Q1

1. Based on Figure 1-4, analyze the configurations of router R1.
   i) Illustrate the problems and suggest solutions in order for PC1 and PC2 to communicate with other PCs on the Internet.

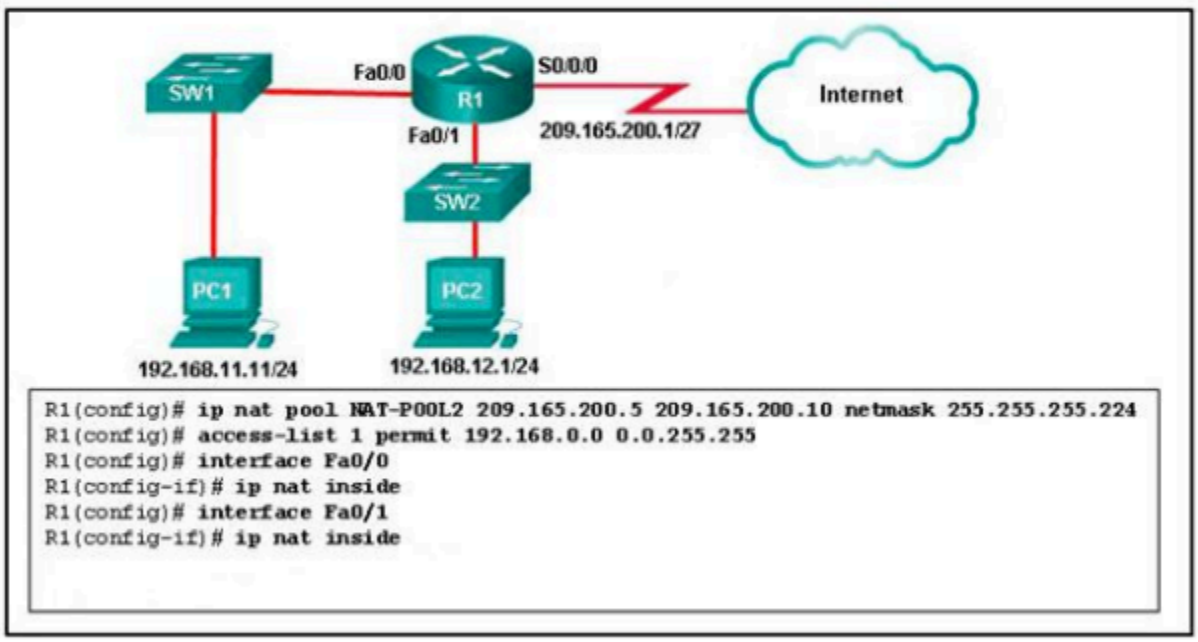

Figure 1-4: NAT

The ip nat outside does not be set. So means that the IP address haven't translated also can be out to the internet.

need to configure:
interface s0/0/0
ip nat outside

Q2

2. Identify the types of Network Address Translation (NAT) shown in Table 3-2a and 3-2b. Compare and contrast differences between these two NATs.

Inside Global Address Pool	Inside Local Address
209.165.200.226	192.168.10.10
209.165.200.227	192.168.10.11
209.165.200.228	192.168.10.12

Table: 3-2a Network Address Translation

Inside Global Address	Inside Local Address
209.165.200.226:1444	192.168.10.10:1444
209.165.200.226:1445	192.168.10.11:1444
209.165.200.226:1446	192.168.10.12:1444

Table: 3-2b Network Address Translation

Table 3-2a

- *Dynamic NAT*
- *Only have limited address for used to translate and follow first come first serve rules.*
- *The IP address that comes first get the first inside global address.*
- *For example, if there are only 3 inside global address in the pool, then only the first three inside local address can be translate, the continue inside local address ping will be failed.*

