Bài 1

1. 169.123.3.8/17

| IP address | 169.123.3.8 | 10101001 | 01111011 | 0000011 | 00001000 |
|----------------------|-----------------|----------|----------|----------|----------|
| Subnet Mask | 255.255.128.0 | 11111111 | 11111111 | 10000000 | 00000000 |
| Network address | 169.123.0.0 | 10101001 | 01111011 | 00000000 | 00000000 |
| First IP address | 169.123.0.1 | 10101001 | 01111011 | 00000000 | 0000001 |
| Last IP address | 169.123.127.254 | 10101001 | 01111011 | 01111111 | 11111110 |
| Broadcast IP address | 169.123.127.255 | 10101001 | 01111011 | 01111111 | 11111111 |

2. 192.13.110.23/25

| IP address | 192.13.110.23 | 11000000 | 00001101 | 01101110 | 00010111 |
|----------------------|-----------------|----------|----------|----------|----------|
| Subnet Mask | 255.255.255.128 | 11111111 | 11111111 | 11111111 | 10000000 |
| Network address | 192.13.110.0 | 11000000 | 00001101 | 01101110 | 00000000 |
| First IP address | 192.13.110.1 | 11000000 | 00001101 | 01101110 | 0000001 |
| Last IP address | 192.13.110.126 | 11000000 | 00001101 | 01101110 | 01111110 |
| Broadcast IP address | 192.13.110.127 | 11000000 | 00001101 | 01101110 | 01111111 |

3. 10.78.21.3/12

| IP address | 10.78.21.3 | 00001010 | 01001110 | 00010101 | 0000011 |
|--------------|----------------|----------|----------|----------|----------|
| Subnet Mask | 255.240.0.0 | 11111111 | 11110000 | 00000000 | 00000000 |
| Network | 10.64.0.0 | 00001010 | 01000000 | 00000000 | 00000000 |
| address | | | | | |
| First IP | 10.64.0.1 | 00001010 | 01000000 | 00000000 | 00000001 |
| address | | | | | |
| Last IP | 10.127.255.254 | 00001010 | 01111111 | 11111111 | 11111110 |
| address | | | | | |
| Broadcast IP | 10.127.255.255 | 00001010 | 01111111 | 11111111 | 11111111 |
| address | | | | | |

Bài 2 Chia mạng chứa địa chỉ IP: 172.169.10.23/18 thành 6 mạng con, mỗi mạng chứa 1000 host

Để biểu diễn 6 mạng con, ta cần ít nhất 3 bit (vì $2^3 = 8 > 6$)

10101100

10101001

 \Rightarrow Số bit host IP còn lại: 14 - 3 = 11

172.169.10.3

172.169.40.1

First IP 6

10101100

10101001

 \Rightarrow Số host: $2^{11} - 2 = 2046$

IP address

| Subnet Mask | 255.255.192.0 | 11111111 | 11111111 | 11000000 | 00000000 |
|----------------|----------------|----------------------|----------------------|----------------------|----------|
| Network | 172.169.0.0 | 10101100 | 10101001 | 00000000 | 00000000 |
| address | | | | | |
| | | | | 1 | • |
| Subnet Mask | 255.255.248.0 | 11111111 | 11111111 | 11111000 | 00000000 |
| new | | | | | |
| | | | | | • |
| Net Add 1 | 172.169.0.0 | 10101100 | 10101001 | 00000000 | 00000000 |
| First IP 1 | 172.169.0.1 | 10101100 | 10101001 | 00000000 | 00000001 |
| Last IP 1 | 172.169.7.254 | 10101100 | 10101001 | 00000111 | 11111110 |
| Broadcast IP 1 | 172.169.7.255 | 10101100 | 10101001 | 00000111 | 11111111 |
| | | | | | l. |
| | | | | | |
| Net Add 2 | 172.169.8.0 | 10101100 | 10101001 | 00001000 | 0000000 |
| First IP 2 | 172.169.8.1 | 10101100 | 10101001 | 00001000 | 0000001 |
| Last IP 2 | 172.169.15.254 | 10101100 | 10101001 | 00001111 | 11111110 |
| Broadcast IP 2 | 172.169.15.255 | 10101100 | 10101001 | 00001111 | 11111111 |
| Not Add 2 | 172 160 16 0 | 10101100 | 10101001 | 00010000 | 0000000 |
| Net Add 3 | 172.169.16.0 | 10101100 | 10101001 | 00010000 | 0000000 |
| First IP 3 | 172.169.16.1 | 10101100 | 10101001 | 00010000 | 0000001 |
| Last IP 3 | 172.169.23.254 | 10101100 | 10101001 | 00010111 | 11111110 |
| Broadcast IP 3 | 172.169.23.255 | 10101100 | 10101001 | 00010111 | 11111111 |
| | | | | | |
| Net Add 4 | 172.169.24.0 | 10101100 | 10101001 | 00011000 | 0000000 |
| First IP 4 | 172.169.24.1 | 10101100 | 10101001 | 00011000 | 00000000 |
| Last IP 4 | 172.169.31.254 | 10101100 | 10101001 | 00011000 | 11111110 |
| Broadcast IP 4 | 172.169.31.255 | 10101100 | 10101001 | 00011111 | 11111111 |
| bioducast if 4 | 1/2.109.31.233 | 10101100 | 10101001 | 00011111 | 1111111 |
| | | | | | |
| Net Add 5 | 172.169.32.0 | 10101100 | 10101001 | 00100000 | 00000000 |
| First IP 5 | 172.169.32.1 | 10101100 | 10101001 | 00100000 | 00000001 |
| | | | | | |
| | | 10101100 | 10101001 | 00100111 | 11111110 |
| Last IP 5 | 172.169.39.254 | 10101100 10101100 | 10101001 10101001 | 00100111 00100111 | 11111110 |
| | | 10101100 10101100 | 10101001 10101001 | 00100111 00100111 | 11111110 |
| Last IP 5 | 172.169.39.254 | | | | |

