

### PROG 3

```
set ns [new Simulator]

$ns color 1 Blue
$ns color 2 Red

set ntrace [open prog4.tr w]
$ns trace-all $ntrace

set namfile [open prog4.nam w]
$ns namtrace-all $namfile

set winFile0 [open WinFile0 w]
set winFile1 [open WinFile1 w]

proc Finish {} {
    global ns ntrace namfile

    $ns flush-trace
    close $ntrace
    close $namfile

    exec nam prog4.nam &
    exec xgraph WinFile0 WinFile1 &
    exit 0
}

proc PlotWindow {tcpSource file} { global ns

    set time 0.1

    set now [$ns now]

    set cwnd [$tcpSource set cwnd_]

    puts $file "$now $cwnd"

    $ns at [expr $now+$time] "PlotWindow $tcpSource $file"
}

for {set i 0} {$i<6} {incr i} { set n($i) [$ns node]
}
```

```
$ns duplex-link $n(0) $n(2) 2Mb 10ms DropTail
$ns duplex-link $n(1) $n(2) 2Mb 10ms DropTail
$ns duplex-link $n(2) $n(3) 0.6Mb 100ms DropTail
set lan [$ns newLan "$n(3) $n(4) $n(5)" 0.5Mb 40ms LL Queue/DropTail MAC/802_3
Channel]
$ns duplex-link-op $n(0) $n(2) orient right-down
$ns duplex-link-op $n(1) $n(2) orient right-up
$ns duplex-link-op $n(2) $n(3) orient right
$ns queue-limit $n(2) $n(3) 20
$ns duplex-link-op $n(2) $n(3) queuePos 0.5
set loss_module [new ErrorModel]
$loss_module ranvar [new RandomVariable/Uniform]
$loss_module drop-target [new Agent/Null]
$ns lossmodel $loss_module $n(2) $n(3)
set tcp0 [new Agent/TCP/Newreno]
$tcp0 set fid_ 1
$tcp0 set window_ 8000
$tcp0 set packetSize_ 552
$ns attach-agent $n(0) $tcp0
set sink0 [new Agent/TCPSink/DelAck]
$ns attach-agent $n(4) $sink0
$ns connect $tcp0 $sink0
set ftp0 [new Application/FTP]
$ftp0 attach-agent $tcp0
$ftp0 set type_ FTP
set tcp1 [new Agent/TCP/Newreno]
$tcp1 set fid_ 2
$tcp1 set window_ 8000
```

```
$tcp1 set packetSize_ 552
$ns attach-agent $n(5) $tcp1
set sink1 [new Agent/TCPSink/DelAck]
$ns attach-agent $n(1) $sink1
$ns connect $tcp1 $sink1
set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1
$ftp1 set type_ FTP
$ns at 0.1 "$ftp0 start"
$ns at 0.1 "PlotWindow $tcp0 $winFile0"
$ns at 0.5 "$ftp1 start"
$ns at 0.5 "PlotWindow $tcp1 $winFile1"
$ns at 25.0 "$ftp0 stop"
$ns at 25.1 "$ftp1 stop"
$ns at 25.2 "Finish"
$ns run
```