COMPUTER APPLICATION

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COMPUTER APPLICATION

5.3.1 a) Define application software

Application software

Application software is developed to perform in any task those benefits from **computation**. It is a set of programs that allows the computer to perform a specific data processing job for the user. It is a broad category, and encompasses **software** of many kinds, including the internet browser being used to display this page.

5.3.1 b) Identifying application software

Word Processing Software: This software enables users to create and edit documents. The most popular examples of this type of software are MS-Word, WordPad, Word Perfect and Notepad among other text editors.

Database Software: Database is a structured collection of data. A computer database relies on database software to organize data and enable database users to perform database operations. Database software allows users to store and retrieve data from databases. Examples are Oracle, MS Access, etc.

Spreadsheet Software: Excel, Lotus 1-2-3 and Apple Numbers are some examples of spreadsheet software. Spreadsheet software allows users to perform calculations using spreadsheets. They simulate paper worksheets by displaying multiple cells that make up a grid.

Multimedia Software: They allow users to create and play audio and video files. They are capable of playing media files. Audio converters, audio players, burners, video encoders and decoders are some forms of multimedia software. Examples of this type of software include Real Player and Media Player.

Presentation Software: The software that is used to display information in the form of a slide show is known as presentation software. This type of software includes three functions, namely, editing that allows insertion and formatting of text, methods to include graphics in the text and a functionality of executing slide shows. Microsoft PowerPoint is the best example of presentation software.

Enterprise Software: It deals with the needs of organization processes and data flow. Customer relationship management or the financial processes in an organization are carried out with the help of enterprise software.

Information Worker Software: Individual projects within a department and individual needs of creation and management of information are handled by information worker software. Documentation tools, resource management tools and personal management systems fall under the category of this type of application software.

Educational Software: It has the capabilities of running tests and tracking progress. It also has the capabilities of collaborative software. It is often used in teaching and self-learning. Dictionaries like Britannica and Encarta, mathematical software like Mat lab and others like Google Earth and NASA World Wind are some of the well-known names in this category.

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Simulation Software: Used to simulate physical or abstract systems, simulation software finds applications in both, research and entertainment. Flight simulators and scientific simulators are examples of simulation software.

Content Access Software: It is used to access content without editing. Common examples of content access software are web browsers and media players.

Application Suites: An application suite is an important type of application software. It consists of a group of applications combined to perform related functions. OpenOffice.org and Microsoft Office are the best examples of this type of application software. These application suites, as you know, come as bundles of applications like word processors, spreadsheets, presentation software, etc. Applications in the suite can work together or operate on each other's files.

Software that aid Engineering and Development of Products: These software are used in the design and development of hardware and software products. Integrated development environments (IDE) and computer language editing tools falls under this type of application software. Interestingly, software products are developed using other software, and software communicate with one another through software. Application programming interfaces which aid the communication of two or more software are examples of this application software type.

6.3.2 Define Data Processing

What is data processing?

Data processing occurs when data is collected and translated into usable information. Usually performed by a data scientist or team of data scientists, it is important for data processing to be done correctly as not to negatively affect the end product or data output. Data processing starts with data in its raw form and converts it into a more readable format (graphs, documents, etc.), giving it the form and context necessary to be interpreted by computers and utilized by employees throughout an organization.

OR

Is the converting of raw data to machine-readable form and its subsequent processing (Such as storing, updating, ranging and printing)

DATA

Data Is the raw materials to be processed by the computer .Example name of the students, Marks obtained, Addresses, Designation, Quantity, Rate

TYPES OF DATA

Mainly data is divided into two types as follows

i. Numeric data
ii. Character data

Numeric data

The data which is represented in the form of numbers .This includes 0-9 digits,+,/'- sign.

Character data

Character data falls into two groups

i. String data

ii. Graphical data

String data
String data consists of the sequence of characters .Characters may be alphabets ,numbers or spaces

Graphical data
It is possible that pictures ,charts and maps can be treated as data .The scanner is normally used to enter this type of data

Information

A collection of data which conveys some meaningful idea is information .It may provide answers to questions like who, which, when, why, what and how

or

The raw input is data and it has no significance when it exists in that form .When data is collected or organized into something meaningful, it gain significance .This meaningful organization is is information

Or

Observations and records are done to obtain data, while analysis is done to obtain information

Six stages of data processing

1. Data collection

Collecting data is the first step in data processing. Data is pulled from available sources, including data lakes and data warehouses. It is important that the data sources available are trustworthy and well-built so the data collected (and later used as information) is of the highest possible quality.

2. Data preparation

Once the data is collected, it then enters the data preparation stage. Data preparation, often referred to as "pre-processing" is the stage at which raw data is cleaned up and organized for the following stage of data processing. During preparation, raw data is diligently checked for any errors. The purpose of this step is to eliminate bad data (redundant, incomplete, or incorrect data) and begin to create high-quality data for the best business intelligence.

3. Data input

The clean data is then entered into its destination (perhaps a CRM like Salesforce or a data warehouse like Redshift), and translated into a language that it can understand. Data input is the first stage in which raw data begins to take the form of usable information.

4. Processing

During this stage, the data inputted to the computer in the previous stage is actually processed for interpretation. Processing is done using machine learning algorithms, though the process itself may vary slightly depending on the source of data being processed (data lakes, social networks, connected devices etc.) and its intended use (examining advertising patterns, medical diagnosis from connected devices, determining customer needs, etc.).

5. Data output/interpretation

The output/interpretation stage is the stage at which data is finally usable to non-data scientists. It is translated, readable, and often in the form of graphs, videos, images, plain text, etc.). Members of the company or institution can now begin to self-serve the data for their own data analytics projects.

6. Data storage

The final stage of data processing is storage. After all of the data is processed, it is then stored for future use. While some information may be put to use immediately, much of it will serve a purpose later on. Plus, properly stored data is a necessity for compliance with data protection legislation like GDPR. When data is properly stored, it can be quickly and easily accessed by members of the organization when needed.

TYPES OF DATA PROCESSING

1. **Manual Data Processing**
   This method of data processing involves human intervention .The manual process of data entry implies many opportunities for errors , such as delays in data capture,high amount of operator misprints or types ,high labour cost from the amount of manual labor required .

2. **EDP**
   EDP(Electronic Data Processing) , an infrequently used term for what is today usually called "IS" (Information service or systems) or MIS (Management Information system) Is the processing of data by a computer and its programs in ana environment involving electronic communication Eg. ATM cards

3. **Real Time Processing**
   This is a continual input, process and output of data .Data has to be processed in a small stipulated time period (real time) , otherwise it will create problem for the system

   Example
   When a bank customer withdraws a sum of money from his or her account it is vital that the transaction be processed and the account balance updated as soon as possible ,allowing both the bank and the customer to keep tracks of funds .

4. **Batch processing**
   In batch processing group of transactions collected over a period of time (entered ,processed and then the batch result are produced) . Batch processing requires separate programs for input , process and output .It is an efficiency way of processing high volume of data
   Example
   Payroll system, billing system and Examination system

Computer Processing Operation

A computer can perform only the following four operations which enable the computer to carry out the various data processing activities we have just discussed

(a) Input/Output oeration

A computer can accept data (input) from and supply the processed data (output) to a wide range of input /output devices..These devices such as keyboards,display,screens and printers make human machine communication possible

(b) Calculation and text manipulation operations

Computer circuit perform manipulation on numbers .They are also capable of manipulating numeric and other symbols used in text with equal efficiency

(c) Logic/comparison operation

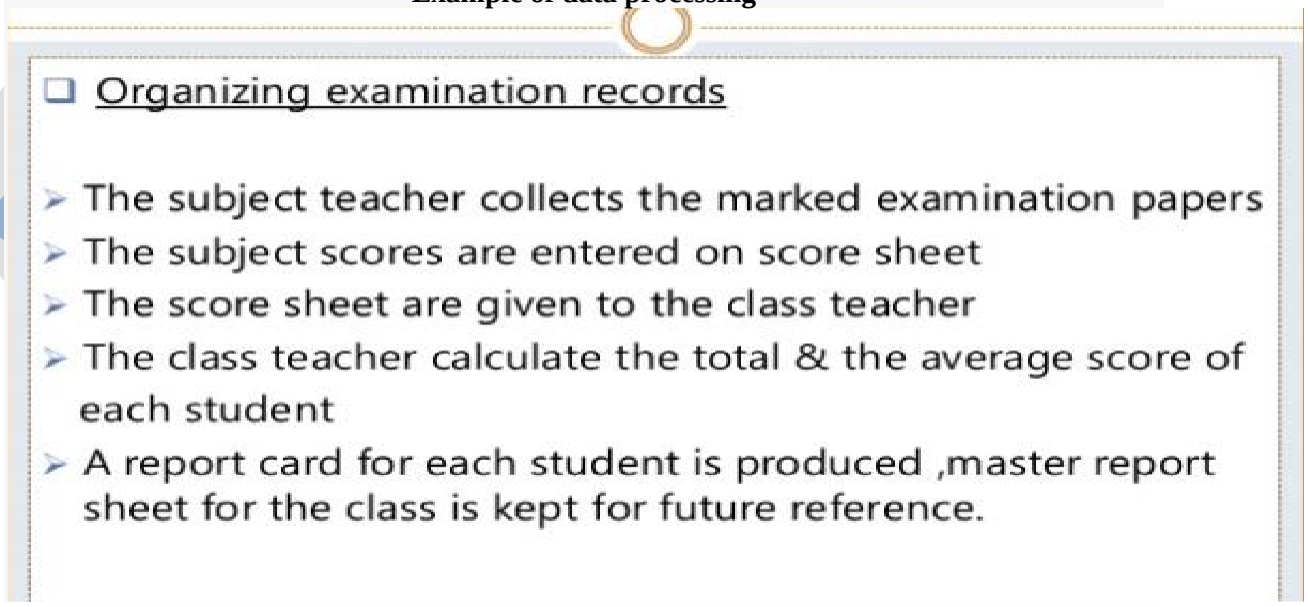
A computer also possesses the ability to perform logical operation.

Example :if we compare two items represent by the symbols A and B ,there are only three possible outcomes (A<B);(A=B) OR (A>B).a computer can perform such comparisons and depending on the results ,follow a pre determined path to complete its work .This ability to compare is an important property of a computer .

(d) Storage and retrieval operations

Both data and program instructions are stored internally in a computer .Once they are stored in the internal memory they can be called up quickly or retrieved for further use .

Example of data processing



6.3.2 b) Identify Application Software for Data Processing

Data processing has now becoming a very important weapon for the researchers ,this is due to the reason that whichever we are doing in the research fields especially data collection and many others we normally deal with raw data ,therefore we need to work with this data in the future use at this point we need to store clean data and readable ones by the computer system .Therefore there are many Data Processing software's which can help us or assist as to perform data processing in an appropriate way as they are mentioned bellow :

i. Microsoft Excel
ii. Intripid-Geophysical software
iii. Geomage g-platform
iv. Topsin software
v. Sylvac Sylcom Data Processing software

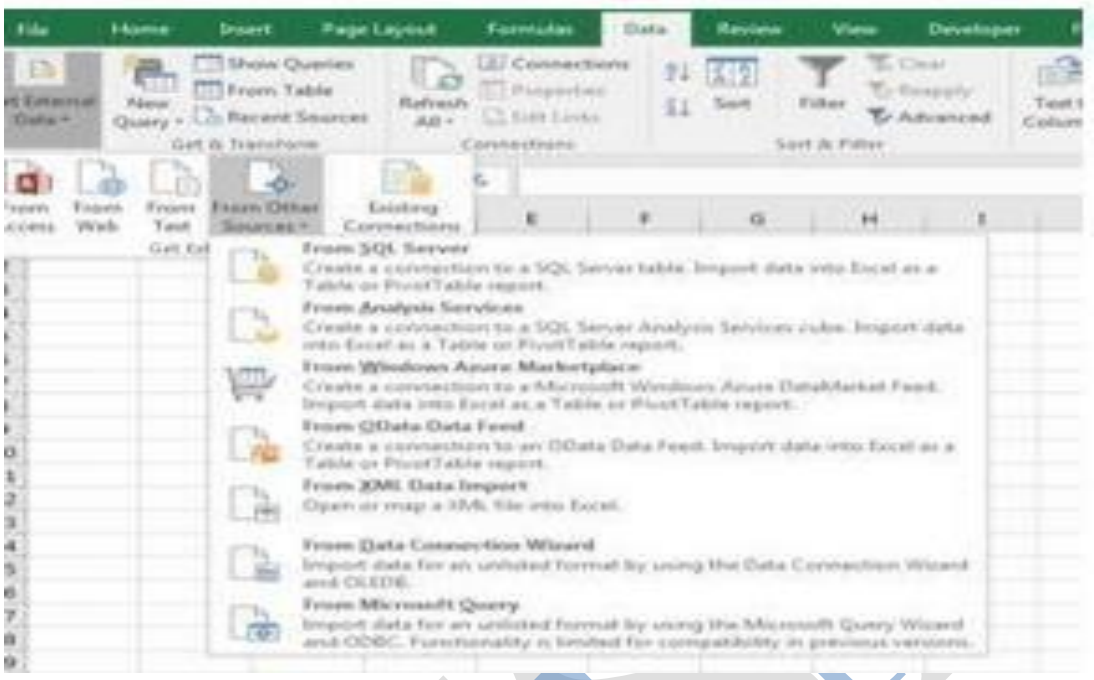
6.3.2 : c) Processing Data using Application Software

Consider bellow how data can be processed using application software the process will be described using **Microsoft Excel** as one of the Data Processing software .Therefore each step must be followed so that you may prepare well you data so that the process (Data Processing) can be done .