00001010

0000011

0000001

00101000

| Last IP 6 | 172.169.47.254 | 10101100 | 10101001 | 00101111 | 11111110 |
|-----------------------|----------------|----------|----------|----------|----------|
| Broadcast IP 6 | 172.169.47.255 | 10101100 | 10101001 | 00101111 | 11111111 |

Mạng con:

1. 172.169.0.0/21

2. 172.169.8.0/21

3. 172.169.16.0/21

4. 172.169.24.0/21

5. 172.169.32.0/21

6. 172.169.40.0/21

Bài 3: Chia mạng chứa địa chỉ IP: 10.24.222.21/10 thành 11 mạng con, mỗi mạng chứa 10K host

Để biểu diễn 11 mạng con, ta cần ít nhất 4 bit (vì $2^4 = 16 > 11$)

 \Rightarrow Số bit host IP còn lại: 22 - 4 = 18

 \Rightarrow Số host: $2^{18} - 2 = 262142$

| IP address | 10.24.222.21 | 00001010 | 00011000 | 11011110 | 00010101 |
|-----------------|--------------|----------|----------|----------|----------|
| Subnet Mask | 255.192.0.0 | 11111111 | 11000000 | 00000000 | 00000000 |
| Network address | 10.0.0.0 | 00001010 | 00000000 | 00000000 | 00000000 |
| | | | | | |
| Subnet Mask new | 255.252.0.0 | 11111111 | 11111100 | 00000000 | 00000000 |

| Net Add 1 | 10.0.0.0 | 00001010 | 0000000 | 00000000 | 0000000 |
|----------------|--------------|----------|----------|----------|----------|
| First IP 1 | 10.0.0.1 | 00001010 | 00000000 | 00000000 | 0000001 |
| Last IP 1 | 10.3.255.254 | 00001010 | 0000011 | 11111111 | 11111110 |
| Broadcast IP 1 | 10.3.255.255 | 00001010 | 00000011 | 11111111 | 11111111 |

| Net Add 2 | 10.4.0.0 | 00001010 | 00000100 | 00000000 | 00000000 |
|----------------|--------------|----------|----------|----------|----------|
| First IP 2 | 10.4.0.1 | 00001010 | 00000100 | 00000000 | 0000001 |
| Last IP 2 | 10.7.255.254 | 00001010 | 00000111 | 11111111 | 11111110 |
| Broadcast IP 2 | 10.7.255.254 | 00001010 | 00000111 | 11111111 | 11111111 |

