



Data Link lab

LAB 4

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Scenario when PCo pings PC₁ with the help of simulation mode

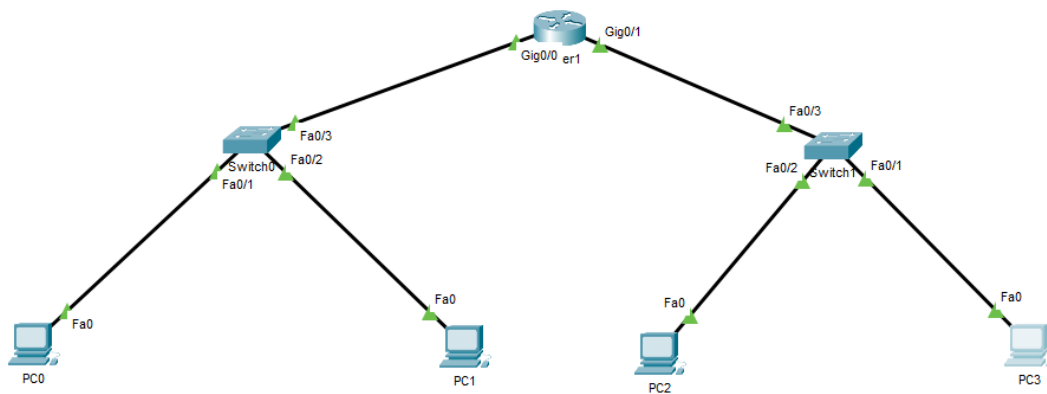
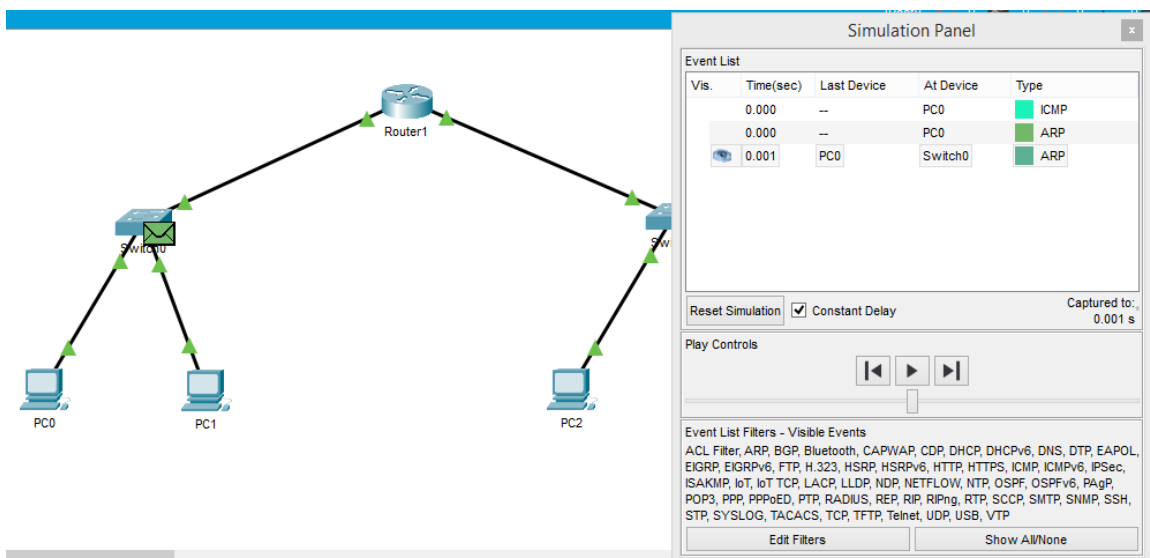
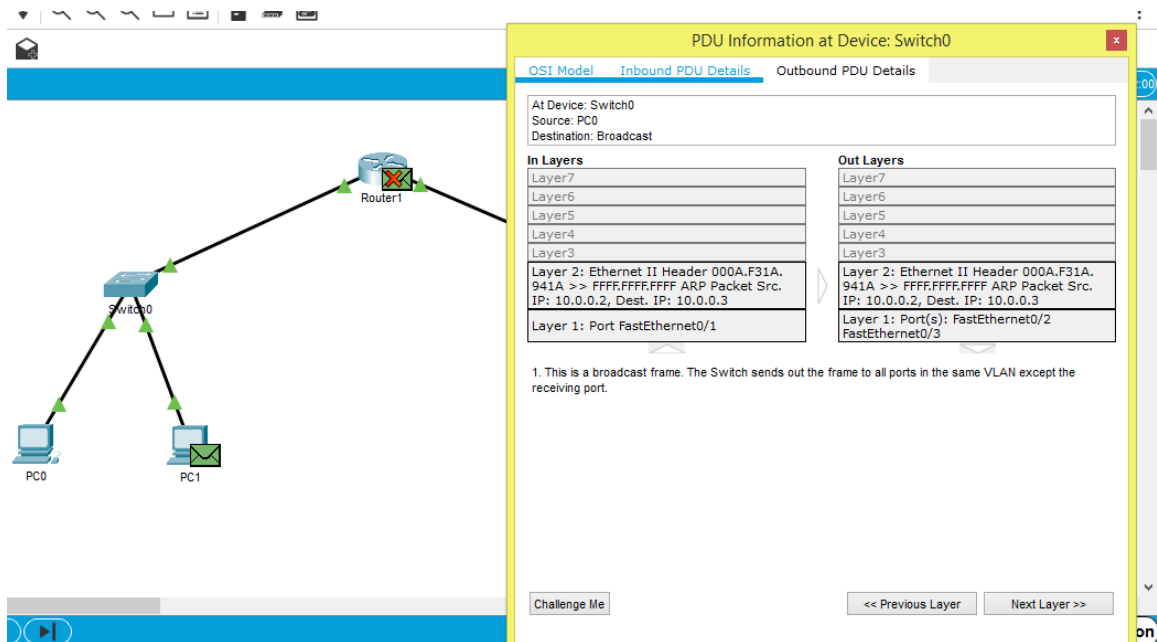