Data Processing Using Excel 2016

i. Our starting point is a text file which may have been produced or output by another application such as a database. Excel has the facility to read a wide range of file formats. In this case the file is a 'tab delimited' text file. This means that each data item is terminated or 'delimited' with a tab. To read in the file click on the Office button and choose Open
ii. Open Excel, click on the Data tab and select 'From Text' within the 'Get External Data' section. Click on the file called 'File 1 original format' and click Open this starts the Text Import Wizard which will guide you through importing the data. Excel will recognise that the file is a delimited file so you can click 'Next'. The next screen gives you an indication as to how the data will be imported and how it will be located in columns. Again, the defaults are appropriate so click 'Next'

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iii. The next step allows you define the format of each column. It's quite simple to change these formats once the data has been imported so it's fine to accept the defaults as identified by Excel. The dates in the two rightmost columns will be identified as dates and imported correctly.

iv. Now that the data is imported it remains to adjust the column widths so that the information is displayed properly and apply some formatting to the different columns to improve the legibility.

K	L	M	N	O	P	Q
ageHead	Cars	Persons	Visit1	Visit2		
55 to 64	1	3	########	12/02/2005		
55 to 74	1	1	########	05/01/2006		
25 to 34	1	3	########	08/02/2005		
25 to 34	0	4	########	20/12/2005		
75 and over	1	2	########	04/02/2005		
75 and over	1	2	########	04/12/2005		
45 to 54	2	5	########	31/01/2005		
25 to 34	0	3	########	18/11/2005		
15 to 24	1	2	########	27/01/2005		
35 to 44	1	1	########	02/11/2005		
45 to 44	1	2	########	23/01/2005		

As shown in Fig above numeric values or dates that are too wide to be displayed within a given column width is shown as a series of ######. To adjust the width of column N double-click on the dividing line between columns N and O and then between columns O and P.

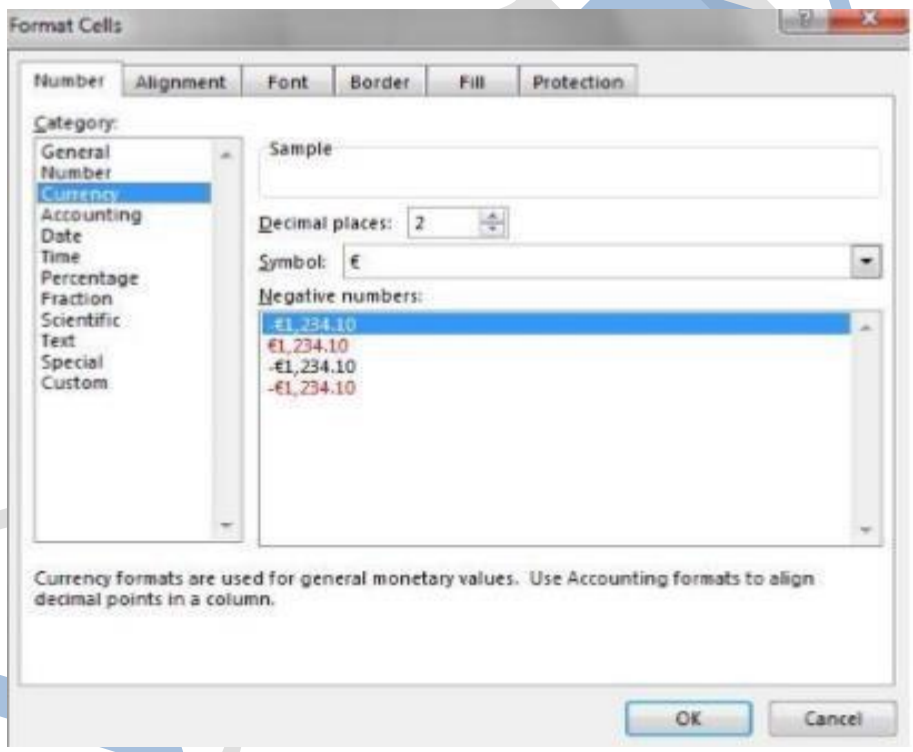
v. Before continuing adjust all the column widths so that the headings for each column as fully visible. To optimise the width of all columns

1. Click on the point where the row and column headings intersect as shown below. This has the effect of selecting all columns in the worksheet.
2. Double-click on the dividing line between any two columns and this will adjust the width of all columns to accommodate their content

Data Types & Data Formats Use the File1 workbook

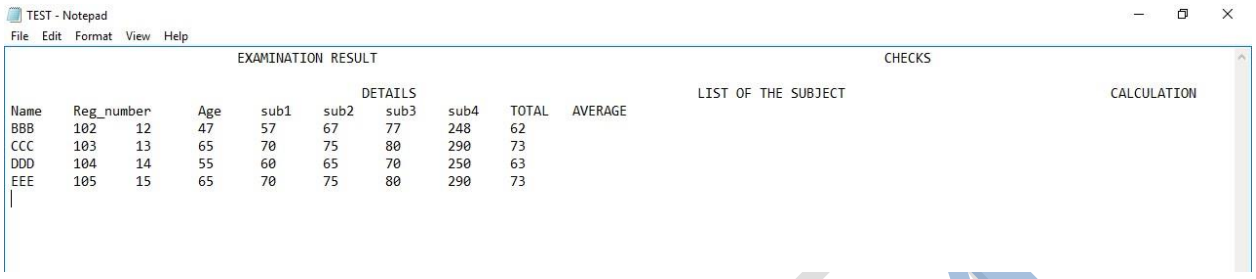
Our starting point is a data file with no formatting. When you type digits into a cell they are recognised as a number and stored just as you typed them. If you enter an alphabetic text it is recognised as merely text. Usually, text is aligned to the left. Usually numbers are aligned to the right of the cell. If you type in numbers and text which have the form of a date (or time), it is actually stored by Excel as the number of days since 1st January 1900. Sometimes the appearance of dates that you type in will be automatically formatted by Excel. For example, 12 January 2004 may be displayed as 12-Jan-04. If you type 1-10 it will be interpreted as 1-Oct (of the current year). To make a cell display exactly what is typed into it, you can format it as 'text'. How data is stored and how it is displayed can be quite different and there are formatting options to control how it is presented on-screen.

You can apply one of many 'formats' to a cell, a range of cells or even an entire row or column. You can do this to cells already containing data or before any data is entered.



6.3.2 : c) Prepare Statistical Data using Application Software

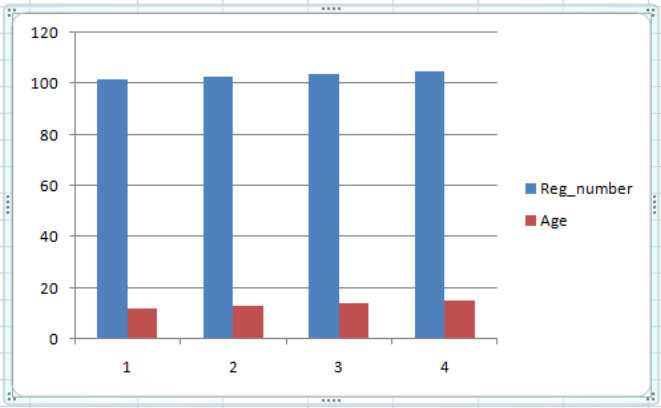
Now from the above procedure consider the following



The above is the raw data obtained after data collection .Then the data are now being converted into a meaningful information (readable formats) after performing a comprehensive data processing of the given raw data

EXAMINATION RESULT								
		DETAILS		LIST OF THE SUBJEC			CALCULATION	
Name	Reg_number	Age	sub1	sub2	sub3	sub4	TOTAL	AVERAGE
BBB	102	12	47	57	67	77	248	62
CCC	103	13	65	70	75	80	290	73
DDD	104	14	55	60	65	70	250	63
EEE	105	15	65	70	75	80	290	73

			EXAMINATION RESULT					
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ANALYSIS

6.3.3: Use Application Software for navigation

6.3.3: a) Explain navigation

Introduction

Navigation refers to the method of determining aspects such as position, speed, and direction during travel. In the pre-modern era, direction and position were determined using an altazimuth, a compass, and a map; these are now considered as primitive forms of navigation.

As a result of modern developments in science and technology, exact positions and speeds are determined using equipment such as

- artificial satellites
- global navigation satellite system (GNSS)
- inertial navigation systems (INS)

In the modern sense, navigation is mechanical devices equipped in ground vehicles, ships, and aircraft to determine their positions.

Navigation has been classified in two categories

i. Physical model-based methods (PMMs)
   Examples of PMMs are inertial navigation systems (INS-is a stand-alone navigation system that continuously calculates the position, direction, and velocity of the main body through its own accelerometer, rotation sensor, and arithmetic unit, without receiving any external information) and dead-reckoning navigation(Dead-reckoning navigation is a method of estimating the current position using the moving direction, velocity, and time. It considers errors according to true north

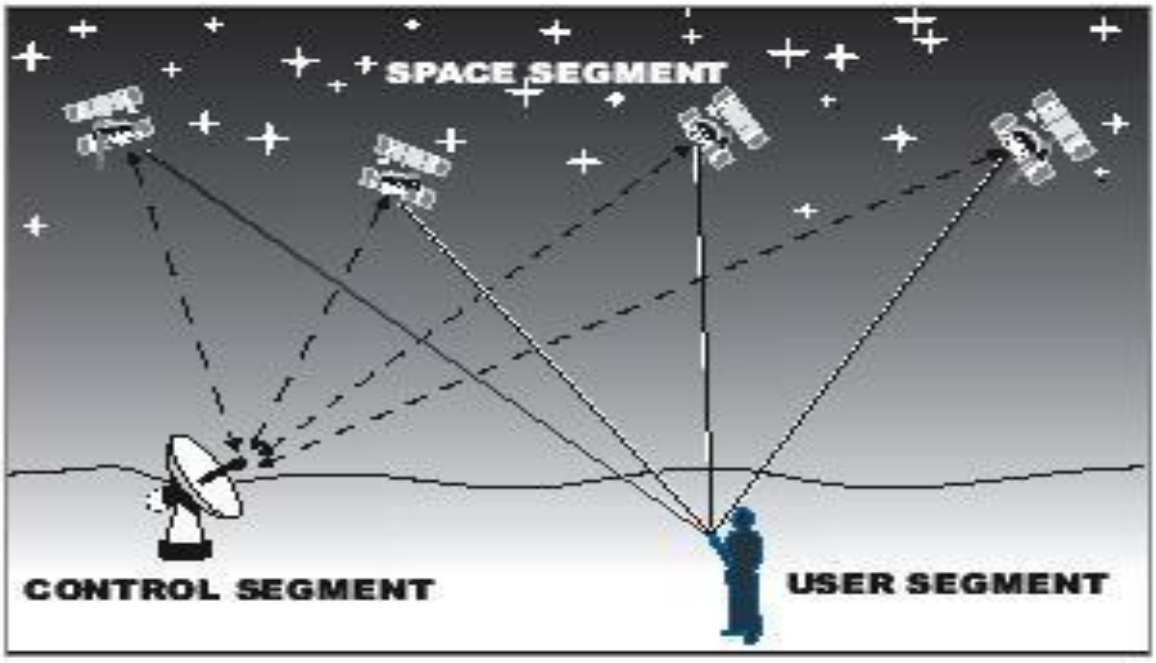
and magnetic north.). They determine the existing position of an object by measuring various changes in its state, such as velocity and acceleration

ii. External data-based methods (EDMs)
Methods to determine longitude and latitude using polar stars or the sun considered as EDMs, which is utilized in the spacecraft nowadays

NOTE:
Although GPS offers a precise navigation system, it has limitations in space, deep seas, tunnels, and similar places because the GPS operates only when it can receive signals from the satellite

6.3.3: b) Explain GPS Coordinates

How does GPS work?