| Company | Last IP 3 10.11.255 Broadcast IP 3 10.11.255 Net Add 4 10.12.0.0 First IP 4 10.15.255 Broadcast IP 4 10.15.255 Net Add 5 10.16.0.0 First IP 5 10.16.0.1 Last IP 5 10.19.255 Broadcast IP 6 10.20.0.1 Last IP 6 10.23.255 Broadcast IP 7 10.24.0.0 First IP 7 10.24.0.1 Last IP 7 10.27.255 Broadcast IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | 00001010 | 00000 000000 | 00001000 00000000 | 00000000 |
|---|--|---------------|--------------|-------------------|----------|
| Net Add 4 | Broadcast IP 3 10.11.255 Net Add 4 10.12.0.0 First IP 4 10.15.255 Broadcast IP 4 10.15.255 Net Add 5 10.16.0.0 First IP 5 10.16.0.1 Last IP 5 10.19.255 Broadcast IP 5 10.20.0.1 Last IP 6 10.20.0.1 Last IP 6 10.23.255 Net Add 7 10.24.0.0 First IP 7 10.24.0.1 Last IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.28.0.1 Last IP 8 10.31.255 Read and 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | 00001010 | 00000 | 00001000 00000000 | 00000001 |
| Net Add 4 10.12.0.0 00001010 0000100 0000000 00000000 | Net Add 4 10.12.0.0 First IP 4 10.12.0.1 Last IP 4 10.15.255 Broadcast IP 4 10.15.255 Net Add 5 10.16.0.0 First IP 5 10.16.0.1 Last IP 5 10.19.255 Broadcast IP 5 10.20.0.1 Last IP 6 10.20.0.1 Last IP 6 10.23.255 Net Add 7 10.24.0.0 First IP 7 10.24.0.1 Last IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.31.255 Read Cast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | .254 00001010 | .1111 111111 | 00001011 11111111 | 11111110 |
| First IP 4 10.12.0.1 00001010 00001110 11111111 1111110 Broadcast IP 4 10.15.255.254 00001010 00001111 11111111 11111110 Broadcast IP 4 10.15.255.254 00001010 00001111 11111111 11111111 Net Add 5 10.16.0.0 00001010 00010000 00000000 00000000 | First IP 4 10.12.0.1 Last IP 4 10.15.255 Broadcast IP 4 10.15.255 Net Add 5 10.16.0.0 First IP 5 10.16.0.1 Last IP 5 10.19.255 Broadcast IP 5 10.19.255 Net Add 6 10.20.0.0 First IP 6 10.23.255 Broadcast IP 6 10.23.255 Net Add 7 10.24.0.0 First IP 7 10.27.255 Broadcast IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.31.255 Net Add 9 10.32.0.1 Last IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.35.255 Net Add 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 | .255 00001010 | .1111 111111 | 00001011 11111111 | 11111111 |
| First IP 4 10.12.0.1 00001010 00001110 11111111 1111110 Broadcast IP 4 10.15.255.254 00001010 00001111 11111111 11111110 Broadcast IP 4 10.15.255.254 00001010 00001111 11111111 11111111 Net Add 5 10.16.0.0 00001010 00010000 00000000 00000000 | First IP 4 10.12.0.1 Last IP 4 10.15.255 Broadcast IP 4 10.15.255 Net Add 5 10.16.0.0 First IP 5 10.16.0.1 Last IP 5 10.19.255 Broadcast IP 5 10.20.0.0 First IP 6 10.20.0.1 Last IP 6 10.23.255 Net Add 7 10.24.0.0 First IP 7 10.24.0.1 Last IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.28.0.1 Last IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.35.255 Net Add 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | 00001010 | 00000 | 00001100 0000000 | 0000000 |
| Company | Last IP 4 10.15.255 Broadcast IP 4 10.15.255 Net Add 5 10.16.0.0 First IP 5 10.16.0.1 Last IP 5 10.19.255 Broadcast IP 5 10.20.0.0 First IP 6 10.20.0.1 Last IP 6 10.23.255 Net Add 7 10.24.0.0 First IP 7 10.24.0.1 Last IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | | | | |
| Net Add 5 | Net Add 5 10.16.0.0 First IP 5 10.16.0.1 Last IP 5 10.19.255 Broadcast IP 5 10.19.255 Net Add 6 10.20.0.1 Last IP 6 10.23.255 Broadcast IP 6 10.23.255 Net Add 7 10.24.0.0 First IP 7 10.27.255 Broadcast IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.28.0.1 Last IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | | | | |
| Net Add 5 | Net Add 5 10.16.0.0 First IP 5 10.16.0.1 Last IP 5 10.19.255 Broadcast IP 5 10.19.255 Net Add 6 10.20.0.0 First IP 6 10.23.255 Broadcast IP 6 10.23.255 Net Add 7 10.24.0.0 First IP 7 10.27.255 Broadcast IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.28.0.1 Last IP 8 10.31.255 Broadcast IP 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | | | | |
| First IP 5 | First IP 5 | .234 00001010 | 1111 | 00001111 | 11111111 |
| First IP 5 | First IP 5 | 00001010 | 00000 | 00010000 0000000 | 0000000 |
| Comparison of | Last IP 5 10.19.255 Broadcast IP 5 10.19.255 Net Add 6 10.20.0.0 First IP 6 10.23.255 Broadcast IP 6 10.23.255 Net Add 7 10.24.0.0 First IP 7 10.24.0.1 Last IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | | | | |
| Net Add 6 | Broadcast IP 5 10.19.255 Net Add 6 10.20.0.0 First IP 6 10.23.255 Broadcast IP 6 10.23.255 Net Add 7 10.24.0.0 First IP 7 10.24.0.1 Last IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | | | | |
| Net Add 6 10.20.0.0 00001010 00010100 00000000 0000000 | Net Add 6 10.20.0.0 First IP 6 10.20.0.1 Last IP 6 10.23.255 Broadcast IP 6 10.23.255 Net Add 7 10.24.0.0 First IP 7 10.27.255 Broadcast IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | | | | |
| First IP 6 | First IP 6 10.20.0.1 Last IP 6 10.23.255 Broadcast IP 6 10.23.255 Net Add 7 10.24.0.0 First IP 7 10.27.255 Broadcast IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | .255 00001010 | .1111 111111 | 00010011 11111111 | 11111111 |
| First IP 6 | First IP 6 10.20.0.1 Last IP 6 10.23.255 Broadcast IP 6 10.23.255 Net Add 7 10.24.0.0 First IP 7 10.27.255 Broadcast IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.31.255 Broadcast IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 | | | | |
| Last IP 6 10.23.255.254 00001010 00010111 11111111 11111110 Broadcast IP 6 10.23.255.255 00001010 0001011 11111111 11111111 Net Add 7 10.24.0.0 00001010 00011000 00000000 00000000 First IP 7 10.24.0.1 00001010 00011010 00000000 00000000 Last IP 7 10.27.255.254 00001010 00011011 11111111 11111111 Broadcast IP 7 10.27.255.255 00001010 0001101 11111111 11111111 Net Add 8 10.28.0.0 00001010 00011100 00000000 00000000 First IP 8 10.28.0.1 00001010 00011101 11111111 11111111 Broadcast IP 8 10.31.255.254 00001010 00011111 11111111 11111111 Broadcast IP 8 10.31.255.255 00001010 00011111 11111111 | Last IP 6 10.23.255 Broadcast IP 6 10.23.255 Net Add 7 10.24.0.0 First IP 7 10.24.0.1 Last IP 7 10.27.255 Broadcast IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | 00001010 | 00000 000000 | 00010100 00000000 | 0000000 |
