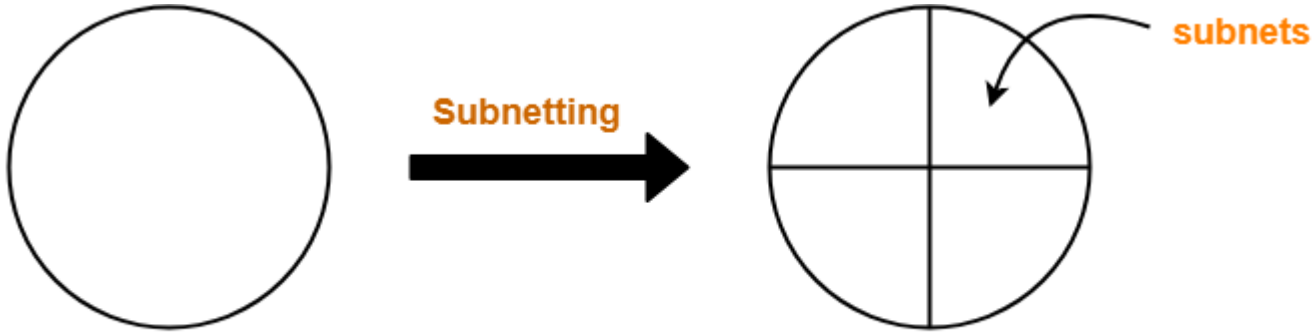
Subnetting in Networking

Subnetting

- The process of dividing a single network into multiple sub networks is called as **subnetting**.
- The sub networks so created are called as **subnets**.



Advantages

The two main advantages of subnetting a network are-

- It improves the security.
- The maintenance and administration of subnets is easy.

Disadvantages of Subnetting-

- We have to face a loss of IP Addresses.
- This is because two IP Addresses are wasted for each subnet.
- One IP address is wasted for its network address.
- Other IP Address is wasted for its direct broadcasting address.
- Subnetting leads to complicated communication process.

Subnet ID

- Each subnet has its unique network address known as its **Subnet ID**.
- The subnet ID is created by borrowing some bits from the Host ID part of the IP Address.
- The number of bits borrowed depends on the number of subnets created.

How to Calculate Subnet Mask?

For any given IP Address, the subnet mask is calculated-

- By setting all the bits reserved for network ID part and subnet ID part to 1.
- By setting all the bits reserved for host ID part to 0.

- Subnet Mask is used to determine to which subnet the given ip address belongs to.

Default mask for different classes of IP Address are-

- Default subnet mask for Class A = 255.0.0.0
- Default subnet mask for Class B = 255.255.0.0
- Default subnet mask for Class C = 255.255.255.0

Problems

In a class B, network on the internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts per subnet? Number of subnet?

Suppose a network with IP Address 192.16.0.0. is divided into 2 subnets, find number of hosts per subnet.

Also for the first subnet, find-

1. Subnet Address
2. First Host ID
3. Last Host ID
4. Broadcast Address

Problems

If the subnet mask 255.255.255.128 belongs to class C, find-

1. Number of subnets
2. Number of hosts in each subnet

Problems

Consider the following routing table at an IP router

Network No.	Net Mask	Next Hop
128.96.170.0	255.255.254.0	Interface 0
128.96.168.0	255.255.254.0	Interface 1
128.96.166.0	255.255.254.0	R2
128.96.164.0	255.255.254.0	R3
0.0.0.0	Default	R4

For each IP address find out the next hop interface using the entries from the routing table above.

128.96.171.92 128.96.167.151

128.96.163.121 128.96.165.121