- Stations on earth, and a GPS receiver, the distances between each of these points can be calculated.
- The distance is calculated based on the amount of time it takes for a radio signal to travel between these points.
- Using satellites in the sky, ground allows the GPS receiver to know where you are, in terms of latitude and longitude, on the earth.
- The more satellites the GPSr can "see", the more accurate your reading.
- The GPSr must "see" the satellites, so it does not work well in dense forests, inside caves, underwater, or inside buildings.

What does a GPS receiver do?

- GPS receiver allows you to pinpoint your location, anywhere in the world, based on latitude and longitude coordinates.
- It can tell you in what direction you are heading.
- It can show you:
  - how fast you are going
  - your altitude
  - a map to help you arrive at a destination

Common Uses for GPS

i. Land, Sea and Air Navigation and Tracking
ii. Surveying/ Mapping
iii. Military Applications
iv. Recreational Uses

Coordinate Systems

- All coordinate systems reference some particular set of numbers for the size and shape of the earth (the datum).
- Coordinate systems are used to designate locations within a datum.
- There are two types of global coordinate systems:
  i. Angular coordinate system
  ii. Rectangular (Cartesian) coordinate system
- Latitude and longitude, and Universal Transverse Mercator are two global coordinate systems commonly used by GPS users.
- Many other coordinate systems exist worldwide.

Precision vs Accuracy

- Precision and accuracy are not the same.
- Precision refers to how small an area coordinates can be defined or plotted.
  - GPS lat/long coordinates can be defined to 1/10 of a second.

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- UTM coordinates can be defined down to one meter.

- Accuracy refers to how closely a GPS receiver can calculate its position relative to its true location.

  - GPS accuracy can vary from a few millimeters to several kilometers.

Latitude & Longitudes

- A geographic (spherical) coordinate system.
- Angular coordinates are perfectly suited to the ellipsoidal shape of the earth.
- Coordinates are expressed in degrees, minutes and seconds (and variations of that).
- Position coordinates are based on an angular distance from a known reference point.
- That reference point is where the Prime Meridian and equator intersect.
- Lat/long is the predominant coordinate system used for nautical and aeronautical navigation.

6.3.3 : b) Examples of navigation application used in areas of specialization

When we think navigation app, we typically think Google Maps. It's the one most people recommend. It also happens to get frequent updates. Google has been really on top of navigation especially over the last couple of years. However, there are plenty of different options if you aren't clicking with Google Maps. In this list, we'll check out the best GPS apps and navigation apps options for Android!

1. BackCountry Navigator

BackCountry Navigator is an Android GPS app that runs on both Android smartphones and tablets. With BackCountry Navigator, your Android phone becomes a complete outdoor topo mapping GPS device. It works without network coverage or data connection. A user only need to pre-download their topo map and it can be viewed offline in the forest and wilderness areas where there is no network connection. BackCountry Navigator Android GPS app can completely replace a handheld GPS device, which makes it convenient and flexible for the users.

2. HERE WeGo

Here WeGo is a web mapping and navigation service, operated by Here Technologies. Originally developed by Nokia as Here Maps, the mapping software application was first released for Windows Phone and the World Wide Web in 2013 as a revamped version of Nokia Maps. The Here Maps application was then released for the Android platform on 10 December 2014 and later for iOS on 11 March 2015, and the name was changed to Here WeGo in July 2016. It is also the default maps service provider for the Amazon Fire tablets and smartphone.The data is provided in-house by Here, which includes satellite views, traffic data, and other location services.Maps are updated every two or three month

3. MapFactor

MapFactor Navigator is a free turn-by-turn GPS navigation app for Windows phones, tablets and PCs using OpenStreetMaps data. Maps are installed on your device or SD card so there is no need for an Internet connection when traveling. Map updates are FREE every month

4. MapQuest

MapQuest (stylized as mapquest) is an American free online web mapping service owned by Verizon Media.It was launched in 1996 as the first commercial web mapping service MapQuest vies for market share with competitors such as Google Maps

5. Google Maps and Waze

Despite owning the most popular mapping app in the world, Google acquired Waze for almost a billion dollars in 2013. ... At the time of the Google acquisition, Google Maps had none of that. Since then, Maps has picked up features like checking nearby gas prices, speed trap reporting, and traffic slowdown alerts

6. Maps.Me

Maps.me is a mobile app for Android, iOS and BlackBerry that provides offline maps using OpenStreetMap data. In November 2014, it was acquired by Mail.Ru Group and became part of its My.com brand. In September 2015, the app was open sourced

7. OsmAnds

Is a GPS Navigation and map application that runs on many Android and iOS smartphones and tablets, featuring optional offline maps and turn by turn directions. OsmAnd is a collaborative, open source (GPL) software project that incorporates the 100% free OpenStreetMap data to deliver a complete, user-friendly, mobile GPS solution. Rich mapping, navigation, routing, Points Of Interest (POI), and historical tracking functions are all well supported. The software is well refined, reliable, globally deployed, and runs on many Android and iOS based smartphones, tablets, and a wide array of Linux-based systems.

8. Polaris GPS Navigation

Imagine... What would it be like to navigate any waterway or explore any wilderness or city using only your phone's GPS location abilities and a view of the sky? What it would be like to create navigation destinations without the need of an internet connection and find them using only an arrow or offline maps.That is just a glimpse of the navigational power you will hold in your hands when you install Polaris Navigation GPS.

9. Sygic GPS

Description. Sygic GPS Navigation & Maps is the world's most advanced navigation app. Lots of smart navigation features, beautiful 3D offline maps and easy to use interface provide exceptional navigation experience. Get Sygic GPS Navigation and join over 200 million happy drivers. Description. Sygic GPS Navigation & Maps is the world's most advanced navigation app. Lots of smart navigation features, beautiful 3D offline maps and easy to use interface provide exceptional navigation experience. Get Sygic GPS Navigation and join over 200 million happy drivers.Description. Sygic GPS Navigation & Maps is the world's most advanced navigation app. Lots of smart navigation features, beautiful 3D offline maps

and easy to use interface provide exceptional navigation experience. Get Sygic GPS Navigation and join over 200 million happy drivers.

10. Scout GPS Navigation

The Scout® GPS Navigation has the MapStream guidance application (full-moving maps) that can only be used on your smartphone, and has no connection capability with your vehicle's multimedia system. The Scout® GPS Link application has been developed to provide MapStream guidance to your multimedia system through Bluetooth® and USB connections.The Scout GPS Link app is compatible with select models. Availability and accuracy of the information provided by Scout GPS Link is subject to change at any time without notice and is dependent upon many factors, including smartphone connectivity, capability and cellular reception. Always use safe driving practices and follow all traffic rules. Data charges may apply.

6.3.3: b) Application example of navigation for business

Have you ever lost your way while driving to that important business meeting you have been scheduling for months? Does your layman approach to finding the right way to a destination, by asking random strangers, often lead you to a dead end? Well, we have all been through such incidents more than once in our lives! .Millennial can be considered fortunate enough to witness an era of digital upsurge. Customized platforms that enable easy access to technology have introduced us to a world of comfort. Several popular apps have made life easier for their user base, almost making them dependent on the app for assistance rather than any other source. Almost like magic, apps have made the solutions to all our problems accessible at the click of our fingertips. It's like carrying your personal problem solver and assistant on small portable screen everywhere you go. That's why apps have become such a big part of our lives and offer us so many benefits, such as:

Convenience

A handy tool for travelling and searching, navigation applications are a blessing in disguise. From searching a great restaurant to finding a way to your dream location, these apps are literally changing the way of travel and living. These apps also allow users to contribute necessary information and mark places of importance thereby generating the most accurate description of a location. This makes it convenient for locals and visitors to any destination.

Connectivity

The biggest perk social media has provided us with is 'connectivity'. Sharing your travel status and current location while commuting is an important facility that is not only convenient for the traveler but also their friends and family who wait at the destination and are forever concerned about the traveler's whereabouts and safety. You can easily share your location with near and dear ones through text message or via social media. The best aspects of these applications are their easy and inexpensive availability. From Android to IOS, you will find these applications supported on all of the devices

Expert Guidance

The aspect of accuracy in technology makes it the most reliable source of information! It seems rather logical to take directions from an automated service that is guided by satellites instead of an unsure human mind with margin for error. It isn't just about finding the right location, these applications guide you through the best routes possible and ensure you reach your destination without hurdles.

Time Saving

Time and comfort are among the two most important pillars around which all innovations are built. 'Time is money' as is said and practiced in our fast-paced generation that enjoys multitasking through different innovative mediums. The gen x and y use these apps for so many things like getting the current status of traffic, to locating the shortest and fastest way to reach office or a venue and also knowing exactly how long it will take them to reach their destination.

Availability

There are several applications to help you with navigation and are usually free and easily available on all major app stores. Most smart phones these days also have automatic inbuilt application that serves the same purpose as independent navigation apps. From android to IOS, you definitely have a navigation app on your phone, just waiting to make your life easier.

NAVIJAZZ NAVIGATION COMPONENT FOR BUSINESS APPLICATIONS



The solution: Agmis developed an Open source OpenStreetMaps based navigation engine OSM which was extended to fit requirements for multi-stop route management. Localization of the guidance voice engine, custom rendering themes, integration into truck's personal assistant application. Component is ready to be integrated into other solutions for logistics sector.

Value for Developers

- NaviJazz – Navigation component for Android based on OpenStreetMaps (OSM);
- Offline OSM maps. Reduce your telecommunication expenses.
- Navigation SDK available for Android;
- API documentation;
- Fast integration with your Android app / It takes just 15 minutes.
- Trusted by over 3000 freight fleet in Europe.

Value for Business

- Plan and control where your fleet drives. Ensure your crews stick to the planned route, waypoints and reduce the probability of errors, wrong turns and thus shorten delivery time.
- Transfer of planned route to the crews. Ability to plan entire route: multiple waypoints for cargo loading/unloading, rest stops, refuelling, display custom messages to the crew at certain points of the route. Accurate instructions ensure sticking to deadlines and other SLA parameters.
- Have your crews send immediate photos of delivery. Ensure safe and on time evidence.**
- Get back on track and deliver on time even in unpredicted circumstances. Optimized rerouting back to the planned route.
- Reduce your telecommunication expenses with use of NaviJazz offline OpenStreetMaps (OSM).
- Decreased data traffic on route/waypoint updates. Avoid hefty data roaming bills.
- Customize voice instructions. Adapt for languages and grammars that are not available in other navigation systems.
- Fine tune planning process. Compare and analyze how crew has performed in regards to the original plan.
- Capitalize on your telemetry investments: secure delivery with geofencing. Track the differences between actual and planned routes in real time

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6.4.1 :Describe the concept of internet and web browser

6.4.1 a) Define internet

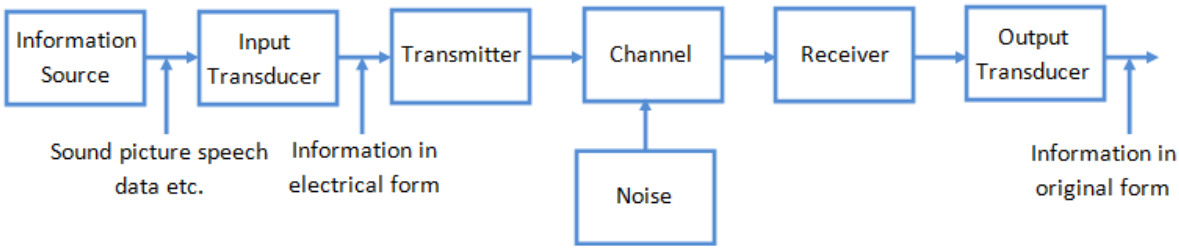
The internet is a globally connected network system that uses TCP/IP to transmit data via various types of media. The internet is a network of global exchanges – including private, public, business, academic and government networks – connected by guided, wireless and fiber-optic technologies.

DATA COMMUNICATIONS

Exchange of data from one point to another
.Whereas the point can be; Transmitter and receiver
Sender and Receiver/ Target.
.The information is the Message

The physical connection between networked computing devices is established using either cable media or wireless media. The best-known computer network is the Internet.

DIAGRAM OF DATA COMMUNICATIONS.



