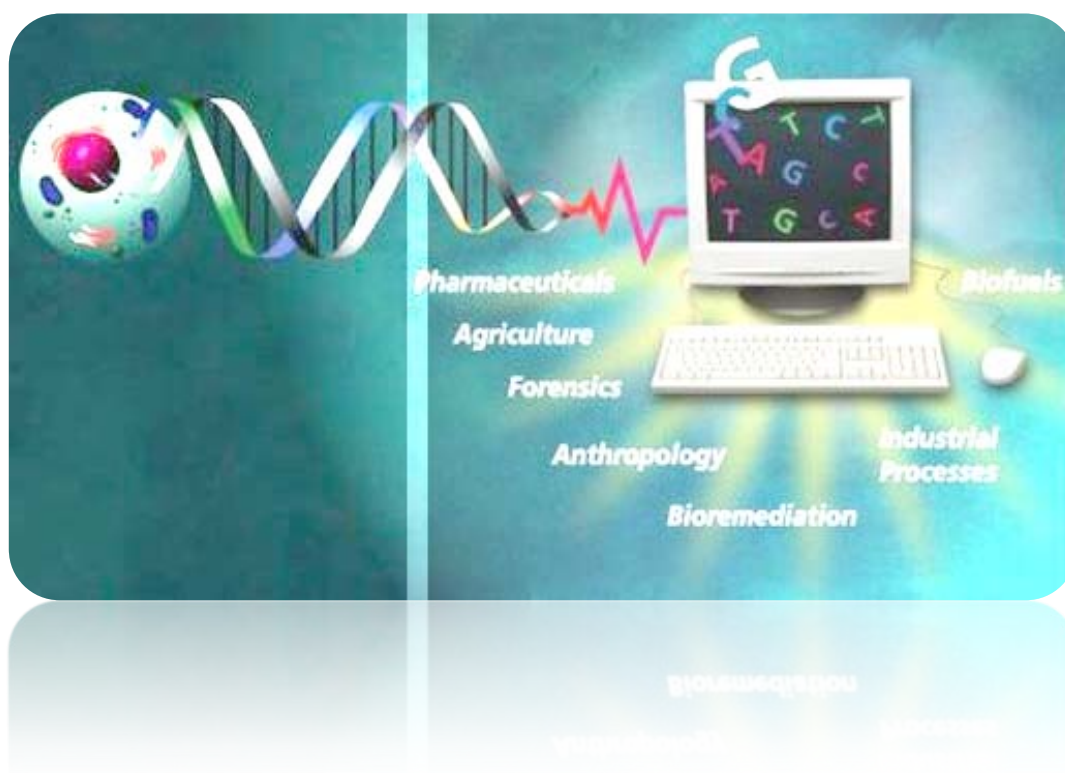


BIOINFORMATICS AND COMPUTER APPLICATIONS IN BIOLOGY

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BIOINFORMATICS AND COMPUTER APPLICATIONS IN BIOLOGY

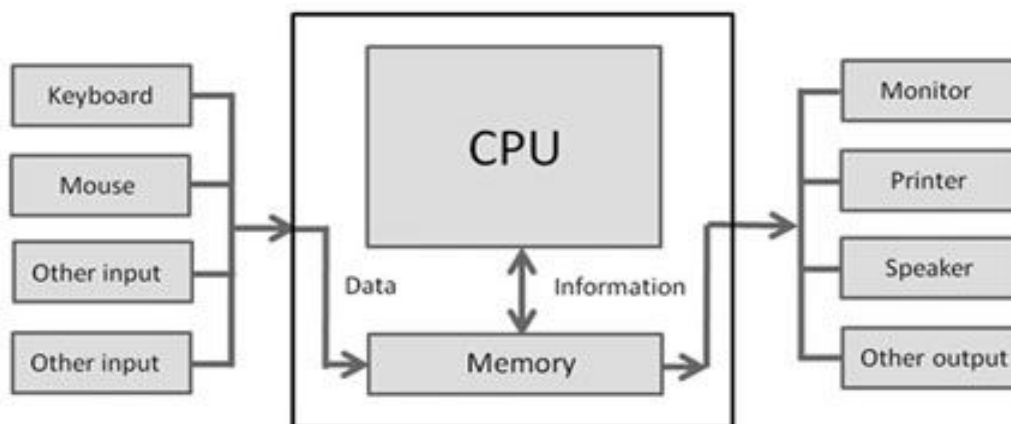
UNIT- I

COMPUTER

Computer is an electronic device that is designed to work with Information. The term computer is derived from the Latin term 'computare', this means to calculate or programmable machine. Computer cannot do anything without a Program. It represents the decimal numbers through a string of binary digits. The Word 'Computer' usually refers to the Center Processor Unit plus Internal memory.

