

## Exercise on IP Addressing

### 1. Convert IP address from Binary to Decimal

- |                         |             |                         |                         |
|-------------------------|-------------|-------------------------|-------------------------|
| 11001100                | 00110000    | 00110101                | 00001111                |
| $2^7 + 2^6 + 2^3 + 2^2$ | $2^5 + 2^4$ | $2^5 + 2^4 + 2^2 + 2^0$ | $2^3 + 2^2 + 2^1 + 2^0$ |
| 204                     | 48          | 53                      | 15                      |

Ans : 204.48.53.15

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|---------------------|---------------------|---------------------|---------------------|
| 11111111            | 11111111            | 11111111            | 11111111            |
| $2^7 + \dots + 2^0$ | $2^7 + \dots + 2^0$ | $2^7 + \dots + 2^0$ | $2^7 + \dots + 2^0$ |
| 255                 | 255                 | 255                 | 255                 |

Ans : 255.255.255.255

- |             |                         |                     |                     |
|-------------|-------------------------|---------------------|---------------------|
| 00001010    | 00001111                | 11110000            | 11111110            |
| $2^3 + 2^1$ | $2^3 + 2^2 + 2^1 + 2^0$ | $2^7 + \dots + 2^4$ | $2^7 + \dots + 2^1$ |

Ans : 10.13.240.254

### 2. Convert IP address from Decimal to Binary

- $192.168.1.100 = 2^7 + 2^6 \cdot 2^7 + 2^5 + 2^3 \cdot 2^0 \cdot 2^6 + 2^5 + 2^2$   
= 11000000 . 10101000 . 00000001 . 01100100
- $172.16.220.21 = 2^7 + 2^5 + 2^3 + 2^2 \cdot 2^4 \cdot 2^7 + 2^5 + 2^4 + 2^3 + 2^2 \cdot 2^4 + 2^2 + 2^0$   
= 10101100 . 00010000 . 11011100 . 00010101
- $127.0.0.1 = 2^6 + \dots + 2^0 \cdot 0 \cdot 0 \cdot 2^0$   
= 01111111 . 00000000 . 00000000 . 00000001
- $10.200.123.31 = 2^3 + 2^1 \cdot 2^7 + 2^6 + 2^3 \cdot 2^6 + 2^5 + 2^4 + 2^3 + 2^1 + 2^0 \cdot 2^4 + \dots + 2^0$   
= 00001010 . 11001000 . 01111011 . 00011111

3. Is the following IP addresses are correct or not? Which class does it belong? Public or private?

- a. 19.34.2.260 : False
- b. 240.445.34.56 : False
- c. 45.67.100 : False
- d. 100.100.100.100 : True , Class A, Public
- e. 200.46.67.23 : True, Class C, Public
- f. 130.45.66.77 : True, Class B, Public
- g. 172.28.0.45 : False, Class B, Private
- h. 192.168.34.55 : True, Class C, Private
- i. 172.15.9.56 : True, Class B, Public
- j. 10.5.6.3 : True, Class A, Private