COMPONENTS OF DATA COMMUNICATIONS

The five components are :
1. **Message** - It is the information to be communicated. Popular forms of information include text, pictures, audio, video etc. Text is converted to binary, number doesn't get converted, image is converted to pixels, etc.
2. **Sender** - It is the device which sends the data messages. It can be a computer, workstation, telephone handset etc.
3. **Receiver** - It is the device which receives the data messages. It can be a computer, workstation, telephone handset etc.
4. **Transmission Medium** - It is the physical path by which a message travels from sender to receiver. Some examples include twisted-pair wire, coaxial cable, radio waves etc.
5. **Protocol** - It is a set of rules that governs the data communications. It represents an agreement between the communicating devices. Without a protocol, two devices may be connected but not communicating.

6.4.1 b) Web Browser

A web browser is a software program that allows a user to locate, access, and display web pages. In common usage, a web browser is usually shortened to "browser." Browsers are used primarily for displaying and accessing websites on the internet, as well as other content created using languages such as Hypertext Markup Language (HTML) and Extensible Markup Language (XML).

Browsers translate web pages and websites delivered using Hypertext Transfer Protocol (HTTP) into human-readable content. They also have the ability to display other protocols and prefixes, such as secure HTTP (HTTPS), File Transfer Protocol (FTP), email handling (mailto:), and files (file:).

In addition, most browsers also support external plug-ins required to display active content, such as in-page video, audio and game content.

Consider examples of browsers bellow

Google Chrome

Popular Browser by Internet giant Google. Focuses on enhanced performance of web applications. Hundreds of useful extensions can be downloaded for free from Chrome Store and can be used for personal use.

Mozilla Firefox 

A web browser designed for simplicity, security, extensibility yet flexibility and power. Available for Linux and android as well. There are lots of plugins and extensions with some powerful developer tools.

Constant updates, high performance delivered and customizable interface is a bliss for advanced users. Firefox allows an open architecture which accepts the installation of themes and extensions. Themes give the browser a customizable new look. Developers can write extensions to make the browser perform functions as desired like check your Gmail account when you open the browser, or block all ads.

- RSS Headliness
- Chat Extensions
- Spam/ Malware Filter

Opera Web Browser 

Constantly evolving and improving and the most popular mobile browser, opera has came a long way from being a browser to a full fledged internet suite.

Free fast browser with good support for updates. Features like page zoom and developer shortcuts allow users to have unique experience. There are some compatibility issues found in certain websites but with constant updates these problems are scarce.

- Email suite
- Phishing Filter
- Bit Torrent

Safari Web Browser 

Safari is a web browser developed by Apple inc. It is the most popular browser with MAC users.

Safari is a clean browser, very fast based on the WebKit rendering engine. Safari comes with the features you want in a modern browser, like tabbed browsing, popup blocking and built-in search functionality. It also has one of the best RSS-reading feature available online, it is easier to keep track a number of websites than using bookmarks.

- Most Popular Macintosh Browser
- Import Bookmarks from any browser
- Private Browsing

Internet Explorer 

Internet Explorer by Microsoft is the default browser for Windows operating system. Its still very popular with many internet users. Startup speed is a big issue with internet explorer.

There are a lot of necessary features like Active X capabilities, SmartScreen Filters, a list of recommended sites and more. Internet Explorer is still considered to be falling behind in the race, but latest editions promise fast load, packed with latest features. We can wait and see if it comes back to top.

- Add ons
- Customization options
- Mouse Gestures

Slimjet Browser 

Slimjet is a powerful and one of the best browsers around. It has in built extensions to ease internet browsing. Powered by Blink Engine, Slimjet supports all Chrome Apps plus a bundle of more extensive build in apps.

Slimjet is as good as Chrome, has powerful and customizable interface like Firefox, reliability features and in built apps which load a power packed browser everytime you use it.

- Ad blocker & Download Manager
- Social Sharing and Youtube Downloader
- Faster, Secure and Reliable

Maxthon 

A fast browser with a lot of features and reliable user interface. Powered by Maxthon Cloud Engine, it offers seamless browsing and downloads. Works on all platforms.

Maxthon has Lots of nifty features, including video-ad fast-forwarding, Speedy performance and Two page rendering engines(Webkit and Trident) for better compatibility.

- Anti Spyware
- Pop up Blocker
- Cloud Browsing

SlimBrowser 

A popular choice for users who like speed and security. It is based on Internet Explorer's Trident Engine and is a robust and powerful browser. It flaunts better usability features and speed compared to internet explorer browser. Slimbrowser takes care of your privacy and security every time you are surfing online. Slimbrowser starts as quickly as possible and allows you to have an amazing web surfing experience.

- Omni Bar mode
- Integrated Plugins(Ad Blocker, Photo Salon)
- Low Crash and Bugs

Netscape Browser 

Originally published by AOL, Netscape browser has released latest version based on Mozilla Firefox. It is fast, secure and is a choice of many users online.

- Dynamic HTML
- Integrated Search Engine
- Opensource Development

UC Browser 

A popular browser for both desktop and mobile devices. Tabbed browsing and fast startup make it a popular choice for thousands of users. Full download manager and full screen browsing ads on nicely.s

- Quick browsing
- Quick Page sharing
- Multiple Apps



6.4.1 c) The difference between internet and web browsers (Ass 01)

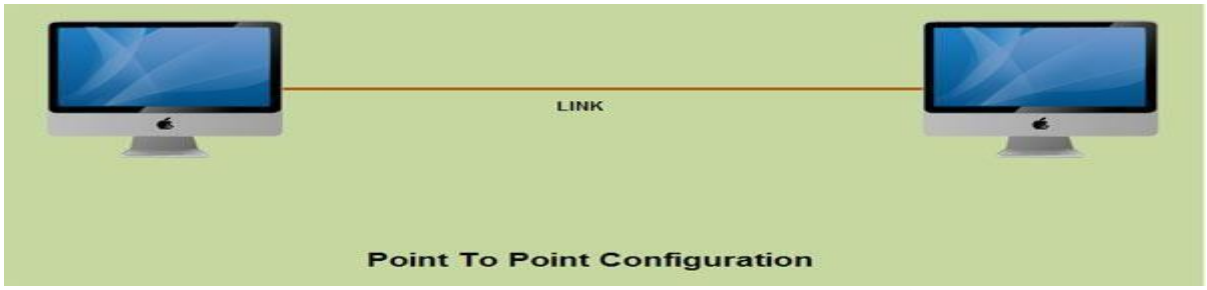
6.4.1 d) Use Internet for Communications

The concept of Internet comes after Network. A network is nothing but a combination of more than one system. When two or more computers are connected with each other for sharing information, data and resources, then we call the whole system a network.

Internet is an essential thing for us in current days. The Internet is nothing but a collection of computer networks; those are interconnected with each other globally to share data, information and resources. So we can say Internet is a big network that combines many networks within it. Internet use the standard Internet protocol suite (TCP/IP) to link several billion devices example computers, laptops, mobile devices and other devices worldwide.

Now days people in all over the world very much use the Internet for different works in day today life. Some of the best uses of Internet are:

1. Easier Communication: we can communicate with our friends and families with in less time and in a better way by using internet. E-mail, Skype and social media sites like facebook and other allows us to create and profile on internet and use that profile to communicate with our friends in an easier way. Also this is very less expensive process so people everywhere like this very much.
2. Best for Research: as internet is connected with many computers and a host or server concept was there on which a huge amount of data and information are stored, so internet is the best way of getting or acquiring knowledge about any topic. So it is best for doing any kind of research work.
3. Provides Better Education: Internet is a huge collection of information, here many kinds of books and journals and blogs are available those provides many valuable knowledge to you. So internet is best for education and another thing is now days distance education in different fields are available through internet from good universities, so it is provide better chance for students to get better education through internet.
4. Online Money Transfer: online money transfer technology can only possible because of internet; the online money transaction is such a technology that is very much helpful for people in all over the world. Now days across the world many people are using this technology and getting benefits from it.
5. Real Time Updates: the real time updates facility of the internet is such a feature that is very helpful for people, through the real time updates people can know all things those are currently happening, may be it from thousands of miles distance from them.

