Practical No. 01

Aim: Create network with three routers with RIPv2 and each router associated network will have minimum three PC. Show connectivity.

Steps to perform practical:

Step 1 : Add 3 routers, 3 switches, end user clients to the switches.
Step 2 : Connect all the devices with straight through cable.
Step 3 : Add serial port devices in the routers in the router.
Step 4 : Give ip to each port of router

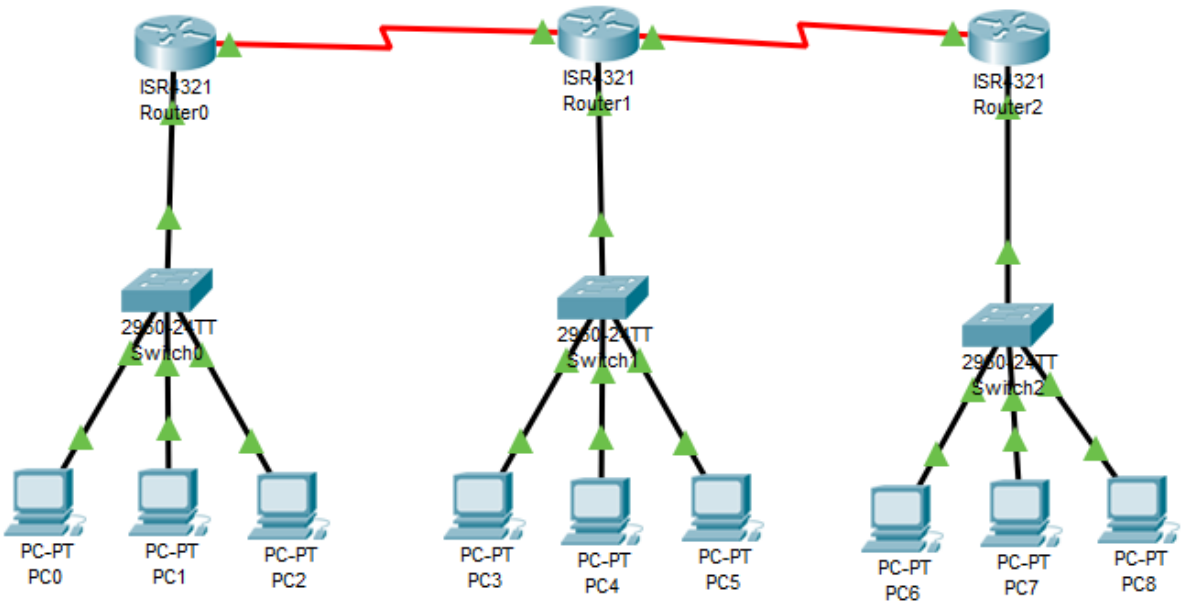
```
enable
configure terminal
interface gig0/0/0
ip address 192.168.10.1 255.255.255.0
no shutdown
exit
```

Step 5 : Set IP address, Subnet & Gateway for End User Client (manually in input boxes). Note that the gateway will be same as the routers IP.
Step 6 : Apply RIP to each of the router

```
configure terminal
router rip
network 192.168.10.0
network 192.168.40.0
exit
```

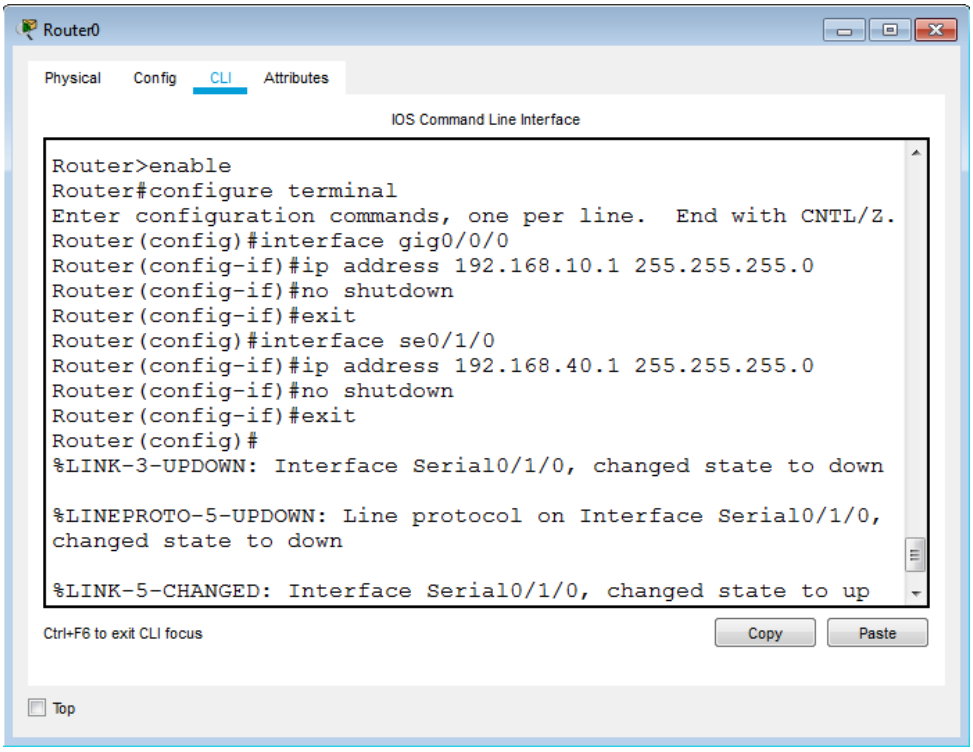
Step 7 : Go for (show ip route) command on each router.
Step 8 : Show connection between PC6 and PC0.
System > Desktop tab > Command Prompt > ping 192.168.10.2

NETWORK TOPOLOGY:



i)Router Configuration:-

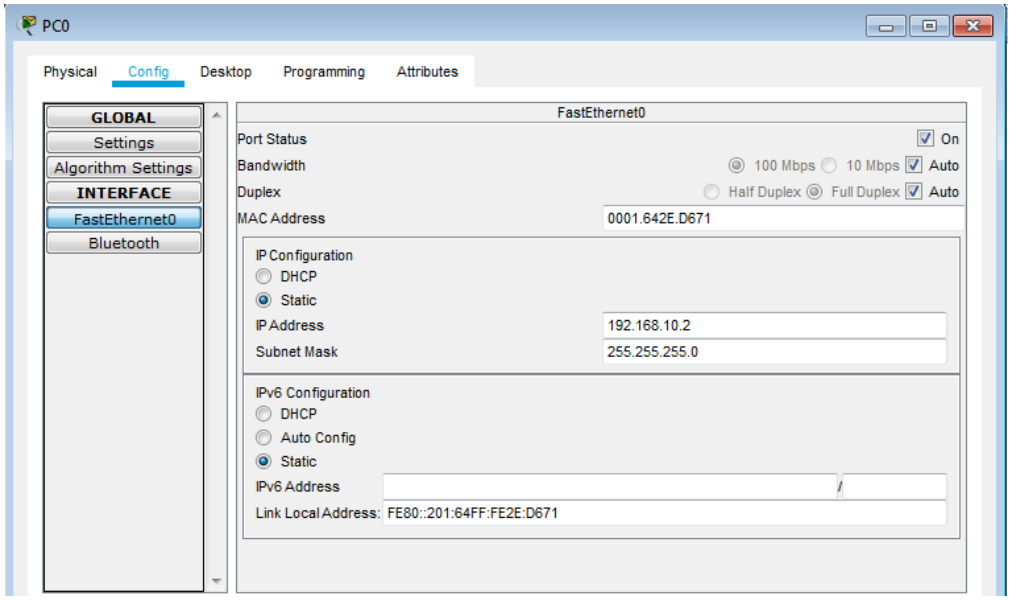
Set IP addresses to routers :-



Set IP addresses to all remaining routers as shown above.

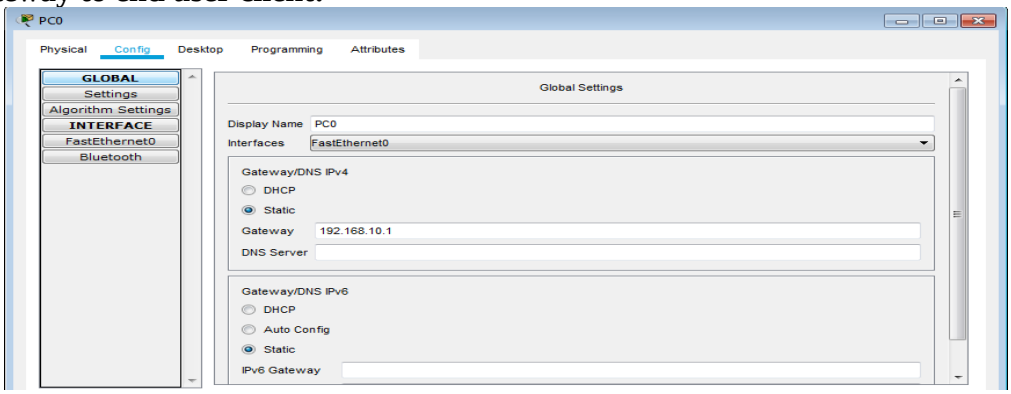
ii)End User Client Configuration :

a)Set IP address to end user client :



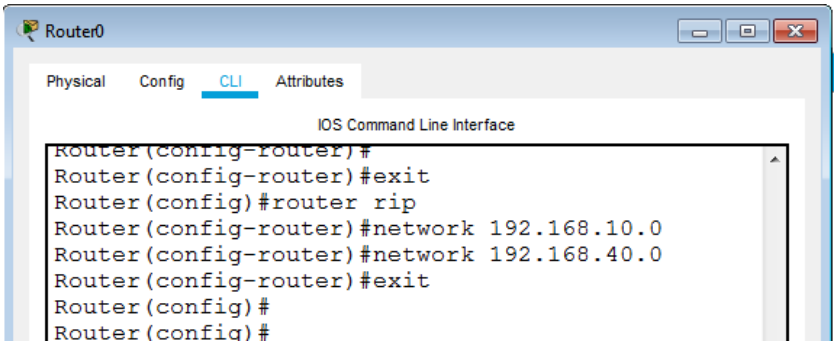
Set IP addresses to all remaining clients as shown above.

b)Set Gateway to end user client:



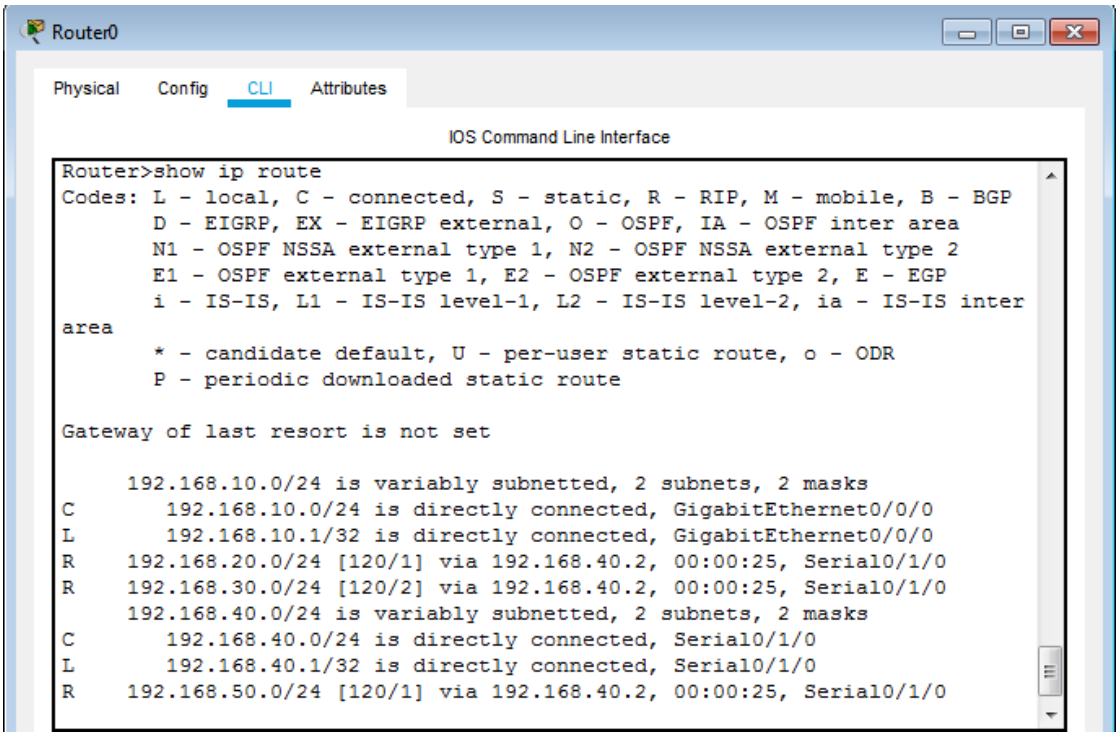
Set Gateways to all remaining end user client.

Set RIP protocol to routers :



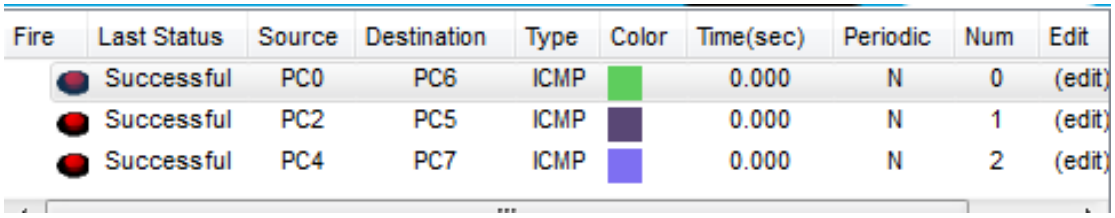
Set RIP protocol to all remaining routers as shown above.

Go for "show ip route" command for each router:



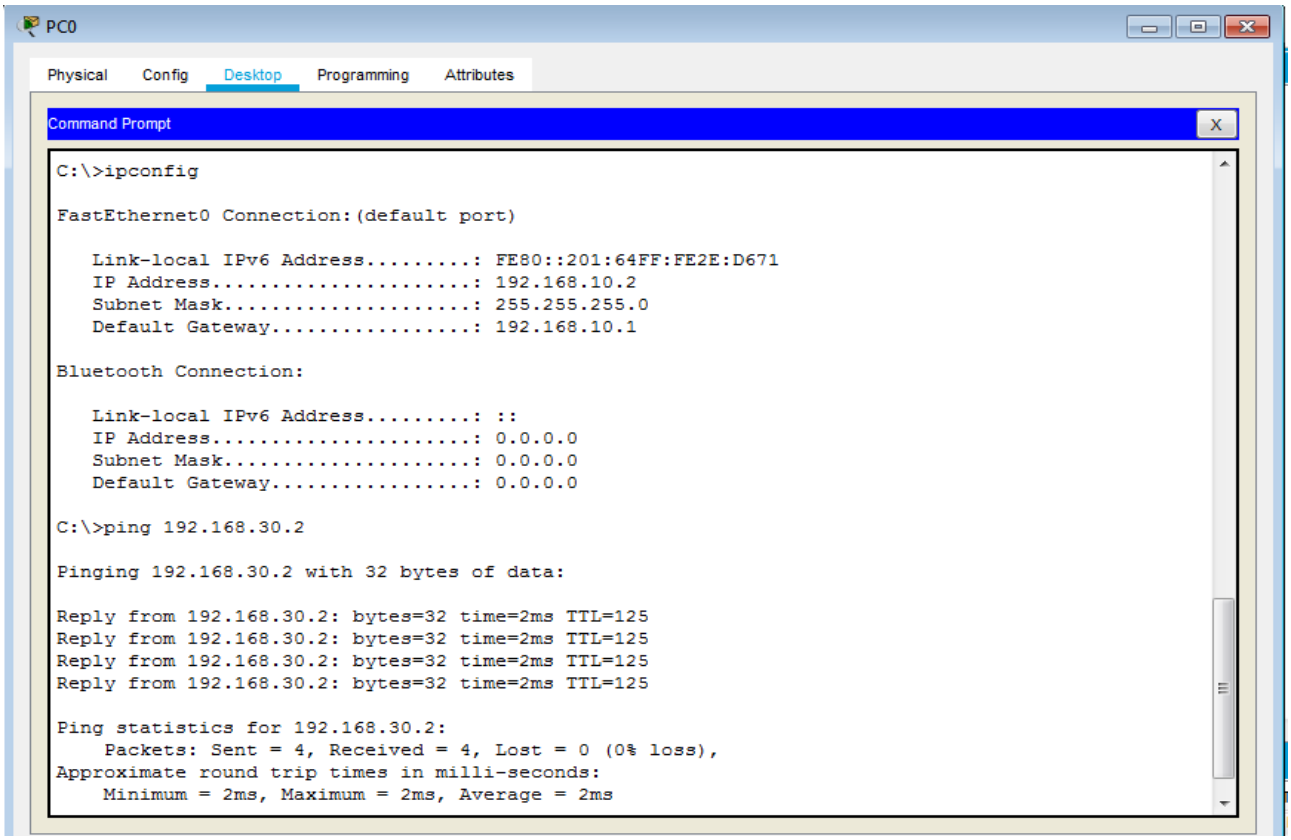
Show "show ip route" command for all remaining routers.

Show Packet Tracing :

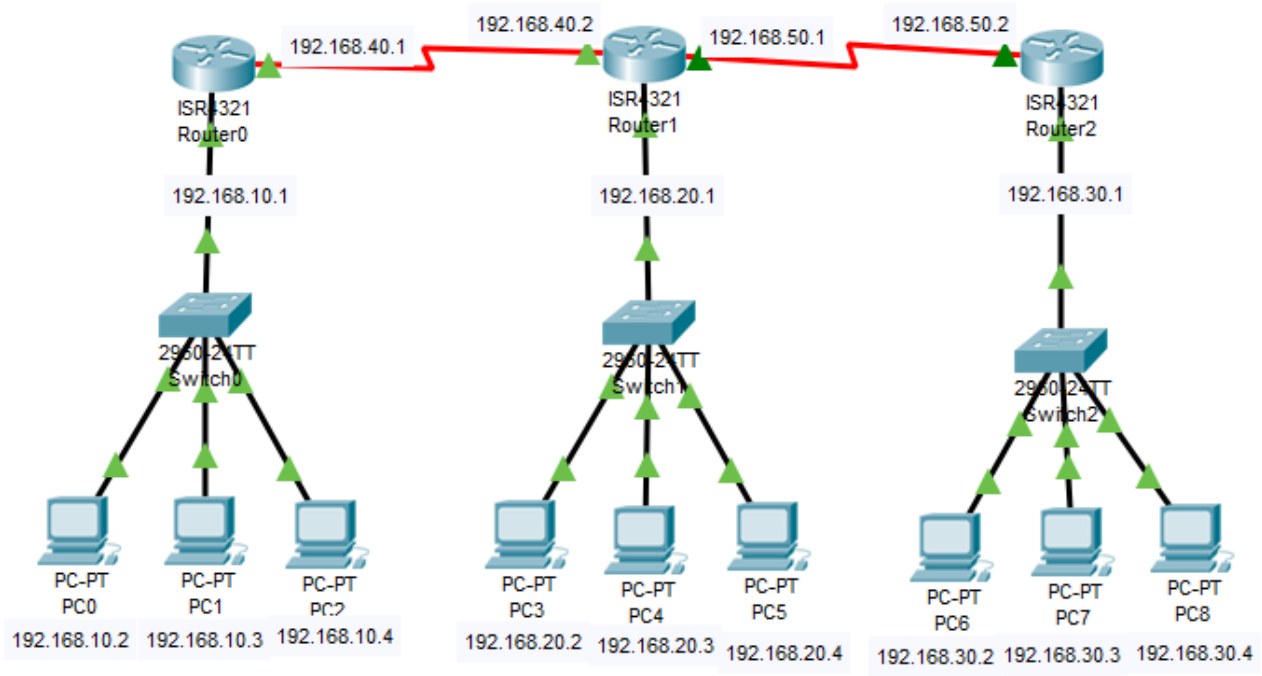


Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Successful	PC0	PC6	ICMP		0.000	N	0	(edit)
	Successful	PC2	PC5	ICMP		0.000	N	1	(edit)
	Successful	PC4	PC7	ICMP		0.000	N	2	(edit)

Show Connection between PC0 to PC6:



FINAL TOPOLOGY:



Conclusion: We have learnt to create RIPv2 with three routers as shown above.

Practical No. 02

Aim: Create network with three routers with OSPF and each router associated network will have minimum three PC. Show connectivity.

