LAB 1: THE HOMEWORK FILE #1

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Objectives

To record and do the class activity. In this case is for Class Activity #1

Scenario

After the exercise in class (Class Activity #1), you should have a basic idea of connections and packet forwarding within a network topology.

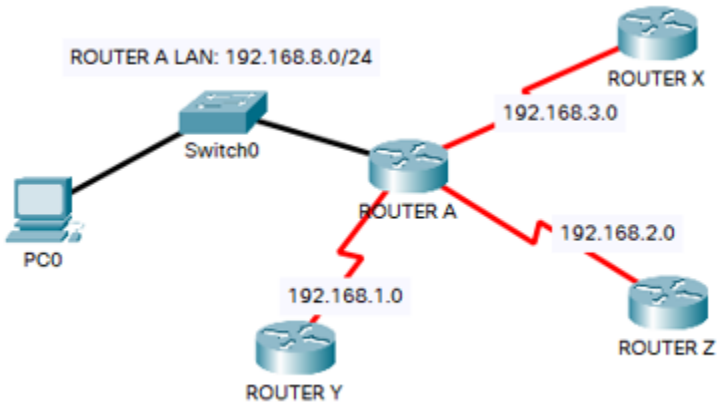
Previously, in class, you and your partner had created a topology, with the 5 routers. Now copy that topology into Packet Tracer. This will now be the basis of your exercises. Just remember to name them accordingly. For this particular activity, name the PT file as YOURNAME_ACT1 (of YOURNAME means your own name). This is individual work.

As you do the activity, and have your answers, compare them with your partner. Then compare your answers with, at least, one other group from the class.

Tasks

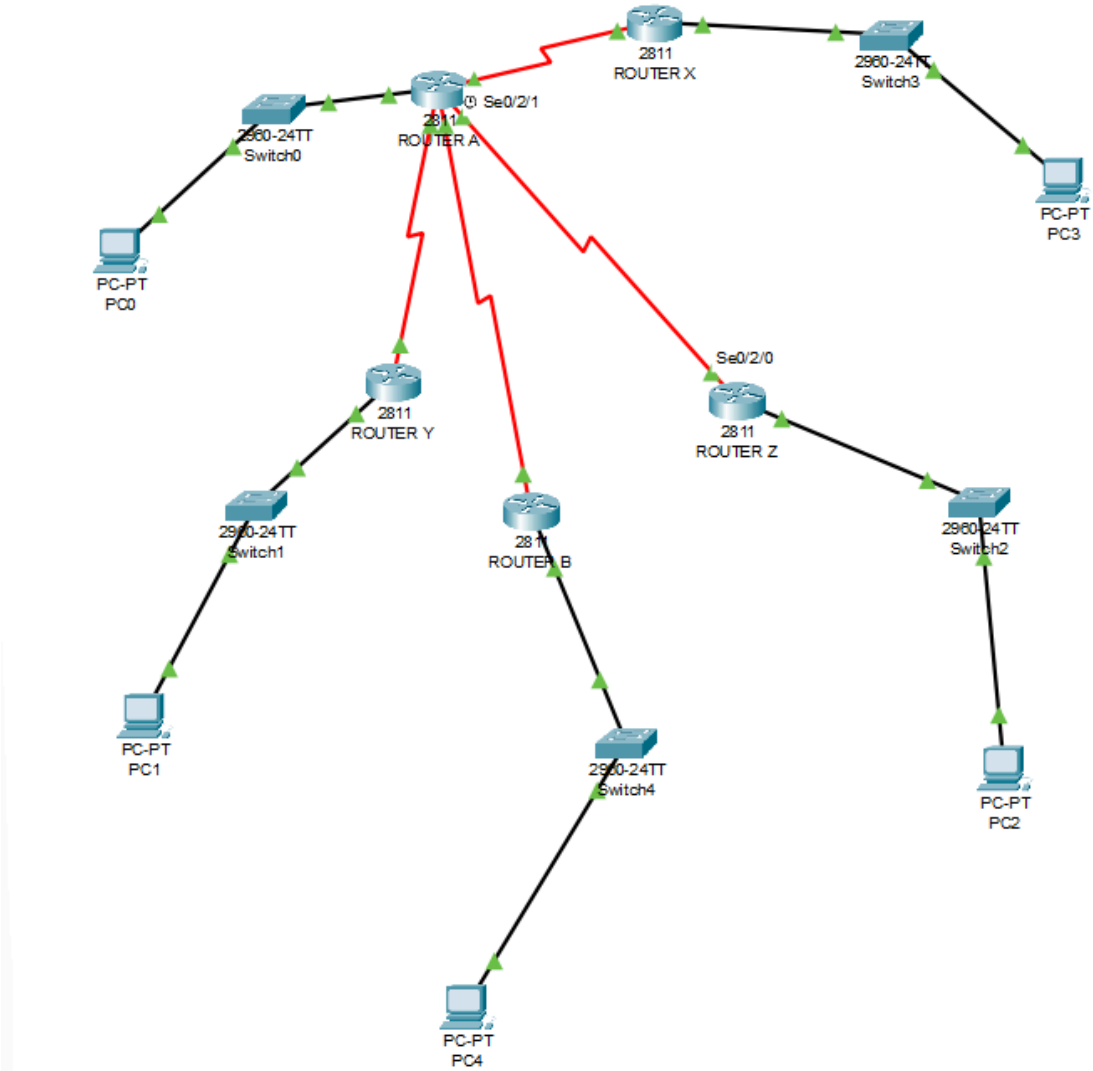
Task 1 – Create in Packet Tracer and record your topology