Figure 1 Network Topology

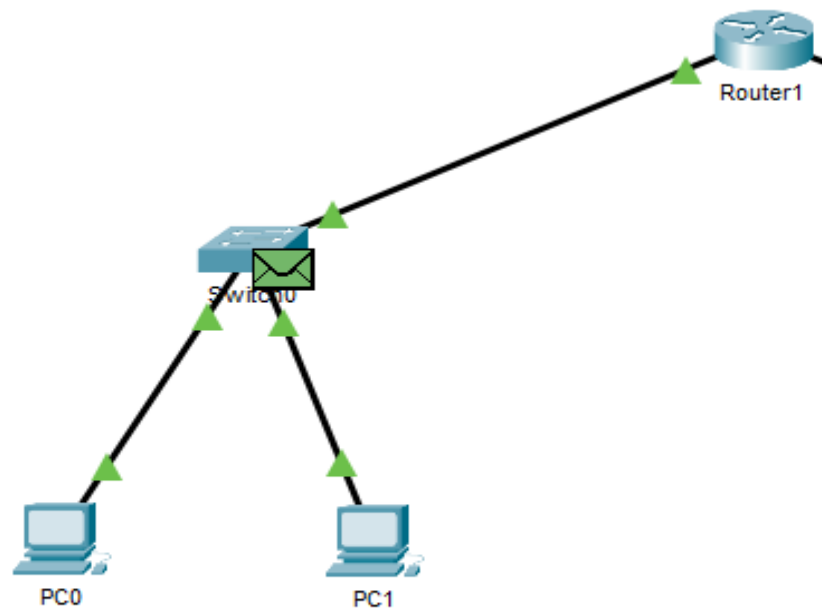
1. First ,PCo (IP 10.0.0.2) pings PC₁ (IP 10.0.0.3)



2. Second, Switch 0 broadcast the messages as its ARP table is empty so it will be sent to both PC₁ and Router



3. Having the reply only from PC1 as it matches its IP address



4. Now , the mac address of PC1 is in the ARP table

PDU Information at Device: PC0

OSI Model

Inbound PDU Details

At Device: PC0
Source: PC0
Destination: Broadcast

In Layers

Layer7

Layer6

Layer5

Layer4

Layer3

Layer 2: Ethernet II Header
0000.0C85.A70B >> 000A.F31A.941A ARP
Packet Src. IP: 10.0.0.3, Dest. IP: 10.0.0.2

Layer 1: Port FastEthernet0

1. FastEthernet0 receives the frame.

Out Layers

Layer7

Layer6

Layer5

Layer4

Layer3

Layer2

Layer1

Challenge Me

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Simulation Panel				
Event List				
Vis.	Time(sec)	Last Device	At Device	Type
	0.000	--	PC0	ICMP
	0.000	--	PC0	ARP
	0.001	PC0	Switch0	ARP
	0.002	Switch0	PC1	ARP
	0.002	Switch0	Router1	ARP
	0.003	PC1	Switch0	ARP
	0.004	Switch0	PC0	ARP
	0.004	--	PC0	ICMP

Note : As illustrated Above, I understand what is happening .However, I am not sure if I understand what the questions really mean :D

Q1. Open the PDU and record the destination MAC address. Is this address listed in the table above?