Steps to perform practical:

Step 1 : Add 3 routers, 3 switches, end user clients to the switches.
Step 2 : Connect all the devices with straight through cable.
Step 3 : Add serial port devices in the routers in the router.
Step 4 : Give IP to each port of router

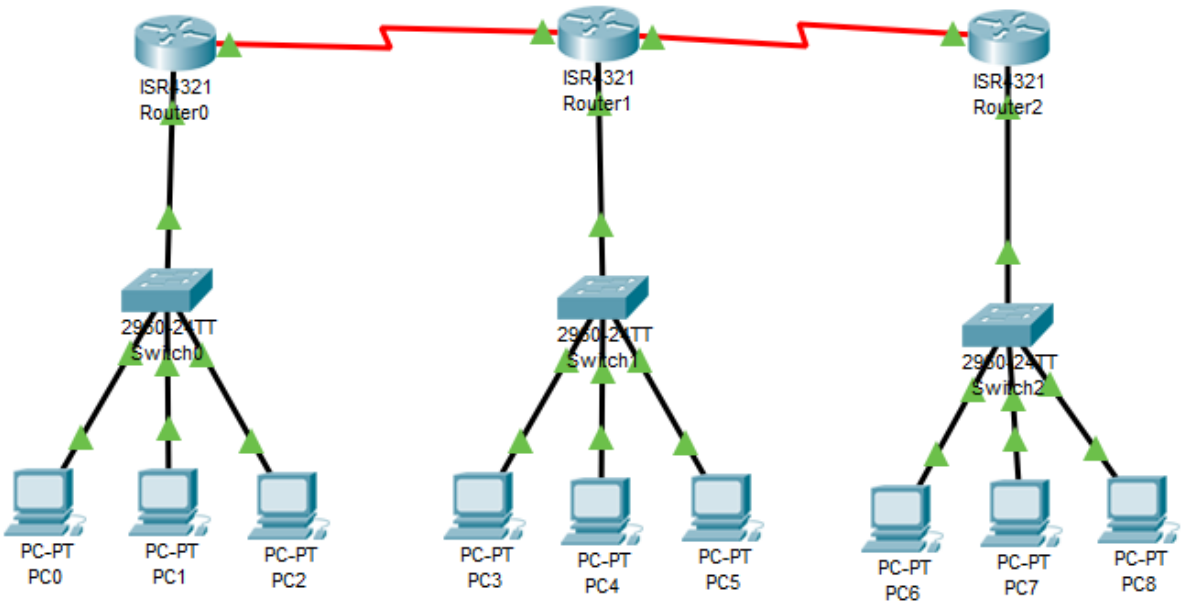
```
enable
configure terminal
interface gig0/0/0
ip address 192.168.10.1 255.255.255.0
no shutdown
exit
```

Step 5 : Set IP address, Subnet & Gateway for End User Client (manually in input boxes). Note that the gateway will be same as the routers IP.
Step 6 : Apply OSPF to each of the router

```
configure terminal
router ospf 100
network 192.168.10.0 0.255.255.255 area 0
network 192.168.40.0 0.255.255.255 area 0
exit
```

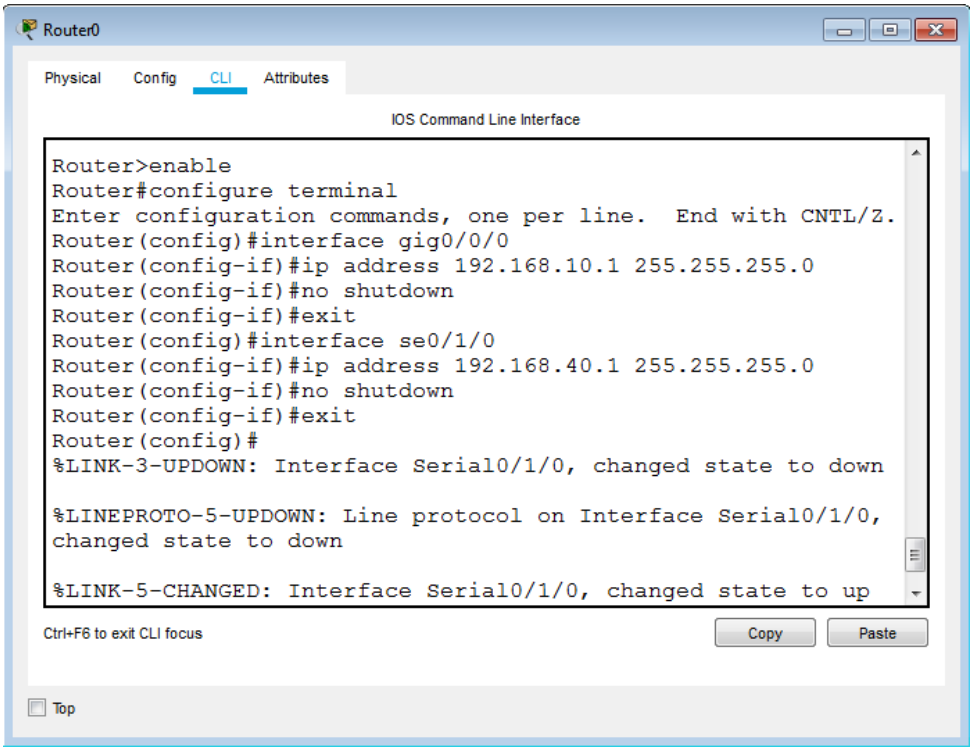
Step 7 : Go for (show ip route) command on each router.
Step 8 : Show connection between PC6 and PC0.
System > Desktop tab > Command Prompt > ping 192.168.10.2

NETWORK TOPOLOGY:



i)Router Configuration:-

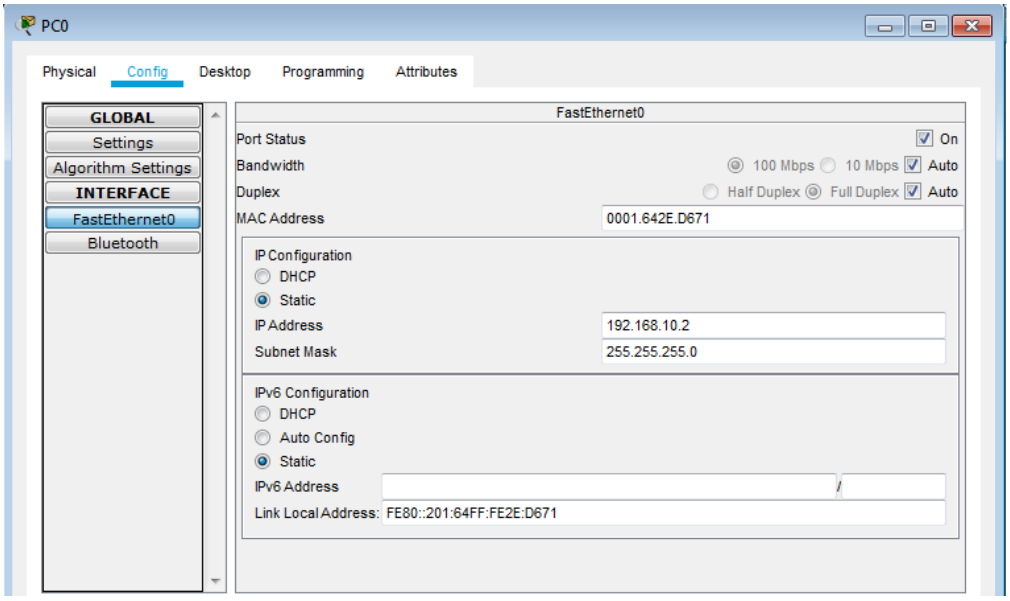
Set IP addresses to routers :-



Set IP addresses to all remaining routers as shown above.

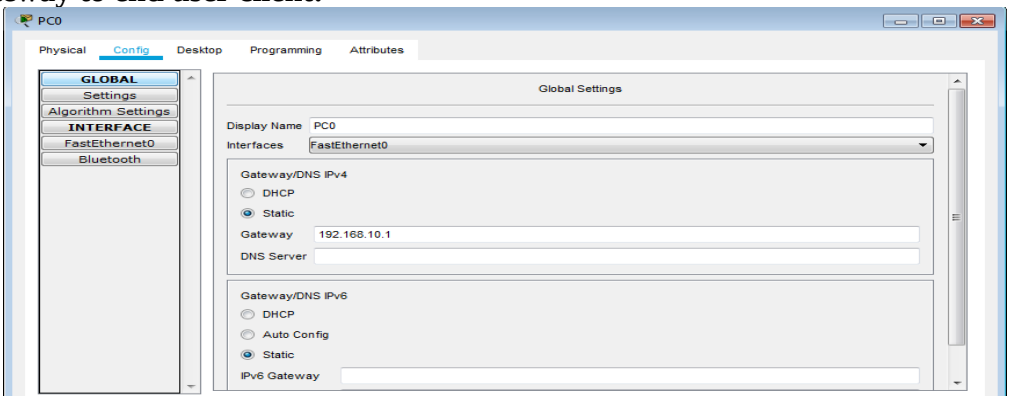
ii)End User Client Configuration :

a)Set IP address to end user client :



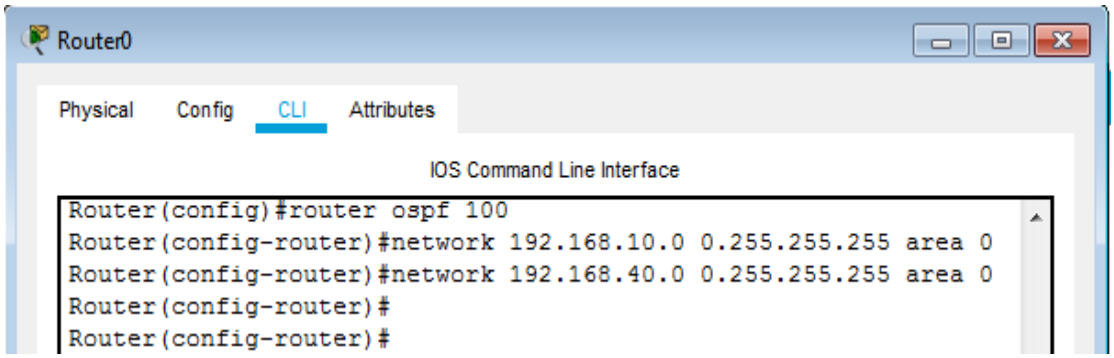
Set IP addresses to all remaining clients as shown above.

b)Set Gateway to end user client:



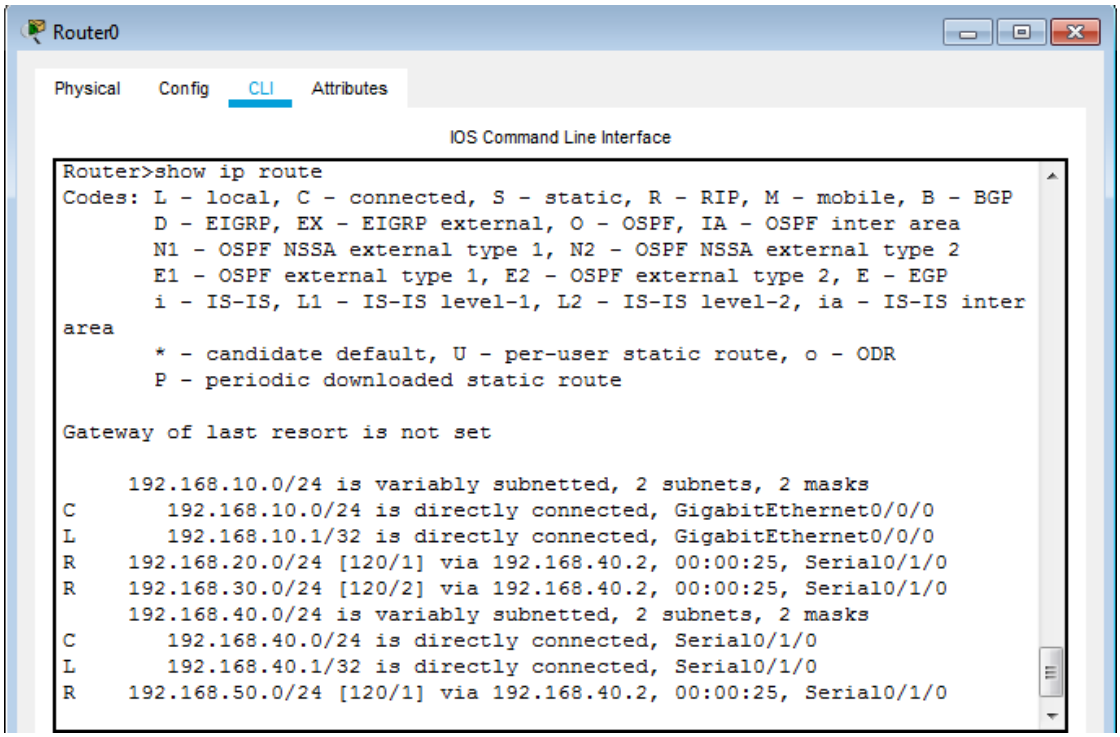
Set Gateways to all remaining end user client.

Set OSPF protocol to routers :



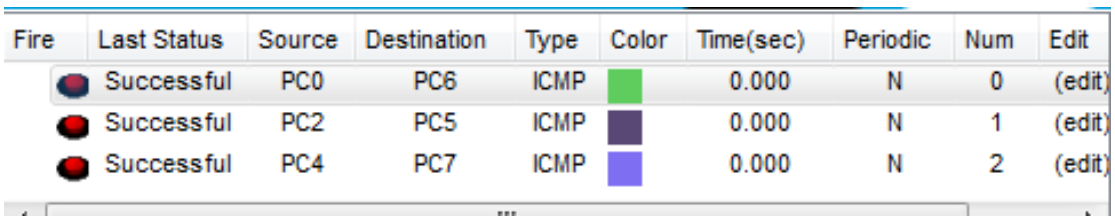
Set OSPF protocol to all remaining routers as shown above.

Go for "show ip route" command for each router:



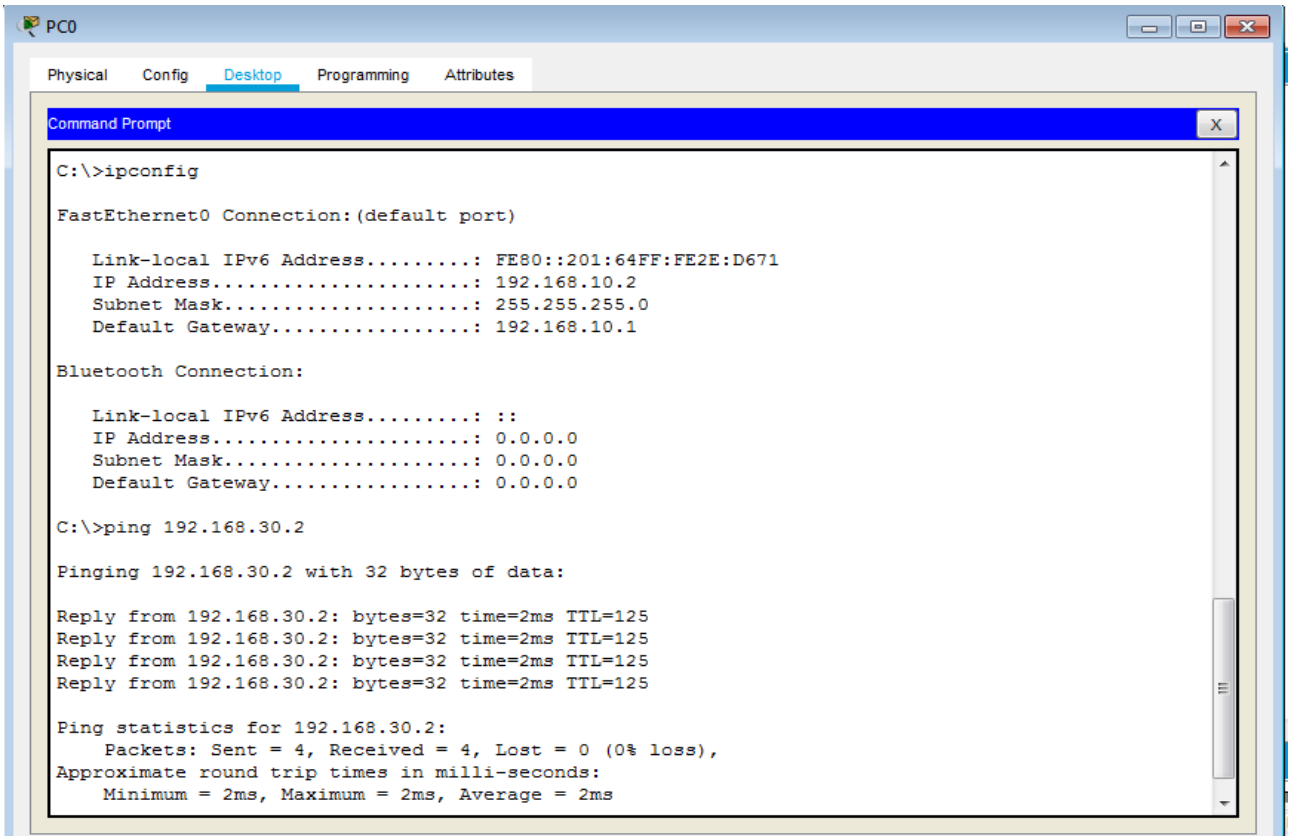
Show "show ip route" command for all remaining routers.

Show Packet Tracing :

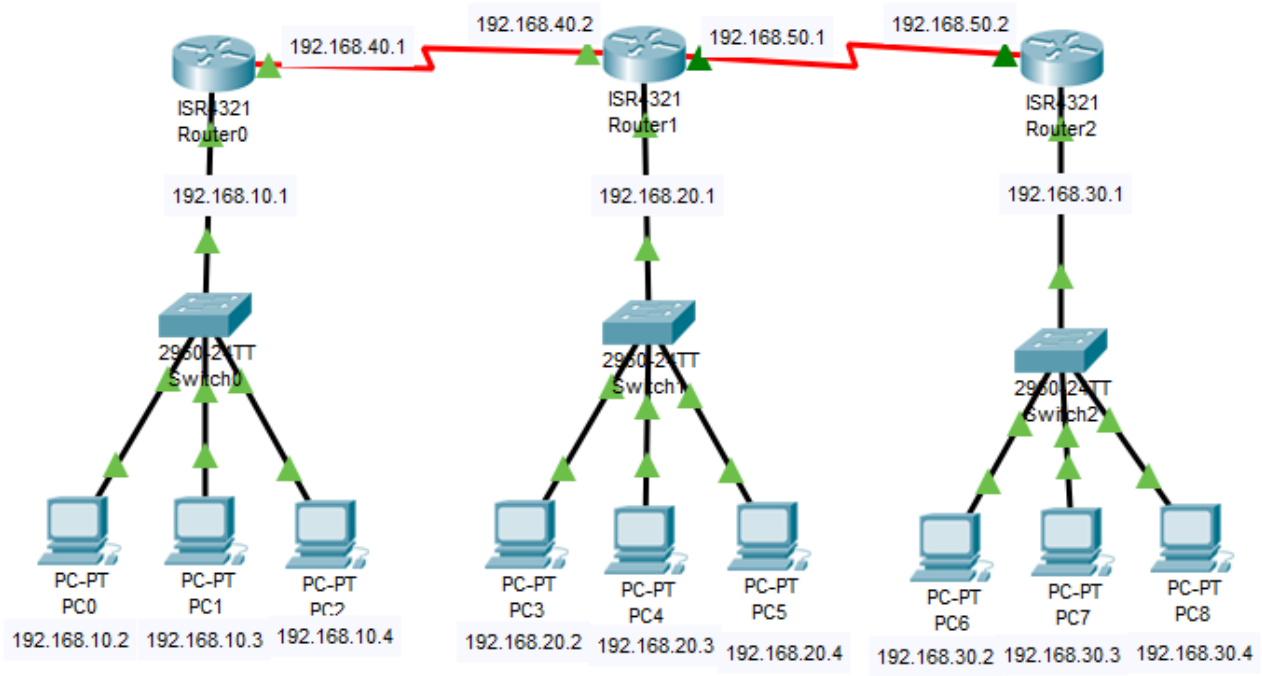


Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Successful	PC0	PC6	ICMP		0.000	N	0	(edit)
	Successful	PC2	PC5	ICMP		0.000	N	1	(edit)
	Successful	PC4	PC7	ICMP		0.000	N	2	(edit)

Show Connection between PC0 to PC6:



FINAL TOPOLOGY:



Conclusion:- We have learnt to create OSPF with three routers as shown above**.**

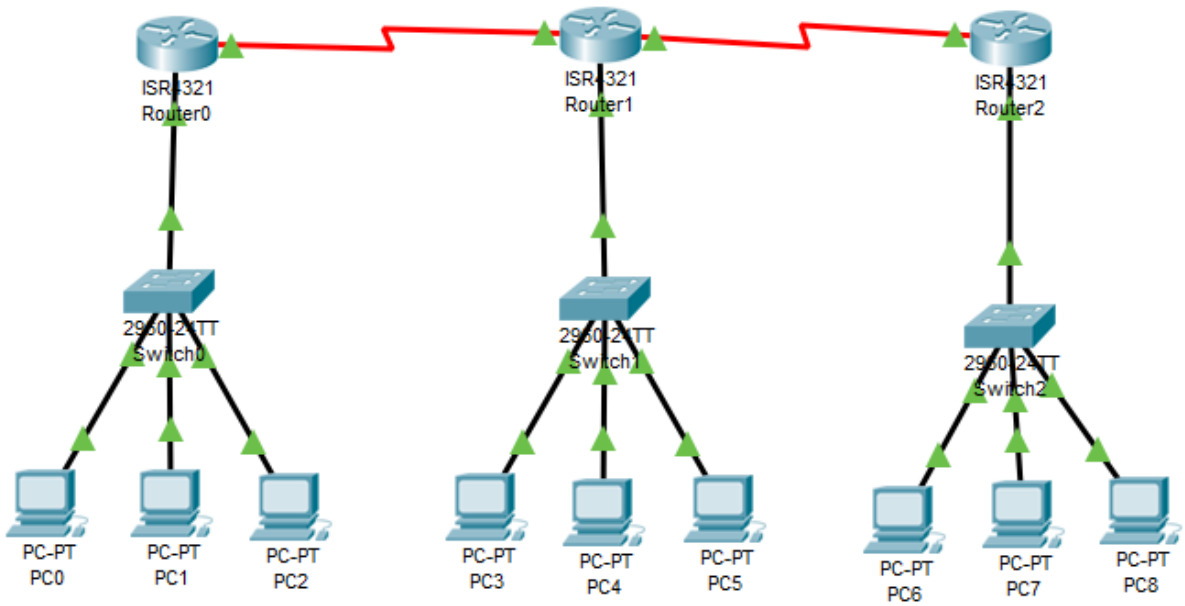
Practical No. 03

Aim: Create network with three routers with BGP and each router associated network will have minimum three PC. Show connectivity.

