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Computer Studies

SS2

Internet is a global computer network providing a variety of information and communication facilities, consisting of interconnected networks using standardized communication protocols.

Internet Terms and Definitions

What is the World Wide Web?

Also called web or www, it is a collection of information, resources, pictures, sounds, multimedia on the internet that are linked and connected together.

What is a Host?

A host is a computer or device that is connected to the Internet.

What is Web Hosting?

To store and make web pages available and ready for inquiries on a computer that has a constant connection to the Internet.

What is a Domain Name?

A domain name is an address of a website on the Internet. It is usually separated by a dot. For example: www.carolstandardconventichi.com

What is DNS?

DNS (Domain Name System) is a large database of domain names and their correspondent Internet (IP Addresses)

What is an IP address?

An IP (Internet Protocol) address is a unique number used to identify a computer on the Internet

What is HTML?

Hypertext Mark-up Language is a coding language used to tell a browser how to place pictures, text, multimedia and links to create a web page.

What is Hypertext?

Hypertext is text on a webpage that links to another document or webpage.

What is FTP?

File Transfer Protocol is a set of rules for transferring files between two computers on the Internet. What is a home Page?

A home Page is the main or index page of a web site.

What is InterNic?

InterNic is the agency that governs and maintains the name and host registration on the Internet.

What is a URL?

Uniform Resource Locator is a web address used to connect to a remote resource on the World Wide Web.

What is a Port?

In relationship to the Internet, a Port is a channel that server software would listen to, for any requests.

What is Baud?

Baud is the number of time per second that a modem converts digital signals to analogue signals, so that it can transfer information over an analogue telephone line.

What is a Bit?

Bit (Binary Digit) is a single digit in the binary numbering system (base 2). A Byte = eight bits.

What is Java?

Java is an object-oriented programming language created by Sun Microsystems Company.

What is JavaScript?

JavaScript is a powerful scripting language created by Netscape.

What is JScript?

JScript is a scripting language created by Microsoft, similar to JavaScript.

What is a Server?

A server is a computer with a software program set up for handling requests to users on the same computer or another (client) computer.

What is Uploading?

To upload is to transfer data from your computer to another computer.

What is Downloading?

To download is to transfer data from another computer to your computer.

BROWSER

An internet browser, also known as a web browser or simply a browser, is a software program that you use to view web pages on your computer. You can think of your browser as your gateway to the internet. EG. Google-Chrome, Microsoft-Internet-Explorer(IE), Mozilla Firefox, Opera Mini, Netscape Navigator.

FEATURES OF A WEB BROWSER

1. Navigation buttons

The Back ← button is used to go to the previous page, while the forward → button is used to get to the next page if the back button has been used

2. Refresh button

Refresh buttons is used to request a web browser to reload webpage.

3. Stop button

This cancels web browser's communication with a server and stops page loading. Very useful to stop malicious sites from loading if accidentally entered.

4. Home button

Loads predefined home page.

5. Web browser's address bar

Address bar is used to enter website and page names.

6. Integrated search

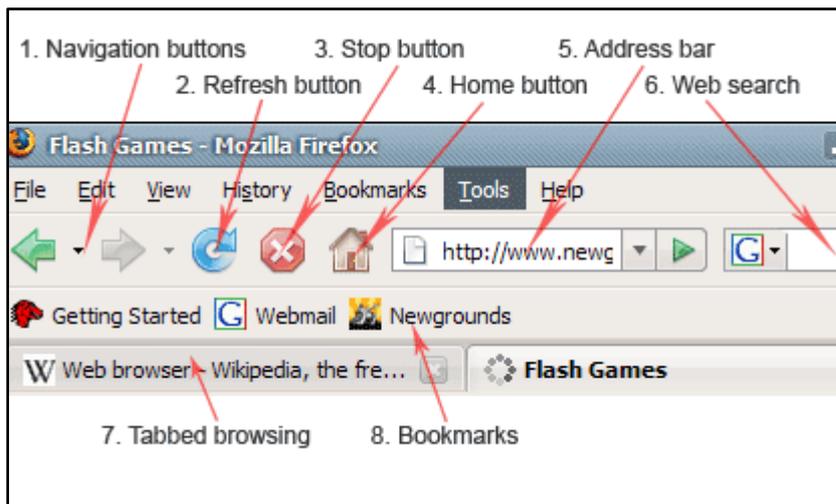
Integrated search engine tool is relatively new feature in web browsers. It allows selecting your favourite search engine and doing a quick search by typing in a search term.

