**IFT 266 Introduction to Network Information Communication Technology (ICT)**

**Lab 32**

**Breakdown the IPv6 address**

Co-authored by Jeremy Hansen

**Answer the open questions in the spaces provided   
or   
Circle/highlight the correct parts**

1. What are the 3 sections of an IPv6 address and how many bits are in those sections?

|  |  |
| --- | --- |
| Section Name | Section Size (Bits per section) |
| 1) Global Routing Prefix 48 bits |  |
| 2) Subnet ID 16 bits |  |
| 3) Interface ID 64 bits |  |

1. Highlight, circle, or separate (whatever is easier and noticeable) each separate section of the following IPv6 addresses. Base answers on the /64 subnets.

Global Routing Prefix

Subnet ID

Interface ID

2001:0DB8:85A3:5678:4321:ABCD:EF89:FE44

1:2:3:4:5:6:7:8

4104:FEA4:9002:5::1

4:3A:0:21:B45::423F

A::321E:45:9C:FFF:6

80FE:CAFE:123:5912::42:1

1. This question is very similar to question two except we are going to switch up the prefix i.e. /48, /52, /56.   
     
   You are going to take the IP address and break it apart into the 3 sections. You can either circle, highlight, or space apart the answer.

2001:0DB8:85A3:5678:4321:ABCD:EF89:FF44 /60

5578:4782:DEDE:3434:1572:DCBA:1235:AEBB /64

11:AA:23AB:7462:5555:32:486:1 /56

1111:23:4AA:8974::3 /60

AA:BB:C:DD:E::F /64

32::4813:93:0:0:23 /52

2001:0DB8:88:149F:123:3245:AAA:B /60

3C4D:2180:4572:AFFE:CAFE:ABBC:2000:0123 /48

1282:BAFF:44:3223::4 /56

21::4523:0:0:0:2 /52

1. Let’s move out of the 48-64 range; highlight **just** the prefix range of the next set of IP addresses.

2402:9400:0000:0000:0000:0000:0000:1111 /128

2402:9400:0000:0000:0000:0000:0000:1111 /124

2402:9400:0000:0000:0000:0000:0000:1111 /120

2402:9400:0000:0000:0000:0000:0000:1111 /116

2402:9400:0000:0000:0000:0000:1111:1111 /112

2402:9400:0000:0000:0000:0000:1111:1111 /108

2402:9400:0000:0000:0000:0000:1111:1111 /104

2402:9400:0000:0000:0000:0000:1111:1111 /100

2402:9400:0000:0000:0000:1111:1111:1111 /96

2402:9400:0000:0000:0000:1111:1111:1111 /92

2402:9400:0000:0000:0000:1111:1111:1111 /88

2402:9400:0000:0000:0000:1111:1111:1111 /84

1. Did you know you can even have odd subnets like /127, /126, /125, /123, etc..?

It may seem intimidating but it’s actually pretty simple.

Let’s take this example IP: **2001:EF01:2345::FFFF**

Next, let’s take the last hextet from that IP: **FFFF**

Lastly, let’s take out the last nibble from that hextet: **F**

In decimal format, what number does **F** represent? \_\_15\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How many binary digits do you need to represent that number? \_\_1111\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How many numbers are between /128 and /124? \_\_\_15\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Piece it together yet? If not, let’s break it down this way.

|  |  |  |
| --- | --- | --- |
| CIDR | End of Range | Binary Representation |
| /128 | :: | 0000 |
| /127 | ::1 | 0001 |
| /126 | ::3 | 0011 |
| /125 | ::7 | 0111 |
| /124 | ::F | 1111 |

Now it your turn…. try and finish these ranges.

|  |  |  |  |
| --- | --- | --- | --- |
| CIDR | End of Range | CIDR | End of Range |
| /123 | ::1F | /76 | ::F:FFFF:FFFF:FFFF |
| /122 | ::3F | /75 | ::1F:FFFF:FFFF:FFFF |
| /121 | ::7F | /74 | ::3F:FFFF:FFFF:FFFF |
| /120 | ::FF | /73 | ::7F:FFFF:FFFF:FFFF |
| /119 | ::1FF | /44 | ::FFFF:FFFF:FFFF:FFFF |
| /118 | ::3FF | /43 | ::7FFF:FFFF:FFFF:FFFF |
| /117 | ::7FF | /42 | ::3FFF:FFFF:FFFF:FFFF |
| /116 | ::FFF | /41 | ::1FFF:FFFF:FFFF:FFFF |
| /115 | ::1FFF | /19 | ::1:FFFF:FFFF:FFFF:FFFF |
| /114 | ::3FFF:FFFF:FFFF:FFFF | /18 | ::3:FFFF:FFFF:FFFF:FFFF |
| /113 | ::7FFF:FFFF:FFFF:FFFF | /17 | ::7:FFFF:FFFF:FFFF:FFFF |