Steps to perform practical:

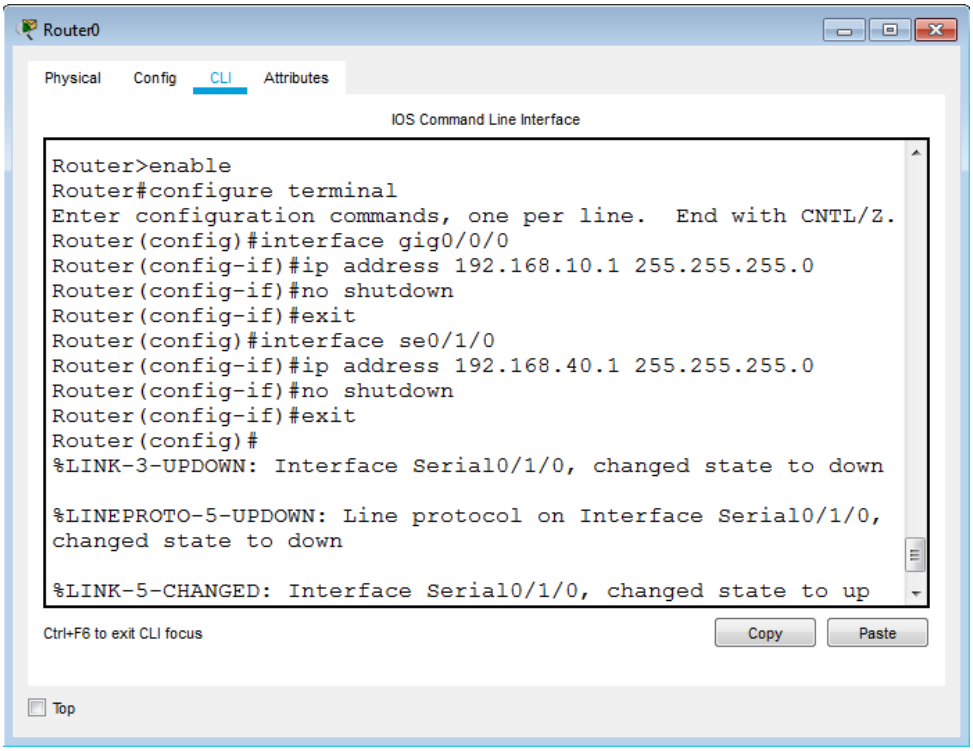
Step 1 : Add 3 routers, 3 switches, end user clients to the switches.
Step 2 : Connect all the devices with straight through cable.
Step 3 : Add serial port devices in the routers in the router.
Step 4 : Give IP to each port of router
enable
configure terminal
interface gig0/0/0
ip address 192.168.10.1 255.255.255.0
no shutdown
exit
Step 5 : Set IP address, Subnet & Gateway for End User Client (manually in input boxes). Note that the gateway will be same as the routers IP.
Step 6 : Apply OSPF to each of the router
configure terminal
router bgp 100
neighbor 192.168.40.2 remote-as 200
network 192.168.10.0
network 192.168.40.0
exit
Step 7 : Go for (show ip route) command on each router.
Step 8 : Show connection between PC6 and PC0.
System > Desktop tab > Command Prompt > ping 192.168.10.2

NETWORK TOPOLOGY:



i)Router Configuration:-

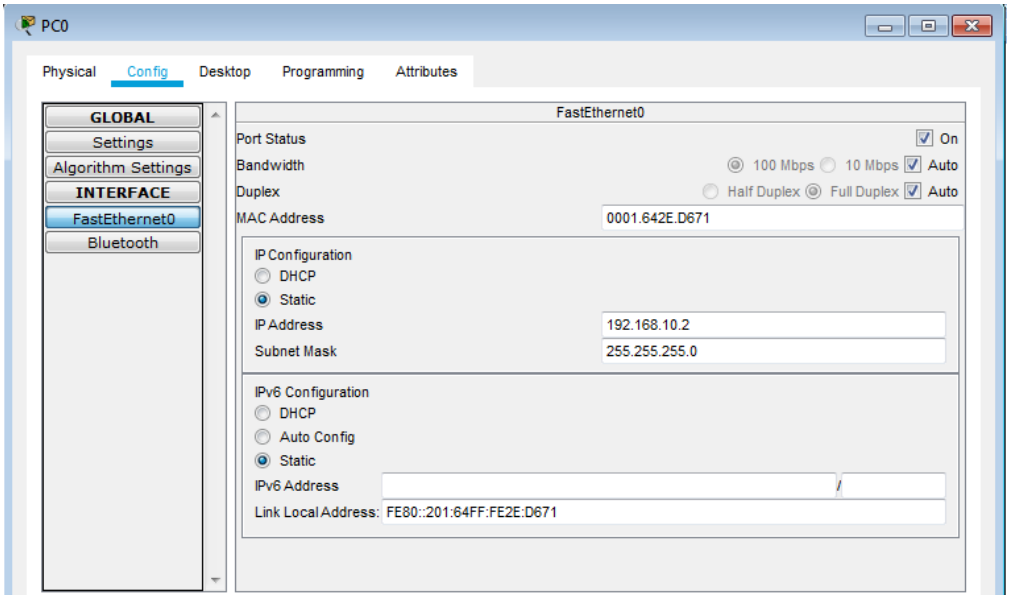
Set IP addresses to routers :-



Set IP addresses to all remaining routers as shown above.

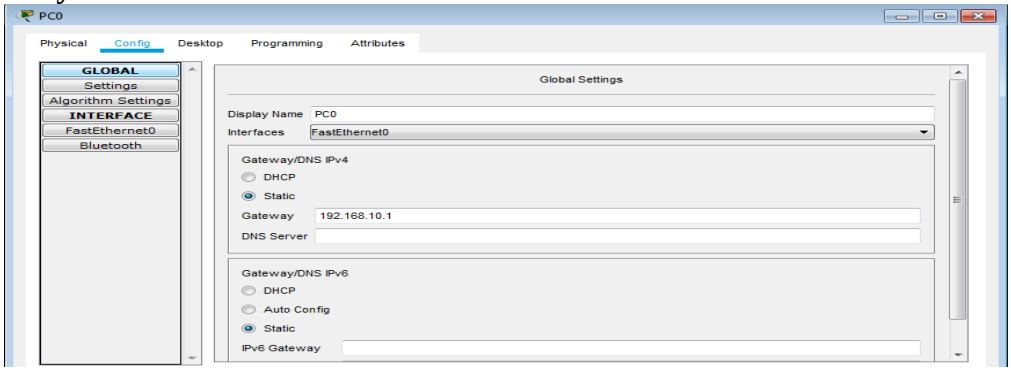
ii)End User Client Configuration :

a)Set IP address to end user client :



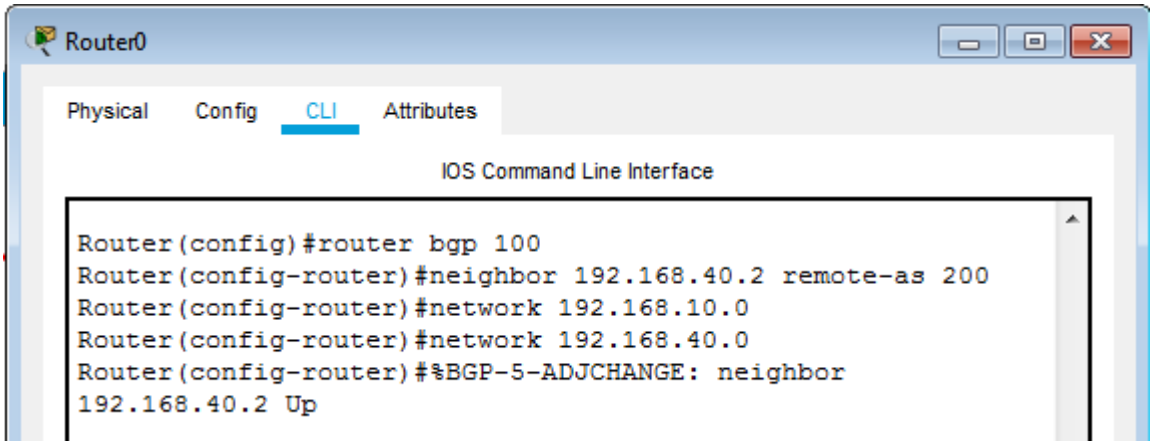
Set IP addresses to all remaining clients as shown above.

b)Set Gateway to end user client:



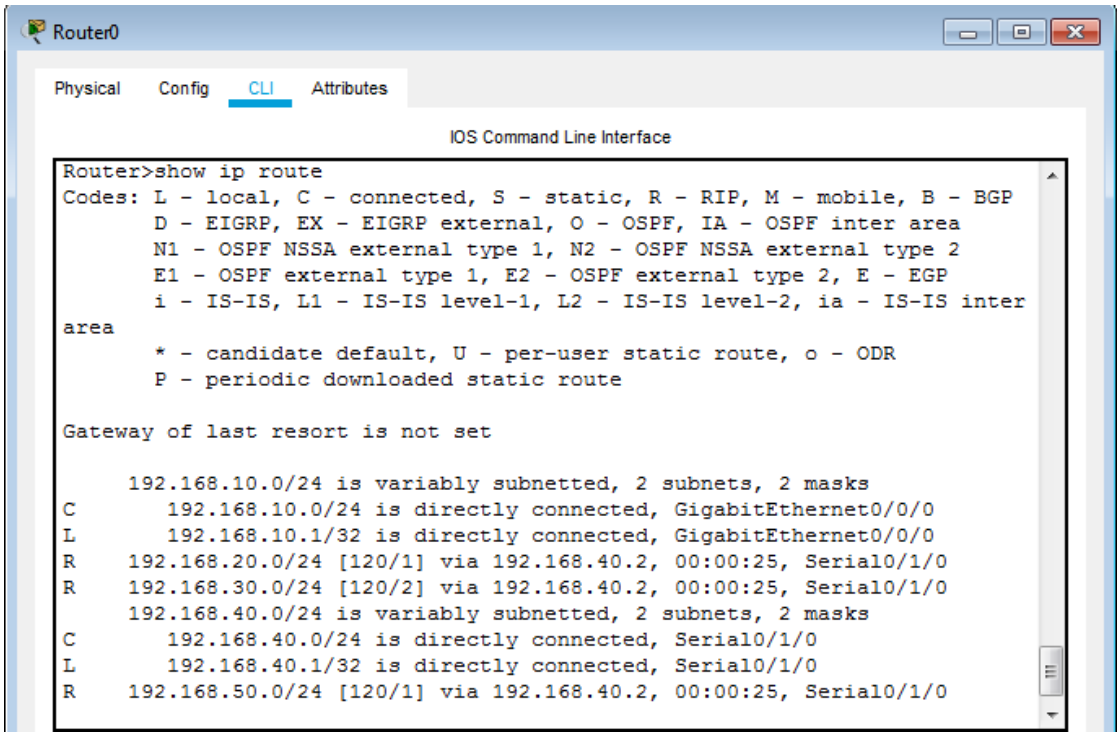
Set Gateways to all remaining end user client.

Set BGP protocol to routers :



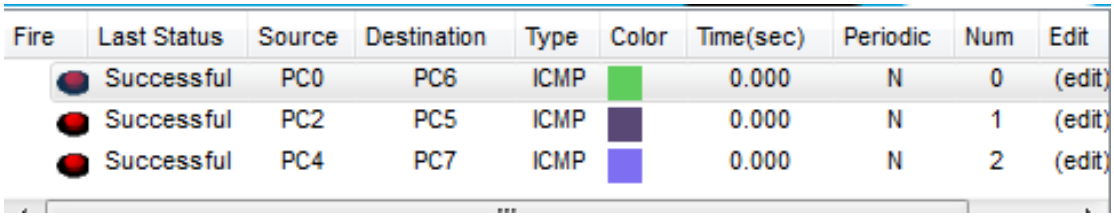
Set BGP protocol to all remaining routers as shown above.

Go for "show ip route" command for each router:



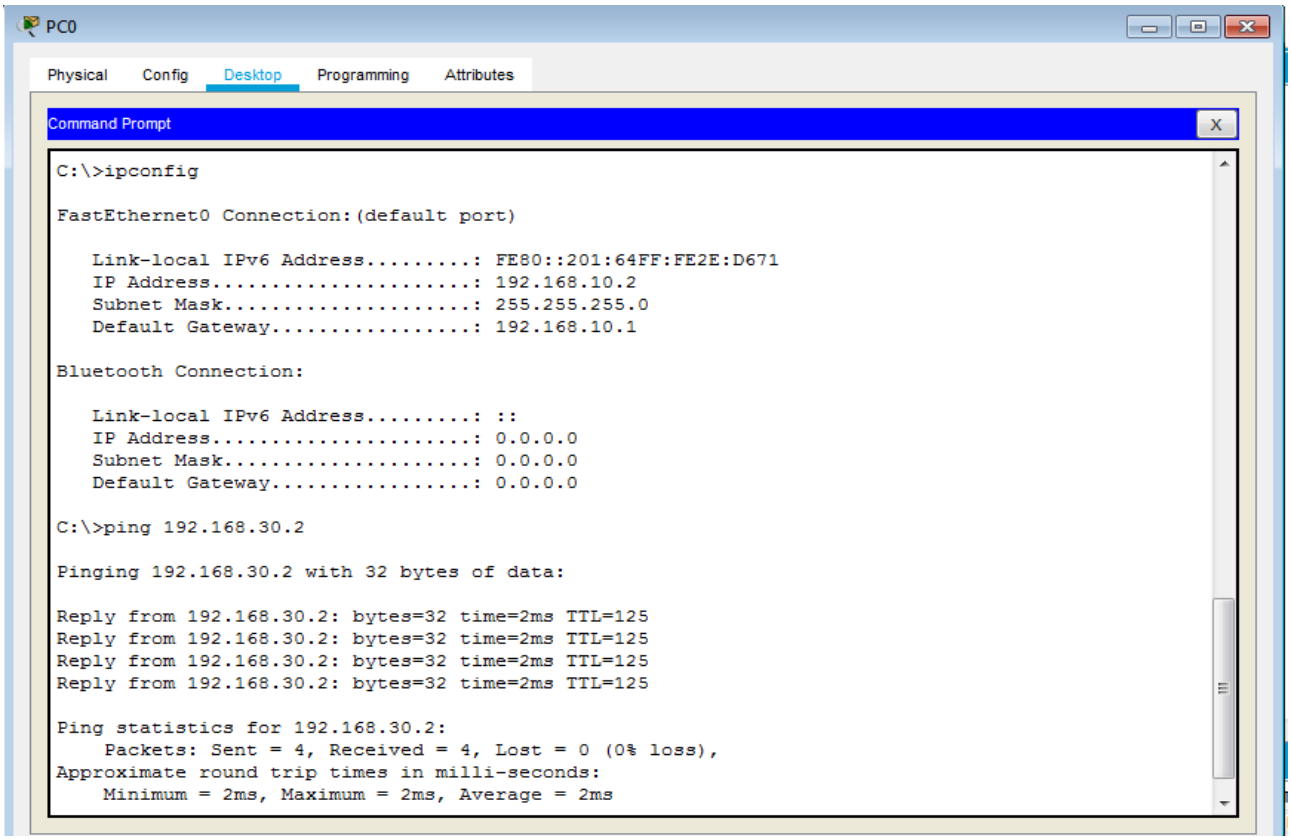
Show "show ip route" command for all remaining routers.

Show Packet Tracing :

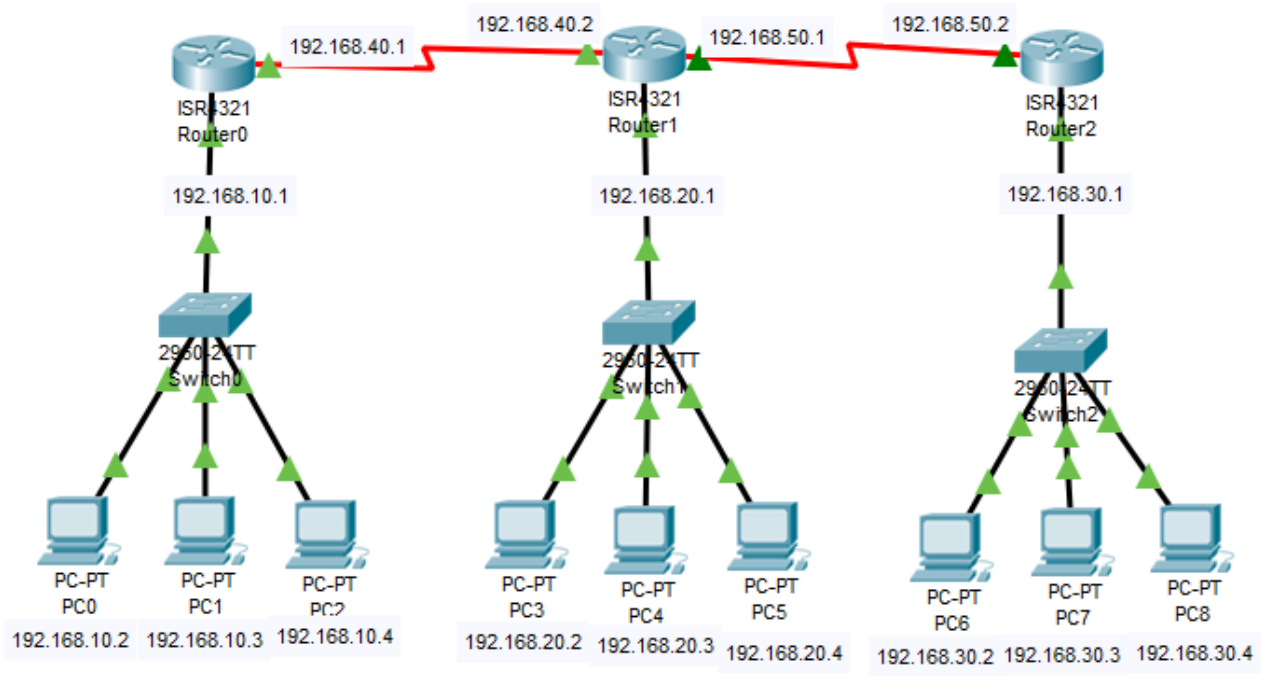


Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Successful	PC0	PC6	ICMP		0.000	N	0	(edit)
	Successful	PC2	PC5	ICMP		0.000	N	1	(edit)
	Successful	PC4	PC7	ICMP		0.000	N	2	(edit)

Show Connection between PC0 to PC6:



FINAL TOPOLOGY:



Conclusion:- We have learnt to create BGP with three routers as shown above.

Practical No. 04

Aim: Configure DHCP server and client for DHCP service.

