Learning Objectives

In this Unit the student will learn Basics of Internet starting from Network definition to today’s social media technologies in general. With this student will get sufficient exposure in current technology trends.

The advent of computers has revolutionized the workplace and redefined operational practices. The use and deployment of computers, computer systems and information technology applications in every aspect of business is now common. The recent application and adoption of Web-based, information and telecommunication technologies has force-multiplied the capabilities and benefits of computers.

Computer systems connected over a Web-based environment or an intranet-based network can communicate with each other. Varied connectivity and access technologies with computing interfaces facilitate communication of employees with business partners, suppliers, customers, government regulators and other stakeholders.

This chapter introduces you to the basics of computer communication and internet. Communication is the most popular use of the Internet, with email topping the list of all the technologies used. Some of the types of communication technologies used also include email Discussion Groups, Usenet News, Chat Groups etc. These are unique to networked computer environments and have come into wide popularity because of the Internet.
What is networking?

Networking is the practice of linking two or more computing devices together for the purpose of sharing data. Networks are built with a mix of computer hardware and computer software. A computer network is a group of computers that are connected to each other for the purpose of communication. Networks may be classified according to a wide variety of characteristics.

A Local Area Network (LAN) is a high-speed communication system, designed to link computers and other data processing devices together within a small geographic area, such as a workgroup, department or building. This allows users to electronically share vital computing resources such as expensive hardware (e.g. printers and CD-ROM drives), application programs and information.

Local Area Networks implement shared access technology. This means that all the devices attached to the LAN share a single communications medium, usually a coaxial, twisted-pair, or fiber-optic cable.

A physical connection to the network is made by putting a network interface card (NIC) inside the computer and connecting it to the network cable. Once the physical connection is in place, the network software manages communications between stations on the network.

To send messages to and from computers, the network software puts the message information in a packet. (If the message to be sent is too big to fit into one packet, it will be sent in a series of packets.) In addition to the message data, the packet contains a header and a trailer that carry special information to the destination. One piece of information in the header is the address of the destination.

The NIC transmits the packet onto the LAN as a stream of data represented by changes in electrical signals. As it travels along the shared cable, each NIC checks its destination address to determine if the packet is addressed to it. When the packet arrives at the proper address, the NIC copies it and gives its data to the computer. Since each individual packet is small, it takes very little time to travel to the ends of the cable. After a packet carrying one message passes along the cable, another station can send its packet. In this way, many devices can share the same LAN medium.

The following characteristics differentiate one LAN from another.

- **Topology**: The geometric arrangement of devices on the network. For example, devices can be arranged in a star, a ring or in a straight line.
• **Protocols**: The rules and encoding specifications for transferring data. The protocols also determine whether the network uses a peer-to-peer or client/server architecture.

• **Media**: Devices can be connected by twisted-pair wire, coaxial cables or fiber optic cables. Some networks (wireless) do without connecting media altogether, instead communicating via radio waves.

A Wide Area Network (WAN) is a geographically dispersed telecommunications network. The term, WAN, distinguishes a broader telecommunication structure from a local area network (LAN). A wide area network may be privately owned or rented, but the term usually connotes the inclusion of public (shared user) networks. An intermediate form of network in terms of geography is a metropolitan area network (MAN).

Computers connected to a wide-area network are often connected through public networks, such as the telephone system. They can also be connected through leased lines or satellites. The largest WAN in existence is the Internet. Wide area networks (WANs) combine the continuous error detection and correction techniques included in synchronous communications with robust network problem determination and data routing to form powerful backbones that ensure high-quality, reliable service for end users. These networks allow multiple users to access a variety of host computers simultaneously through the same physical medium, while separating each user’s session so that no user is aware of another on the network. Wide area networks also operate at speeds much higher than the 19,200-bps limit of normal voice-grade telephone lines.

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The Internet is a network of networks that connects users in every country in the world. There are currently over one billion Internet users worldwide. The Internet brings the outside world to your desktop in your home or in your office. The Internet is a global network made up of thousands of networks that communicate with each other. The Internet offers a diverse range of information and ideas, covering almost every topic you can think of. You can also share your knowledge and interest with others.

An individual or organization controls the LAN or private WAN network. The Internet is a conglomerate of networks and is not owned by any individual
or group. There are, however, several major International organizations that help to manage the Internet so that everyone follows the same rules.

Whoever wants to connect to Internet must contact Internet Service Provider (ISP). An ISP is a company that provides the connections and support to access the Internet. It can also provide additional services such as Email and web hosting.

You connect to an ISP by using a PC modem to connect to your ISP’s modems. Your modem connects to a single modem among a bank of modems at your ISP. This is called a dial-up connection. Users within corporations and large organizations typically connect to an ISP via a high-speed link.

**Internet Architecture consists.**

(i) **User PC**

A Multi-Media PC equipped to send and receive all variety of audio and video. It may include.

1. Sound Board/Microphone/Speakers
2. Video/Graphics for 3D graphics, video, playback
3. Video camera
4. Voice recognition

(ii) **User’s Communication Equipment**

This is the communication equipment located at the User’s location(s) to connect the Users’ PC(s) to the “Local Loop”. It may include.

1. Phone line - Analog Modem
2. Phone line - ISDN (128K).
3. Phone Line - DSL (6 MB)
4. Cable Modem (27 MB)
5. Electric Line (1 MB)
6. Satellite (400 Kb)
7. LAN
8. Routers
9. Firewalls
(iii) Local Loop Carrier

It connects the User location to the ISP’s Point of Presence using any of the following.

1. Communication Lines
2. Cable.
3. Satellite
4. Power line.
5. Wireless.

(iv) ISP POP

This is the edge of the ISP’s network. Connections from the user are accepted and authenticated here using remote ports.

(v) User Services

These are the services that most users would use along with Internet Access.

1. Domain Name.
2. Email Host
3. Usenet Newsgroups (NNTP)
4. Special services such as TELNET, FTP
5. User Web Hosting
6. These servers require fast interfaces and large/fast storage.

(vi) Online Content

These are the host sites that the user interacts with. It includes.

1. Web Server platforms
2. Hosting Farms- Many online resources are hosted at well-connection facilities
3. These servers require fast interfaces and large/fast storage.

(vii) Origins of online content

This is the original “real-world” sources for the online information which may include.
1. Existing electronic information is being connected from legacy systems.
2. Traditional print resources are being scanned and converted into electronic format.
3. Many types of video and audio programming is being broadcast via the internet.
4. Internet telephony is growing on the Internet.

(viii) ISP Backbone

The ISP backbone interconnects the ISP’s POPs and interconnects the ISP to Other ISP’s and online content. It includes:

1. Backbone Providers
2. Large Circuits - fiber Circuit carriers
3. Routers
4. ATM Switches.
5. Sonet/SDH Switches.
6. Gigaswitch
7. Network Access Points

The Internet’s origins

On the fourth of October in 1957 an event occurred that would change the world. The Soviet Union successfully launched the first satellite into Earth’s orbit. Called Sputnik 1, it shocked the world — especially the United States of America, who had their own programme of satellite launches underway, but had yet to launch.

These events lead directly to the creation of the US Department of Defence, ARPA, due to a recognised need for an organization that could research and develop advanced ideas and technology. Perhaps their most famous project (certainly the most widely used) was the creation of the Internet.

In 1960, psychologist and computer scientist Joseph Licklider published a paper entitled Man-Computer Symbiosis, which articulated the idea of networked computers providing advanced information storage and retrieval. In 1962, whilst working for ARPA as the head of the information processing office, he formed a group to further computer research, but left the group before any actual work was done on the idea.
The plan for this computer network (to be called ARPANET) was presented in October 1967, and in December 1969 the first four-computer network was up and running. The core problem in creating a network was how to connect separate physical networks without tying up network resources for constant links. The technique that solved this problem is known as packet switching and it involves data requests being split into small chunks (packets,) which can be processed quickly without blocking communication from other parties — this principle is still used to run the Internet today.

This concept received wider adoption, with several other networks springing up using the same packet switching technique — for example, X.25 (developed by the International Telecommunication Union) formed the basis of the first UK university network JANET (allowing UK universities to send and receive files and emails) and the American public network CompuServe (a commercial enterprise allowing small companies and individuals access to time-shared computer resources, and then later Internet access.) These networks, despite having many connections, were more like private networks than the Internet of today.

This proliferation of different networking protocols soon became a problem, when trying to get all the separate networks to communicate. There was a solution in sight however— Robert Kahn, whilst working on a satellite packet network project for ARPA, started defining some rules for a more open networking architecture to replace the current protocol used in ARPANET. Later joined by Vinton Cerf from Stanford University, the two created a system that masked the differences between networking protocols using a new standard. In the publication of the draft specification in December 1974, this was called the Internet Transmission Control Program.

This specification reduced the role of the network and moved the responsibility of maintaining transmission integrity to the host computer. The result was that it became possible to easily join almost all networks together. ARPA funded development of the software, and in 1977 a successful demonstration of three different networks communicating was conducted. By 1981, the specification was finalized, published and adopted; and in 1982 the ARPANET connections outside of the US were converted to use the new TCP/IP protocol. The Internet as we know it had arrived.

**The creation of World Wide Web**

Gopher was an information retrieval system used in the early 1990s, providing a method of delivering menus of links to files, computer resources and other menus. These menus could cross the boundaries of the current computer
and use the Internet to fetch menus from other systems. It was very popular with universities looking to provide campus-wide information and large organisations looking to centralise document storage and management.

Gopher was created by the University of Minnesota. In February, 1993, they announced that it was going to charge licensing fees for the use of their reference implementation of the Gopher server. As a consequence, many organisations started to look for alternatives to Gopher.

The European Council for Nuclear Research (CERN) in Switzerland had such an alternative. Tim Berners-Lee had been working on a information management system, in which text could contain links and references to other works, allowing the reader to quickly jump from document to document. He had created a server for publishing this style of document (called hypertext) as well as a program for reading them, which he had called WorldWideWeb. This software had first been released in 1991, however, it took two events to cause an explosion in popularity and the eventual replacement of Gopher.

On the thirtieth of April 1993 CERN released the source code of WorldWideWeb into the public domain, so anyone could use or build upon the software without charge.

Then, later in the same year, the NCSA released a program that was a combined web browser and Gopher client, called Mosaic. This was originally only available on Unix machines and in source code form, but in December 1993 Mosaic provided a new version with installers for both Apple Macintosh and Microsoft Windows. Mosaic rapidly increased in popularity, and with it the Web.

The number of available web browsers increased dramatically, many created by research projects at universities and corporations, such as Telenor (a Norwegian communications company), which created the first version of the Opera browser in 1994.

**The browser wars**

The popularisation of the web brought commercial interests. Marc Andreessen left NCSA and together with Jim Clark founded Mosaic Communications, later renamed to Netscape Communications Corporation, and started work on what was to become Netscape Navigator. Version 1.0 of the software was released in December 1994.

Spyglass Inc. (the commercial arm of NCSA) licensed their Mosaic technology to Microsoft to form the basis of Internet Explorer. Version 1.0 was released in August 1995.
A rapid escalation soon followed, with Netscape and Microsoft each trying to get a competitive edge in terms of the features they support in order to attract developers. This has since become known as the browser wars. Opera maintained a small but steady presence throughout this period, and tried to innovate and support web standards as well as possible in these times.

The coming of web standards

During the browser wars, Microsoft and Netscape focused on implementing new features rather than on fixing problems with the features they already supported, and adding proprietary features and creating features that were in direct competition with existing features in the other browser, but implemented in an incompatible way.

Developers at the time were forced to deal with ever increasing levels of confusion when trying to build web sites, sometimes to the extent of building two different but effectively duplicate sites for the two main browsers, and other times just choosing to support only one browser and block others from using their sites. This was a terrible way of working, and the inevitable backlash from developers was not far away.

The formation of the W3C

In 1994, Tim Berners-Lee founded the World Wide Web Consortium (W3C) at the Massachusetts Institute of Technology, with support from CERN, DARPA (as ARPA had been renamed to) and the European Commission. The W3C’s vision was to standardize the protocols and technologies used to build the web such that the content would be available to as wide a population of the world as possible.

During the next few years, the W3C published several specifications (called recommendations) including HTML 4.01, the format for PNG images, and Cascading Style Sheets versions 1 and 2.

However, the W3C did not (and still do not) enforce their recommendations. Manufacturers only had to conform to the W3C documents if they wished to label their products as W3C-compliant. In practice, this was not a valuable selling point as almost all users of the web did not know, nor probably care, who the W3C were (this is still the case, to a large extent). Consequently, the browser wars of the nineties continued unabated.

The Web Standards Project

In 1998, the browser market was dominated by Internet Explorer 4 and Netscape Navigator 4. A beta version of Internet Explorer 5 was then
released, and it implemented a new and proprietary dynamic HTML, which meant that professional web developers needed to know five different ways of writing JavaScript.

As a result, a group of professional web developers and designers banded together. This group called themselves the Web Standards Project (WaSP). The idea was that by calling the W3C documents standards rather than recommendations, they might be able to convince Microsoft and Netscape to support them.

The early method of spreading the call to action was to use a traditional advertising technique called a roadblock, where a company would take out an advert on all broadcast channels at the same time, so no matter how a viewer would flick between channels, they would get exactly the same message. The WaSP published an article simultaneously on various web development focused sites including builder.com, Wired online, and some popular mailing lists.

Another technique the WaSP used was to ridicule the companies involved with the W3C (and other standards bodies) that focused more on creating new, often self-serving, features rather than working to get the basic existing standards supported correctly in their products to start with (this includes some browser companies that shall remain nameless here). This doesn’t mean that the WaSP ridiculed the W3C themselves, rather they ridiculed the companies that became W3C members and then misbehaved.

The W3C has a few full time staff, but most of the people who work on the standards are volunteers from member companies, eg Microsoft, Opera, Mozilla, Apple, Google, IBM and Adobe, to name a few of the bigger ones.

This all sounds a bit negative, but the WaSP didn’t just sit there criticising people they also helped. Seven members formed the CSS Samurai, who identified the top ten problems with the CSS support in Opera and other browsers (Opera fixed their problems, others did not).

**The rise of web standards**

In 2000, Microsoft released Internet Explorer 5 Macintosh Edition. This was a very important milestone, it being the default browser installed with the Mac OS at the time, and having a reasonable level of support for the W3C recommendations too. Along with Opera’s decent level of support for CSS and HTML, it contributed to a general positive movement, where web developers and designers finally felt comfortable designing sites using web standards, as they knew they would work to a reasonable level across multiple browsers.
The WaSP persuaded Netscape to postpone the release of the 5.0 version of Netscape Navigator until it was much more compliant (this work formed the basis of what is now Firefox, a very popular browser). The WaSP also created a Dreamweaver Task Force to encourage Macromedia to change their popular web authoring tool to encourage and support the creation of compliant sites.

The popular web development site A List Apart was redesigned early in 2001 and in an article describing how and why, stated.

In six months, a year, or two years at most, all sites will be designed with these standards. [...] We can watch our skills grow obsolete, or start learning standards-based techniques now.