| Broadcast IP 6 10.23.255.255 00001010 00010111 11111111 11111111 Net Add 7 10.24.0.0 00001010 00011000 00000000 00000000 First IP 7 10.24.0.1 00001010 00011010 00000000 00000001 Last IP 7 10.27.255.254 00001010 00011011 11111111 11111111 Broadcast IP 7 10.27.255.255 00001010 00011011 111111111 111111111 Net Add 8 10.28.0.0 00001010 00011100 00000000 00000000 First IP 8 10.28.0.1 00001010 00011111 11111111 11111111 Broadcast IP 8 10.31.255.254 00001010 00011111 111111111 111111111 | Net Add 7 10.24.0.0 First IP 7 10.24.0.1 Last IP 7 10.27.255 Broadcast IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | 00001010 | 00000 000000 | 00010100 00000000 | 0000001 |
| Net Add 7 10.24.0.0 00001010 00011000 00000000 00000000 | Net Add 7 10.24.0.0 First IP 7 10.24.0.1 Last IP 7 10.27.255 Broadcast IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | .254 00001010 | .1111 111111 | 00010111 11111111 | 11111110 |
| First IP 7 10.24.0.1 00001010 00011000 00000000 00000001 Last IP 7 10.27.255.254 00001010 00011011 11111111 11111110 Broadcast IP 7 10.27.255.255 00001010 00011011 11111111 11111111 Net Add 8 10.28.0.0 00001010 00011100 00000000 00000000 | First IP 7 10.24.0.1 Last IP 7 10.27.255 Broadcast IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | .255 00001010 | 1111 111111 | 00010111 11111111 | 11111111 |
| First IP 7 10.24.0.1 00001010 00011000 00000000 00000001 Last IP 7 10.27.255.254 00001010 00011011 11111111 11111110 Broadcast IP 7 10.27.255.255 00001010 00011011 11111111 11111111 Net Add 8 10.28.0.0 00001010 00011100 00000000 00000000 | First IP 7 10.24.0.1 Last IP 7 10.27.255 Broadcast IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | | | | |
| Last IP 7 10.27.255.254 00001010 00011011 11111111 11111110 Broadcast IP 7 10.27.255.255 00001010 00011011 11111111 11111111 Net Add 8 10.28.0.0 00001010 00011100 00000000 00000000 First IP 8 10.28.0.1 00001010 00011100 00000000 00000001 Last IP 8 10.31.255.254 00001010 00011111 11111111 11111111 Broadcast IP 8 10.31.255.255 00001010 00011111 11111111 11111111 | Last IP 7 10.27.255 Broadcast IP 7 10.27.255 Net Add 8 10.28.0.0 First IP 8 10.28.0.1 Last IP 8 10.31.255 Broadcast IP 8 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 | 00001010 | 00000 000000 | 00011000 00000000 | 0000000 |
| Broadcast IP 7 10.27.255.255 00001010 00011011 11111111 11111111 Net Add 8 10.28.0.0 00001010 00011100 00000000 00000000 First IP 8 10.28.0.1 00001010 00011100 00000000 00000001 Last IP 8 10.31.255.254 00001010 00011111 11111111 11111111 Broadcast IP 8 10.31.255.255 00001010 00011111 11111111 11111111 | Net Add 8 10.28.0.0 First IP 8 10.28.0.1 Last IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 Broadcast IP 9 10.35.255 | 00001010 | 00000 | 00011000 00000000 | 0000001 |
| Net Add 8 10.28.0.0 00001010 00011100 00000000 00000000 First IP 8 10.28.0.1 00001010 00011100 00000000 00000001 Last IP 8 10.31.255.254 00001010 00011111 11111111 11111111 Broadcast IP 8 10.31.255.255 00001010 00011111 111111111 111111111 | Net Add 8 10.28.0.0 First IP 8 10.28.0.1 Last IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 | .254 00001010 | .1111 111111 | 00011011 11111111 | 11111110 |
| First IP 8 10.28.0.1 00001010 00011100 00000000 00000001 Last IP 8 10.31.255.254 00001010 00011111 11111111 11111110 Broadcast IP 8 10.31.255.255 00001010 00011111 11111111 11111111 | First IP 8 10.28.0.1 Last IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 | .255 00001010 | 1111 111111 | 00011011 11111111 | 11111111 |
| First IP 8 10.28.0.1 00001010 00011100 00000000 00000001 Last IP 8 10.31.255.254 00001010 00011111 11111111 11111110 Broadcast IP 8 10.31.255.255 00001010 00011111 11111111 11111111 | First IP 8 10.28.0.1 Last IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 | | | | |
| Last IP 8 10.31.255.254 00001010 00011111 11111111 11111110 Broadcast IP 8 10.31.255.255 00001010 00011111 11111111 11111111 | Last IP 8 10.31.255 Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 | 00001010 | 00000 000000 | 00011100 00000000 | 00000000 |
| Last IP 8 10.31.255.254 00001010 00011111 11111111 11111110 Broadcast IP 8 10.31.255.255 00001010 00011111 11111111 11111111 | Broadcast IP 8 10.31.255 Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 | 00001010 | 00000 | 00011100 00000000 | 0000001 |
| | Net Add 9 10.32.0.0 First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 | .254 00001010 | .1111 111111 | 00011111 11111111 | 11111110 |
| Net Add 9 10.32.0.0 00001010 00100000 00000000 | First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 | .255 00001010 | 1111 111111 | 00011111 11111111 | 11111111 |
| Net Add 9 10.32.0.0 00001010 00100000 00000000 | First IP 9 10.32.0.1 Last IP 9 10.35.255 Broadcast IP 9 10.35.255 | | | | |
| 10.32.0.0 00001010 0010000 00000000 00000000 000000 | Last IP 9 10.35.255 Broadcast IP 9 10.35.255 | 00001010 | 00000 000000 | 00100000 00000000 | 0000000 |
| First IP 9 10.32.0.1 00001010 00100000 00000000 00000001 | Broadcast IP 9 10.35.255 | 00001010 | 00000 000000 | 00100000 00000000 | 0000001 |
| Last IP 9 10.35.255.254 00001010 00100011 11111111 11111110 | ' | .254 00001010 | 1111 111111 | 00100011 11111111 | 11111110 |
| Broadcast IP 9 10.35.255.255 00001010 00100011 11111111 11111111 | | .255 00001010 | 1111 111111 | 00100011 11111111 | 11111111 |
| | | | | | |
| Net Add 10 10.36.0.0 00001010 00100100 00000000 00000000 | Net Add 10 10.36.0.0 | 00001010 | 00000 000000 | 00100100 00000000 | 0000000 |
| | First IP 10 10.36.0.1 | | | 00100100 00000000 | 00000001 |
| First IP 10 10.36.0.1 00001010 00100100 00000000 00000001 | Last IP 10 10.39.255 | 00001010 | 000000 | 00100111 11111111 | 11111110 |