7. Tabs

Browser tabs allow opening many websites on a single web browser's window

8. Bookmark buttons

Custom user defined buttons that redirect to chosen



INTERNET SERVICES

Internet service provides a way for data to be transferred from Internet servers to your computer. In order to connect to the Internet, you need to use an Internet service. EG. Electronic Mail, Telnet, Newsgroup, Internet Relay Chat (IRC), Mailing Lists, Internet Telephony (VoIP), Instant Messaging

An Internet service provider is a company that provides access to the Internet.

E-MAIL

This is a system for sending messages from one individual to another via telecommunications links between computers or terminals using dedicated software

To create an account:

- ✓ Go to www.gmail.com.
- ✓ Click Create account.
- ✓ The signup form will appear. ...
- ✓ Review Google's Terms of Service and Privacy Policy, click the check box, then click Next step.
- ✓ Here, you'll have an opportunity to set up recovery options. ...
- ✓ Your account will be created, and the Google welcome page will appear.

FEATURES OF E-MAIL: Inbox, Sent Box or Outbox, Drafts, Spam, Bin or Trash. Other features include: Compose Environment, starred messages folder, important messages or archived

Main difference between Web Address and E-mail:

- ✓ Web address is the URL of your web page while Email is used to send electronic messages to each other using computer networks.
- ✓ In the Email @ is used and you can never find it in any web address.
- ✓ The email address often uses lower case, while websites or web addresses are written in mixed letters.
- ✓ With email you can always receives electronic mails while web address is not used to receive any mails sent to you.
- ✓ A web address is used to access a website where you can get information while email is not used to get any information.

Chatting

Online chat refer to any kind of communication over the Internet that offers a real-time transmission of text messages from sender to receiver

WWW

Short for World Wide Web, the WWW, W3, or web is a graphical interface for the Internet that was first introduced to the public on August 6, 1991, by Tim

Berners-Lee. A few days later on August 23, 1991, it was available to everyone. The first Internet browser was named WorldWideWeb (later changed to Nexus) and was invented by Tim Berners-Lee in 1990. The internet was initially called ARPANET which only started with four computers connected together.

1989, March 12: Tim Berners-Lee proposed a “distributed information system” meant to help researchers deal with huge amounts of information generated by complex physics experiments.

1990, December 20: The first website published at Info.cern.ch

1991, August 6: The World Wide Web was publicly launched with Berners-Lee details of the project.

1992, March: Pipex presents dial-up internet connection to the UK

1993, April 30: Cern presents the World Wide Web source code and claims it will be free.

1994, May 25 – 27: First International World-Wide Web Conference, at CERN – named the “Woodstock of the web.”

1995, July 16: Jeff Bezos presents Amazon.com, an online bookshop managed from computers in his garage in Seattle, Washington. Today it is the world’s largest online retailer.

August 16: Microsoft’s first version of Internet Explorer web browser.

1997, September 15: Larry Page and Sergey Brin register Google.com as a web domain.

2000, March: Virgin introduces high-speed broadband internet connections to the UK.

2004, February: Harvard student Mark Zuckerberg launches Facebook to connect students at the University.

2005, November: YouTube, a video-hosting website was launched. Today, 100 hours of footage is uploaded every minute.

2006, March: Twitter Inc was developed by Jack Dorsey, Evan Williams, Biz Stone and Noah Glass. The first tweet was sent on March 21.

2007, January 9: The iPhone was launched.

2008, July 10: Apple presents the App Store.

2010, April 23: Apple introduces the world's first tablet – the iPad.

October: Instagram was launched.

2012, April: Instagram was sold to Facebook for 1 billion dollars.

2014, February 20: Facebook buys a mobile phone messaging system, WhatsApp for 19 billion US dollars.

April: A coding error discovered in OpenSSL, encryption software which guarantees transactions between a computer and a remote secure. This error makes users vulnerable to having their usernames, passwords, and personal information was stolen.