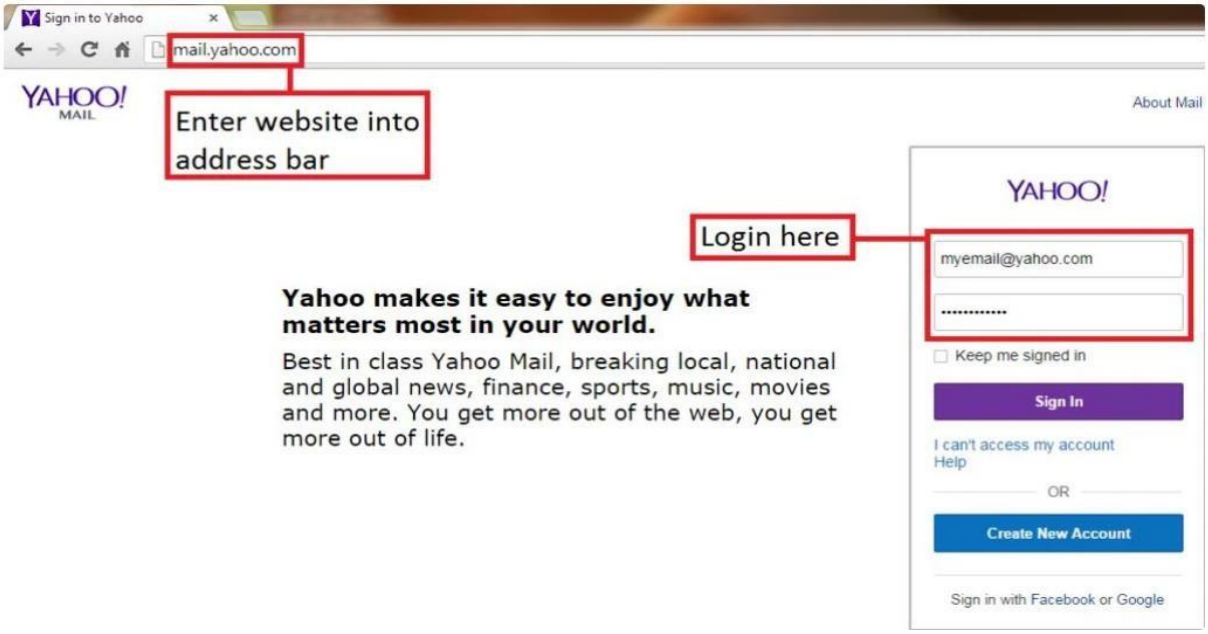


HOW TO SEND EMAIL

Consider 7 steps bellow on how to perform communication via internet

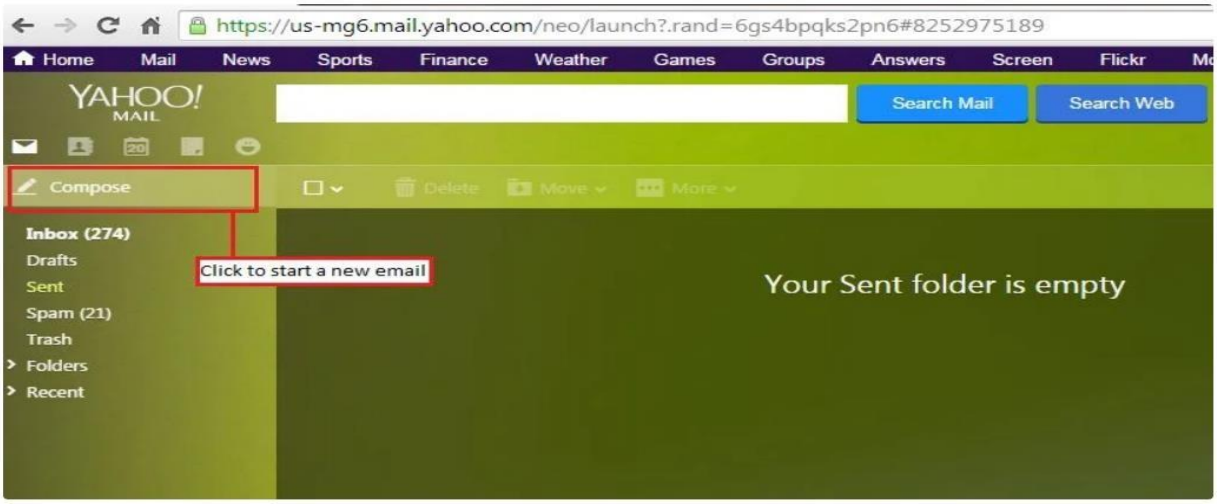
advertisement

Step 1: Sign Into Your Account



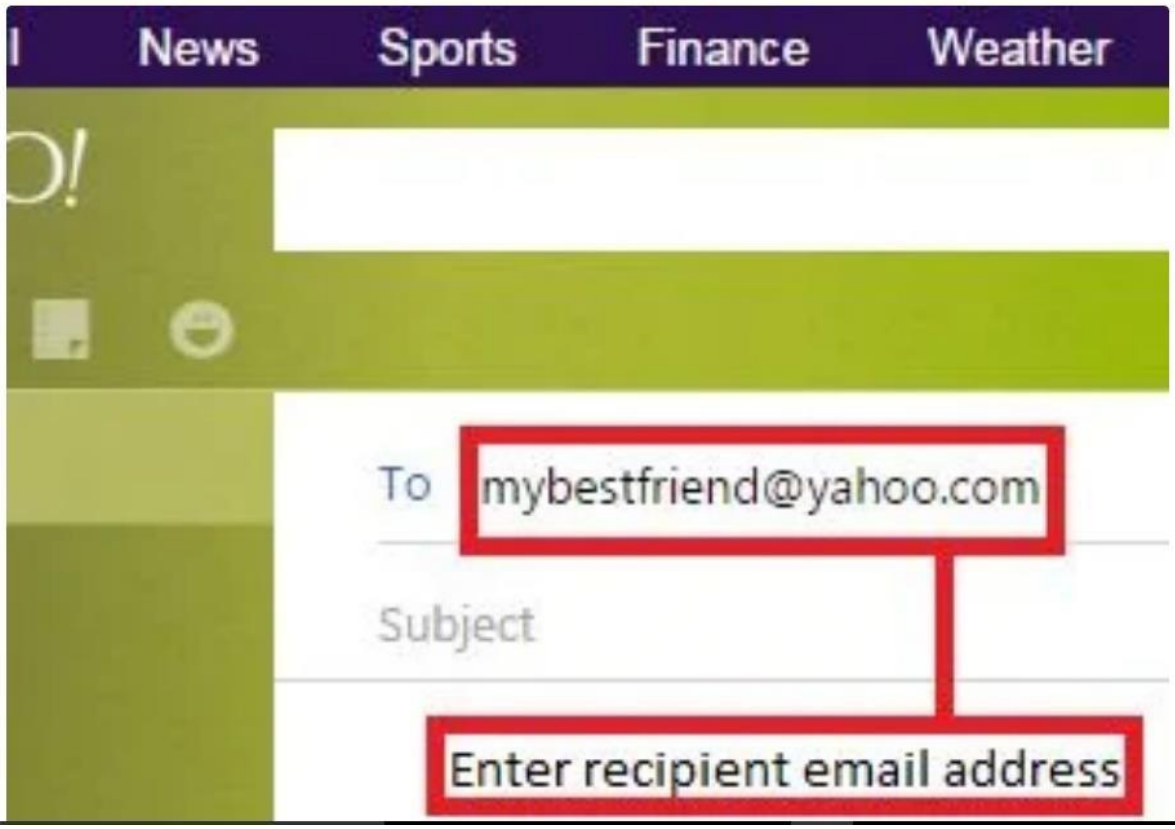
Go to https://mail.yahoo.com/. Make sure the link you typed is correct. Login into your account with the correct Yahoo ID or your email address and password to match.

Step 2: Compose a New Email

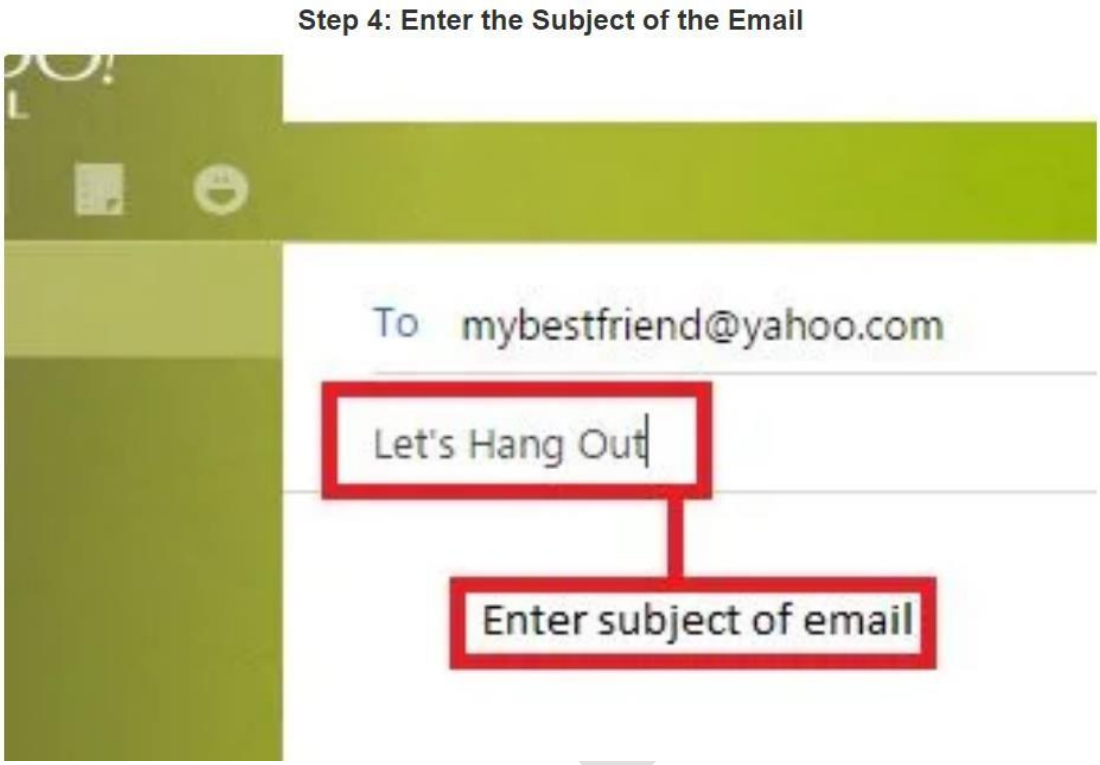


After logging in, you will see a similar interface of the example of your email account. Click compose to start creating an email.

Step 3: Write Recipient Email Address



On this page, you will enter your message and to whom you will send the message. First enter the recipient email address. This email address is obtained from the recipient similar to how you need someone's physical address to send mail.



Enter the title or subject of the email below.

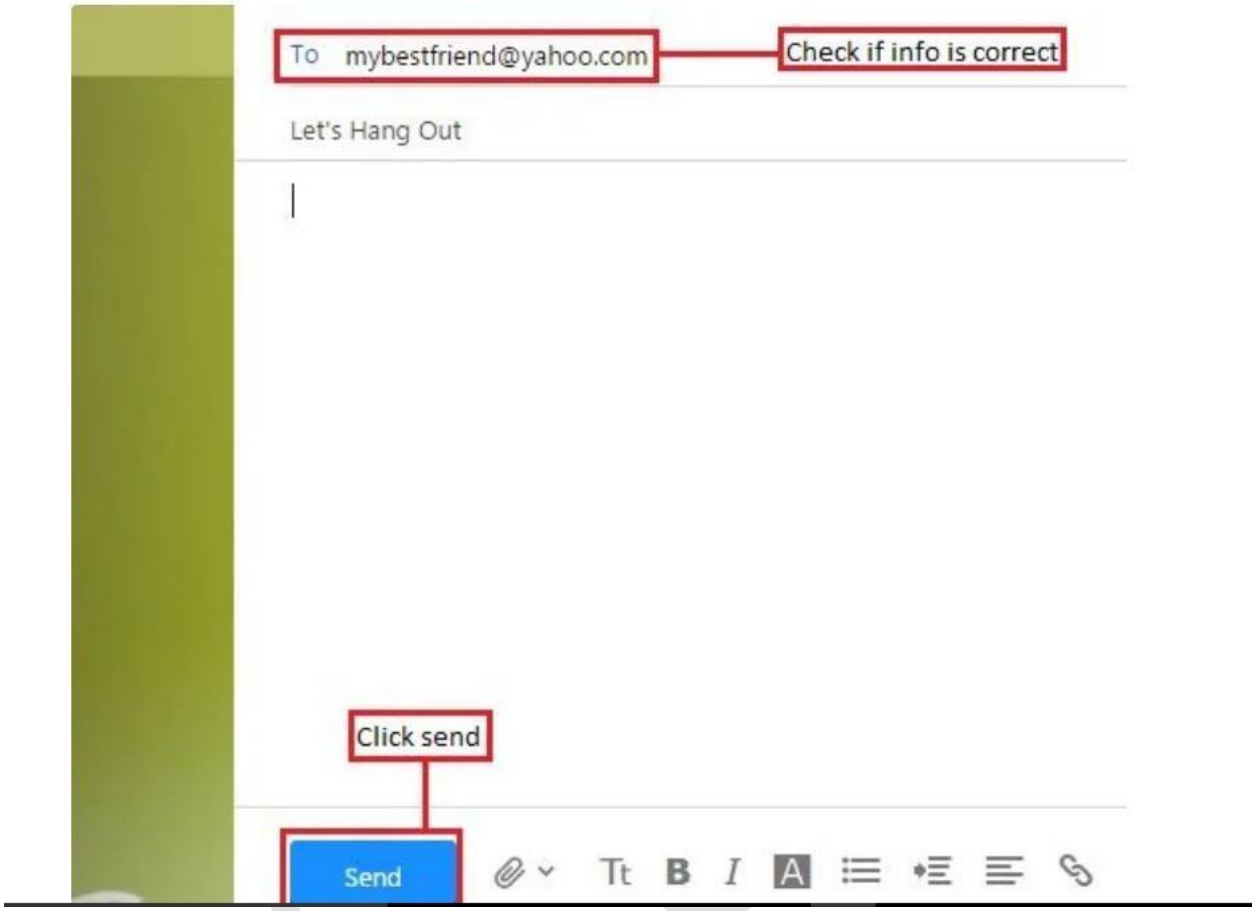
Step 5: Enter the Body



Enter the body of the message in the box below the subject line.

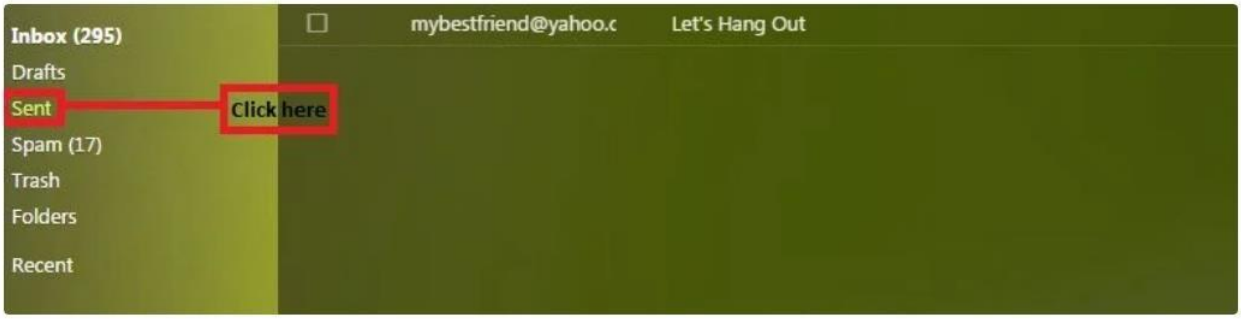
CSIS

Step 6: Send and Finish



After typing up your message, confirm your recipient's email address. Just as having the wrong physical address of someone's home can result to the message being sent somewhere else, the incorrect email address can send it to someone else. After you checked all the information is correct, click send on the bottom and you have sent your email.

