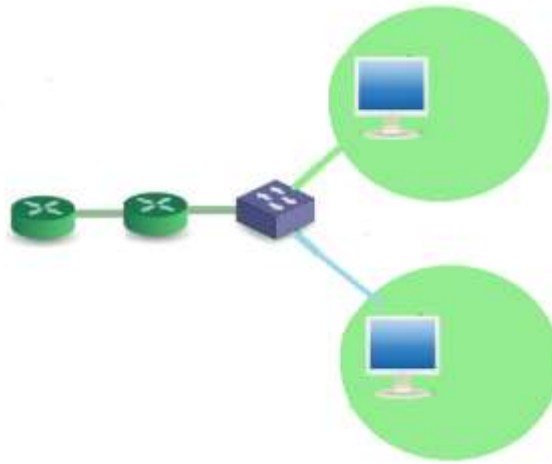


1 (A). Please refer to network topology in the figure below. The network address that is used is **10.1.1.0/24**:



Answer the following questions:

1: What class of IP address this particular network address belongs. (1 mark)

Answer: Class A

2: Is it a private or public IP? (1 mark)

Answer: Private

3: How many subnets (Networks) are required for the given network topology?

Answer: 2 (1 mark)

4: Show the subnet calculation (3 marks)

Answer:

For the given topology we require only 2 subnets, using the *subnet formula* we will find the number of bits to be borrowed.

$$2^n = \text{Number of subnets}$$

Here n is the number of bits to be borrowed from host portion which we have to calculate.

We know the number of subnets required is 2 so enter that value in the formula

$$2^n = 2,$$

Substituting $n = 1$ we will get the answer

$$2^1 = 2$$

Therefore, the number of bits to borrow from the host portion in the subnet mask is 1.

The *new subnet mask* will now be 255.255.255.10000000 also written as 25

(first 3 octets are in decimal form and the last octet in binary form)

Now do the AND operation of the given address and the new subnet mask to identify the network address and the broadcast address

10.	1.	1.	00000000	
255.	255.	255.	10000000	
<hr/>				
10.	1.	1.	00000000	→ network address [10.1.1.0]
10.	1.	1.	01111111	→ broadcast address [10.1.1.127]

(draw a line from the subnet mask where zeros start and then convert all the zeros to ones in the network address in order to get the broadcast address)

To find the subnet range of 2 subnets, use the magic number (also known as jump) which is the place value of the last one in the subnet mask. In this case it is 128. The second subnet will jump to 128.

Subnet 1 : [10.1.1.0 – 10.1.1.127]

Subnet 2 : [10.1.1.128 – 10.1.1.255]

5: Number of valid host IP address for each subnet? (1 mark)

Answer:

Use the *host formula*, $2^n - 2$ (here n is the number of remaining hosts bits)

1 bit was borrowed from the last octet of the subnet mask, so the remaining host bits are 7. Substitute this number in the formula

$$2^7 - 2 = 126.$$

(B). What are the benefits of subnetting and what are the alternative solutions than subnetting? (3 marks)

1. What is the benefits of using Linux Operating System? (5 marks)

2. What are the three User types in Linux system? Describe about them briefly.

(5 marks)