No , it is not ARP table is empty at the beginning .

Q2. How many copies of the PDU did Switch1 make?

Three

One to PC1 , Another one to Router , the last one back to PC0

Q3. How many copies of the PDU did the switch make during the ARP reply?

One copy to PC0

Q4. Do the MAC addresses of the source and destination align with their IP addresses?

If this is what you mean by align, then yes they are aligned.

At Device: PC0
Source: PC0
Destination: Broadcast

In Layers
Layer7
Layer6
Layer5
Layer4
Layer3
Layer 2: Ethernet II Header
0000.0C85.A70B >> 000A.F31A.941A ARP
Packet Src. IP: 10.0.0.3, Dest. IP: 10.0.0.2
Layer 1: Port FastEthernet0

Out Layers
Layer7
Layer6
Layer5
Layer4
Layer3
Layer2
Layer1

1. FastEthernet0 receives the frame.

Challenge Me

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Q5. To what IP address does the MAC address entry correspond?

It corresponds to PC1 as illustrated internet address is 10.0.0.3 which is the ip address of PC1

```
C:\>arp -a
Internet Address      Physical Address      Type
10.0.0.3              0000.0c85.a70b       dynamic
C:\>
```

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Q6. When does an end device issue an ARP request?

When it does not have the mac address of the destination but have the IP address only.

Q7. Do the entries correspond to those in the table above?

Switch 0 mac address

Vlan	Mac Address	Type	Ports
1	0000.0c85.a70b	DYNAMIC	Fa0/2
1	000a.f31a.941a	DYNAMIC	Fa0/1
1	000b.be85.a901	DYNAMIC	Fa0/3

Switch 1 mac address table

```
Switch>show mac-address-table
Mac Address Table
-----
Vlan    Mac Address      Type      Ports
----    -
1       000b.be85.a902   DYNAMIC   Fa0/3
1       0060.479c.7294   DYNAMIC   Fa0/2
1       0090.21de.3e60   DYNAMIC   Fa0/1
Switch>
```

Q8. Do the entries correspond to those in the table above?

Yes, they correspond to it.

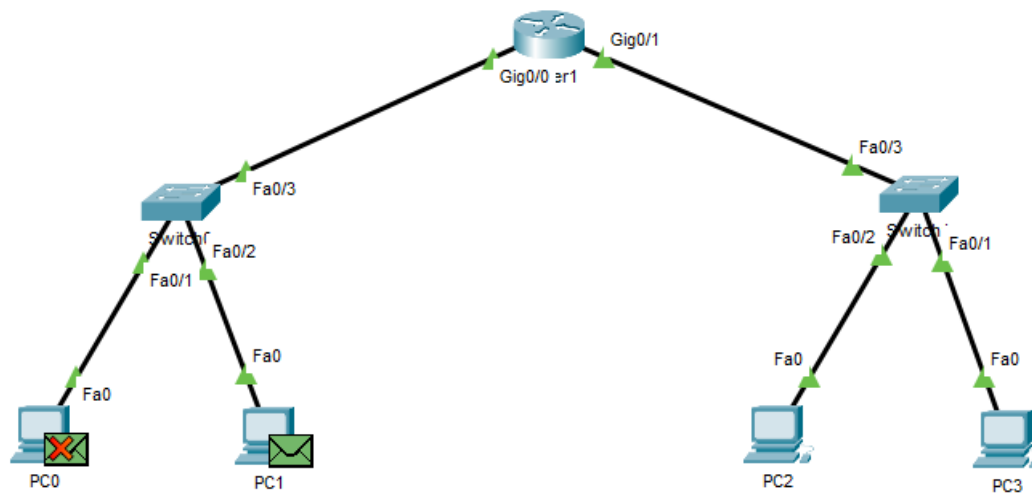
Q9: What is the IP address of the new ARP table entry?

This is the arp table @ PC2

It is the IP address of PC2 and router

```
C:\>arp -a
Internet Address      Physical Address      Type
192.168.0.1           000b.be85.a902        dynamic
192.168.0.3           0090.21de.3e60        dynamic
```

When PC2 pings PC1 final step at simulation



Q10: What happens to the first ping in a situation where the router responds to the ARP request?