| Net Add 11 | 10.40.0.0 | 00001010 | 00101000 | 00000000 | 00000000 |
|--------------|---------------|----------|----------|----------|----------|
| First IP 11 | 10.40.0.1 | 00001010 | 00101000 | 00000000 | 0000001 |
| Last IP 11 | 10.43.255.254 | 00001010 | 00101011 | 11111111 | 11111110 |
| Broadcast IP | 10.43.255.255 | 00001010 | 00101011 | 11111111 | 11111111 |
| 11 | | | | | |

00100111

11111111

11111111

00001010

Mạng con:

Broadcast IP

10

10.39.255.255

- 1. 10.0.0.0/14
- 2. 10.4.0.0/14
- 3. 10.8.0.0/14
- 4. 10.12.0.0/14
- 5. 10.16.0.0/14
- 6. 10.20.0.0/14
- 7. 10.24.0.0/24
- 8. 10.28.0.0/14
- 9. 10.32.0.0/14
- 10.10.36.0.0/44
- 11.10.40.0.0/14

Bài 4: Chia mạng chứa địa chỉ IP: 192.168.22.31/19 thành 10 mạng con, mỗi mạng con chứa 500 host

Để biểu diễn 10 mạng con, ta cần ít nhất 4 bit (vì $2^4 = 16 > 10$)

 \Rightarrow Số bit host IP còn lại: 13 - 4 = 9

 \Rightarrow Số host: $2^9 - 2 = 510$

| IP address | 192.168.22.31 | 11000000 | 10101000 | 00010110 | 00011111 |
|-------------|---------------|----------|----------|----------|----------|
| Subnet Mask | 255.255.224.0 | 11111111 | 11111111 | 11100000 | 00000000 |
| Network | 192.168.0.0 | 11000000 | 10101000 | 00000000 | 00000000 |
| address | | | | | |
| | | | | | |
| Subnet Mask | 255.255.254.0 | 11111111 | 11111111 | 11111110 | 00000000 |
| new | | | | | |

