**LAB-10**

**SUBNETING**

**TASK 1:**

### 1. IP: 10.0.0.0 for 1025 Subnets

* **Class**: Class A, default subnet mask: /8
* **Number of bits required**: ⌈log⁡21025⌉=11\lceil \log\_2 1025 \rceil = 11⌈log2​1025⌉=11 bits.
* **New subnet mask**: 8+11=/198 + 11 = /198+11=/19.
* **Block size**: 232−19=81922^{32 - 19} = 8192232−19=8192 addresses per subnet.

**Subnets:**

1. **First Subnet**:
   * **Range**: 10.0.0.0 – 10.0.31.255
   * **Broadcast Address**: 10.0.31.255
2. **Second Subnet**:
   * **Range**: 10.0.32.0 – 10.0.63.255
   * **Broadcast Address**: 10.0.63.255
3. **Second Last Subnet**:
   * **Range**: 10.127.192.0 – 10.127.223.255
   * **Broadcast Address**: 10.127.223.255
4. **Last Subnet**:
   * **Range**: 10.127.224.0 – 10.127.255.255
   * **Broadcast Address**: 10.127.255.255

**2. IP: 212.31.30.0 for 21 Subnets**

* **Class**: Class C, default subnet mask: /24
* **Number of bits required**: ⌈log⁡221⌉=5\lceil \log\_2 21 \rceil = 5⌈log2​21⌉=5 bits.
* **New subnet mask**: 24+5=/2924 + 5 = /2924+5=/29.
* **Block size**: 232−29=82^{32 - 29} = 8232−29=8 addresses per subnet.

**Subnets:**

1. **First Subnet**:
   * **Range**: 212.31.30.0 – 212.31.30.7
   * **Broadcast Address**: 212.31.30.7
2. **Second Subnet**:
   * **Range**: 212.31.30.8 – 212.31.30.15
   * **Broadcast Address**: 212.31.30.15
3. **Second Last Subnet**:
   * **Range**: 212.31.30.240 – 212.31.30.247
   * **Broadcast Address**: 212.31.30.247
4. **Last Subnet**:
   * **Range**: 212.31.30.248 – 212.31.30.255
   * **Broadcast Address**: 212.31.30.255

**3. IP: 190.38.0.0 for 645 Subnets**

* **Class**: Class B, default subnet mask: /16
* **Number of bits required**: ⌈log⁡2645⌉=10\lceil \log\_2 645 \rceil = 10⌈log2​645⌉=10 bits.
* **New subnet mask**: 16+10=/2616 + 10 = /2616+10=/26.
* **Block size**: 232−26=642^{32 - 26} = 64232−26=64 addresses per subnet.

**Subnets:**

1. **First Subnet**:
   * **Range**: 190.38.0.0 – 190.38.0.63
   * **Broadcast Address**: 190.38.0.63
2. **Second Subnet**:
   * **Range**: 190.38.0.64 – 190.38.0.127
   * **Broadcast Address**: 190.38.0.127
3. **Second Last Subnet**:
   * **Range**: 190.38.255.128 – 190.38.255.191
   * **Broadcast Address**: 190.38.255.191
4. **Last Subnet**:
   * **Range**: 190.38.255.192 – 190.38.255.255
   * **Broadcast Address**: 190.38.255.255

**TASK-2**

**PROCEDURE:**

1. For implementing this first two subnets we will take 2 routers for each subnet and will connect it with switches and their respective nodes.
2. We will assign IP on router interface 1 that is 10.0.0.1 and default subnet mask
3. We will assign IP to PCs connected to it as we did previously
4. Now we will ping from PC1 to PC2 and we are getting reply
5. Now we will assign IP to the router 2 and according to the subnetting it is 10.0.32.1
6. We will assign IP to it’s PCs and connection is setup
7. Now we will ping from PC1 to PC2 from router 2 and we are getting reply it means that or connection was successful
8. Now we will create a static route for both routers to be able to communicate with each other
9. On their interface 0/1 we will assign class c IP for static routing
10. We will create a static route with command ip route destination network subnet mask ip of next router
11. Now as our static routing is setup we will ping from router 1 PC to the PC of second router.
12. As we are getting reply our connection was successful.