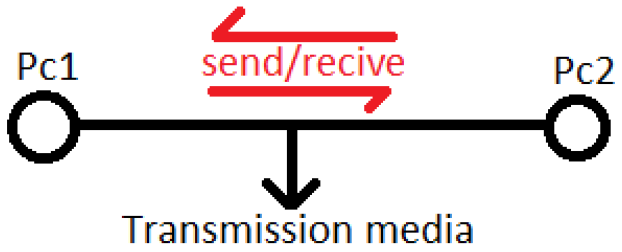
Cisco Packet Tracer & WireShark

Lab-1

Creating transmission media-



Required devices:

1. **Computing Devices** - Pc
2. **NIC (Network Interface Card)** - Required to connect the device to the network
3. **Transmission Media** -
    a. **Guided (Wired)** -
        i. **Twisted pair cable** - 2 types of cable. CAT5 & CAT6. CAT5 has 4 pairs of cable which are twisted. CAT6 has a plastic cross between the 4 pairs. The wires are twisted to repel electromagnetic interference.
        ii. **Coaxial cable** - It is a copper wire, plastic shield, silver mesh (to repel electromagnetic interference), rubber insulation. (Ex: dish line)
        iii. **Fiber optic cable** - It is like a transparent white plastic strand. Carries light pulse. So the electrical signal has to be converted to a light pulse. Light emitting diode, photo diode.
    b. **Unguided (Wireless)**
4. **Switch/Hub** - Connecting multiple pc in a network.
5. **Connectors** - RJ45 (Resistor Jack 45).

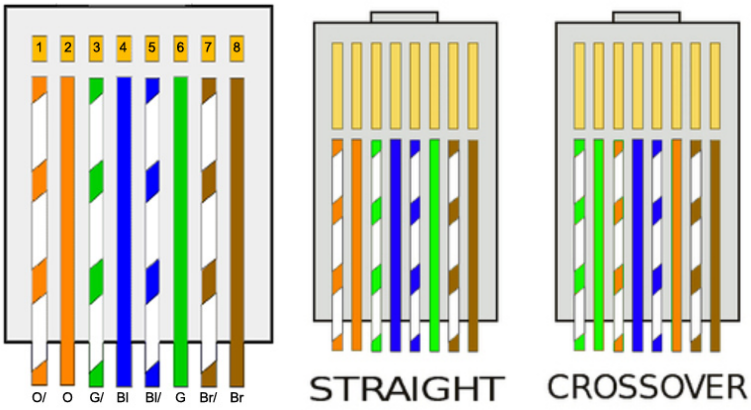
Connecting switch with Pc:

Straight through cable: Straight through cable is the specific orientation of the 8 wires in the twisted pair cable when Connecting a switch with Pc.

Solid	Mixed
Orange	White Orange
Blue	White Blue

Green	White Green
Brown	White Brown

No	**Straight Through Cable Orientation 568B standard**	PC Pins	Switch Pins
1	White Orange	Transmit	Receive
2	Orange		
3	White Green		
4	Blue		
5	White Blue		
6	Green		
7	White Brown		
8	Brown	Receive	Transmit



Lab-2

Connecting Pc with Pc:

Crossover cable: Crossover cable is the specific orientation of the 8 wires in the twisted pair cable when Connecting a Pc with another Pc.

Crossover Cable Orientation 568B/568A standard			
No	1st end 568B	2nd end 568A	PC Pins
1	White Orange	White Green	Transmit
2	Orange	Green	Transmit
3	White Green	White Orange	Receive
4	Blue	Blue	
5	White Blue	White Blue	
6	Green	Orange	Receive
7	White Brown	White Brown	
8	Brown	Brown	

Auto mdix: It can detect the orientation of the wires and can set the pins befitting that orientation**.** So both ends of the wire can be the same orientation**.**

IP address-

IPv4: IP version 4 a 32 bit long address.
Ex:
Decimal notation: 192.168.10.15
Binary: 11000000 10110111 00001010 00001111

cmd-

ipconfig: Shows PC IP address
Ipconfig -all: Shows a detailed information

ping ip_address: Get a reply from the given ip address. Thes reply packets are called ICMP (Internet Control Messaging Protocol) packet

Lab-3

MAC: Medium access control 48 bits. MAC address also called physical address. In the data link layer the devices communicate using MAC addresses. The address is in hexadecimal.