That was a little optimistic — not all sites, even in 2008, are built with web standards. But many people listened. Older browsers decreased in market share, and two very high profile sites redesigned using web standards: Wired magazine in 2002, and ESPN in 2003 became field leaders in supporting web standards and new techniques.

Also in 2003, Dave Shea launched a site called the CSS Zen Garden. This was to have more impact on web professionals than anything else, by truly illustrating that the entire design can change just by changing the style of the page; the content could remain identical.

Since then, web standards usage have become de rigueur in the professional web development community. And in this series, we will give you an excellent grounding in these techniques so that you can develop clean, semantic, accessible and standards-compliant websites!

The new breed of web standards

After 2003, web standards didn’t just sit still. New practices started to really come to the forefront, with many web sites being more like desktop applications than static pages. This new breed of sites is way more complicated than what the web was really intended for, and we still have to concern ourselves with making them semantic, accessible and usable!

When HTML 4 was nearing completion, the W3C decided that in terms of markup languages, the future of the Web was XML and XHTML, not HTML. So the W3C drew a line under HTML 4.01 and instead concentrated on the XHTML 1.0 spec, finished in early 2000. XHTML 1.0 is just the same as HTML 4.01, except that it uses the stricter markup syntax rules of XML (more on this later). XHTML 2.0 soon followed, which added a whole bunch of new powerful features, and aimed to be the next big thing on the Web.
The trouble with XHTML 2.0 is that it wasn’t backwards compatible with the markup already on the Web. The elements worked differently, XHTML did not work properly in Internet Explorer, which still has the majority browser market share as of the time of writing, the developer tools available weren’t ready for working with XML, and it didn’t reflect what web developers were REALLY doing out there in the wild, wild web.

In 2004, a group of like-minded developers and implementers (including representatives from Opera, Mozilla and slightly later, Apple) got together and formed a breakaway spec group called the WHATWG, with the aim of writing a better HTML markup spec that could handle authoring the new breed of web applications, without crucially breaking backwards compatibility.

The result was the Web Applications 1.0 specification, which documented existing interoperable browser behaviors and features, as well as new features for the Web stack such as APIs and new DOM parsing rules. After many discussions between W3C Members, on March 7, 2007, the work on HTML was restarted with a new HTML Working Group in an open participation process. In the first few days, hundreds of participants joined to continue to work on the next version of HTML. One of the first decisions of the HTML WG was to adopt the Web Applications 1.0 spec and call it HTML5.

**HTML5 is a really good thing for web developers and designers, because it.**

- Is mostly backwards compatible with what’s already there — you don’t need to learn completely new languages to use HTML5. The new markup features work in the same way as the old ones (although the semantics of some elements have been changed — we will cover these differences in a future article), and the new APIs are based on mostly the same JavaScript/DOM that developers have been programming in for years.

- Adds powerful new features to HTML that were previously only available on the Web using plugin technologies like Flash, or with complex JavaScript and hacks. Form validation and video are prime examples.

- Is better suited to writing dynamic applications than previous HTML versions (HTML was originally designed for creating static documents).

- Has a clearly defined parsing algorithm so that all browsers implementing HTML5 will create the same DOM from the same markup, regardless of validity. This is a massive win for interoperability.

The evolution of CSS is not nearly as long winded and controversial as that of HTML, but it is still very interesting, and worth a mention here. The
CSS2 specification was nearing completion is around 1999/2000, and although it was a powerful language with many great features, its creators knew that it had limitations. There were a number of visual/stylistic things that CSS couldn’t do, and that developers had to turn to hacks, JavaScript or plugins to achieve. This includes things such as animation, dynamic layouts, and using custom fonts on pages.

To begin to address this, work started on CSS3 as early as 2000. The spec writers decided on a modular structure, with different pieces of distinct functionality being broken down into manageable chunks. This made it easier not only for the writers to write, but also for the browsers to implement, and the web designers/developers to learn. A lot more features have been added since the first spec version in 2000, and we didn’t start to see browser support for many of the features until about 2006. At the time of writing, CSS3 has over 40 modules in various stages of completion. You can find more out about CSS3 and HTML5 later on in the course.

WWW is a system consisting of interlinked hypertext documents, available on Internet. These web pages can be collectively called a website and has a unique name called Website name. These websites can be accessed on any computer connected to Internet using a web browser. The most commonly used web browser is Internet Explorer(IE). The web pages or web site may contain text, images, videos and other multimedia contents and user can navigate between them. The English physicist Tim Berners-Lee wrote a proposal in 1989, making a way for so-called WWW (World Wide Web). This is why he is called Father of Web. Now he is the director of World Wide Web Consortium.

A website is a collection of web pages maintained by a single person or organization. In most cases, a website has a distinct fully qualified domain name, such as www.yahoo.com. We can classify Websites into three types:

1. Public
2. Personal
3. Intranet

A public site focuses on a company or an organization.

A personal site is a site that focuses on an individual. These sites are specifically designed to provide support and services to customers of a particular product or a range of products.

An Intranet site provides information about a company, but it makes the information available only to that company’s employees mainly.
We can communicate on the Internet through mail, chatting, newsgroup etc.

**Email**: On the Internet we commonly use the word MAIL to refer to email (electronic mail). Anyone who has an email address can send/receive mail. Similarly if you have someone’s email address you can send him/her mail.

**Chatting**: Chatting is used for online interactive communication through Internet, where sender and receiver need to be online at the same time.

**UseNet(Newsgroups)**: Usenet refers to a service that is very much like a public bulletin board. Usenet allows you to post messages to a public subject area, a newsgroup where a number of other participants can read them and post their own replies and comments.

Newsgroup can be a good source of information from other users who have used certain products or have had experiences with certain companies. In newsgroup you can find job postings, business and health care advice, political and religious discussions etc.

**Email**

Email is one of the most popular client/server applications on the Internet. Email servers run server software that enables them to interact with clients and with other email servers over the network.

Each mail server receives and stores mail for users who have mailboxes configured on the mail server. Each user with a mailbox must then use an email client to access the mail server and read these messages.

Mail servers are also used to send mail addressed to local mailboxes or mailboxes located on other email servers.

**Mail boxes are identified by the format**

User@company.domain.

Various application protocols used in processing email include SMTP, POP3, IMAP4.

**Telnet**

Telnet is a protocol which makes the connection between two remote computers (called hosts) possible over a TCP/IP network (such as Internet). It can be used to connect host (client PC) with the server on the network. Once your telnet client establishes a connection to the remote host (or server), the client becomes a virtual terminal, allowing us to communicate with the remote
host from client computer. The commands entered at client side using telnet are directly executed on the server console. In this way server can be controlled from client side.

**Telnet clients are available for all major operating systems.**

Command-line telnet clients are built into most OS and it can be activated from command prompt by entering command.

Telnet [host-name] or
Telnet [IP-address]

Replace host with the name or IP address of the remote computer to which you wish to connect.

Hence telnet is a network protocol used on LAN, WAN or Internet to provide bidirectional interactive communication facility.

**File Transfer Program(FTP)**

FTP is the user interface to the Internet standard File Transfer Protocol. The program allows a user to transfer files to and from a remote network site. Options may be specified at the command line or to the command interpreter.

The FTP service lets you transfer files from one connected computer to another. However there is one basic restriction you cannot access a computer unless you log on to it. In other words you cannot copy files to or from a remote computer unless you have a valid username and a password.

Anonymous FTP is a facility that lets you connect to certain hosts and download files without having to be a registered user. To do so, you log in using a special user name - anonymous. With this user name you do not need a regular password. Instead you type your mail address. Some files in the FTP servers may be accessible to the general public, while others are accessible only by the user. To separate the general public from the registered users, FTP servers are divided into two parts.

- Anonymous server
- Non-anonymous server

**Search Engine**

A Search Engine is a program that can search a large database for specific information. On the web, there are a number of search engines devoted to keep track of everything on the web, and you can use them for free(The companies that maintain them make their money by selling advertisement slots).
Some of popular search engines are

1. Yahoo! And Alta Vista
2. HotBot
3. WebCrawler
4. Excite
5. Lycos
6. Magellan

7. The advent of computers has revolutionized the workplace and redefined operational practices. The use and deployment of computers, computer systems and information technology applications in every aspect of business is now common. The recent application and adoption of Web-based, information and telecommunication technologies has force-multiplied the capabilities and benefits of computers.

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4. Voice recognition

(ii) User’s Communication Equipment

This is the communication equipment located at the User’s location(s) to connect the Users’ PC(s) to the “Local Loop”. It may include.

1. Phone line - Analog Modem
2. Phone line -ISDN(128K).
3. Phone Line - DSL (6 MB),
4. Cable Modem (27 MB)
5. Electric Line (1 MB)
6. Satellite (400 Kb)
7. LAN
8. Routers
9. Firewalls

(iii) Local Loop Carrier

It connects the User location to the ISP’s Point of Presence using any of the following.

1. Communication Lines
2. Cable.
3. Satellite
4. Power line.
5. Wireless.
(iv) ISP POP

This is the edge of the ISP’s network. Connections from the user are accepted and authenticated here using remote ports.

(v) User Services

These are the services that most users would use along with Internet Access.

1. Domain Name.
2. Email Host
3. Usenet Newsgroups (NNTP)
4. Special services such as TELNET, FTP
5. User Web Hosting
6. These servers require fast interfaces and large/fast storage.

(vi) Online Content

These are the host sites that the user interacts with. It includes.

1. Web Server platforms
2. Hosting Farms- Many online resources are hosted at well-connection facilities
3. These servers require fast interfaces and large/fast storage.

(vii) Origins of online content

This is the original “real-world” sources for the online information which may include.

1. Existing electronic information is being connected from legacy systems.
2. Traditional print resources are being scanned and converted into electronic format
3. Many types of video and audio programming is being broadcast via the internet.
4. Internet telephony is growing on the Internet

(viii) ISP Backbone

The ISP backbone interconnects the ISP’s POPs and interconnects the ISP to Other ISP’s and online content. It includes.
1. Backbone Providers
2. Large Circuits - fiber Circuit carriers
3. Routers
4. ATM Switches.
5. Sonet/SDH Switches.
6. Gigaswitch
7. Network Access Points

The Internet’s origins

On the fourth of October in 1957 an event occurred that would change the world. The Soviet Union successfully launched the first satellite into Earth’s orbit. Called Sputnik 1, it shocked the world — especially the United States of America, who had their own programme of satellite launches underway, but had yet to launch.

These events lead directly to the creation of the US Department of Defence, ARPA, due to a recognised need for an organization that could research and develop advanced ideas and technology. Perhaps their most famous project (certainly the most widely used) was the creation of the Internet.

In 1960, psychologist and computer scientist Joseph Licklider published a paper entitled Man-Computer Symbiosis, which articulated the idea of networked computers providing advanced information storage and retrieval. In 1962, whilst working for ARPA as the head of the information processing office, he formed a group to further computer research, but left the group before any actual work was done on the idea.

The plan for this computer network (to be called ARPANET) was presented in October 1967, and in December 1969 the first four-computer network was up and running. The core problem in creating a network was how to connect separate physical networks without tying up network resources for constant links. The technique that solved this problem is known as packet switching and it involves data requests being split into small chunks (packets,) which can be processed quickly without blocking communication from other parties — this principle is still used to run the Internet today.

This concept received wider adoption, with several other networks springing up using the same packet switching technique — for example, X.25 (developed by the International Telecommunication Union) formed the basis of the first UK university network JANET (allowing UK universities to send and
receive files and emails) and the American public network CompuServe (a commercial enterprise allowing small companies and individuals access to time-shared computer resources, and then later Internet access.) These networks, despite having many connections, were more like private networks than the Internet of today.

This proliferation of different networking protocols soon became a problem, when trying to get all the separate networks to communicate. There was a solution in sight however—Robert Kahn, whilst working on a satellite packet network project for ARPA, started defining some rules for a more open networking architecture to replace the current protocol used in ARPANET. Later joined by Vinton Cerf from Stanford University, the two created a system that masked the differences between networking protocols using a new standard. In the publication of the draft specification in December 1974, this was called the Internet Transmission Control Program.

This specification reduced the role of the network and moved the responsibility of maintaining transmission integrity to the host computer. The result was that it became possible to easily join almost all networks together. ARPA funded development of the software, and in 1977 a successful demonstration of three different networks communicating was conducted. By 1981, the specification was finalized, published and adopted; and in 1982 the ARPANET connections outside of the US were converted to use the new TCP/IP protocol. The Internet as we know it had arrived.

**The creation of World Wide Web**

Gopher was an information retrieval system used in the early 1990s, providing a method of delivering menus of links to files, computer resources and other menus. These menus could cross the boundaries of the current computer and use the Internet to fetch menus from other systems. It was very popular with universities looking to provide campus-wide information and large organisations looking to centralise document storage and management.

Gopher was created by the University of Minnesota. In February, 1993, they announced that it was going to charge licensing fees for the use of their reference implementation of the Gopher server. As a consequence, many organisations started to look for alternatives to Gopher.

The European Council for Nuclear Research (CERN) in Switzerland had such an alternative. Tim Berners-Lee had been working on a information management system, in which text could contain links and references to other works, allowing the reader to quickly jump from document to document. He had created a server for publishing this style of document (called hypertext) as
well as a program for reading them, which he had called WorldWideWeb. This software had first been released in 1991, however, it took two events to cause an explosion in popularity and the eventual replacement of Gopher.

On the thirtieth of April 1993 CERN released the source code of WorldWideWeb into the public domain, so anyone could use or build upon the software without charge.

Then, later in the same year, the NCSA released a program that was a combined web browser and Gopher client, called Mosaic. This was originally only available on Unix machines and in source code form, but in December 1993 Mosaic provided a new version with installers for both Apple Macintosh and Microsoft Windows. Mosaic rapidly increased in popularity, and with it the Web.

The number of available web browsers increased dramatically, many created by research projects at universities and corporations, such as Telenor (a Norwegian communications company), which created the first version of the Opera browser in 1994.

**The browser wars**

The popularisation of the web brought commercial interests. Marc Andreessen left NCSA and together with Jim Clark founded Mosaic Communications, later renamed to Netscape Communications Corporation, and started work on what was to become Netscape Navigator. Version 1.0 of the software was released in December 1994.

Spyglass Inc. (the commercial arm of NCSA) licensed their Mosaic technology to Microsoft to form the basis of Internet Explorer. Version 1.0 was released in August 1995.

A rapid escalation soon followed, with Netscape and Microsoft each trying to get a competitive edge in terms of the features they support in order to attract developers. This has since become known as the browser wars. Opera maintained a small but steady presence throughout this period, and tried to innovate and support web standards as well as possible in these times.

**The coming of web standards**

During the browser wars, Microsoft and Netscape focused on implementing new features rather than on fixing problems with the features they already supported, and adding proprietary features and creating features that were in direct competition with existing features in the other browser, but implemented in an incompatible way.
Developers at the time were forced to deal with ever increasing levels of confusion when trying to build web sites, sometimes to the extent of building two different but effectively duplicate sites for the two main browsers, and other times just choosing to support only one browser and block others from using their sites. This was a terrible way of working, and the inevitable backlash from developers was not far away.

