NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCE
Computer Network Lab (CL-307)
Lab Session 02

IP Address Classes

Class A	1 – 127	(Network 127 is reserved for loopback and internal testing) Leading bit pattern	0	00000000.00000000.00000000.00000000 Network . Host . Host . Host
Class B	128 – 191	Leading bit pattern	10	10000000.00000000.00000000.00000000 Network . Network . Host . Host
Class C	192 – 223	Leading bit pattern	110	11000000.00000000.00000000.00000000 Network . Network . Network . Host
Class D	224 – 239	(Reserved for multicast)		
Class E	240 – 255	(Reserved for experimental, used for research)		

Private Address Space

Class A	10.0.0.0 to 10.255.255.255
Class B	172.16.0.0 to 172.31.255.255
Class C	192.168.0.0 to 192.168.255.255

Default Subnet Masks

Class A	255.0.0.0
Class B	255.255.0.0
Class C	255.255.255.0

Address Class Identification

Address	Class
10.250.1.1	A
150.10.15.0	B
192.14.2.0	
148.17.9.1	
193.42.1.1	
126.8.156.0	
220.200.23.1	
230.230.45.58	
177.100.18.4	
119.18.45.0	
249.240.80.78	
199.155.77.56	
117.89.56.45	
215.45.45.0	
199.200.15.0	
95.0.21.90	
33.0.0.0	
158.98.80.0	
219.21.56.0	

Network & Host Identification

Circle the network portion of these addresses:

177.100.18.4

119.18.45.0

209.240.80.78

199.155.77.56

117.89.56.45

215.45.45.0

192.200.15.0

95.0.21.90

33.0.0.0

158.98.80.0

217.21.56.0

10.250.1.1

150.10.15.0

192.14.2.0

148.17.9.1

193.42.1.1

126.8.156.0

220.200.23.1

Circle the host portion of these addresses:

10.15.123.50

171.2.199.31

198.125.87.177

223.250.200.222

17.45.222.45

126.201.54.231

191.41.35.112

155.25.169.227

192.15.155.2

123.102.45.254

148.17.9.155

100.25.1.1

195.0.21.98

25.250.135.46

171.102.77.77

55.250.5.5

218.155.230.14

10.250.1.1

Network Addresses

Using the IP address and subnet mask shown write out the network address:

188.10.18.2
255.255.0.0 — 188 . 10 . 0 . 0

10.10.48.80
255.255.255.0 — 10 . 10 . 48 . 0

192.149.24.191
255.255.255.0 _____

150.203.23.19
255.255.0.0 _____

10.10.10.10
255.0.0.0 _____

186.13.23.110
255.255.255.0 _____

223.69.230.250
255.255.0.0 _____

200.120.135.15
255.255.255.0 _____

Host Addresses

Using the IP address and subnet mask shown write out the host address:

188.10.18.2 255.255.0.0	0 . 0 . 18 . 2
10.10.48.80 255.255.255.0	0 . 0 . 0 . 80
222.49.49.11 255.255.255.0	
128.23.230.19 255.255.0.0	
10.10.10.10 255.0.0.0	
200.113.123.11 255.255.255.0	
223.169.23.20 255.255.0.0	
203.20.35.215 255.255.255.0	

Default Subnet Masks

Write the correct default subnet mask for each of the following addresses:

177.100.18.4	255 . 255 . 0 . 0
119.18.45.0	255 . 0 . 0 . 0
191.249.234.191	
223.23.223.109	
10.10.250.1	
126.123.23.1	
223.69.230.250	
192.12.35.105	
77.251.200.51	
189.210.50.1	

PACKET TRACER:

Cisco Packet Tracer is a software in which you can simulate the complete network by adding and connecting different network devices. Cisco Packet Tracer is a competitor to the open source GNS3 and Bosan NetSim.

You can also send variety of packets and see them travel from one node to another along with that telling which layers are involved on the way. This is an application that gives you interactive environment un-like any other.

PACKET TRACER MODES:

Cisco Packet Tracer provides two operating modes to visualize the behavior of a network—real-time mode and simulation mode. In real-time mode the network behaves as real devices do, with immediate real-time response for all network activities. The real-time mode gives students a viable alternative to real equipment and allows them to gain configuration practice before working with real equipment.