Table 3-2b

- *Port Address Translation (PAT)*
- *Configure only one IP inside global address but will assigned together with port number with the range from 1 - 65535.*
- *Provide a wide range of available address for translation.*

dynamic nat

- *each inside local IP addrss will translate to an inside global IP*
- *Once the jnside gloabl IP is exhausted, other inside local device not able to outside world*

pat

- *port is being used to uniquely differnt*
- *inside local address share a local global address*
- *not easily exhausted*

Q3

3. What benefit does NAT64 provide?

IPv6 to IPv4

- *Provide access between IPv6-only and IPv4-only networks*

The varieties of NAT for IPv6 are used to transparently provide access between IPv6-only and IPv4-only networks, as shown. It is not used as a form of private IPv6 to global IPv6 translation.

NAT for IPv6 should not be used as a long-term strategy, but as a temporary mechanism to assist in the migration from IPv4 to IPv6.

Q4

4. Analyze Figure 3-1 and Figure 3-2. Identify and rectify the errors for static NAT and dynamic NAT with PAT to be implemented successfully in the network topology. Use Table 3-1 to document your answers. (15 marks)

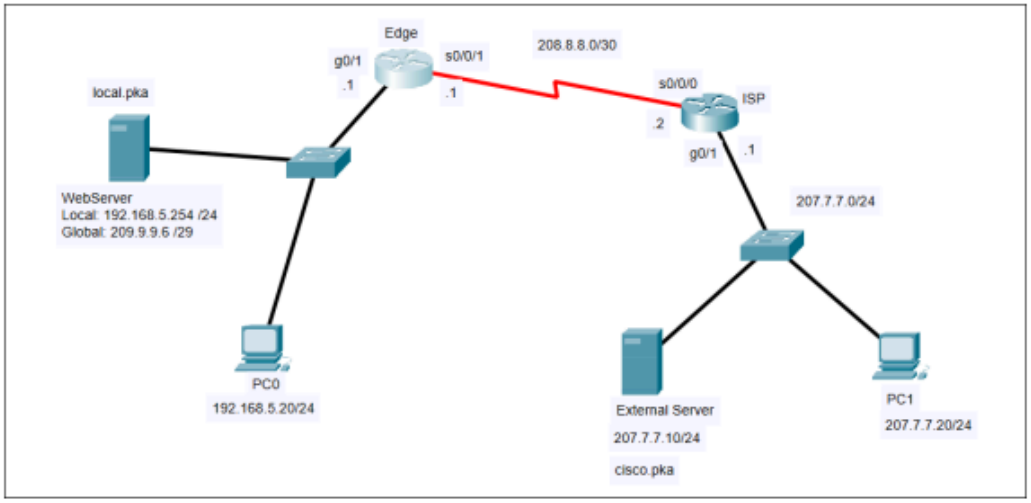

Figure 3-1: Network Topology

Edge router	ISP router
interface GigabitEthernet0/1 ip address 192.168.5.1 255.255.255.0 interface Serial0/0/1 ip address 208.8.8.1 255.255.255.252 ip nat pool EdgePool 209.9.9.1 209.9.9.5 netmask 255.255.255.248 access-list 3 permit 209.9.9.0 0.0.0.7 ip route 0.0.0.0 0.0.0.0 Serial0/0/1	interface GigabitEthernet0/1 ip address 207.7.7.1 255.255.255.0 interface Serial0/0/0 ip address 208.8.8.2 255.255.255.252 clock rate 2000000 ip route 209.9.9.0 255.255.255.248 Serial0/0/0

Figure 3-2: Partial output of "show run"

Table 3-1: Documentation Table

Problems	**Solutions**

Problem	***Solution***
On edge router does not configure the ACL binding	*Add in configuration with command "ip nat source list 3 pool EdgePool s0/0/1"*
ip plnat pool range wrong source	

access list range i wrong	
static (nat not configure)	
nat route is not configure	

Q5

5. A network topology with IPv4 addressing, OSPF configurations and static routing were configured in the respective routers in Figure 3-1 network topology. All PCs are able to communicate with each other. Refer to Figure 3-1, answer the following questions. (202201 pass year)

