**Q5. Given an IP address range of 192.168.1.0/24, divide the network into 4 subnets. Task: Manually calculate the new subnet mask and the range of valid IP addresses for each subnet.**

**The IP address 192.168.1.0 belongs to class C. The default subnet masking of class C is 255.255.255.0. The IP 192.168.1.0 can cater 254 hosts under one network. We can divide the network into 4 subnets as following:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Subnet Number #** | **Network Address** | **Starting usable IP address** | **Last usable IP address** | **Broadcast address** | **Total number of hosts capacity** |
| **1** | **192.168.1.0/26** | **192.168.1.1** | **192.168.1.62** | **192.168.1.63** | **62** |
| **2** | **192.168.1.64/26** | **192.168.1.65** | **192.168.1.126** | **192.168.1.127** | **62** |
| **3** | **192.168.1.128/26** | **192.168.1.129** | **192.168.1.190** | **192.168.1.191** | **62** |
| **4** | **192.168.1.192/26** | **192.168.1.193** | **192.168.1.254** | **192.168.1.255** | **62** |
| **Total** | **-** | **-** | **-** | **-** | **248** |

**Q6. You are given three IP addresses: 10.1.1.1, 172.16.5.10. and 192.168.1.5. Task: Identify the class of each IP address (Class A, B, or C). What is the default subnet mask for each class? Provide the range of IP addresses for each class.**

**10.1.1.1 belongs to class A. The default subnet mask of class A is 255.0.0.0 and the default IP address format of class A is 0NNNNNNN.HHHHHHHH.HHHHHHHH.HHHHHHHH.**

**172.16.5.0 belongs to class B. The default subnet mask of class B is 255.255.0.0 and the default IP address format of class B is 10NNNNNN.NNNNNNNN.HHHHHHHH.HHHHHHHH.**

**192.168.1.5 belongs to class C. The default subnet mask of class C is 255.255.255.0 and the default IP address format of class B is 110NNNNN.NNNNNNNN.NNNNNNNN.HHHHHHHH.**

**The ranges of IP addresses are as following:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Class** | **IP address format** | **Range** | **Network capacity** | **Host capacity** |
| **A** | **0NNNNNNN.HHHHHHHH.HHHHHHHH.HHHHHHHH** | **1.0.0.0 to 126.255.255.255** | **126** | **16777214** |
| **B** | **10NNNNNN.NNNNNNNN.HHHHHHHH.HHHHHHHH** | **128.0.0.0 to 191.255.255.255** | **16384** | **65534** |
| **C** | **110NNNNN.NNNNNNNN.NNNNNNNN.HHHHHHHH** | **192.0.0.0 to 223.255.255.255** | **2097152** | **254** |

**Note: 127.0.0.0 – 127.255.255.255 IP address range is used for internal testing.**