In simulation mode the user can see and control time intervals, the inner workings of data transfer, and the propagation of data across a network. This helps students understand the fundamental concepts behind network operations. A solid understanding of network fundamentals can help accelerate learning about related concepts.

Network Infrastructure

Aim: Study of following Network Devices in Detail

1. **Hub**
2. **Switch**
3. **Bridge**
4. **Router**

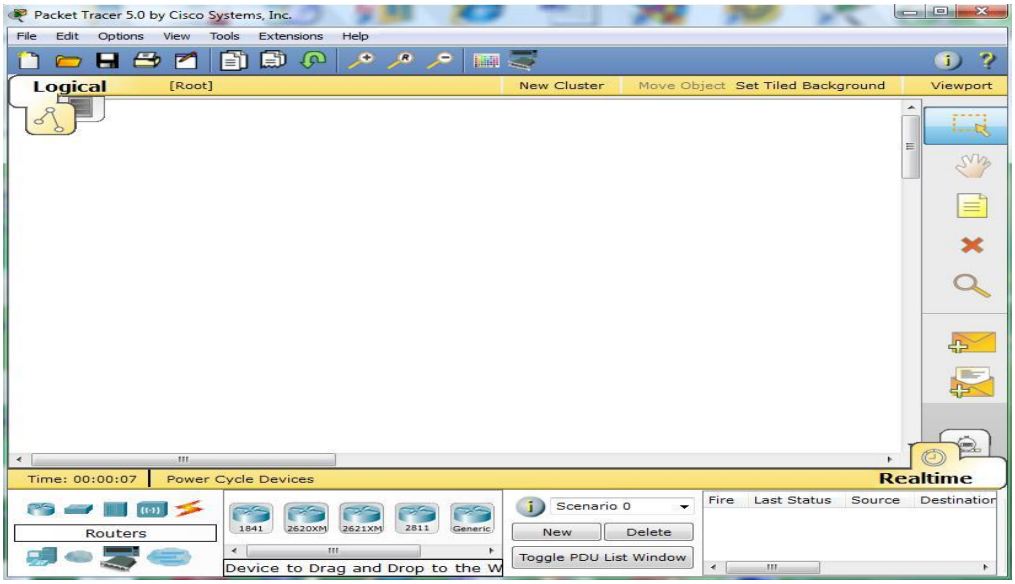
Layer 1, Layer 2 and Layer 3 Devices

4. **Hub: is a device for connecting multiple twisted pair or fiber optic Ethernet devices together and making them act as a single network segment. Hubs work at the physical layer (layer 1) of the OSI model. The device is a form of broadcast sender.**

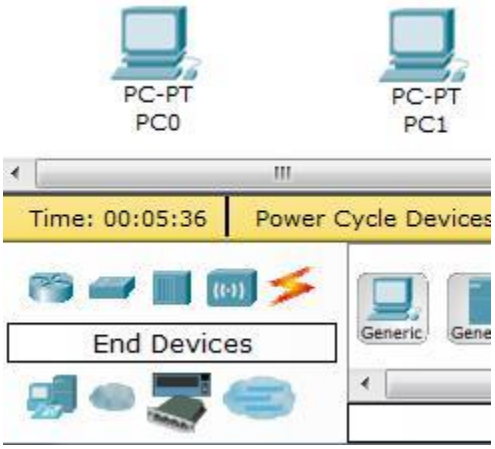
5. **Switch: A network switch or switching hub is a device that connects network segments. The term commonly refers to a network bridge that processes and routes data at the data link layer (layer 2) of the OSI model. Switches that additionally process data at the network layer (layer 3 and above) are often referred to as Layer 3 switches or multilayer switches.**

6. **Bridge: A network bridge connects multiple network segments at the data link layer (Layer 2) of the OSI model. A bridge and switch are very much alike; a switch being a bridge with numerous ports. Switch or Layer 2 switch is often used interchangeably with bridge.**

7. **Router: A router is an electronic device that interconnects two or more computer networks, and selectively interchanges packets of data between them. Each data packet contains address information that a router can use to determine if the source and destination are on the same network, or if the data packet must be transferred from one network to another. Where multiple routers are used in a large collection of interconnected networks, the routers exchange information about target system addresses, so that each router can build up a table showing the preferred paths between any two systems on the interconnected networks.**



At the bottom there is a list of devices which you can select.
Drag n drop devices on to the main working area.

