NETWORKING

**IP Addresses –**

There are more than 4 billion IP Addresses, and to manage them we divide them into 4 classes –

|  |  |  |
| --- | --- | --- |
| **Class** | **Starting Address** | **Ending Addresses** |
| A | 0.0.0.0 | 127.255.255.255 |
| B | 128.0.0.0 | 191.255.255.255 |
| C | 192.0.0.0 | 223.255.255.255 |
| D | 224.0.0.0 | 239.255.255.255 |
| E | 240.0.0.0 | 255.255.255.255 |

Class A, B is used for Host Addresses purposes and Class D for Multicast and Class E for Experimental Purposes.

**How Classes were created?**

An IP Address is the combination of Network and Host ID –

**192.168.32.170**

Network Id Host id

8 Bits 8 Bits 8 Bits 8 Bits

**Class A** Network Host Host Host /8 or 255.0.0.0

**Class B** Network Network Host Host /16 or 255.255.0.0

**Class C** Network Network Network Host /24 or 255.255.255.0

**For Example**

**1.2.3.4** **191.200.100.1** **192.168.1.1**

Class A Class B Class C

If the value of first octate is from the given class, then it will be of that class.

**Use of Command Prompt for network troubleshooting**

1. **Ipconfig -** The IPCONFIG command displays all current TCP/IP network configuration values.

It gives you basic information to get your IP Address, your router’s IP address, DNS Server IP address, DHCP Server IP address, etc….

If we use **“ipconfig /all”** then it will give full details of your network.

1. **PING-**  Allows you to send a SIGNAL to another Device on the NETWORK to see if it is ACTIVE.

**How does it work? –** Use the ICMP (Internet Control Message Protocol) to send out an “echo request” to the destination device, and gets back an “echo response” if the device you are trying to reach of in fact ACTIVE.

**Example-** ping 192.168.1.1 or “ping [www.google.com](http://www.google.com)”

1. **TRACERT-** TRCERT lets you see, the step-by-step route a packet takes to the destination you specify. So, if you send a packet to google.com, before the packet actually reaches google.com servers, it will go through many different routers before it finally reaches google.com. You can also use the term HOPS instead of routers. So if it takes 10 routers to get to google.com, you can instead say, “it took 10 hops”.

**Example –** tracert google.com

1. **NSLOOKUP-** This command will fetch the DNS record for a given domain name or IP address. Remember, the IP addresses and domain names are stored in DNS servers, so the nslookup command lets you query the DNS Records to gather information.

**Example-** nslookup google.com.

**What is various term with school Example**

**IP-** IP is an address of your device , like student roll No in a class.

**SWITCH-** It is which is in your LAN(Local Area network) and connects devices within same network , Suppose a student from one class wants to meet the student of other class, so he will go to **puen** and ask him , so puen is a switch which tells where to go.

**ROUTER-** It is a networking device that forwards data packets between “DIFFERENT” computer networks outside of LAN. Suppose a student from one school wants to meet to a student of another school , so he wiil meet to security guard , so guard is like router.

**SUBNET-** It defines the range of your network. So how the machine can identify whether it is sitting in your LAN or outside it , so with the help of subnet we can identify,

Suppose two IP addresses are

***192.168***.4.5 IP address of one device

***255.255***.0.0 Subnet mask/netmask, it describes that this LAN has fixed range of 192.168…..

***192.168***.6.0 IP address of second device

Suppose student roll no of a particular school are

**SJDC**.X.24

***SJDC***.XII.36

Then subnet will be 255.0.0.0 as school names are same.

**GATEWAY-** It is the IP Address of the router, means they can talk to any device within the LAN and outside of it.

**SUBNET RANGE**

|  | **Addresses** | **Hosts** | **Netmask** | **Amount of a Class C** |
| --- | --- | --- | --- | --- |
| / 30 | 4 | 2 | 255.255.255.252 | 1 / 64 |
| / 29 | 8 | 6 | 255.255.255.248 | 1 / 32 |
| / 28 | 16 | 14 | 255.255.255.240 | 1 / 16 |
| / 27 | 32 | 30 | 255.255.255.224 | 1 / 8 |
| / 26 | 64 | 62 | 255.255.255.192 | 1 / 4 |
| / 25 | 128 | 126 | 255.255.255.128 | 1 / 2 |
| / 24 | 256 | 254 | 255.255.255.0 | 1 |
| / 23 | 512 | 510 | 255.255.254.0 | 2 |
| / 22 | 1024 | 1022 | 255.255.252.0 | 4 |
| / 21 | 2048 | 2046 | 255.255.248.0 | 8 |
| / 20 | 4096 | 4094 | 255.255.240.0 | 16 |
| / 19 | 8192 | 8190 | 255.255.224.0 | 32 |
| / 18 | 16384 | 16382 | 255.255.192.0 | 64 |
| / 17 | 32768 | 32766 | 255.255.128.0 | 128 |
| / 16 | 65536 | 65534 | 255.255.0.0 | 256 |