**Provided network: 175.21.0.0/16 (Class B)**

Before Subnetting:

* **Network Addresses (range)**
  + 175.21.0.0 🡪 175.21.255.255
* **Broadcast Address**
  + 175.21.255.255
* **Netmask**
  + 255.255. 0.0 (decimal)
* **Maximum number of hosts**
  + There are a total of 16 host bits
  + This means there can be a total of 65536 hosts before subnetting
  + 65534 hosts are usable (given the statement that we are **unable** to use all 0s and 1s)

After Subnetting:

* **New netmask**
  + Since we need a minimum number of 11 usable subnets, 4 bits are required
  + We can create a total of 16 subnets, 14 of which are usable (given the statement that we are **unable** to use all 0s and 1s)
  + New netmask will be /20 (16 + 4)
  + 255.255.11110000.0 (decimal in cyan, binary in yellow)
  + 255.255.240.0
* **Maximum number of hosts per subnet**
  + After subnetting, there is a total of **12 host bits per subnet**
  + This means that we have a maximum number of 4096 hosts per subnet
  + 4094 hosts are usable (given the statement that we are **unable** to use all 0s and 1s)

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Subnet Number** | **Subnet ID Binary Value** | **Host bits binary range (3rd octet)** | **3rd octet binary range** | **3rd octet decimal value** | **IP Range (From)** | **IP Range (To)** | **Usable** |
| 0 | 0000 | 0000 - 1111 | 0000 0000 – 0000 1111 | 0 - 15 | 175.21.0.0 | 175.21.15.255 | No |
| 1 | 0001 | 0000 - 1111 | 0001 0000 – 0001 1111 | 16 - 31 | 175.21.16.0 | 175.21.31.255 | Yes |
| 2 | 0010 | 0000 - 1111 | 0010 0000 – 0010 1111 | 32 - 47 | 175.21.32.0 | 175.21.47.255 | Yes |
| 3 | 0011 | 0000 - 1111 | 0011 0000 – 0011 1111 | 48 - 63 | 175.21.48.0 | 175.21.63.255 | Yes |
| 4 | 0100 | 0000 - 1111 | 0100 0000 – 0100 1111 | 64 - 79 | 175.21.64.0 | 175.21.79.255 | Yes |
| 5 | 0101 | 0000 - 1111 | 0101 0000 – 0101 1111 | 80 - 95 | 175.21.80.0 | 175.21.95.255 | Yes |
| 6 | 0110 | 0000 - 1111 | 0110 0000 – 0110 1111 | 96 - 111 | 175.21.96.0 | 175.21.111.255 | Yes |
| 7 | 0111 | 0000 - 1111 | 0111 0000 – 0111 1111 | 112 - 127 | 175.21.112.0 | 175.21.127.255 | Yes |
| 8 | 1000 | 0000 - 1111 | 1000 0000 – 1000 1111 | 128 - 143 | 175.21.128.0 | 175.21.143.255 | Yes |
| 9 | 1001 | 0000 - 1111 | 1001 0000 – 1001 1111 | 144 - 159 | 175.21.144.0 | 175.21.159.255 | Yes |
| 10 | 1010 | 0000 - 1111 | 1010 0000 – 1010 1111 | 160 - 175 | 175.21.160.0 | 175.21.175.255 | Yes |
| 11 | 1011 | 0000 - 1111 | 1011 0000 – 1011 1111 | 176 - 191 | 175.21.176.0 | 175.21.191.255 | Yes |
| 12 | 1100 | 0000 - 1111 | 1100 0000 – 1100 1111 | 192 - 207 | 175.21.192.0 | 175.21.207.255 | Yes |
| 13 | 1101 | 0000 - 1111 | 1101 0000 – 1101 1111 | 208 - 223 | 175.21.208.0 | 175.21.223.255 | Yes |
| 14 | 1110 | 0000 - 1111 | 1110 0000 – 1110 1111 | 224 - 239 | 175.21.224.0 | 175.21.239.255 | Yes |
| 15 | 1111 | 0000 - 1111 | 1111 0000 – 1111 1111 | 240 - 255 | 175.21.240.0 | 175.21.255.255 | No |