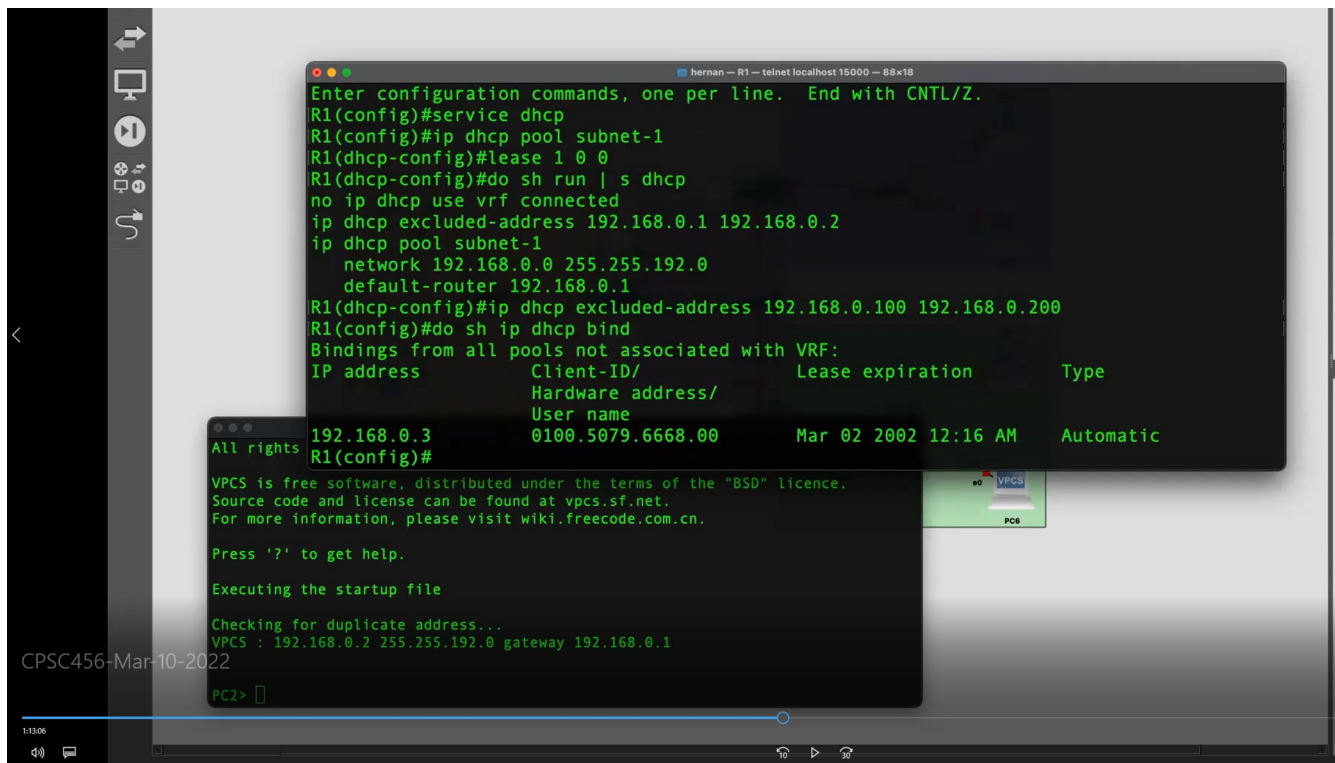


Display the current static routing table in global config mode.

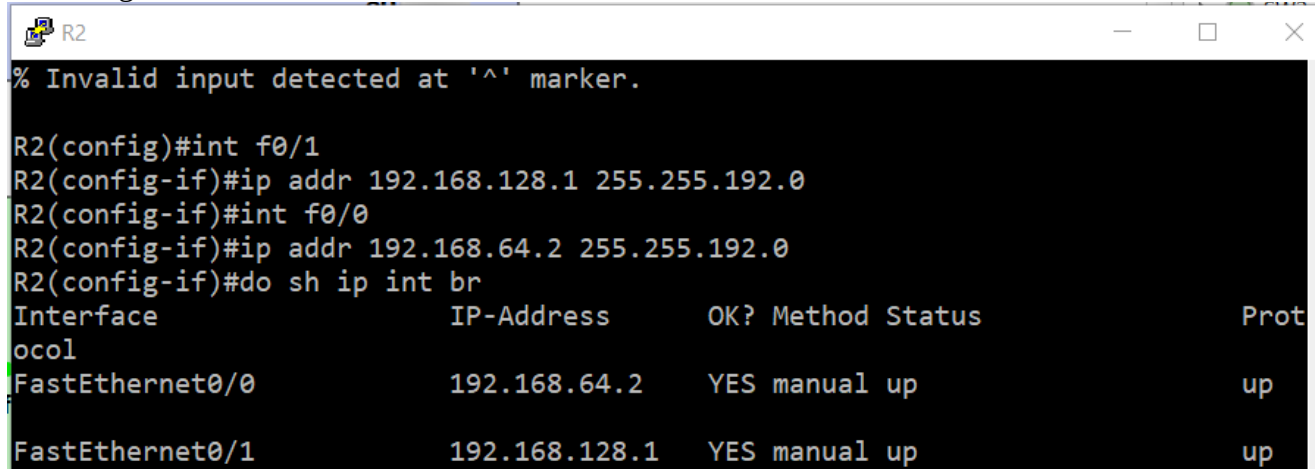
R1#~~do~~ sh ip route static

Verify that the appropriate next hop address in the static routing table as entered.

```
R1#sh ip route static
S 192.168.192.0/18 [1/0] via 192.168.64.3
S 192.168.128.0/18 [1/0] via 192.168.64.2
R1#
```



R2 configuration:



add the static route destined for subnet #1

```
ip route 192.168.0.0 255.255.192.0 192.168.64.1
```

Add the static route destined for 192.168.128.0/18 (subnet #4).

```
R1(config)#ip route 192.168.192.0 255.255.192.0 192.168.64.3
```

```
R2(config)#ip route 192.168.0.0 255.255.192.0 192.168.64.1
R2(config)#ip route 192.168.192.0 255.255.192.0 192.168.64.3
R2(config)#do sh ip route static
S    192.168.192.0/18 [1/0] via 192.168.64.3
S    192.168.0.0/18 [1/0] via 192.168.64.1
```

Enable DHCP service

```
R1(config)#service dhcp
```

Create a DHCP pool named subnet-3

```
R1(config)#ip dhcp pool subnet-3
```

Assign the subnet #3 address to the DHCP pool.

```
R1(dhcp-config)#network 192.168.128.0 255.255.192.0
```

Set the lease time to 1 day. lease format: *<days> <hours> <minutes>*

```
R1(dhcp-config)#lease 1 0 0
```

Set the designated default gateway.

```
R1(dhcp-config)#default-router 192.168.128.1
```

Note: The DHCP OFFER message sent to the client by the DHCP server will include both of the lease time and gateway address along with the available IPv4 address.

Exclude the host address range that were already assigned (f0/1 and PC4?) through static assignments. It can be used with a single address or range using two IP addresses. Use the help (?) command to better understand this command.

```
R1(dhcp-config)#ip dhcp excluded-address 192.168.128.1 192.168.128.4
```

Save the running-config to startup-config under the global configuration mode.

```
R1(config)#do wr
```

Display DHCP leases, if any, in the global config mode. It should be empty. Let PC1 successfully lease an IP address from the DHCP server (R1), then run it again. Note that it is okay if the address is different as labeled in the diagram.

```
R1(config)#do sh ip dhcp bind
```

video progress at 1:21:46

Router R3 configuration

Enter the global config mode.

```
R1#conf t
```

Set the designated host address for the R3 f0/1 interface and enable it.

```
R1(config)#int f0/1
```

```
R1(config-if)#ip addr 192.168.192.1 255.255.192.0
```

```
R1(config-if)#no shut
```

Set the designated host address for the R3 f0/0 interface and enable it.

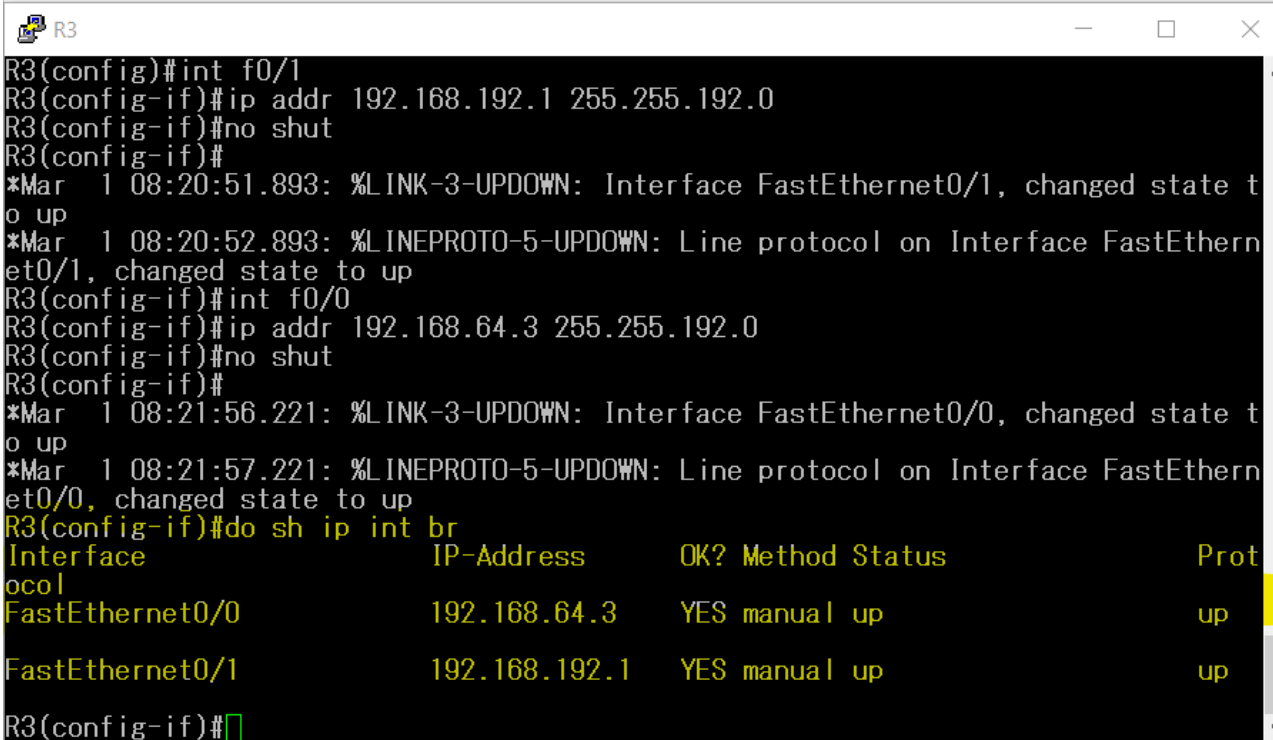
```
R1(config)#int f0/0
```

```
R1(config-if)#ip addr 192.168.64.3 255.255.192.0
```

```
R1(config-if)#no shut
```