The formation of the W3C

In 1994, Tim Berners-Lee founded the World Wide Web Consortium (W3C) at the Massachusetts Institute of Technology, with support from CERN, DARPA (as ARPA had been renamed to) and the European Commission. The W3C’s vision was to standardize the protocols and technologies used to build the web such that the content would be available to as wide a population of the world as possible.

During the next few years, the W3C published several specifications (called recommendations) including HTML 4.01, the format for PNG images, and Cascading Style Sheets versions 1 and 2.

However, the W3C did not (and still do not) enforce their recommendations. Manufacturers only had to conform to the W3C documents if they wished to label their products as W3C-compliant. In practice, this was not a valuable selling point as almost all users of the web did not know, nor probably care, who the W3C were (this is still the case, to a large extent). Consequently, the browser wars of the nineties continued unabated.

The Web Standards Project

In 1998, the browser market was dominated by Internet Explorer 4 and Netscape Navigator 4. A beta version of Internet Explorer 5 was then released, and it implemented a new and proprietary dynamic HTML, which meant that professional web developers needed to know five different ways of writing JavaScript.

As a result, a group of professional web developers and designers banded together. This group called themselves the Web Standards Project (WaSP). The idea was that by calling the W3C documents standards rather than recommendations, they might be able to convince Microsoft and Netscape to support them.

The early method of spreading the call to action was to use a traditional advertising technique called a roadblock, where a company would take out an advert on all broadcast channels at the same time, so no matter how a viewer would flick between channels, they would get exactly the same message. The
WaSP published an article simultaneously on various web development focused sites including builder.com, Wired online, and some popular mailing lists.

Another technique the WaSP used was to ridicule the companies involved with the W3C (and other standards bodies) that focused more on creating new, often self-serving, features rather than working to get the basic existing standards supported correctly in their products to start with (this includes some browser companies that shall remain nameless here). This doesn’t mean that the WaSP ridiculed the W3C themselves, rather they ridiculed the companies that became W3C members and then misbehaved.

The W3C has a few full time staff, but most of the people who work on the standards are volunteers from member companies, eg Microsoft, Opera, Mozilla, Apple, Google, IBM and Adobe, to name a few of the bigger ones.

This all sounds a bit negative, but the WaSP didn’t just sit there criticising people — they also helped. Seven members formed the CSS Samurai, who identified the top ten problems with the CSS support in Opera and other browsers (Opera fixed their problems, others did not).

The rise of web standards

In 2000, Microsoft released Internet Explorer 5 Macintosh Edition. This was a very important milestone, it being the default browser installed with the Mac OS at the time, and having a reasonable level of support for the W3C recommendations too. Along with Opera’s decent level of support for CSS and HTML, it contributed to a general positive movement, where web developers and designers finally felt comfortable designing sites using web standards, as they knew they would work to a reasonable level across multiple browsers.

The WaSP persuaded Netscape to postpone the release of the 5.0 version of Netscape Navigator until it was much more compliant (this work formed the basis of what is now Firefox, a very popular browser). The WaSP also created a Dreamweaver Task Force to encourage Macromedia to change their popular web authoring tool to encourage and support the creation of compliant sites.

The popular web development site A List Apart was redesigned early in 2001 and in an article describing how and why, stated.

In six months, a year, or two years at most, all sites will be designed with these standards. […] We can watch our skills grow obsolete, or start learning standards-based techniques now.

That was a little optimistic — not all sites, even in 2008, are built with web standards. But many people listened. Older browsers decreased in market
share, and two very high profile sites redesigned using web standards: Wired magazine in 2002, and ESPN in 2003 became field leaders in supporting web standards and new techniques.

Also in 2003, Dave Shea launched a site called the CSS Zen Garden. This was to have more impact on web professionals than anything else, by truly illustrating that the entire design can change just by changing the style of the page; the content could remain identical.

Since then, web standards usage have become de rigueur in the professional web development community. And in this series, we will give you an excellent grounding in these techniques so that you can develop clean, semantic, accessible and standards-compliant websites!

**The new breed of web standards**

After 2003, web standards didn’t just sit still. New practices started to really come to the forefront, with many web sites being more like desktop applications than static pages. This new breed of sites is way more complicated than what the web was really intended for, and we still have to concern ourselves with making them semantic, accessible and usable!

When HTML 4 was nearing completion, the W3C decided that in terms of markup languages, the future of the Web was XML and XHTML, not HTML. So the W3C drew a line under HTML 4.01 and instead concentrated on the XHTML 1.0 spec, finished in early 2000. XHTML 1.0 is just the same as HTML 4.01, except that it uses the stricter markup syntax rules of XML (more on this later). XHTML 2.0 soon followed, which added a whole bunch of new powerful features, and aimed to be the next big thing on the Web.

The trouble with XHTML 2.0 is that it wasn’t backwards compatible with the markup already on the Web — the elements worked differently. XHTML did not work properly in Internet Explorer, which still has the majority browser marketshare as of the time of writing, the developer tools available weren’t ready for working with XML, and it didn’t reflect what web developers were Really doing out there in the wild wild web.

In 2004, a group of like minded developers and implementers (including representatives from Opera, Mozilla and slightly later, Apple) got together and formed a breakaway spec group called the WHATWG, with the aim of writing a better HTML markup spec that could handle authoring the new breed of web applications, without — crucially — breaking backwards compatibility.

The result was the Web Applications 1.0 specification, which documented existing interoperable browser behaviors and features, as well as new features
for the Web stack such as APIs and new DOM parsing rules. After many discussions between W3C Members, on March 7, 2007 the work on HTML was restarted with a new HTML Working Group in an open participation process. In the first few days, hundreds of participants joined to continue to work on the next version of HTML. One of the first decisions of the HTML WG was to adopt the Web Applications 1.0 spec and call it HTML5.

**HTML5 is a really good thing for web developers and designers, because it.**

- Is mostly backwards compatible with what’s already there — you don’t need to learn completely new languages to use HTML5. The new markup features work in the same way as the old ones (although the semantics of some elements have been changed — we will cover these differences in a future article), and the new APIs are based on mostly the same JavaScript/DOM that developers have been programming in for years.

- Adds powerful new features to HTML that were previously only available on the Web using plugin technologies like Flash, or with complex JavaScript and hacks. Form validation and video are prime examples.

- Is better suited to writing dynamic applications than previous HTML versions (HTML was originally designed for creating static documents).

- Has a clearly defined parsing algorithm so that all browsers implementing HTML5 will create the same DOM from the same markup, regardless of validity. This is a massive win for interoperability.

The evolution of CSS is not nearly as long winded and controversial as that of HTML, but it is still very interesting, and worth a mention here. The CSS2 specification was nearing completion is around 1999/2000, and although it was a powerful language with many great features, its creators knew that it had limitations. There were a number of visual/stylistic things that CSS couldn’t do, and that developers had to turn to hacks, JavaScript or plugins to achieve. This includes things such as animation, dynamic layouts, and using custom fonts on pages.

To begin to address this, work started on CSS3 as early as 2000. The spec writers decided on a modular structure, with different pieces of distinct functionality being broken down into manageable chunks. This made it easier not only for the writers to write, but also for the browsers to implement, and the web designers/developers to learn. A lot more features have been added since
the first spec version in 2000, and we didn’t start to see browser support for many of the features until about 2006. At the time of writing, CSS3 has over 40 modules in various stages of completion. You can find more out about CSS3 and HTML5 later on in the course.

WWW is a system consisting of interlinked hypertext documents, available on Internet. These web pages can be collectively called a website and has a unique name called Website name. These web sites can be accessed on any computer connected to Internet using a web browser. The most commonly used web browser is Internet Explorer(IE). The web pages or web site may contain text, images, videos and other multimedia contents and user can navigate between them. The English physicist Tim Berners-Lee wrote a proposal in 1989, making a way for so-called WWW (World Wide Web). This is why he is called Father of Web. Now he is the director of World Wide Web Consortium.

A website is a collection of web pages maintained by a single person or organization. In most cases, a website has a distinct fully qualified domain name, such as www.yahoo.com. We can classify Websites into three types:

1. Public
2. Personal
3. Intranet

A public site focuses on a company or an organization.

A personal site is a site that focuses on an individual. These sites are specifically designed to provide support and services to customers of a particular product or a range of products.

An Intranet site provides information about a company, but it makes the information available only to that company’s employees mainly.

We can communicate on the Internet through mail, chatting, newsgroup etc.

**Email**: On the Internet we commonly use the word MAIL to refer to email(electronic mail). Anyone who has an email address can send/receive mail. Similarly if you have someone’s email address you can send him/her mail.

**Chatting**: Chatting is used for online interactive communication through Internet, where sender and receiver need to be online at the same time.

**UseNet(Newsgroups)**: Usenet refers to a service that is very much like a public bulletin board. Usenet allows you to post messages to a public subject area, a newsgroup where a number of other participants can read them and post their own replies and comments.
Newsgroup can be a good source of information from other users who have used certain products or have had experiences with certain companies. In newsgroup you can find job postings, business and health care advice, political and religious discussions etc.

**Email**

Email is one of the most popular client/server applications on the Internet. Email servers run server software that enables them to interact with clients and with other email servers over the network.

Each mail server receives and stores mail for users who have mailboxes configured on the mail server. Each user with a mailbox must then use an email client to access the mail server and read these messages.

Mail servers are also used to send mail addressed to local mailboxes or mail boxes located on other email servers.

**Mail boxes are identified by the format**

user@company.domain.

Various application protocols used in processing email include SMTP, POP3, IMAP4.

**Telnet**

Telnet is a protocol which makes the connection between two remote computers (called hosts) possible over a TCP/IP network (such as Internet). It can be used to connect host (client PC) with the server on the network. Once your telnet client establishes a connection to the remote host (or server), the client becomes a virtual terminal, allowing us to communicate with the remote host from client computer. The commands entered at client side using telnet are directly executed on the server console. In this way server can be controlled from client side.

Telnet clients are available for all major operating systems.

Command-line telnet clients are built into most OS and it can be activated from command prompt by entering command.

Telnet [host-name] or

Telnet [IP-address]

Replace host with the name or IP address of the remote computer to which you wish to connect.
Hence telnet is a network protocol used on LAN, WAN or Internet to provide bidirectional interactive communication facility.

**File Transfer Program (FTP)**

FTP is the user interface to the Internet standard File Transfer Protocol. The program allows a user to transfer files to and from a remote network site. Options may be specified at the command line or to the command interpreter.

The FTP service lets you transfer files from one connected computer to another. However there is one basic restriction you cannot access a computer unless you log on to it. In other words you cannot copy files to or from a remote computer unless you have a valid username and a password.

Anonymous FTP is a facility that lets you connect to certain hosts and download files without having to be a registered user. To do so, you log in using a special user name - anonymous. With this user name you do not need a regular password. Instead you type your mail address. Some files in the FTP servers may be accessible to the general public, while others are accessible only by the user. To separate the general public from the registered users, FTP servers are divided into two parts.

- Anonymous server
- Non-anonymous server

**Search Engine**

A Search Engine is a program that can search a large database for specific information. On the web, there are a number of search engines devoted to keep track of everything on the web, and you can use them for free (The companies that maintain them make their money by selling advertisement slots).

**Some of popular search engines are**

1. Yahoo! And Alta Vista
2. HotBot
3. WebCrawler
4. Excite
5. Lycos
6. Magellan
7. Google
Each search engine is different and you must learn to use it in its own way. For Example, Yahoo and AltaVista keep track of a great deal of the content on the web but they do so in completely different ways.

The Yahoo search engine seeks to categorize everything on the web. When you use Yahoo to search for something, the results are given as a list of categories related to that something. If you select a category, you will be shown links to Web pages falling in that category.

The AltaVista search engine has a different emphasis. AltaVista does its best to maintain copy of all the information on the web. You use AltaVista to look for specific words and it responds by showing you a list of links to web pages that contain those words.

An Internet service provider (ISP), also sometimes referred to as an Internet access provider (IAP), is a company that offers its customers access to the Internet.

ISPs may provide Internet e-mail accounts to users which allow them to communicate with one another by sending and receiving electronic messages through their ISP’s servers. ISPs may provide other services such as remotely storing data files on behalf of their customers, as well as other services unique to each particular ISP.

In addition to serving individuals, ISPs also serve large companies, providing a direct connection from the company’s networks to the Internet. ISPs themselves are connected to one another through Network Access Points (NAPs).

There are a number of ISPs in India at present. Some of them are BSNL, Sify, VSNL, Reliance, Tata, Airtel etc.

ISPs employ a range of technologies to enable consumers to connect to their network.

Your choice will depend on how often and how you intend to use the internet. You can choose from Dial-up, DSL, ISDN, Broadband, Cable Internet or Wi-Fi etc.

**Internet can be accessed by using any of the following methods.**

**Dial-up**

Dial-up connections are one type of internet connection available from ISPs, they are the slowest and (usually) the most inexpensive.
A dial-up connection allows you to connect to the internet via a local server using a standard 56k modem. Your PC literally dials (hence the name) a phone number (provided by your ISP) and connects to the server and therefore the internet.

**DSL**

Digital Subscribers Line connections are becoming more and more widely available and can provide an excellent internet connection.

The connections work by splitting your phone line into two separate channels, one for data (internet) and one for voice (phone calls), which means you can talk on the phone and be connected to the internet at the same time.

**Broadband wireless access**

Wireless Broadband is a fairly new technology that provides high-speed wireless internet and data network access over a wide area. According to the 802.16-2004 standard, broadband means having instantaneous bandwidth greater than around 1 MHz and supporting data rates greater than about 1.5 Mbit/s.

**Cable Internet**

Cable connections are considered one of the best types of internet connection available to the home user, they offer very fast and reliable connections with a fixed monthly fee.

Cable companies usually offer different packages to suit different internet subscribers, your choice of package will depend on how you intend to use the internet.

The different packages will offer different speed specifications and bandwidth limits.

Because a cable connection uses a totally separate medium to transfer data, it doesn’t affect your ability to make/receive phone calls.

**FTTH (Fiber To The Home)**

FTTH or Fiber To The Home, refers to fiber optic cable that replaces the standard copper wire. FTTH is desirable because it can carry high-speed broadband services integrating voice, data and video and runs directly to the junction box at the home or building. For this reason, it is sometimes called Fiber To The Building or FTTB. Fiber optic cables are made of glass fiber that can carry data at speeds exceeding 2.5 gigabits per second (gbps).
ISDN

Integrated Services Digital Network, an international communications standard for sending voice, video and data over digital telephone lines or normal telephone wires. ISDN supports data transfer rates of 64 Kbps (64,000 bits per second). There are two types of ISDN:

Basic Rate Interface (BRI) — consists of two 64-Kbps B-channels and one D-channel for transmitting control information.

Primary Rate Interface (PRI) — consists of 23 B-channels and one D-channel (U.S.) or 30 B-channels and one D-channel (Europe).

