Demo Task.

IP Address

An **IP (Internet Protocol) address** is a unique number assigned to each device connected to a network

that uses the internet. It serves two important purposes: it identifies the device (like a name),

and it shows where the device is located in the network (like an address). Without IP addresses,

devices wouldn't be able to send or receive data properly.

Types of IP Addresses

There are two main versions of IP addresses: **IPv4** and **IPv6**.
IPv4 is the most commonly used.

It has a 32-bit format, written as four numbers separated by dots (like 192.168.1.1),

and can support about 4.3 billion devices.
IPv6 is the newer version, created because IPv4 is running out of addresses.

IPv6 uses a 128-bit format with eight groups of hexadecimal numbers separated by

colons (like 2001:0db8:85a3::8a2e:0370:7334).

It supports a huge number of devices and offers better security, automatic configuration, and efficiency.

Classes of IP Addresses

IP addresses are grouped into classes based on how large a network they can support.

- **Class A** (1.0.0.0 – 126.0.0.0): Used for large networks.
- **Class B** (128.0.0.0 – 191.255.0.0): Used for medium networks.
- **Class C** (192.0.0.0 – 223.255.255.0): Used for small networks.

Private and Public IP Addresses

Private IP addresses are used inside local networks (like home or school Wi-Fi).

They are not seen on the internet. Examples include:

- 10.0.0.0 to 10.255.255.255
- 172.16.0.0 to 172.31.255.255
- 192.168.0.0 to 192.168.255.255

Public IP addresses are used for devices that connect directly to the internet.

These are assigned by your Internet Service Provider (ISP) and are visible online.

How IP Works

The Internet Protocol acts like the **postal system of the internet**. When you send something online,

like opening a website or chatting with a friend, the data is broken into small parts called **packets**. Each packet has two main things:

- Your IP address (sender)
- The IP address of the destination (receiver)

These packets are sent through different devices called **routers**, which act like traffic directors.

Each router reads the destination IP address and decides where to send the packet next.

Eventually, all packets arrive at the right device and are put back together to form the complete data.

For example, when you visit **www.google.com**, your request goes through the internet using

IP addresses until it reaches the website’s server, which then sends back the content you see.

IPv6 – The Future of IP

IPv6 was created to solve the problem of running out of IPv4 addresses.

With its 128-bit address format, IPv6 can support more addresses — enough for all

devices in the future. It includes features like:

- **Larger address space**
- **Automatic configuration** (SLAAC)
- **Built-in security (IPsec)**
- **No need for NAT** (each device can have a public IP)
- **Better support for mobile and modern applications**

Summary

To sum it up, IP addresses are essential for identifying devices and sending information across the internet.

They allow computers and devices to find each other and communicate.

Whether it's using IPv4 or IPv6, the Internet Protocol makes sure that every message reaches its correct

destination — just like a digital postal service.