Demystifying Networking
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Lecture – 25
Introduction to IP Addressing

Hello and welcome back to the new video on Network Addressing. So, in this video we will be talking about IP addresses mainly.

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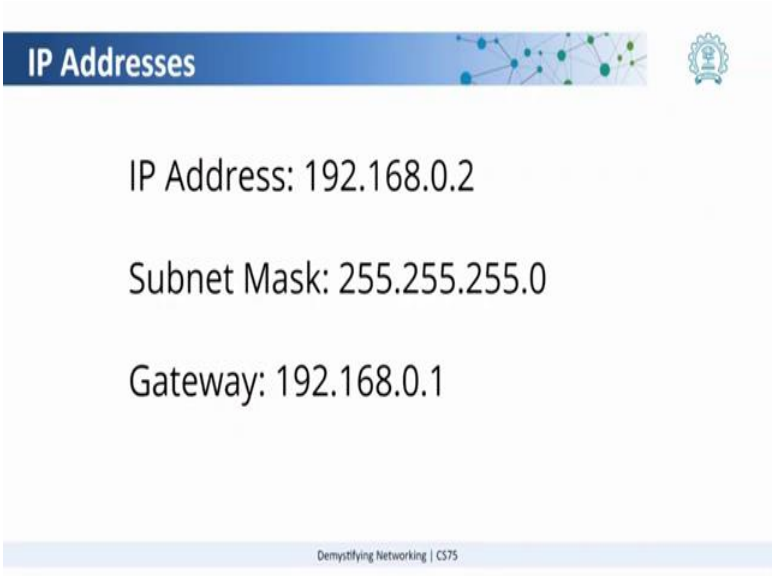

So, what are IP addresses? IP addresses are basically certain addresses which are used to communicate between two devices. Now these addresses define which device you are communicating from and which device you want to communicate it to. Like normal addresses, they help the packets or the communication determine where it is supposed to go and where it is supposed to place the request and get the response from.

So, when you look at IP addresses there are typically three things we talk about, they are IP addresses themselves, something called the subnet mask and then a gateway. So, if you have ever try to configure or enter an IP address into any of your devices, say your laptops, you would have seen these three things. So, what do they mean? So, IP addresses as we know this is a unique address that your system has over the network. Now, when we come to subnet mask, this basic address or these digits define, whether this particular IP address and the others belong to a single network.

So, using this a computer can calculate, whether 192.168.0.2 or any other IP address with this subnet mask belong to the same network or not. How? We will look at it in sometime. And gateway is the IP address of your router. So, what is a router? Router is a device that actually divides networks or marks the end of a network. So, the function of a router is to connect two networks. So, so the gateway is the router of your network. For example, at your home if you have a WiFi router, that router connects you to the internet service provider like different company which give your internet.

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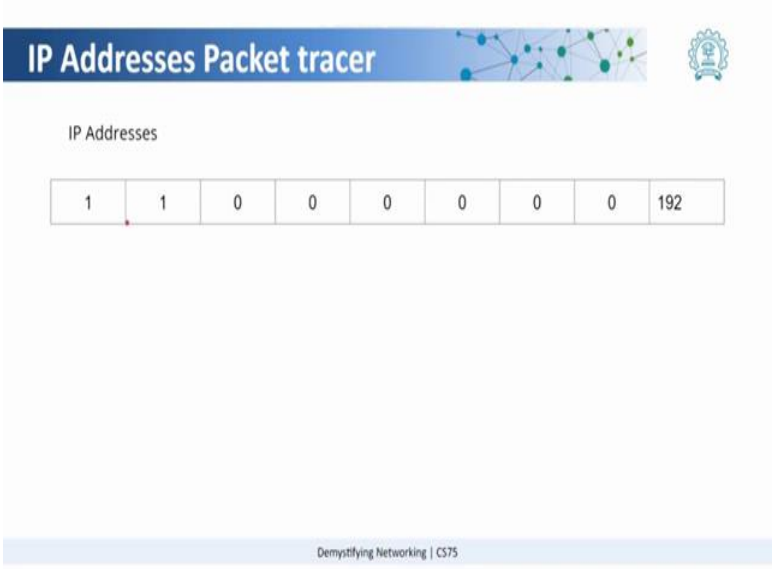

So, what IP addresses are? They are set of 4 digits as you saw or we call them 4 octets. Why octets? So, as we know computers communicate using the 0s and 1s language. So, each number is represented by 8 digits, which can be 0 or 1. So, here what we say is 192s representation in the octet form which is basically binary is 1 1 and all the 0s.