Display the router's brief summary interface to verify the IP address assignments and both interfaces are enabled.

```
R1(config-if)#do sh ip int br
```



```
R3
R3(config)#int f0/1
R3(config-if)#ip addr 192.168.192.1 255.255.192.0
R3(config-if)#no shut
R3(config-if)#
*Mar 1 08:20:51.893: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
*Mar 1 08:20:52.893: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
R3(config-if)#int f0/0
R3(config-if)#ip addr 192.168.64.3 255.255.192.0
R3(config-if)#no shut
R3(config-if)#
*Mar 1 08:21:56.221: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar 1 08:21:57.221: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R3(config-if)#do sh ip int br
Interface                IP-Address      OK? Method Status      Prot
ocol
FastEthernet0/0          192.168.64.3    YES manual  up          up
FastEthernet0/1          192.168.192.1   YES manual  up          up
R3(config-if)#
```

Return to the Privilege EXEC mode.

```
R1(config-if)#end
```

Save the current running-config to the startup-config in the Privilege EXEC mode.

```
R1#wr
```

Router R3 - Static Routing

Static route format: <destination_subnet> <destination_subnet_mask>
<next_hop_address>

Display the current static routing table in Privilege EXEC mode. It should be empty at this point.

```
R1#sh ip route static
```

Enter the global configuration mode.

```
R1#conf t
```

add the static route destined for subnet #1

```
ip route 192.168.0.0 255.255.192.0 192.168.64.1
```

Add the static route destined for 192.168.128.0/18 (subnet #3).

```
R1(config)#ip route 192.168.128.0 255.255.192.0 192.168.64.2
```

Display the current static routing table in global config mode.

```
R1(config-if)#do sh ip route static
```

```
R3#sh ip route static  
  
R3#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
R3(config)#ip route 192.168.0.0 255.255.192.0 192.168.64.1  
R3(config)#ip route 192.168.128.0 255.255.192.0 192.168.64.2  
R3(config)#do sh ip route static  
S    192.168.128.0/18 [1/0] via 192.168.64.2  
S    192.168.0.0/18 [1/0] via 192.168.64.1  
R3(config)#
```

Verify that the appropriate next hop address in the static routing table as entered.

Return to the global config mode.

```
R1(config-if)#exit
```

Router R3 - DHCP Service

Enable DHCP service

```
R1(config)#service dhcp
```

Create a DHCP pool named subnet-4.

```
R1(config)#ip dhcp pool subnet-4
```

Assign the subnet #4 address to the DHCP pool.

```
R1(dhcp-config)#network 192.168.192.0 255.255.192.0
```

Set the lease time to 1 day. lease format: *<days> <hours> <minutes>*

```
R1(dhcp-config)#lease 1 0 0
```

Set the designated default gateway.

```
R1(dhcp-config)#default-router 192.168.192.1
```

Note: The DHCPOFFER message sent to the client by the DHCP server will include both of the lease time and gateway address along with the available IPv4 address.

Exclude the host address range that were already assigned (f0/1 and PC6?) through static assignments. It can be used with a single address or range using two IP addresses. Use the help (?) command to better understand this command.

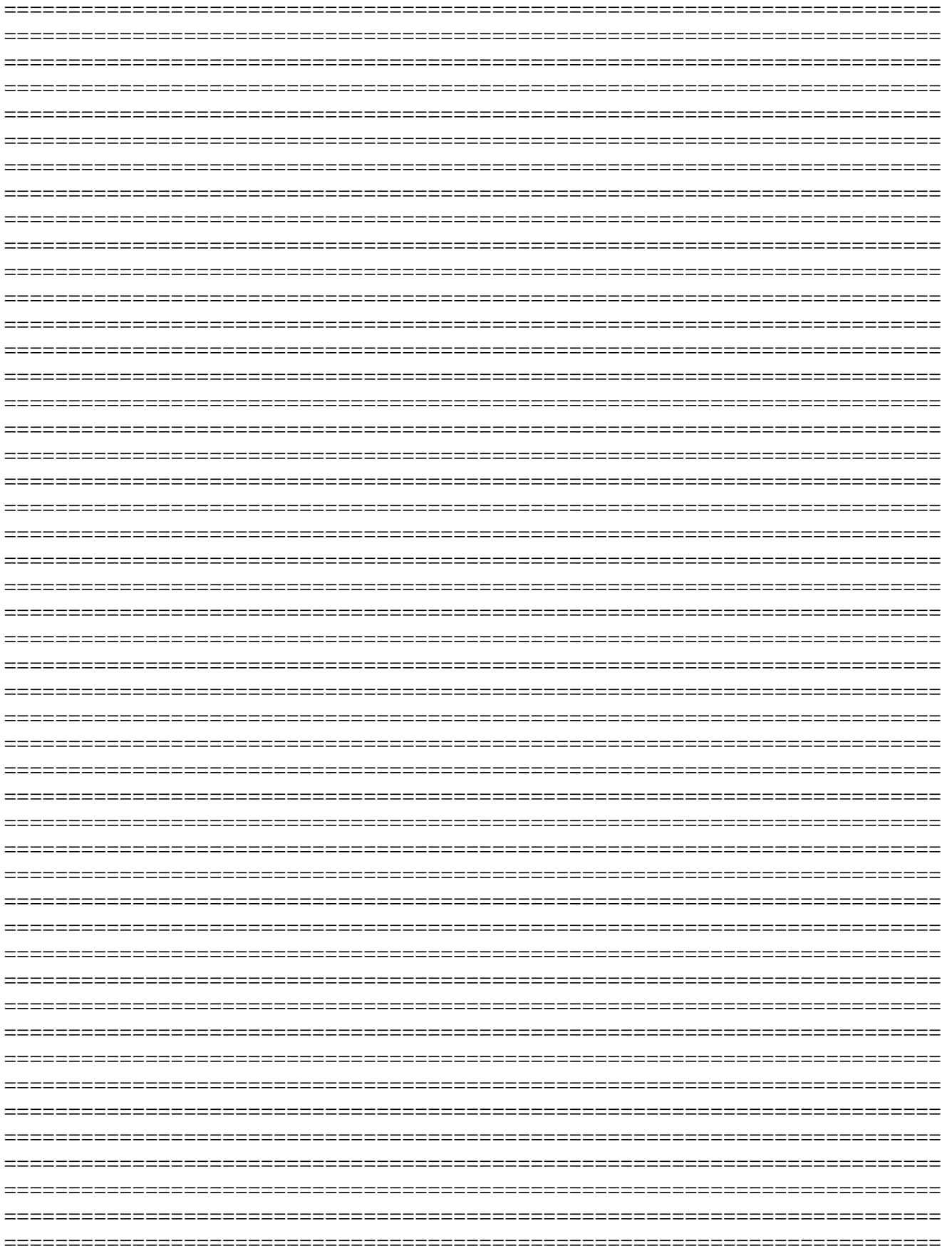
```
R1(dhcp-config)#ip dhcp excluded-address 192.168.192.1 192.168.192.6
```

Save the running-config to startup-config under the global configuration mode.

```
R1(config)#do wr
```

Display DHCP leases, if any, in the global config mode. It should be empty. Let PC5? successfully lease an IP address from the DHCP server (R3), then run it again. Note that it is okay if the address is different as labeled in the diagram.

```
R1(config)#do sh ip dhcp bind
```

Part 2: The actual tryhackme questions:

What is the original subnet where all 4 subnets are derived?

192.168.0.0/16

Correct Answer

done see the reverse subnets document for more info

Configure the hosts below with manual IPv4 addresses based on the given network topology using the following format "ip <host_address>/<cidr_netmask> <gateway_address>"

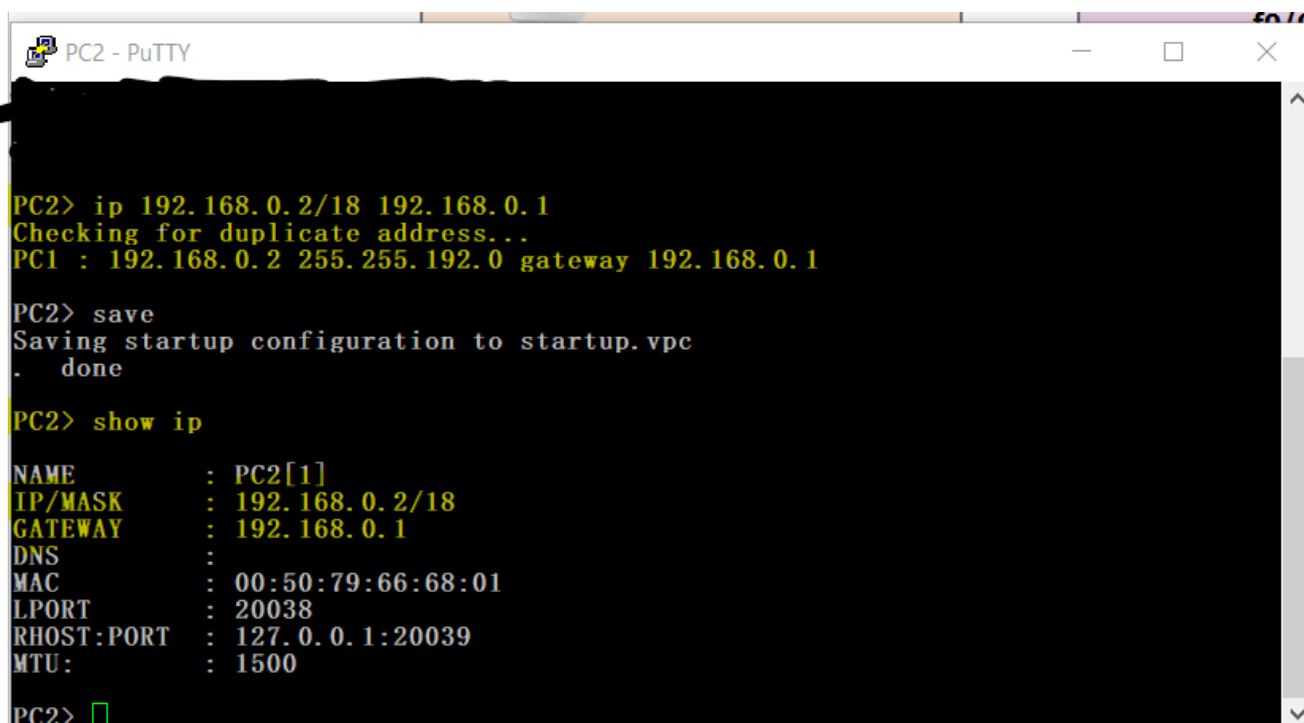
PC2: ip 192.168.0.2/18 192.168.0.1

Configure the hosts below with manual IPv4 addresses based on the given network topology using the following format "ip <host_address>/<cidr_netmask> <gateway_address>"