Step 7: Confirmation



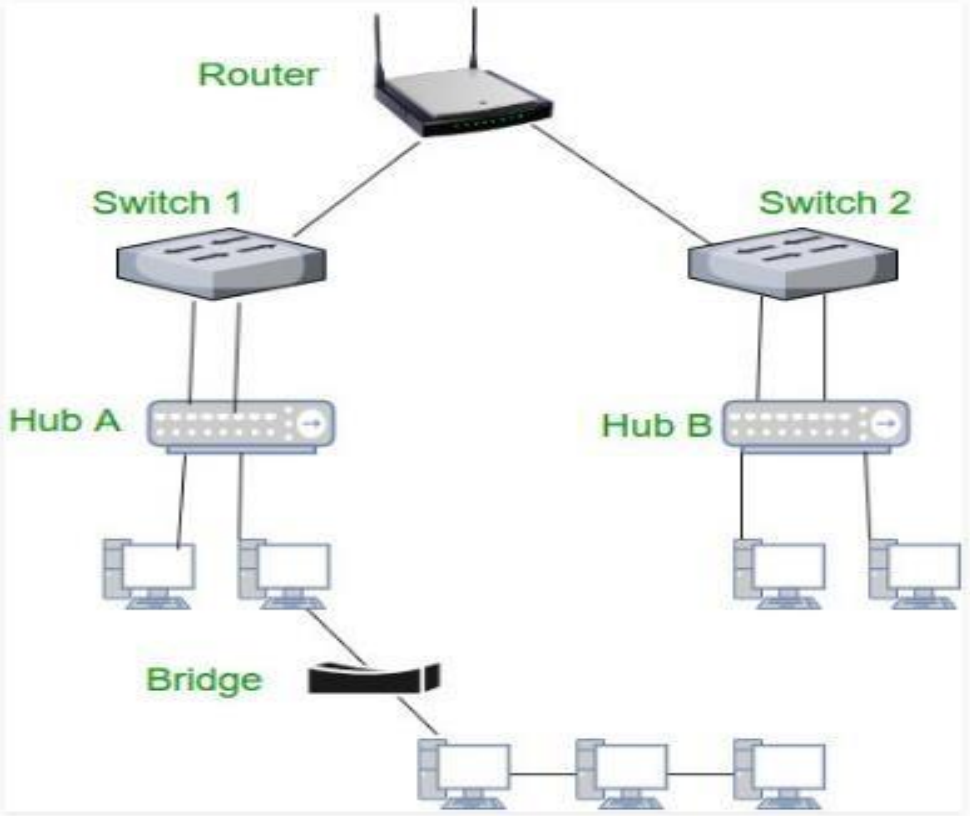
You can confirm if your email was sent by clicking the sent tab on the left. It will display all the email

you have sent. If the email recently sent has not shown up or if you wish to send additional emails, please refer again to steps 2 through 5. Now you have sucessfully sent an email and confirmed it's delivery.

6.4.1 e) Use computer networking in data or device

Routers

A router is a device like a switch that routes data packets based on their IP addresses. Router is mainly a Network Layer device. Routers normally connect LANs and WANs together and have a dynamically updating routing table based on which they make decisions on routing the data packets. Router divide broadcast domains of hosts connected through it



6.4.2 a) importance of internet in accessing information

Research

The internet has a wide range of information that both teachers and students can access at the convenience of their locations. The distinction of scholarly domains from personal, organizational, and government domains makes it easy to find reliable information. Also, students have access to resources published in any period because most of them are available on internet platforms

Increased Accessibility of Education
Education is accessible now more than ever, thanks to the internet. Several reputable institutions of learning like Yale and Harvard universities have free courses in diverse areas through platforms like Coursera. In most cases, one has to pay for a certificate, but the lessons are completely free of charge.

Innovative Learning
The internet offers extra resources and new methods of learning. Teachers can opt to have online classes which students attend from the comfort of their homes. Alternative methods of learning and study materials are also available on the internet (including crash course videos, images, animated videos, and educational games).

Ease of Communication
Teachers and students can interact timely using internet platforms. A student no longer has to wait until the next class to communicate with their classmates or teachers. One can easily send a message to the teacher or student in question through online platforms. Additionally, most schools have online platforms where students hold discussions on various topics and assignments.

Marketing
The internet offers the best marketing platform in this age. Business organizations can choose from a variety of platforms to market their products and services. Most successful organizations combine online/digital marketing with traditional marketing to reach customers with different preferences.

Internal Communication
The internet facilitates communication within organization especially those with branches in different geographical regions. Information from the head office reaches the rest of the branches promptly. Today, email is the main method of communication in many organizations

Creating an image
Business organizations can use the internet to create a preferred image through various platforms. Most businesses primarily use websites and social media platforms. The perfect example is the rising presence of business pages on Facebook, LinkedIn, Instagram, and Twitter. These platforms allow the business to establish an online presence which showcases the company's values and beliefs.

Globalization
Compared to internationalization, globalization is more formal and focuses on the global economy. The internet is crucial in establishing one global economy because it eliminates the physical boundaries that most avenues of business and communication have

Free medical information
Doctors and other health practitioners run various internet pages where they provide quality medical information. This information is useful to medical students and the public. Now, self-diagnosis is not recommended on these pages. However, they provide understanding after a known diagnosis. The patient can learn more about the disease they suffer from and how to care for themselves. Some of the pages also provide home remedies for simple conditions like migraines, stomach aches, and menstrual period pains

Online hospitals
These hospitals take the patient's research a notch higher. The patient can talk to the doctors like in a traditional consultation. The doctor would then provide a diagnosis and prescribed treatment. There are also platforms for people recovering from addiction or simply seeking help. FRANK, in the United Kingdom, is an example of a functioning online addiction helpline. The anonymity that comes with online

health platforms encourages patients to be more honest than in face-to-face discussions. The importance of the internet, in this case, is in the facilitation of these services in a timely manner

6.4.2 b) Types of web browsers

Web Browsers are software installed on your PC. To access the Web, you need a web browser, such as Netscape Navigator, Microsoft Internet Explorer or Mozilla Firefox.

Currently you must be using any sort of Web browser while you are navigating through our site sjuit.co.tz. On the Web, when you navigate through pages of information, this is commonly known as web browsing or web surfing.

There are four leading web browsers − Explorer, Firefox, Netscape, and Safari, but there are many others browsers available. You might be interested in knowing Complete Browser Statistics. Now we will see these browsers in bit more detail.

While developing a site, we should try to make it compatible to as many browsers as possible. Especially sites should be compatible to major browsers like Explorer, Firefox, Chrome, Netscape, Opera, and Safar

 **Internet Explorer**

Internet Explorer (IE) is a product from software giant Microsoft. This is the most commonly used browser in the universe. This was introduced in 1995 along with Windows 95 launch and it has passed Netscape popularity in 1998.

 **Google Chrome**

This web browser is developed by Google and its beta version was first released on September 2, 2008 for Microsoft Windows. Today, chrome is known to be one of the most popular web browser with its global share of more than 50%.

 **Mozilla Firefox**

Firefox is a new browser derived from Mozilla. It was released in 2004 and has grown to be the second most popular browser on the Internet.

 **Safari**

Safari is a web browser developed by Apple Inc. and included in Mac OS X. It was first released as a public beta in January 2003. Safari has very good support for latest technologies like XHTML, CSS2 etc.

CSISP

 Opera

Opera is smaller and faster than most other browsers, yet it is full- featured. Fast, user-friendly, with keyboard interface, multiple windows, zoom functions, and more. Java and non Java-enabled versions available. Ideal for newcomers to the Internet, school children, handicap and as a front-end for CD-Rom and kiosks.

 **Konqueror**

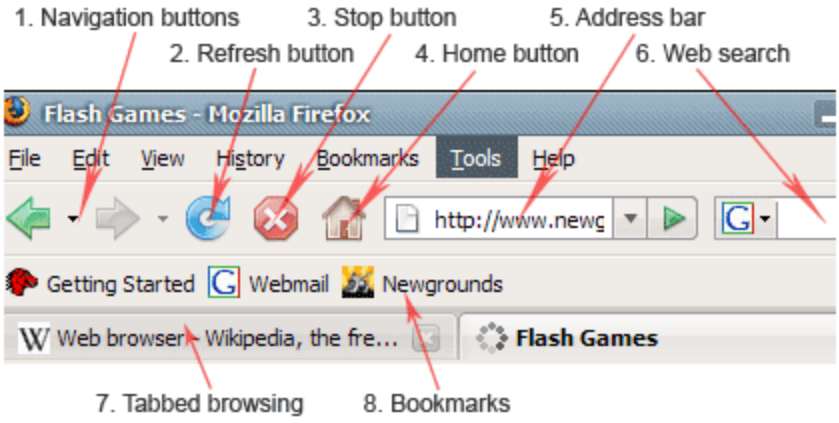
Konqueror is an Open Source web browser with HTML 4.01 compliance, supporting Java applets, JavaScript, CSS 1, CSS 2.1, as well as Netscape plugins. This works as a file manager as well as it supports basic file management on local UNIX filesystems, from simple cut/copy and paste operations to advanced remote and local network file browsing.

**Lynx**

Lynx is a fully-featured World Wide Web browser for users on Unix, VMS, and other platforms running cursor-addressable, character-cell terminals or emulators.

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6.4.3 c) Basic Features of Web browsers

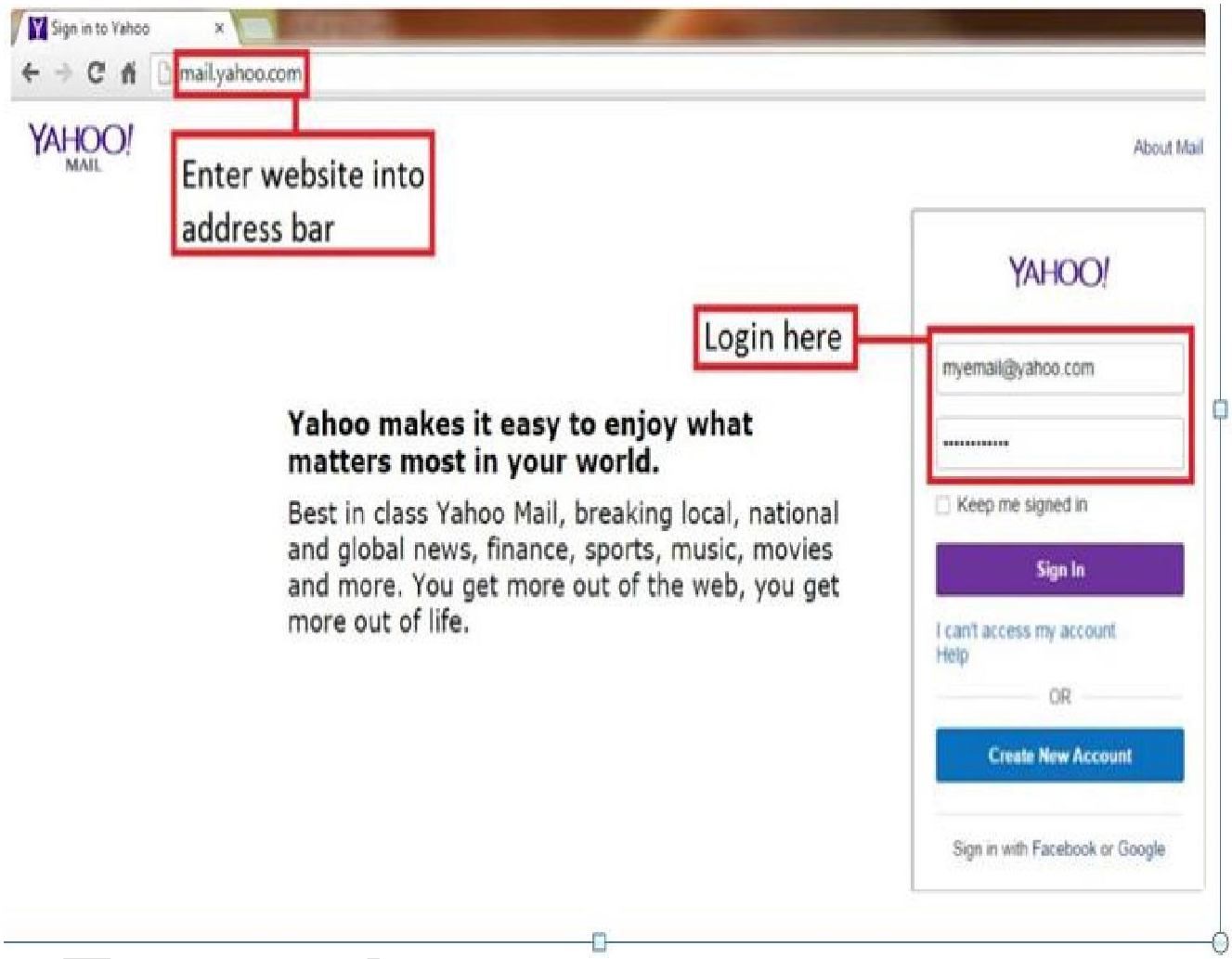


FEATURES

S.no	Features	Explanation
01.	**Navigation buttons**	Refresh button is used to go back and forward while browsing. If you are in a home page of some site, then you go to contact page – *Back button* would *bring you back to the home page*, if then you would click *forward button* it would bring you *again to the contact page*. A small arrow next to navigation buttons brings up a quick list of all back/forward web pages available
02.	**Refresh button**	Refresh buttons is used to force web browser to reload webpage. Most major web browsers use caching mechanism (store local copies of visited pages to speed up performance) that sometimes *prevents seeing the most updated information*; *by clicking refresh, latest version of the page is forcefully reloaded.*
03.	**Stop button**	Cancels web browser's communication with a server and stops page loading. Very useful to stop malicious sites from loading if accidentally entered.
04.	**Home button**	Loads predefined home page. You can select any page as browser's home by clicking on tools menu and selecting options.