Steps to perform practical:

Step 1 : Add router, switch and end user clients to the switches.
Step 2 : Connect all the devices with straight through cable.
Step 3 : Give IP to each port of router

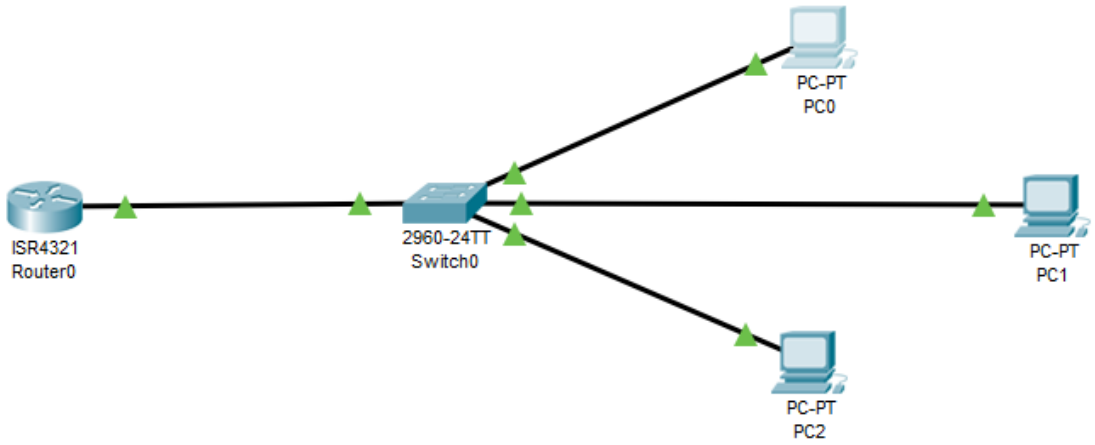
```
enable
configure terminal
interface gig0/0/0
ip address 192.168.10.1 255.255.255.0
no shutdown
exit
```

Step 4 : Apply DHCP to the router

```
configure terminal
ip dhcp pool pool_name
network 192.168.10.0 255.255.255.0
default-router 192.168.10.1
exit
ip dhcp excluded-address 192.168.10.2 192.168.10.10
exit
```

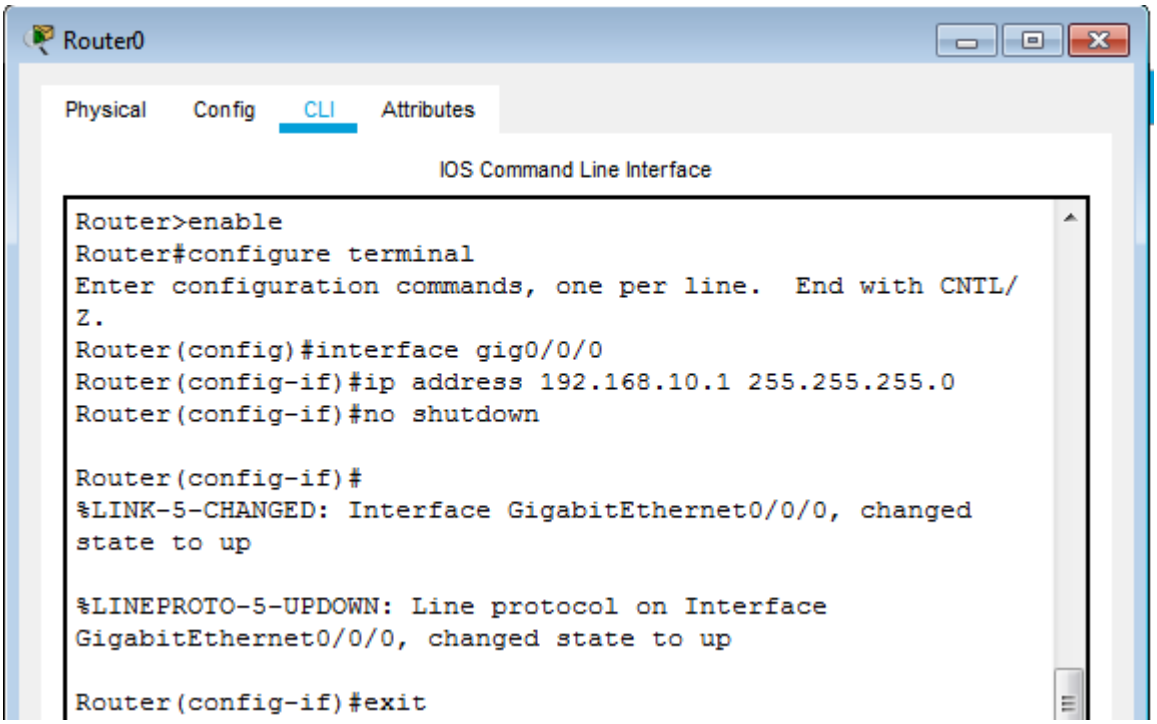
Step 5 : Show DHCP ip address to each end user clients.
System > Desktop tab > ip configuration > select dhcp.
DHCP automatically assign ip address to each client.

NETWORK TOPOLOGY:



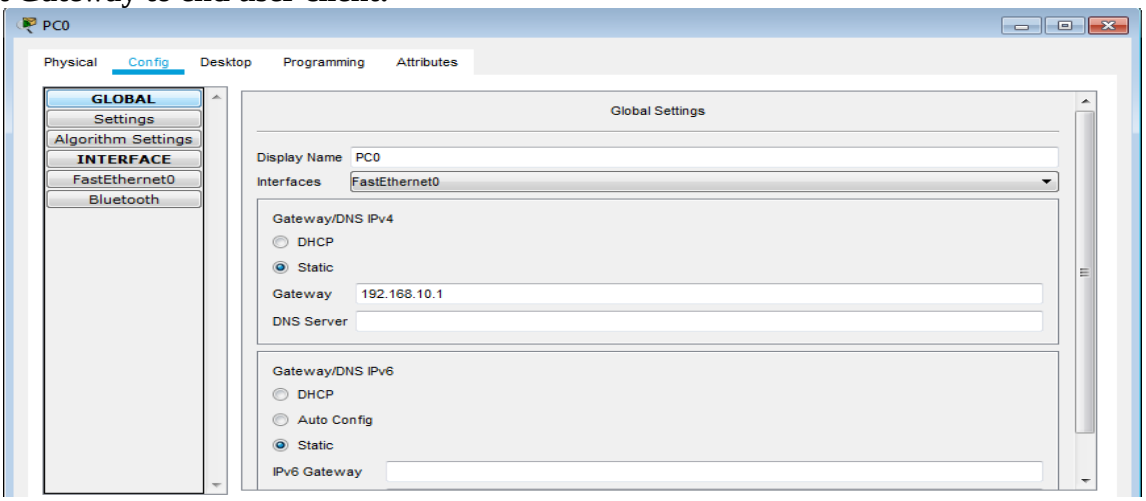
i)Router Configuration:-

Set IP addresses to routers :-



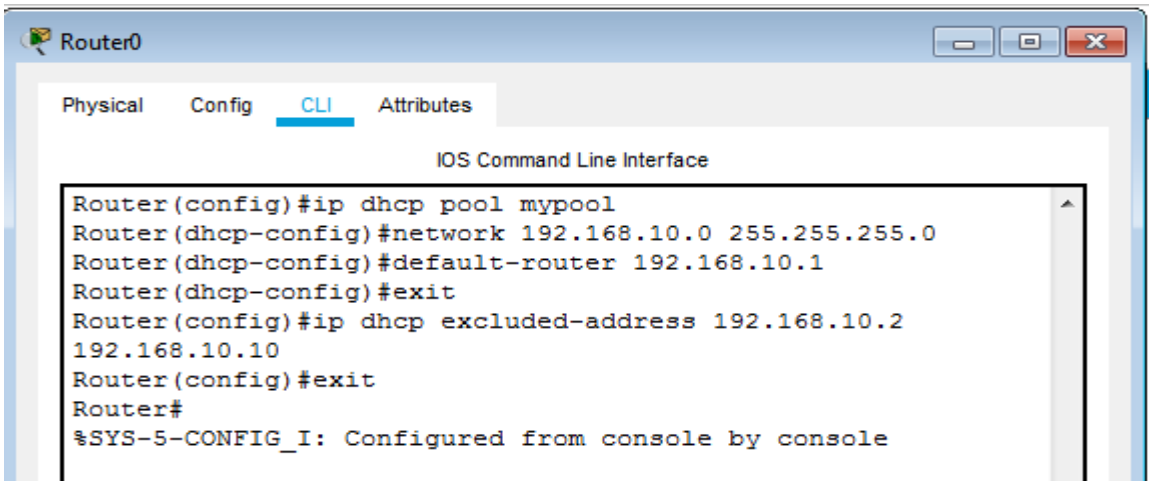
ii)End User Client Configuration :

a)Set Gateway to end user client:

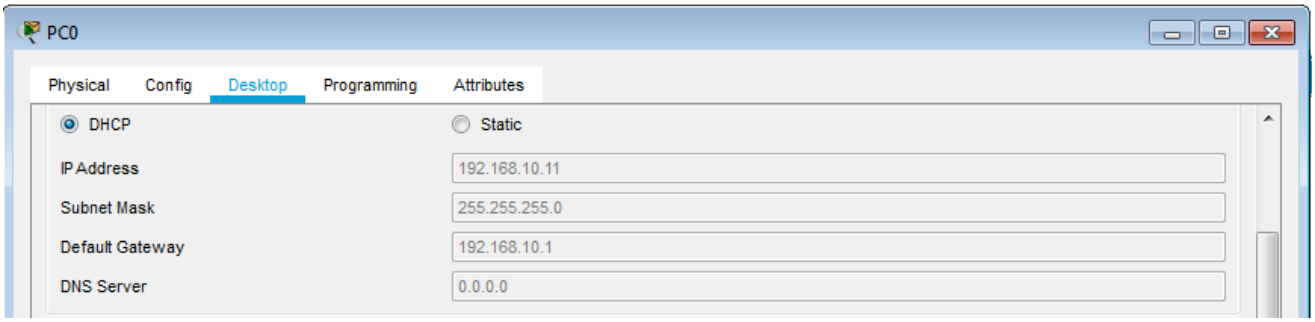


Set Gateways to all remaining end user client.

Set DHCP protocol to routers :

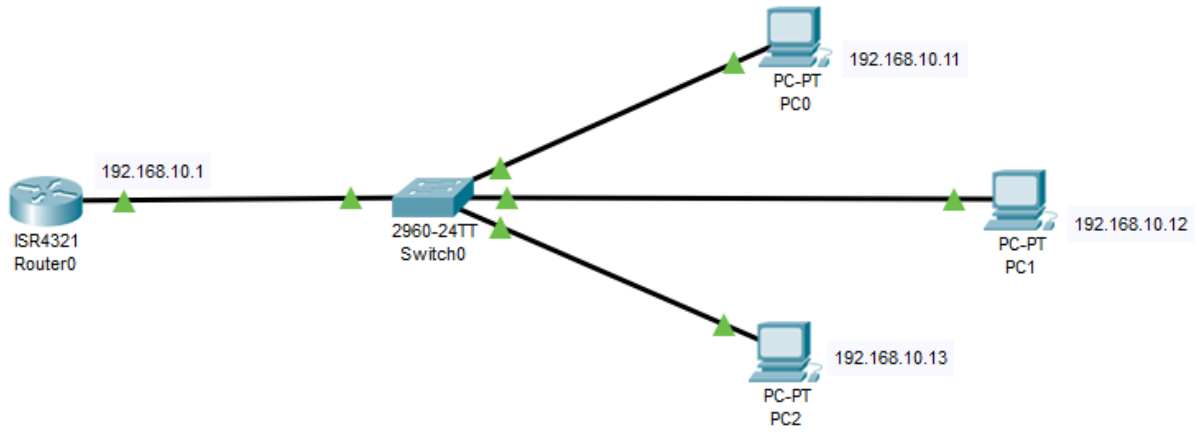


Show DHCP ip address to each end user clients.



Show DHCP ip address to all remaining end user clients as shown above.

FINAL TOPOLOGY:



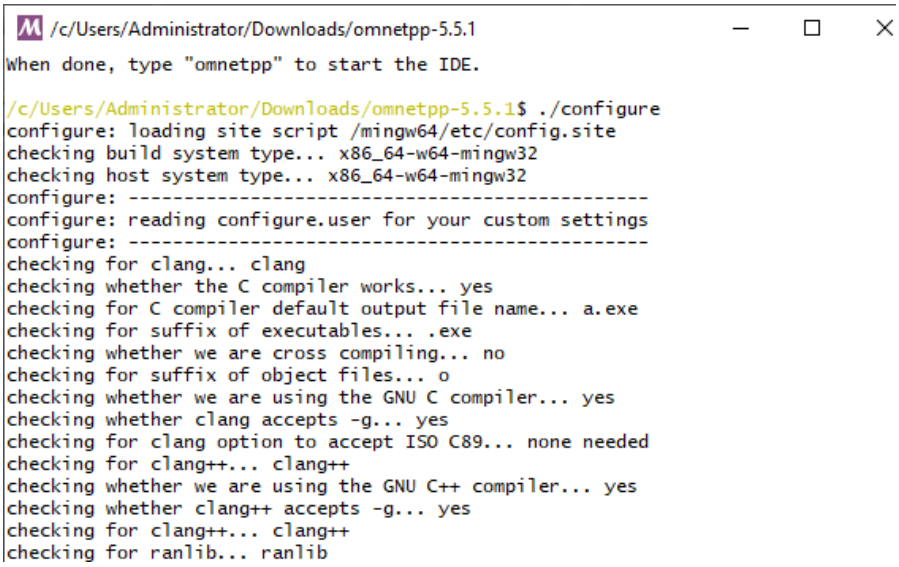
Conclusion:- We have learnt to create DHCP server with client service as shown above.

Practical No. 05

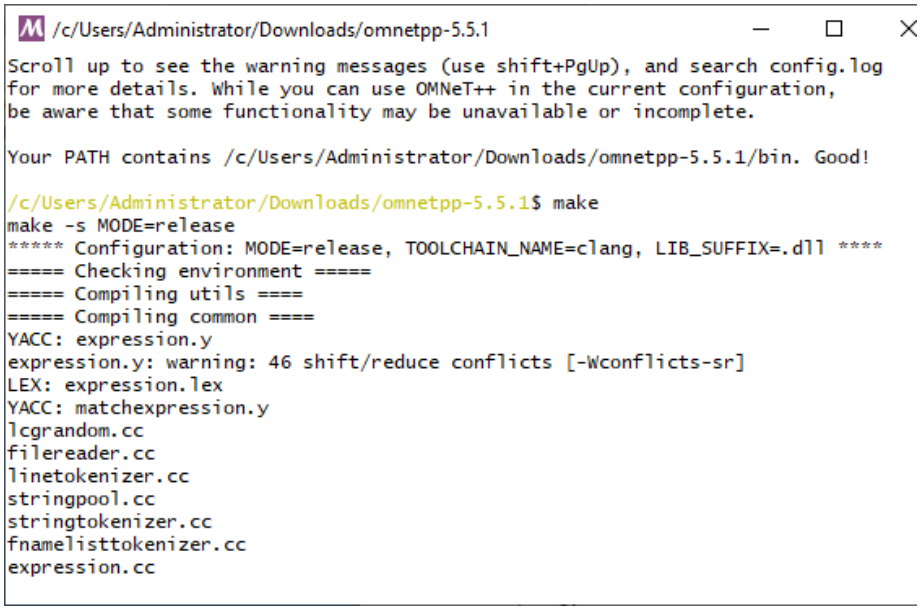
Aim: Create simple Adhoc network.

Installation Steps:

Step 1: Go to omnetpp-5.5.1 folder in which open "mingwenv" file, we get following window. Type "./configure" command.

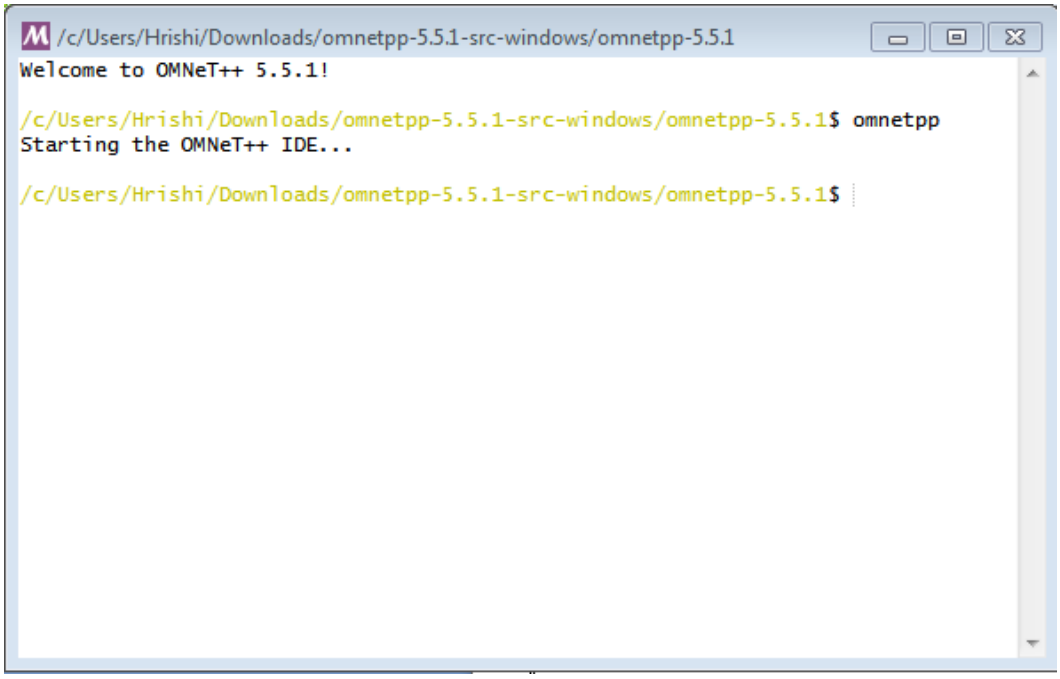


Step 2: After successfully run above command, type another command "make".

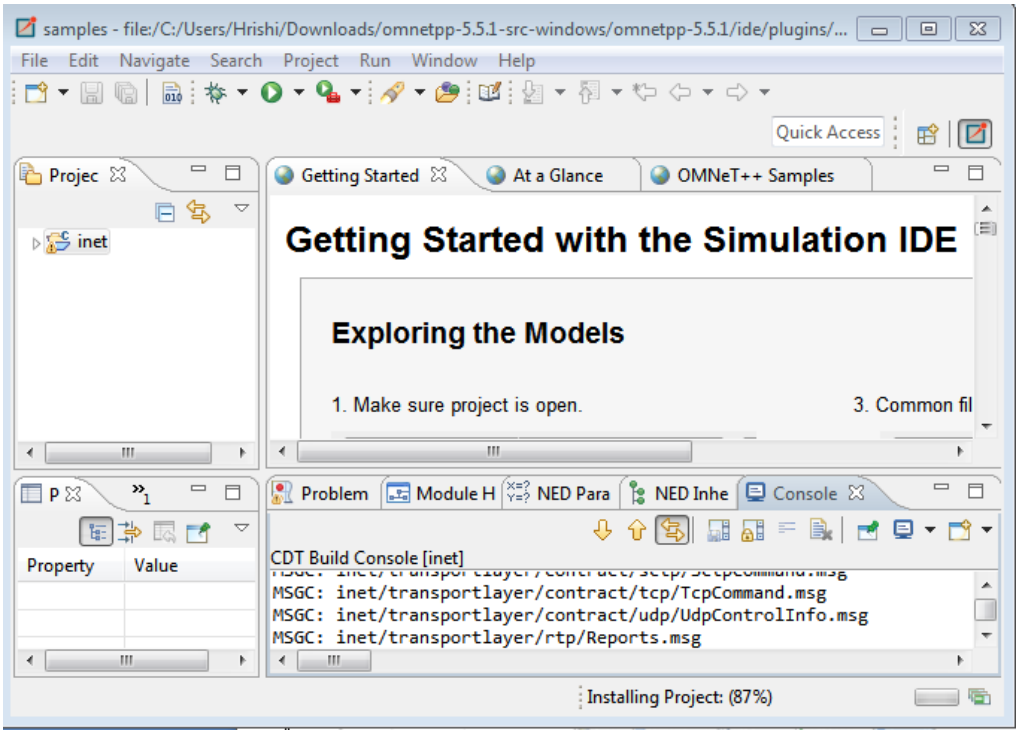


Practical Steps:

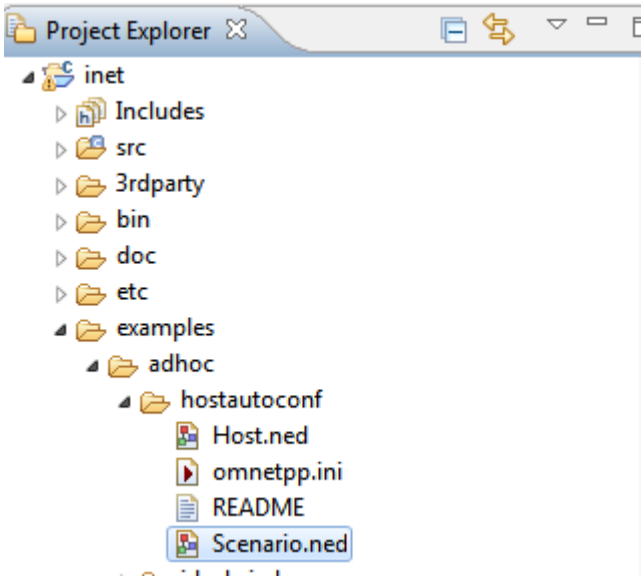
Step 1: Go to omnetpp-5.5.1 folder in which open “mingwenv” file, we get following window. Type “omnetpp” command to open omnet++ IDE.



