# CIS225 Networking II Rafat Khandaker

# Unit 2 Lab 1

# IP Numbering Systems Practice

## PART I: Number Systems Review

*Use the following binary numbers to fill in the decimal answer on the left:*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Answer | **128** | **64** | **32** | **16** | **8** | **4** | **2** | **1** |
| 192 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 224 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 240 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |

Change the Decimal number on the left to its binary equivalent

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Decimal | **128** | **64** | **32** | **16** | **8** | **4** | **2** | **1** |
| **15** | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| **16** | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| **127** | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **128** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## PART II: “AND”operations with *classful* subnet masks

***Perform Anding: 1st row with 2nd, etc, fill in ALL blanks as needed***

Decimal Result

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1st Decimal # 🡪 |  | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| 2nd Decimal # 🡪 |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ANDed result 🡪 |  | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| What do you learn? In AND Logic, both values have to be a gain or 1, in order to return a 1 | | | | | | | | | |
| 1st Decimal # |  | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| 2nd Decimal # |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ANDed result 🡪 |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| What is the pattern? I In AND Logic, all values compared with 0 will retain 0. | | | | | | | | | |

*Using what you learned above, specify the network that each of the following addresses is on:*

*Hint: AND the IP Address and Subnet Mask*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **IP Address** | 10.63.38.60 | 10.63.38.60 | 10.63.38.60 | 192.168.8.0 | 172.16.6.0 |
| **Subnet Mask** | 255.0.0.0 | 255.255.0.0 | 255.255.255.0 | 255.255.255.0 | 255.255.255.0 |
| **Network** | 10.0.0.0 | 10.63.0.0 | 10.63.38.0 | 192.168.8.0 | 172.16.6.0 |
| **What is the pattern?** The IP Address and subnet are compared with the and operator where 255 is the maximum number of bits available in an octet. | | | | | | |

## PART III: ANDing a Classless subnet mask:

AND the following and fill in ALL empty blanks:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Decimal | 81 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| Decimal | 248 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| ANDed result | 80 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| Binary | 63 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| Binary | 224 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Anded | 32 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Binary | 97 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| Binary | 192 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| ANDed result | 64 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

**PART IV: Convert the following hex numbers to decimal**

Hexadecimal Decimal

|  |  |
| --- | --- |
| A | 10 |
| 1A | 26 |
| 32 | 50 |
| 64 | 100 |
| 65 | 101 |