PC2: ip 192.168.0.2/18 192.168.0.1

No answer needed

Completed



```
PC2> ip 192.168.0.2/18 192.168.0.1
Checking for duplicate address...
PC1 : 192.168.0.2 255.255.192.0 gateway 192.168.0.1

PC2> save
Saving startup configuration to startup.vpc
. done

PC2> show ip

NAME       : PC2[1]
IP/MASK    : 192.168.0.2/18
GATEWAY    : 192.168.0.1
DNS        :
MAC        : 00:50:79:66:68:01
LPORT     : 20038
RHOST:PORT : 127.0.0.1:20039
MTU       : 1500

PC2> 
```


PC4: _____

PC4: _____

Answer format: ** ***,***,***,***/** ***,***,***,**

 Submit

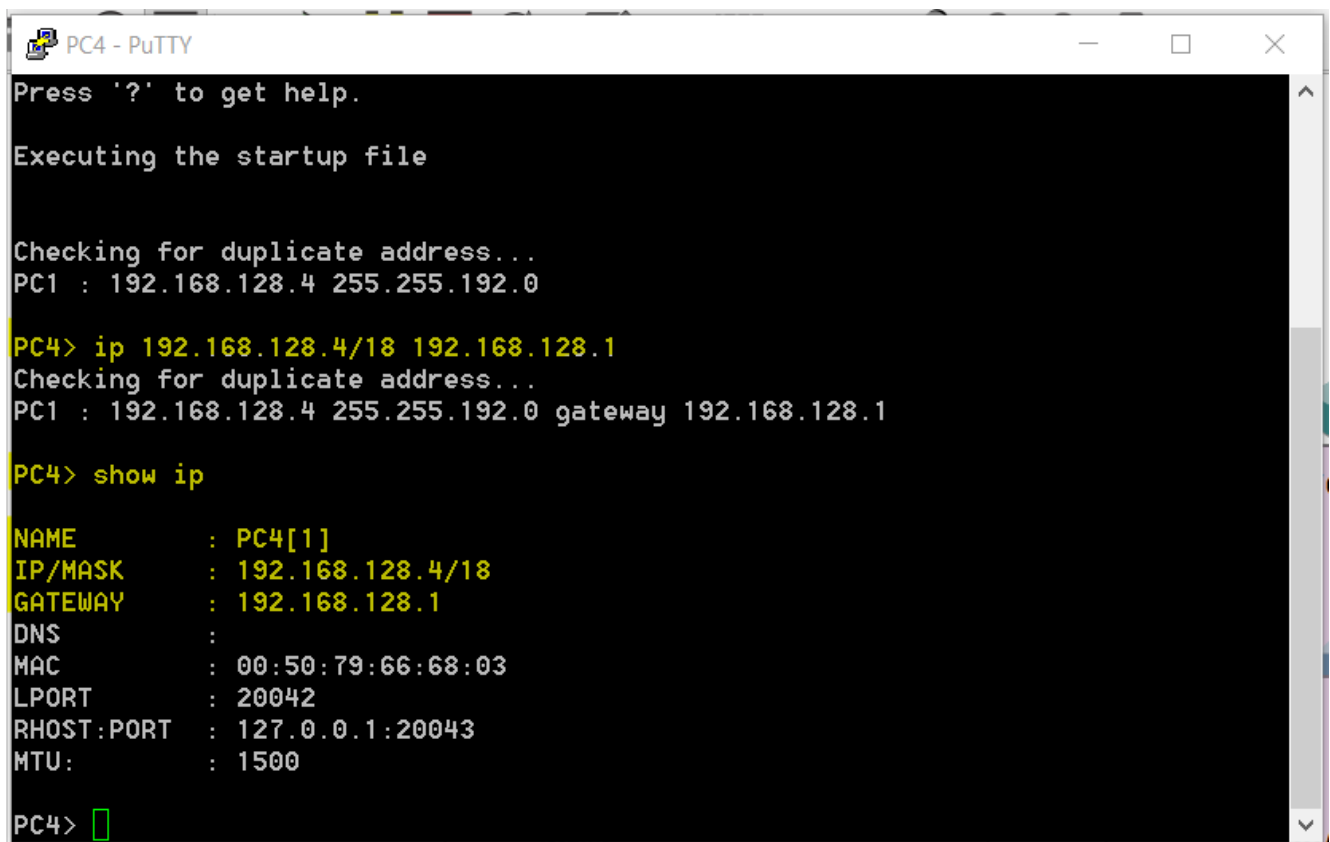
"ip <host_address>/<cidr_netmask > <gateway_address>"

host_address = 192.168.128.4

cidr_netmask = 18

gateway_address = 192.168.128.1

PC4: ip 192.168.128.4/18 192.168.128.1



```
PC4 - PuTTY
Press '?' to get help.

Executing the startup file

Checking for duplicate address...
PC1 : 192.168.128.4 255.255.192.0

PC4> ip 192.168.128.4/18 192.168.128.1
Checking for duplicate address...
PC1 : 192.168.128.4 255.255.192.0 gateway 192.168.128.1

PC4> show ip

NAME       : PC4[1]
IP/MASK     : 192.168.128.4/18
GATEWAY     : 192.168.128.1
DNS         :
MAC         : 00:50:79:66:68:03
LPORT       : 20042
RHOST:PORT  : 127.0.0.1:20043
MTU         : 1500

PC4> 
```

next

PC4: _____

ip 192.168.128.4/18 192.168.128.1

Correct Answer

PC6: _____

Answer format: ** ***,***,***,***/** ***,***,***,**

Submit

PC6: _____

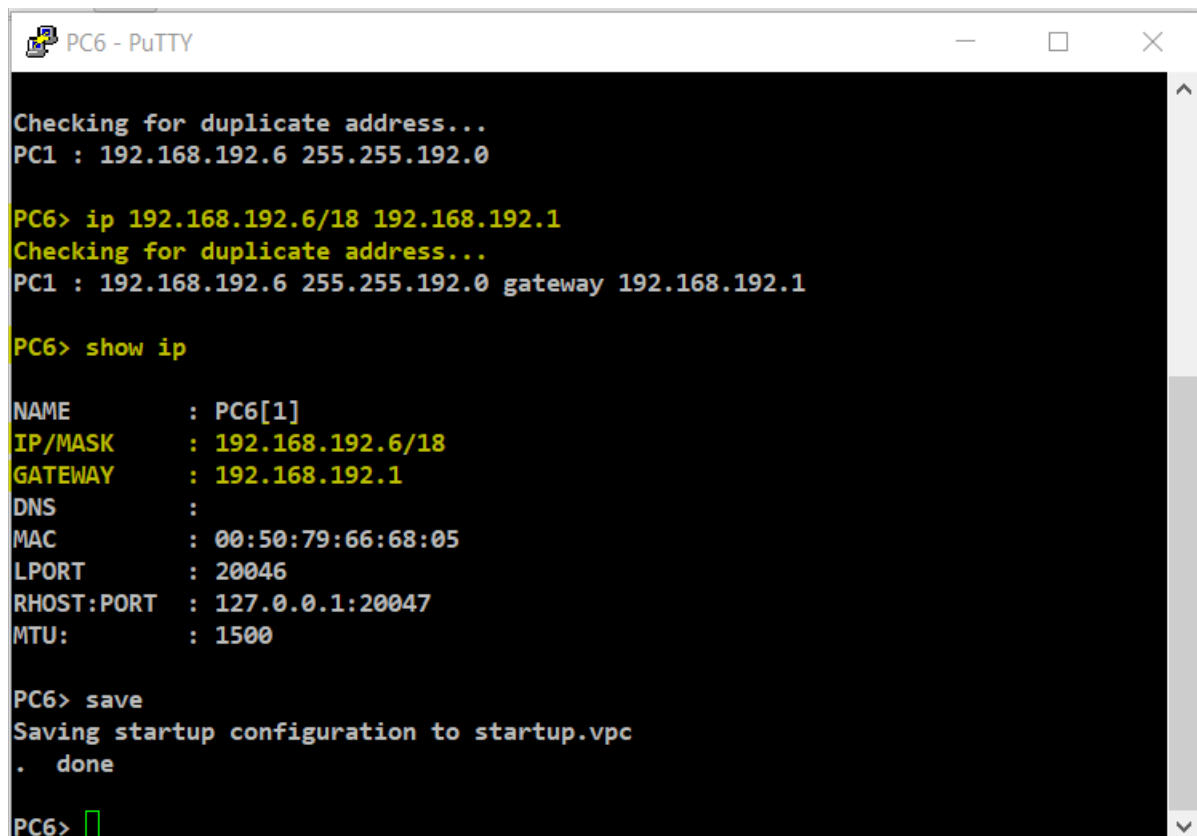
Configure the hosts below with manual IPv4 addresses based on the given network topology using the following format "ip <host_address>/<cidr_netmask> <gateway_address>"

host_address = 192.168.192.6

cidr_netmask = /18

gateway_address = 192.168.192.1

PC6: ip 192.168.192.6/18 192.168.192.1



```
PC6 - PuTTY
Checking for duplicate address...
PC1 : 192.168.192.6 255.255.192.0
PC6> ip 192.168.192.6/18 192.168.192.1
Checking for duplicate address...
PC1 : 192.168.192.6 255.255.192.0 gateway 192.168.192.1
PC6> show ip
NAME       : PC6[1]
IP/MASK    : 192.168.192.6/18
GATEWAY    : 192.168.192.1
DNS        :
MAC        : 00:50:79:66:68:05
LPORT      : 20046
RHOST:PORT : 127.0.0.1:20047
MTU        : 1500
PC6> save
Saving startup configuration to startup.vpc
. done
PC6> 
```

next

Configure the router interfaces as assigned in the diagram.