2015, September 26: Mark Zuckerberg speaks at the 70th annual U.N. General Assembly session, to increase awareness and garner support for the initiative One which is an organization that is trying to end extreme poverty and preventable disease.

2016, December 14: Yahoo announced that 1 billion Yahoo accounts were hacked in August 2013 before it was acquired by Verizon.

NOTE: The WWW is different from the Internet although most people today think the WWW is the Internet. The Internet is what connects your computer with other computers.

BASIC TERMINOLOGIES IN WWW

Internet: A global network connecting millions computers

ISP: Short for Internet Service Provider, a company that provides access to the Internet.

Browser: Short for Web browser, a software application used to locate and display Web pages.

URL: URLs make it possible to direct both people and software applications to a variety of information, available from a number of different Internet protocols.

WWW: A system of Internet servers that support specially formatted documents.

Http: Short for HyperText Transfer Protocol, the underlying protocol used by the World Wide Web.

Hypertext: Hypertext simply means non linear text.

HTML: Short for HyperText Markup Language, the authoring language used to create documents on the World Wide Web.

Mark-up tags: The components of HTML.

Web Page: A document on the WWW.

Website: A location on the World Wide Web.

Home page: The main page of a Web site. Typically, the home page serves as an index or table of contents to other documents stored at the site.

Internet Protocol (IP)

The Internet Protocol (IP) is a protocol, or set of rules, for routing and addressing packets of data so that they can travel across networks and arrive at the correct destination.

Internet Protocols Include:

1. **Transmission Control Protocol (TCP):** TCP is a popular communication protocol which is used for communicating over a network. It divides any message into series of packets that are sent from source to destination and there it gets reassembled at the destination.
2. **Internet Protocol (IP):** IP is designed explicitly as addressing protocol. It is mostly used with TCP. The IP addresses in packets help in routing them through different nodes in a network until it reaches the destination system. TCP/IP is the most popular protocol connecting the networks.
3. **User Datagram Protocol (UDP):** UDP is a substitute communication protocol to Transmission Control Protocol implemented primarily for creating loss-tolerating and low-latency linking between different applications.
4. **Post office Protocol (POP):** POP3 is designed for receiving incoming E-mails.
5. **Simple mail transport Protocol (SMTP):** SMTP is designed to send and distribute outgoing E-Mail.

6. **File Transfer Protocol (FTP):** FTP allows users to transfer files from one machine to another. Types of files may include program files, multimedia files, text files, and documents, etc.
7. **Hyper Text Transfer Protocol (HTTP):** HTTP is designed for transferring a hypertext among two or more systems. HTML tags are used for creating links. These links may be in any form like text or images. HTTP is designed on Client-server principles which allow a client system for establishing a connection with the server machine for making a request. The server acknowledges the request initiated by the client and responds accordingly.
8. **Hyper Text Transfer Protocol Secure (HTTPS):** HTTPS is abbreviated as Hyper Text Transfer Protocol Secure is a standard protocol to secure the communication among two computers one using the browser and other fetching data from web server. HTTP is used for transferring data between the client browser (request) and the web server (response) in the hypertext format, same in case of HTTPS except that the transferring of data is done in an encrypted format. So it can be said that https thwart hackers from interpretation or modification of data throughout the transfer of packets.
9. **Telnet:** Telnet is a set of rules designed for connecting one system with another. The connecting process here is termed as remote login. The system which requests for connection is the local computer, and the system which accepts the connection is the remote computer.
10. **Gopher:** Gopher is a collection of rules implemented for searching, retrieving as well as displaying documents from isolated sites. Gopher also works on the client/server principle.

Uses of the Internet and World Wide Web

- Publicity, Marketing and Advertising.
- Direct On-line Selling.
- Research and Development.
- Communication.
- Collaboration.
- Industrial Classification of the Sample Companies.
- Access of WWW Sites.

- Presentation of Multi-Media.