| Net Add 1 | 192.168.0.0 | 11000000 | 10101000 | 0000000 | 00000000 |
|---|---|--|--|--|--|
| First IP 1 | 192.168.0.1 | 11000000 | 10101000 | 00000000 | 00000001 |
| Last IP 1 | 192.168.1.254 | 11000000 | 10101000 | 00000001 | 11111110 |
| Broadcast IP 1 | 192.168.1.255 | 11000000 | 10101000 | 0000001 | 11111111 |
| | | | 1 -0-0-0-0 | 0000000 | |
| Net Add 2 | 192.168.2.0 | 11000000 | 10101000 | 00000010 | 0000000 |
| | | | 10101000 | T . | 00000000 |
| First IP 2 Last IP 2 | 192.168.2.1 192.168.3.254 | 11000000 11000000 | 10101000 | 00000010 00000011 | 00000001 11111110 |
| Broadcast IP 2 | 192.168.3.255 | 11000000 | 10101000 10101000 | 00000011 | 11111111 |
| bioducast if Z | 192.106.3.233 | 11000000 | 10101000 | 00000011 | 1111111 |
| | | | | | |
| Net Add 3 | 192.168.4.0 | 11000000 | 10101000 | 00000100 | 0000000 |
| First IP 3 | 192.168.4.1 | 11000000 | 10101000 | 00000100 | 00000001 |
| Last IP 3 | 192.168.5.254 | 11000000 | 10101000 | 00000101 | 11111110 |
| Broadcast IP 3 | 192.168.5.255 | 11000000 | 10101000 | 00000101 | 11111111 |
| | | | | | |
| | | | | | |
| Net Add 4 | 192.168.6.0 | 11000000 | 10101000 | 00000110 | 00000000 |
| First IP 4 | 192.168.6.1 | 11000000 | 10101000 | 00000110 | 00000001 |
| Last IP 4 | 192.168.7.254 | 11000000 | 10101000 | 00000111 | 11111110 |
| Broadcast IP 4 | 192.168.7.255 | 11000000 | 10101000 | 00000111 | 11111111 |
| | | | | | |
| | | | | | |
| Net Add 5 | 192.168.8.0 | 11000000 | 10101000 | 00001000 | 00000000 |
| Net Add 5 | 192.168.8.0 | 11000000 | 10101000 | 00001000 | 00000000 |
| First IP 5 | 192.168.8.1 | 11000000 | 10101000 | 00001000 | 0000001 |
| First IP 5 Last IP 5 | 192.168.8.1 192.168.9.254 | 11000000 11000000 | 10101000 10101000 | 00001000 00001001 | 00000001 11111110 |
| First IP 5 | 192.168.8.1 | 11000000 | 10101000 | 00001000 | 0000001 |
| First IP 5 Last IP 5 | 192.168.8.1 192.168.9.254 | 11000000 11000000 | 10101000 10101000 | 00001000 00001001 | 00000001 11111110 |
| First IP 5 Last IP 5 | 192.168.8.1 192.168.9.254 | 11000000 11000000 | 10101000 10101000 | 00001000 00001001 | 00000001 11111110 |
| First IP 5 Last IP 5 Broadcast IP 5 | 192.168.8.1 192.168.9.254 192.168.9.255 | 11000000 11000000 11000000 | 10101000 10101000 10101000 | 00001000 00001001 00001001 | 00000001 11111110 11111111 |
| First IP 5 Last IP 5 Broadcast IP 5 Net Add 6 First IP 6 | 192.168.8.1 192.168.9.254 192.168.9.255 192.168.10.0 192.168.10.1 | 11000000 11000000 11000000 11000000 11000000 | 10101000 10101000 10101000 10101000 10101000 | 00001000 00001001 00001001 00001010 00001010 | 00000001 11111110 11111111 00000000 |
| First IP 5 Last IP 5 Broadcast IP 5 Net Add 6 First IP 6 Last IP 6 | 192.168.8.1 192.168.9.254 192.168.9.255 192.168.10.0 192.168.10.1 192.168.11.254 | 11000000 11000000 11000000 11000000 11000000 | 10101000 10101000 10101000 10101000 10101000 10101000 | 00001000 00001001 00001001 00001010 00001010 00001011 | 00000001 11111110 11111111 00000000 000000 |
| First IP 5 Last IP 5 Broadcast IP 5 Net Add 6 First IP 6 | 192.168.8.1 192.168.9.254 192.168.9.255 192.168.10.0 192.168.10.1 | 11000000 11000000 11000000 11000000 11000000 | 10101000 10101000 10101000 10101000 10101000 | 00001000 00001001 00001001 00001010 00001010 | 00000001 11111111 11111111 00000000 000000 |
| First IP 5 Last IP 5 Broadcast IP 5 Net Add 6 First IP 6 Last IP 6 Broadcast IP 6 | 192.168.8.1 192.168.9.254 192.168.9.255 192.168.10.0 192.168.10.1 192.168.11.254 192.168.11.255 | 11000000 11000000 11000000 11000000 11000000 | 10101000 10101000 10101000 10101000 10101000 10101000 | 00001000 00001001 00001010 00001010 00001010 00001011 | 00000001 11111111 11111111 00000000 000000 |
| First IP 5 Last IP 5 Broadcast IP 5 Net Add 6 First IP 6 Last IP 6 Broadcast IP 6 Net Add 7 | 192.168.8.1 192.168.9.254 192.168.9.255 192.168.10.0 192.168.10.1 192.168.11.254 192.168.11.255 | 11000000 11000000 11000000 11000000 11000000 11000000 11000000 | 10101000 10101000 10101000 10101000 10101000 10101000 10101000 | 00001000 00001001 00001001 00001010 00001011 00001011 | 00000001 11111111 00000000 00000001 111111 |