Arp table @ router

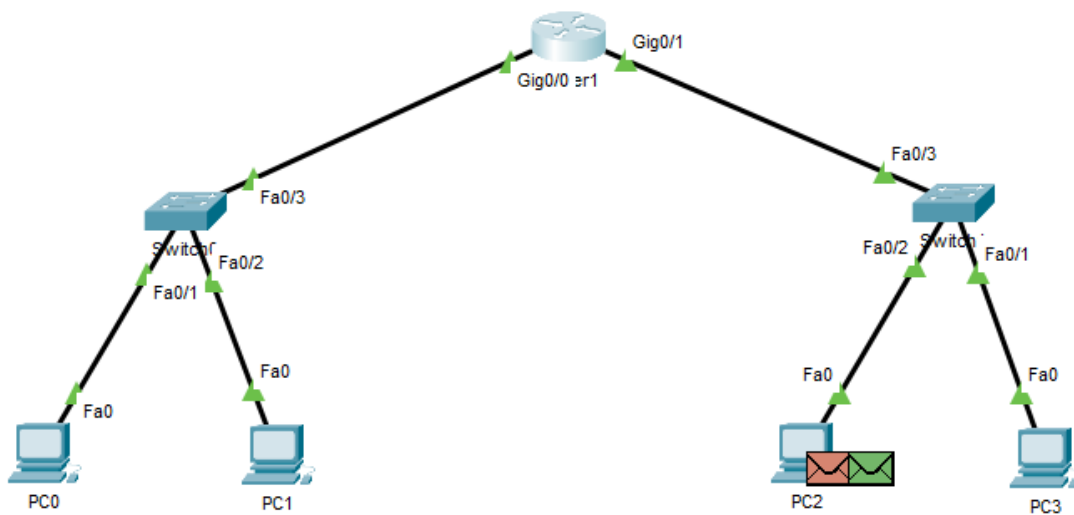
```
MyRouter>show arp
Protocol Address      Age (min)  Hardware Addr  Type
Interface
Internet  10.0.0.3             -           Incomplete     ARPA
GigabitEthernet0/0
Internet  10.0.0.1             -           000B.BE85.A901  ARPA
GigabitEthernet0/0
Internet  192.168.0.1          -           000B.BE85.A902  ARPA
GigabitEthernet0/1
Internet  192.168.0.2          0           0060.479C.7294  ARPA
GigabitEthernet0/1
MyRouter>
MyRouter>
```

Ctrl+F6 to exit CLI focus

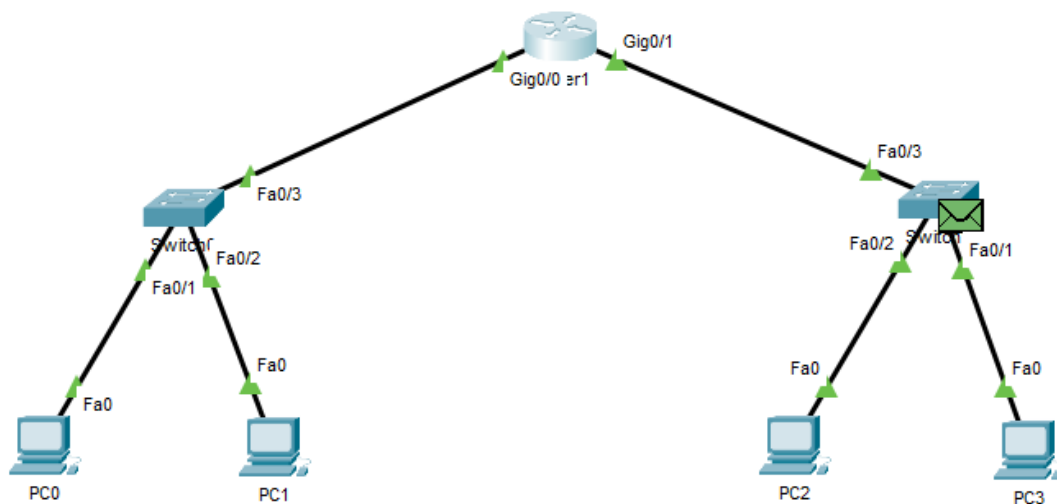
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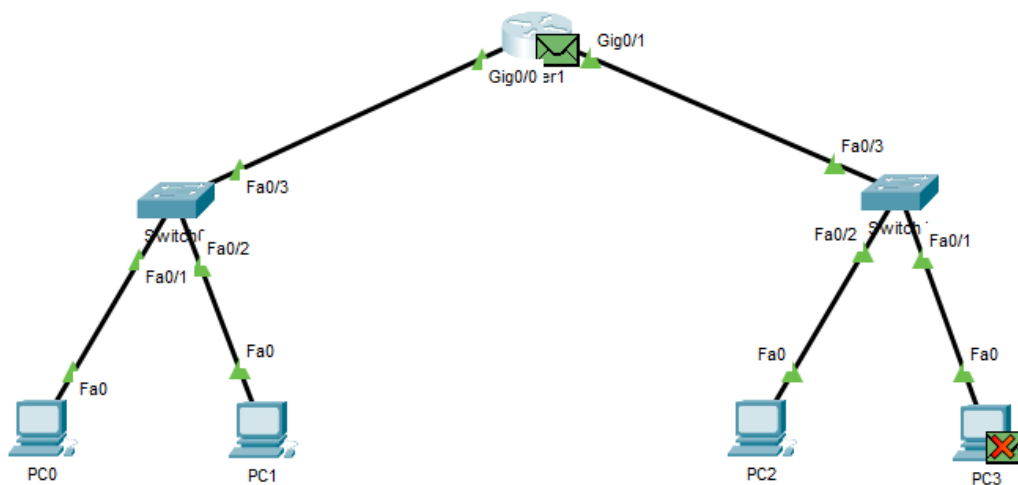
Here is what happens using screenshots



