

***LAB REPORT 11***

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***20P-0018***

***Computer Networks***

***Sec A***

**SUBNETTING**

**Task 1. Determine Network Address of the Following Network .**

**IP address : 10.128.240.50/30. Also, determine broadcast and range of host addresses.**

Broadcast Address : 10.128.240.48

Network Address : 10.128.240.51

Range of useable Hosts : 10.128.240.49 - 10.128.240.50

**TASK 2. Determine the network and broadcast addresses and number of hosts bits and hosts for the given IPv4 addresses and prefixes in the following table.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IPv4**  **Address** | **Network**  **Address** | **Broadcast**  **Address** | **Total Number of Host bits** | **Total Number of Hosts** |
| **192.168.100.25/28** | **192.168.100.16** | **192.168.100.31** | **4** | **14** |
| **172.30.10.130/30** | **172.30.10.128** | **172.30.10.131** | **2** | **2** |
| **10.1.113.75/19** | **10.1.96.0** | **10.1.127.255** | **13** | **8190** |
| **198.133.219.250/24** | **198.133.219.0** | **198.133.219.255** | **10** | **1022** |

**TASK 3.**

Step 1: Determine the number of subnets in Network Topology A.

a. How many subnets are there? \_\_\_\_**2**\_\_\_\_\_\_\_

b. How many bits should you borrow to create the required number of subnets? \_\_\_\_**1**\_\_\_\_\_

c. How many usable host addresses per subnet are in this addressing scheme? \_\_\_\_\_**126**\_\_\_\_\_\_

d. What is the new subnet mask in dotted decimal format? \_\_\_\_\_**255.255.255.128**\_\_\_\_\_\_

e. How many subnets are available for future use? \_\_\_\_**0**\_\_\_\_\_

STEP 2.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Subnet**  **Number** | **Subnet Address** | **First Usable Host**  **Address** | **Last Usable Host**  **Address** | **Broadcast**  **Address** |
| 1 | 192.168.10.0 | 192.168.10.1 | 192.168.10.126 | 192.168.10.127 |
| 2 | 192.168.10.128 | 192.168.10.129 | 192.168.10.254 | 192.168.10.255 |
|  |  |  |  |  |

**Subnet Address:**

**1**. The subnet address will be **192.168.10.0** because the host bit that we reserved for network will be 0. The complete octet is zero so it will be 192.168.10.0.

**2**. The subnet address will be **192.168.10.128** because the host bit that we reserved for network will be 1. The binary of **10000000** will be **128**. So the second subnet address will be **192.168.10.128**.

**First Usable Host Address:**

**1.** The first useable host cannot be used because that address is used to identify the complete network. So, the first useable host address for **192.168.10.0** is **192.168.10.1**.

**2.** The first useable host cannot be used because that address is used to identify the complete network. So, the first useable host address for **192.168.10.128** is **192.168.10.129**.

**Last Usable Host Address:**

**1.** The last useable host cannot be used because that address is used to for broadcasting. So, the last useable host address for **192.168.10.0** is **192.168.10.126**.

**2.** The last useable host cannot be used because that address is used to for broadcasting. So, the last useable host address for **192.168.10.128** is **192.168.10.255**.

**Broadcast Address for 192.168.10.128:**

• Network Address = IP Address AND Subnet Mask

192.168.10.128 => 192.168.10.10000000

• Bits to make 1 of network address = 32 – 25 => 7

• **Broadcast Address = 192.168.10.11111111 => 192.168.10.255**

**TASK 4.**

Step 1:

Determine the number of subnets in Network Topology B.