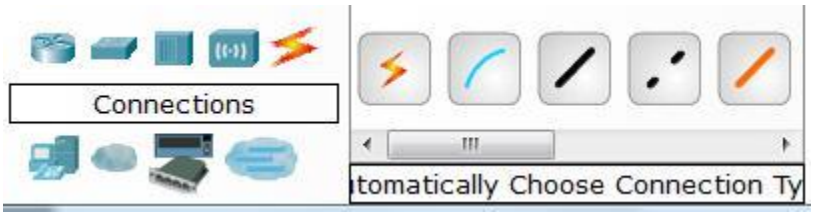


Above screen shows two PCs selected for interconnection.

List of some of the icons are shown below:

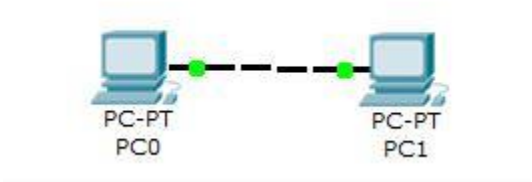
Symbol	Device Name
	Router
	Switch
	Hub
	Wireless Device
	Connections

Press the right most icons this icon is of **"Connections"** you will see different options like **straight, cross-over or fiber** if you don't know the type of connection that will be used then simply select **"Automatically Choose connection type"** this will be the first option you will see after selecting **"connections".**

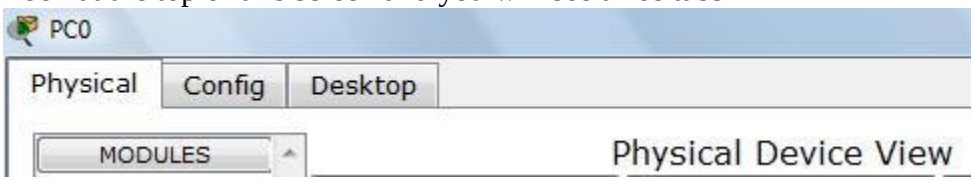


Between similar devices if connection needs to be done then type of wire used is **"Copper Cross Over".**

Select type of wire using mouse and click on PC0 then Click it again on PC1 your connection will establish.

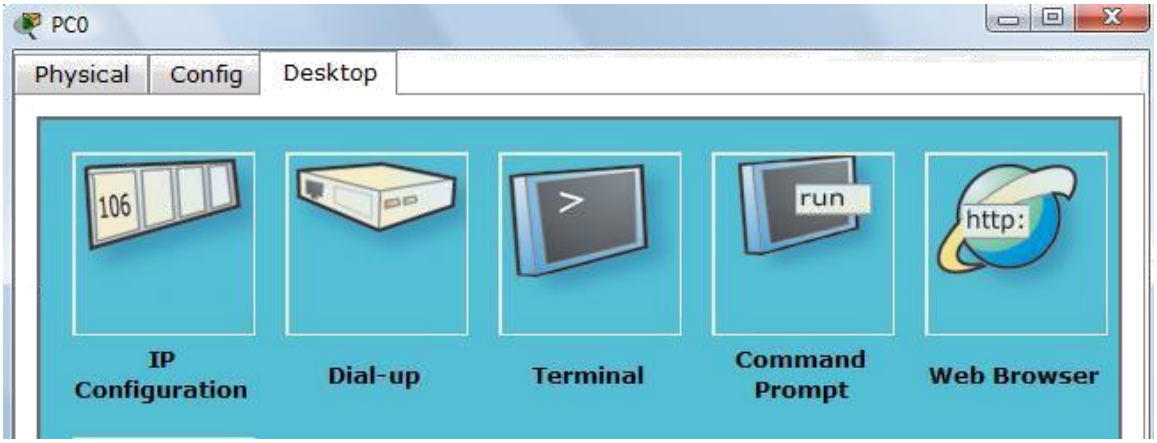


Click PC0.
A screen will open.
Look at the top of this screen and you will see three tabs



