|  |  |
| --- | --- |
|  | CS 542 - Assignment 1 |
|  |  |
|  | Sukanta Sharma (A20472623), Vidya Sudarshan (A20472468), Vidhi Kakini (A20473969)  CS 542 – Computer Networks – I | Spring 2021 | Illinois Institute of Technology  4/1/21 |

* What is the range of addresses that can assign to users in the 2021 block of class C? (3 points)

Ans:

Class C addresses start with to with the first 3 bytes as Net Id and the last byte as Host Id. As the block number starts with 0, so the 2021st block will be to be added to the first block of class C.

## 2021st Block:

To find the first address of the 2021st block, we need to add to the Net Id of the first address of the class C in base-256 number system.

**Converting**  **to base-256:**

| **Divisor** | **Dividend** | **Quotient** | **Remainder** |
| --- | --- | --- | --- |
| 256 | 2020 | 7 | 228 |
| 256 | 228 | 0 | 7 |

Therefore, 🡪

To get the range of the addresses in the 2021st block class C, we must find the first and the last address of the given block.

## First Address:

To find the first address of the 2021st block, we need to add with the Net Id .

| **+/-** | **Byte4** | **Byte3** | **Byte2** |
| --- | --- | --- | --- |
|  | 192 | 0 | 0 |
| + |  | 7 | 228 |
| **Result** | **192** | **7** | **228** |

With Net ID followed by zeros (0 bits), we can find the first address in the 2021st block as .

## Last Address:

As this is a class C address and the number of Host Id bits is 8, so each block will have addresses. To find the last address of the 2021st block, we need to add to the first address of the block.

| **+/-** | **Byte4** | **Byte3** | **Byte2** | **Byte1** |
| --- | --- | --- | --- | --- |
|  | 192 | 7 | 228 | 0 |
| + |  |  |  | 255 |
| **Result** | **192** | **7** | **228** | **255** |

So, the last address in the 2021st block as .

The range of addresses that can assign to users in the 2021st block of class C is .

* Convert the number C0514019 in the hexadecimal base to the dotted-decimal notation. What is the class of this address? (consider classful addressing). (5 points)

Ans:

* Hexadecimal is a base-16 numerical system. It uses 16 distinct symbols to represent the value from 0 to 9, and to represent the value from 10 – 15. Here we will be considering per 2 digits of the hexadecimal to be equivalent to 1 byte in dotted-decimal notation and convert it to base-256 by each byte.

| **Hexadecimal** | **Conversion** | **Base-256 System** |
| --- | --- | --- |
|  |  |  |
|  | 5 |  |
|  | 4 |  |
|  | 1 |  |

The equivalent number of in dotted-decimal notation is **.**

* Define the 1202 block of class B? (Give first and last address in the block) (3 points)

Ans:

Class B addresses start with to with the first 2 bytes as Net Id and the last 2 bytes as Host Id. As the block number starts with 0, so the 1202nd block will be to be added to the first block of class B.

## 1202nd Block:

To find the first address of the 1202nd block, we need to add to the Net Id of the first address of the class B in base-256 number system.

**Converting**  **to base-256:**

| **Divisor** | **Dividend** | **Quotient** | **Remainder** |
| --- | --- | --- | --- |
| 256 | 2020 | 7 | 228 |
| 256 | 228 | 0 | 7 |

Therefore, 🡪

To get the range of the addresses in the 1202nd block class B, we must find the first and the last address of the given block.

## First Address:

To find the first address of the 1202nd block, we need to add with the Net Id .

| **+/-** | **Byte4** | **Byte3** |
| --- | --- | --- |
|  | 128 | 0 |
| + | 4 | 177 |
| **Result** | **132** | **177** |

With Net ID followed by zeros (0 bits), we can find the first address in the 1202nd block as .

## Last Address:

As this is a class B address and the number of Host Id bits is 16, so each block will have addresses. To find the last address of the 1202nd block, we need to add to the first address of the block (i.e., ).

| **+/-** | **Byte4** | **Byte3** | **Byte2** | **Byte1** |
| --- | --- | --- | --- | --- |
|  | 132 | 177 | 0 | 0 |
| + |  |  | 255 | 255 |
| **Result** | **132** | **177** | **255** | **255** |

So, the last address in the 1202nd block as .

The range of addresses that can assign to users in the 1202nd block of class B is .

* Convert the decimal number 5141.01568603515625 to the base 256 number system. (5 points)

Ans:

To convert to base-256 number system, we need to convert the integer part and the fraction part separately to base-256 and then we can combine them to obtain the result.

* Integer Part 🡪 :

| **Divisor** | **Dividend** | **Quotient** | **Remainder** |
| --- | --- | --- | --- |
| 256 | 5141 | 20 | 21 |
| 256 | 20 | 0 | 20 |

Therefore, 🡪

* Fraction Part 🡪 :

| **Multiplicand** | **Multiplier** | **Result** | **Integer Part** |
| --- | --- | --- | --- |
| 0.015686035 | 256 | 4.015625 | 4 |
| 0.015625 | 256 | 4 | 4 |

Therefore, 🡪 *[“,” is used as decimal point notation and “.” as separator of base-256 digits]*

Now, concatenating both the result we can write, 🡪 *[“,” is used as decimal point notation and “.” as separator of base-256 digits]*