| First IP 5 Last IP 5 Broadcast IP 5 Net Add 6 First IP 6 Last IP 6 Broadcast IP 6 Net Add 7 First IP 7 | 192.168.8.1 192.168.9.254 192.168.9.255 192.168.10.0 192.168.10.1 192.168.11.254 192.168.11.255 192.168.12.0 192.168.12.1 | 11000000 11000000 11000000 11000000 11000000 11000000 11000000 | 10101000 10101000 10101000 10101000 10101000 10101000 10101000 | 00001000 00001001 00001010 00001010 00001011 00001011 00001100 | 00000001 11111111 00000000 00000001 111111 |
| First IP 5 Last IP 5 Broadcast IP 5 Net Add 6 First IP 6 Last IP 6 Broadcast IP 6 Net Add 7 First IP 7 Last IP 7 | 192.168.8.1 192.168.9.254 192.168.9.255 192.168.10.0 192.168.10.1 192.168.11.254 192.168.11.255 192.168.12.0 192.168.12.1 192.168.13.254 | 11000000 11000000 11000000 11000000 11000000 11000000 11000000 11000000 | 10101000 10101000 10101000 10101000 10101000 10101000 10101000 10101000 | 00001000 00001001 00001010 00001010 00001011 00001011 00001100 00001100 00001101 | 00000001 11111111 00000000 00000001 111111 |
| First IP 5 Last IP 5 Broadcast IP 5 Net Add 6 First IP 6 Last IP 6 Broadcast IP 6 Net Add 7 First IP 7 | 192.168.8.1 192.168.9.254 192.168.9.255 192.168.10.0 192.168.10.1 192.168.11.254 192.168.11.255 192.168.12.0 192.168.12.1 | 11000000 11000000 11000000 11000000 11000000 11000000 11000000 | 10101000 10101000 10101000 10101000 10101000 10101000 10101000 | 00001000 00001001 00001010 00001010 00001011 00001011 00001100 | 00000001 11111111 00000000 00000001 111111 |
| First IP 5 Last IP 5 Broadcast IP 5 Net Add 6 First IP 6 Last IP 6 Broadcast IP 6 Net Add 7 First IP 7 Last IP 7 | 192.168.8.1 192.168.9.254 192.168.9.255 192.168.10.0 192.168.10.1 192.168.11.254 192.168.11.255 192.168.12.0 192.168.12.1 192.168.13.254 | 11000000 11000000 11000000 11000000 11000000 11000000 11000000 11000000 | 10101000 10101000 10101000 10101000 10101000 10101000 10101000 10101000 | 00001000 00001001 00001010 00001010 00001011 00001011 00001100 00001100 00001101 | 00000001 11111111 00000000 00000001 111111 |
| First IP 5 Last IP 5 Broadcast IP 5 Net Add 6 First IP 6 Last IP 6 Broadcast IP 6 Net Add 7 First IP 7 Last IP 7 | 192.168.8.1 192.168.9.254 192.168.9.255 192.168.10.0 192.168.10.1 192.168.11.254 192.168.11.255 192.168.12.0 192.168.12.1 192.168.13.254 | 11000000 11000000 11000000 11000000 11000000 11000000 11000000 11000000 | 10101000 10101000 10101000 10101000 10101000 10101000 10101000 10101000 | 00001000 00001001 00001010 00001010 00001011 00001011 00001100 00001100 00001101 | 00000001 11111111 00000000 00000001 111111 |
| First IP 5 Last IP 5 Broadcast IP 5 Net Add 6 First IP 6 Last IP 6 Broadcast IP 6 Net Add 7 First IP 7 Last IP 7 Broadcast IP 7 | 192.168.8.1 192.168.9.254 192.168.9.255 192.168.10.0 192.168.10.1 192.168.11.254 192.168.11.255 192.168.12.0 192.168.12.1 192.168.13.254 192.168.13.255 | 11000000 11000000 11000000 11000000 11000000 | 10101000 10101000 10101000 10101000 10101000 10101000 10101000 10101000 10101000 10101000 | 00001000 00001001 00001010 00001010 00001011 00001011 00001100 00001100 00001101 00001101 | 00000001 11111111 00000000 00000001 111111 |
| First IP 5 Last IP 5 Broadcast IP 5 Net Add 6 First IP 6 Last IP 6 Broadcast IP 6 Net Add 7 First IP 7 Last IP 7 Broadcast IP 7 | 192.168.8.1 192.168.9.254 192.168.9.255 192.168.10.0 192.168.10.1 192.168.11.254 192.168.11.255 192.168.12.0 192.168.12.1 192.168.13.254 192.168.13.255 | 11000000 11000000 11000000 11000000 11000000 | 10101000 10101000 10101000 10101000 10101000 10101000 10101000 10101000 10101000 10101000 | 00001000 00001001 00001010 00001010 00001011 00001011 00001100 00001100 00001101 00001101 | 00000001 11111111 00000000 00000000 111111 |
| First IP 5 Last IP 5 Broadcast IP 5 Net Add 6 First IP 6 Last IP 6 Broadcast IP 6 Net Add 7 First IP 7 Last IP 7 Broadcast IP 7 Net Add 8 First IP 8 | 192.168.8.1 192.168.9.254 192.168.9.255 192.168.10.0 192.168.10.1 192.168.11.254 192.168.11.255 192.168.12.0 192.168.12.1 192.168.13.254 192.168.13.255 192.168.14.0 192.168.14.1 | 11000000 11000000 11000000 11000000 11000000 | 10101000 10101000 10101000 10101000 10101000 10101000 10101000 10101000 10101000 10101000 10101000 | 00001000 00001001 00001010 00001010 00001010 00001011 00001100 00001100 00001101 00001110 00001110 | 00000001 11111111 00000000 00000001 111111 |