Software for Web Development Include

- ✓ Editors {Notepad, Notepad++, VSCode, Sublime Text, etc}
- ✓ Virtual Hosts {XAMPP,WAMP, LAMP, etc}
- ✓ WYSIWYG {Adobe Dreamweaver, Macromedia Dreamweaver, WordPress, etc}
- ✓ Scripting & Mark-up {PHP, Python, CSS, JavaScript, HTML, Frameworks, etc }

Network

A computer network is a digital telecommunications network which allows nodes to share resources. A computer network is a set of computers connected together for the purpose of communication and sharing resources (data, peripherals, programs).

Computer Network Types

A computer network can be categorized by their size, to give four types; which are:

LAN (Local Area Network)

PAN (Personal Area Network)

MAN (Metropolitan Area Network)

WAN (Wide Area Network)

LAN (Local Area Network)

Local Area Network is a group of computers connected to each other in a small area such as building, office. LAN is used for connecting two or more personal computers through a communication medium such as twisted pair, coaxial cable, etc. It is less costly as it is built with inexpensive hardware such as hubs, network adapter, and Ethernet cables. Data is transferred at an extremely faster rate in Local Area Network. Local Area Network provides higher security.

Personal Area Network is a network arranged within an individual person, typically within a range of 10 meters. Personal Area Network is used for connecting the computer devices of personal use.

MAN (Metropolitan Area Network)

A metropolitan area network is a network that covers a larger geographic area by interconnecting different LANs to form a larger network.

WAN (Wide Area Network)

A Wide Area Network is a network that extends over a large geographical area such as states or countries.

Network Topology

Network Topology refers to the layout of a network, how different nodes in the network are connected to each other and how they communicate.

There are two types of network topology

1. Logical Topology: Logical topologies are bound to the network protocols that direct how the data moves across a network.

2. Physical topology is the physical layout of the network (like a map)

Types of topology include but not limited to:

1. Mesh Topology

In a mesh network, devices are connected with many redundant interconnections between network nodes. In a true mesh topology every node has a connection to every other node in the network. There are two types of mesh topologies:

Full mesh topology: occurs when every node has a circuit connecting it to every other node in a network. Full mesh is very expensive to implement but yields the greatest amount of redundancy, so in the event that one of those nodes fails, network traffic can be directed to any of the other nodes. Full mesh is usually reserved for backbone networks.

Partial mesh topology: is less expensive to implement and yields less redundancy than full mesh topology. With partial mesh, some nodes are organized in a full mesh scheme but others are only connected to one or two in the network. Partial mesh topology is commonly found in peripheral networks connected to a full meshed backbone.

2. Star Topology

In a star network devices are connected to a central computer, called a hub. Nodes communicate across the network by passing data through the hub. Main advantage of a star network is that one malfunctioning node doesn't affect the rest of the network. While the main disadvantage is that if the central computer fails, the entire network becomes unusable.

3. Bus Topology

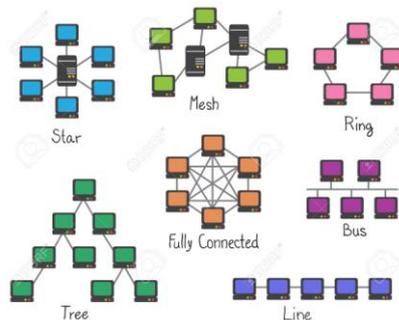
In networking a bus is the central cable (the main wire) that connects all devices on a Local Area Network (LAN). It is also called the backbone. Bus networks are relatively inexpensive and easy to install for small networks. Ethernet systems use a bus topology. The main advantage is that it is easy to connect a computer or device and typically it requires less cable than a star topology while the main disadvantage is that the entire network shuts down if there is a break in the main wire and it can be difficult to identify the problem if the network shuts down.

4. Ring Topology

In a Local Area Network (LAN), whose topology is a ring all of the nodes are connected in a closed loop. Messages travel around the ring, with each node reading those messages addressed to it. Main advantage is that it can span larger distances than other types of networks, such as bus networks, because each node regenerates messages as they pass through it.

5. Tree Topology

This is a "hybrid" topology that combines characteristics of linear bus and star topologies. In a tree network, groups of star-configured networks are



connected to a linear bus backbone cable.