05.	**Web browser's address bar**	Address bar is used to *enter website and* page names. Address bar works as a dropdown menu showing all previously visited sites. At the end of address bar you will find *go button*, that is not very useful as by simply clicking enter *(after typing or selecting a domain name)* you will be directed to the site
06.	**Integrated search**	*Integrated search engine tool is relatively* new feature in web browsers. *It allows selecting your* favorite search engine *and doing a quick search by typing in a search term*.
07.	**Tabbed browsing**	Browser tabs allow opening many websites on a single web browser's window - very helpful when reading several websites at the same time. I.e. if you want to open several links from a website without losing it, you can right click on each link you want to see, and select open in a new tab option
08.	**Bookmark buttons**	Custom user defined buttons that redirect to chosen websites - Very useful to configure web mail and other often visited sites. Check Mozilla Firefox browser for live bookmarking

6.4.2 :d) Apply web browsers to access internet



6.4.3 : Use computer network systems in communication

6.4.3: a) Define computer networking

A **computer network** or **data network** is a digital telecommunications network which allows nodes to share resources. In computer networks, networked computing devices exchange data with each other using a data link. The connections between nodes are established using either cable media or wireless media.

Network Criteria.

A network must be able to meet a certain number of criteria. The most important of these are performance, reliability, and security.

Performance

Performance can be measured in many ways, including transit time and response time. Transit time is the amount of time required for a message to travel from one device to another. Response time is the elapsed time between an inquiry and a response. The performance of a network depends on a number of factors, including the number of users, the type of transmission medium, the capabilities of the connected hardware, and the efficiency of the software.

Performance is often evaluated by two networking metrics: throughput and delay. We often need more throughput and less delay. However, these two criteria are often contradictory. If we try to send more data to the network, we may increase throughput but we increase the delay because of traffic congestion in the network.

Reliability

In addition to accuracy of delivery, network reliability is measured by the frequency of failure, the time it takes a link to recover from a failure, and the network's robustness in a catastrophe.

Security

Network security issues include protecting data from unauthorized access, protecting data from damage and development, and implementing policies and procedures for recovery from breaches and data losses.

Types of connections

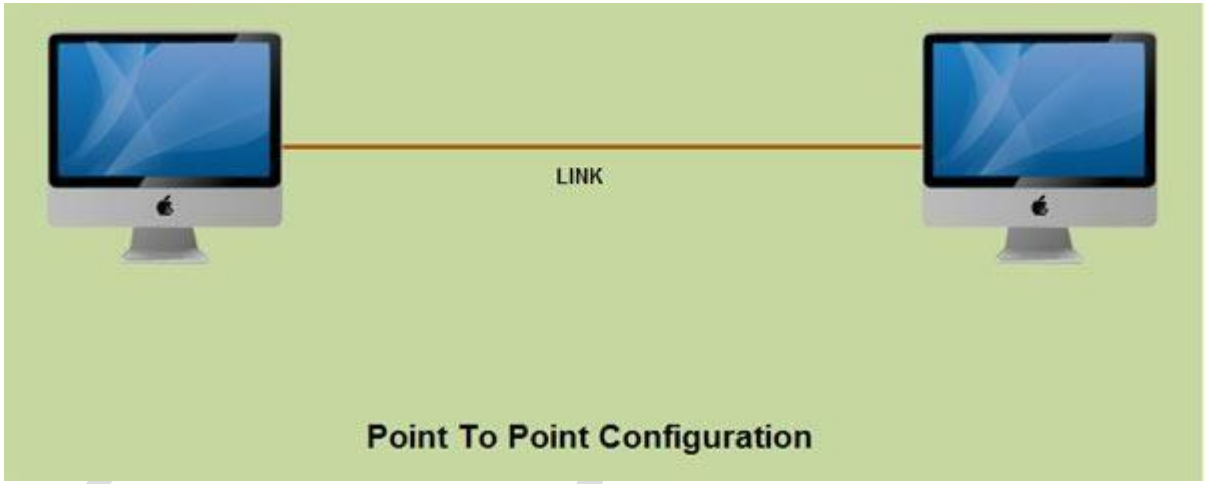
The two different computer network connection types are

(A) Point-to-PointConnection
(B) Multipoint Connection.

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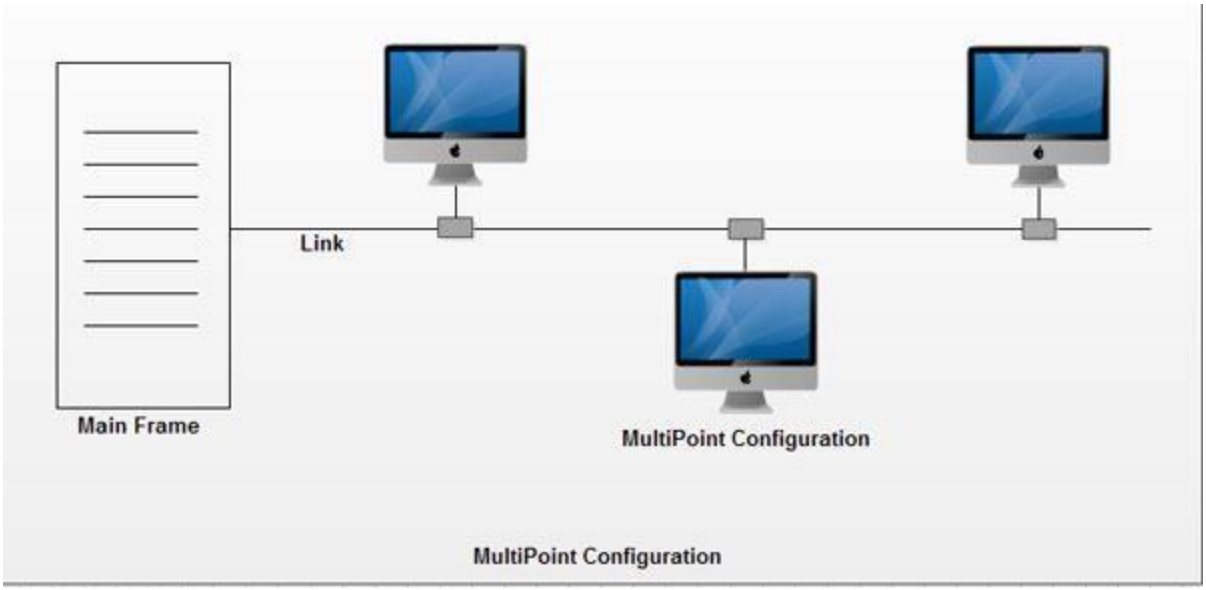
A) Point-to-Point connection

Is a direct link between two devices such as a computer and a printer.It uses dedicated link between the devices. The entire capacity of the link is used for the transmission between those two devices. Most of today's point-to-point connections are associated with modems and PSTN (Public Switched Telephone Network) communications. In point to point networks, there exist many connections between individual pairs of machines.To move from sources to destination, a packet (short message) may follow different routes. In networking, the Point-to-Point Protocol (PPP) is a data link protocol commonly used in establishing a direct connection between two networking nodes. It can provide connection authentication, transmission encryption, and compression PPP is used over many types of physical networks including serial cable, phone line, trunk line, cellular telephone, specialized radio links, and fiber optic links such as SONET. PPP is also used over Internet access connections (now marketed as "broadband").



B) Multipoint Connection.

A multipoint connection is a link between three or more devices. It is also known as Multi-drop configuration. The networks having multipoint configuration are called **Broadcast Networks**. In broadcast network, a message or a packet sent by any machine is received by all other machines in a network. The packet contains address field that specifies the receiver. Upon receiving a packet, every machine checks the address field of the packet. If the transmitted packet is for that particular machine, it processes it; otherwise it just ignores the packet.



Broadcast network provides the provision for broadcasting & multicasting. Broadcasting is the process in which a single packet is received and processed by all the machines in the network. It is made possible by using a special code in the address field of the packet. When a packet is sent to a subset of the machines i.e. only to few machines in the network it is known as multicasting. Historically, multipoint connections were used to attach central CPs to distributed dumb terminals. In today's LAN environments, multipoint connections link many network devices in various configurations.

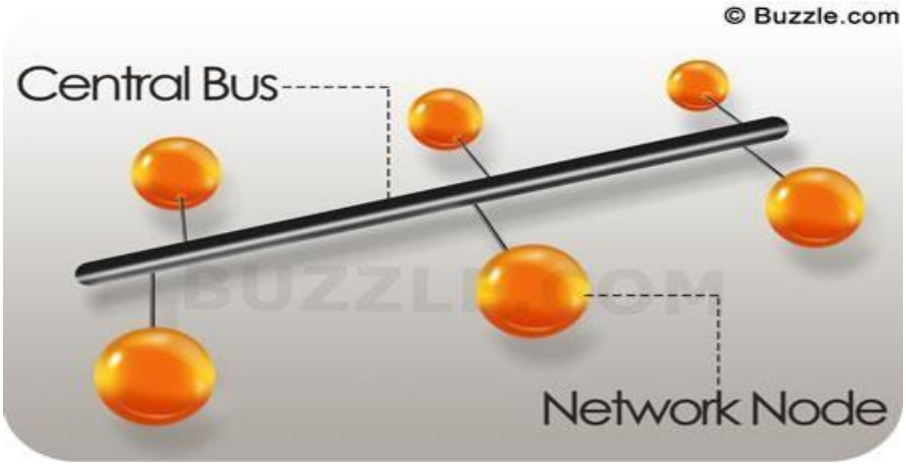
6.4.3: b) Describe types of networking systems

NETWORK TOPOLOGIES

Network topology is the arrangement of the various elements (links, nodes, etc.) of a computer network. Essentially, it is the topological structure of a network and may be depicted physically or logically. *Physical topology* is the placement of the various components of a network, including device location and cable installation, while *logical topology* illustrates how data flows within a network, regardless of its physical design. There are several network topologies which are:

Bus topology:- In this topology a number of nodes is connected to a central cable or bus. It is usually implemented using coaxial cable and is less expensive compared to other topologies. The disadvantage of bus topology is that the entire network shuts down when there occurs a break in the cable.

Bus Topology



Advantages

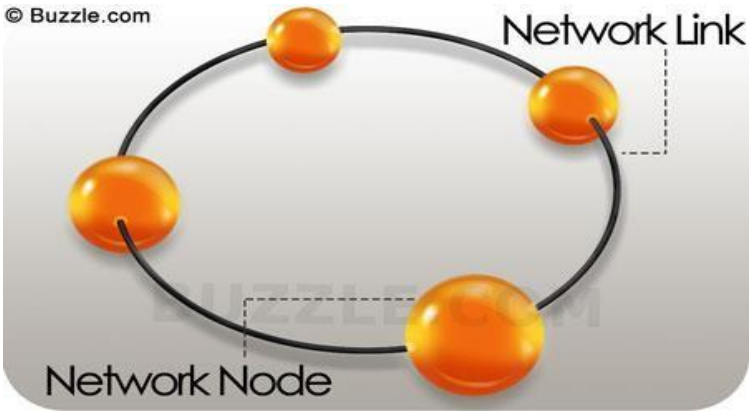
- It is easy to set up, handle, and implement.
- It is best-suited for small networks.
- It costs very less.

Disadvantages

- The cable length is limited. This limits the number of network nodes that can be connected.
- This network topology can perform well only for a limited number of nodes. When the number of devices connected to the bus increases, the efficiency decreases.
- It is suitable for networks with low traffic. High traffic increases load on the bus, and the network efficiency drops.
- It is heavily dependent on the central bus. A fault in the bus leads to network failure.
- It is not easy to isolate faults in the network nodes.
- Each device on the network "sees" all the data being transmitted, thus posing a security risk.

Ring topology:– In ring, cables form closed loop or ring with all computers and devices arranged along the ring. Data travels from device to device along the ring in one direction. Data travels from node to node in Round Robin fashion. The disadvantage is that data must pass through each node between the sender and receiver and this makes it slower. Also it is difficult to troubleshoot the ring when problems arise.