- Create your topology in Packet Tracer.
- Make sure that every router has **ONE LAN**, with a switch and 1 PC. *Note: You can assign any network address to the LAN – as long as it does not conflict with other network address in the topology).
- A sample is shown below.



- Make sure all the IP addresses ,cables and interfaces done.
- Copy the topology from your Packet Tracer here.

THE HOMEWORK FILE #1



Task 2 – Record your topology's information in an addressing table.

- You have seen an example of addressing table in previous labs. For LAN, use the same address group (example for Router A LAN – use 192.168.x.0/24 , where x is 1 – 9 and does not overlap with the other addresses).
- Create one for your topology in Task 1.Display your Addressing table here. Be sure to be specific (as previous examples show).

Device	Interface	IP Address	Subnet Mask	Gateway	Status
ROUTER A	Serial0/2/0	192.168.1.1	255.255.255.0	-	UP
	FastEthernet0/0	192.168.8.1	255.255.255.0	-	UP
	Serial0/2/1	192.168.2.1	255.255.255.0	-	UP
	Serial0/0/0	192.168.3.1	255.255.255.0	-	UP
	Serial0/0/1	192.168.4.1	255.255.255.0		
ROUTER Y	Serial0/2/1	192.168.1.2	255.255.255.0	-	UP
	FastEthernet0/0	192.168.10.1	255.255.255.0	-	UP
ROUTER X	Serial0/2/0	192.168.3.2	255.255.255.0	-	UP
	FastEthernet0/0	192.168.30.1	255.255.255.0	-	UP
ROUTER Z	Serial 0/2/0	192.168.2.2	255.255.255.0	-	UP
	FastEthernet0/0	192.168.20.1	255.255.255.0	-	UP
ROUTER B	Serial0/2/0	192.168.4.2	255.255.255.0	-	UP
	FastEthernet0/0	192.168.40.1	255.255.255.0	-	UP
PC0	FastEthernet0	192.168.8.10	255.255.255.0	192.168.8.1	
PC1	FastEthernet0	192.168.10.2	255.255.255.0	192.168.10.1	
PC2	FastEthernet0	192.168.20.2	255.255.255.0	192.168.20.1	
PC3	FastEthernet0	192.168.30.2	255.255.255.0	192.168.30.1	
PC4	FastEthernet0	192.168.40.2	255.255.255.0	192.168.40.1	

Task 2 – Record the routing table of all routers.

- In the privilege Exec mode type ***`show ip route`*** to display the routing table for the router.
- Paste the routing table for each router here.
- Look through these routing table for information (to answer Reflection questions).

ROUTER A:

```
Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, Serial0/2/0
L       192.168.1.1/32 is directly connected, Serial0/2/0
     192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.2.0/24 is directly connected, Serial0/2/1
L       192.168.2.1/32 is directly connected, Serial0/2/1
     192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.3.0/24 is directly connected, Serial0/0/0
L       192.168.3.1/32 is directly connected, Serial0/0/0
     192.168.8.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.8.0/24 is directly connected, FastEthernet0/0
L       192.168.8.1/32 is directly connected, FastEthernet0/0
```

ROUTER Y:

```
Router>ENABLE
Router#SHOW IP ROUTE
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, Serial0/2/1
L       192.168.1.2/32 is directly connected, Serial0/2/1
     192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.10.0/24 is directly connected, FastEthernet0/0
L       192.168.10.1/32 is directly connected, FastEthernet0/0

Router#
```

ROUTER Z:

```
Router>ENABLE
Router#SHOW IP ROUTE
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.2.0/24 is directly connected, Serial0/2/0
L       192.168.2.2/32 is directly connected, Serial0/2/0
     192.168.20.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.20.0/24 is directly connected, FastEthernet0/0
L       192.168.20.1/32 is directly connected, FastEthernet0/0

Router#
```

