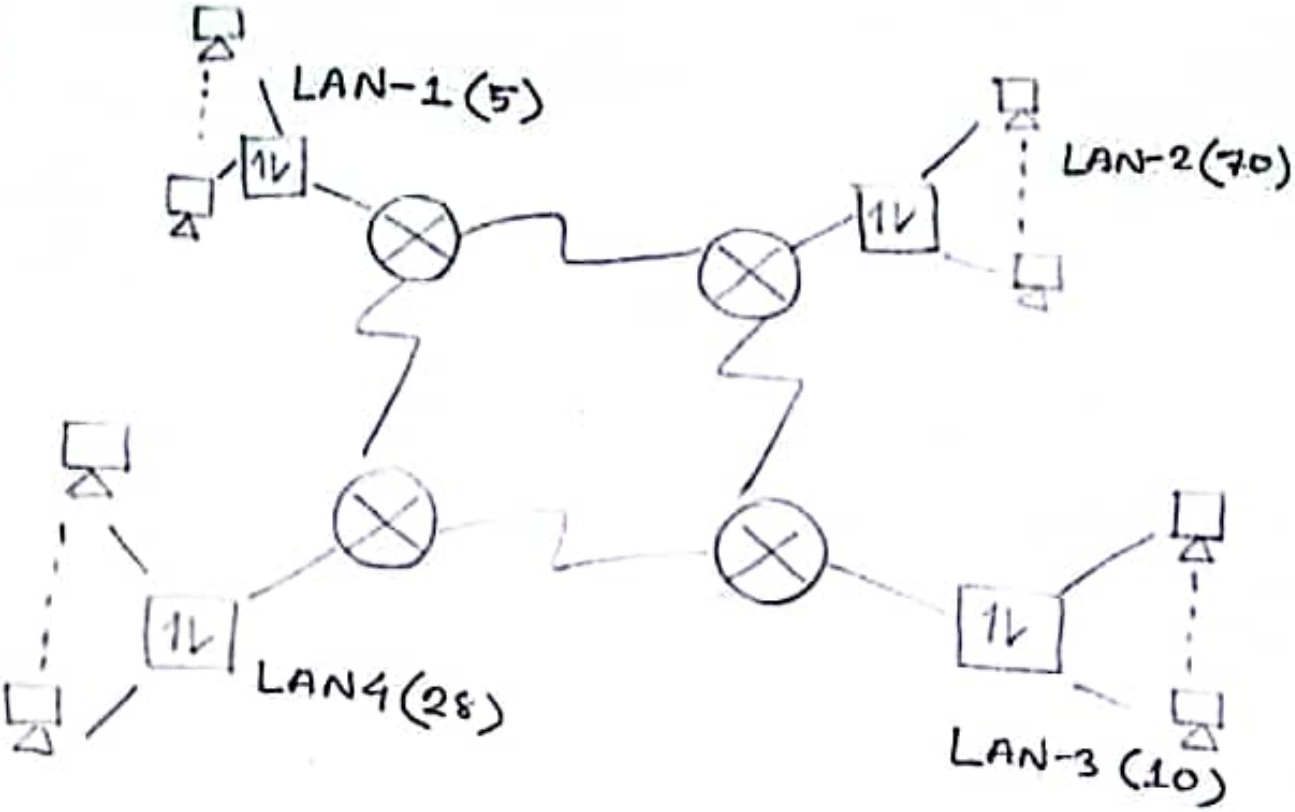
(*) Given Network:—



Here are number of 8 Networks:—

1. LAN 1: 5 hosts.
2. LAN 2: 70 hosts
3. LAN 3: 10 hosts
4. LAN 4: 28 hosts.

and 4 serial Network of 2 hosts each.

Given Base Address, 200.200.200.0/24

Maximum number of hosts is 70.

to facilitate 70 hosts we need 7 bits for hosts as $2^7 - 2 = 126 > 70$.

Base address 200.200.200.0/24

possible subnets with 7 bits for hosts.

1) 200.200.200.00000000/25 → 200.200.200.0/25
   (7 bit for host.)
2) 200.200.200.10000000/25 → 200.200.200.128/25
   (7 bit for host.)

the ip 200.200.200.0/25 is assigned to LAN-2.

Now we'll subnet remaining 200.200.200.128/25 for LAN-4 having 28 hosts.

We'll need ($2^5 - 2 > 28$) so 5 bits for host portion.