| Net Add 9 | 192.168.16.0 | 11000000 | 10101000 | 00010000 | 00000000 |
|----------------|----------------|----------|----------|----------|----------|
| First IP 9 | 192.168.16.1 | 11000000 | 10101000 | 00010000 | 0000001 |
| Last IP 9 | 192.168.17.254 | 11000000 | 10101000 | 00010001 | 11111110 |
| Broadcast IP 9 | 192.168.17.255 | 11000000 | 10101000 | 00010001 | 11111111 |

| Net Add 10 | 192.168.18.0 | 11000000 | 10101000 | 00010010 | 00000000 |
|--------------------|----------------|----------|----------|----------|----------|
| First IP 10 | 192.168.18.1 | 11000000 | 10101000 | 00010010 | 00000001 |
| Last IP 10 | 192.168.19.254 | 11000000 | 10101000 | 00010011 | 11111110 |
| Broadcast IP 10 | 192.168.19.255 | 11000000 | 10101000 | 00010011 | 11111111 |

Mạng con

- 1. 192.168.0.0/23
- 2. 192.168.2.0/23
- 3. 192.168.4.0/23
- 4. 192.168.6.0/23
- 5. 192.168.8.0/23
- 6. 192.168.10.0/23
- 7. 192.168.12.0/23
- 8. 192.168.14.0/23
- 9. 192.168.16.0/23
- 10.192.168.18.0/23