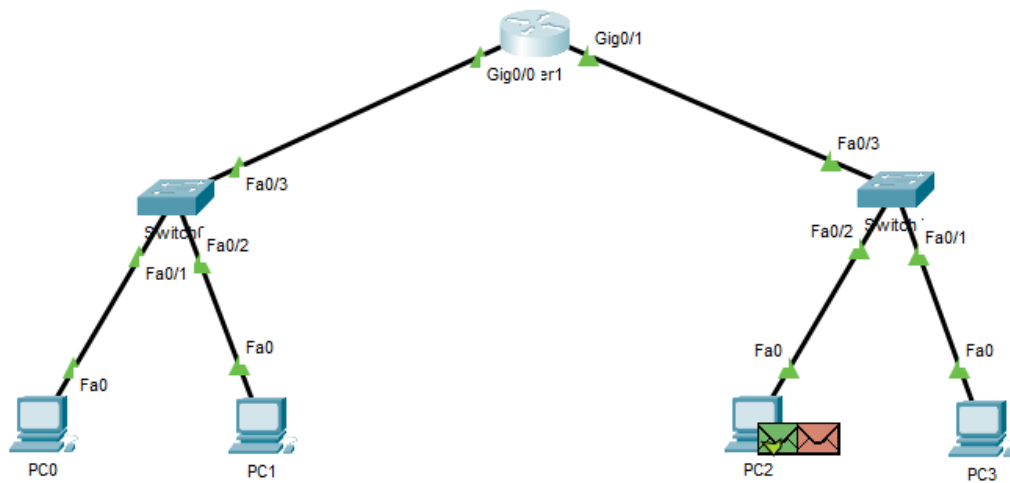
It will be sent to the switch



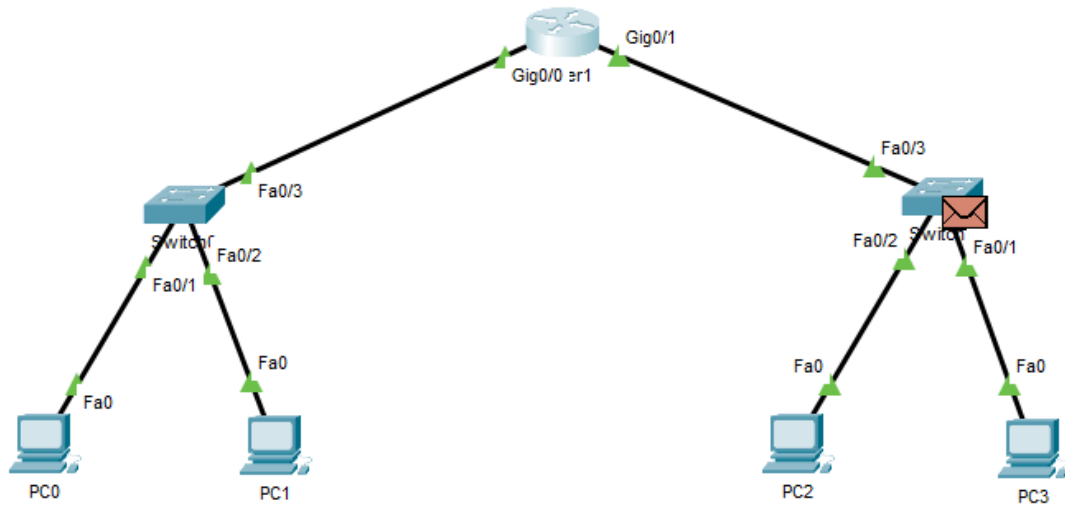
Switch will broadcast it to pc 3 and router