Wireless (Wi-Fi)

Wireless Internet uses radio waves as a means of transmission. The most convenient thing about wireless is that more than one person can log onto the connection. Wireless Internet provides you Internet access in your home, on the road or at the office. Many cell phone providers bundle phone and Internet service that save you money. Wireless Internet is free in many public areas. You can use it as long as you have a wireless connection on your laptop.

Summary

In this article we’ve looked at how the modern Internet was created as a result of the space race, how Tim Berners-Lee defined hypertext for a generation and how the commercial interests of two companies caused one of the most notable developer backlashes ever seen. The term web standards is now more widely used by web professionals that any other term applied by the W3C (in fact the W3C have started to use the term on their own pages), so that is what we are going to teach you — the standards way to build web sites and also understood about networking. Networking can be of two types - LAN and WAN.

- There are different topologies, protocols and media available for networking.
- The concept of Internet has also been explained here.
- Internet Architecture consists of User PC, communication network equipment, local loop carrier, User services, ISP backbone etc.
- We have explained different types of websites.
- A number of services like email, telnet, Ftp etc. are available on the internet.
• The term ISP (Internet Service Provider) is also explained here.

• Different types of Internet Access techniques like dial-up, DSL, cable internet, Wi-Fi etc. have been described in this chapter.

**Long Answer Type Questions**

1. What browsers are available on the Internet today for users of Windows, Mac OS X and Linux?

2. What percentage of web users use each browser?

3. What browsers do mobile devices use when accessing web pages?

4. How many web standards have the W3C published, and which are widely supported by browser manufacturers today.

5. Define Network and write about its importance in present society.
Learning Objectives

In this Unit the student will learn Basics of Web Designing with a special focus to design methodologies and also will get exposure in creating personal web sites.

The home page

At this point, many people tend to think “let’s start at the first page many users are going to see—the home page. That’s logical isn’t it.

Fig 2.1 The MSN home page—that’s a lotta links
It may sound logical, but then again, it’s not really the best place to start. It can be a common mistake to focus upon the home page. Home pages of websites can become hot property, trying to summarize everything in the site, and be everything to everyone. This can lead to them becoming a bloated mess.

As an example of what I mean, take a quick moment to visit the MSN home page (see also Figure 1). Marvel at the vast over-abundance of links and content. The MSN network of sites is vast—from travel to TV, dating to directions, gadgets to green information. And all of them vying for your attention.

This kind of overwhelming “throw everything in but the kitchen sink, then add the kitchen sink” home page is probably fine for such a large collection of sites, but for our band home page it is definitely over-kill and would turn away many more users than it would attract.

Also, it is a common misconception to think that the home page is the first page your site visitors will see. Maybe if they hear about the band or get a flyer or sticker or badge/button about it, they will enter the site’s location into their browser and so end up on the home page.

What is more likely however is that your visitors will end up on your site based upon a search. If they search for the band name it is likely (although not guaranteed) that they will have the home page of the site as their top result. Say for example someone searches for “Beatles tribute gig” instead though—they may well get the “Tour Dates” page as the first result. Or if the search was “band Moose Jaw” the top result may be the “About TDB” page because that mentions that the band is from Moose Jaw, whereas the home page does not.

In an article about their decision to stop charging for access to old content, the New York Times notes that the behaviour of their visitors had changed—What changed, The Times said, was that many more readers started coming to the site from search engines and links on other sites instead of coming directly to NYTimes.com. These indirect readers, unable to get access to articles behind the pay wall and less likely to pay subscription fees than the more loyal direct users, were seen as opportunities for more page views and increased advertising revenue.

**What does this mean for our site**

All of this means that whilst you need to sub-divide your content up into individual pages, you should be thinking about how your visitors will find what they might really be looking for, or where in the site they might go next once they start exploring further.
Whilst it may be tempting to cram in a little of everything on the home page, it is actually better to use it to highlight other areas of content within the site and drive your traffic to them. Treat the home page as any other page on the site and give it a defined purpose (to show what’s new, to provide an overview, to just introduce the band and lead people further into the site, and so on). The page will also need some form of navigation to other areas of the site, and branding.

Now you will go a bit deeper, and learn more about these things.

**Navigation**

How to navigate a site is one of the most, if not the most, crucial aspects of implementation to get right. You should identify the common destinations of your site and put these into your main navigation.

There is another common misconception about navigating sites that you may have heard—that any page should be at most three clicks away. The spreading of this has led to some of the worst and most complex navigation on the internet. As a real-life example, look at most shopping or price comparison sites on the internet—they tend to try to cram in as many links as possible for the mantra of keeping their customers’ clicks as few as possible before they purchase something, lest they leave and use a competitor. Eventually, though, this will lead to too much information for the user to take in and use effectively. Too much choice is as paralysing as too little choice.

As long as there is an apparent progress from one link to the next, and the indication is that they are still on track to reach their end goal, users will tend to continue through a site.

Taking the cues from the IA structure, the main navigation of TDB’s site should contain links to the pages/sections “Store”, “About”, Contact, “The Music” and “Band News”, as well as a link back to the Home page. It is not really necessary to link to pages below that, such as the “Tour Dates” and “Lyrics” pages. Links to these pages should be found within that area alone—anyone needing to jump from a particular song lyric page directly to “Tour Dates” will be able to navigate to “Band News” and hence to “Tour Dates”.

One of the most crucial aspects of a successful site navigation is consistency. Take a look at the tabs at the top of this page (links such as “Home”, “Articles”, “Forums” and so on). As you move around the dev.opera site this navigation bar will remain. The navigation will change to indicate where you currently are in the site and provide further links to deeper within the area. For example, clicking on the “Articles” tab will take you to the main articles area,
which then contains links to some of the most recent articles and a collection of links to sub-areas on topics like “Accessibility”, “CSS” and “Mobile” (see also Figure 2).

Fig. 2.2 The dev.opera.com navigation is constant wherever you are on the site.

Other common elements on a site

Apart from the navigation, there are normally other parts of a site that appear on pages repeatedly.

Most sites will have some form of branding, logo or masthead to show ownership. For example, almost every page on a Yahoo! site will have the logo in the top-left position, and this logo should contain the part of the Yahoo! network you are on (such as “Travel”, “Movies”, “Autos”, etc).

The header (across the top of the page) can contain more than just a logo, however. It can also contain, or be attached to, the main navigation. A search box is not uncommon, allowing users to search through the site rather than navigate around using menus and links. You should be including most or all of these elements on each page of your site.

The footer (the last area of the page) should contain extra information such as your copyright notice and links to useful ancillary pages on your site if you have them (such as “About This Site”, “Terms & Conditions”, “Contact Us” etc).
Colour, layout, the use of shapes and icons, typography and imagery all combine to create an overall impression of a page as ‘belonging’ to the site it is on—consistency is key. The use of consistent appearances and placement help to keep you oriented as to where in a site you’ve ended up and creates a sense of familiarity. You know that the page you are on now is related to and a part of the same experience as the previous pages because they are visually connected and related. When you design the site you must bear this in mind and not create a different look for all of the pages in the site.

In our TDB site, the header of the page would contain the band logo and name to reinforce this to visitors as they move around the site and give them a sense of familiarity that they are still looking at information about the band. The footer would contain copyright information about the site and about the lyrics, images and audio samples on the site; it should also contain links to pages on contacting/booking the band.

**Context is everything**

Each page, despite all of the common elements, should be unique. A good web page will do one thing, or a small number of things, and do them well.

**Relevant content**

Making content relevant and separate is a key factor of making good web pages great. Content should be uniquely addressible (have a place where it definitively lives, at a unique URL) and logically ordered (both within the site and the page itself) so that it can be easily found.

Take upcoming gigs performed by the band—whilst it could be tempting to place an “upcoming gigs” module on each page, that information has a home of its own and should live there. A simple “next gig” module that also links across to the Tour Dates page can promote that just as effectively without duplicating content and potentially confusing both users and search engines.

**Headings**

The next time you have your hands on a newspaper, really look at it. Notice how some stories are bigger, have darker type and imagery, and more prominent headlines. You are effectively being told what the most important stories to read are if you are in a hurry and only want to catch the big news.

The same is true of web pages. Each section of content on a page should be introduced by a heading, indicating its relative importance (is this section subordinate to the previous one, or on the same level?) within the page.
As an example, in the current part of this very article page are the two lines “Relevant Content” and “Headings”. These are headings and are at a lower level than “Context Is Everything” to indicate that these are sub-sections of the Context section of the page.

**Usability**

Usability is a catch-all term for making a site behave in a rational and expected way.

Have you ever tried to read an article on a news portal only to find you had to register with them before reading it? Ever tried to book a flight or a train journey online in under two minutes—the time you might expect it to take to explain the journey you wish to purchase tickets for to someone over the phone or over a counter? Ever entered an address or a credit card number only to be told you had entered it in the wrong form? Ever have a search return no useful results even though you know they are there, or for a site to not have a search facility in the first place?

These are all examples of bad usability—stemming from not considering the needs of the site’s users. By placing those needs at the centre of the experience you design and create, you are much more likely to create a satisfying and rewarding site.

Creating usable sites is not easy, however, and much of the knowledge simply comes from experience. Keep a diary of things that annoy you on other sites, and learn not to do them in your own. Also, nothing beats testing the site on real people. Once you’ve created it watch people as they use it.

1. Can they find pages they are looking for.
2. Does the search give them the right results for the search terms used.
3. Do images/audio/video work in their browser.
4. Do they get annoyed at anything.
5. Are they pleased by anything.

Dedicated usability testing is something professional companies will charge a lot of money for, but even some quick informal testing with friends and family can give you valuable insights into problems that you have not noticed. This is because you created the site, so can second guess things—other people, however, can’t do this.
Accessibility

Accessibility is, unfortunately, most commonly understood to mean “making a website work for blind people.” The truth is that accessibility issues affect many, many more people.

The term “assistive technology” is used to describe any extra piece of computer equipment or hardware that helps a person interact with their computer more successfully. This normally brings to mind screen readers for people who cannot see, or voice input for people who cannot use a mouse or keyboard. But what about glasses? People who need to correct their vision are also using an assistive technology. But most would not classify themselves as being disabled.

An awareness of the problems that people can face when trying to use the internet is important when developing good web pages. Don’t assume that your users will have a mouse; don’t assume that people can see the images you have used; don’t assume that everyone has Flash installed and provide alternative content for those without.

In addition to people who require assistive technology, there are other people these things are true for such as mobile users. Flash is still quite an immature technology for the mobile phones that even have it—the Apple iPhone doesn’t have it and possibly never will, but otherwise can browse the web almost like the desktop version of the Safari browser on a Mac (Opera Mobile does support Flash).

Technologies like Opera Mini that allow lower powered mobile phones to access the web will rewrite web pages to be lighter and more efficient and imagery in pages may be rendered much smaller for most users—meaning any content relying on subtlety of detail may be missed.

In the case of our band, you should be aware that if you use a lot of imagery (band photos), you should be describing the content of the image. If you use a Flash music player in the page to allow people to listen to the band’s music, you should also link to the music directly so that those without Flash installed can still access the music in their preferred way.

Summary

In this article I’ve discussed in broad terms what you will need to bear in mind as you start creating actual web pages, to make them more usable, more accessible, and run more smoothly. All of the concepts will be explained in greater detail as this series progresses.
For the exercise questions for this article, just go and browse the web—visit some of your favourite sites, and look at them in a new light. Jot down some answers to the following questions.

If you can, turn off support for images or JavaScript in your browser, or use your mobile phone and compare the experience to using the same site on your computer.

**Short Answer Type Questions**

1. What are qualities of a good designer?

2. What is the difference between Graphic and web Design?

**Long Answer Type Questions**

1. What is the use of thinking about browser compatibility issue while making a web page?

2. Write about software applications necessary in making a web page.

3. What is the role of Navigation and Content in web page design context?
Learning Objectives

In this Unit the student will learn Basics of HTML and its importance in web page designing, with a basic idea of creating web structure using tags and attributes.

What is HTML

HTML is a Markup Language for creating Web pages.

Description

HTML stands for HyperText Markup Language. It is used to create Web pages. That is, Web pages all over the world consist of HTML.

We can look at how other people have coded their Web pages. Click on the “View” menu and then on “Source”.

```html
<!doctype html>
<html lang="en">
<head>
  <title>Sample Web page</title>
</head>
<body>
  <p>Here is a paragraph</p>
</body>
</html>
```
History

The HyperText Markup Language (HTML) is the publishing language of the World Wide Web. The first version of HTML was described by Tim Berners-Lee in late 1991. For its first five years (1990-1995), HTML went through a number of revisions and experienced a number of extensions, primarily hosted first at CERN, and then at the IETF.

With the creation of the W3C, HTML’s development changed venue again. A first abortive attempt at extending HTML in 1995 known as HTML 3.0 then made way to a more pragmatic approach known as HTML 3.2, which was completed in 1997. HTML4 followed, reaching completion in 1998.

<table>
<thead>
<tr>
<th>Version</th>
<th>Published year</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTML+</td>
<td>1993</td>
</tr>
<tr>
<td>HTML2.0</td>
<td>1995</td>
</tr>
<tr>
<td>HTML3.2</td>
<td>1997</td>
</tr>
<tr>
<td>HTML4.01</td>
<td>1999</td>
</tr>
</tbody>
</table>

Tag

HTML uses markup tags to create Web pages. All content on the Web page is meant by tag. For examples, “Here is a paragraph”, “This is a image” and so on.

Tag syntax

HTML is using tags for its syntax. A tag is composed with special characters: <, > and /.. They are interpreted by softwares to compose an HTML element.

Decomposition of HTML elements

HTML Elements comes usually by tag pairs.

Fig 3.1 For opening a simple element with a start tag
1. It starts with <
2. Then a list of characters without space, the tagname (or element)
3. Ends usually with a >.

**Then closing the simple element with a end tag**

1. It starts with </
2. Then the same list of characters without space, the tagname (or element)
3. Ends usually with a >.

If the tagname is “cite”, then you get

<cite></cite>

Some elements do not have an end tag (because they are implied by the following tags). For example you might have seen.

<br>

An element can have attributes to refine its meaning.

These attributes are specified on the start tag. They consist of a name and a value, separated by an “=” character. Such as.

<tagname attribute="value"></tagname>

In HTML, the attribute value can remain unquoted if it doesn’t contain spaces or any of the following characters: ‘ ’ = < or >. Otherwise, it has to be quoted using either single or double quotes. The value, along with the “=” character, can be omitted altogether if the value is the empty string. Once you are working in a team you might want to choose a common way of authoring your code.
These are examples of syntaxes you might see on the Web

```
<!— empty attributes —>
<input disabled>
<input disabled="">
<input disabled=""/>
<!— attributes with a value —>
<input name=address>
<input name='address'>
<input name="address">
<input name='"address'>
```

Summary

HTML stands for HyperText Markup Language. It is used to create Web pages. That is, Web pages all over the world consist of HTML. The first version of HTML was described by Tim Berners-Lee in late 1991. For its first five years (1990-1995), HTML went through a number of revisions and experienced a number of extensions, primarily hosted first at CERN. Tags and elements are very important in making a web page, full fledged.

