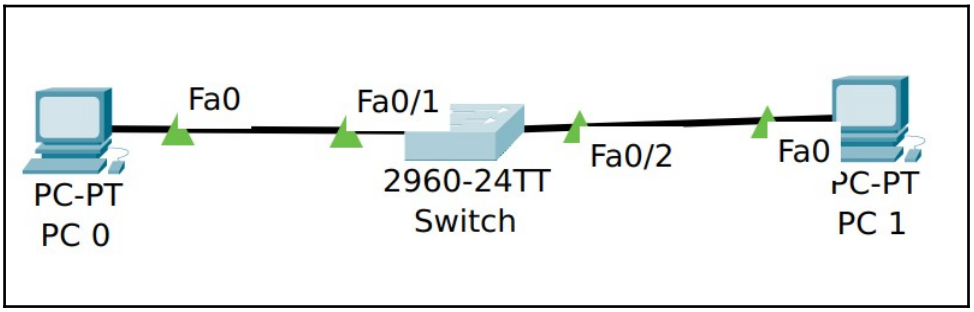
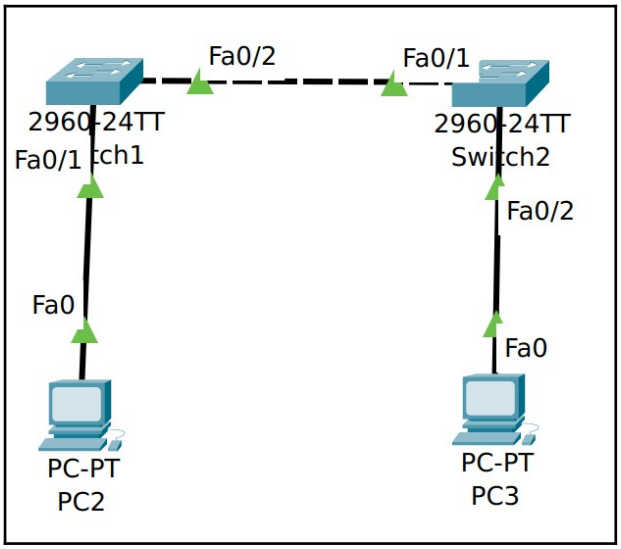
Purpose of Lab

Inspecting destination and source MAC addresses of ICMP packages while they are being transmitted in following three topologies:

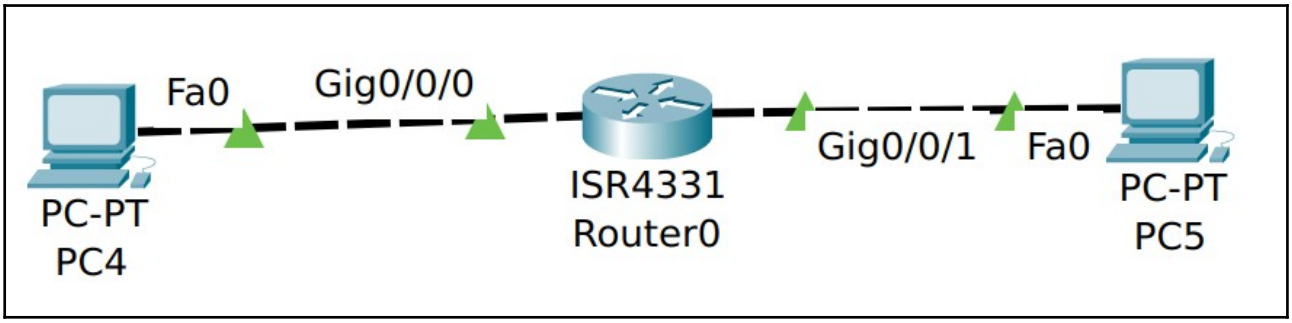
Topology a.



Topology b.