ROUTER X:

```
Router>ENABLE
Router#SHOW IP ROUTE
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.3.0/24 is directly connected, Serial0/2/0
L       192.168.3.2/32 is directly connected, Serial0/2/0
     192.168.30.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.30.0/24 is directly connected, FastEthernet0/0
L       192.168.30.1/32 is directly connected, FastEthernet0/0

Router#
```

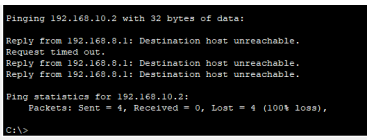
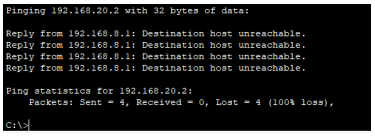
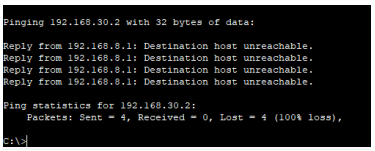
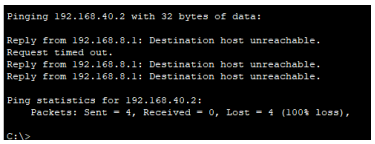
ROUTER B:

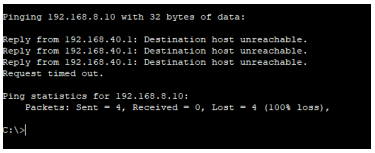
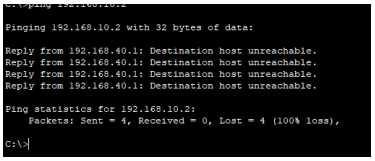
```
Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.4.0/24 is directly connected, Serial0/2/0
L       192.168.4.2/32 is directly connected, Serial0/2/0
     192.168.40.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.40.0/24 is directly connected, FastEthernet0/0
L       192.168.40.1/32 is directly connected, FastEthernet0/0

Router#
```

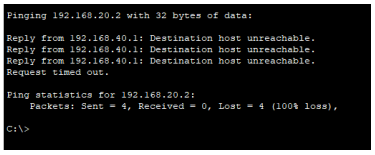
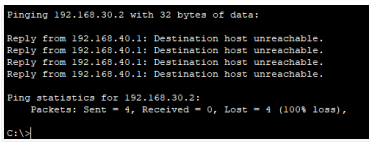
Task 3 – Testing the connection.

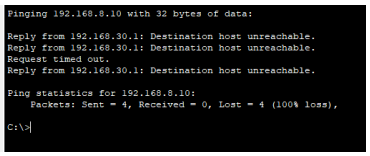
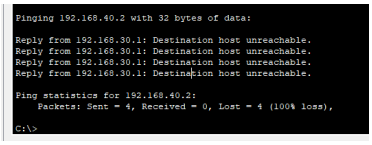
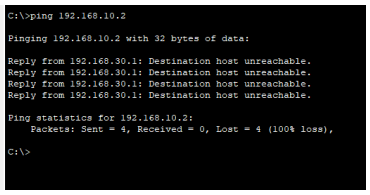
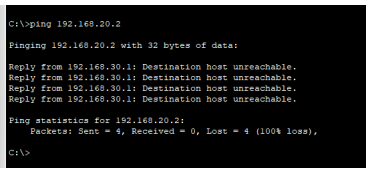
- From a PC in LAN of router A (let's call it PCA of LAN_A), try pinging all the other PCs in te other LANs. What is the outcome?

Table 1

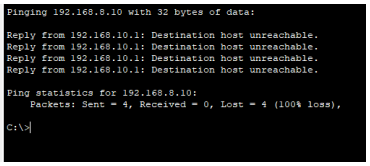
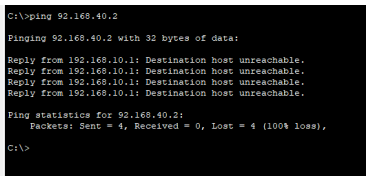
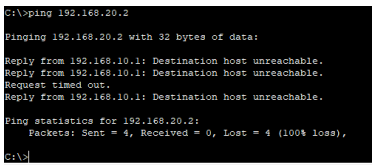
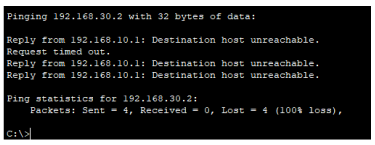
From	To	Ping result
PCA	PCB	 Reply from….Destination host unreachable
PCA	PCX	 Reply from….Destination host unreachable
PCA	PCY	 Reply from….Destination host unreachable
PCA	PCZ	 Reply from….Destination host unreachable