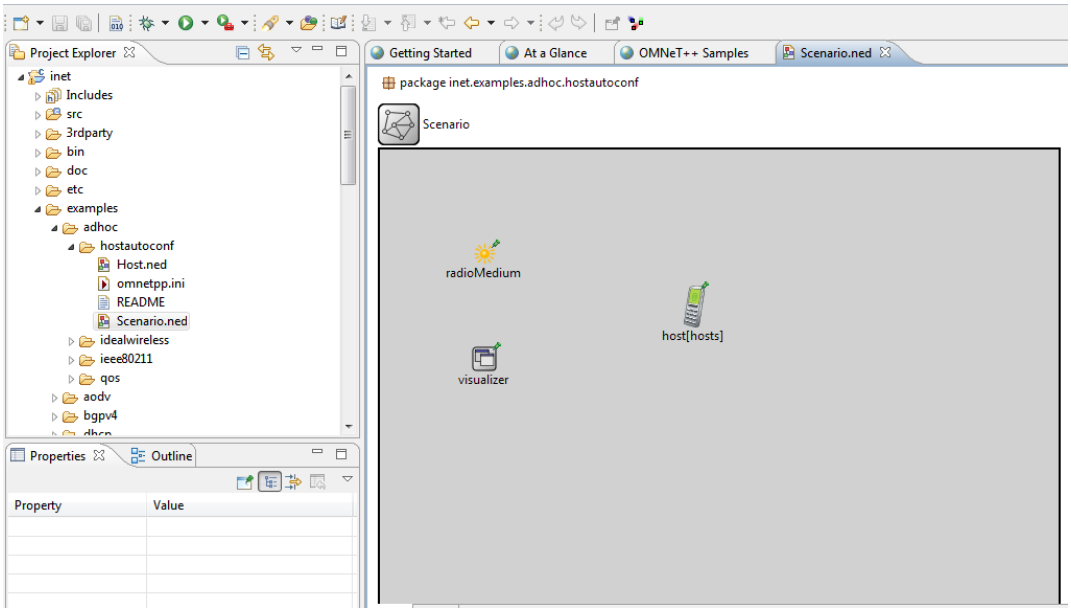
Step 2: after that command, following window will open.



Step 3: Go to project Explorer > inet > examples > Adhoc > Hostautoconf and open Scenario.ned file.



Scenario.ned:



Coding:

Scenario.ned:

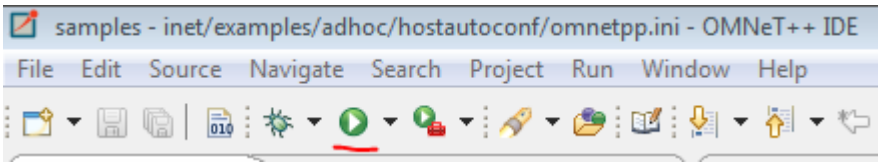
```
package inet.examples.adhoc.hostautoconf;
import inet.physicallayer.ieee80211.packetlevel.Ieee80211ScalarRadioMedium;
import inet.visualizer.contract.IIntegratedVisualizer;
network Scenario
{
    parameters:
        int hosts;
        @display("bgb=650,450");
    submodules:
        visualizer: <default("IntegratedCanvasVisualizer")> like IIntegratedVisualizer if
hasVisualizer() {
            parameters:
```

```
            @display("p=100,200;is=s");
        }
        radioMedium: Ieee80211ScalarRadioMedium {
            parameters:
            @display("p=100,100;is=s");
        }
        host[hosts]: Host {
            @display("p=300,150");
        }
}
```

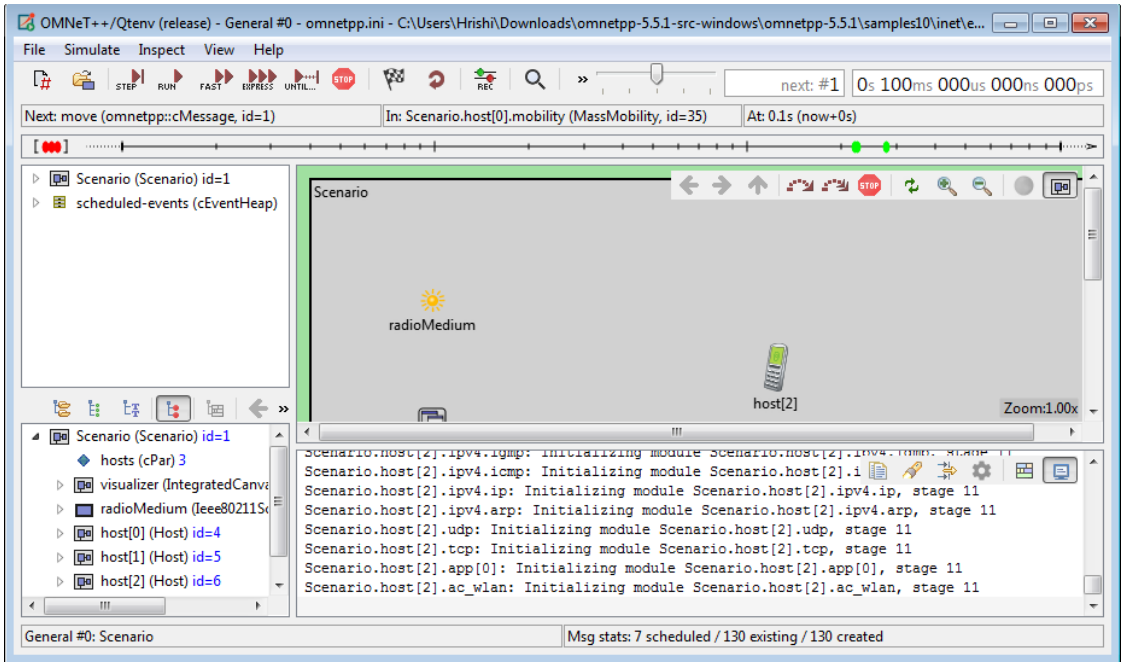
Omnetpp.ini:

```
[General]
#debug-on-errors = true
#record-eventlog = true
network = Scenario
sim-time-limit = 60min
cmdenv-express-mode = true
*.hosts = 3
**.constraintAreaMinX = 0m
**.constraintAreaMinY = 0m
**.constraintAreaMinZ = 0m
**.constraintAreaMaxX = 600m
**.constraintAreaMaxY = 400m
**.constraintAreaMaxZ = 0m
# mobility
**.host*.mobility.typename = "MassMobility"
**.host*.mobility.initFromDisplayString = false
**.host*.mobility.changeInterval = truncnormal(2s, 0.5s)
**.host*.mobility.angleDelta = normal(0deg, 30deg)
**.host*.mobility.speed = truncnormal(20mps, 8mps)
**.host*.mobility.updateInterval = 100ms
**.host*.ac_wlan.interfaces = "wlan0"
# UdpBasicApp / UdpSink
**.host*.numApps = 1
**.app[0].typename = "UdpBasicApp"
**.app[0].destAddresses = "host[0]"
**.app[0].localPort = 9001
**.app[0].destPort = 9001
**.app[0].messageLength = 100B
**.app[0].startTime = uniform(10s, 30s)
**.app[0].sendInterval = uniform(10s, 30s)
# nic settings
**.wlan[*].bitrate = 2Mbps
**.wlan[*].mgmt.frameCapacity = 10
**.wlan[*].mac.retryLimit = 7
**.wlan[*].mac.dcf.channelAccess.cwMin = 7
**.wlan[*].mac.cwMinBroadcast = 31
**.wlan[*].radio.transmitter.power = 2mW
**.wlan[*].radio.receiver.sensitivity = -85dBm
**.wlan[*].radio.receiver.snirThreshold = 4dB
**.udpapp.*.vector-recording = true
**.vector-recording = true
```

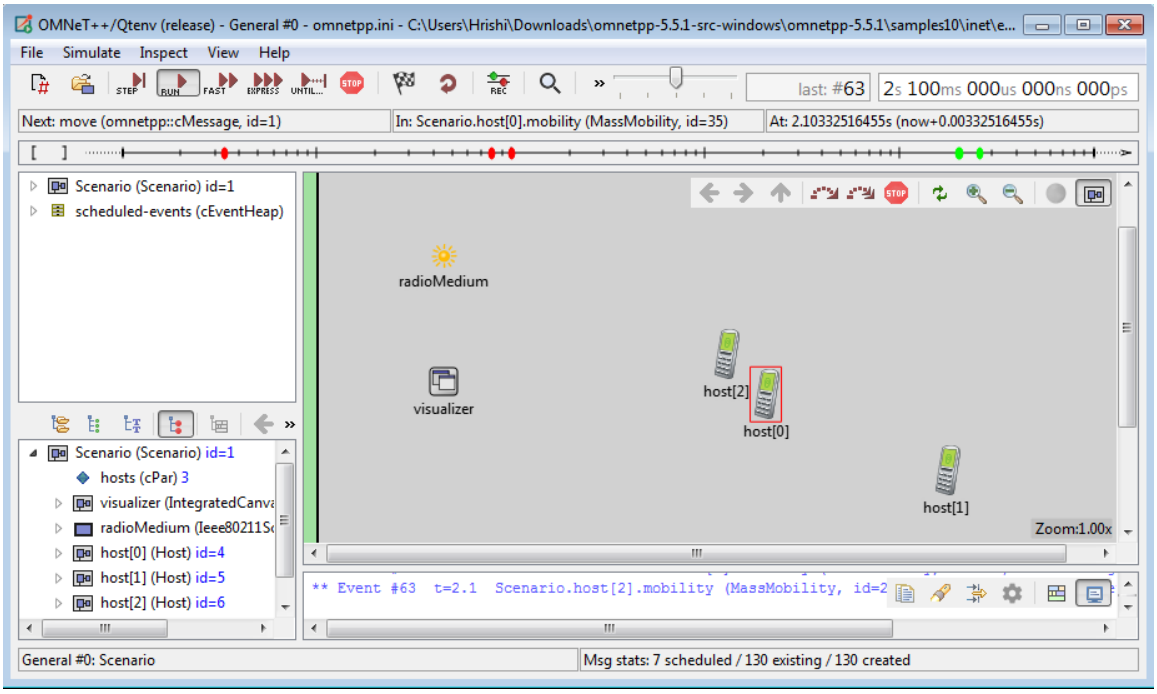
Step 4: Click on Run button.



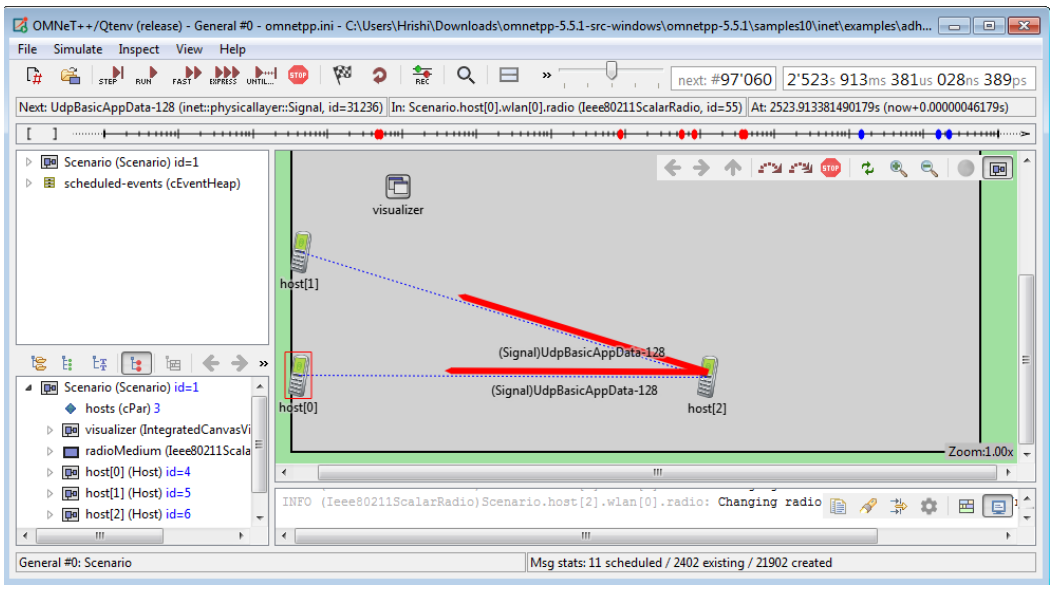
Step 5: After that following window will open.

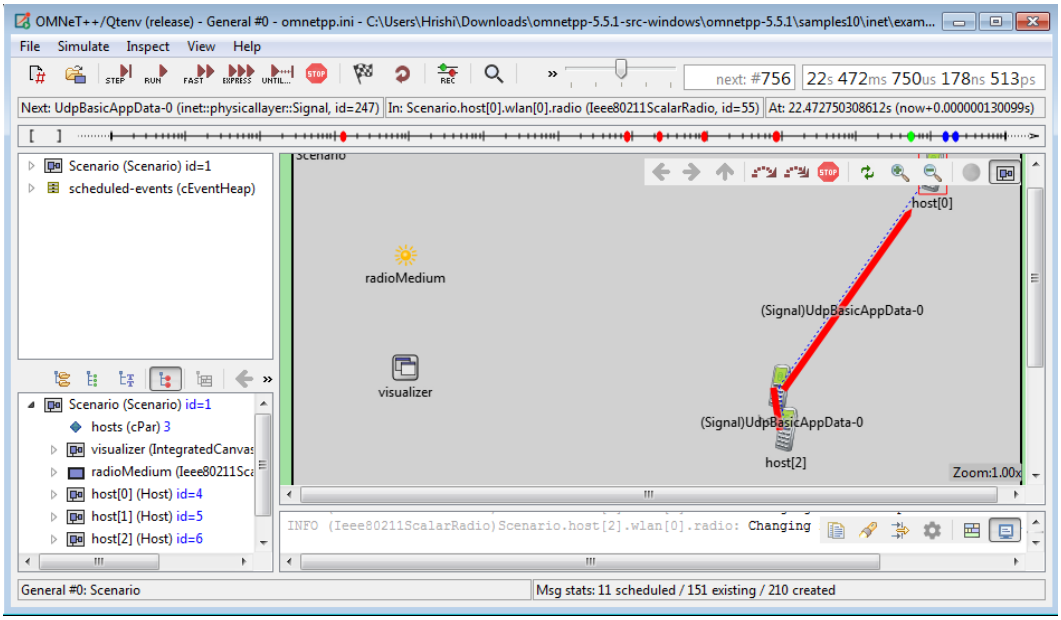


Step 6: Click on RUN.



OUTPUT:



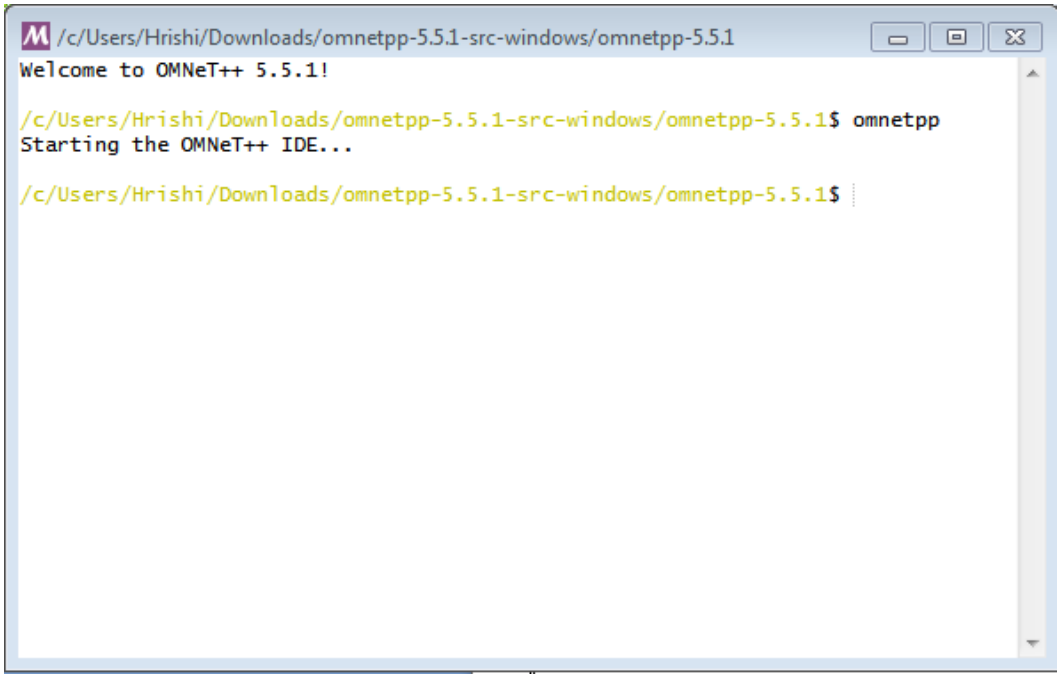


Conclusion: We have learnt to create a simple ADHOC network.

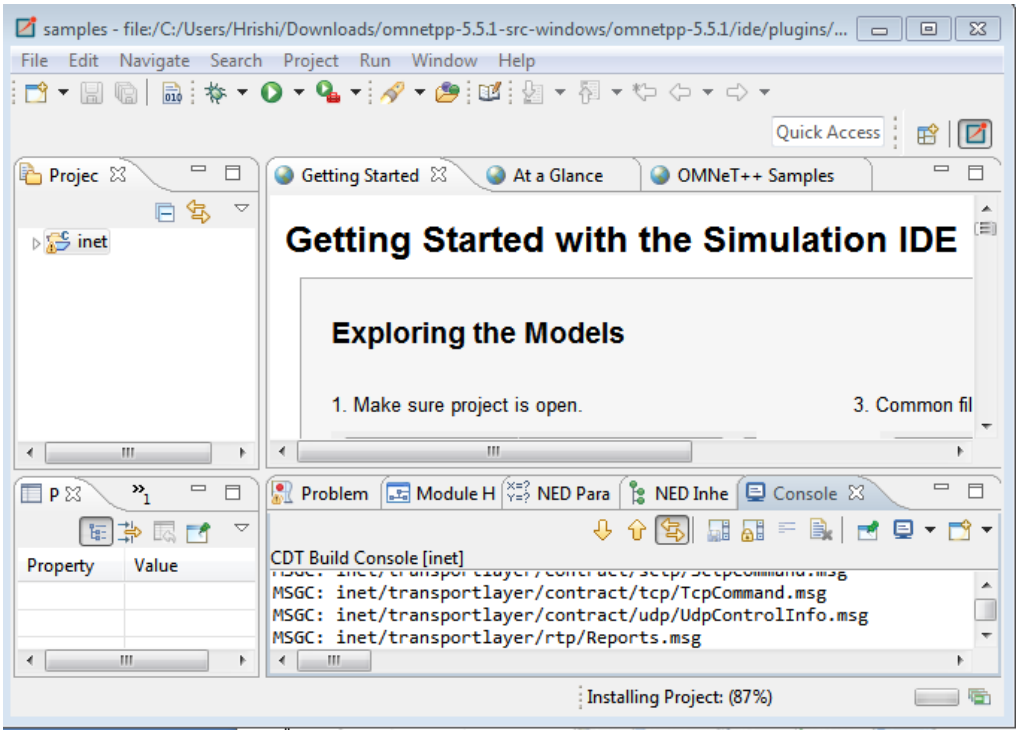
Practical No. 06

Aim: Create MANET simulation for AODVUU Network.

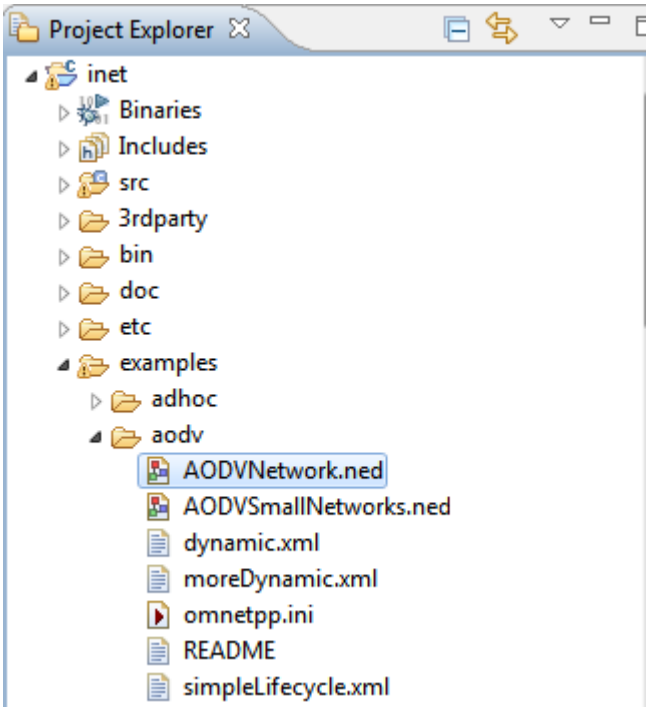
Step 1: Go to omnetpp-5.5.1 folder in which open "mingwenv" file, we get following window. Type "omnetpp" command to open omnet++ IDE.