Short Answer Type Questions

1. What is HTML?
2. What are browsers applications?
3. Who is Tim Berners Lee.
4. Write about CERN.

Long Answer Type Questions

1. Write the procedure to create a simple HTML page.
Learning Objectives

Although student learned basics of html and its structure in previous unit, this unit will give a different perspective of html in preparing an eye catching web page structure.

Create HTML

Edit tools

You don’t need a special tool for making HTML. You can write HTML using just NotePad on Windows, or TextEdit on the Mac OS. However, you should choose an editor that allows you to save a page in the UTF-8 encoding (see more details below).

Some websites recommend using tools such as FrontPage and Dreamweaver for writing HTML, because they generate HTML for you. However, professional web developers highly discourage using such tools, because they often generate code that you don’t want. Instead, it is considered a good practice that you write all HTML code yourself.

Although the HTML can be written with any text editor, specialized HTML editors can offer convenience and added functionality. But here we will just use a plain text editor, because we want to concentrate on learning.

Try it

Let’s make a HTML document.
1. Open the NotePad (Windows users) or TextEdit (MacOS users).

2. Write the following example.

```html
<!doctype html>
<html lang="en">
<head>
<meta charset="utf-8">
<title>Sample Web page</title>
</head>
<body>
<p>Hello!</p>
</body>
</html>
```

Note

Don’t worry. You will learn about these tags in the next chapter.

Saving the file

When you save the HTML document, you should follow the following two sections.

File names

File name’s rules are as follows

- Use either the “.htm” or the “.html” file extension.
- Use only alphabets, numbers, “-(hyphen)” and “_(underscore)”.

Character Encoding

There are two works for the setting of the character encoding.

1. The markup within the document must properly designate the encoding.

2. The file, itself, must be saved in the proper encoding format.

The explanation of first point is learnt in the following chapter. In this chapter, you will learn second point. That is, setting the character encoding of the HTML document file.
Try it (Notepad)

1. Click on the “File” menu and then on “Save as”.
2. Select “UTF-8” in the dropdown menu of the “Encoding”.
3. Put in the file name. In this example, “index.html”.

Try it (TextEdit)

1. Click on the “TextEdit” menu and then on “Preferences”.
2. Click on the “Open and Save” tab.
3. Select “UTF-8” in the dropdown menu of the “Encoding”.
4. Click on the “File” menu and then on “Save”.
5. Put in the file name. In this example, “index.html”.

We browsers

Web browser is a software application for viewing the Web pages. There are a lot of kinds of Web browser and be used by each favor of the person who sees the Web pages:

- Internet Explorer(Microsoft)
- Firefox(Mozilla)
- Chrome(Google)
- Safari(Apple)
- Opera(Opera) ...etc

You should check whether the Web page is correctly made by two or more Web browsers.

Try it

Let’s view your HTML document on the Web browser.

1. Open the Web browser that you like.
2. Drag & Drop the HTML document file to Web browser.

Can you view the your HTML document
**HTML Document**

The following example is basic HTML document

```html
<!doctype html>
<html lang="en">
<head>
  Document meta data
</head>
<body>
  Document contents
</body>
</html>
```

**Description**

**Doc type**

The DOCTYPE must be specified, and be top in the HTML document. That is, the DOCTYPE exists before the `<html>` start tag.

The DOCTYPE declaration is `<!DOCTYPE html>` and is case-insensitive in the HTML syntax.

```html
<!DOCTYPE html>
```

or

```html
<!doctype html>
```

**HTML element**

The `html` element represents the root of an HTML document.

- The `html` element should always have a lang attribute. The lang attribute specifies the primary language for the contents of the element. For example, “en” means “English”, “fr” means “French”. There are tools available which provide additional help while searching the langage tag, such as Richard Ishida’s Language Subtag Lookup tool.

- The `<html>` ... `<html>` contains a `head` element followed by a `body` element.
<html lang="en">
  
  <head>
    
    The head element represents a collection of metadata for the Document.
    
    • The <head> ... </head> contains the title, and information on style sheets and scripts.
    
    • Contents in the head tag are not displayed on a Web browser.
    
  </head>
  
  <body>
    
    The body element represents the main content of the document.
    
    • The <body> ... </body> contains the markup with the visible content.
    
  </body>
  
  Metadata
  
  The following example represents the document metadata
  
  <head>
    
    <meta charset="utf-8">
    
    <title>About W3C | World Wide Web Consortium(W3C)</title>
    
    <meta name="description" Content="The World Wide Web Consortium (W3C) is an international community
    Where Member organizations, a full-time staff, and the public work together to develop Web standards.">
    
    <meta name="keywords" content="W3C, HTML, HTML5, XHTML, CSS, CSS3, SVG, MathML, WCAG">
    
  </head>
Character setting

The character encoding used by the document is specified by **the charset attribute** for the *meta* element.

```html
<meta charset="utf-8">
```

**Title**

Web page’s title is specified by `<title>`.

- Title is used in a title bar of Web browsers, user’s history, bookmarks, or in search results.
- You should use titles that identify their documents even when they are used out of context.

```html
<title>About W3C | World Wide Web Consortium(W3C)</title>
```

**Try it**

Let’s create the Web page of the shop of fictitious.

I create the “W3C cafe”.

1. Describe the Web page’s title between `<title>` ... `</title>`.

**Example**

```html
<head>
<meta charset="utf-8">
<title>HOME | W3C cafe</title>
</head>
```

2. Check the Web browsers.

**Web page’s description**

Web page’s description is specified by `<meta name="description">`.

- You describe the Web page’s description in the content attribute.

```html
<meta name="description" content="The World Wide Web Consortium (W3C) is an international community
```
Where Member organizations, a full-time staff, and the public work together to develop Web standards.”

Try it

1. Describe the Web page’s description. [Example]

   <head>
   <meta charset="utf-8">
   <title>About W3C cafe | W3C cafe</title>
   <meta name="description" content="The W3C cafe is .....">
   </head>

Web page’s keywords

Web page’s keywords are specified by <meta name="keywords">

   • You describe the Web page’s keywords in the content attribute.

   <meta name="keywords" content="W3C, HTML, HTML5, XHTML, CSS, CSS3, SVG, MathML, WCAG">

Try it

1. Describe the Web page’s keywords. [Example]

   <head>
   <meta charset="utf-8">
   <title>About W3C cafe | W3C cafe</title>
   <meta name="description" content="The W3C cafe is .....">
   <meta name="keywords" content="W3C cafe, coffee, .....">
   </head>

Basic content

   The following example is a basic content.

   <body>
   <h1>ABOUT W3C</h1>
The World Wide Web Consortium (W3C) is an international community where Member organizations, A full-time staff, and the public work together to develop Web standards.

Questions About W3C or the Web?

Please consult the Help and FAQ for answers to questions such as

- What does W3C do?
- How is W3C funded?
- Is W3C sending me spam?

Heading

Headings are specified by `<h1>`, `<h2>`, `<h3>`, `<h4>`, `<h5>`, and `<h6>`.

- `<h1>` is said to have the highest rank, `<h6>` has the lowest rank, and two elements with the same name have equal rank.

h1 example

h2 example

h3 example

h4 example

h5 example

h6 example
Paragraph

Paragraphs are specified by `<p>`.

<p>This is paragraph 1</p>
<p>This is paragraph 2</p>

Line

Horizontal rules are specified by `<hr>`.

- The `hr` element can omit end element. This is because it is empty element.
This is paragraph 1

This is paragraph 2

List

Un ordered list

Unordered list is specified by `<ul>` and `<li>`.

- The items of the list are the li element child nodes of the ul element.

If you would like to make 3 list items, you should specify 3 li elements.

```html
<ul>
  <li>List 1</li>
  <li>List 2</li>
  <li>List 3</li>
</ul>
```

Fig 6.3 Line Example

Fig 6.4 List
Ordered list

Ordered list is specified by `<ol>` and `<li>`.

- The items of the list are the `li` element child nodes of the `ol` element.
- The `type` attribute specifies the kind of marker to use in the list.

```html
<ol type="lower-alpha">
  <li>sample1</li>
  <li>sample2</li>
  <li>sample3</li>
</ol>
```

Fig 6.5 Ordered list

Definition list

Definition list is specified by `<dl>`, `<dt>` and `<dd>`.

```html
<dl>
  <dt>tarm1</dt>
  <dd>definition1</dd>
  <dt>tarm2</dt>
  <dd>definition2</dd>
</dl>
```
Challenge

Try it

1. Create Web page’s content that introduce your shop

```html
[index.html]

<!doctype html>
<html lang="en">
<head>
<meta charset="utf-8">
<title>HOME | W3C cafe</title>
</head>
<body>
<h1>W3C cafe</h1>
<ul>
<li>menu</li>
<li>location</li>
<li>about us</li>
<li>recruit</li>
</ul>
<h2>new branch</h2>
```
<p>26 January 2011</p>

<h2>new menu</h2>

<p>26 January 2011</p>

<p>Copyright © 2011 W3C cafe</p>
2. Check your Web browsers.

Fig 6.7 Check your Web browsers
When you finish learning “HTML educational materials for beginners” and “CSS educational materials for beginners”, you complete the following web pages.

**Fig 6.8**

**Summary**

The HTML element is the container of the entire document content, including the head element. Typically, the html element start tag is the second line of an HTML file, following the Document Type Definition DTD statement. The end tag should be in the last line of the file.
A meta element conveys hidden information about the document. Some browsers respond to this element to derive header information that may be important to the document but is not sent by the server in response to the request for the document. And any HTML page requires some basic tags like <html> itself, <head>, <body>, <title> etc.

**Short Answer Type Questions**

1. What is the use of <Head> and <Title> tags?

2. Write about <Body> tag in general

3. What is a <Meta> tag. Write about its uses?

4. A forward slash before any tag indicates what. Ex. </head>

**Long Answer Type Questions**

1. Write the basic structure of a HTML document.
Learning Objectives

In this unit the student will learn about how to give hyperlinks to web pages and in response to that how to load content into same page or separate pages.

Hyper Link

```html
<body>
<ul>
<li><a href="faq1.html">What does W3C do?</a></li>
<li><a href="faq2.html">How is W3C funded?</a></li>
<li><a href="faq3.html">Is W3C sending me spam?</a></li>
</ul>
<p>Copyright © 2009 W3C ( <a href="http://www.csail.mit.edu/">MIT</a> , ERCIM , Keio) Usage policies apply.</p>
</body>
```

What is Hyper Links

Start of the World Wide Web is the ability to define links from one page to another, and to follow links at the click of a button. This is Hyperlink.
Hyper Links

Hyper Links are specified by `<a>`.

Linked document is represented by the `href` attribute.

[syntax]

```
<a href="URL">Link label</a>
```

Try it

Let’s link to Google.

1. Enclose the link text between `<a>` and `</a>`.

```
<a>Go to Google</a>
```

2. Specifies the `href` attribute.

```
<a href="http://www.google.com/">Go to Google</a>
```

![Go to Google](image)

Fig 5.1 Menu/W3C cafe
Relative paths or Absolute URL

Relative path

**Fig 5.2 Relative path**

**Linking to be in a same folder/directory**

[Syntax]

```html
<a href='file.html'>Link label</a>
```

**Ex:** `[b.html-c.html]`

```html
<a href='c.html'>Link label</a>
```

**Linking to be in a parent folder/directory**

[Syntax]

```html
<a href='..file.html'>Link label</a>
```

**Ex:** `[b.html-a.html]`

```html
<a href='..a.html'>Link label</a>
```
Linking to be in a subdirectory

[Syntax]

```html
<a href="directory/file.html">Link label</a>
```

Ex : [a.html-b.html]

```html
<a href="XXX/b.html">Link label</a>
```

absolute URL

Linking to a page on another Web site.

```html
<a href="URL">Link label</a>
```

Challenge

1. Links to other pages in our Web site.

[index.html]

```html
<ul>
  <li><a href="menu.html">menu</a></li>
  <li><a href="location.html">location</a></li>
  <li><a href="about.html">about us</a></li>
  <li><a href="recruit.html">recruit</a></li>
</ul>
```

Fig 5.3
Link options

In which window to open the link document

In which window to open the link document is specified by the **target** attribute.

If you would like to open new window, you should use “_blank” for value of the target attribute.

```html
<a href="http://www.csail.mit.edu/" target="_blank">MIT</a>

**blank**: Open the new window.

**Self**: Open the current one.

**Parent**: Open the parent browsing context of the current one.

**Top**: Open the most top-level browsing context of the current one.

Link that specifies position of Web page

Link that specifies position of Web page is specified by the **id** attribute.

The id attribute specifies that its a element is a named hyperlink, with the name given by the value of this attribute.

1. Specifies the id attribute.

   ```html
   <h2 id="top">Top</h2>
   
   Note: The id attribute can be specified for any tag.
   ```

2. The a element with the href attribute. Value of the href attribute is a named hyperlink that you would like to link.

   ```html
   <a href="#top">Go back top</a>
   ```

Challenge

1. Specifies the name linked anchor by the id attribute.

   ```html
   [menu.html]
   <h2 id="food">Food</h2>
   <h2 id="drink">Drink</h2>
   ```

2. Specifies the link text by <a>.

   ```html
   [menu.html]
   <p><a href="#food">Food</a> | <a href="#drink">Drink</a>
   ```
**HTML Images**

```html
<body>
  <h1><img src="images/logo.png" alt="W3C" width="90" height="53"></h1>
</body>
```

Images are specified by `<img>`.

- The img element can omit end element. This is because it is an empty element.
- The image given by the `src` attribute is the embedded content. **SRC** stands for source.

```
[<img src="URL">]
```

- The images are often save on images folder.
<img src="images/logo.png">

• Alternative text
• You can specify an alternative text for a image.
• The value of the alt attribute give an alternative text for a image.
• The intent is that replacing every image with the text of its alt attribute not change the meaning of the page.

Note: One way to think of alternative text is to think about how you would read the page containing the image to someone over the phone, without mentioning that there is an image present. Whatever you say instead of the image is typically a good start for writing the alternative text.

Image size

Images size are specified by the width attribute and the height attribute.

• The width and height aren’t strictly necessary but help to speed the display of your Web page.

<img src="images/logo.png" alt="W3C" width="90" height="53">

Challenge

Try it

1. Let’s embed the logo image.

[index.html]

<h1><img src="images/logo.png" alt="W3C cafe" width="249" height="107"></h1>

Fig 5.5
2. Check your Web browsers.

The URI of the destination of a link. In browsers, when the URI is an HTML document, the document is loaded into the current (default) or other window target. For some other file types, the browser may load the destination content into a plugin or save the destination file on the client machine. In the absence of the href attribute, the element does not distinguish itself in a browser as a clickable link and may instead be only an anchor.
Ex: `<A href="photoshop/photoshop.html">photoshop CS5</A>`

**Short Answer Type Questions**

1. Write the syntax of a hyperlink tag, with example.

2. What is href in `<A href="xxxxxxxxxx">`?

3. Define the term Hyperlink.

4. What is anchor name in hyperlinking?

5. Differentiate URL and URI?
Learning Objectives

In this Unit the student will learn about loading media elements into webpages. Media elements includes Audio, video etc.

HTML Videos

```html
<video controls src="movie.ogv">
<p>Your user agent does not support the HTML5 Video element.</p>
</video>
```

Embedded videos

- The embedded videos are specified by `<video>`.
- There are two way of specifying the embedded content.
- The src attribute
- The image given by the src attribute is the embedded content.
- SRC stands for source.

