CSE 256
INTERNET TECHNOLOGIES

TUTORIAL SHEET-1

Presidency University, Bengaluru

Welcome to the exciting and rapidly evolving world of Internet and web programming!

Introduction……course overview

You'll begin by learning the client-side programming technologies used to build web pages and applications that are run on the client (i.e., in the browser on the user's device).

You'll use Hyper Text Markup Language 5 (HTML5) and Cascading Style Sheets 3 (CSS3)

The recent releases of HTML and CSS technologies—to add powerful, dynamic and fun features and effects to web pages and web applications, such as audio, video, animation, drawing, image manipulation, designing pages for multiple screen sizes

You'll learn JavaScript—the language of choice for implementing the client side of Internet-based applications

you'll learn server-side programming—the applications that respond to requests from client-side web browsers, such as searching the Internet, checking your bank-account balance, ordering a book from Amazon, bidding on an eBay auction and
ordering concert tickets.

there's also an emphasis on Ajax development, which helps you create better-performing, more usable applications.

A brief history of internet

The Internet—a global network of computers—was made possible by the convergence of computing and communications technologies.

In the late 1960s, ARPA (the Advanced Research Projects Agency) rolled out blueprints for networking the main computer systems of about a dozen ARPA-funded universities and research institutions.

The history of telecommunication and data transport is a long one.

The Internet is not alone in providing instantaneous digital communication. Earlier technologies like radio, telegraph, and the telephone provided the same speed of communication in an analog form.

What Is the Internet?

The Internet is a huge collection of computers connected in a communications network.

These computers are of every imaginable size, configuration, and manufacturer.

In fact, some of the devices connected to the Internet—such as plotters and printers—are not computers at all.

The innovation that allows all these diverse devices to communicate with each other is a single, low-level protocol named Transmission Control Protocol/Internet Protocol (TCP/IP).

Circuit switching or Packet Switching

Earlier days of network connections are referred to as circuit switching.

Low bandwidth was one of the major issues with circuit switching

Bandwidth is a measurement of how much data can (maximally) be transmitted along an Internet connection.

Normally measured in bits per second (bps), this measurement differs according to the type of Internet access technology you are using.
A dial-up 56-Kbps modem has far less bandwidth than a 10-Gbps fiber optic connection.

A packet-switched network does not require a continuous connection.

Instead it splits the messages into smaller chunks called packets and routes them to the appropriate place based on the destination address.

The packets contained address, error-control and sequencing information.

The packets can take different routes to the destination

Internet Protocol Addresses

To promote the growth and unification of the disparate networks, a suite of protocols was invented to unify the networks.

A protocol is the name given to a formal set of publicly available rules that manage data exchange between two points.

Communications protocols allow any two computers to talk to one another, so long as they implement the protocol.

The protocol for communicating over the ARPANET became known as TCP—the Transmission Control Protocol.

TCP ensured that messages were properly routed from sender to receiver and that they arrived intact.

As the Internet evolved, organizations worldwide were implementing their own networks for both intraorganization (i.e., within the organization) and interorganization (i.e., between organizations) communications.

A wide variety of networking hardware and software appeared.

One challenge was to get these different networks to communicate.

ARPA accomplished this with the development of IP—the Internet Protocol, truly creating a network of networks, the current architecture of the Internet.

The combined set of protocols is now commonly called TCP/IP.

Each computer on the Internet has a unique IP address.

The Internet Protocol (IP) address of a machine connected to the Internet is a unique 32-bit number.

IP addresses usually are written (and thought of) as four 8-bit numbers, separated by periods.

The four parts are separately used by Internet-routing computers to decide where a message must go next to get to its destination.

Domain Names

Because people have difficulty dealing with and remembering numbers, machines on the Internet also have textual names.

These names begin with the name of the host machine, followed by progressively larger enclosing collections of machines, called domains.

There may be two, three, or more domain names.

Because IP addresses are the addresses used internally by the Internet, the fully qualified domain name of the destination for a message, which is what is given by a browser user, must be converted to an IP address before the message can be transmitted over the Internet to the destination.

These conversions are done by software systems called name servers, which implement the Domain Name System (DNS).

The World Wide Web

In 1989, a small group of people led by Tim Berners-Lee at Conseil Européen pour la Recherche Nucléaire (CERN) or European Organization for Particle Physics proposed a new protocol for the Internet, as well as a system of document access to use it.

The intent of this new system, which the group named the World Wide Web, was to allow scientists around the world to use the Internet to exchange documents describing their work.

Main postulates of WWW are as follows

1. A technology for sharing information via hyperlinked text documents. Berners-Lee called his invention the HyperTextMarkup Language (HTML).

2. He also wrote communication protocols to form the backbone of his new information system, In particular, he wrote the Hypertext Transfer Protocol (HTTP)—a communications protocol used to send information over the web.

3. The units of information on the Web have been referred to by several different names; among them, the most common are pages, documents, and resources.

4. A Uniform Resource Locator (URL) to uniquely identify a resource on the WWW. Each web page on the Internet is associated with a unique URL.

5. A software program (later called web server software) that can respond to HTTP requests.

6. A program (later called a browser) that can make HTTP requests from URLs and that can display the HTML it receives.

Web Browsers

When two computers communicate over some network, in many cases one acts as a client and the other as a server.

The client initiates the communication, which is often a request for information stored on the server, which then sends that information back to the client.

The Web, as well as many other systems, operates in this client-server configuration.

Documents provided by servers on the Web are requested by browsers, which are programs running on client machines.

They are called browsers because they allow the user to browse the resources available on servers.

Web Servers

Web servers are programs that provide documents to requesting browsers.

Servers are slave programs: They act only when requests are made to them by browsers running on other computers on the Internet.

The most commonly used Web servers are Apache, which has been implemented for a variety of computer platforms,

and Microsoft's Internet Information Server (IIS), which runs under Windows operating systems

World Wide Web Consortium

In October 1994, Tim Berners-Lee founded an organization—the World Wide Web Consortium (W3C)—devoted to developing nonproprietary, interoperable technologies for the World Wide Web.

One of the W3C's primary goals is to make the web universally accessible—regardless of disability, language or culture.

The W3C is also a standards organization. Web technologies standardized by the W3C are called Recommendations.

Current and forthcoming W3C Recommendations include the Hyper Text Markup Language 5 (HTML5), Cascading Style Sheets 3 (CSS3) and the Extensible Markup Language (XML).

Governance

Internet Engineering Task Force (IETF)- The technical underpinning and standardization of the core protocols (IPv4 and IPv6)

Internet Corporation for Assigned Names and Numbers (ICANN)- coordinates the assignment of unique identifiers for use on the Internet, including domain names, Internet Protocol (IP) addresses, application port numbers in the transport protocols etc…

Intranet or Internet

One of the more common terms you might encounter in web development is the term “intranet” (with an “a”), which refers to an Internet network that is local to an organization or business.

Intranet resources are often private, meaning that only employees (or authorized external parties such as customers or suppliers) have access to those resources.

Internet is a broader term that encompasses both private (intranet) and public networked resources.