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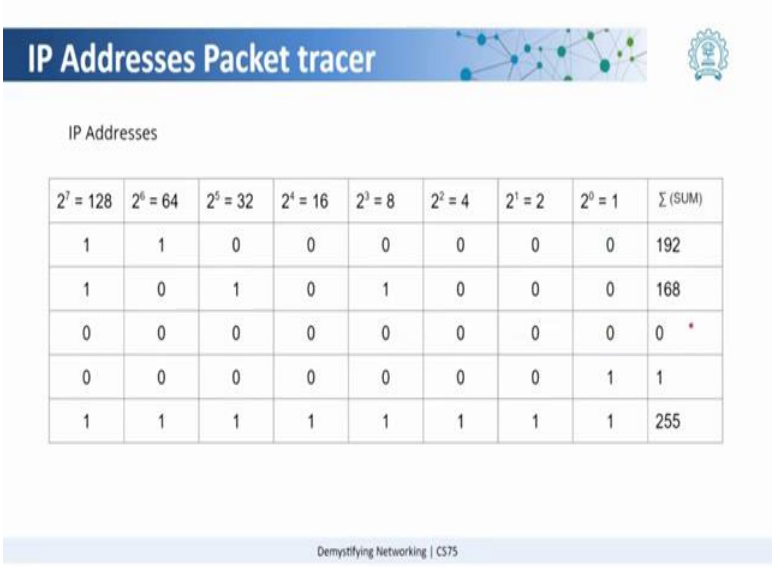

$2^7 = 128$	$2^6 = 64$	$2^5 = 32$	$2^4 = 16$	$2^3 = 8$	$2^2 = 4$	$2^1 = 2$	$2^0 = 1$	Σ (SUM)
1	1	0	0	0	0	0	0	192
1	0	1	0	1	0	0	0	168
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1	1
1	1	1	1	1	1	1	1	255

So, how do you get that? So, if you look at this. So, you take 2 to the power 0 which is 1, 2 to the power 1 which is 2 and similarly if you calculate all of these and then multiply whatever value here with the value here. So, this becomes 128 and 64 and then you add all these that should become 192.

So, this is one, I would say a crude way of calculating what the respective binary values are or how you can get a value from the binary value. Now, let us look at the other a number which were there in the address, which were 192, 168, 0, 1 and 255. So, these are the representations of the other numbers. So, an octet can go from 0 which is the minimum number it can represent to 255.

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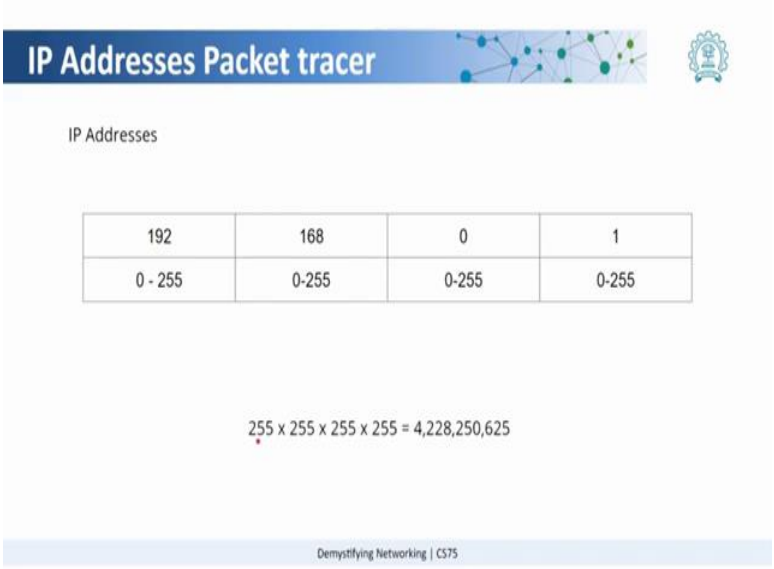

Now, what does this mean? This means that an IP address in each octet can take a number between 0 to 255, which is 256 numbers. Similarly for the other octet as well. We can have at the max of 255 to the power 4 of number of unique addresses using this addressing scheme. But do not you think these are these addresses are bit less in number if we consider the entire internet? Yes, definitely. So, we have something called IP v 6 that has come in and that is a totally different topic that to be discussed and there is another concept of something called public and private addresses that we will be looking into soon.

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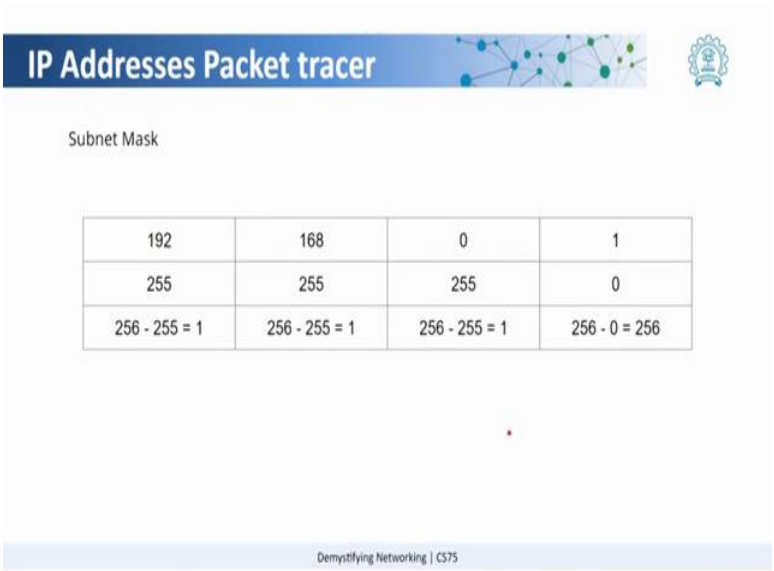

Now, let us get to the next part of IP addresses which was the subnet mask.