Refer to the **Router R1 - Interface Configurations** in the description section.

No answer needed

Correct Answer

Router R2 - Interface Configurations

```
R2#conf t
R2(config)#int f0/1
```

Enter the assigned static IPv4 address of R2 f0/1.

R2(config-if)# _____

Answer format: ** ***** ***,***,* ***,***,***,*

 Submit

Router R2 - Interface Configurations

```
R2#conf t
R2(config)#int f0/1
```

Enter the assigned static IPv4 address of R2 f0/1.
R2(config-if)# _____

example:

Set the designated host address for the R1 f0/1 interface and enable it.

```
R1(config)#int f0/1
R1(config-if)#ip addr 192.168.0.1 255.255.192.0
R1(config-if)#no shut
```

```
R2(config-if)# ip addr 192.168.128.1 255.255.192.0
R2(config-if)#no shut
```

```
R2#
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#int f0/1
R2(config-if)#ip addr 192.168.128.1 255.255.192.0
R2(config-if)#no shut
R2(config-if)#wr
^
% Invalid input detected at '^' marker.

R2(config-if)#do wr
Building configuration...
[OK]
R2(config-if)#sh ip int br
^
% Invalid input detected at '^' marker.

R2(config-if)#do sh ip int br
Interface                IP-Address      OK? Method Status      Prot
ocol
FastEthernet0/0          192.168.64.2    YES NVRAM    up          up
FastEthernet0/1          192.168.128.1   YES NVRAM    up          up
R2(config-if)#
```

next

Enter the assigned static IPv4 address of R2 f0/1.

R2(config-if)# _____

ip addr 192.168.128.1 255.255.192.0

Correct Answer

Enable the R2 f0/1 interface.

R2(config-if)# _____

no shut

Correct Answer

Switch to the router interface f0/0.

R2(config-if)# _____

int f0/0

Correct Answer

Enter the assigned static IPv4 address of R2 f0/0.

R2(config-if)# _____

Enable the R2 f0/0 interface.

R2(config-if)#no shut

Answer format: * * * * * , * * * , * * * , * * * , * * * , *

 Submit

Return to the Privilege EXEC mode.

R2(config-if)#end

Display a brief summary of the interfaces' IP addresses.

R2# _____

Save the running-config to startup-config in Privilege EXEC mode.

R2#wr

Answer format: * * * * *

 Submit

Enter the assigned static IPv4 address of R2 f0/0.

R2(config-if) # _____

Enable the R2 f0/0 interface.

R2(config-if) #no shut

example:

Set the designated host address for the R1 f0/0 interface and enable it.

R1(config)#int f0/0

R1(config-if)#ip addr 192.168.64.1 255.255.192.0

R1(config-if)#no shut

R2(config)#int f0/0

R2(config-if)#ip addr 192.168.64.2 255.255.192.0

R2(config-if)#no shut

```
R2
R2(config-if)#int f0/0
R2(config-if)#ip addr 192.168.64.2 255.255.192.0
R2(config-if)#sh ip int br
% Invalid input detected at '^' marker.

R2(config-if)#do sh ip int br
Interface IP-Address OK? Method Status Prot
ocol
FastEthernet0/0 192.168.64.2 YES NVRAM up up
FastEthernet0/1 192.168.128.1 YES NVRAM up up

R2(config-if)#do wr
Building configuration...
[OK]
R2(config-if)#no shut
R2(config-if)#do sh ip int br
Interface IP-Address OK? Method Status Prot
ocol
FastEthernet0/0 192.168.64.2 YES NVRAM up up
FastEthernet0/1 192.168.128.1 YES NVRAM up up
R2(config-if)#
```

next

R2#conf t
R2(config)#int f0/1

Enter the assigned static IPv4 address of R2 f0/1.
R2(config-if)# _____

ip addr 192.168.128.1 255.255.192.0

Correct Answer

Enable the R2 f0/1 interface.
R2(config-if)# _____

no shut

Correct Answer

Switch to the router interface f0/0.
R2(config-if)# _____

int f0/0

Correct Answer

Enter the assigned static IPv4 address of R2 f0/0.
R2(config-if)# _____

Enable the R2 f0/0 interface.
R2(config-if)#no shut

ip addr 192.168.64.2 255.255.192.0

Correct Answer

Return to the Privilege EXEC mode.
R2(config-if)#end

Display a brief summary of the interfaces' IP addresses.
R2# _____

Save the running-config to startup-config in Privilege EXEC mode.
R2#wr

sh ip int br

Correct Answer

next

Access the router R3 f0/1.

Enter the assigned static IPv4 address for R3 f0/1.

R3(config-if)# _____

Answer format: ** *****.***.***.* ****.***.***.*

 Submit

Enable the R3 f0/1 interface.

R3(config-if)# _____

Answer format: ** *****

 Submit

Access the router R3 f0/0.

Enter the assigned static IPv4 address for R3 f0/0.

R3(config-if)# _____

Answer format: ** *****.***.***.* ****.***.***.*

 Submit

Enable the R3 f0/1 interface.

R3(config-if)# _____

Answer format: ** *****

 Submit

Save the running-config to startup-config while in the interface level config mode.

R3(config-if)# _____

Return to the Privilege EXEC mode.

R3(config-if)#end

Answer format: ** **

 Submit

next

Access the router R3 f0/1.

Enter the assigned static IPv4 address for R3 f0/1.

R3(config-if) # _____

example:

Enter the global config mode.

R1#**conf t**

Set the designated host address for the R1 f0/1 interface and enable it.

R1(config)#**int f0/1**

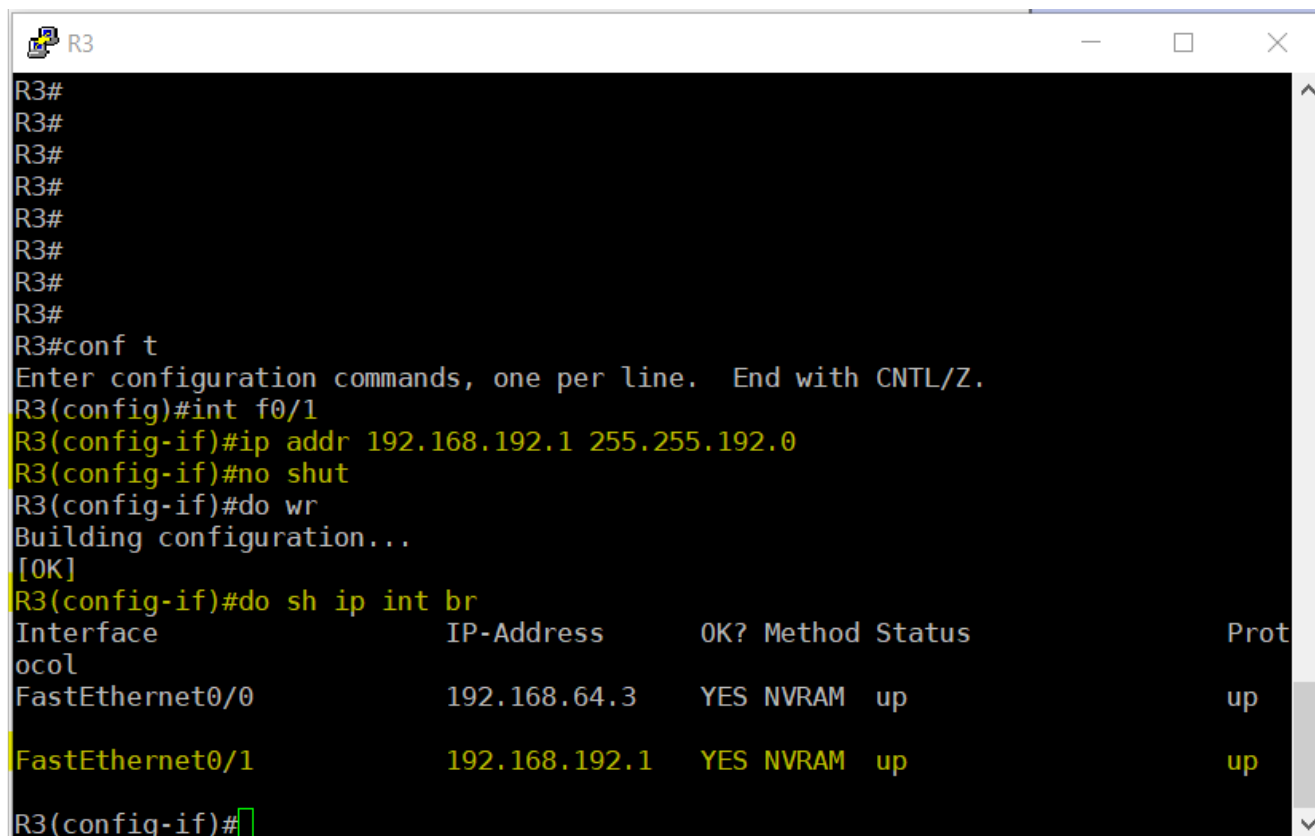
R1(config-if)#**ip addr 192.168.0.1 255.255.192.0**

R1(config-if)#**no shut**

R3#**conf t**


```
R3(config)#int f0/1
R3(config-if)#ip addr 192.168.192.1 255.255.192.0
R3(config-if)#no shut

R3(config-if) # do sh ip int br
```



```
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#int f0/1
R3(config-if)#ip addr 192.168.192.1 255.255.192.0
R3(config-if)#no shut
R3(config-if)#do wr
Building configuration...
[OK]
R3(config-if)#do sh ip int br
Interface                IP-Address      OK? Method Status Prot
FastEthernet0/0          192.168.64.3    YES NVRAM  up    up
FastEthernet0/1          192.168.192.1   YES NVRAM  up    up
R3(config-if)#
```

next

Access the router R3 f0/0.