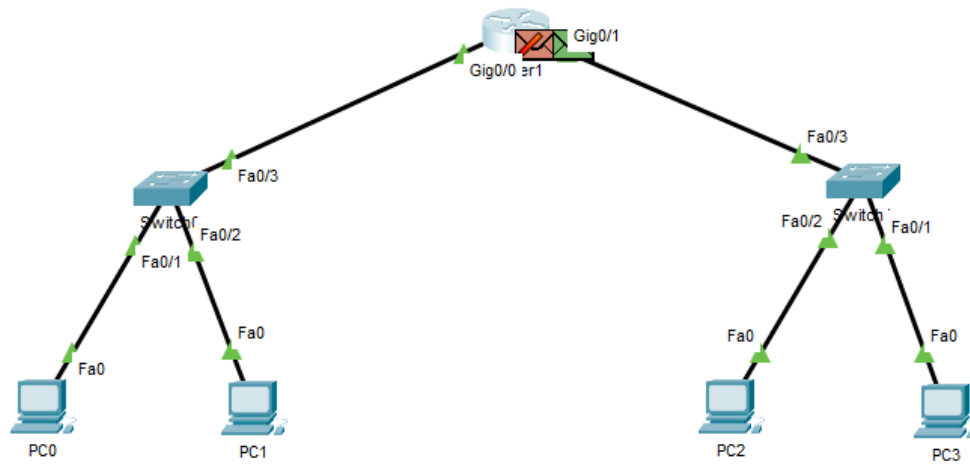
Router will then reply with its mac address while PC3 will not reply



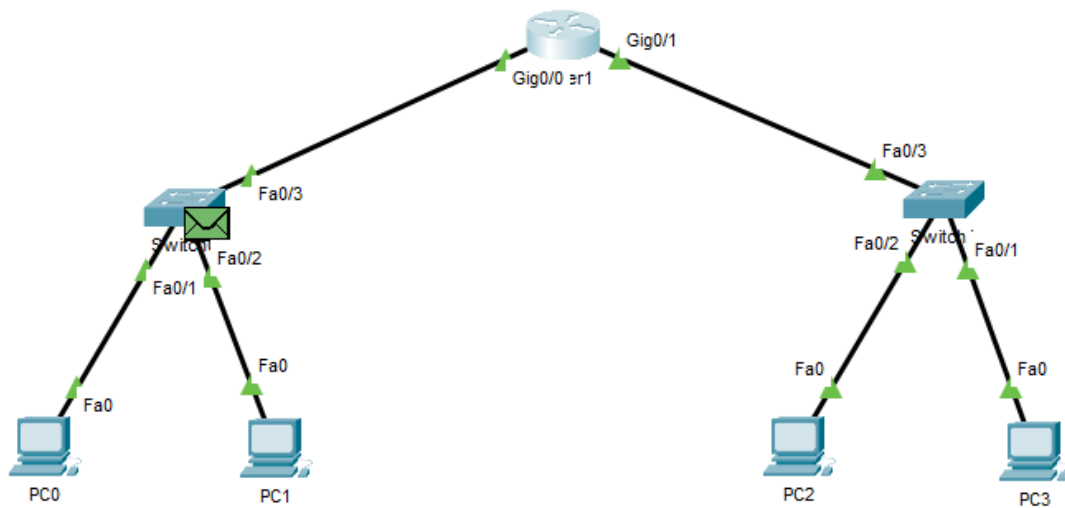
It will then repass to switch



It will send to the router



Router will send it to switch o



Switch o will send it to both PCo which will ignore it , and PC1 which will accept it .

PC1 will send its mac to PC2 through switch o , then router , then to PC2.