Network devices

Networking hardware, also known as network equipment or computer networking devices, are electronic devices which are required for communication and interaction between devices on a computer network. Networking devices may include gateways, routers, network bridges, modems, wireless access points, networking cables, line drivers, switches, hubs, and repeaters; and may also include hybrid network devices such as multilayer switches, protocol converters, bridge routers, proxy servers, firewalls, network address translators, multiplexers, network interface controllers, wireless

network interface controllers, ISDN terminal adapters and other related hardware.

Other network components

Gateway: an interface providing a compatibility between networks by converting transmission speeds, protocols, codes, or security measures.

Router: A networking device that forwards data packets between computer networks. Routers perform the "traffic directing" functions on the Internet. A data packet is typically forwarded from one router to another through the networks that constitute the internetwork until it reaches its destination node. It works on OSI layer 3.

Switch: A device that connects devices together on a computer network, by using packet switching to receive, process and forward data to the destination device. Unlike less advanced network hubs, a network switch forwards data only to one or multiple devices that need to receive it, rather than broadcasting the same data out of each of its ports. It works on OSI layer 2.

Bridge: A device that connects multiple network segments. It works on OSI layers 1 and 2.

Repeater: An electronic device that receives a signal and retransmits it at a higher level or higher power, or onto the other side of an obstruction, so that the signal can cover longer distances.

Repeater hub: For connecting multiple Ethernet devices together and making them act as a single network segment. It has multiple input/output (I/O) ports, in which a signal introduced at the input of any port appears at the output of every port except the original incoming. A hub works at the physical layer (layer 1) of the OSI model. Repeater hubs also participate in collision detection, forwarding a jam signal to all ports if it detects a collision. Hubs are now largely obsolete, having been replaced by network switches except in very old installations or specialized applications.

Hybrid: Hybrid components can be found in the core or border of a network.

Multilayer switch: A switch that, in addition to switching on OSI layer 2, provides functionality at higher protocol layers.

Protocol converter: A hardware device that converts between two different types of transmission, for interoperation.

Bridge router (Brouter): A device that works as a bridge and as a router. The brouter routes packets for known protocols and simply forwards all other packets as a bridge would.

Advantages of Computer Networking

- ✓ It enhances communication and availability of information
- ✓ It allows for more convenient resource sharing
- ✓ It makes file sharing easier
- ✓ It is highly flexible
- ✓ It is an inexpensive system
- ✓ It increases cost efficiency
- ✓ It boosts storage capacity

TYPES OF NETWORK CABLES AND CONNECTORS

There are three specific types network cables, and the connectors associated with each, that you must know for SSCE: fiber, twisted pair, and coaxial.

Fiber is the most expensive of the three and can run the longest distance. A number of types of connectors can work with fiber, but the that three you must know are SC, ST, and LC.

Twisted pair is commonly used in office settings to connect workstations to hubs or switches. It comes in two varieties: unshielded (UTP) and shielded (STP), the two types of connectors commonly used are RJ-11 (four wires and popular with telephones), and RJ-45 (eight wires and used with xBaseT networks:- 100BaseT, 1000BaseT, and so forth). The two common wiring standards are T568A and T568B.

Coaxial (or coax) cabling is no longer as popular as it was, but it's still used with cable television and some legacy networks. The two most regularly used connectors are F-connectors (television cabling) and BNC (10Base2, and so on).

COMPUTER CABLES AND CONNECTORS

1. **VGA Cable** Also known as D-sub cable, analog video cable: Connects one end to: computer monitor, television (PC input port) and connects the other end to: VGA port on computer.
2. **DVI Cable** Connects one end to: computer monitor and connects other end to: DVI port on computer. There are 2 types of DVI: DVI-I and DVI-D. DVI-D

does not have the extra pins around the long pin, this is also a pure digital signal over DVI-I.

3. **HDMI Cable** Connects one end to: computer monitor, television and connects the other end to: HDMI port on computer.

Note: If you want to connect a television to your computer, it is nice that you use a HDMI cable as your PC cable connection; since it is able to transmit both display and sound, so you don't only use your TV screen as a monitor, but also make use of your TV speakers to play PC audio.