```html
<video src="movie.ogv">
</video>
```

HTML `<embed>` tag Function: The HTML `<embed>` tag is used to embed multimedia in an HTML document. You should use `<noembed>` tag
along with this tag to handle browsers who do not support embed tag. Difference between HTML and XHTML: This tag is deprecated. You should use <object> tag.

Example: Syntax: - <embed src="/html/yourfile.mid" width="100%" height="60" />

1. Embed audio file:

<embed height="50" width="100" src="horse.mp3"/>

2. Embed video: Playing Videos in HTML

Example <video width="320" height="240" controls>
<source src="movie.mp4" type="video/mp4">
<source src="movie.ogg" type="video/ogg">
<source src="movie.webm" type="video/webm">
<object data="movie.mp4" width="320" height="240">
<embed src="movie.swf" width="320" height="240">
</object> </video>

3. embed flash object:

<object type="application/x-shockwave-flash">
  <param name="movie" value="myclip.swf"/>
  <param name="quality" value="high"/>
</object>

Summary

An embed element allows you to load media and file types other than those natively rendered by the browser. Typically, such external data requires a plugin or helper application to properly load the data and display its file. This element has been supported by both Navigator and IE since versions 2 and 3, respectively, but the element never became a part of the HTML standard vocabulary.

Bear in mind that for data types that launch plugins, the control panel displayed for the data varies widely among browsers, operating systems, and the plugins the user has installed for that particular data type.
Learning Objectives

In this Unit student will learn about organising data into rows and columns, which is the perfect way of presenting raw facts in a refined manner.

Table

```html
<table>
  <caption>HTML History</caption>
  <tr>
    <th>Version</th>
    <th>Published year</th>
  </tr>
  <tr>
    <td>HTML+</td>
    <td>1993</td>
  </tr>
  <tr>
    <td>HTML2.0</td>
    <td>1995</td>
  </tr>
</table>
```
Table
Tables are specified by `<table>`.

```
| HTML+  | 1993 |
```

Table row
Table rows are specified by `<tr>`.

```
| HTML+  | 1993 |
```

Table data
Table data cells are specified by `<td>`.

```
| HTML+   |
```

Table heading
Table heading cells are specified by `<th>`.

- The text between `<th>` ... `<th>` will be bold and centered.

```
| Version |
```
<th>Published year</th>
</tr>
<tr>
<td>HTML+</td>
<td>1993</td>
</tr>
</table>

Captions
Captions are specified by <caption>.
• <caption> must be as the first element child of a table element.
<table>
<caption>HTML History</caption>
<tr>
<th>Version</th>
<th>Published year</th>
</tr>
<tr>
<td>HTML+</td>
<td>1993</td>
</tr>
</table>

Challenge
Try it
1. Let’s make a shop history’s table.
[about.html]
<table border="1">
<tr>
<table>
<thead>
<tr>
<th>Year</th>
<th>History</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>W3C cafe opens first store in Boston</td>
</tr>
<tr>
<td>2007</td>
<td>W3C cafe opens first stores outside of USA</td>
</tr>
<tr>
<td>2010</td>
<td>W3C cafe opens online stores</td>
</tr>
</tbody>
</table>

2. Check your Web browsers.

Fig 7.1
Summary

The table element is a container for additional elements that specify the content for a table. A table consists of rows and columns of content. Other elements related to the table element are caption, col, colgroup, tbody, td, tfoot, th, thead, and tr. Tables have been used for a relatively long time not only to organize rows and columns of content but also to position content.

A table within another table is called nested table.

Long Answer Type Questions

1. Write the complete structure of a table tag.
2. What are the attributes associated with Table tag.
3. How to create a nested table.
4. Write about cellpadding, cellspacing.
5. How to increase or decrease the size of a table.
Learning Objectives

In this unit the student will learn the importance of HTML forms in communication between web page visitors and the server. A form element at its heart is nothing more than a container of controls.

Forms

```html
<form>
  <table>
    <tr>
      <td>First name</td>
      <td><input type="text" id="fn"></td>
    </tr>
    <tr>
      <td>Last name</td>
      <td><input type="text" id="ln"></td>
    </tr>
    <tr>
      <td>Gender</td>
    </tr>
  </table>
</form>
```
<table>
<thead>
<tr>
<th><strong>Gender</strong></th>
<th><strong>Phone number</strong></th>
<th><strong>E-mail</strong></th>
<th><strong>Kind of contact</strong></th>
<th><strong>Comment</strong></th>
</tr>
</thead>
</table>
| <input type="radio" id="m" name="gender"> male<br/> <input type="radio" id="f" name="gender"> female | <input type="tel" id="tel"/> | <input type="email" id="email"/> | <select> 
<option value="ir"> Interview Request </option> 
<option value="mq"> Membership Questions </option> 
<option value="ilq"> International Liaison Questions </option> 
<option value="tq"> Technology Questions </option> 
</select> | <textarea></textarea> |
User-submittable form

User-submittable form is specified by `<form>`.
The form is used to pass data to a server.

The action attribute

The server of the destination is specified by the `action` attribute.

```html
<form action="http://www.example.com/form.cgi"></form>
```

The method attribute

The method attribute specifies the HTTP method with which a UA is meant to associate this element for form submission.

```html
<form action="http://www.example.com/form.cgi" method="get"></form>
```

Form controls

The form element can contain some form-controls

- Input
- Textarea
- Radiobutton
- Checkbox
- Submit button
- Select menu
... etc.

Form controls are included between `<form>` ... `<form>`.

```html
<form>
<table>
<tr>
```

<table>
<thead>
<tr>
<th>First name</th>
<th>&lt;input type=&quot;text&quot; id=&quot;fn&quot;&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last name</td>
<td>&lt;input type=&quot;text&quot; id=&quot;ln&quot;&gt;</td>
</tr>
</tbody>
</table>
| Gender     | <input type="radio" id="m" name="gender"> male<br/>
|            | <input type="radio" id="f" name="gender"> female |
| Phone number | <input type="tel" id="tel"> |
| E-mail     | <input type="email" id="email"> |
| Kind of contact | <td> |
|            | </td> |
The Input element

The <input> element represents a typed data field, usually with a form control to allow the user to edit the data.

- The data type of the input elements are specified by the type attribute.

The following examples are typical kinds of the type attribute.

Type="text"

The text state represents a one line plain text edit control for the element’s value

- Name
- User ID
... etc
Account: <input type="text"/> PIN: <input type="text"/>

The radio button state represents a type attribute whose value is “radio” represents a selection of one item from a list of items.

- Male or female
- Single or married
- ... etc

The radio button groups are specified by the name attribute. The items that belong to the same radio group should have the same value of the name attribute.

```html
<input type="radio" name="gender" value="m">male
<input type="radio" name="gender" value="f">female
```

The telephone state represents a control for editing a telephone number given in the element’s value.

```html
Type="tel"
```

Fig 8.1

Type ="radio"

Fig 8.2

Type="tel"
Phone: <input type="tel">

Fig 8.3

Type ="email"

The E-mail state represents a control for editing a list of e-mail addresses given in the element’s value.

Cc: <input type ="email">

Fig 8.4

The textarea element

The <textarea> element represents a multiline plain text edit control for the element’s raw value.

• The cols attribute specifies the expected maximum number of characters per line. by default, it is 20.

• The rows attribute specifies the number of lines to show. by defult, it is 2.

<textarea cols ="80" rows ="5"></textarea>

Fig 8.5
Select menu

The select menu is specified by `<select>` and `<option>`.

The select element

The `<select>` element represents a control for selecting amongst a set of options.

- The list of options for a select element consists of all the option element children of the select element.

The option element

The `<option>` element represents an option in a select element.

```html
<select>
  <option>Boston</option>
  <option>New York</option>
</select>
```

![Option example](image)

Fig 8.6

Challenge

Try it

1. Let’s make a recruit application form.

```html
[recruit.html]
<h2>Recruit</h2>
<h3>Apprications</h3>
<form action="http://www.example.com/form.cgi" method="get">
  <table>
```

```
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Name</strong></td>
<td>&lt;input type=&quot;text&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Last Name</strong></td>
<td>&lt;input type=&quot;text&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>E-mail</strong></td>
<td>&lt;input type=&quot;email&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Job Categories** | <input type="checkbox" name="job" value="barista">barista<br>
|                | <input type="checkbox" name="job" value="waiter">waiter |
|                |                        |
| **Comment**    | <textarea>             |

</table>
</form>
2. Check your Web browser.

Fig 8.7

**Summary**

Communication between web page visitor and the server will be established by forms and form controls. A document may contain any number of form elements, but a client may submit the settings of controls from only one form at a time.

When a form is submitted to the server, all controls that have name attributes assigned to them pass both their names and values in name/value pairs to the server for further processing. A common gateway interface (CGI) program running on the server can accept and dissect the name/value pairs for further processing.

The W3C recommendations prefer that form controls use their id attributes in name/value pairs.

The second step of submission encodes the text of each name/value pair. And in the final step, the method attribute setting determines how the escaped form data set is transmitted to the server.
Short Answer Type Questions

1. Write about important elements of a form like, name, method etc.

2. What is CGI. write its full form and function?

Long Answer Type Questions

1. What are forms, write in detail with proper example?

2. Define Server and write about its importance in general.

3. What are the common buttons that you see in any form, write in general?
Learning Objectives

In this unit the student will learn about how to divide a page into functionable sections with the help of div and xml(if necessary) tags along with html.

Header

Header is specified by `<header>`. The header element usually contain Web page’s/section’s headers.

- Logo
- Navigations
- Heading(ex. h1-h6 elements)
- Search form
  ... etc

  `<header>
  <h1><img src="logo.png" alt="W3C"></h1>
  </header>`

Footer

Footer is specified by `<footer>`. A footer typically contains information about its section.
• Author
• Links to related documents
• Copyright data
... etc
<footer>
<p>Copyright © 2011 W3C</p>
</footer>

Navigations

Navigations are specified by `<nav>`.

<nav>
<ul>
<li>navigation 1</li>
<li>navigation 2</li>
<li>navigation 3</li>
</ul>
</nav>

Article

Article is specified by `<article>`.

W3C Introduces an HTML5 Logo
W3C unveiled today an HTML5 logo, a striking visual identity for the open web platform.

W3C encourages early adopters to use HTML5 and to provide feedback to the W3C HTML Working Group as part of the standardization process.

Now there are logos for those who have taken up parts of HTML5 into their sites, and for anyone who wishes to tell the world they are using or referring to HTML5, CSS, SVG, WOFF, and other technologies used to build modern Web applications.

Aside

Aside is specified by `<aside>`. The `<aside>` element represents a section of a page that consists of content that is tangentially related to the content around the aside element, and which could be considered separate from that content:

- Pull quotes
- Sidebars
- Advertising
- Groups of nav elements
  ...
  etc
  `<aside>`
  `<h2>related contents</h2>`
  `<ul>`
  `<li>`<a href="contents1.html">contents 1</a>`</li>`
  `<li>`<a href="contents2.html">contents 2</a>`</li>`
  `<li>`<a href="contents3.html">contents 3</a>`</li>`
  `</ul>`
  `</aside>`

Challenge

1. Sets the header section.

   [index.html]

   `<header>`
2. Sets the navigation section.

[index.html]

<nav>
  <ul>
    <li><a href="menu.html">menu</a></li>
    <li><a href="location.html">location</a></li>
    <li><a href="about.html">about us</a></li>
    <li><a href="recruit.html">recruit</a></li>
  </ul>
</nav>

3. Sets the article section.

In the following example, two article elements are nested. Because “new branch” and “new menu” are independent item of content.

[index.html]

<article>
  <article>
    <header>
      <h2>new branch</h2>
      <p>26 January 2011</p>
    </header>
    <p>text text text text text text text text text text text text text text text text text text text text text text text text text text text text text text text text text text text text text text text text text</p>
  </article>
</article>
4. Sets the footer section.

[index.html]
<footer>
<p>Copyright © 2011 W3C cafe</p>
</footer>
Summary

Sections defined in it and a section has parent and children. Section means a part of the HTML screen.

For example, a section can have 30% of the screen width (of the parent section) and other can have the other 70%. Parent is the container with 100% full screen, Section A has 30% and Section B 70% that would result in:(test it)

```html
<HTML>
<HEAD>
<TITLE>A simple frameset document</TITLE>
</HEAD>
<div id="main">
<div id="left">
</div>
<div id="right">
</div>
</div>
</HTML>
```
Short Answer Type Questions

1. What is the Iframe tag?
2. List important open source databases of web.
3. Define sections in html, write about its importance.
4. What is the use of div tag?
5. What is xml?
Learning Objectives

In this unit the student will get some introductory information script languages like javascript, vbscript, dhtml etc. in general. (Note:- No indepth knowledge on scripting languages will be imparted here, ‘cause this program primarily focuses on Design and Motion graphics)

Style Sheets

Style Sheets can format the HTML document. HTML documents may contain style sheet rules directly in them or they may import style sheets. There are three ways of providing styling information for the Web browsers.

Any style sheet language may be used with HTML. This educational materials use the style language “CSS(Cascading Style Sheets)”.

Adding style to HTML

Linking style sheet

You can separate style sheets from HTML documents. Style sheet files are imported to HTML documents by <link>.

This offers several benefits

- Authors and Web site managers may share style sheets across a number of documents (and sites).
- Authors may change the style sheet without requiring modifications to the document.
• User agents may load style sheets selectively (based on media descriptions).

[Syntax]

```html
<head>
<link rel="stylesheet" type="text/css" href="example.css">
</head>
```

**Internal style sheet**

You can put style sheet rules in the head of the document by `<style>`.

[Syntax]

```html
<head>
<style>
p { color: red; font-size:120%; }
</style>
</head>
<body>
<p>This is a paragraph</p>
</body>
```

**Online style sheet**

The start tags can contain style sheet rules directly in HTML documents by the style attribute.

[Syntax]

```html
<p style="color: red; font-size:120%;">This is a paragraph</p>
```

**Script**

A client-side script is a program that may accompany an HTML document or be embedded directly in it. Scripts offer you a means to extend HTML documents in highly active and interactive ways.

Any script language may be used with HTML. This educational materials use the script language “JavaScript.”
Adding script to HTML

External script

Script files are imported to HTML documents by the src attribute for the script element.

[Syntax]

```html
<script type="text/javascript" src="example.js"></script>
```

Local script

The client-side script is embedded directly in HTML documents. The script should be contained between `<script> ... </script>`.

[Syntax]

```html
<script type="text/javascript">
    document.write('Hello world!');
</script>
```

Setting the default script language

You must specify the script language associated with an HTML document by `<meta http-equiv="Content-Script-Type">`.