Charles Babbage is called the "Grand Father" of the computer. The First mechanical computer designed by Charles Babbage was called Analytical Engine. It uses read-only memory in the form of punch cards.

Computer is an advanced electronic device that takes raw data as input from the user and processes these data under the control of set of instructions (called program) and gives the result (output) and saves output for the future use. It can process both numerical and non-numerical (arithmetic and logical) calculations.



Digital Computer Definition

The basic components of a modern digital computer are: Input Device, Output Device, Central Processor Unit (CPU), mass storage device and memory. A Typical modern computer uses LSI Chips. Four Functions about computer are:

accepts data	Input
processes data	Processing
produces output	Output
stores results	Storage

CHARACTERISTICS OF COMPUTER

- ❖ **SPEED** : In general, no human being can compete to solving the complex computation, faster than computer.
- ❖ **ACCURACY** : Since Computer is programmed, so whatever input we give it gives result with accurately.
- ❖ **STORAGE** : Computer can store mass storage of data with appropriate format.
- ❖ **DILIGENCE** : Computer can work for hours without any break and creating error.
- ❖ **VERSATILITY** : We can use computer to perform completely different type of work at the same time.
- ❖ **POWER OF REMEMBERING** : It can remember data for us.
- ❖ **NO IQ** : Computer does not work without instruction.
- ❖ **NO FEELING** : Computer does not have emotions, knowledge, experience, feeling.

AREAS OF COMPUTER APPLICATIONS

❖ **Business**

A computer has high speed of calculation, diligence, accuracy, reliability, or versatility which has made it an integrated part in all business organizations.

Computer is used in business organizations for,

- Payroll calculations
- Budgeting
- Sales analysis
- Financial forecasting
- Managing employee database
- Maintenance of stocks, etc.

❖ Banking

Today, banking is almost totally dependent on computers. Banks provide the following facilities

- Online accounting facility, which includes checking current balance, making deposits and overdrafts, checking interest charges, shares, and trustee records.
- ATM machines which are completely automated are making it even easier for customers to deal with banks.

❖ Insurance

Insurance companies are keeping all records up-to-date with the help of computers. Insurance companies, finance houses, and stock broking firms are widely using computers for their concerns.

Insurance companies are maintaining a database of all clients with information showing ,

- Procedure to continue with policies
- Starting date of the policies
- Next due installment of a policy
- Maturity date
- Interests due
- Survival benefits
- Bonus

❖ Education

The computer helps in providing a lot of facilities in the education system.

- The computer provides a tool in the education system known as CBE (Computer Based Education).
- CBE involves control, delivery, and evaluation of learning.
- Computer education is rapidly increasing the graph of number of computer students.
- There are a number of methods in which educational institutions can use a computer to educate the students.
- It is used to prepare a database about performance of a student and analysis is carried out on this basis.

❖ Marketing

In marketing, uses of the computer are following,

- Advertising – With computers, advertising professionals create art and graphics, write and revise copy, and print and disseminate ads with the goal of selling more products.
- Home Shopping – Home shopping has been made possible through the use of computerized catalogues that provide access to product information and permit direct entry of orders to be filled by the customers.

❖ Healthcare

Computers have become an important part in hospitals, labs, and dispensaries. They are being used in hospitals to keep the record of patients and medicines. It is also used in scanning and diagnosing different diseases. ECG, EEG, ultrasounds and CT scans, etc. are also done by computerized machines.

Following are some major fields of health care in which computers are used.

- Diagnostic System – Computers are used to collect data and identify the cause of illness.
- Lab-diagnostic System – All tests can be done and the reports are prepared by computer.
- Patient Monitoring System – These are used to check the patient's signs for abnormality such as in Cardiac Arrest, ECG, etc.
- Pharma Information System – Computer is used to check drug labels, expiry dates, harmful side effects, etc.
- Surgery – Nowadays, computers are also used in performing surgery.