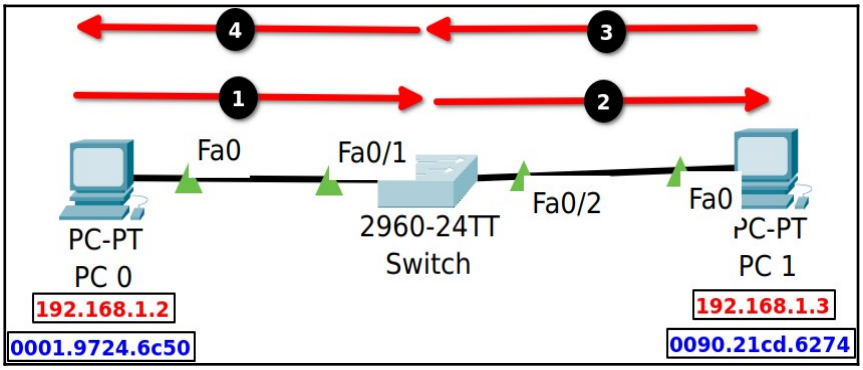
Topology c.



For sake of simplicity, in following pictures all **IP** Addresses of related devices has been shown in **red** and **MAC** Addresses in **blue**.

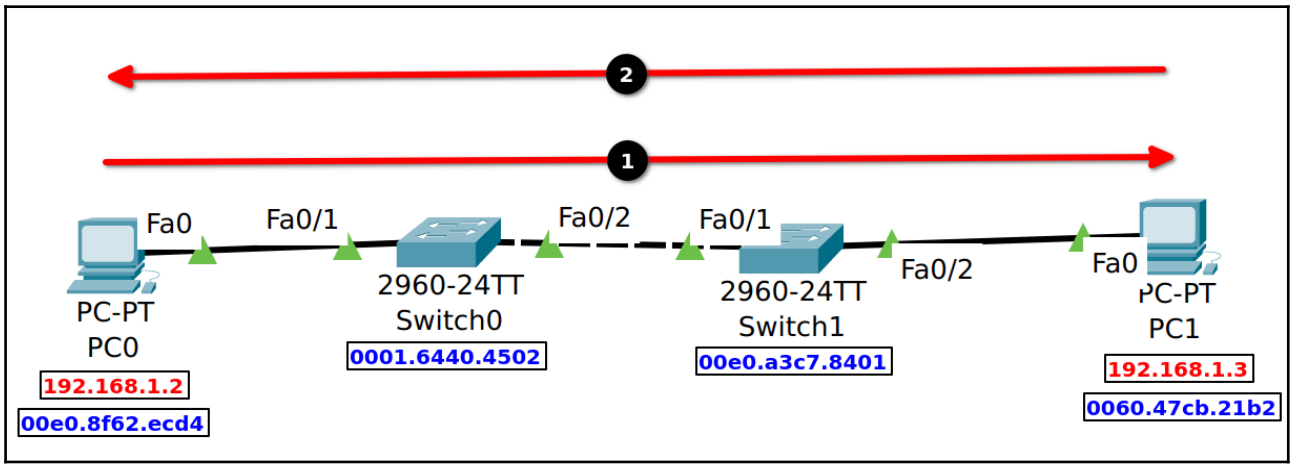
Topology a.

Red arrow indicates path that ICMP package took after **ping 192.168.1.3** command has been executed in PC 0.



	1	2	3	4
Source MAC	0001.9724.6c50	0001.9724.6c50	0090.21cd.6274	0090.21cd.6274
Destination MAC	0090.21cd.6274	0090.21cd.6274	0001.9724.6c50	0001.9724.6c50
Source IP	192.168.1.2	192.168.1.2	192.168.1.3	192.168.1.3
Destination IP	192.168.1.3	192.168.1.3	192.168.1.2	192.168.1.2

Topology b.



