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**Lab 5**

[**https://angsila.cs.buu.ac.th/~pusit/cisco/ch10/lab1/index.html**](https://angsila.cs.buu.ac.th/~pusit/cisco/ch10/lab1/index.html)

**Task 1: Use the IP address chart and your knowledge of IP address classes to answer the following questions:**

1. **What is the decimal and binary range of the first octet of all possible Class B IP addresses?**

* Decimal: From: 128 To: 191
* Binary: From: 10000000 To: 10111111

1. **Which octet(s) represent the network portion of a Class C IP address?**

In a Class C IP address, the network portion is represented by the first 3 octets, the network portion consists of Octets 1, 2, and 3.

1. **Which octet(s) represent the host portion of a Class A IP address?**

In a Class A IP address, the network portion is represented by the first octet,

the host portion consists of Octets 2, 3, and 4.

1. **What is the maximum number of useable hosts with a Class C network address?**

A Class C network uses 24 bits for the network portion and 8 bits for the host portion. The number of hosts per Class C network is calculated as 28−2=2542^8 - 2 = 25428−2=**254** usable.

1. **How many Class B networks are there?**

Class B IP addresses have 14 bits for the network portion and 16 bits for the host portion. The total number of possible Class B networks is 214=16,3842^14} = 16,384214=**16,384**.

1. **How many hosts can each Class B network have?**

Class B network has 16 bits for the host portion. The number of hosts per Class B network is 216−2=65,5342^16} - 2 = 65,534216−2=**65,534** usable hosts.

1. **How many octets are there in an IP address?**

An IP address consists of 4 octets.

**How many bits per octet?**

Each octet contains 8 bits.

**Task 2: Determine the host and network portions of the IP address**

With the following IP host addresses, indicate the following:

* Class of each address
* Network address or ID
* Host portion
* Default subnet mask

The host portion will be all zeros for the network ID. Enter just the octets that make up the host. The host portion will be all ones for a broadcast. The network portion of the address will be all ones for the subnet mask. Fill in the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Host IP Address | **Address Class** | **Network Address** | **Host Address** | **Default Subnet Mask** |
| **216.14.55.137** | Class C | 216.14.55.0 | 137 | 255.255.255.0 |
| **123.1.1.15** | Class A | 123.0.0.0 | 1.1.15 | 255.0.0.0 |
| **150.127.221.244** | Class B | 150.127.0.0 | 221.244 | 255.255.0.0 |
| **194.125.35.199** | Class C | 194.125.35.0 | 199 | 255.255.255.0 |
| **175.12.239.244** | Class B | 175.12.0.0 | 239.244 | 255.255.0.0 |

**Task 3: Given an IP address of 142.226.0.15, answer the following questions:**

**What is the binary equivalent of the second octet?**

1. 226 ÷ 2 = 113 remainder 0
2. 113 ÷ 2 = 56 remainder 1
3. 56 ÷ 2 = 28 remainder 0
4. 28 ÷ 2 = 14 remainder 0
5. 14 ÷ 2 = 7 remainder 0
6. 7 ÷ 2 = 3 remainder 1
7. 3 ÷ 2 = 1 remainder 1
8. 1 ÷ 2 = 0 remainder 1

Therefore, the binary equivalent of the second octet 226 is 11100010.

**What is the class of the address?**

To determine the class of the IP address, look at the first octet, which is 142:

**Class A**: 0-127

**Class B**: 128-191

**Class C**: 192-223

**What is the network address of this IP address?**

**Network Address**: To determine the network address, set the host portion (last 2 octets) to 0:

Given IP: 142.226.0.15

Network Address: 142.226.0.0

**Is this a valid IP host address(Y/N) ? Why or why not?**

Yes. The address 142.226.0.15 is within the valid range of host addresses for the network.

**Task 4: Determine which IP host addresses are valid for commercial networks**

|  |  |  |
| --- | --- | --- |
| **IP Host Address** | **Valid Address? (Yes/No)** | **Why or Why Not** |
| 150.100.255.255 | No | Not a valid host address. |
| 175.100.255.18 | Yes | Valid Class B address. |
| 195.234.253.0 | No | Network address (last octet is 0), not a valid host address. |
| 100.0.0.23 | Yes | Valid Class A address. |
| 188.258.221.176 | No | Invalid octet (out of range 258) |
| 127.34.25.189 | No | Loopback address (127.x.x.x), not used for networks. |
| 224.156.217.73 | No | Multicast address (224.0.0.0 to 239.255.255.255), not used for commercial networks. |