a. How many subnets are there? \_\_\_\_\_**6**\_\_\_\_\_\_

b. How many bits should you borrow to create the required number of subnets? \_\_\_\_**3 Bits**\_\_\_\_\_

c. How many usable host addresses per subnet are in this addressing scheme? \_\_\_\_\_\_32-2 = 30\_\_\_\_\_

d. What is the new subnet mask in dotted decimal format? \_\_\_\_**255.255.255.224**\_\_\_\_\_\_\_

e. How many subnets are available for future use? \_\_**Two Subnets**\_\_

**Step 2: Record The Subnet Information.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Subnet**  **Number** | **Subnet Address** | **First Usable Host**  **Address** | **Last Usable Host**  **Address** | **Broadcast**  **Address** |
| 1 | 192.16810.0 | 192.168.10.1 | 192.168.10.30 | 192.168.10.31 |
| 2 | 192.168.10.32 | 192.168.10.33 | 192.168.10.62 | 192.168.10.63 |
| 3 | 192.168.10.64 | 192.168.10.65 | 192.168.10.94 | 192.168.10.95 |
| 4 | 192.168.10.96 | 192.168.10.97 | 192.168.10.126 | 192.168.10.127 |
| 5 | 192.168.10.128 | 192.168.10.129 | 192.168.10.158 | 192.168.10.159 |
| 6 | 192.168.10.160 | 192.168.10.161 | 192.168.10.190 | 192.168.10.191 |
| 7 | 192.168.10.192 | 192.168.10.191 | 192.168.10.222 | 192.168.10.223 |
| 8 | 192.168.10.224 | 192.168.10.225 | 192.168.10.254 | 192.168.10.255 |
|  |  |  |  |  |

**Calculation:**

**First Usable Host for 192.168.10.0.**

• First address cannot be used because it is used to identify the network so 192.168.10.1 will be going to be the first usable host address.

**Last Usable Host for 192.168.10.0.**

• To calculate the last usable host address that will be first three bits of the last octets will be zero. The next five bits will be one.

• 192.168.10.00011111 => 192.168.10.31

• Last address is used for broadcasting so the last usable host will be **192.168.10.30**.

**Broadcast Address for 192.168.10.0:**

• Network Address = IP Address AND Subnet Mask => 192.168.10.0

• **Bits to make 1 of network addres**s = (IPV4 total bits) - (Network Bits)

• = 32 – 27

• **Bits to make 1 of network address = 5**

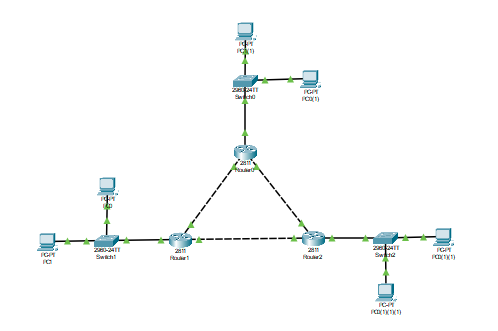
• **Network Address = 192.168.10.00000000**

• **Broadcast Address = 192.168.10.00011111**

• **Result => Broadcast Address = 192.168.10.31**

**Step 3: Assign Addresses to network devices in the subnet**

**Topology.**



|  |  |  |  |
| --- | --- | --- | --- |
| **Device** | **Interface** | **IP Address** | **Subnet Mask** |
| **R1** | **GigabitEthernet 0/1** | **192.168.10.1** | **255.255.255.224** |
|  | **Serial 0/0/0** | **192.168.10.33** | **255.255.255.224** |
|  | **Serial 0/0/1** | **192.168.10.65** | **255.255.255.224** |
| **R2** | **GigabitEthernet 0/1** | **192.168.10.97** | **255.255.255.224** |
|  | **Serial 0/0/0** | **192.168.10.34** | **255.255.255.224** |
|  | **Serial 0/0/1** | **192.168.10.129** | **255.255.255.224** |
| **R3** | **GigabitEthernet 0/1** | **192.168.10.161** | **255.255.255.224** |
|  | **Serial 0/0/0** | **192.168.10.66** | **255.255.255.224** |
|  | **Serial 0/0/1** | **192.168.10.130** | **255.255.255.224** |