	1	2
Source MAC	00e0.8f62.ecd4	0060.47cb.21b2
Destination MAC	0060.47cb.21b2	00e0.8f62.ecd4
Source IP	192.168.1.2	192.168.1.3
Destination IP	192.168.1.3	192.168.1.2

Everything looks almost same when we compare this topology to previous one. We have a slight difference. If we look at a switch's MAC address table we can see that there are 3 entries unlike first topology.

topology a.

```
Switch>
Switch>show mac address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0007.ec9d.d511    DYNAMIC     Fa0/2
   1    000c.8580.0b2c    DYNAMIC     Fa0/1
Switch>
```

topology b.

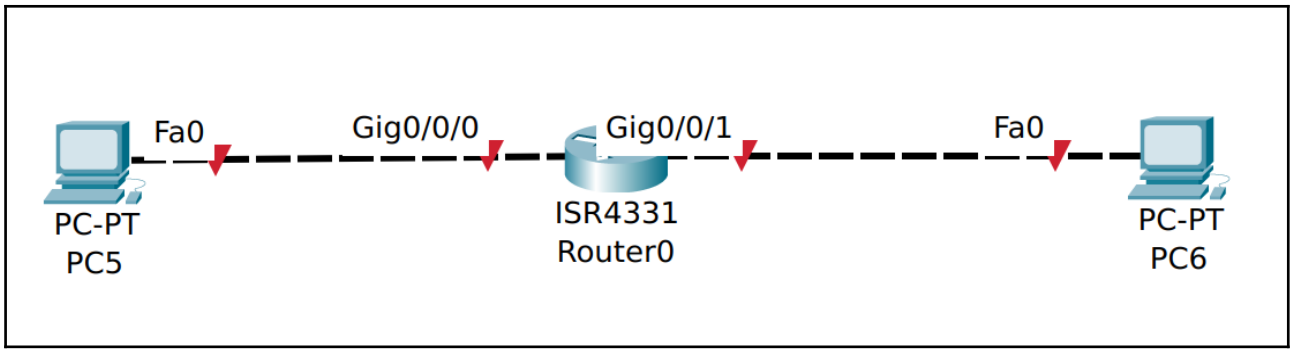
```
Switch>show mac address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0060.47cb.21b2    DYNAMIC     Fa0/2
   1    00e0.8f62.ecd4    DYNAMIC     Fa0/1
   1    00e0.a3c7.8401    DYNAMIC     Fa0/2
Switch>
```

Topology c.

Since configuration of the topology little bit different and we're dealing with a new layer device, I also want to talk about how to configure such a network topology. If you just put router and computers, then connect each device to other ones, you'll see a red mark on cables which means communication between devices cannot be performed.



To fix that situation we need to do two things:

1- Assign computers **IP address**, **subnet mask** and **gateway address**.
2- Assign **IP addresses** to each interface of router and **activate** ports.

Lets start with first one. It's important to be careful while assigning IP and gateway address because we are using router, therefore they should be in different LANs which means you **can't** assign **192.168.1.2** to one of them and **192.168.1.3** to other one. In that case these devices*(assuming subnet for both is 255.255.255.0)* were already in same network and there'd be no reason to use router.

PC5

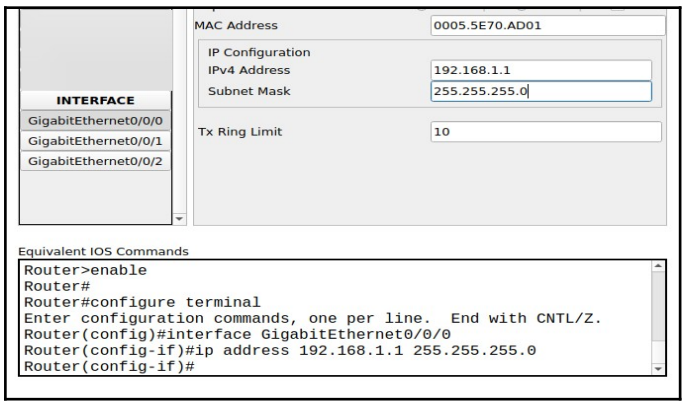
IPv4 Address	192.168.1.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1

