1 -1 12115
```