Enter the assigned static IPv4 address for R3 f0/0.

```
R3(config-if) # _____
```

example:

Set the designated host address for the R1 f0/0 interface and enable it.

```
R1(config)#int f0/0
R1(config-if)#ip addr 192.168.64.1 255.255.192.0
R1(config-if)#no shut
```

```
R3(config)#int f0/0
R3(config-if)#ip addr 192.168.64.3 255.255.192.0
R3(config-if)#no shut
```

```
R3
R3(config-if)#
R3(config-if)#
R3(config-if)#
R3(config-if)#
R3(config-if)#
R3(config-if)#
R3(config-if)#
R3(config-if)#
R3(config-if)#
R3(config-if)#int f0/0
R3(config-if)#ip addr 192.168.64.3 255.255.192.0
R3(config-if)#no shut
R3(config-if)#do wr
Building configuration...
[OK]
R3(config-if)#do sh ip int br
Interface                IP-Address      OK? Method Status      Prot
ocol
FastEthernet0/0          192.168.64.3    YES NVRAM    up          up
FastEthernet0/1          192.168.192.1  YES NVRAM    up          up
R3(config-if)#
```

next

Router R3 - Interface Configurations

Enter the global configuration mode.

R3# _____

conf t

Correct Answer

Access the router R3 f0/1.

Enter the assigned static IPv4 address for R3 f0/1.

R3(config-if)# _____

ip addr 192.168.192.1 255.255.192.0

Correct Answer

Enable the R3 f0/1 interface.

R3(config-if)# _____

no shut

Correct Answer

Access the router R3 f0/0.

Enter the assigned static IPv4 address for R3 f0/0.

R3(config-if)# _____

ip addr 192.168.64.3 255.255.192.0

Correct Answer

Enable the R3 f0/1 interface.

R3(config-if)# _____

no shut

Correct Answer

Save the running-config to startup-config while in the interface level config mode.

R3(config-if)# _____

Return to the Privilege EXEC mode.

R3(config-if)#end

do wr

Correct Answer

next

Configure the static routes for each router.

Use the **Router R1 - Static Routes** section in the description for reference to configure the static routes on both routers R2 and R3.

No answer needed

Question Done

Router R2 - Static Routes

Static route format: `<destination_subnet> <destination_subnet_mask> <next_hop_address>`

Enter the global configuration mode.

Add the static route destined for 192.168.0.0/18 (subnet #1).

```
R2(config)#
```

Answer format: ** ***** ***,***,*,* ****,****,****,* ****,****,****,*

Submit

Add the static route destined for 192.168.192.0/18 (subnet #4).

R2(config)#

```
ip route 192.168.192.0 255.255.192.0 192.168.64.3
```

Correct Answer

Display the current static routing table in the global config mode.

```
R2(config)#
```

Return to the global config mode.

Save the running-config to startup-config in the global config mode.

Answer format: ** ** ** ***** *****

Submit

Configure the static routes for each router.

Use the **Router R1 - Static Routes** section in the description for reference to configure the static routes on both routers R2 and R3.

Router R2 - Static Routes

Static route format: `<destination_subnet> <destination_subnet_mask>
<next_hop_address>`

Enter the global configuration mode.

Add the static route destined for 192.168.0.0/18 (subnet #1).

```
R2 (config) #
```

example:

Static route format: <destination_subnet> <destination_subnet_mask>
<next hop address>

Display the current static routing table in Privilege EXEC mode. It should be

empty at this point.

```
R1#sh ip route static
```

//I don't have a screenshot of the blank

//This is what it looks like for R3:

```
R3#sh ip route static
```

Enter the global configuration mode.

```
R1#conf t
```

Add the static route destined for 192.168.128.0/18 (subnet #3).

```
R1(config)#ip route 192.168.128.0 255.255.192.0 192.168.64.2
```

Add the static route destined for 192.168.128.0/18 (subnet #4).

```
R1(config)#ip route 192.168.192.0 255.255.192.0 192.168.64.3
```

Display the current static routing table in global config mode.

```
R1(config-if)#do sh ip route static
```

Verify that the appropriate next hop address in the static routing table as entered.

Return to the global config mode.

```
R1(config-if)#exit
```

Add the static route destined for 192.168.0.0/18 (subnet #1).

```
R2(config)#_____
```

```
R2(config)#ip route 192.168.0.0 255.255.192.0 192.168.64.1
```

Add the static route destined for 192.168.192.0/18 (subnet #4).

```
R2(config)#_____
```

```
R2(config)#ip route 192.168.192.0 255.255.192.0 192.168.64.3
```

Display the current static routing table in the global config mode.

```
R2(config)#_____
```

Return to the global config mode.

Save the running-config to startup-config in the global config mode.

```
R2(config-if)#do sh ip route static
```

```
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip route 192.168.0.0 255.255.192.0 192.168.64.1
R2(config)#ip route 192.168.192.0 255.255.192.0 192.168.64.3
R2(config)#do sh ip route static
$ 192.168.192.0/18 [1/0] via 192.168.64.3
$ 192.168.0.0/18 [1/0] via 192.168.64.1
R2(config)#end
R2#
*Mar 1 01:04:01.059: %SYS-5-CONFIG_I: Configured from console by console
R2#wr
Building configuration...
[OK]
R2#
```

next

Router R2 - Static Routes

Static route format: <destination_subnet> <destination_subnet_mask> <next_hop_address>

Enter the global configuration mode.

Add the static route destined for 192.168.0.0/18 (subnet #1).

R2(config)#_____

ip route 192.168.0.0 255.255.192.0 192.168.64.1

Correct Answer

Add the static route destined for 192.168.192.0/18 (subnet #4).

R2(config)#_____

ip route 192.168.192.0 255.255.192.0 192.168.64.3

Correct Answer

Display the current static routing table in the global config mode.

R2(config)#_____

Return to the global config mode.

Save the running-config to startup-config in the global config mode.

do sh ip route static

Correct Answer

next

Router R3 - Static Routes

Enter the global configuration mode.

Add the static route destined for subnet #1.

R2(config)# _____

Answer format: ** ***** ***,***.* ***,***.* ***,***.*

 Submit

Add the static route destined for subnet #3.

R2(config)# _____

Answer format: ** ***** ***,***.* ***,***.* ***,***.*

 Submit

Display the current static routing table in global config mode.

Return to the global config mode.

Save the running-config to startup-config in global config mode.

No answer needed

Correct Answer

tutorial again:

Router R1 - Static Routing

Static route format: <destination_subnet> <destination_subnet_mask>
<next_hop_address>

Display the current static routing table in Privilege EXEC mode. It should be empty at this point.

R1#**sh ip route static**

R3#sh ip route static

R3#sh ip route static

Enter the global configuration mode.

R1#**conf t**

Add the static route destined for 192.168.128.0/18 (subnet #3).

R1(config)#**ip route 192.168.128.0 255.255.192.0 192.168.64.2**

Add the static route destined for 192.168.128.0/18 (subnet #4).

```
R1(config)#ip route 192.168.192.0 255.255.192.0 192.168.64.3
```

Display the current static routing table in global config mode.

```
R1(config-if)#do sh ip route static
```

Verify that the appropriate next hop address in the static routing table as entered.

Return to the global config mode.

```
R1(config-if)#exit
```

Router R3 - Static Routes

Enter the global configuration mode.

Add the static route destined for subnet #1.

```
R3(config)#_____
```

Add the static route destined for 192.168.0.0/18 (subnet #1).

```
R2(config)#_____
```

```
R2(config)#ip route 192.168.0.0 255.255.192.0 192.168.64.1
```

```
R3(config)#ip route 192.168.0.0 255.255.192.0 192.168.64.1
```

Add the static route destined for subnet #3.

```
R3(config)#_____
```

Add the static route destined for 192.168.128.0/18 (subnet #3).

```
R1(config)#ip route 192.168.128.0 255.255.192.0 192.168.64.2
```

```
R3(config)#ip route 192.168.128.0 255.255.192.0 192.168.64.2
```

Display the current static routing table in global config mode.

Return to the global config mode.

Save the running-config to startup-config in global config mode.

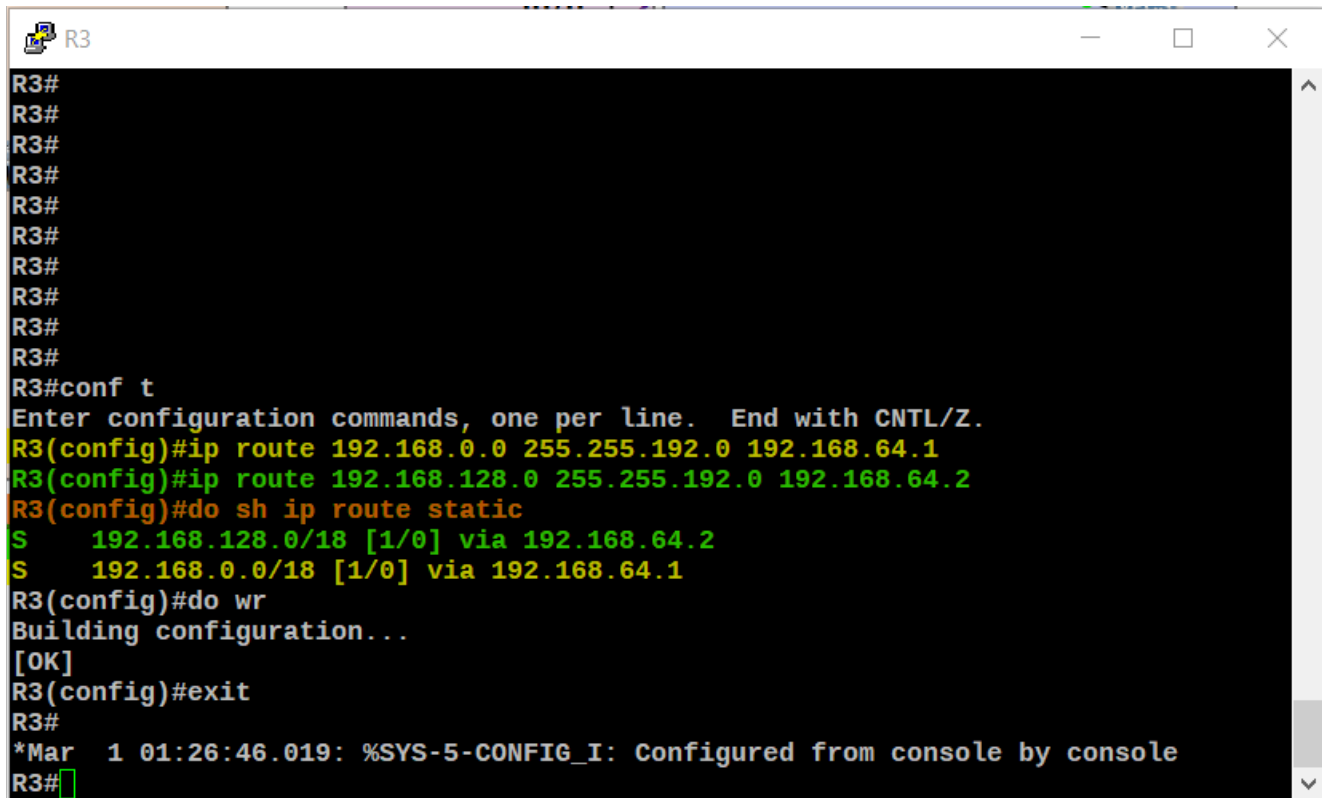
Display the current static routing table in global config mode.

```
R3(config-if)#do sh ip route static
```

Verify that the appropriate next hop address in the static routing table as entered.