Ring Topology



Advantages

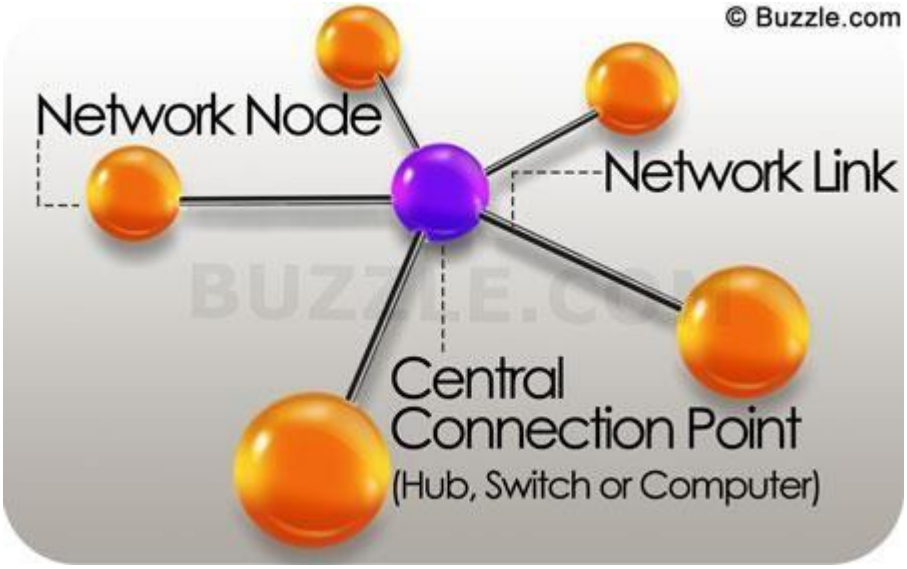
- The data being transmitted between two nodes passes through all the intermediate nodes. A central server is not required for the management of this topology.
- The traffic is unidirectional and the data transmission is high-speed.
- In comparison to a bus, a ring is better at handling load.
- The adding or removing of network nodes is easy, as the process requires changing only two connections.
- The configuration makes it easy to identify faults in network nodes.
- In this topology, each node has the opportunity to transmit data. Thus, it is a very organized network topology.
- It is less costly than a star topology.

Disadvantages

- The failure of a single node in the network can cause the entire network to fail.
- The movement or changes made to network nodes affect the entire network's performance.
- Data sent from one node to another has to pass through all the intermediate nodes. This makes the transmission slower in comparison to that in a star topology. The transmission speed drops with an increase in the number of nodes.
- There is heavy dependency on the wire connecting the network nodes in the ring.

Star topology:- All the devices are connected to a central hub and all data transmitted between devices pass through the hub. All wiring is done from the central hub. If a cable to a node fails only that node is affected. Rest of the nodes in the network can work uninterrupted.

Star Topology



Advantages

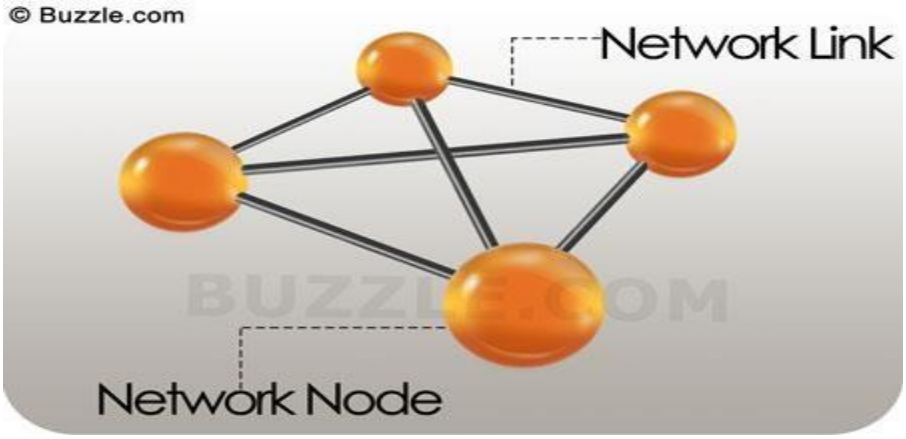
- Due to its centralized nature, the topology offers simplicity of operation.
- It also achieves isolation of each device in the network.
- Adding or removing network nodes is easy, and can be done without affecting the entire network.
- Due to the centralized nature, it is easy to detect faults in the network devices.
- As the analysis of traffic is easy, the topology poses lesser security risk.
- Data packets do not have to pass through many nodes, like in the case of a ring network. Thus, with the use of a high-capacity central hub, traffic load can be handled at fairly decent speeds.

Disadvantages

- Network operation depends on the functioning of the central hub. Hence, central hub failure leads to failure of the entire network.
- Also, the number of nodes that can be added, depends on the capacity of the central hub.
- The setup cost is quite high.

Mesh topology:– In this type there is a point-to-point connection between each node in a ring topology. There is no traffic problem in this type of topology and it provides more privacy and security. Mesh is much more expensive than other topologies and requires more cable.

Mesh Topology



Advantages

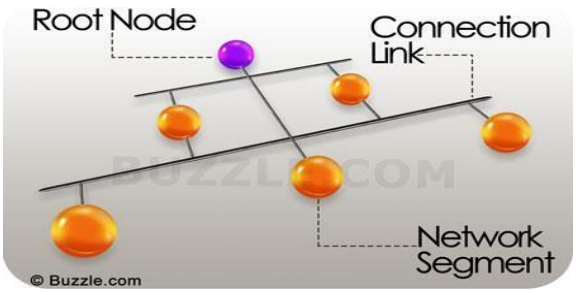
- The arrangement of the network nodes is such that it is possible to transmit data from one node to many other nodes at the same time.
- The failure of a single node does not cause the entire network to fail as there are alternate paths for data transmission.
- It can handle heavy traffic, as there are dedicated paths between any two network nodes.
- Point-to-point contact between every pair of nodes, makes it easy to identify faults.

Disadvantages

- The arrangement wherein every network node is connected to every other node of the network, many connections serve no major purpose. This leads to redundancy of many network connections.
- A lot of cabling is required. Thus, the costs incurred in setup and maintenance are high.
- Owing to its complexity, the administration of a mesh network is difficult.

Tree topology:- it is a combination of linear bus and star topologies. A group of workstations configured as star topology is connected to a linear bus which acts as backbone. That is it integrate multiple star topologies onto a single bus. The hub in star topology is connected to the bus and the hub acts as the root of a tree of devices.

Tree Topology



Imagine a hierarchy of network nodes, with the root node serving client nodes, that in turn serve other lower-level nodes. The top-level node is mostly a mainframe computer while other nodes in the hierarchy are mini or microcomputers. In this arrangement, the node at each level could be forming a star network with the nodes it serves. In this case, the structure combines star and bus topologies and inherits their advantages and disadvantages.

Advantages

- The tree topology is useful in cases where a star or bus cannot be implemented individually. It is most-suited in networking multiple departments of a university or corporation, where each unit (star segment) functions separately, and is also connected with the main node (root node).
- The advantages of centralization that are achieved in a star topology are inherited by the individual star segments in a tree network.
- Each star segment gets a dedicated link from the central bus. Thus, failing of one segment does not affect the rest of the network.
- Fault identification is easy.
- The network can be expanded by the addition of secondary nodes. Thus, scalability is achieved.

Disadvantages

- As multiple segments are connected to a central bus, the network depends heavily on the bus. Its failure affects the entire network.
- Owing to its size and complexity, maintenance is not easy and costs are high. Also, configuration is difficult in comparison to that in other topologies.
- Though it is scalable, the number of nodes that can be added depends on the capacity of the central bus and on the cable type.

Hybrid topology:– this type consists of combination of different topologies in such a way that it does not exhibit the characteristics of standard topologies. One example is 'Snowflake' topology which is really star of stars network.

Hybrid Topology

A hybrid topology combines two or more topologies and is meant to reap their advantages. Obviously, the advantages and disadvantages of a hybrid topology are a combination of the merits and demerits of the topologies used to structure it.

1.2 Types of networks (Geographical based)

Different types of (private) networks are distinguished based on their size (in terms of the number of machines), their data transfer speed, and their reach.
Private networks are networks that belong to a single organization.

There are usually said to be three categories of networks:

- LAN (**local area network**)
- MAN (**metropolitan area network**)
- WAN (**wide area network**)

LANs

LAN stands for *Local Area Network*.
It's a group of computers which all belong to the same organization, and which are linked within a small geographic area using a network, and often the same technology (the most widespread being Ethernet).

A local area network is a network in its simplest form. Data transfer speeds over a local area network can reach up to 10 Mbps (such as for an Ethernet network) and 1 Gbps (as with FDDI or Gigabit Ethernet).
A local area network can reach as many as 100, or even 1000, users.

By expanding the definition of a LAN to the services that it provides, two different operating modes can be defined:

- In a "peer-to-peer" network, in which communication is carried out from one computer to another, without a central computer, and where each computer has the same role.
- in a "client/server" environment, in which a central computer provides network services to users.

MANs

MANs (*Metropolitan Area Network*s) connect multiple geographically nearby LANs to one another (over an area of up to a few dozen kilometres) at high speeds. Thus, a MAN lets two remote nodes communicate as if they were part of the same local area network. A MAN is made from switches or routers connected to one another with high-speed links (usually fibre optic cables).

WANs

A **WAN** (Wide Area Network or extended network) connects multiple LANs to one another over great geographic distances.
The speed available on a WAN varies depending on the cost of the connections (which increases with distance) and may be low.
WANs operate using routers, which can "choose" the most appropriate path for data to take to reach a network node.

The most well-known WAN is the Internet.

6.4.3: d) Use intranet in communication

What is intranet?

Intranet is the digital workplace, where you and your colleagues can discuss, share ideas, and collaborate on work projects. It's much more than just information, you can access documents, find and read all company news.

USES OF INTRANET

Share files

Your intranet platform will either integrate with existing file-sharing solutions (e.g. Google Drive, Dropbox, OneDrive or others), or have its own file-storing system.

Search across your organization

Because you store a lot of information on your intranet, search is one of the most frequently-used features in an intranet. The best intranets don't just search across information in pages or posts, but also in file name

Find people in the people directory

When you have a large organization, finding the one person you need can be a challenge. Almost all intranet platforms have a people directory – the most useful ones are auto-generated. Here you can search for people across location, job title or even skill set, depending on your intranet solution.

Build pages

A page builder tool is essential for static communication, but it can do much more than just inform. Automate your onboarding journey, house your brand assets, make wiki pages or set up a place to request IT assistance.

Collaborate on documents, spreadsheets and slides

Modern intranet systems allow you to directly work on documents, spreadsheets, slides or other frequently-used apps in your productivity suite. Rather than just linking to a file stored in the cloud, editing it directly makes conversation and collaboration revolve around what really matters – work.

Mobile access

Most modern intranets offer a mobile app, so you can stay connected on the go. Since work is increasingly less dependent on your device, a mobile app simply means that employees can stay engaged, wherever they are.

Promote employee engagement

At the end, this is what you will truly want to accomplish with your intranet solution. Gluing a global workforce together is no easy feat, and keeping them engaged is key. A once-a-year survey just won't cut it – you need a scalable solution to let employees voice concerns, and to listen. That's the great thing about an intranet – with strong analytics features you will be able to measure and gauge the sentiment around your company, a specific post or an internal campaign. In other words: it truly measures employee Engagement.

Difference between internet and intranet?

Internet	Intranet
the internet is publically accessible	An intranet is only accessible to people in your organization.
the internet offers a lot of Software as a Service (SaaS) tools to accomplish your business goals	An intranet should function as the place that brings them all together.

6.4.3 : e) Use extranet in communication

An extranet is a private network that uses Internet technology and the public telecommunication system to securely share part of a business's information or operations with suppliers, vendors, partners, customers, or other businesses. An extranet can be viewed as part of a company's intranet that is extended to users outside the company. It has also been described as a "state of mind" in which the Internet is perceived as a way to do business with other companies as well as to sell products to customers.
An extranet requires security and privacy. These can include

- Firewall server management,
- The issuance
- use of digital certificates or similar means of user authentication,
- Encryption of messages,
- The use of virtual private networks (VPNs) that tunnel through the public network

USES OF EXTRANET

- Exchange large volumes of data using Electronic Data Interchange (EDI)
- Share product catalogs exclusively with wholesalers or those "in the trade"
- Collaborate with other companies on joint development efforts
- Jointly develop and use training programs with other companies
- Provide or access services provided by one company to a group of other companies, such as an online banking application managed by one company on behalf of affiliated banks
- Share news of common interest exclusively with partner companies

6.4.3: f) Use computer networking in data or device sharing (Ass2)

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