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|  | You’re given a network: 192.168.1.0/24  You need to create subnets for the following departments:   * **HR**: 50 hosts * **Finance**: 25 hosts * **IT**: 12 hosts * **Sales**: 6 hosts  1. **List the requirements (Descending order)**   HR - 50 hosts  Finance - 25 hosts  IT - 12 hosts  Sales - 6 hosts   1. **Find required subnet size**   To find the subnet size, use the formula:  Hosts = 2^x , where x is host bit   | **Department** | **Required**  **Hosts** | **Nearest Power of 2** | **Subnet Mask** | **Subnet Size** | | --- | --- | --- | --- | --- |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | HR | 50 | 2^6 = 64 | /26 | 255.255.255.192 |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | Finance | 25 | 2^5 = 32 | /27 | 255.255.255.224 |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | IT | 12 | 2^4 = 16 | /28 | 255.255.255.240 |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | Sales | 6 | 2^3 = 8 | /29 | 255.255.255.248 |  1. **Subnet Allocation :**   **Step 1:**  As we are working with Class C address, First 24 bit fixed for network. To assign highest 50 host we got 6 bit for host that’s why 2bits left for subnetwork. So the available subnetwork addresses are:  192.168.1.0/26  192.168.1.64/26  192.168.1.128/26  192.168.1.192/26  Now , we are going to select subnet address for **HR**  **🔹 HR: /26 (64 IPs)**  192.168.1.0/26  192.168.1.64/26  192.168.1.128/26  192.168.1.192/26   * **Network**: 192.168.1.0/26 * **Range**: 192.168.1.1 – 192.168.1.62 * **Broadcast**: 192.168.1.63   **Step 2: Finance: /27 (32 IPs) :** Again, we are going to select subnet address for Finance with next available subnetwork address i.e.  192.168.1.64/26  192.168.1.128/26  192.168.1.192/26  But , for finance we need host bit 5 but in 192.168.1.64/26, there are 6 host bit, That’s why extra 1 bit will be added as subnetwork bit. Now the available subnetwork addresses are,  192.168.1.64/27  192.168.1.96/27  192. 168.1.128/27  192.168.1. 160/27  192.168.1.192/27  192.168.1.224/27  192.168.1.128/26  192.168.1.192/26  Now , we are going to select subnet address for **Finance**  192.168.1.64/27  192.168.1.96/27  192. 168.1.128/27  192.168.1. 160/27  192.168.1.192/27  192.168.1.224/27  192.168.1.128/26  192.168.1.192/26  **Finally Finance:/27(32 Ips)**   * **Network**: 192.168.1.64/27 * **Range**: 192.168.1.65 – 192.168.1.94 * **Broadcast**: 192.168.1.95   **Step 3: IT: /28 (16 IPs)** Again, we are going to select subnet address for IT with next available subnetwork address i.e.  192.168.1.96/27  192. 168.1.128/27  192.168.1. 160/27  192.168.1.192/27  192.168.1.224/27  192.168.1.128/26  192.168.1.192/26  But , for IT we need host bit 4 but in 192.168.1.96/27, there are 5 host bit, That’s why extra 1 bit will be added as subnetwork bit. Now the available subnetwork addresses are,  192.168.1.96/28  192.168.1.112/28  192.168.1.128/28  192.168.1.144/28  192.168.1.240/28  192. 168.1.128/27  192.168.1. 160/27  192.168.1.192/27  192.168.1.224/27  192.168.1.128/26  192.168.1.192/26  Now , we are going to select subnet address for **IT,**  192.168.1.96/28  192.168.1.112/28  192.168.1.128/28  192.168.1.144/28  ……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………  192.168.1.240/28  192. 168.1.128/27  192.168.1. 160/27  192.168.1.192/27  192.168.1.224/27  192.168.1.128/26  192.168.1.192/26  **Finally, IT: /28 (16 IPs)**   * **Network**: 192.168.1.96/28 * **Range**: 192.168.1.97 – 192.168.1.110 * **Broadcast**: 192.168.1.111 |  |  |  |

**Step 3:**

**Sales: /29 (8 IPs):** Again, we are going to select subnet address for IT with next available subnetwork address i.e.

192.168.1.112/28

192.168.1.128/28

192.168.1.144/28

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192.168.1.240/28

192. 168.1.128/27

192.168.1. 160/27

192.168.1.192/27

192.168.1.224/27

192.168.1.128/26

192.168.1.192/26

But , for Sales we need host bit 3 but in 192.168.1.112/28, there are 4 host bit, That’s why extra 1 bit will be added as subnetwork bit. Now the available subnetwork addresses are,

192.168.1.112/29

192.168.1.120/29

192.168.1.128/29

192. 168.1.136/29

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192.168.1.248/29

192.168.1.128/28

192.168.1.144/28

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192.168.1.240/28

192. 168.1.128/27

192.168.1. 160/27

192.168.1.192/27

192.168.1.224/27

192.168.1.128/26

192.168.1.192/26,

Now , we are going to select subnet address for **Sales,**

192.168.1.112/29

192.168.1.120/29

192.168.1.128/29

192. 168.1.136/29

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192.168.1.248/29

192.168.1.128/28

192.168.1.144/28

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192.168.1.240/28

192. 168.1.128/27

192.168.1. 160/27

192.168.1.192/27

192.168.1.224/27

192.168.1.128/26

192.168.1.192/26

**Finally, Sales: /29 (8 IPs)**

* **Network: 192.168.1.112/29**
* **Range: 192.168.1.113 – 192.168.1.118**
* **Broadcast: 192.168.1.119**