4. **PS/2 Cable** Connects one end to: PS/2 keyboard, PS/2 mouse and connect the other end to: PS/2 ports on computer (Purple PS/2 port: keyboard, Green PS/2 port: mouse)

5. **Ethernet Cable** Also known as RJ-45 cable, connects one end to: router, network switch and connects other end to: Ethernet port on computer

6. **3.5mm Audio Cable** Also known as phone connector (since 3.5mm jacks are often found on mobile phones too), connects one end to: computer speakers, 3.5mm headphones, 3.5mm microphone and connects the other end to: audio ports on computer (Green audio port: computer speakers or headphones, Pink audio port: microphone, Blue audio port: MP3 player, CD player, DVD player, turntable, electric guitar etc. it uses the line-in port to play and record sounds from these devices)

7. **USB Cable** For USB computer cable connections, there are two popular formats: USB 2.0 and the newer USB 3.0 (USB 3.0 cables have a blue tip, and sometimes labelled SS "Super Speed" while 2.0 is black) Connects one end to: USB device, Storage devices: USB flash drive, external hard drive, external optical drive, Input devices: USB keyboard (wired and wireless), USB mouse (wired and wireless), webcam, scanner, gamepad, Output devices: printer, all-in-one office machine, USB speaker, Wireless adapters: network (Wi-Fi) adapter, Bluetooth adapter, 3G adapter, Data (and charging) cable for mobile devices such as mobile phone, tablet, MP3 player. It also connects other end to: USB ports on computer. There are also USB cables which connect new external backup drives, these are described as USB-A to Micro-B. USB 3.0 is backwards-compatible, meaning that you can connect a USB 2.0 device to a USB 3.0 port and vice versa (but the USB 3.0 devices hooked up to a USB 2.0 port will perform at lowered rates)

8. **Computer Power Cord (Kettle Plug)** Connect one end to: AC power socket and connect other end to: power supply unit or power pack, computer monitor.

9. **ThunderBolt/USB-C** Mostly seen on laptops and Apple Macs. These cables are high speed and are capable of carrying Data, video and other information. There are 2 current types of Thunderbolt, the older version Thunderbolt 2 can be confused with Mini Display ports as they look identical and only visual difference is the picture beside the port. Thunderbolt 2 has a lightning symbol and carries Data and video. The Mini Display Port will only carry Video. Thunderbolt 3 also known as USB-C on Apple Macs.

10. **Display Port:** Display Port is the best to use if you require a fast, high-resolution image. The cable has better quality over HDMI and is the best option if you have this interface.

Male VS Female connectors: A male connector is commonly referred to as a plug and has a solid pin for a centre conductor. A female connector is often referred to as a jack and has a centre conductor with a hole in it to accept the male pin.

DATABASE

A database is a structured set of data or records stored in a computer for easy access and management.

A database management system (DBMS) is an application software for creating and managing databases

Types of Database Management Systems

- ✓ Hierarchical databases.
- ✓ Network databases.
- ✓ Relational databases.
- ✓ Object-oriented databases.
- ✓ Graph databases.
- ✓ ER model databases.
- ✓ Document databases.
- ✓ NoSQL databases, and so on.

Some DBMS examples include MySQL, PostgreSQL, Microsoft Access, SQL Server, FileMaker, Oracle, RDBMS, dBASE, Clipper, and FoxPro.

Terminologies:

Database: A database is a collection of data that is organized in a specific way.

Table: A table is the element of database that contain fields. A database can have multiple tables in it. All the data is stored in the tables.

Field: Fields are individual elements of a table. They are arranged in columns and rows for entering data

Data Type: This determines the type of entry for every field in a form. Data types can be Numbers, OLE, Hyperlink, Text, AutoNumber, Yes/No, Date/Time, etc.

Row: This is the horizontal arrangement of fields

Column: This is the vertical arrangement of fields

Primary Key: The primary key determines the field that will be unique (whose value cannot be duplicated) through the table

A **secondary key** is made on a field that you would like to be indexed for faster searches. A table can have more than one secondary key.

Relation: The connection between two tables is called a relation.

Foreign Key: When there is a relation between 2 tables, these tables will be connected by inserting the primary key of one table into the corresponding row of the other table. The field used in such a way to connect the 2 tables is called the foreign key.

Form: A form is the work area of the database where data is filled in; after the table is created

Query: This is a structured request issued to a database to perform specific database operation.

Report: This is a presentation of the data from a form or a query which can be printed or stored within the database