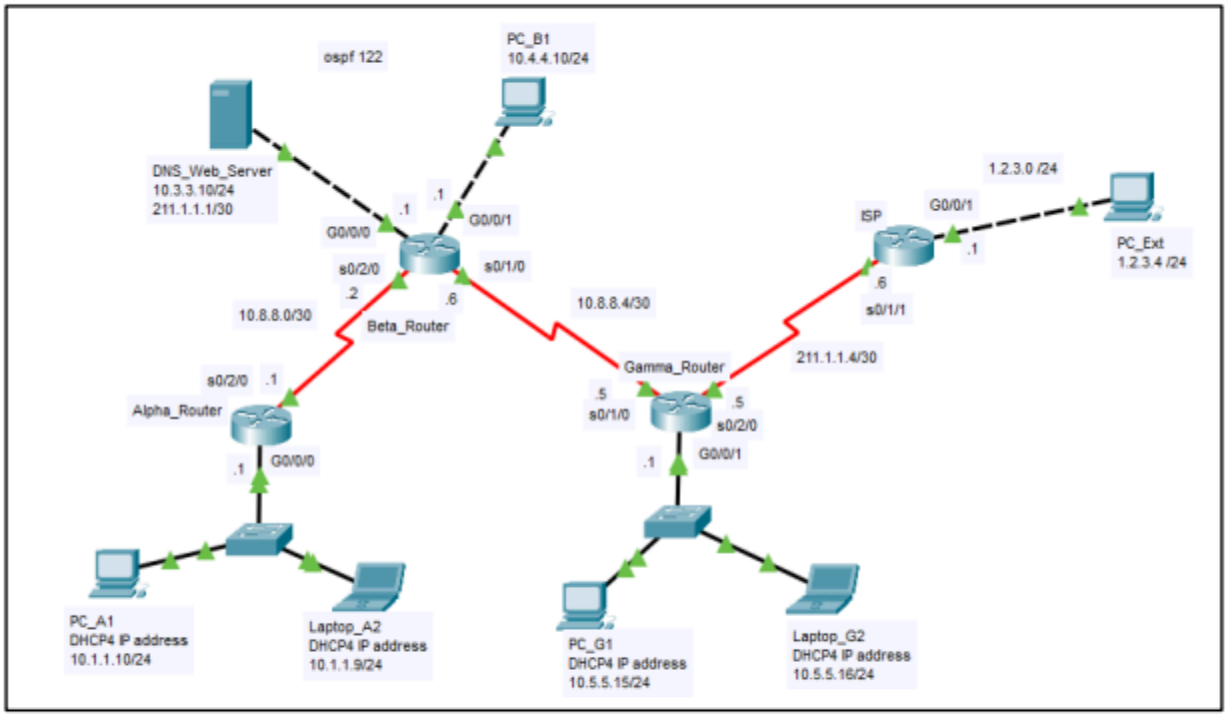

Figure 3-1: A network topology

a) (i) Analyze Figure 3-1 and write a Static NAT configuration in order for DNS_Web_Server to be directly reachable from the Internet. Specify the router to implement Static NAT. (3 marks)

Gamma_Router
ip nat source static 10.3.3.10 211.1.1.1

int s0/1/0
ip nat inside

int s0/2/0
ip nat outside

(ii) Examine Figure 3-1 and write the configurations for Port Address Translation (PAT) using the **single IP address** assigned to the external interface in Gamma_Router. Access-list number is 72. All the PCs should be able to ping the PC_Ext. (8 marks)

ip nat inside source list 72 interface s0/2/0 overload
access-list 72 permit 10.4.4.0 0.0.0.255
access-list 72 permit 10.1.1.0 0.0.0.255
access-list 72 permit 10.5.5.0 0.0.0.255
access-list 72 permit 10.3.3.0 0.0.0.255

int s0/1/0
ip nat inside

int g0/0/1
ip nat inside

int s0/2/0
ip nat outside