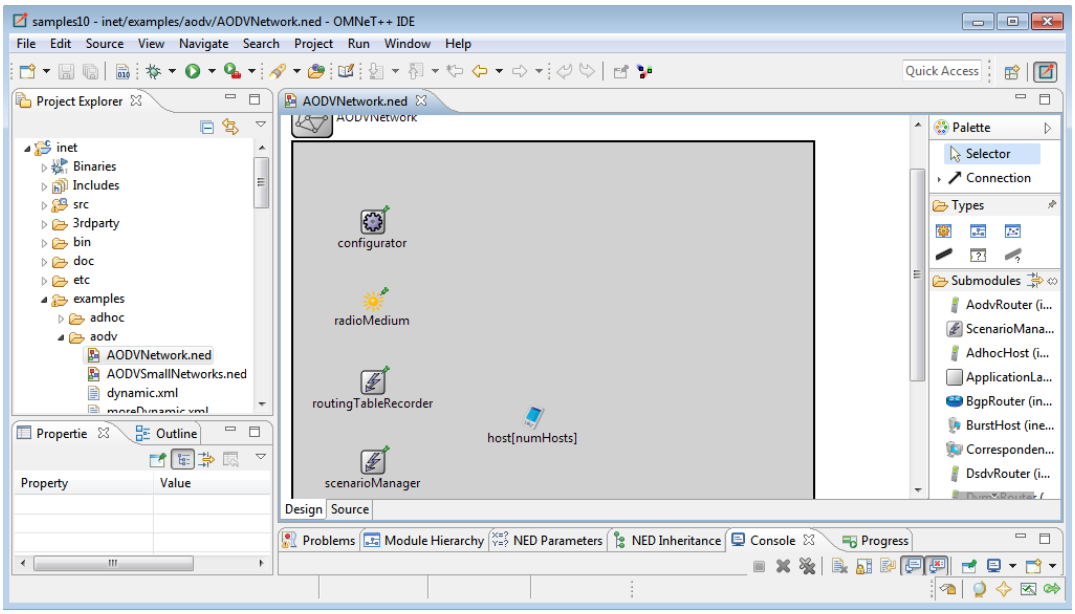
Step 2: after that command, following window will open.



Step 3: Go to project Explorer > inet > examples > aodv and open AODVNetwork.ned file.



AODVNetwork.ned:



Coding:

AODVNetwork.ned:

```
package inet.examples.aodv;
import inet.common.scenario.ScenarioManager;
import inet.networklayer.configurator.ipv4.Ipv4NetworkConfigurator;
import inet.networklayer.ipv4.RoutingTableRecorder;
import inet.node.aodv.AodvRouter;
import inet.physicallayer.unitdisk.UnitDiskRadioMedium;

network AODVNetwork
{
    parameters:
```

```
        int numHosts;
        @display("bgb=650,650");
    submodules:
        radioMedium: UnitDiskRadioMedium {
            parameters:
                @display("p=100,200;is=s");
        }
        configurator: Ipv4NetworkConfigurator {
            parameters:
                config = xml("<config><interface hosts='*' address='145.236.x.x'
netmask='255.255.0.0'/></config>");
                @display("p=100,100;is=s");
        }
        routingTableRecorder: RoutingTableRecorder {
            parameters:
                @display("p=100,300;is=s");
        }
        scenarioManager: ScenarioManager {
            parameters:
                script = default(xml("<scenario/>"));
                @display("p=100,400;is=s");
        }
        host[numHosts]: AodvRouter {
            parameters:
                @display("i=device/pocketpc_s;r=,,#707070");
        }
    connections allowunconnected:
}
```

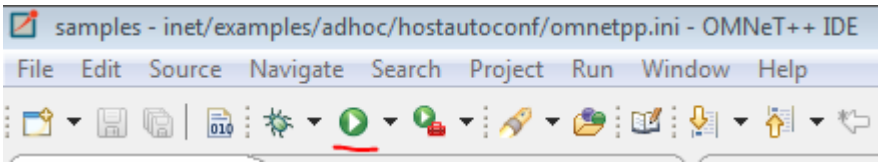
Omnetpp.ini:

```
[General]
network = AODVNetwork
#record-eventlog = true
num-rngs = 3
debug-on-errors = true
**.mobility.rng-0 = 1
**.wlan[*].mac.rng-0 = 2
# channel physical parameters
**.wlan[*].typename = "AckingWirelessInterface"
**.wlan[*].bitrate = 2Mbps
**.wlan[*].mac.headerLength = 20B
**.wlan[*].radio.typename = "UnitDiskRadio"
**.wlan[*].radio.transmitter.headerLength = 96b
**.wlan[*].radio.transmitter.communicationRange = 250m
**.wlan[*].radio.transmitter.interferenceRange = 0m
**.wlan[*].radio.transmitter.detectionRange = 0m
**.wlan[*].radio.receiver.ignoreInterference = true
*.numHosts = 20
# mobility
**.host[*].mobility.typename = "StationaryMobility"
**.mobility.constraintAreaMinZ = 0m
**.mobility.constraintAreaMaxZ = 0m
**.mobility.constraintAreaMinX = 0m
```

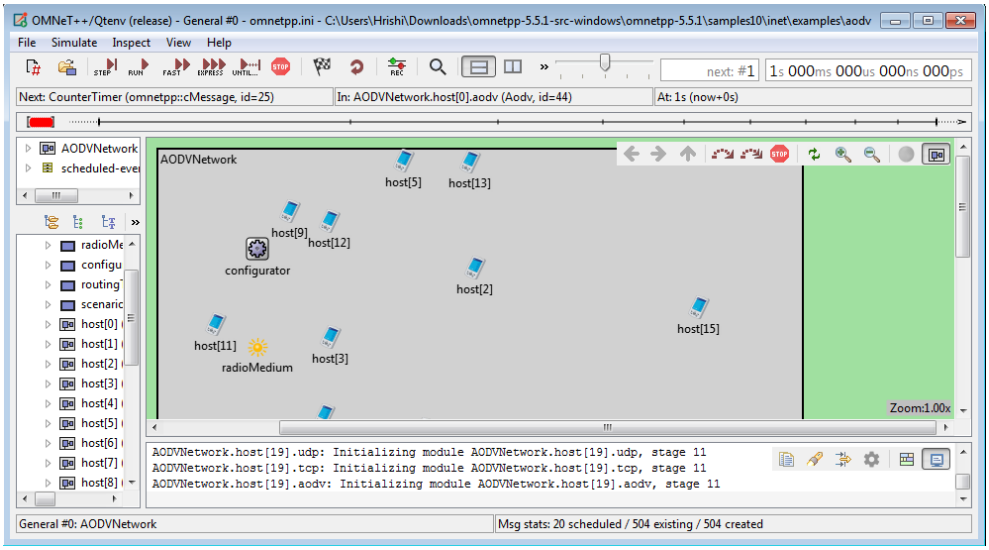
```
**.mobility.constraintAreaMinY = 0m
**.mobility.constraintAreaMaxX = 600m
**.mobility.constraintAreaMaxY = 600m
# ping app (host[0] pinged by others)
*.host[0].numApps = 1
*.host[0].app[0].typename = "PingApp"
*.host[0].app[0].startTime = uniform(1s,5s)
*.host[0].app[0].printPing = true
# nic settings
**.wlan[*].bitrate = 2Mbps
**.wlan[*].mgmt.frameCapacity = 10
**.wlan[*].mac.retryLimit = 7
# lifecycle
**.hasStatus = true
[Config Static]
description = routing without mobility
*.host[*].wlan[*].radio.transmitter.communicationRange = 250m
*.host[0].app[0].destAddr = "host[1](ipv4)"
[Config IPv4SlowMobility]
description = two fixed communicating nodes with low speed mobile nodes
extends = Static
# mobility
**.aodv.activeRouteTimeout = 3s
**.host[2..20].mobility.typename = "MassMobility"
**.host[0].mobility.typename = "StationaryMobility"
**.host[1].mobility.typename = "StationaryMobility"
**.host[*].mobility.changeInterval = normal(5s, 0.1s)
**.host[*].mobility.angleDelta = normal(0deg, 30deg)
**.host[*].mobility.speed = normal(2mps, 0.01mps)
**.host[1].mobility.initialX = 600m
**.host[1].mobility.initialY = 600m
[Config IPv4ModerateFastMobility]
description = two fixed communicating nodes with moderate speed mobile nodes
extends = IPv4SlowMobility
# mobility
**.aodv.activeRouteTimeout = 2s
**.host[*].mobility.speed = normal(8mps, 0.01mps)
[Config IPv4FastMobility]
description = two fixed communicating nodes with high speed mobile nodes
extends = IPv4SlowMobility
# mobility
**.aodv.activeRouteTimeout = 1s
**.host[*].mobility.speed = normal(15mps, 0.01mps)
[Config Dynamic]
description = one node is shut down and restarted trigger route changes
extends = Static
*.host[*].hasStatus = true
*.scenarioManager.script = xmldoc("dynamic.xml")
[Config MoreDynamic]
description = some nodes are shut down trigger route changes
extends = Static
*.host[*].hasStatus = true
*.scenarioManager.script = xmldoc("moreDynamic.xml")
[Config SimpleRREQ]
```

```
description = demonstrates a single RREQ-RREP exchange
network = SimpleRREQ
# nic settings
**.wlan[*].radio.transmitter.communicationRange = 240m
**.sender.numApps = 1
**.sender.app[0].typename = "PingApp"
**.sender.app[0].startTime = uniform(1s,5s)
**.sender.app[0].printPing = true
**.sender.app[0].destAddr = "receiver(ipv4)"
[Config SimpleRREQ2]
description = demonstrates a single RREQ-RREP exchange with two intermediate nodes
extends = SimpleRREQ
network = SimpleRREQ2
[Config SimpleLifecycle]
description = demonstrates AODV's RERR mechanism when a node shuts down
extends = SimpleRREQ2
*.scenarioManager.script = xmldoc("simpleLifecycle.xml")
[Config ShortestPath]
description = demonstrates that AODV chooses the shorter path
network = ShortestPath
extends = SimpleRREQ
```

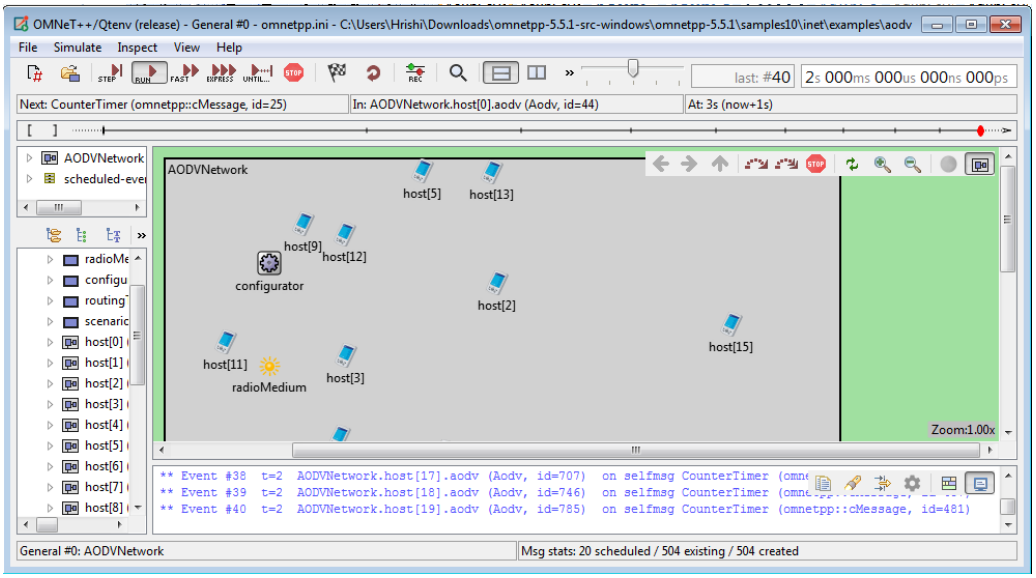
Step 4: Click on Run button.



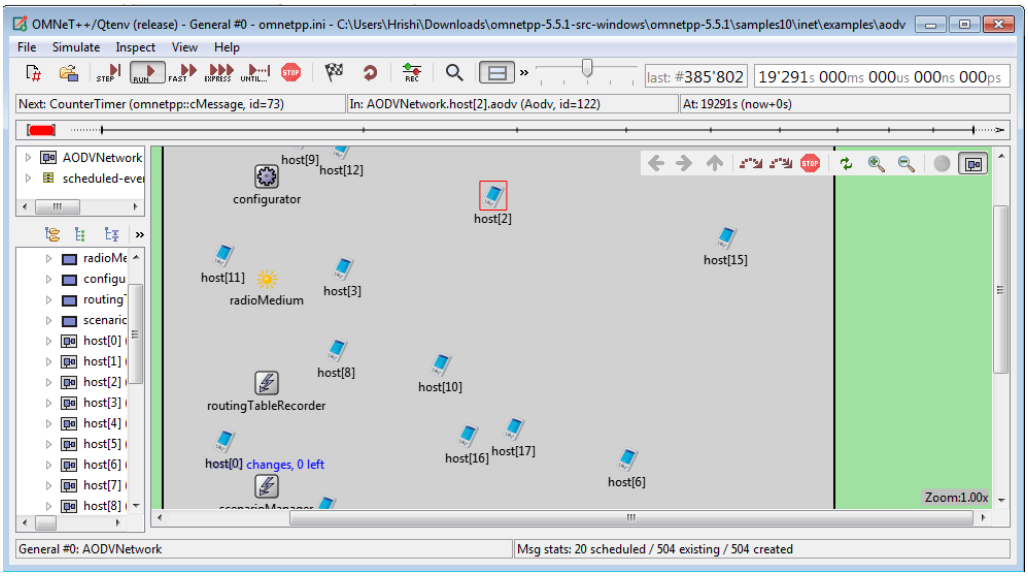
Step 5: After that following window will open.



Step 6: Click on RUN.



OUTPUT:

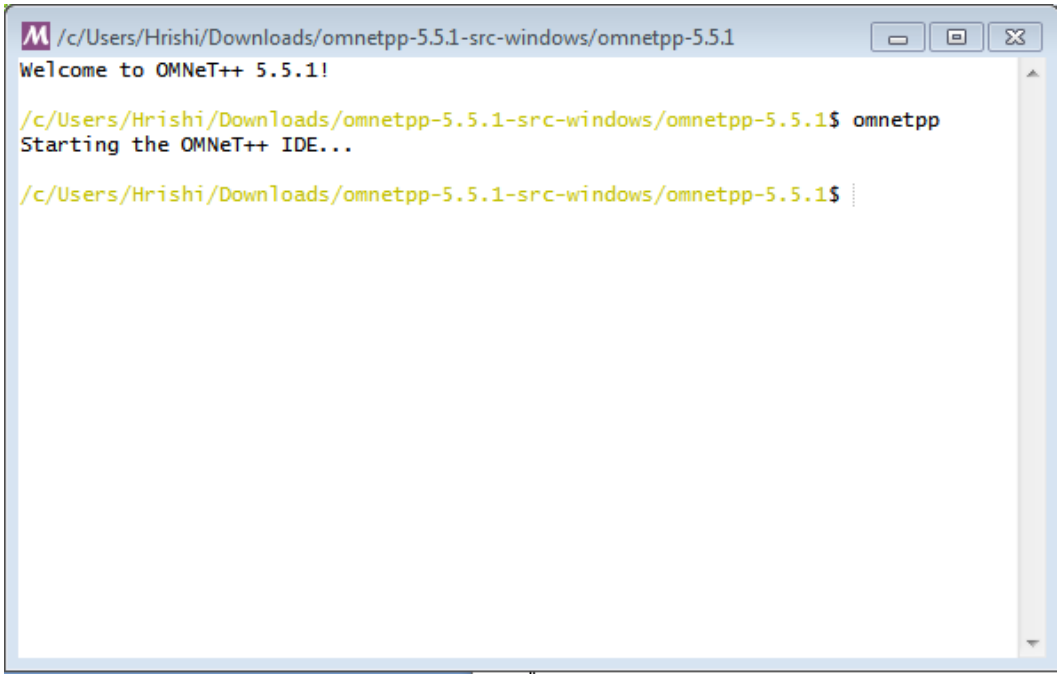


Conclusion: We have learnt to MANET simulation for AODVUU Network.

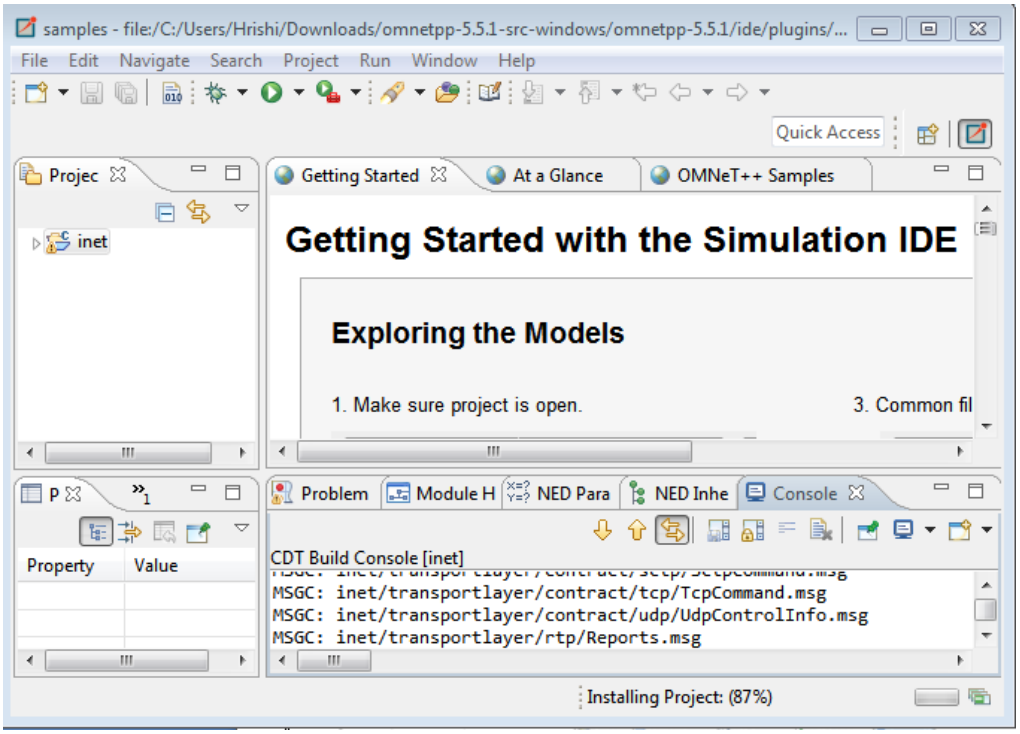
Practical No. 07

Aim: Create Single mobile network.

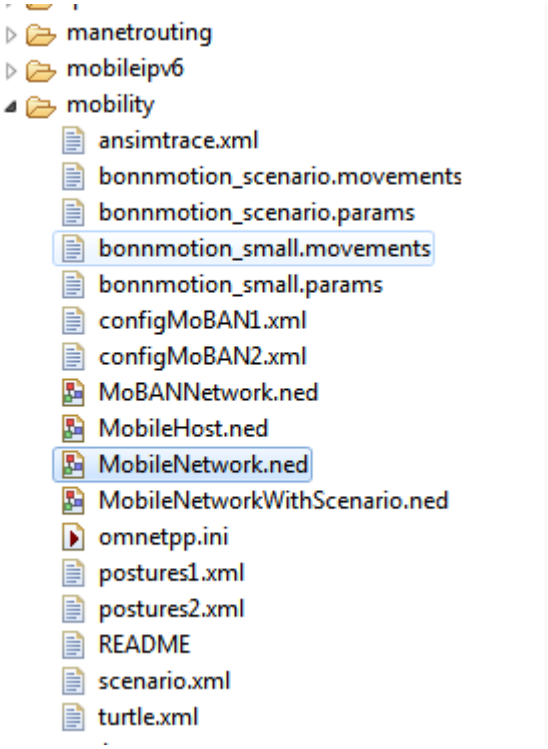
Step 1: Go to omnetpp-5.5.1 folder in which open "mingwenv" file, we get following window. Type "omnetpp" command to open omnet++ IDE.