ARP: Address resolution protocol. It runs in the backend. When we ping an ip address, It finds the MAC address for the given ip address to communicate with that ips device. After finding the MAC address it stores in an ARP table, so next time if we ping that same IP it will look for its corresponding MAC address in the ARP table.

cmd-

arp -a: shows the ARP table.
tracert url/ip: Shows the devices the packet hopped to reach its destination.
ping ip_address -t: continuously will ping the ip address.

[**Note**: www.cnn.com. Here, www = web server host name which is under cnn.com]

DNS(Domain Name System): Gives the ip address against the given url. When we ping a url in the backend the DNS finds the url's corresponding IP address.

TTL: Time to leave. It is the lifespan of the packet. Ex: TTL = 10 means that after hopping on 10 devices the packet will be deleted.

Simulation programs:

1. Cisco packet tracer
2. OPNET
3. OMNET
4. NS2/NS3
5. Simulink

Lab-4

IP address/ DHCP -

DHCP- Dynamic host Configuration Protocol
Switch Model : 2960

Lab-5

Web server and DNS server-

[Note: DNS, WWW all falls under the application layer. **]**

[Note: http://www.cnn.com/filename here, http:// is a protocol, www.cnn.com is the domain where www is a host machine under cnn.com, filename is the requested file we want. So there is an IP address under www.cnn.com **]**

