9. **Write a TCL script to simulate the following scenario. Consider six nodes, (as shown in the figure below) moving within a flat topology of 700m x 700m. The initial positions of nodes are: n0 (150, 300), n1 (300, 500), n2(500, 500), n3 (300, 100), n4(500, 100) and n5(650, 300) respectively. A TCP connection is initiated between n0 (source) and n5(destination) through n3 and n4 i.e., the route is 0- 3-4-5. At time t = 3 seconds, the FTP application runs over it. After time t = 4 seconds, n3 (300,100) moves towards n1 (300, 500)with a speed of 5.0m/sec and after some time the path breaks. The data is then transmitted with a new path via n1 and n2 i.e., the new route is 0-1-2-5. The simulation lasts for 60 secs. In the above said case both the routes have equal cost. Use DSR as the routing protocol and the IEEE 802.11 MAC protocol.**

Save this file as p9.tcl :-

```
set val(chan) Channel/WirelessChannel
set val(prop) Propagation/TwoRayGround
set val(netif) Phy/WirelessPhy
set val(mac) Mac/802_11
#set val(ifq) Queue/DropTail/PriQueue
set val(ifq) CMUPriQueue
set val(ll) LL
set val(ant) Antenna/OmniAntenna
set val(x) 700
set val(y) 700
set val(ifqlen) 50
set val(nn) 6
set val(stop) 60.0
set val(rp) DSR

set ns_ [new Simulator]
set tracefd [open 004.tr w]
$ns_ trace-all $tracefd
set namtrace [open 004.nam w]
$ns_ namtrace-all-wireless $namtrace $val(x) $val(y)
set prop [new $val(prop)]
set topo [new Topography]
$topo load_flatgrid $val(x) $val(y)

set god_ [create-god $val(nn)]

#Node Configuration
$ns_ node-config -adhocRouting $val(rp) \
-llType $val(ll) \
-macType $val(mac) \
-ifqType $val(ifq) \
-ifqLen $val(ifqlen) \
-antType $val(ant) \
-propType $val(prop) \
-phyType $val(netif) \
-channelType $val(chan) \
```

```
-topoInstance $topo \
-agentTrace ON \
-routerTrace ON \
-macTrace ON

#Creating Nodes
for {set i 0} {$i < $val(nn) } {incr i} {
set node_($i) [$ns_ node]
$node_($i) random-motion 0
}

#Initial Positions of Nodes
$node_(0) set X_ 150.0
$node_(0) set Y_ 300.0
$node_(0) set Z_ 0.0
$node_(1) set X_ 300.0
$node_(1) set Y_ 500.0
$node_(1) set Z_ 0.0
$node_(2) set X_ 500.0
$node_(2) set Y_ 500.0
$node_(2) set Z_ 0.0
$node_(3) set X_ 300.0
$node_(3) set Y_ 100.0
$node_(3) set Z_ 0.0
$node_(4) set X_ 500.0
$node_(4) set Y_ 100.0
$node_(4) set Z_ 0.0
$node_(5) set X_ 650.0
$node_(5) set Y_ 300.0
$node_(5) set Z_ 0.0
for {set i 0} {$i < $val(nn)} {incr i} {
$ns_ initial_node_pos $node_($i) 40
}

#Topology Design
$ns_ at 1.0 "$node_(0) setdest 160.0 300.0 2.0"
$ns_ at 1.0 "$node_(1) setdest 310.0 150.0 2.0"
$ns_ at 1.0 "$node_(2) setdest 490.0 490.0 2.0"
$ns_ at 1.0 "$node_(3) setdest 300.0 120.0 2.0"
$ns_ at 1.0 "$node_(4) setdest 510.0 90.0 2.0"
$ns_ at 1.0 "$node_(5) setdest 640.0 290.0 2.0"
$ns_ at 4.0 "$node_(3) setdest 300.0 500.0 5.0"

#Generating Traffic
set tcp0 [new Agent/TCP]
set sink0 [new Agent/TCPSink]
$ns_ attach-agent $node_(0) $tcp0
$ns_ attach-agent $node_(5) $sink0
$ns_ connect $tcp0 $sink0

set ftp0 [new Application/FTP]
$ftp0 attach-agent $tcp0
```

```
$ns_ at 5.0 "$ftp0 start"
$ns_ at 60.0 "$ftp0 stop"

#Simulation Termination
for {set i 0} {$i < $val(nn) } {incr i} {
$ns_ at $val(stop) "$node_($i) reset";
}

$ns_ at $val(stop) "puts \"NS EXITING...\" ; $ns_ halt"
puts "Starting Simulation..."
$ns_ run
```

Execution Commands :-

1) ns p9.tcl
2) nam 004.nam

Output:-