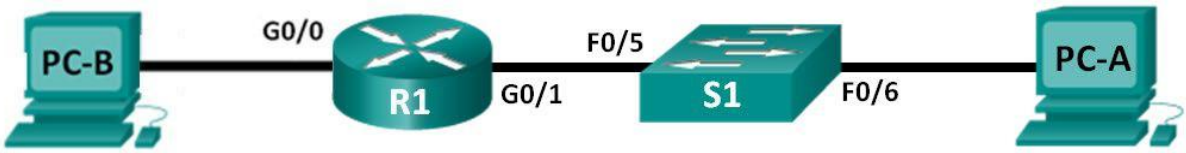
CCNA ITN Lab 3 **Homework** **Deadline: 4.1.2021**

Name: Shabnaz Khanam

IPv4 Subnetting
Secure SSH Connection and Device Security
TCP, UDP, DNS



NP Course NP Chapter 4-7

PrepExam: ITN Module Group Exams 14-17

With the deadline of this Homework all **ITN Module Group Exams 1-17** shall have been taken at least once.
By these **ITN Module Group Exams** you exercise for the **ITN Final Exam.**

Upload

Record your answers in this PDF File ITN-Lab3-Homework.pdf.

Write your answers in **red color**. You may use the comment capabilities of the free Adobe reader.

Upload the PDF file with your answers is Ilias.

Homework / Preparation

Part 1: Recall for the ITN Skill Test: Basic Configuration Commands

a. Read the Lab Instructions of this Lab

b. Check the IOS Command List, provided for the Labs.

c. Which IOS commands are necessary to configure the following tasks?

- Enter the privileged mode from startup mode. **Router>**enable
- Enter the configuration (EXEC) mode from terminal. **Router#**configuration terminal
- Set the hostname to R1. **Router(config)#**hosname R1
- Disable DNS lookup. **R1(config)#** no ip domain lookup
- Assign **class** the EXEC encrypted password

  R1(config)#enable secret class

  Configure global password encryption.

- **R1(config)#**service password-encryption

  Return from configuration (EXEC) mode:

- **R1(config)#exit**
- Assign **cisco** the console password and enforce login and set **logging synchronous** to prevent console messages from interrupting command entry.

  R1(config)# line console 0

  R1(config-line)# Password Cisco

  R1(config-line)# login

  R1(config-line)#login synchronous

  R1(config-line)#exit

- Use vty (Telnet) lines 0-4, assign **cisco** as the vty (Telnet) password and enforce login.

  R1(config)# line vty 0 4

  R1(config-line)# password cisco

  R1(config-line)# login

  R1(config-line)#exit

- Create a banner that will warn anyone accessing the device that unauthorized access is prohibited.

  R1(config)# banner motd # text #

- Save the running configuration to the startup configuration file.

  R1(config)# copy running-config startup-config

- Display the **running configuration**. **R1(config)#** show running-config
- Display the status of all **interfaces** in brief. **R1(config)#** show ip interface brief

Part 2: Calculate IPv4 Subnets

Step 1: Network Topology A

The 10.10.10.0/24 network address is used to provide the addresses in the network. Determine the number of subnets in Network Topology A.

a. How many subnets are there?
9

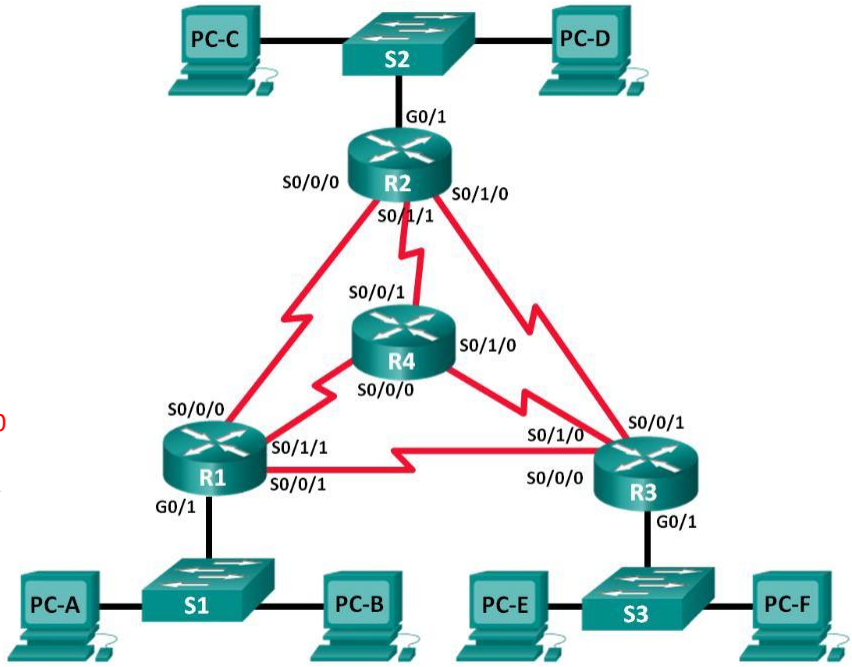
b. The Inter-Router links have no other hosts connected. Which subnet mask should be used?255.255.255.252

c. The LANs connected to the switches have the different host numbers. Which subnet mask are valid for these LANs?

