# Introduction to Internet & Web

## What is the Internet?

The Internet is a vast network of networks, a networking infrastructure. It connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are both connected to the Internet. Information that travels over the Internet does so via a variety of languages known as protocols.

## What is is the world wide web ?

The web, or the World Wide Web (WWW), is a system of interlinked hypertext documents accessed via the Internet. With a web browser, one can view web pages that may contain text, images, videos, and other multimedia and navigate between them via hyperlinks.

There are billions of web pages and billions of people who use the web every day. The web has become an essential part of our lives, and it has changed the way we communicate, learn, and do business.

The web is made up of three main components:

- **Web servers:** These are computers that store web pages and make them available to users.
- **Web browsers:** These are software programs that allow users to view web pages.
- **Hyperlinks:** These are links that connect one web page to another.

## What is a domain name?

A domain name is basically the address of a website that you type into a web browser to visit that website. It's a human-readable version of an Internet Protocol (IP) address, which is a string of numbers that computers use to identify each other on the internet. For example, the domain name "google.com" points to the IP address "172.217.10.14", but it's much easier for people to remember "google.com".

**How does the Internet work when you enter a domain name?**
When you type a domain name into your web browser and hit enter, several things happen in the background:

1. **Domain Name System (DNS) Lookup**: The first thing your computer does is look up the IP address associated with the domain name you entered. This is done through the Domain Name System (DNS), which is like a phone book for domain names and their corresponding IP addresses. Your computer asks a DNS server (usually provided by your Internet Service Provider) for the IP address associated with the domain name.
2. **Requesting the page**: Once your computer knows the IP address of the server hosting the website you want to visit, it sends a request to that server asking to view the page. This request includes information about your computer and browser so the server knows how to format the page for you.
3. **Server response**: The server then responds to the request by sending the requested data back to your computer. The data for a webpage is typically sent in a language called Hypertext Markup Language (HTML), along with other languages like CSS and JavaScript that can be used to style the page and add interactive features.
4. **Rendering the page**: Once your browser receives the HTML, CSS, and JavaScript files from the server, it interprets these files and renders the webpage that you see.
5. **Further interactions**: Any interactions you have with the page (like clicking on links or submitting forms) usually involve sending more requests to the server and receiving more data to render new parts of the page.

When you enter a domain name, your browser and the server communicate back and forth, sending requests and receiving data, until your browser has all the information it needs to display the webpage to you.

**Making a Request**

Once the IP address is known, your browser sends an HTTP request to the web server at that address. The request includes details such as the specific file you want (usually a HTML file), the method (GET to receive data, POST to send data), and headers with additional information like the type of browser you're using.
If your connection is secure (the URL starts with https), then this process involves an extra step called SSL/TLS handshake, where your browser and the server establish a secure, encrypted connection before sending the HTTP request.

**Server Processes the Request**
The server receives the HTTP request and processes it. If it's a static website, the server simply retrieves the requested HTML file. For dynamic websites, the server might need to run scripts or query a database to create the HTML file.

**Server Response**
Once the server has the HTML file ready, it sends it back to your browser in an HTTP response. This response also includes a status code to tell your browser if the request was successful (e.g., 200 for success, 404 for not found), and headers with additional information like the type of content it's sending.

**Rendering the Page**
Your browser receives the HTML file and starts parsing it to build the webpage. It will typically need to send additional requests for other resources like CSS files (which control how the page looks), JavaScript files (which add interactivity), and images. Each of these requests involves the same steps of DNS lookup, making a request, and receiving a response.
Once your browser has all the necessary resources, it can finish rendering the page and display it to you. Now you can interact with the website by clicking links, filling out forms, etc., and each interaction might involve sending more requests to the server and updating the page with the new responses.