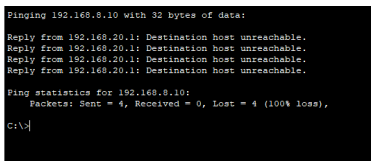
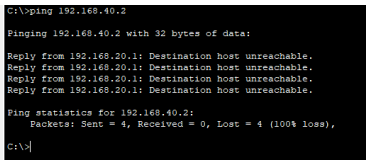
From	To	Ping result
PCB	PCA	 Reply from….Destination host unreachable
PCB	PCX	 Reply from….Destination host unreachable

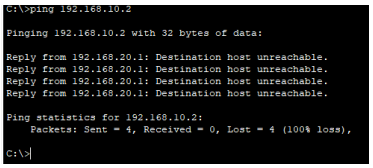
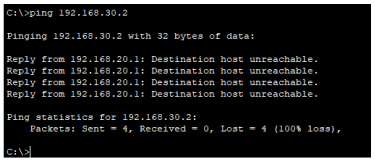
PCB	PCY	 Reply from….Destination host unreachable
PCB	PCZ	 Reply from….Destination host unreachable

From	To	Ping result
PCX	PCA	 Reply from….Destination host unreachable
PCX	PCB	 Reply from….Destination host unreachable
PCX	PCY	 Reply from….Destination host unreachable
PCX	PCZ	 Reply from….Destination host unreachable

From	To	Ping result

PCY	PCA	 Reply from….Destination host unreachable
PCY	PCB	 Reply from….Destination host unreachable
PCY	PCX	 Reply from….Destination host unreachable
PCY	PCZ	 Reply from….Destination host unreachable

From	To	Ping result
PCZ	PCA	 Reply from….Destination host unreachable
PCZ	PCB	 Reply from….Destination host unreachable

PCZ	PCY	 Reply from….Destination host unreachable
PCZ	PCX	 Reply from….Destination host unreachable

- Do the previous step to all the other PCs. Make a table for each PC (like Table 1 above), and paste it here.

Reflection

1. What can you say about the content of the routing table of the router?
2. What kind of connection does the routers have (as shown in its routing table)?
3. In their current situation, can each LAN of each router reach the LAN of the other routers?
4. What is needed to enable end-to-end communication between all the PCs within the topology?

Answers:

1. **Content of the Routing Table**
   The routing table of a router contains information about networks it can reach. Typically, it lists directly connected networks and, if configured, static or dynamic routes to remote networks. In this case, the routing table likely includes only directly connected networks, which means the router does not have knowledge of networks beyond its immediate connections unless additional routing has been implemented.

2. **Type of Connection in the Routing Table**
   Based on the routing table, the routers show **directly connected routes**, which are networks that are physically connected to the router's interfaces. If routing protocols such as RIP or OSPF are not configured, then there are no dynamic routes. Likewise, if static routes are not manually added, the router cannot reach networks that are not directly connected.

3. **Connectivity Between LANs of Different Routers**
   In the current configuration, not all LANs connected to different routers can communicate with each other. Without proper routing information shared between routers, communication is limited to within each individual LAN or directly connected networks. Hence, end-to-end connectivity between all LANs is not possible in this situation.

4. **Requirements for End-to-End Communication**
   To enable full end-to-end communication between all PCs in the topology, routing must be properly configured on all routers. This can be achieved by:

   - Adding **static routes** manually for all remote networks, or
   - Configuring a **dynamic routing protocol** such as RIP or OSPF to allow routers to exchange routing information automatically. Additionally, each PC must be assigned a correct IP address, subnet mask, and default gateway. All router interfaces must also be correctly configured and operational.

Extra information

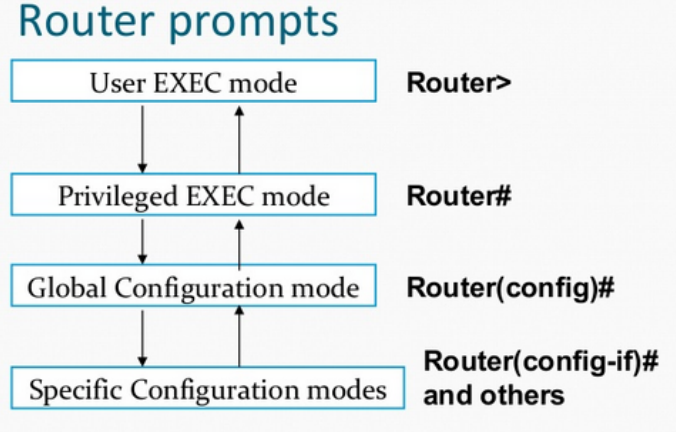


Figure 1: Router prompts