❖ Engineering Design

Computers are widely used for Engineering purpose.

One of the major areas is CAD (Computer Aided Design) that provides creation and modification of images. Some of the fields are –

- Structural Engineering – Requires stress and strain analysis for design of ships, buildings, budgets, airplanes, etc.

- Industrial Engineering – Computers deal with design, implementation, and improvement of integrated systems of people, materials, and equipment.
- Architectural Engineering – Computers help in planning towns, designing buildings, determining a range of buildings on a site using both 2D and 3D drawings.

❖ **Military**

Computers are largely used in defense. Modern tanks, missiles, weapons, etc. Military also employs computerized control systems. Some military areas where a computer has been used are,

- Missile Control
- Military Communication
- Military Operation and Planning
- Smart Weapons

❖ **Communication**

Communication is a way to convey a message, an idea, a picture, or speech that is received and understood clearly and correctly by the person for whom it is meant. Some main areas in this category are,

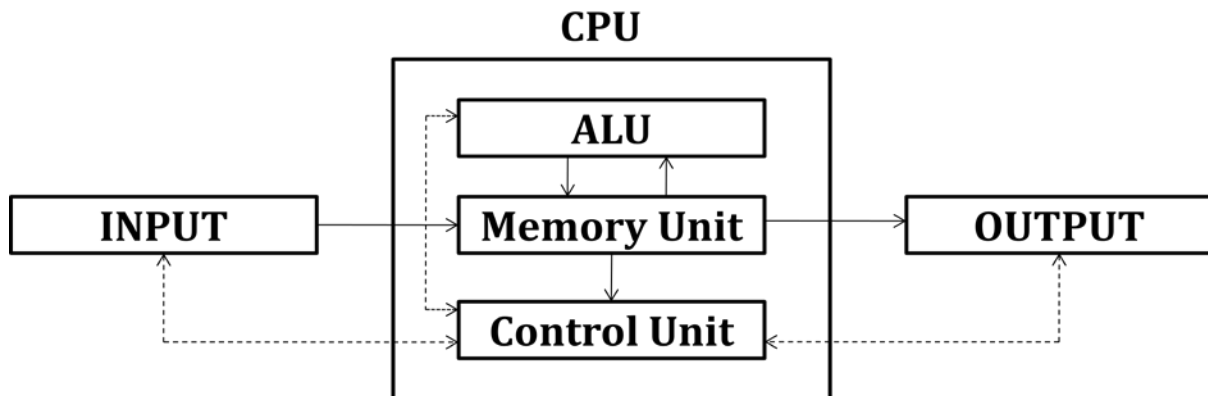
- E-mail
- Chatting
- Usenet
- FTP
- Telnet
- Video-conferencing

❖ **Government**

Computers play an important role in government services. Some major fields in this category are,

- Budgets
- Sales tax department
- Income tax department
- Computation of male/female ratio
- Computerization of voters lists
- Computerization of PAN card
- Weather forecasting

I-P-O CYCLE – COMPONENTS OF COMPUTER



Where

CPU – Central Processing Unit

ALU – Arithmetic Logic Unit

Any electronic machine that performs 'IPO cycle' is known as computer.

Input Unit

This unit contains devices with the help of which we enter data into the computer. This unit creates a link between the user and the computer. The input devices translate the information into a form understandable by the computer.

CPU (Central Processing Unit)

CPU is considered as the brain of the computer. CPU performs all types of data processing operations. It stores data, intermediate results, and instructions (program). It controls the operation of all parts of the computer.

CPU itself has the following three components,

- ALU (Arithmetic Logic Unit)
- Memory Unit
- Control Unit

Output Unit

The output unit consists of devices with the help of which we get the information from the computer. This unit is a link between the computer and the users. Output devices translate the computer's output into a form understandable by the users.

MEMORY AND CONTROL UNITS

A memory is just like a human brain. It is used to store data and instructions. Computer memory is the storage space in the computer, where data is to be processed and instructions required for processing are stored. The memory is divided into large number of small parts called cells.

