Department of ICT

Faculty of Technology

University of Ruhuna

Computer Networks – ICT1253 **Level 1 - Semester - 2**

Lab Sheet 07

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Goals:

Understand IP subnetting and use it in Cisco packet tracer.

Exercise 1:

1. Read the document about IPv4 subnetting.
2. Look at the table about CIDR notations given below.

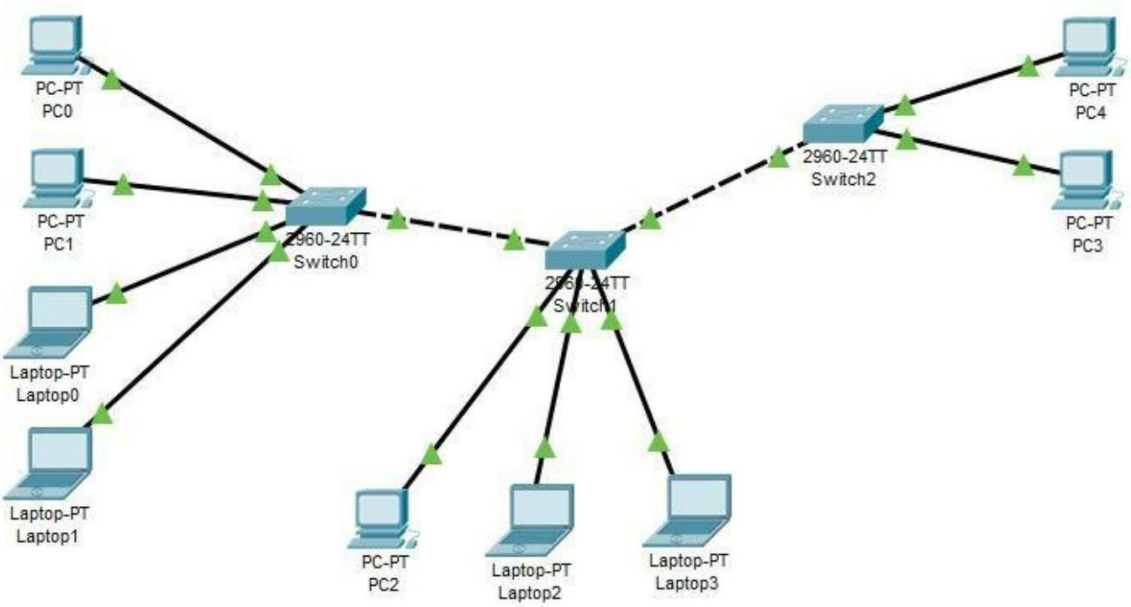
Subnet Mask	CIDR Prefix	Total IP's	Usable IP's	Number of Class C networks
255.255.255.255	/32	1	1	1/256th
255.255.255.254	/31	2	0	1/128th
255.255.255.252	/30	4	2	1/64th
255.255.255.248	/29	8	6	1/32nd
255.255.255.240	/28	16	14	1/16th
255.255.255.224	/27	32	30	1/8th
255.255.255.192	/26	64	62	1/4th
255.255.255.128	/25	128	126	1 half
255.255.255.0	/24	256	254	1
255.255.254.0	/23	512	510	2
255.255.252.0	/22	1024	1022	4
255.255.248.0	/21	2048	2046	8
255.255.240.0	/20	4096	4094	16
255.255.224.0	/19	8192	8190	32
255.255.192.0	/18	16,384	16,382	64
255.255.128.0	/17	32,768	32,766	128
255.255.0.0	/16	65,536	65,534	256
255.254.0.0	/15	131,072	131,070	512
255.252.0.0	/14	262,144	262,142	1024
255.248.0.0	/13	524,288	524,286	2048
255.240.0.0	/12	1,048,576	1,048,574	4096

Subnet Mask	CIDR Prefix	Total IP's	Usable IP's	Number of Class C networks
255.224.0.0	/11	2,097,152	2,097,150	8192
255.192.0.0	/10	4,194,304	4,194,302	16,384
255.128.0.0	/9	8,388,608	8,388,606	32,768
255.0.0.0	/8	16,777,216	16,777,214	65,536
254.0.0.0	/7	33,554,432	33,554,430	131,072
252.0.0.0	/6	67,108,864	67,108,862	262,144
248.0.0.0	/5	134,217,728	134,217,726	1,048,576
240.0.0.0	/4	268,435,456	268,435,454	2,097,152
224.0.0.0	/3	536,870,912	536,870,910	4,194,304
192.0.0.0	/2	1,073,741,824	1,073,741,822	8,388,608
128.0.0.0	/1	2,147,483,648	2,147,483,646	16,777,216
0.0.0.0	/0	4,294,967,296	4,294,967,294	33,554,432

3. Read the document about reserved IP addresses.

Exercise 2:

1. Open Cisco packet tracer.
2. Add some switches, PCs and laptops.
3. Connect those using proper cables.



4. Assign these IP addresses to relevant PCs

PC/Laptop name	IP address
PC0	192.168.1.1
PC1	192.168.1.2
Laptop0	192.168.1.3
Laptop1	192.168.1.4
PC2	192.168.1.5
Laptop2	192.168.1.6
Laptop3	192.168.1.7
PC3	192.168.1.8
PC4	192.168.1.9

5. Subnet mask is **255.255.255.0**. No default gateway and DNS server.
6. Ping between PCs. Is it successful or not?
7. Save the workspace.