S1: 10 hosts mask: 255.255.255.240

S2: 27 hosts mask:255.255.255.224

S3: 48 hosts mask:255.255.255.192

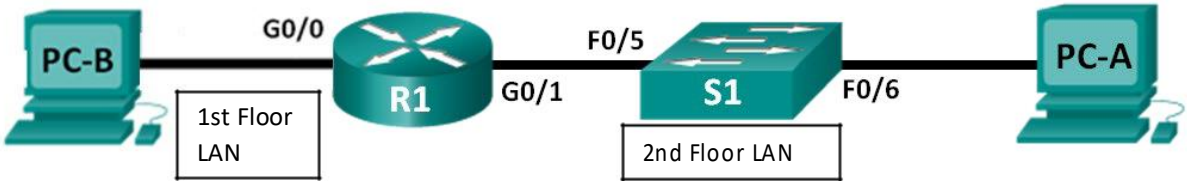


d. Record the subnet information.
- Derive the subnets from the largest subnet to the smallest subnet.
- Name the LAN subnets according to their switch number Sx
- Name the Inter-Router subnets Rx-Ry

Subnet	Subnet Address	First Usable Host Address	Last Usable Host Address	Broadcast Address
S3	10.10.10.0	10.10.10.1	10.10.10.62	10.10.10.63
S2	10.10.10.64	10.10.10.65	10.10.10.94	10.10.10.95
S1	10.10.10.96	10.10.10.97	10.10.10.112	10.10.10.111
R3-R2	10.10.10.112	10.10.10.113	10.10.10.114	10.10.10.115
R3-R4	10.10.10.116	10.10.10.117	10.10.10.118	10.10.10.119
R3-R1	10.10.10.120	10.10.10.121	10.10.10.122	10.10.10.123
R2-R4	10.10.10.124	10.10.10.125	10.10.10.126	10.10.10.127
R2-R1	10.10.10.128	10.10.10.129	10.10.10.130	10.10.10.131
R1-R4	10.10.10.132	10.10.10.133	10.10.10.134	10.10.10.135

Step 2: Network Subnetting

Given is the following simple network without any Internet access.



Available is the IP address range 192.168.100.0 / 24. Subnet the network to provide 60 host addresses per subnet while wasting the fewest addresses in table1.

Subnet	Subnet Address	First Usable Host Address	Last Usable Host Address	Broadcast Address
1	192.168.100.0	192.168.100.1	192.168.100.62	192.168.100.63
2	192.168.100.64	192.168.100.65	192.168.100.126	192.168.100.127
3	192.168.100.128	192.168.100.129	192.168.100.190	192.168.100.191
4	192.168.100.192	192.168.100.193	192.168.100.254	192.168.100.255

We assign the third subnet to the First Floor LAN. Assign the last network host address (the highest) in this subnet to the G0/0 interface of router R1 in table2.

Assign the first network host address in this subnet to the NIC interface of PC-B in table2.

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0	192.168.100.190	255.255.255.192	N/A
	G0/1	192.168.100.254	255.255.255.224	N/A
S1	VLAN1	192.168.100.253	255.255.255.224	192.168.100.254
PC-A	NIC	192.168.100.225	255.255.255.224	192.168.100.253
PC-B	NIC	192.168.100.129	255.255.255.192	192.168.100.190

Starting with the forth subnet of table 1, subnet this network again so that the new subnets will provide 28 host addresses per subnet while wasting the fewest addresses in table3.

Subnet	Subnet Address	First Usable Host Address	Last Usable Host Address	Broadcast Address
1	192.168.100.192	192.168.100.193	192.168.100.222	192.168.100.223
2	192.168.100.224	192.168.100.225	192.168.100.254	192.168.100.255