∴ possible subnets;

1) 200.200.200.128/27 (LAN-4)
2) 200.200.200.160/27
3) 200.200.200.192/27
4) 200.200.200.224/27

As,
(8−5)+24 = 27.
27−25 = 2 bits for combination that means $2^2 = 4$ subnets.

Now,
200.200.200.160/27 will be used to create subnets.

For LAN-3 We have 10 hosts.

∴ 4 host bits required

∴ possible subnets:−

1) 200.200.200.160/28 (LAN-3)
2) 200.200.200.176/28

Now,
200.200.200.176/28 will be used for subnetting.

For LAN-1 there are 5 hosts so 3 bits are required.

∴ possible subnets:—

1) 200.200.200.176/29 [LAN-1]
2) 200.200.200.184/29.

Now, remaining 200.200.200.184/29 can be used for subnetting:—

required hosts per subnet 2 and number of subnets 4.

So, 2 bits for 2 hosts, ∴

1) 200.200.200.184/30 [Serial-1]
2) 200.200.200.188/30 [Serial-2]

2 subnets more required so we can use the unused 200.200.200.192/27 for that as base address.

∴ 1) 200.200.200.192/30 and [Serial-3]
2) 200.200.200.196/30 [Serial-4].

Given Lan number and number of hosts under each Lan:—

LAN-1	10 hosts
LAN-2	80 hosts
LAN-3	1000 hosts
LAN-4	3000 hosts
LAN-5	20 hosts
LAN-6	1500 hosts
LAN-7	2 hosts
LAN-8	2 hosts

and base address, 175.170.32.0/19

To facilitate 3000 hosts we need 12 host bits as $2^{12}-2 = 4096-2 = 4094$

∴ possible subnets:—

1) 175.170.32.0/20 (assigned to LAN-4)

2) 175.170.48.0/20

Now base address will be considered as 175.170.48.0/20.

for 1500 hosts we need 11 host bits

∴ possible subnets:—

1) 175.170.48.0/21 (assigned to LAN-6)

2) 175.170.56.0/21

Now new base address 175.170.56.0/21
Number of hosts 1000
bits required 10 for hosts

∴ possible subnets:-

1) 175.170.56.0/22 (Assigned to LAN-3)
2) 175.170.60.0/22

New base address considered 175.170.60.0/22
Number of hosts 80
bits required 7 for hosts

∴ possible subnets:-

1. 175.170.60.0/25 (Assigned to LAN-2)
2. 175.170.60.128/25
3. 175.170.61.0/25
:

Now, taking 175.170.60.128/25 as base address
number of hosts 20.
number of host bits required = 5

∴ possible subnets:-

1) 175.170.60.128/27 assigned to LAN-5
2) 175.170.60.160/27
3) 175.170.60.192/27
4) 175.170.60.224/27

Now, remaining network address 175.170.60.160/27

number of hosts 10.

number of bits required for host is 4.

∴ possible subnets:-

1) 175.170.60.160/28 (for LAN-1)

2) 175.170.60.176/28

Now for LAN-7 and LAN-8 we need 2 subnets each having 2 hosts.

∴ number of host bits required 2.

∴ possible subnets:-

1) 175.170.60.176/30 (LAN-7)

2) 175.170.60.180/30 (LAN-8)

3) 175.170.60.184/30

4) 175.170.60.188/30

* Given IP Address 172.16.0.0/16.

To create 100 subnets we require 7 bits extra for network.

∴ 1st subnet: 172.16.0.0/23

1 total Subnet = $2^7 = 128$

2. New Subnet Mask 255.255.254.0

3. Hosts/per subnet = $2^{32-23} - 2 = 510$

4. total hosts = $128 \times 510 = 65280$

Number of hosts if not been subnetting.

$$2^{32-16} - 2 = 65534$$

∴ hosts lost = $65534 - 6528 = 254$.

* Given IP Address 192.168.2.0/24

12 Subnets to be created.

For this we require 4 network bits. extra.

∴ 1st subnet address: 192.168.2.0/28

1. total subnet = $2^4 = 16$.

2. New subnet Mask 255.255.255.240

3. Host per subnet = $2^{32-28} - 2 = 14$

4. total hosts = $14 \times 16 = 224$

total hosts befor subnetting $2^8 - 2 = 254$

hosts lost for subnetting = $254 - 224 = 30$.