Exercise 3:

1. Open a new workspace.
2. Add components stated in exercise 2.
3. Assign these IP addresses to relevant PCs

PC/Laptop name	IP address
PC0	192.168.1.1
PC1	192.168.1.2
Laptop0	192.168.1.3
Laptop1	192.168.1.4
PC2	192.168.2.1
Laptop2	192.168.2.2
Laptop3	192.168.2.3
PC3	192.168.3.1
PC4	192.168.3.2

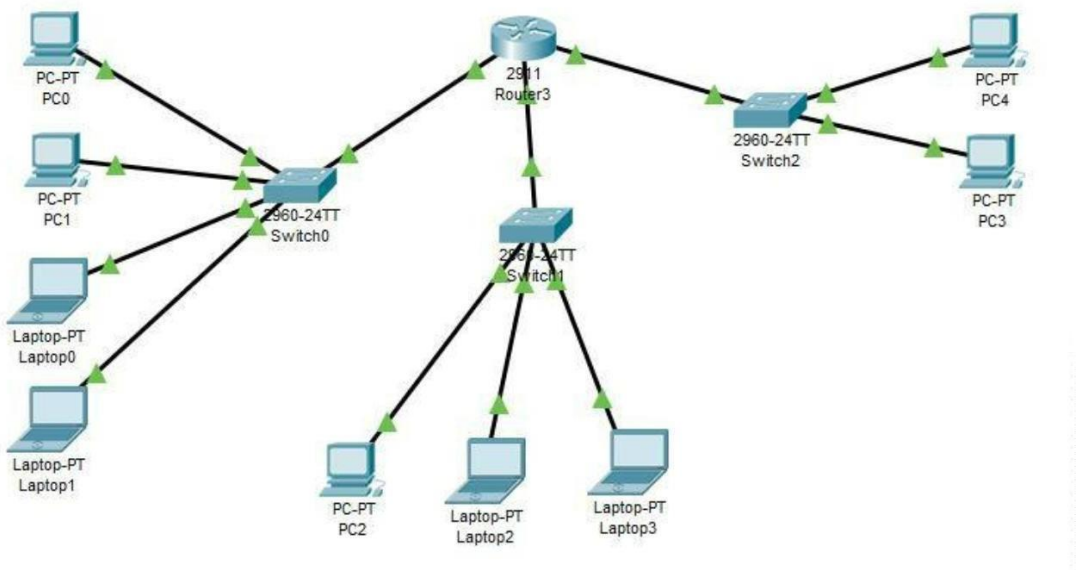
4. Subnet mask is **255.255.255.0**. No default gateway and DNS server.
5. Ping between PCs. Is it successful or not? Give reasons.
6. Save the workspace.

Exercise 4:

1. Open a new workspace.
2. Repeat above exercise using optimal IP subnets.
3. State the subnet mask and CIDR notation of created subnets.
4. Ping between PCs. Is it successful or not? Give reasons.

Exercise 5:

1. Open a new workspace
2. Repeat above exercise and connect switches to the router (**2911**).



3. Assign these IP addresses to relevant PCs

PC/Laptop name	**IP address**	**Default gateway**
PC0	192.168.1.1	192.168.1.10
PC1	192.168.1.2	192.168.1.10
Laptop0	192.168.1.3	192.168.1.10
Laptop1	192.168.1.4	192.168.1.10
PC2	192.168.2.1	192.168.2.10
Laptop2	192.168.2.2	192.168.2.10
Laptop3	192.168.2.3	192.168.2.10
PC3	192.168.3.1	192.168.3.10
PC4	192.168.3.2	192.168.3.10

4. Change the router’s interface IP addresses.

Interface name	**IP address**
GigabitEthernet 0/0	192.168.1.10
GigabitEthernet 0/1	192.168.2.10
GigabitEthernet 0/2	192.168.3.10

5. Try to ping other devices.
6. Try **traceroute (tracert 192.168.1.1)** command to examine how the data is flowing.
7. Examine the router’s running configuration. Save it and submit to the given address.
8. Save the workspace.

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