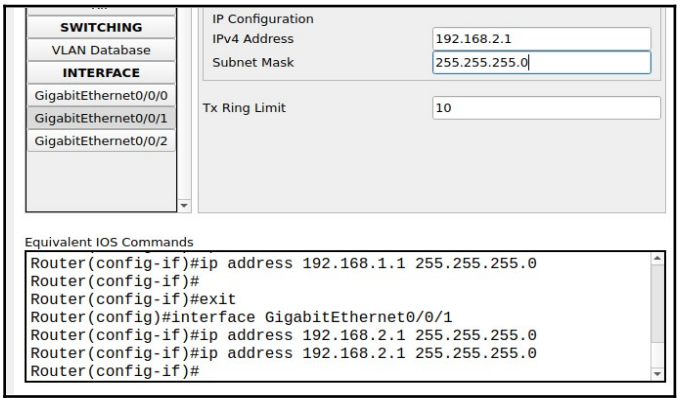
PC6

IPv4 Address	192.168.2.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.2.1

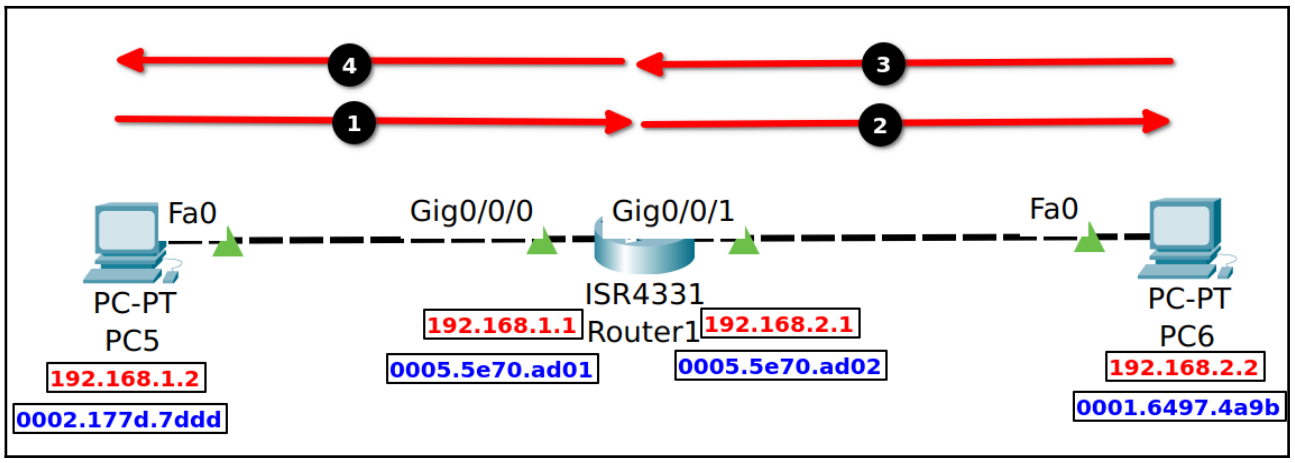
Default gateway addresses that assigned here, indicates that if any device in that network want to talk with a external device, that device need to go gateway address because it's the gateway of network.

And looking subnet mask we can understand whether devices in that network or not. For example if we look at PC5's subnet mask we can say that range of IP addresses in that network is: **(192.168.1.0 – 192.168.1.255)** so if any device want to talk 192.168.2.1 we can say it's an external device
Lets configure router also, then interpret MAC and IP addresses of ICMP package.





Also we need to activate each interface with entering **no shutdown** command in CLI. After that you can see red mark turn into green which means everything's ready to communicate.



	1	2	3	4
Source MAC	0002.177d.7ddd	0005.5e70.ad02	0001.6497.4a9b	0005.5e70.ad01
Destination MAC	0005.5e70.ad01	0001.6497.4a9b	0005.5e70.ad02	0002.177d.7ddd
Source IP	192.168.1.2	192.168.1.2	192.168.2.2	192.168.2.2
Destination IP	192.168.2.2	192.168.2.2	192.168.1.2	192.168.1.2