[Syntax]

```html
<meta http-equiv="Content-Script-Type" content="text/javascript">
```

Designing documents for user agents that don’t support scripting

The noscript element

The `<noscript>` element represents nothing if scripting is enabled, and represents its children if scripting is disabled.

[Syntax]

```html
<script type="text/javascript">
    document.write('Hello world!');
</script>
<noscript>
    Hello world!
</noscript>
```
Commenting scripts

The JavaScript engine allows the string “<!—” to occur at the start of a SCRIPT element, and ignores further characters until the end of the line. JavaScript interprets “//” as starting a comment extending to the end of the current line. This is needed to hide the string “—>” from the JavaScript parser.

[Syntax]

```html
<script type="text/javascript">
<!—  to hide script contents from old browsers
document.write('Hello world!');
// end hiding contents from old browsers —>
</script>
<noscript>
Hello world!
</noscript>
```

Summary

Style Sheets can format the HTML document. HTML documents may contain style sheet rules directly in them or they may import style sheets. There are three ways of providing styling information for the Web browsers.

A client-side script is a program that may accompany an HTML document or be embedded directly in it. Scripts offer you a means to extend HTML documents in highly active and interactive ways.

Any script language may be used with HTML. This educational materials use the script language “JavaScript”.

Short Answer Type Questions

1. What are styles and script, write in general?

2. Write the syntax for simple style.

3. Write and explain a simple javascript.

4. How to set up a default scripting language

Long Answer Type Questions

1. What is client server technology, in what way script are useful to control client and server. Explain in detail.
Introduction to CSS

Learning Objectives

This Unit introduces CSS in detail to the student. By the time when student finishes this unit he/she will be clear with concept of cascading style sheets.

What is CSS?

CSS is a Style Sheet Language.

Description

CSS stands for Cascading Style Sheet. CSS can format the document content (written in HTML or other markup language)

- Layout
- Colors
- Fonts
  ... etc.

CSS is designed primarily to enable the separation of the document content and document format. As a result, we can improve content accessibility, can similarly format two or more documents.

```p{
  Color : red;
```
Font-size: 12px;

Background-color: green;

}

Adding style to HTML

There are three ways of providing styling information for the Web browsers.

Linking style sheet

You can separate style sheets from HTML documents. Style sheet files are imported to HTML documents by <link>.

This offers several benefits

- Authors and Web site managers may share style sheets across a number of documents (and sites).
- Authors may change the style sheet without requiring modifications to the document.
- User agents may load style sheets selectively (based on media descriptions).

[example.html]

<head>
<link rel="stylesheet" type="text/css" href="example.css">
</head>

[example.css]

P{
Color: red;
Foto-size: 120%;
}

Note: Don’t worry. You will learn about CSS’s syntax in the next chapter.

Internal style sheet

You can put style sheet rules in the head of the document by <style>.
Inline style sheet

The start tags can contain style sheet rules directly in HTML documents by the style attribute.

Syntax

CSS has some syntax. The point of the syntax of CSS is described as follows.

Point of the syntax

This syntax has two parts, the selector and the declaration.
Selector: Specifies the target of styling.

Declaration: Specifies the property and value.

- Declaration is contained between “{ “ ... “}”.
- Declaration end with a semicolon.

p{ color: red; }

Declaration part can have one or more declarations.

p{ color: red; font-size: 12px; }

When the declarative part has a lot of declarations, the Web creators usually describes it as follows:

p{
    Color : red;
    Font-size : 12px;
}

Describing it like this is more comprehensible.

CSS comments

- CSS comment starts with “/\*”, and end with “/\*”. 

p{
    Color : red;
    /* This is a comment */
    Font-size : 12px;
}

Selectors

Selectors are specify the target of styling. Selectors may range from simple element names to rich contextual representations.

Kind of selector

Type selector

A type selector is the name of HTML Tag.
[index.html]

```html
<p>This is a paragraph</p>
<p>This is a paragraph</p>
<p>This is a paragraph</p>
```

[style.css]

```css
p{
    Color : red;
    Font-size : 12px;
}
```

**Class selector**

Class selector is used for one or more elements. It is described the value of class attribute of HTML document with ".(period)".

[index.html]

```html
<p class="red">This is a paragraph</p>
<p class="blue">This is a paragraph</p>
<p class="red">This is a paragraph</p>
<p class="blue">This is a paragraph</p>
```

[style.css]

```css
p{
    Font-size : 12px;
}
.red{
    Color : red;
}
.blue{
    Color : blue;
}
```
ID selector

ID selector is used for unique element. It is described the value of ID attribute of HTML document with “#”.

[index.html]

<p class="red">This is a paragraph</p>
<p class="blue">This is a paragraph</p>
<p class="red id="small">This is a paragraph</p>

[style.css]

p{
    Font-size : 12px;
}
.red{
    Color : red;
}
.blue{
    Color : blue;
}
#small{
    Font-size : 9px;
}

Descendant combinator

A descendant combinator is whitespace that separates two sequences of simple selectors. A selector of the form “A B” represents an element B that is an arbitrary descendant of some ancestor element A.

[index.html]

<h1>This is a <em>header</em></h1>
<p>This is a <em>paragraph</em></p>
[style.css]

```css
h1 em{
  Color : red;
  Font-size : 12px;
}
```

The selector introduces here is not all.

**Grouping**

A comma-separated list of selectors represents the union of all elements selected by each of the individual selectors in the list.

[index.html]

```html
<h1>This is a heading</h1>
<h2>This is a heading</h2>
<h3>This is a heading</h3>
<h4>This is a heading</h4>
```

[style.css]

```css
h1, h2, h3, h4{
  Color : red;
  Font-size : 12px;
}
```

---

**Summary**

CSS stands for Cascading Style Sheets. Styles define how to display HTML elements. Styles were added to HTML 4.0 to solve a problem. External Style Sheets can save a lot of work. External Style Sheets are stored in CSS files.

**Short Answer Type Questions**

1. Define CSS and its importance in Web design context.

2. What is the difference between internal, external and inline styles?

3. What is the latest version of style sheet available in the market?
Long Answer Type Questions

1. What is the correct HTML for referring to an external, internal and inline style sheet? Write in detail.

2. Write in detail about the correct syntax of CSS
Learning Objectives

In this Unit the student will learn about Texts, Fonts, Lists and Links through style sheets.

Create CSS

Edit tools

You don’t need a special tool for making HTML. We can write CSS by hand using tools such as NotePad on Windows, or TextEdit on the MacOS.

However, Web developer often use Web authoring tools

- Dreamweaver
- FrontPage
- ...etc

But, I recommend that you use plain text editor. Because I think this is the best way to acquire the CSS.

File names

When you save the CSS document, you should follow the file name rules.

- Use the “.css” file extension.
- Use only alphabets, numbers, “-(hyphen)” and “_(underscore)”.
Challenge

1. Describe CSS document as follows

body{
  
  Font-size : 0.8em;

}

2. Save the file as CSS document. In this example, “style.css”.

3. Describe HTML document as follows

[index.html]

  <head>
  <meta charset="utf-8">
  <title>HOME | W3C cafe</title>
  <link rel="stylesheet" type="text/css" href="style.css">
  
  </head>

CSS Text

Color

The color property describes the foreground color of an element’s text content.

[Syntax]

  Color : Color keywords | color values

Example

The following example specifies same color

[style.css]

  p#key{ color: red; }
  p#val{ color: #ff0000; }

[index.html]

  <p id = "key">This is a paragraph(red)</p>
  <p id = "val">This is a paragraph(#ff0000)</p>
Text-align

This property describes how inline contents of a block are horizontally aligned.

[Syntax]

    Text-align : left | right | center | justify

Example

[style.css]

    p#le{ text-align: left; }
    p#ri{ text-align: right; }
    p#ce{ text-align: center; }
    p#ju{ text-align: justify; }

[index.html]

    <p id="le">This is a paragraph(left)</p>
    <p id="ri">This is a paragraph(right)</p>
    <p id="ce">This is a paragraph(center)</p>
    <p id="ju">This is a paragraph(justify)</p>
Text-decoration

This property describes line decorations that are added to the content of an element.

[Syntax]

Text-decoration: none | underline | overline | line-through | blink

Example

[style.css]

```
p#no{ text-decoration: none; }
p#un{ text-decoration: underline; }
p#ov{ text-decoration: overline; }
p#th{ text-decoration: line-through; }
p#bl{ text-decoration: blink; }
```

[index.html]

```
<p id="no">This is a paragraph(none)</p>
<p id="un">This is a paragraph(underline)</p>
<p id="ov">This is a paragraph(overline)</p>
<p id="th">This is a paragraph(line-through)</p>
<p id="bl">This is a paragraph(blink)</p>
```
Text-indent

The text-indent property specifies the indentation applied to first line of inline content in a block.

[Syntax]

Text-indent : length

Example

[style.css]

p#ind{
    Text-indent : 2em;
}

[index.html]

<p>This is a paragraph(normal)</p>
<p id="ind">This is a paragraph(indent)</p>
Challenge

1. Sets the text color of default. It is often set to “#333333”. Because the character of jet-black is hard to read in a white background in the monitor. “#333333” means the dark gray.

```
[style.css]

Body{
  Color : #333333;
}
```

2. Justify the date when the news was updated to the right, and change the color.

```
[style.css]

#main .date{
  Color : #666666;
  Text-align : right;
}
```
3. Justify the copyright to the center.

```css
Footer{
    text-align: center;
}
```
CSS Fonts

Font-size

The font-size property sets size of the text.

[Syntax]

```css
p{
    font-size: <absolute-size> | <relative-size> | <length> | <percentage>;
}
```

- Absolute-size are
  [ xx-small | x-small | small | medium | large | x-large | xx-large ]

- Relative-size are
  [ larger | smaller ]

Example

[style.css]

```css
p#ab{ font-size: small; }
p#px{ font-size: 24px; }
p#em{ font-size: 1.2em; }
p#per{ font-size: 180%; }
```

Fig 12.7
Font-family
The font-family property sets the font family of the text.

Syntax

```
p{
    font-family: <family-name> | <generic-family>;
}
```

- Family-name is the name of a font family of choice. For example, “Gill”, “Helvetica” and “Time New Roman”.
- Generic-family are
  
  [ serif | sans-serif | cursive | fantasy | monospace ]

Example

```
[style.css]
p#se { font-family: "Time New Roman", Garamond, serif; }
p#sa { font-family: Helvetica, "MS Verdana", sans-serif; }
```

```
[index.html]
<p id="se" This is a paragraph(serif)</p>
<p id="sa" This is a paragraph(sans-serif)</p>
```

![Font-family example](image)

This is a paragraph(serif)
This is a paragraph(sans-serif)

Fig 12.8
Font-style

The font-style property selects the style of the text. This property is often used to select italic text.

[Syntax]

```css
p {
  Font-style: normal | italic | oblique;
}
```

[Example]

[style.css]

```css
p#no { font-style: normal; }
p#i { font-style: italic; }
p#ob { font-style: oblique; }
```

[index.html]

```html
<p id="no">This is a paragraph(normal)</p>
<p id="i">This is a paragraph(italic)</p>
<p id="ob">This is a paragraph(oblique)</p>
```

![Font-style example](image)

This is a paragraph(normal)

This is a paragraph(italic)

This is a paragraph(oblique)

Fig 12.9
Font-weight

The font-weight property selects the weight of the text.

[Syntax]

```css
p{
  Font-weight: normal | bold | bolder | lighter | 100 | 200 | 300 | 400 | 500
  | 600 | 700 | 800 | 900
}
```

[Example]

[style.css]

```css
p#one{ font-weight: 100; }
p#two{ font-weight: 200; }
p#three{ font-weight: 300; }
p#four{ font-weight: 400; }
p#five{ font-weight: 500; }
p#six{ font-weight: 600; }
p#seven{ font-weight: 700; }
p#eight{ font-weight: 800; }
p#nine{ font-weight: 900; }
```

[index.html]

```html
<p id ="one">This is a paragraph(100)</p>
<p id ="two">This is a paragraph(200)</p>
<p id ="three">This is a paragraph(300)</p>
<p id ="four">This is a paragraph(400)</p>
<p id ="five">This is a paragraph(500)</p>
<p id ="six">This is a paragraph(600)</p>
<p id ="seven">This is a paragraph(700)</p>
<p id ="eight">This is a paragraph(800)</p>
<p id ="nine">This is a paragraph(900)</p>
```
Challenge

1. Sets the font family of default.

```
[style.css]

Body{
  Color : #333333;
  Font-size : 0.9em;
  Font-family : 'Helvetica Neue', Helvetica, Arial, Verdana, Geneva, sans-serif;
}
```

2. Changes the size of side navigation texts.

```
[style.css]

Nav ul li{
  Font-size : 1.5em;
}
```
CSS Lists

list-style-type

The list-style-type property specifies appearance of the list item marker.

[Syntax]

```css
list-style-type : disc | circle | square | decimal | decimal-leading-zero |
  lower-roman | upper-roman | lower-greek |
  | lower-latin | upper-latin | armenian | georgian | lower-alpha | upper-alpha | none
```

1. For unordered list.
   - disc : Î%
   - circle : Ê%
   - square : %

2. For ordered list.
   - decimal : 1, 2, 3, ...
   - decimal-leading-zero : 01, 02, 03, ...
   - lower-roman : i, ii, iii, ...
• upper-roman : I, II, III, ...
• lower-greek : á, â, ã, ...
• lower-latin : a, b, c, ...
• upper-latin : A, B, C, ...
• armenian : 1, 2, 3, ...
• georgian : an, ban, gan, ...
• lower-alpha : a, b, c, ...
• upper-alpha : A, B, C, ...

Example

[style.css]

ul{
    list-style-type: square;
}
ol{
    list-style-type: lower-alpha;
}

[index.html]

<ul>
    <li>list item1</li>
    <li>list item2</li>
    <li>list item3</li>
</ul>

<ol>
    <li>list item1</li>
    <li>list item2</li>
    <li>list item3</li>
</ol>
list-style-image

The list-style-image property sets the image that will be used as the list item marker.

Syntax

```
list-style-image : <uri> | none
```

- uri

The functional notation used to designate URIs in property values is “url()”:

```
list-style-image : url(http://www.example.com/image.png);
```

Example

[style.css]

```
ul{
    list-style-image : url(images/list.gif);
}
```

[index.html]

```
<ul>
```

Fig 12.12
<li>list item1</li>
<li>list item2</li>
<li>list item3</li></ul>

Fig 12.13

Challenge

1. Removes the marker from side navigation. Because you will learn the decoration of the list. That is, the list marker is not necessary.

[style.css]

```css
nav ul{
```

Fig 12.14
Link state

The link pseudo-classes

Web browsers commonly display unvisited links differently from previously visited ones.

[Syntax]

A : link{ Declarations }
A : visited{ Declarations }

• A : link : applies for links that have not yet been visited.
• A : visited : applies once the link has been visited by the user.

The dynamic pseudo-classes

Interactive Web browsers sometimes change the rendering in response to user actions.