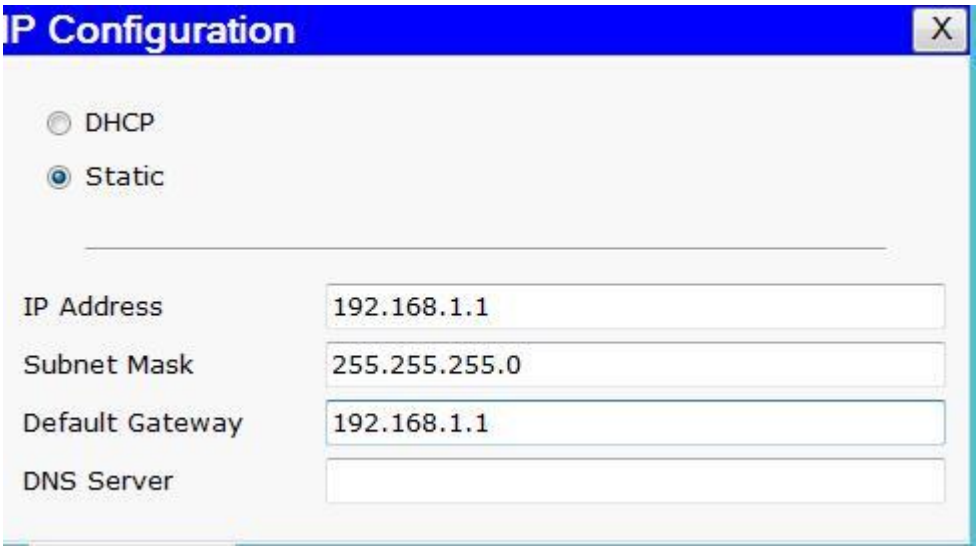
Physical, Config, Desktop.

Click Desktop
Now click Command Prompt.
At command Prompt type "ipconfig" to see ip address of PC
If all fields are Null then exit this window and go to "IP Configuration" Tab shown below



click IP Configuration.

Enter IP 192.168.1.1 and select "static"



Do the same for PC1.
Set IP and Default Gateway 192.168.1.2
Now use PING command to check connection.

Tasks:

- Take two PCs, connect them with suitable wire and also describe the reason of selection of wire. Assign them IP addresses and check their connectivity by using PING command.
- Design and configure the network given in Figure-1 and check the connectivity by PING command. Also describe the functionality of HUB device in given scenario.

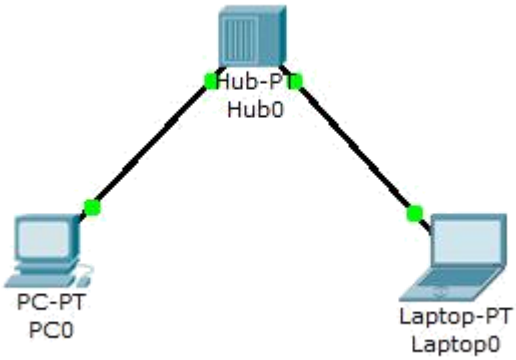


Figure-1

- Please refer Figure 2. The PC is connected to the console port of the switch. All the other connections are made through FastEthernet links. Which types of UTP (unshielded twisted pair) cables can be used with segment 1, 2 and 3?

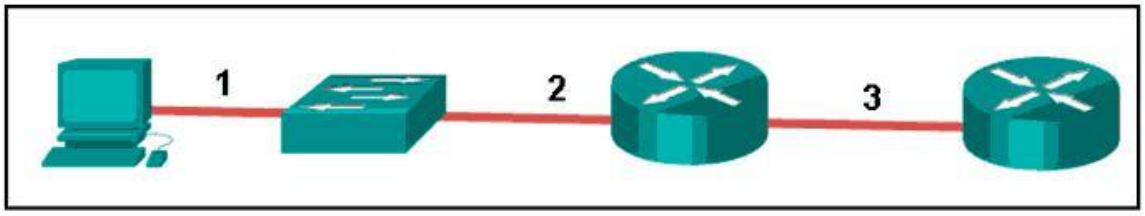


Figure-2

- What is the significance of Real-time mode and logical mode in packet tracer? Describe briefly?