Return to the global config mode.

R3(config-if)#**exit**



```
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#ip route 192.168.0.0 255.255.192.0 192.168.64.1
R3(config)#ip route 192.168.128.0 255.255.192.0 192.168.64.2
R3(config)#do sh ip route static
S    192.168.128.0/18 [1/0] via 192.168.64.2
S    192.168.0.0/18 [1/0] via 192.168.64.1
R3(config)#do wr
Building configuration...
[OK]
R3(config)#exit
R3#
*Mar  1 01:26:46.019: %SYS-5-CONFIG_I: Configured from console by console
R3#
```

next

Router R3 - Static Routes

Enter the global configuration mode.

Add the static route destined for subnet #1.

R2(config)#_____

```
ip route 192.168.0.0 255.255.192.0 192.168.64.1
```

Correct Answer

Add the static route destined for subnet #3.

R2(config)#_____

```
ip route 192.168.128.0 255.255.192.0 192.168.64.2
```

Correct Answer

Display the current static routing table in global config mode.

Return to the global config mode.

Save the running-config to startup-config in global config mode.

No answer needed

Correct Answer

Configure each router's DHCP service.

Use the **Router R1 - DHCP Service** section in the description for reference to configure the DHCP service on both routers R2 and R3.

No answer needed

Correct Answer

next

Router R2 - DHCP Service

Enable the DHCP service.

Create a DHCP pool named subnet-3.

R2(config)#_____

Answer format: ** **** * * *

 Submit

Use the corresponding subnet #3 network address.

R2(dhcp-config)#_____

Answer format: ***** ***,***,***,***,***,***,*

 Submit

Set the lease time to 3 days, 20 hours and 22 minutes.

R2(dhcp-config)#_____

Answer format: ***** * * *

 Submit

Set the designated default gateway.

R2(dhcp-config)#_____

Answer format: ***** ***,***,***,*

 Submit

Exclude both 192.168.128.1 and 192.168.128.4 from the DHCP pool named subnet-3.

R2(dhcp-config)#ip dhcp excluded-address 192.168.128.1

R2(config)#_____

Answer format: ** **** ***** ***,***,***,*

 Submit

Use PC3 to obtain an IPv4 address from the R2 DHCP server.

No answer needed

Correct Answer

Display the DHCP leased address from the router. Note that it is okay if the address is different as labeled in the diagram.

R2(config)#_____

Answer format: ** * * * * *

 Submit

Save the running-config to startup-config.

No answer needed

Correct Answer

tutorial:

Router R1 - DHCP Service

Enable DHCP service

R1 (config) #**service dhcp**

Create a DHCP pool named subnet-1.

R1 (config) #**ip dhcp pool subnet-1**

Assign the subnet #1 address to the DHCP pool.

```
R1(dhcp-config)#network 192.168.0.0 255.255.192.0
```

Set the lease time to 1 day. lease format: <days> <hours> <minutes>

```
R1(dhcp-config)#lease 1 0 0
```

Set the designated default gateway.

```
R1(dhcp-config)#default-router 192.168.0.1
```

Note: The DHCPOFFER message sent to the client by the DHCP server will include both of the lease time and gateway address along with the available IPv4 address.

Exclude the host address range that were already assigned (f0/1 and PC2) through static assignments. It can be used with a single address or range using two IP addresses. Use the help (?) command to better understand this command.

```
R1(dhcp-config)#ip dhcp excluded-address 192.168.0.1 192.168.0.2
```

Save the running-config to startup-config under the global configuration mode.

```
R1(config)#do wr
```

Display DHCP leases, if any, in the global config mode. It should be empty. Let PC1 successfully lease an IP address from the DHCP server (R1), then run it again. Note that it is okay if the address is different as labeled in the diagram.

```
R1(config)#do sh ip dhcp bind
```

Router R2 - DHCP Service

Enable the DHCP service.

```
R2(config)#service dhcp
```

Create a DHCP pool named subnet-3.

```
R2(config)#_____
```

```
R2(config)#ip dhcp pool subnet-3
```

Assign the subnet #1 address to the DHCP pool.

```
R1(dhcp-config)#network 192.168.0.0 255.255.192.0
```

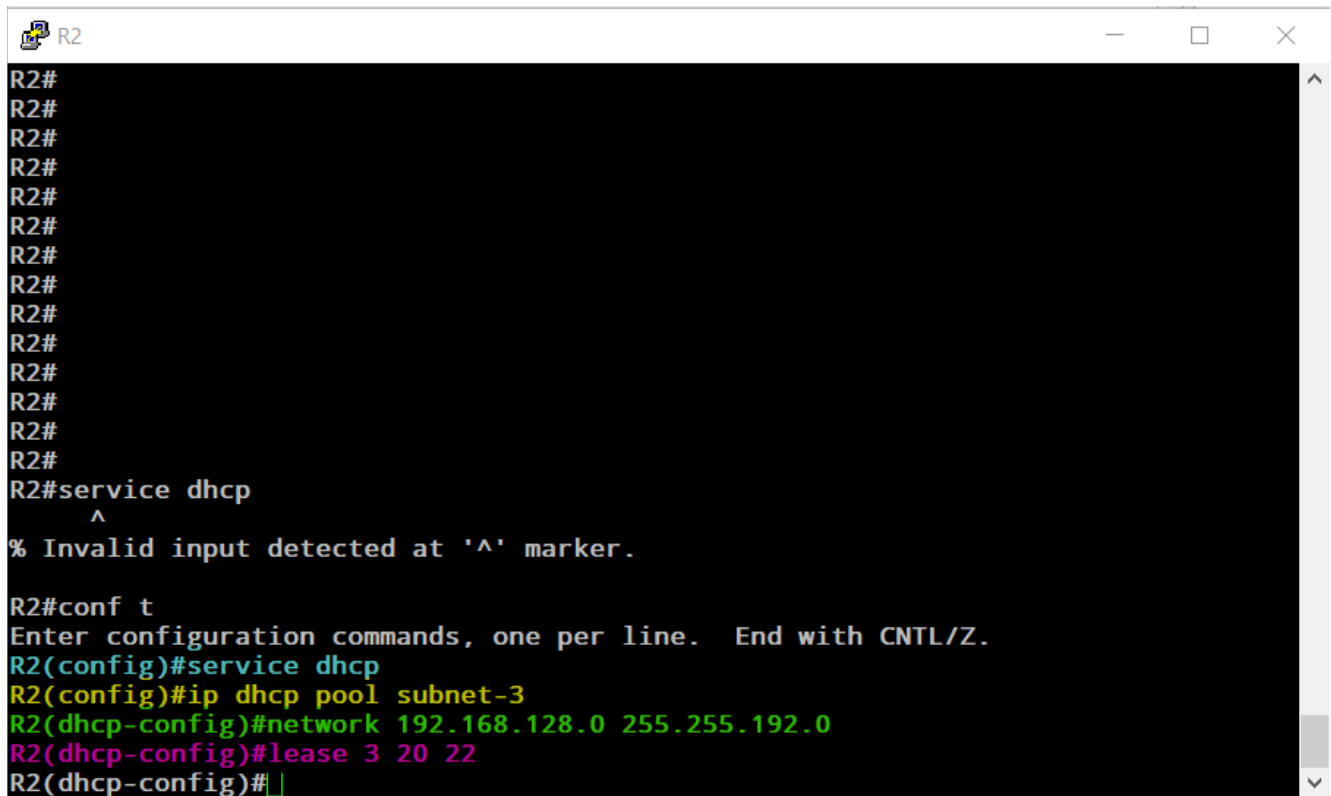
Use the corresponding subnet #3 network address.

```
R2(dhcp-config)#
```

```
R2(dhcp-config)#network 192.168.128.0 255.255.192.0
```

Set the lease time to 3 days, 20 hours and 22 minutes.

```
R2(dhcp-config)#lease 3 20 22
```



```
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#
R2#service dhcp
^
% Invalid input detected at '^' marker.

R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#service dhcp
R2(config)#ip dhcp pool subnet-3
R2(dhcp-config)#network 192.168.128.0 255.255.192.0
R2(dhcp-config)#lease 3 20 22
R2(dhcp-config)#
```

Set the designated default gateway.

```
R1(dhcp-config)#default-router 192.168.0.1
```

Set the designated default gateway.

```
R2(dhcp-config)#
```

```
R2(dhcp-config)#default-router 192.168.128.1
```

Exclude both 192.168.128.1 and 192.168.128.4 from the DHCP pool named subnet-3.

```
R2(dhcp-config)#ip dhcp excluded-address 192.168.128.1
```

```
R2(config)#
```

```
R2(dhcp-config)#ip dhcp excluded-address 192.168.128.4
```

```
R2
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#service dhcp
R2(config)#ip dhcp pool subnet-3
R2(dhcp-config)#network 192.168.128.0 255.255.192.0
R2(dhcp-config)#lease 3 20 22
R2(dhcp-config)#default-router 192.168.128.1
R2(dhcp-config)#ip dhcp excluded-address 192.168.128.1
R2(config)#ip dhcp excluded-address 192.168.128.4
R2(config)#
```

Use PC3 to obtain an IPv4 address from the R2 DHCP server.

```
PC3 - PuTTY
auto      Attempt to obtain IPv6 address, mask and gateway using SLAAC
dhcp [OPTION] Attempt to obtain IPv4 address, mask, gateway, DNS via DHCP
        -d      Show DHCP packet decode
        -r      Renew DHCP lease
        -x      Release DHCP lease
dns ip     Set DNS server ip, delete if ip is '0'
domain NAME Set local domain name to NAME

PC3> ip dhcp ?

ip dhcp [OPTION]
Attempt to obtain IPv4 address, mask, gateway and DNS via DHCP
OPTION:
    -d      Show DHCP packet decode
    -r      Renew DHCP lease
    -x      Release DHCP lease

PC3> lease
Bad command: "lease". Use ? for help.

PC3> ip dhcp -r
DDORA IP 192.168.128.5/18 GW 192.168.128.1

PC3> 
```

Material for helping on dhcp:

Answers to Lab 2 Dynamic Host Configuration Protocol.pdf

8. Give a detailed explanation on how the client machine was able to get an IPv4 address from the DHCP server on the network starting from a successful DHCP Discover transaction using your captured flow graph. (15 pts) Hint: Explain DHCP (DORA) transactions based on the wireshark capture and timeline from #6 and #7.