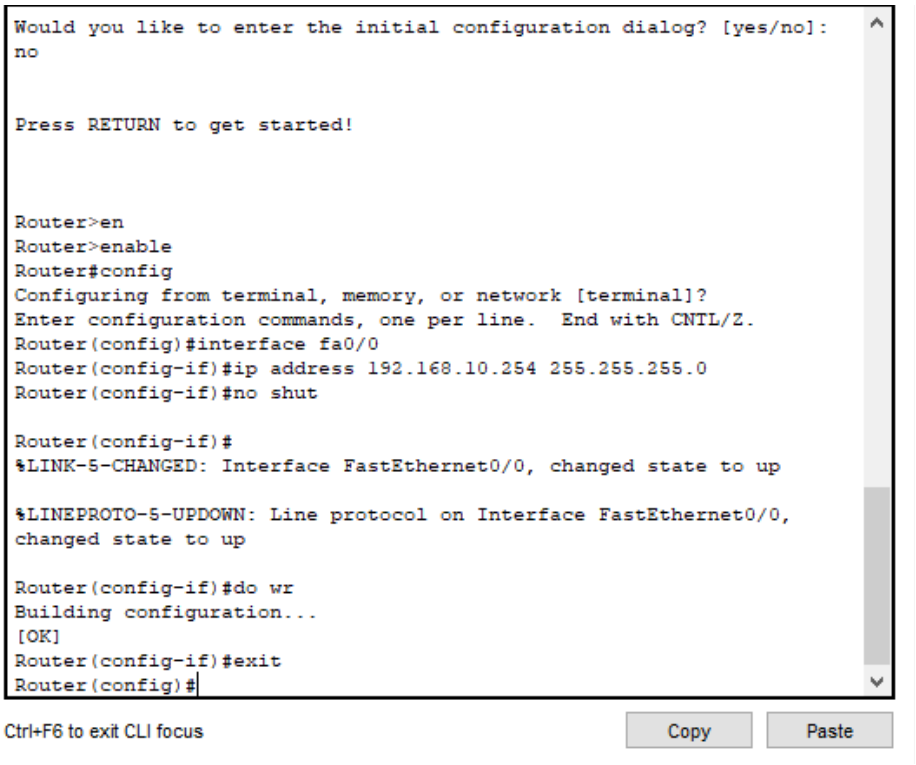
Lab-6

Router: 2811

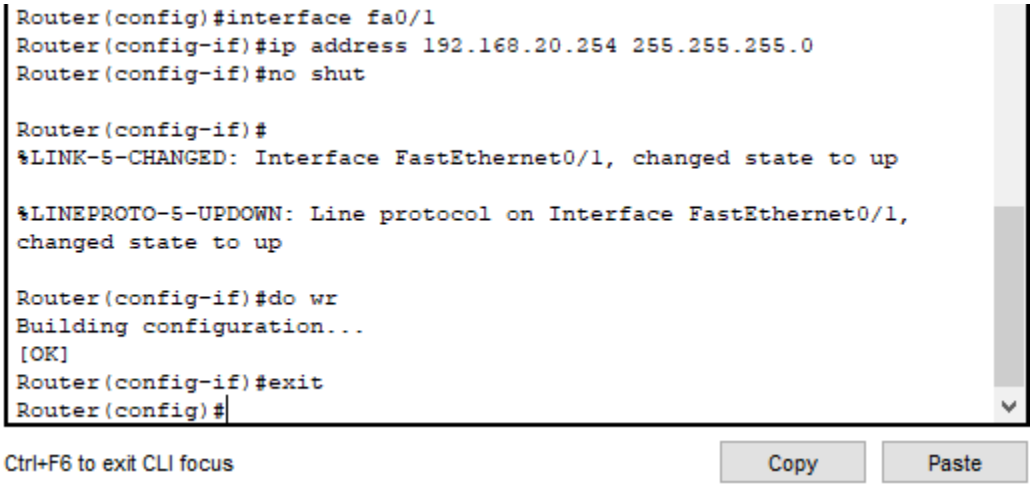
Router config commands-

en/enable: Enables the router and gives administrator privilege.
config: Enter the config mode
interface fa0/1(any interface): Goes to config the fa0/1 interface of the router.
no shut: ups the link
do wr: saves the configuration
exit: goes to the previous step/folder

Setting up routers fa0/0 interface-



Setting up routers fa0/1 interface-



Lab-7

Multiple routers-

Router config commands-

show ip route: Shows which networks are connected to the router
ip destinationIP subnetMask hopIP: Creates that routers routing table

Router: routerPT
Wire: DCE wire for router to router connection in the serial port. One end of this wire is DCE and the other is DTE.
DCE: Data communication equipment. It will have a clock
DTE: Data terminal equipment

[Note: we used a distance vector routing algorithm here.**]**

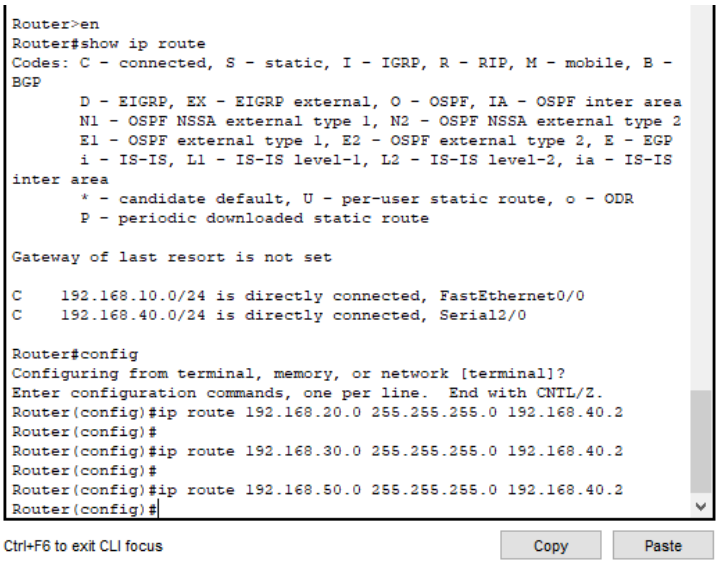
Setting up router 1 fa0/0 & se2/0 interface-

```
        --- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: no


Press RETURN to get started!



Router>en
Router>enable
Router#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface fa0/0
Router(config-if)#ip address 192.168.10.254 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)#do wr
Building configuration...
[OK]
Router(config-if)#exit
Router(config)#interface se2/0
Router(config-if)#ip address 192.168.40.1 255.255.255.0
Router(config-if)#clock rate 64000
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#do wr
Building configuration...
[OK]
Router(config-if)#exit
Router(config)#
```