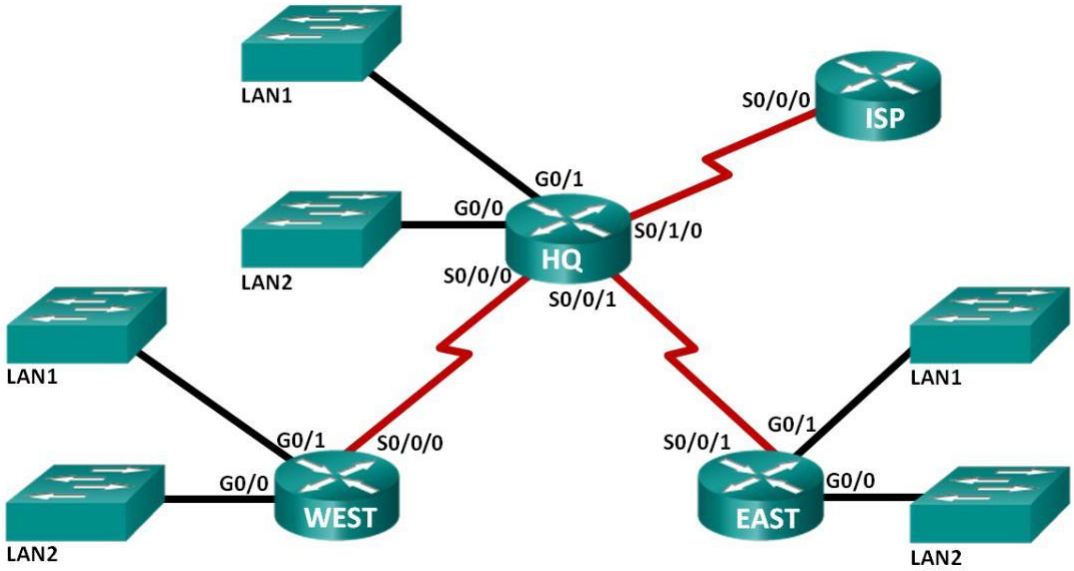
Assign the second of these new 28-host subnets to the Second Floor LAN. Assign the last network host address (the highest) in the Second Floor LAN subnet to the G0/1 interface of router R1 in table2.

Assign the second to the last address (the second highest) in this subnet to the VLAN 1 interface of the Second Floor Switch in table2.

Assign the first address in this subnet to the NIC interface of PC-A in table2.

Part 3: Calculating IPv4 Summary Routes

Topology



Addressing Table

Subnet	IPv4 Address		Subnet	IPv4 Address
HQ LAN1	192.168.64.0/23		WEST LAN1	192.168.70.0/25
HQ LAN2	192.168.66.0/23		WEST LAN2	192.168.70.128/25
			Link from HQ to EAST	192.168.71.4/30
EAST LAN1	192.168.68.0/24		Link from HQ to WEST	192.168.71.0/30
EAST LAN2	192.168.69.0/24		Link from HQ to ISP	209.165.201.0/30

Step 1: Determine the summary route for HQ LAN1 and HQ LAN2

You may work step by step to the following scheme: List the HQ LAN1 and HQ LAN2 IP subnet mask in decimal form. Then List the HQ LAN1 and HQ LAN2 IP address in binary form. Finally Count the number of far left matching bits to determine the subnet mask for the summary route:

a. How many far left matching bits are present in the two networks? 22 bit

b. List the matching binary bits for HQ subnets.

c. Add zeros to comprise the remainder of the network address in binary form.

d. List the summarized network address in decimal form.

Subnet	IPv4 Address	Subnet Mask	Subnet IP Address in Binary Form
HQ LAN1	192.168.64.0	255.255.254.0	11000000.101010000.01000000.00000000
HQ LAN2	192.168.66.0	255.255.254.0	11000000.10101000.01001000. 00000000
HQ LANs Summary Address	192.168.64.0	255.255.252.0	11000000.101010000.01000000.00000000

Step 2: Determine the summary route for EAST LAN1 and EAST LAN2

a. How many far left matching bits are present in the two networks? 23

b. Build the summarized network address

Subnet	IPv4 Address	Subnet Mask	Subnet Address in Binary Form
EAST LAN1	192.168.68.0	255.255.255.0	11000000.101010000.01000100.00000000
EAST LAN2	192.168.69.0	255.255.255.0	11000000.10101000.01000101.00000000
EAST LANs Summary Address	192.168.68.0	255.255.254.0	11000000.101010000.01000100.00000000

Step 3: Determine the summary route for WEST LAN1 and WEST LAN2

a. How many far left matching bits are present in the two networks? 24

b. Build the summarized network address

Subnet	IPv4 Address	Subnet Mask	Subnet IP Address in Binary Form
WEST LAN1	192.168.70.0	255.255.255.128	11000000.101010000.0100110.00000000
WEST LAN2	192.168.70.128	255.255.255.128	11000000.101010000.01000110.1000000
WEST LANs Summary Address	192.168.70.0	255.255.255.0	11000000.101010000.0100110.00000000

Step 4: Determine the summary routes for HQ, EAST and WEST

a. List the matching binary bits for HQ, EAST, and WEST subnets. 21 bit

b. Add zeros to comprise the remainder of the network address in binary form.

c. List the summarized network address in decimal form.

Subnet	IPv4 Address	Subnet Mask	Subnet IP Address in Binary Form
HQ	192.168.64.0	255.255.252.0	11000000.10101000.01000000.00000000
EAST	192.168.68.0	255.255.254.0	11000000.10101000.01000100.00000000
WEST	192.168.70.0	255.255.255.0	11000000.10101000.0100110.00000000
Network Address Summary Route	192.168.68.0	255.255.248.0	11000000.10101000.01000000.00000000

!!A summary route may be used by the ISP as static route to your stub network!!