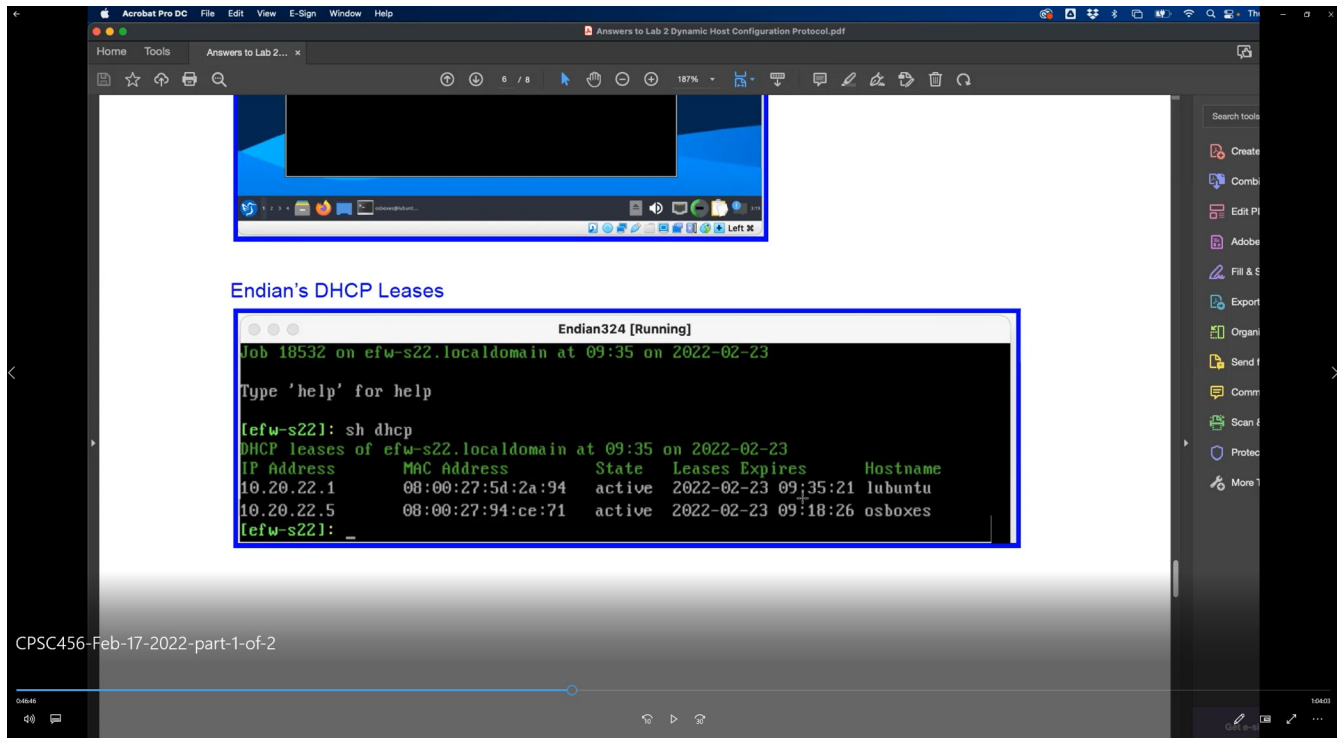
DHCP DISCOVER: Packet #1; Time 0.000000
The client (kali VM) received a default IP address of 0.0.0.0. It then sent out a broadcast message (255.255.255.255) to look for a DHCP server within the LAN.

DHCP OFFER: Packet #4; ; Time 1.001776
The DHCP server (Endian VM - 10.20.21.254) sent out an available IP address (10.20.22.5) offer to the client along with the IP parameters (gateway, lease time, etc.) offered to the client in response to the DHCP DISCOVER message.

DHCP REQUEST: Packet #5; Time 1.002269
The kali VM sent back a message to the DHCP server via broadcast address once more to accept the current DHCP OFFER.

DHCP ACK: Packet #6; Time 1.004142
The server sent an acknowledgement message to the client to finalize the lease. The server then removes the requested IP address from its IP address availability pool to prevent other clients from being offered this newly leased IP address.

next



note: above doesn't seem to work by itself on the router
next

Display the DHCP leased address from the router. Note that it is okay if the address is different as labeled in the diagram.

R2(config) # _____

R2(config) # do sh ip dhcp bind


```
R2
Secure arp entries 0

Message          Received
BOOTREQUEST      0
DHCPDISCOVER     3
DHCPREQUEST      2
DHCPDECLINE      0
DHCPRELEASE      0
DHCPINFORM       0

Message          Sent
BOOTREPLY        0
DHCPOFFER        3
DHCPACK          2
DHCPNAK          0
R2#sh ip dhcp bind
Bindings from all pools not associated with VRF:
IP address      Client-ID/      Lease expiration      Type
                Hardware address/
                User name
192.168.128.5   0100.5079.6668.02   Mar 05 2002 02:18 AM   Automatic
R2#
```

next

misc how to see server info:

```
R2
R2#sh ip dhcp server stati
Memory usage     23576
Address pools    1
Database agents  0
Automatic bindings 1
Manual bindings  0
Expired bindings 0
Malformed messages 0
Secure arp entries 0

Message          Received
BOOTREQUEST      0
DHCPDISCOVER     3
DHCPREQUEST      2
DHCPDECLINE      0
DHCPRELEASE      0
DHCPINFORM       0

Message          Sent
BOOTREPLY        0
DHCPOFFER        3
DHCPACK          2
DHCPNAK          0
```

next

Router R2 - DHCP Service

Enable the DHCP service.

Create a DHCP pool named subnet-3.

R2(config)#_____

ip dhcp pool subnet-3

Correct Answer

Use the corresponding subnet #3 network address.

R2(dhcp-config)#_____

network 192.168.128.0 255.255.192.0

Correct Answer

Set the lease time to 3 days, 20 hours and 22 minutes.

R2(dhcp-config)#_____

lease 3 20 22

Correct Answer

Set the designated default gateway.

R2(dhcp-config)#_____

default-router 192.168.128.1

Correct Answer

Exclude both 192.168.128.1 and 192.168.128.4 from the DHCP pool named subnet-3.

R2(dhcp-config)#**ip dhcp excluded-address 192.168.128.1**

R2(config)#_____

ip dhcp excluded-address 192.168.128.4

Correct Answer

Use PC3 to obtain an IPv4 address from the R2 DHCP server.

No answer needed

Correct Answer

Display the DHCP leased address from the router. Note that it is okay if the address is different as labeled in the diagram.

R2(config)#_____

do sh ip dhcp bind

Correct Answer

Save the running-config to startup-config.

No answer needed

Correct Answer

next

Router R3 - DHCP Service

Enable the DHCP service.

Create a DHCP pool named subnet-4.

R3(config)# _____

Answer format: ** **** * * *

 Submit

Use the corresponding subnet #3 network address

R3(dhcp-config)# _____

Answer format: ***** *.*.*.*.* *.*.*.*.*.*

 Submit

Set the lease time to 7 days.

R3(dhcp-config)# _____

Answer format: *****

 Submit

Set the designated default gateway.

R3(dhcp-config)# _____

Answer format: ***** *.*.*.*.*

 Submit

Exclude all hosts between 192.168.192.1 and 192.168.192.105 from the DHCP pool named subnet-4.

R3(config)# _____

Answer format: ** **** ***** *.*.*.*.* *.*.*.*.*.*

 Submit

Use PC5 to obtain an IPv4 address from the R2 DHCP server.

No answer needed

Correct Answer

Display the DHCP leased address from the router.

R3(config)# _____

Save the running-config to startup-config.

next

tutorial:

Router R1 - DHCP Service

Enable DHCP service

R1(config) #**service dhcp**

Create a DHCP pool named subnet-1.

R1(config) #**ip dhcp pool subnet-1**

Assign the subnet #1 address to the DHCP pool.

R1(dhcp-config) #**network 192.168.0.0 255.255.192.0**

Set the lease time to 1 day. lease format: *<days> <hours> <minutes>*

```
R1(dhcp-config)#lease 1 0 0
```

Set the designated default gateway.

```
R1(dhcp-config)#default-router 192.168.0.1
```

Note: The DHCPOFFER message sent to the client by the DHCP server will include both of the lease time and gateway address along with the available IPv4 address.

Exclude the host address range that were already assigned (f0/1 and PC2) through static assignments. It can be used with a single address or range using two IP addresses. Use the help (?) command to better understand this command.

```
R1(dhcp-config)#ip dhcp excluded-address 192.168.0.1 192.168.0.2
```

Save the running-config to startup-config under the global configuration mode.

```
R1(config)#do wr
```

Display DHCP leases, if any, in the global config mode. It should be empty. Let PC1 successfully lease an IP address from the DHCP server (R1), then run it again. Note that it is okay if the address is different as labeled in the diagram.

```
R1(config)#do sh ip dhcp bind
```

Router R3 - DHCP Service

Enable the DHCP service.

```
R3(config)# service dhcp
```

Create a DHCP pool named subnet-1.

```
R1(config)#ip dhcp pool subnet-1
```

Create a DHCP pool named subnet-4.

```
R3(config)#_____
```

```
R3(config)#ip dhcp pool subnet-4
```

```
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#service dhcp
      ^
% Invalid input detected at '^' marker.

R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#service dhcp
R3(config)#ip dhcp pool subnet-4
R3(dhcp-config)#
```

next

Assign the subnet #1 address to the DHCP pool.

```
R1(dhcp-config)#network 192.168.0.0 255.255.192.0
```

Use the corresponding subnet #4 network address

```
R3(dhcp-config)#_____
```

```
R3(dhcp-config)#network 192.168.192.0 255.255.192.0
```

Set the lease time to 7 days.

```
R3(dhcp-config)#_____
```

```
R3(dhcp-config)# lease 7 0 0
```

R3

R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#

R3#service dhcp

^

% Invalid input detected at '^' marker.

