DAY 14 - Subnetting Practices

Subnetting Practices

`192.168.255.0/24` into 5 subnets:

- **Original**:
  - `11000000.10101000.11111111.00000000`
  - `11111111.11111111.11111111.00000000`
  - Borrow **3** bits from the host portion (/27):
    - `11111111.11111111.11111111` `.111` `00000`
- **S1**:
  - Borrowed bits = `000`
  - Network ID: `00000` = `192.168.255.0`
  - Broadcast: `11111` = `192.168.255.31
- **S2**:
  - Borrowed bits = `001`
  - Network: `192.168.255.32`
  - Broadcast: `192.168.255.63`
- **S3**:
  - Borrowed bits = `010`
  - Network: `192.168.255.64`
  - Broadcast: `192.168.255.95`
- **S4**:
  - Borrowed bits = `011`
  - Network: `192.168.255.96`
  - Broadcast: `192.168.255.127`
- **S5**:
  - Borrowed bits = `100`
  - Network: `192.168.255.128`
  - Broadcast: `192.168.255.159`
- **Formula**:
  - No. of subnets = `pow(2, borrowed_bits)` : borrow 3 bits = 8 subnets.
  - (Don't subtract 2 like No. of Hosts formula)

What subnet does host `192.168.5.57/27` belong to?

- `192.168.5.57` into `11000000.10101000.00000101` `.001` `11001`/27

Network	Host	Mask
001	00000	/27
32	0	/27

Answer: Subnet `192.168.5.32/27`

What subnet does host `192.168.29.219/29` belong to?

- Last octet: `219` = `11011011`

Network	Host	Mask
11011	011	/29
216	0	/29

Answer: Subnet `192.168.29.216/29`

Note: The process is exactly the same regardless of classes.

Create 80 Subnets from `172.16.0.0/16`, what prefix to use?

- **Mask**: `1111111.11111111.00000000.00000000`
- **Borrowing 7 Bits** (/23):
  - `pow(2, 7)` = 128 Subnets >= 80 Subnets requirement.
- **New Mask**:
  - `11111111.11111111.11111110.00000000`
  - `255.255.254.0`

Answer: Prefix Length = 23

`172.22.0.0/16` into 500 Subnets

- **Mask**: `1111111.11111111.00000000.00000000`
- **Borrowing 9 Bits** (/25):
  - `pow(2, 9)` = 512 Subnets >= 500 Subnets requirement.
- **New Mask**:
  - `11111111.11111111.11111111.10000000`
  - `255.255.255.192`

Answer: /25

10.0.0.0/8 into 1,000,000 subnets

- **Mask**: `1111111.00000000.00000000.00000000`
- **Borrowing 20 Bits** (/28):
  - `pow(2, 20)` = 1,048,576 Subnets >= 1,000,000 Subnets requirement.
- **New Mask**:
  - `11111111.11111111.11111111.11110000`
  - `255.255.255.232`

172.25.217.192/21 Belongs to?

- **Address**: `10101100.00011001.11011001.11000000`
- **Host = 0**: `10101100.00011001.11011` `000.00000000`
  - `172.25.216.0/21`

Answer: `172.25.216.0/21`

Broadcast IP of `192.168.91.78/26`

- **Address**: `11000000.10101000.01011011.01001110`
- **Separate Network/Host**: `11000000.10101000.01011011.01` & `001110`
- **Host = 1**:

  `192.168.91.01` & *`111111`*

  `192.168.91.01111111`

  Answer `192.168.91.127`