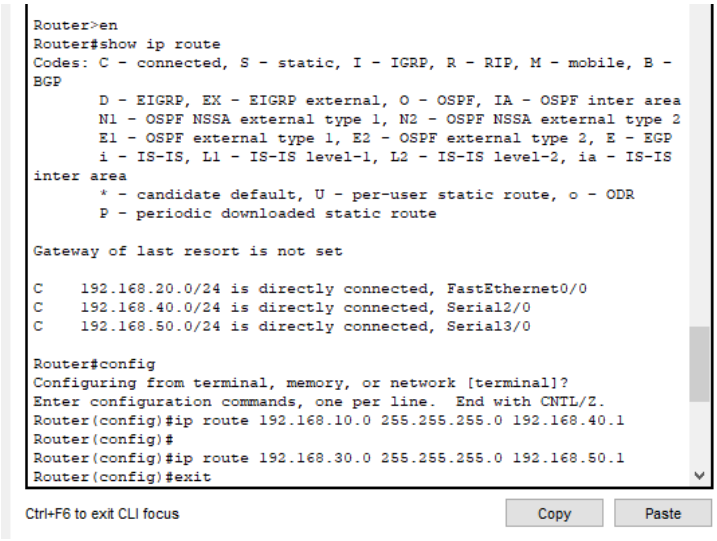
Setting up routers 3 fa0/0 & se2/0 interface-

```
         --- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: no


Press RETURN to get started!



Router>en
Router#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface fa0/0
Router(config-if)#ip address 192.168.30.254 255.255.255.0
Router(config-if)#no shut

Router(config-if)#do wr
Building configuration...
[OK]
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#interface se2/0
Router(config-if)#ip address 192.168.50.1 255.255.255.0
Router(config-if)#clock rate 64000
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#do wr
Building configuration...
[OK]
Router(config-if)#
Router(config-if)#exit
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config)#
```

Setting up router 1's routing table & checking connected networks -



Setting up router 2's routing table & checking connected networks -



Lab-8

OSPF (Open shortest path first) routing algorithm-

[**Note:** OSPF is under link state routing]

Router config commands-

router OSPF process_id: Defines the ospf algorithm/protocol
network directly_Connected_Network wildcard_mask area area_number: adding the directly connected networks to the routers routing table.

Wildcard_mask: Max number of ip address which is 255.255.255.255 minus the subnet mask.
Example:

	255.255.255.255
	255.255.255.0
Wildcard mask:-	0.0.0.255

Setting up router 1's routing table and OSPF-

```
Router>en
Router#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router OSPF 1
Router(config-router)#
Router(config-router)#network 192.168.10.0 0.0.0.255 area 1
Router(config-router)#
Router(config-router)#network 192.168.40.0 0.0.0.255 area 1
Router(config-router)#
Router(config-router)#network 192.168.60.0 0.0.0.255 area 1
Router(config-router)#
Router(config-router)#exit
Router(config)#
```

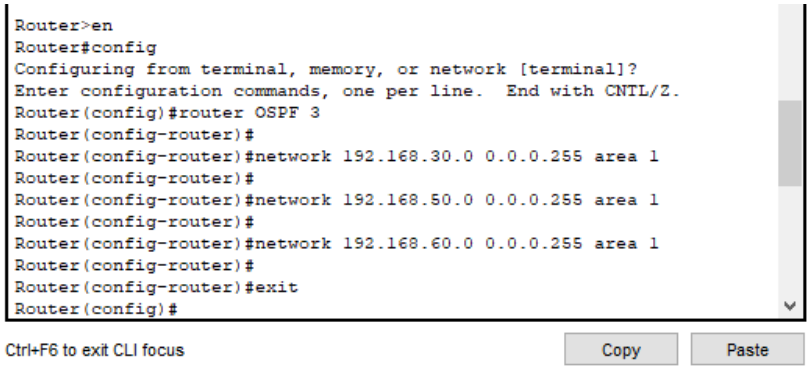
Ctrl+F6 to exit CLI focus Copy Paste

Setting up router 2's routing table and OSPF-

```
Router>en
Router#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router OSPF 2
Router(config-router)#
Router(config-router)#network 192.168.20.0 0.0.0.255 area 1
Router(config-router)#
Router(config-router)#network 192.168.40.0 0.0.0.255 area 1
Router(config-router)#
Router(config-router)#network 192.168.50.0 0.0.0.255 area 1
Router(config-router)#
Router(config-router)#exit
Router(config)#
```

Ctrl+F6 to exit CLI focus Copy Paste

Setting up router 3's routing table and OSPF-



Lab-9

Wireshark