R3#conf t

Enter configuration commands, one per line. End with CNTL/Z.

R3(config)#service dhcp

R3(config)#ip dhcp pool subnet-4

R3(dhcp-config)#network 192.168.192.0 255.255.192.0

R3(dhcp-config)#lease 7 0 0

R3(dhcp-config)#

Router R3 - DHCP Service

Enable the DHCP service.

Create a DHCP pool named subnet-4.

R3(config)#_____

ip dhcp pool subnet-4

Correct Answer

Use the corresponding subnet #3 network address

R3(dhcp-config)#_____

network 192.168.192.0 255.255.192.0

Correct Answer

Set the lease time to 7 days.

R3(dhcp-config)#_____

lease 7

Correct Answer

Set the designated default gateway.

R3(dhcp-config)#_____

Answer format: ***** *.*.*.*.*

 Submit

Exclude all hosts between 192.168.192.1 and 192.168.192.105 from the DHCP pool named subnet-4.

R3(config)#_____

Answer format: ** ***** *.*.*.*.* *.*.*.*.*.*

 Submit

Use PC5 to obtain an IPv4 address from the R2 DHCP server.

No answer needed

Correct Answer

Display the DHCP leased address from the router.

R3(config)#_____

Save the running-config to startup-config.

next

Set the designated default gateway.

R1(dhcp-config)#default-router 192.168.0.1

Set the designated default gateway.

R3(dhcp-config)#_____

R3(dhcp-config)#default-router 192.168.192.1

Note: The DHCPOFFER message sent to the client by the DHCP server will include both of the lease time and gateway address along with the available IPv4 address.

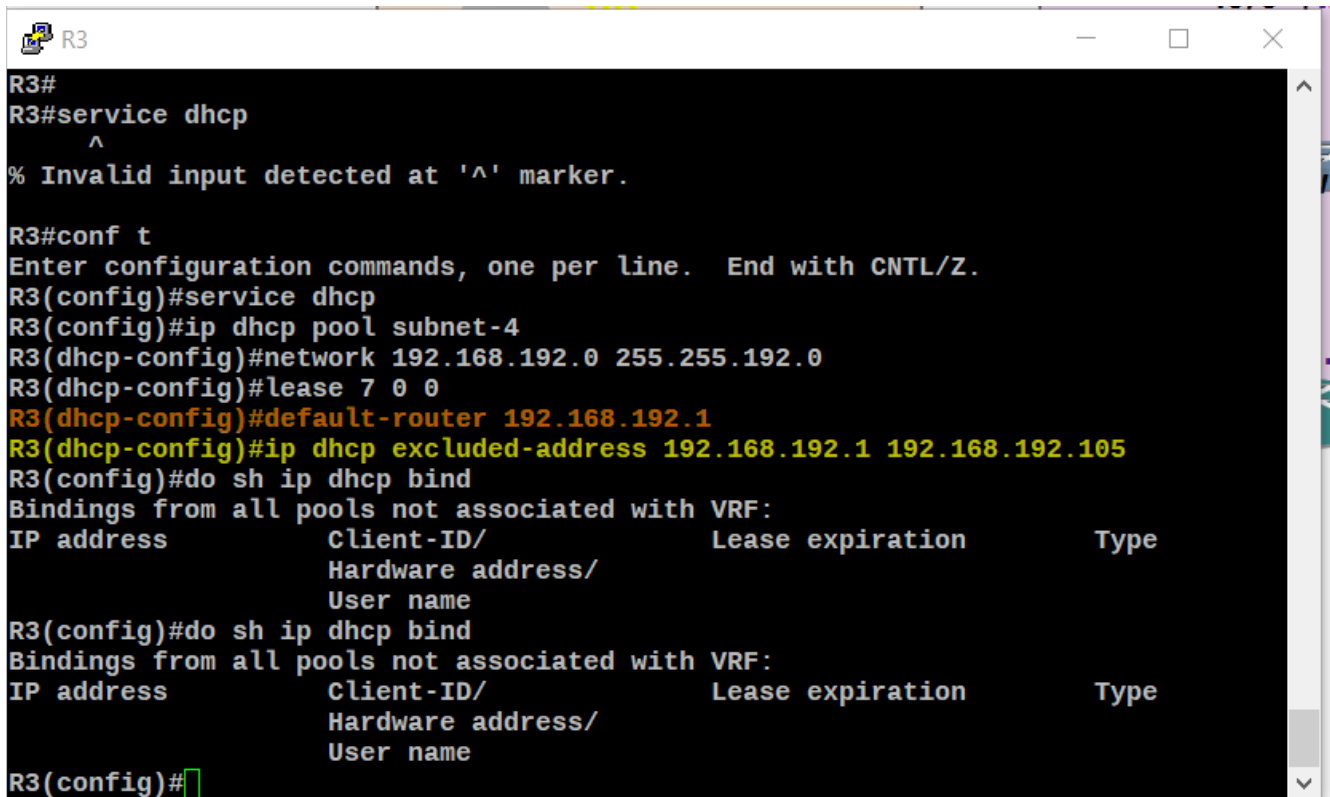
Exclude the host address range that were already assigned (f0/1 and PC2) through static assignments. It can be used with a single address or range using two IP addresses. Use the help (?) command to better understand this command.

```
R1(dhcp-config)#ip dhcp excluded-address 192.168.0.1 192.168.0.2
```

Exclude all hosts between 192.168.192.1 and 192.168.192.105 from the DHCP pool named subnet-4.

```
R3(config)# _____
```

```
R1(dhcp-config)#ip dhcp excluded-address 192.168.192.1  
192.168.192.105
```



```
R3#  
R3#service dhcp  
^  
% Invalid input detected at '^' marker.  
  
R3#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
R3(config)#service dhcp  
R3(config)#ip dhcp pool subnet-4  
R3(dhcp-config)#network 192.168.192.0 255.255.192.0  
R3(dhcp-config)#lease 7 0 0  
R3(dhcp-config)#default-router 192.168.192.1  
R3(dhcp-config)#ip dhcp excluded-address 192.168.192.1 192.168.192.105  
R3(config)#do sh ip dhcp bind  
Bindings from all pools not associated with VRF:  
IP address      Client-ID/  
                Hardware address/  
                User name  
R3(config)#do sh ip dhcp bind  
Bindings from all pools not associated with VRF:  
IP address      Client-ID/  
                Hardware address/  
                User name  
R3(config)#
```

next

Use PC5 to obtain an IPv4 address from the R2 DHCP server.


```
PC5 - PuTTY
PC5> ip dhcp -d
Opcode: 1 (REQUEST)
Client IP Address: 0.0.0.0
Your IP Address: 0.0.0.0
Server IP Address: 0.0.0.0
Gateway IP Address: 0.0.0.0
Client MAC Address: 00:50:79:66:68:04
Option 53: Message Type = Discover
Option 12: Host Name = PC51
Option 61: Client Identifier = Hardware Type=Ethernet MAC Address = 00:50:79:66:68:04

Opcode: 1 (REQUEST)
Client IP Address: 0.0.0.0
Your IP Address: 0.0.0.0
Server IP Address: 0.0.0.0
Gateway IP Address: 0.0.0.0
Client MAC Address: 00:50:79:66:68:04
Option 53: Message Type = Discover
Option 12: Host Name = PC51
Option 61: Client Identifier = Hardware Type=Ethernet MAC Address = 00:50:79:66:68:04
```

```
PC5 - PuTTY
Opcode: 2 (REPLY)
Client IP Address: 0.0.0.0
Your IP Address: 192.168.192.106
Server IP Address: 0.0.0.0
Gateway IP Address: 0.0.0.0
Client MAC Address: 00:50:79:66:68:04
Option 53: Message Type = Offer
Option 54: DHCP Server = 192.168.192.1
Option 51: Lease Time = 604800
Option 58: Renewal Time = 302400
Option 59: Rebinding Time = 529200
Option 1: Subnet Mask = 255.255.192.0
Option 3: Router = 192.168.192.1

Opcode: 1 (REQUEST)
Client IP Address: 192.168.192.106
Your IP Address: 0.0.0.0
Server IP Address: 0.0.0.0
Gateway IP Address: 0.0.0.0
Client MAC Address: 00:50:79:66:68:04
Option 53: Message Type = Request
Option 54: DHCP Server = 192.168.192.1
Option 50: Requested IP Address = 192.168.192.106
Option 61: Client Identifier = Hardware Type=Ethernet MAC Address = 00:50:79:66:68:04
```

```
PC5 - PuTTY
Option 54: DHCP Server = 192.168.192.1
Option 50: Requested IP Address = 192.168.192.106
Option 61: Client Identifier = Hardware Type=Ethernet MAC Address = 00:50:79:66:68:04
Option 12: Host Name = PC51

Opcode: 2 (REPLY)
Client IP Address: 192.168.192.106
Your IP Address: 192.168.192.106
Server IP Address: 0.0.0.0
Gateway IP Address: 0.0.0.0
Client MAC Address: 00:50:79:66:68:04
Option 53: Message Type = Ack
Option 54: DHCP Server = 192.168.192.1
Option 51: Lease Time = 604800
Option 58: Renewal Time = 302400
Option 59: Rebinding Time = 529200
Option 12: Host Name = PC51
Option 1: Subnet Mask = 255.255.192.0
Option 3: Router = 192.168.192.1

IP 192.168.192.106/18 GW 192.168.192.1

PC5> 
```

Display the DHCP leased address from the router.

R3(config)# _____

R3(config)# do sh ip dhcp bind

```
R3
R3(dhcp-config)#network 192.168.192.0 255.255.192.0
R3(dhcp-config)#lease 7 0 0
R3(dhcp-config)#default-router 192.168.192.1
R3(dhcp-config)#ip dhcp excluded-address 192.168.192.1 192.168.192.105
R3(config)#do sh ip dhcp bind
Bindings from all pools not associated with VRF:
IP address      Client-ID/      Lease expiration      Type
                  Hardware address/
                  User name
R3(config)#do sh ip dhcp bind
Bindings from all pools not associated with VRF:
IP address      Client-ID/      Lease expiration      Type
                  Hardware address/
                  User name
R3(config)#do wr
Building configuration...
[OK]
R3(config)#do sh ip dhcp bind
Bindings from all pools not associated with VRF:
IP address      Client-ID/      Lease expiration      Type
                  Hardware address/
                  User name
192.168.192.106  0100.5079.6668.04  Mar 08 2002 07:34 AM  Automatic
R3(config)#
```

Save the running-config to startup-config.

R3(config) # do wr