[Syntax]

A : Hover{ Declarations }
A : Active{ Declarations }

• A : hover : Applies while the user designates an element (with some pointing device), but does not activate it.
• A : Active : Applies while an element is being activated by the user.

Example

[style.css]

A : link, a:visited{
  Color : #ff0000;
  Text-decoration : underline;
}
A : hover, a:active{
  Color : #0000ff;
  Text-decoration : none;
}
[index.html]

<p>Jump to <a href="http://www.google.com/">Google</a></p>
<p>Jump to <a href="http://www.yahoo.com/">Yahoo!</a></p>

---

**Fig 12.15**

**Challenge**

1. Changes the color of side navigation by link state.

[style.css]

```css
Nav ul li
A : link, nav ul li
A : visited{
Color : #333333;
Text-decoration : none;
}

Nav ul li
A : active,
Nav ul li
A : hover{
Color : #990066;
Text-decoration : none;
}
```
Summary

Text Color

The color property is used to set the color of the text.

With CSS, a color is most often specified by

A HEX value: like “#ff0000”

An RGB value: like “rgb(255,0,0)”

A color name: like “red”

Text Alignment

The text-align property is used to set the horizontal alignment of a text.

Text can be centered, or aligned to the left or right, or justified.

When text-align is set to “justify”, each line is stretched so that every line has equal width, and the left and right margins are straight (like in magazines and newspapers) and also you can control hyperlinks and lists as well.
Short Answer Type Questions

1. What are all the things included in styling in CSS?
2. Write the syntax for CSS text styling.
3. How to create Hyperlink in CSS.
4. Create a list through CSS.

Long Answer Type Questions

1. List important text attributes that every designer should know.
Learning Objectives

In this Unit the student will learn about how to design or layout a page using CSS Box Model.

CSS Box Model

Fig 13.1 Box model
Width

The width property specifies the content width of boxes.

[Syntax]

Width : <length> | <percentage> | auto

Height

The height property specifies the content height of boxes.

[Syntax]

height : <length> | <percentage> | auto

Example

[style.css]

p{
  Width : 300px;
  Height : 300px;
  Background-color : red;
}

[index.html]

<p>This is a paragraph</p>
Challenge

1. Sets the size of boxes.

    #wrapper{
        Width : 900px;
    }
    Nav{
        Width : 200px;
        Text-align : center;
    }
    #main{
        Width : 400px;
    }

Fig 13.3
CSS Paddings and Margins

Padding

The padding properties specify the width of the padding area of a box.

[Syntax]

- padding-Top : <length> | <percentage>
- padding-Right : <length> | <percentage>
- padding-Bottom : <length> | <percentage>
- padding-Left : <length> | <percentage>

Padding property

The padding property is a shorthand property for setting ‘padding-top’, ‘padding-right’, ‘padding-bottom’, and ‘padding-left’ at the same place in the style sheet.

- Padding : 10px 20px;
  Top and bottom paddings are 10px, right and left paddings are 20px.
- Padding : 10px 20px 30px;
  Top padding is 10px, right and left paddings are 20px, bottom padding is 30px.
- Padding : 10px 20px 30px 40px;
  Top padding is 10px, right padding is 20px, bottom padding is 30px, left padding is 40px.

Example

[style.css]

p{
  Width : 300px;
  Height : 100px;
  Background-color : red;
} 

p#pad{ 
    Padding : 10px 20px; 
} 

[index.html]

<p> This is a paragraph </p>
<p id ="pad">This is a paragraph with padding </p>

![Padding example](image)

This is a paragraph

This is a paragraph with padding

---

**Fig 13.4**

**Margin**

The margin properties specify the width of the margin area of a box.

- Margin doesn’t have a background color.

**[Syntax]**

Margin-Top : <length> | <percentage>
Margin-Right : <length> | <percentage>
Margin-Bottom : <length> | <percentage>
Margin-left : <length> | <percentage>
• Margin property

The margin property is a shorthand property for setting ‘margin-top’, ‘margin-right’, ‘margin-bottom’, and ‘margin-left’ at the same place in the style sheet.

• **Margin**: 10px 20px;
Top and bottom margins are 10px, right and left margins are 20px.

• **Margin**: 10px 20px 30px;
Top Margin is 10px, right and left margins are 20px, bottom margin is 30px.

• **Margin**: 10px 20px 30px 40px;
Top margin is 10px, right margin is 20px, bottom margin is 30px, left margin is 40px.

**Example**

```
[style.css]

p{

  **Width**: 300px;
  **Height**: 100px;
  **Background-color**: red;
}

p#mar{

  **Margin-top**: 10px;
  **Margin-bottom**: 10px;
  **Margin-left**: 20px;
  **Margin-right**: 20px;
}
```

```
[index.html]

<p>This is a paragraph</p>
<p id="Mar">This is a paragraph with margin</p>
```
Challenge

1. Sets the paddings and the margins of side navigation.

```css
Nav ul{
    padding-left: 7px;
    margin-bottom: 10px;
}
```
2. Arranges contents at the center of Web browser window. When the value of a left margin and a right margin is set to “auto”, box is arranged at the center. Because left and right margins have the same value.

![Web browser window showing W3C cafe website with centered content](image)

Fig 13.7
[style.css]

    #wrapper{
        Width : 900px;
        Margin : 0px auto;
    }

Summary

All HTML elements can be considered as boxes. In CSS, the term “box model” is used when talking about design and layout.

The CSS box model is essentially a box that wraps around HTML elements, and it consists of: margins, borders, padding, and the actual content.

The box model allows us to place a border around elements and space elements in relation to other elements.

Explanation of the different parts

   Margin : Clears an area around the border. The margin does not have a background color, it is completely transparent

   Border : A border that goes around the padding and content. The border is affected by the background color of the box

   Padding : Clears an area around the content. The padding is affected by the background color of the box

   Content : The content of the box, where text and images appear

Short Answer Type Questions

1. Define border, padding, and margin.
2. Write about Neighboring and Nested Elements
3. What are Collapsing Margins?
4. What is Negative Margin?
5. Define Box model.
**Learning Objectives**

In this Unit the student will learn about floating part of CSS.

**CSS Backgrounds**

The background is behind the border, padding and content, but not in the margin.
Background : Color

The ‘background-color’ property sets the background color of an element.

[Syntax]

**Background-Color** : <color>

• **Color** : Specifies a color value:

• Color keywords

• Color values

Example

[style.css]

Body{

   **Background - Color** : red;

}

[index.html]

<body>

<p>This is a paragraph</p>

</body>

[Fig. 14.2]
**Background :** Image

The ‘background-image’ property sets the background image of an element.

**[Syntax]**

```
Background-image : <uri> | none
```

- Uri

The functional notation used to designate URIs in property values is “url()”:

```
Background-image : url(images/image.png);
```

**Note**

You should also specify a background color that will be used when the image is unavailable. The background color sets the color that looks like the set background image.

**Example**

- Sets the W3C logo to the background image.

**[style.css]**

```
Body{
  Background-image : url(images/logo.png);
}
```

**[index.html]**

```
<body>
  <p>This is a paragraph</p>
</body>
```
By default, the background image is spread like a tile.

**Background:** Repeat

The ‘background-repeat’ property specifies whether the image is repeated

**Syntax**

```
background-repeat: repeat | repeat-x | repeat-y | no-repeat
```

- **Repeat**: The image is repeated both horizontally and vertically.
- **Repeat-x**: The image is repeated horizontally only.
- **Repeat-y**: The image is repeated vertically only.
- **No-repeat**: The image is not repeated: only one copy of the image is drawn.

**Example**

**[style.css]**

```css
body{
```
**Background-image** : url(images/logo.png);
**Background-repeat** : repeat-x;

```html
[index.html]
<body>
<p>This is a paragraph</p>
</body>
```

![Image](image-url)

**Fig 14.4**

**Challenge**

1. Specifies the image for the background.

```css
[style.css]
body{
  Color : #333333;
  Font-size : 0.9em;
  Font-family : 'Helvetica Neue', Helvetica, Arial, Verdana, Geneva, sans-serif;
  **Background-image** : url(images/bg.gif);
  **Background-repeat** : repeat;
}
```

2. Sets the color and the image of the background in the main contents area.
CSS Borders

Border : Style

The border style properties specify the line style of a box’s border.

Syntax

Border-style: none | hidden | dotted | dashed | solid | double | groove | ridge | inset | outset.
Example

[style.css]

    p{
        Width : 300px;
        Height : 100px;
    }

    p#dot { border-style: dotted; }

    p#sol { border-style: solid; }

[index.html]

    <p id ="dot">This is a paragraph(dotted)</p>
    <p id ="sol">This is a paragraph(solid)</p>
Border - Color

The border color properties specify the color of a box’s border.

[Syntax]

Border-color : <color> | transparent

• Color : Specifies a color value
• Color keywords
• Color values

Example

[style.css]

p{
  Width : 300px;
  Height : 100px;
  Border-style : solid;
  Border-color : red;
The border width properties specify the width of the border area.

**Syntax**

```
Border-width : thin | medium | thick | <length>
```

**Example**

**[style.css]**

```
p#thin{  Border-width : thin;  }
p#med{  Border-width : medium;  }
p#thick{  Border-width : thick;  }
```

**[index.html]**

```
<p id = "thin"  >This is a paragraph(thin)</p>
<p id = "med" >This is a paragraph(medium)</p>
<p id = "thick" >This is a paragraph(thick)</p>
```
Challenge

1. Styles the side navigation by border.

```
Nav ul li{
  Font-size: 1.5em;
  Padding-left: 10px;
  Margin-bottom: 7px;
  Border-left-width: 5px;
  Border-left-color: #990066;
  Border-left-style: solid;
}
```

2. Styles the news headers.

```
#main header{
  Padding-left: 10px;
}```
Margin-bottom : 10px;
Border-top-width : 1px;
Border-top-color : #A6A6A6;
Border-top-style : dashed;
Border-bottom-width : 1px;
Border-bottom-color : #A6A6A6;
Border-bottom-style : dashed;

Fig 14.10

3. Styles the table of recruit application page(recruit.html).

[style.css]

#main2 table{
Border-top-width: 1px;
Border-top-color: #A6A6A6;
Border-top-style: solid;
Border-left-width: 1px;
Border-left-color: #A6A6A6;
Border-left-style: solid;
Margin: 0px;
Padding: 0px;
Border-collapse: collapse;
}
#main2 th, #main2 td{
Border-right-width: 1px;
Border-right-color: #A6A6A6;
Border-right-style: solid;
Border-bottom-width: 1px;
Border-bottom-color: #A6A6A6;
Border-bottom-style: solid;
Margin: 0px;
Padding: 5px 10px;
}
#main2 th{
Width: 150px;
}
#main2 td{
Width: 410px;
}
CSS floating boxes very common in table less layouts. This property specifies whether a box should float within the space or not.

**Summary**

CSS floating boxes very common in table less layouts. This property specifies whether a box should float within the space or not.

**Short Answer Type Questions**

1. What is float in CSS?
2. Write the syntax for css float.
3. What is the use of left, right, none attributes?
4. What is the use of clear property and id property?

**Long Answer Type Questions**

1. Write about CSS floating boxes in general.
Learning Objectives

In this unit the student will learn advanced aspects of CSS in web designing.

CSS Floating boxes

Float

The float property specifies whether a box should float to the left, right, or not at all.

[Syntax]

Float : left | right | none

- **Left** : The element generates a block box that is floated to the left. Content flows on the right side of the box, starting at the top.
- **Right** : Similar to ‘left’, except the box is floated to the right, and content flows on the left side of the box, starting at the top.
- **None** : The box is not floated.

Example

[style.css]

```css
p{
    Width : 100px;
}
```
**Height**: 100px;

**Float**: left;

```html
p#red{
  **Background-color**: red;
}

p#blue{
  **Background-color**: blue;
}
```

[index.html]

```html
<p id="red">This is a paragraph</p>
<p id="blue">This is a paragraph</p>
```

![Float example](image)

**Fig 15.1**

**Clear**

This property indicates which sides of an element’s box(es) may not be adjacent to an earlier floating box.
[Syntax]

Clear : left | right | both | none

Example

[style.css]

p{
    Width : 100px;
    Height : 100px;
    Float : left;
}

p#red{
    Background-color : red;
}

p#blue{
    Background-color : blue;
p#green{
    Background-color : green;
    Clear : left;
}

[index.html]
<p id = "red" >This is a paragraph</p>
<p id = "blue" >This is a paragraph</p>
<p id = "green" >This is a paragraph</p>

Challenge

[style.css]
Nav{
    Float : left;
    Width : 200px;
    Margin-top : 30px;
}
Footer{
    Height : 50px;
    Clear : both;
    Text-align : center;
    Background-color : #999999;
}
#main{
    Float : left;
    Width : 400px;
    Padding-left: 30px;
    margin-top: 30px;
Fig 15.3
Inheritance

Some values are inherited by the children of an element in the document tree.

Example

The ‘font-size’ property for the h1 element will have the computed value ’13pt’ (130% times 10pt, the parent’s value). Since the computed value of ‘font-size’ is inherited, the em element will have the computed value ’13pt’ as well.

[style.css]

Body { Font-size : 10pt }

h1 { Font-size : 130% }

[index.html]

<body>
Priority level of selector

Calculating a selector's specificity

The priority level of the selector is decided in Point of combination of selectors.

- Style attribute = a
- Number of ID attributes in the selector = b
- Number of other attributes and pseudo-classes in the selector = c
- Number of element names and pseudo-elements in the selector = d

For example, if it is a combination of the following selectors

[index.html]

```html
<body>
<article>
<p>This is <span id="red">paragraph</span>.</p>
</article>
</body>
```

[style.css]

```css
Article p span{
  Color: blue;
}

#red{
  Color: red;
}
```

“Article p span” are “A = 0, B = 0, C = 0, D = 3 (0003)”. “#red” is “A = 0, B = 1, C = 0, D = 0 (0100)”.

In this instance, paragraph becomes a red character. Because “#red(0100)” is bigger than “article p span(0003)”. 
Example

[index.html]

```html
<body>
 <div id="wrapper">
  <header id="top">
   <h1>W3C cafe</h1>
  </header>
  <nav>
   <ul id="gnavi">
    <li>menu</li>
    <li>location</li>
    <li>about us</li>
    <li>recruit</li>
   </ul>
  </nav>
 </div>
</body>
```

Fig 15.5
In this case, the markers of list are changed to “square”. Because “#top #bright #gnavi(a=0, b=3, c=0, d=0)” is bigger than “#wrapper header div nav #gnavi(a=0, b=2, c=0, d=3)”. 

![My first styled page](image)

**Summary**

In Cascading Style Sheets Some values are inherited by the children of an element in the document tree, technically called inheritance. And also priority level of the selector is another advanced option which is also known as combination of selector.
**Short Answer Type Questions**

1. What is inheritance?
2. Write about priority level selector.
3. What is the meaning of `<div id="wrapper">`?
4. What exactly a `#` sign before a word indicates?
5. Differentiate pseudo class and element.