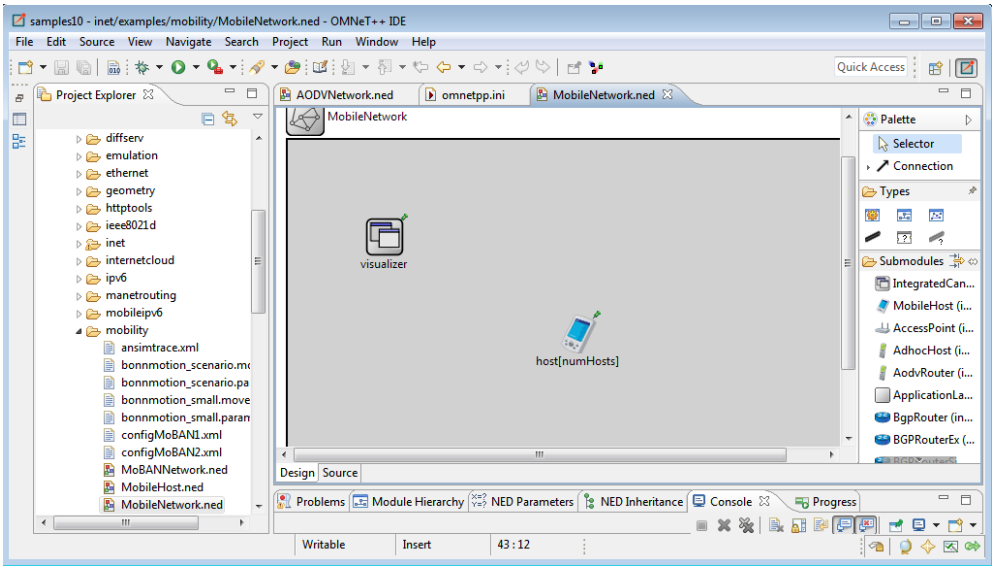
Step 2: after that command, following window will open.



Step 3: Go to project Explorer > inet > examples > mobility and open MobileNetwork.ned file.



MobileNetwork.ned:



Coding:

MobileNetwork.ned:

```
package inet.examples.mobility;
import inet.visualizer.integrated.IntegratedCanvasVisualizer;
network MobileNetwork{
   parameters:
      int numHosts;
      bool hasVisualizer = default(false);
      @display("bgb=600,400");
   submodules:
```

```
    visualizer: IntegratedCanvasVisualizer if hasVisualizer {
        parameters:
            @display("p=100,100");
    }
    host[numHosts]: MobileHost {
        parameters:
            @display("p=300,200;r=,,#707070");
    }
}
```

Omnetpp.ini:

```
[General]
#scheduler-class = "inet::cRealTimeScheduler" #so that speed appears realistic
#debug-on-errors = true
sim-time-limit = 10day
*.numHosts = 2
**.constraintAreaMinX = 0m
**.constraintAreaMinY = 0m
**.constraintAreaMinZ = 0m
**.constraintAreaMaxX = 600m
**.constraintAreaMaxY = 400m
**.constraintAreaMaxZ = 0m
**.updateInterval = 0.1s # test with 0s too, and let getCurrentPosition update the display string
from a test module
**.mobility.initFromDisplayString = false
[Config AnsimMobility]
network = MobileNetwork
**.host*.mobility.typename = "AnsimMobility"
**.host*.mobility.ansimTrace = xmldoc("ansimtrace.xml")
**.host*.mobility.nodeId = -1  #means "host module's index"
[Config BonnMotionMobility1]
network = MobileNetwork
description = "2 hosts"
**.host*.mobility.typename = "BonnMotionMobility"
**.host*.mobility.traceFile = "bonnmotion_small.movements"
**.host*.mobility.nodeId = -1  #means "host module's index"
[Config BonnMotionMobility2]
network = MobileNetwork
description = "100 hosts"
*.numHosts = 100
**.host*.mobility.typename = "BonnMotionMobility"
**.host*.mobility.traceFile = "bonnmotion_scenario.movements"
**.host*.mobility.nodeId = -1  #means "host module's index"
[Config ChiangMobility]
network = MobileNetwork
*.numHosts = 1
**.host*.mobility.typename = "ChiangMobility"
**.host*.mobility.stateTransitionUpdateInterval = 3s
**.host*.mobility.speed = 10mps
[Config CircleMobility1]
network = MobileNetwork
*.numHosts = 3
**.host*.mobility.typename = "CircleMobility"
```

```
**.host*.mobility.cx = 200m
**.host*.mobility.cy = 200m
**.host*.mobility.r = 150m
**.host*.mobility.speed = 40mps
**.host[0].mobility.startAngle = 0deg
**.host[1].mobility.startAngle = 120deg
**.host[2].mobility.startAngle = 240deg
[Config CircleMobility2]
network = MobileNetwork
*.numHosts = 3
**.host*.mobility.typename = "CircleMobility"
**.host[0].mobility.cx = 100m
**.host[1].mobility.cx = 300m
**.host[2].mobility.cx = 500m
**.host*.mobility.cy = 200m
**.host*.mobility.r = 150m
**.host*.mobility.speed = 40mps
**.host*.mobility.startAngle = 0deg
[Config GaussMarkovMobility]
network = MobileNetwork
*.numHosts = 1
**.host*.mobility.typename = "GaussMarkovMobility"
**.host*.mobility.alpha = 0.9
**.host*.mobility.speed = 10mps
**.host*.mobility.angle = 0deg
**.host*.mobility.variance = 40
**.host*.mobility.margin = 30m
[Config LinearMobility]
network = MobileNetwork
**.host*.mobility.typename = "LinearMobility"
**.host*.mobility.initFromDisplayString = false
**.host*.mobility.speed = 50mps
**.host*.mobility.angle = 30deg  # degrees
[Config LinearMobility01]
extends = LinearMobility
**.updateInterval = 0.1s
[Config LinearMobility1]
extends = LinearMobility
**.updateInterval = 1s
[Config LinearMobility10]
extends = LinearMobility
**.updateInterval = 10s
[Config LinearMobility100]
extends = LinearMobility
**.updateInterval = 100s
[Config LinearMobility1000]
extends = LinearMobility
**.updateInterval = 1000s
[Config MassMobility]
network = MobileNetwork
*.numHosts = 5
**.host*.mobility.typename = "MassMobility"
**.host*.mobility.initFromDisplayString = false
**.host*.mobility.changeInterval = truncnormal(2s, 0.5s)
```

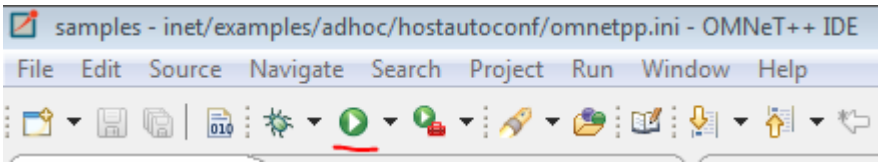
```
**.host*.mobility.angleDelta = normal(0deg, 30deg)
**.host*.mobility.speed = truncnormal(15mps, 5mps)
[Config MassMobilityWithScenario]
network = MobileNetworkWithScenario
*.numHosts = 5
**.host*.mobility.typename = "MassMobility"
**.host*.mobility.initFromDisplayString = false
**.host*.mobility.changeInterval = truncnormal(2s, 0.5s)
**.host*.mobility.angleDelta = normal(0deg, 30deg)
**.host*.mobility.speed = truncnormal(15mps, 5mps)
**.scenarioManager.script = xmldoc("scenario.xml")
[Config MoBANMobility1]
network = MoBANNetwork
**.constraintAreaMaxX = 1000m
**.constraintAreaMaxY = 1000m
**.constraintAreaMaxZ = 1000m
**.numNodes = 12
**.numMoBAN = 1
**.coordinator[*].postureSpecFile = xmldoc("postures1.xml")
**.coordinator[*].configFile = xmldoc("configMoBAN1.xml")
**.coordinator[*].useMobilityPattern = false
**.coordinator[0].mobilityPatternFile = "MoBAN_Pattern_in0.txt"
**.node[*].mobility.typename = "MoBanLocal"
**.node[*].mobility.coordinatorIndex = 0
[Config MoBANMobility2]
network = MoBANNetwork
**.constraintAreaMaxX = 1000m
**.constraintAreaMaxY = 1000m
**.constraintAreaMaxZ = 1000m
**.numNodes = 24
**.numMoBAN = 2
**.coordinator[*].postureSpecFile = xmldoc("postures1.xml")
**.coordinator[*].configFile = xmldoc("configMoBAN2.xml")
**.coordinator[*].useMobilityPattern = false
**.coordinator[*].mobilityPatternFile = ""
**.node[*].mobility.typename = "MoBanLocal"
**.node[0..11].mobility.coordinatorIndex = 0
**.node[12..23].mobility.coordinatorIndex = 1
[Config RandomWaypointMobility1]
description = "zero waitTime"
network = MobileNetwork
*.numHosts = 5
**.host*.mobility.typename = "RandomWaypointMobility"
**.host*.mobility.initFromDisplayString = false
**.host[0].mobility.speed = 10*uniform(20mps,50mps)
**.host*.mobility.speed = uniform(20mps,50mps)
[Config RandomWaypointMobility2]
description = "nonzero waitTime"
extends = RandomWaypointMobility1
**.host*.mobility.waitTime = uniform(3s,8s)
[Config RectangleMobility]
network = MobileNetwork
**.host*.mobility.typename = "RectangleMobility"
**.host*.mobility.constraintAreaMinX = 100m
```

```
**.host*.mobility.constraintAreaMinY = 100m
**.host*.mobility.constraintAreaMaxX = 500m
**.host*.mobility.constraintAreaMaxY = 300m
#**.host*.mobility.x1 = 100
#**.host*.mobility.y1 = 100
#**.host*.mobility.x2 = 500
#**.host*.mobility.y2 = 300
**.host[0].mobility.startPos = 0
**.host[1].mobility.startPos = 2.5
**.host[0].mobility.speed = 20mps
**.host[1].mobility.speed = -10mps
[Config StaticGridMobility]
network = MobileNetwork
*.numHosts = 20
**.host*.mobility.typename = "StaticGridMobility"
**.host*.mobility.marginX = 100m
**.host*.mobility.marginY = 100m
**.host*.mobility.numHosts = 20
[Config StationaryMobility]
network = MobileNetwork
*.numHosts = 3
**.host*.mobility.typename = "StationaryMobility"
# place it at a fixed position:
**.host[0].mobility.initialX = 50m
**.host[0].mobility.initialY = 200m
**.host[0].mobility.initFromDisplayString = false
# the second node is using the display string position (or placed randomly if position is not
present in display string)
**.host[1].mobility.initFromDisplayString = true
# place it at a random position:
**.host[2].mobility.initFromDisplayString = false
[Config TractorMobility]
network = MobileNetwork
*.numHosts = 1
**.host*.mobility.typename = "TractorMobility"
**.host*.mobility.x1 = 100m
**.host*.mobility.y1 = 100m
**.host*.mobility.x2 = 500m
**.host*.mobility.y2 = 300m
**.host*.mobility.rowCount = 4
**.host*.mobility.speed = 50mps
[Config TurtleMobility1]
network = MobileNetwork
description = "square"
*.numHosts = 1
**.host*.mobility.typename = "TurtleMobility"
**.host*.mobility.turtleScript = xmldoc("turtle.xml", "movements//movement[@id='1']")
[Config TurtleMobility2]
network = MobileNetwork
description = "two squares"
*.numHosts = 1
**.host*.mobility.typename = "TurtleMobility"
**.host*.mobility.turtleScript = xmldoc("turtle.xml", "movements//movement[@id='2']")
[Config TurtleMobility3]
```

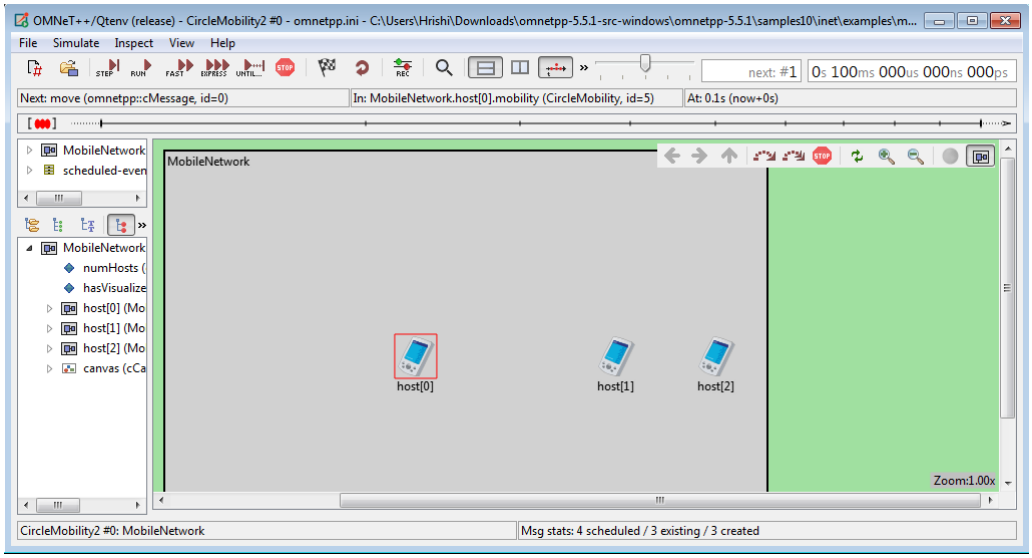
```
network = MobileNetwork
description = "random waypoint"
*.numHosts = 2
**.host*.mobility.typename = "TurtleMobility"
**.host*.mobility.turtleScript = xmldoc("turtle.xml", "movements//movement[@id='3']")
[Config TurtleMobility4]
network = MobileNetwork
description = "mass+reflect"
*.numHosts = 2
**.host*.mobility.typename = "TurtleMobility"
**.host*.mobility.turtleScript = xmldoc("turtle.xml", "movements//movement[@id='4']")
[Config TurtleMobility5]
network = MobileNetwork
description = "mass+wrap"
*.numHosts = 2
**.host*.mobility.typename = "TurtleMobility"
**.host*.mobility.turtleScript = xmldoc("turtle.xml", "movements//movement[@id='5']")
[Config TurtleMobility6]
network = MobileNetwork
description = "mass+placerandomly"
*.numHosts = 2
**.host*.mobility.typename = "TurtleMobility"
**.host*.mobility.turtleScript = xmldoc("turtle.xml", "movements//movement[@id='6']")
[Config AttachedMobility]
network = MobileNetwork
description = "attached"
*.numHosts = 3
# mobility visualizer shows velocity and orientation
*.hasVisualizer = true
*.visualizer.mobilityVisualizer.moduleFilter = "**.mobility" # filter for host mobilities, ignore
mobility superposition elements
*.visualizer.mobilityVisualizer.displayMovementTrails = true
*.visualizer.mobilityVisualizer.displayOrientations = true
*.visualizer.mobilityVisualizer.displayVelocities = true
# other hosts are also moving around in a larger circle following host[0]
**.host[0].mobility.typename = "CircleMobility"
**.host[0].mobility.cx = 300m
**.host[0].mobility.cy = 200m
**.host[0].mobility.r = 150m
**.host[0].mobility.speed = 40mps
# other hosts are also moving around in a larger circle following host[0]
**.host[*].mobility.typename = "AttachedMobility"
**.host[*].mobility.mobilityModule = "^.^.host[0].mobility"
**.host[1].mobility.offsetX = 50m
**.host[1].mobility.offsetHeading = 90deg
**.host[2].mobility.offsetX = -50m
**.host[2].mobility.offsetHeading = -90deg
[Config SuperpositioningMobility]
network = MobileNetwork
description = "superpositioning"
*.numHosts = 8
# mobility visualizer shows velocity and orientation
*.hasVisualizer = true
```

```
*.visualizer.mobilityVisualizer.moduleFilter = "**.mobility" # filter for host mobilities, ignore mobility superposition elements
*.visualizer.mobilityVisualizer.displayMovementTrails = true
*.visualizer.mobilityVisualizer.displayOrientations = true
*.visualizer.mobilityVisualizer.displayVelocities = true
# last host stays in the center of the scene
**.host[7].mobility.typename = "StationaryMobility"
**.host[7].mobility.initialX = 300m
**.host[7].mobility.initialY = 200m
**.host[7].mobility.initialZ = 0m
# other hosts move around the scene using mobility superpositon
**.host[*].mobility.typename = "SuperpositioningMobility"
**.host[*].mobility.numElements = 4
# other hosts are intiallly positioned in static concentric circles
**.host[*].mobility.element[0].typename = "StaticConcentricMobility"
**.host[*].mobility.element[0].subjectModule = "^.^"
**.host[*].mobility.element[0].numHosts = 7
# other hosts are also moving around in a larger circle following host[0]
**.host[0].mobility.element[1].typename = "CircleMobility"
**.host[0].mobility.element[1].faceForward = false
**.host[0].mobility.element[1].cx = 300m
**.host[0].mobility.element[1].cy = 200m
**.host[0].mobility.element[1].r = 150m
**.host[0].mobility.element[1].speed = 40mps
**.host[*].mobility.element[1].typename = "AttachedMobility" # other hosts follow the movement of the 2nd element of host[0]'s mobility superposition
**.host[*].mobility.element[1].mobilityModule = "^.^.^.host[0].mobility.element[1]"
# other hosts are also slightly moving randomly around their position in the group
**.host[*].mobility.element[2].typename = "MassMobility"
**.host[*].mobility.element[2].faceForward = false
**.host[*].mobility.element[2].initFromDisplayString = false
**.host[*].mobility.element[2].initialX = 0m
**.host[*].mobility.element[2].initialY = 0m
**.host[*].mobility.element[2].initialZ = 0m
**.host[*].mobility.element[2].constraintAreaMinX = 0m
**.host[*].mobility.element[2].constraintAreaMinY = 0m
**.host[*].mobility.element[2].constraintAreaMaxX = 50m # limiting the random movement
**.host[*].mobility.element[2].constraintAreaMaxY = 50m # limiting the random movement
**.host[*].mobility.element[2].changeInterval = truncnormal(2s, 1s)
**.host[*].mobility.element[2].angleDelta = normal(0deg, 30deg)
**.host[*].mobility.element[2].speed = truncnormal(10mps, 3mps)
# other hosts are facing towards the last host sitting in the center
**.host[*].mobility.element[3].typename = "FacingMobility"
**.host[*].mobility.element[3].initFromDisplayString = false
**.host[*].mobility.element[3].initialX = 0m
**.host[*].mobility.element[3].initialY = 0m
**.host[*].mobility.element[3].initialZ = 0m
**.host[*].mobility.element[3].sourceMobility = "^" # the superposition is the source
**.host[*].mobility.element[3].targetMobility = "^.^.^.host[7].mobility" # last host is the target
```

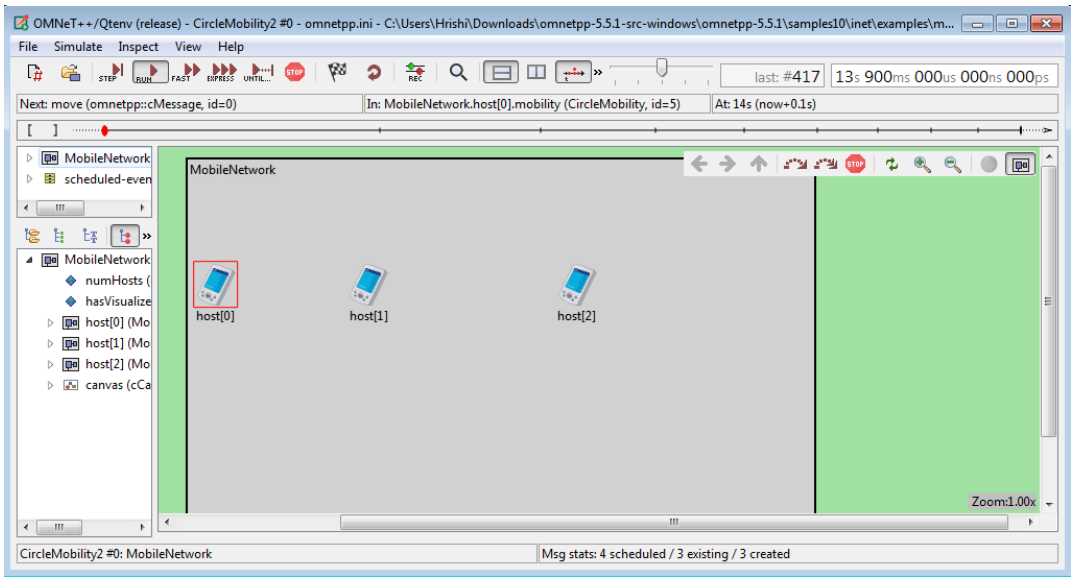
Step 4: Click on Run button.



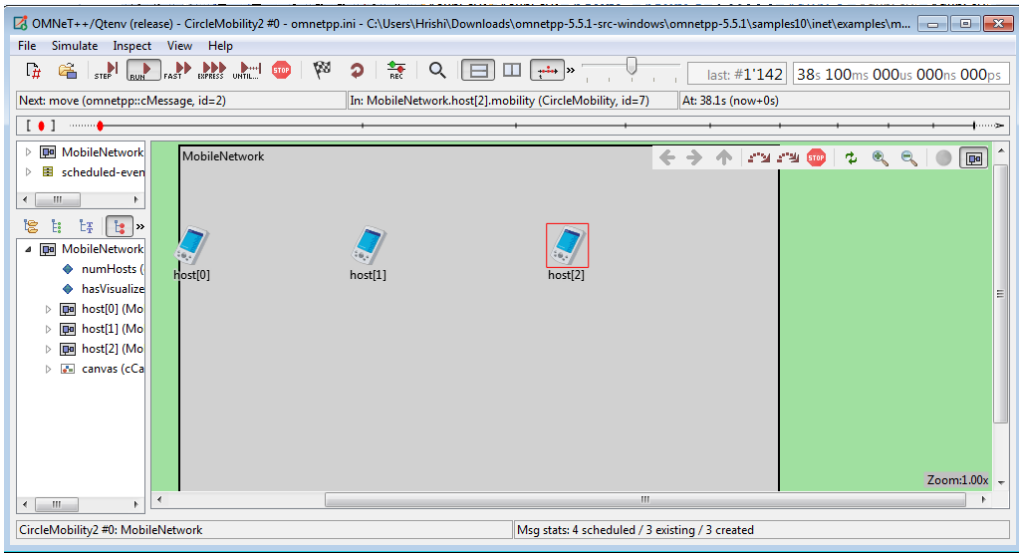
Step 5: After that following window will open.



Step 6: Click on RUN.



OUTPUT:

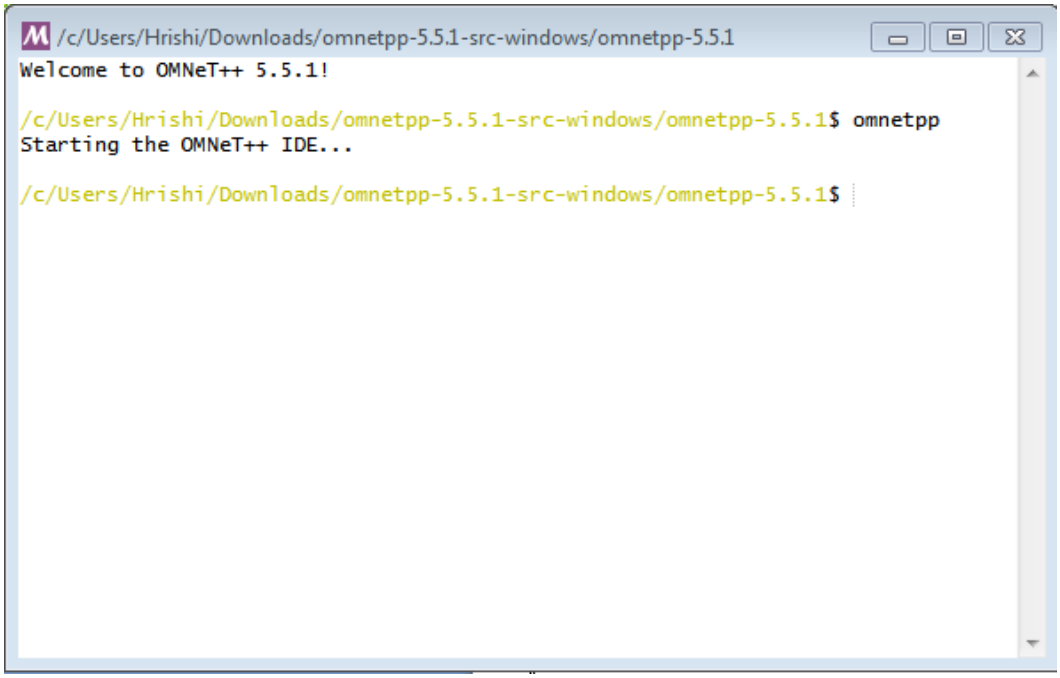


Conclusion: We have learnt to create a simple Single mobile network.

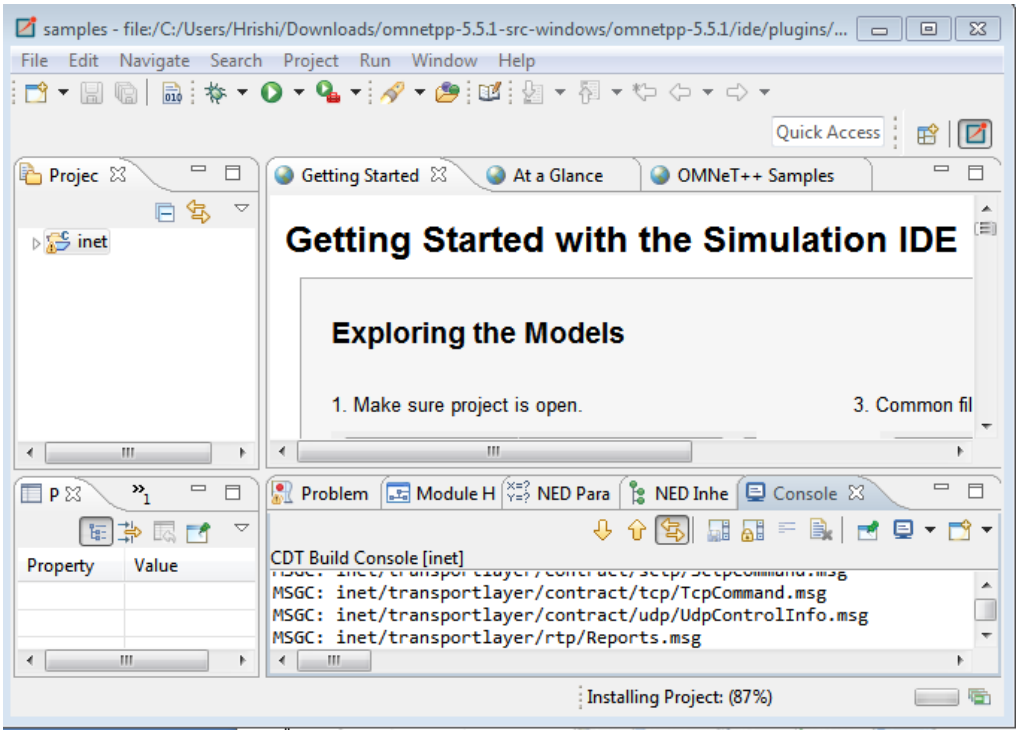
Practical No. 08

Aim: Create wireless network in OMNET++.

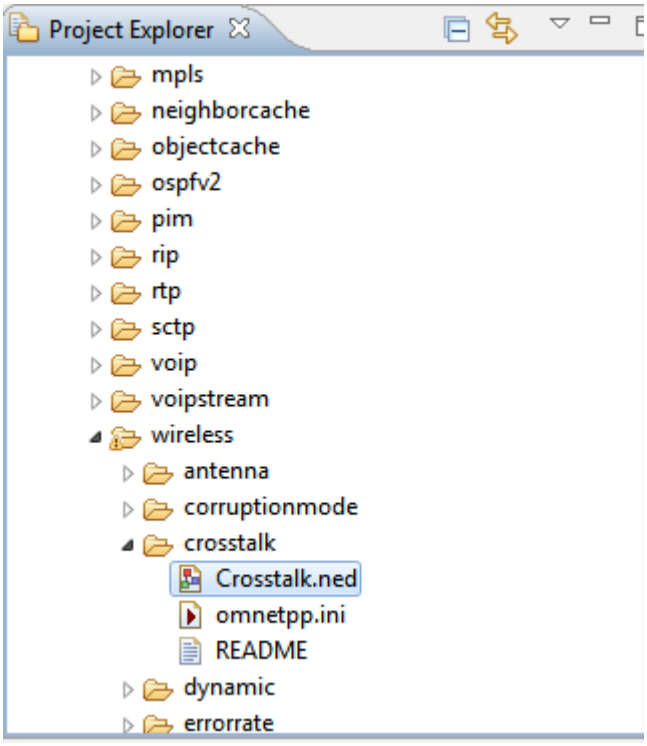
Step 1: Go to omnetpp-5.5.1 folder in which open "mingwenv" file, we get following window. Type "omnetpp" command to open omnet++ IDE.



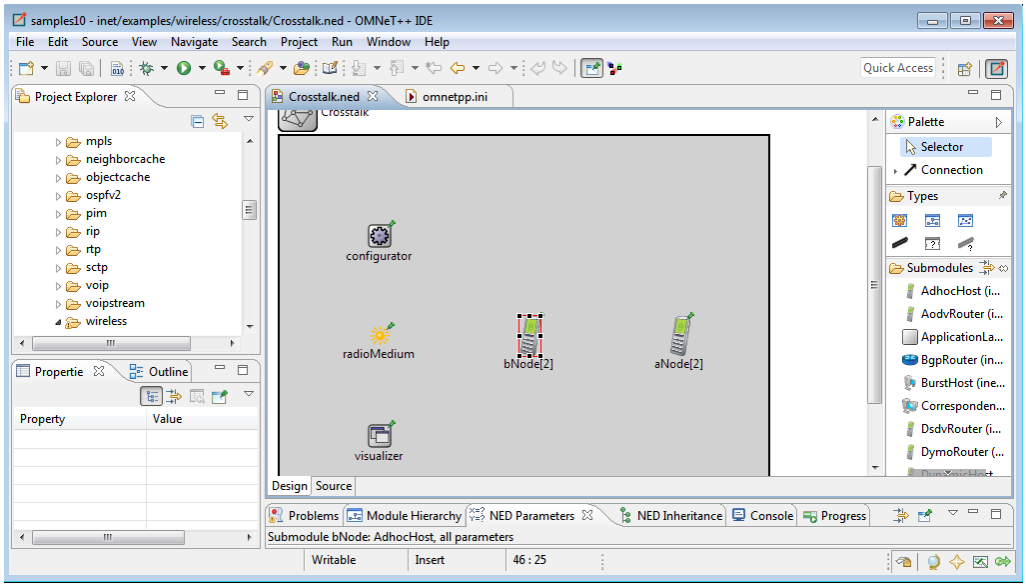
Step 2: after that command, following window will open.



Step 3: Go to project Explorer > inet > examples > wireless > crosswalk and open Crosstalk.ned file.



Crosstalk.ned:



Coding:

Crosstalk.ned:

```
package inet.examples.wireless.crosstalk;
import inet.networklayer.configurator.ipv4.Ipv4NetworkConfigurator;
import inet.node.inet.AdhocHost;
import inet.physicallayer.ieee80211.packetlevel.Ieee80211DimensionalRadioMedium;
import inet.visualizer.contract.IIntegratedVisualizer;
network Crosstalk
```

```
{
   parameters:
   submodules:
      visualizer: <default("IntegratedCanvasVisualizer")> like IIntegratedVisualizer if
hasVisualizer() {
         parameters:
            @display("p=100,300;is=s");
      }
      configurator: Ipv4NetworkConfigurator {
         parameters:
            @display("p=100,100;is=s");
      }
      radioMedium: Ieee80211DimensionalRadioMedium {
         parameters:
            @display("p=100,200;is=s");
      }
      aNode[2]: AdhocHost {
         parameters:
            @display("r=,,#707070;p=400,200");
      }
      bNode[2]: AdhocHost {
         parameters:
            @display("r=,,#707070;p=250,200");
      }
}
```

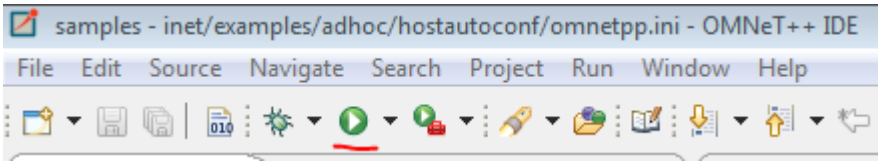
Omnetpp.ini:

```
[General]
network = Crosstalk
#record-eventlog = true
sim-time-limit = 0.1s
seed-set = 1
**.constraintAreaMinX = 0m
**.constraintAreaMinY = 0m
**.constraintAreaMinZ = 0m
**.constraintAreaMaxX = 100m
**.constraintAreaMaxY = 100m
**.constraintAreaMaxZ = 0m
# mobility
*.*Node[*].mobility.typename = "StationaryMobility"
*.*Node[*].mobility.initFromDisplayString = false
# udp App
*.*Node[*].numApps = 1
*.*Node[0].app[0].typename = "UdpSink"
*.*Node[*].app[0].typename = "UdpBasicApp"
*.*Node[*].app[0].localPort = 100
*.*Node[*].app[0].destPort = 100
*.*Node[*].app[0].messageLength = 1250B
*.*Node[*].app[0].startTime = exponential(100us)
*.*Node[*].app[0].sendInterval = exponential(100us)
*.aNode[*].app[0].destAddresses = "aNode[0]"
*.bNode[*].app[0].destAddresses = "bNode[0]"
```

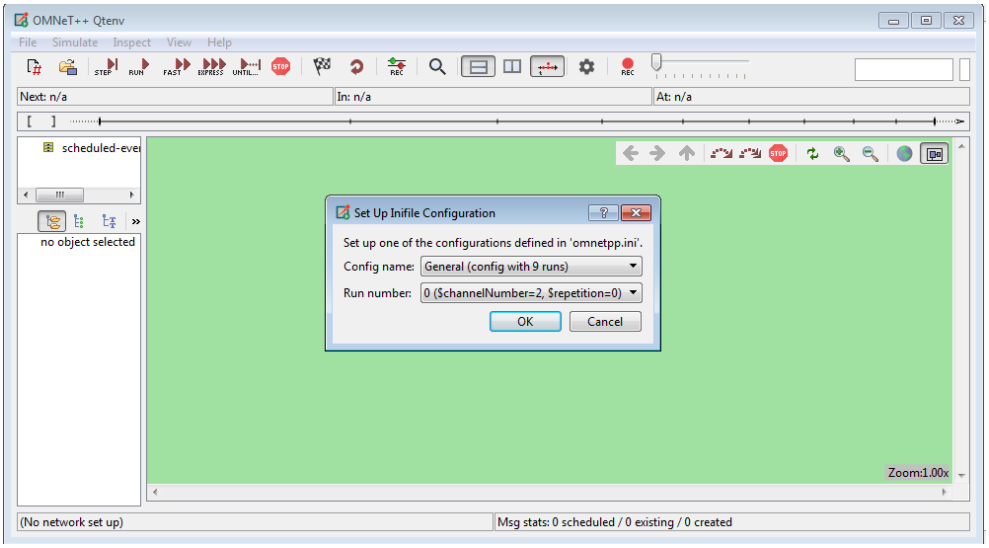
```
# nic
*.*Node[*].wlan[*].radio.typename = "Ieee80211DimensionalRadio"

# medium
*.radioMedium.backgroundNoise.dimensions = "time frequency"
# radio
*.*Node[*].wlan[*].radio.transmitter.bandwidth = 20 MHz
*.*Node[*].wlan[*].radio.receiver.bandwidth = 20 MHz
*.*Node[*].wlan[*].radio.transmitter.dimensions = "time frequency"
*.aNode[*].wlan[*].radio.channelNumber = 1
*.bNode[*].wlan[*].radio.channelNumber = ${channelNumber=2..10}
```

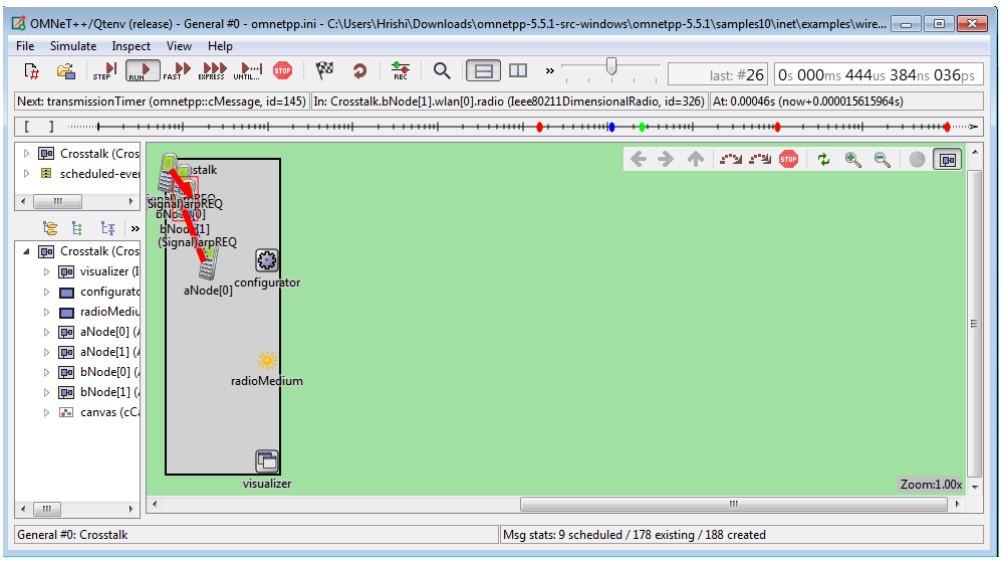
Step 4: Click on Run button.



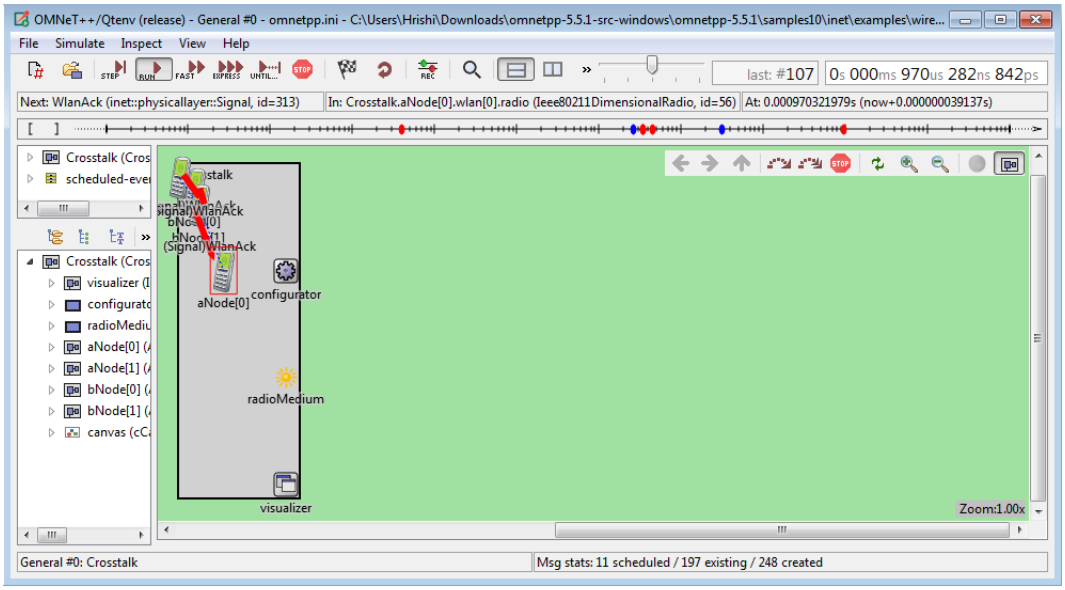
Step 5: After that following window will open.

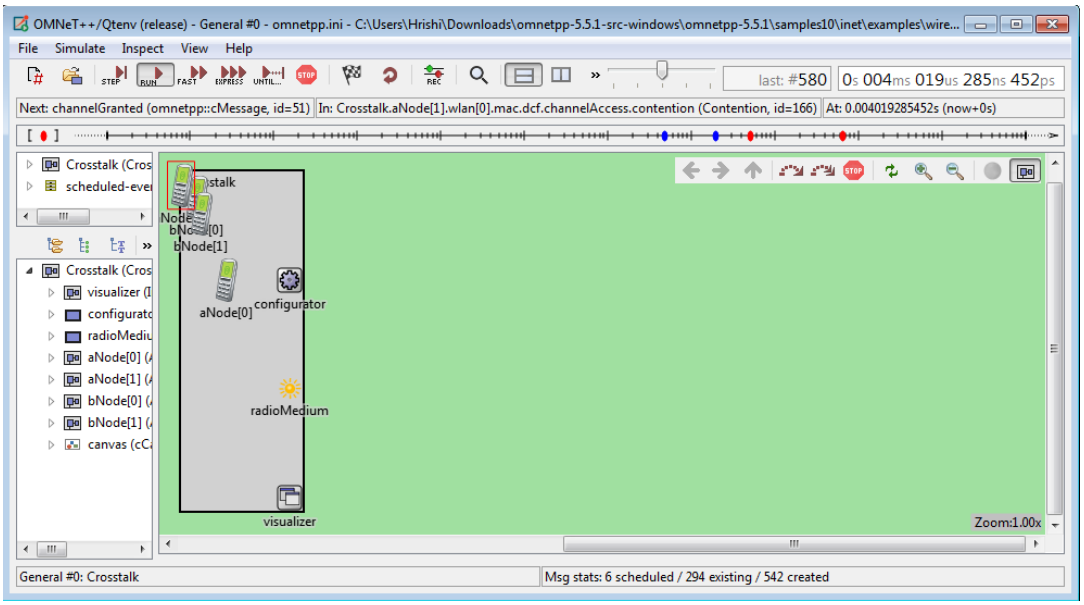


Step 6: Click OK and then Click on RUN.



OUTPUT:





Conclusion: We have learnt to wireless network in OMNET++.