Memory is primarily of two types,

- ❖ Primary Memory/Main Memory
- ❖ Secondary Memory

❖ Primary Memory (Main Memory)

Primary memory holds only those data and instructions on which the computer is currently working. It has a limited capacity and data is lost when power is switched off. It is generally made up of semiconductor device. These memories are not as fast as registers. The data and instruction required to be processed resides in the main memory. It is divided into two subcategories RAM and ROM.

Characteristics of Main Memory

- These are semiconductor memories.
- It is known as the main memory.
- Usually volatile memory.
- Data is lost in case power is switched off.
- It is the working memory of the computer.
- Faster than secondary memories.
- A computer cannot run without the primary memory.

RAM

RAM (Random Access Memory) is the internal memory of the CPU for storing data, program, and program result. It is a read/write memory which stores data until the machine is working. As soon as the machine is switched off, data is erased.

ROM

ROM stands for Read Only Memory. The memory from which we can only read but cannot write on it. This type of memory is non-volatile. The information is stored permanently in such memories during manufacture. A ROM stores such instructions that are required to start a computer. This operation is referred to as bootstrap. ROM chips are not only used in the computer but also in other electronic items like washing machine and microwave oven.

❖ Secondary Memory

This type of memory is also known as external memory or non-volatile. It is slower than the main memory. These are used for storing data/information permanently. CPU directly does not access these memories, instead they are accessed via input-output routines. The contents of secondary memories are first transferred to the main memory, and then the CPU can access it. For example, disk, CD-ROM, DVD, etc.

Characteristics of Secondary Memory

- These are magnetic and optical memories.
- It is known as the backup memory.
- It is a non-volatile memory.
- Data is permanently stored even if power is switched off.
- It is used for storage of data in a computer.
- Computer may run without the secondary memory.
- Slower than primary memories.

INPUT DEVICES AND OUTPUT DEVICES

Input Devices

- > Mouse
- > Keyboard
- > Scanner
- > Webcam
- > Digital camera
- > Microphone
- > Joysticks, etc.

Output Devices

- > Monitor
- > Speaker
- > Printer

HARDWARE AND SOFTWARE

Hardware:

Hardware includes the physical, tangible parts or components of a computer, such as the cabinet, central processing unit, monitor, keyboard, computer data storage, graphics card, sound card, speakers and motherboard.

Software

Software is a set of instructions, data or programs used to operate computers and execute specific tasks.

There are two types of software. Such as,

- ❖ Application Software
- ❖ System Software

Application Software

Application software (app for short) is a program or group of programs designed for end users.

Examples of an application include a word processor, a spreadsheet, an accounting application, a web browser, an email client, a media player, a file viewer, an aeronautical flight simulator, a console game or a photo editor. The collective noun application software refers to all applications collectively.

System Software

System software is software designed to provide a platform for other software.

Examples of system software include operating systems like macOS, Linux OS and Microsoft Windows, computational science software, game engines, industrial automation, and software as a service applications.

OPERATING SYSTEMS



- ❖ An operating system is a program that acts as an interface between the software and the computer hardware.
- ❖ It is an integrated set of specialized programs used to manage overall resources and operations of the computer.
- ❖ It is specialized software that controls and monitors the execution of all other programs that reside in the computer, including application programs and other system software.

Objectives of Operating System

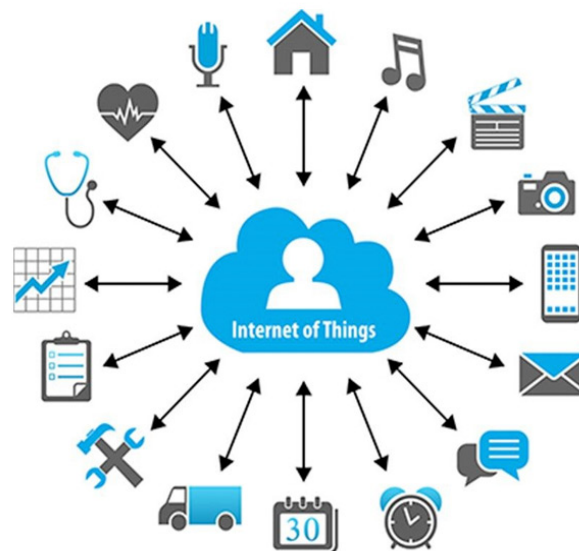
The objectives of the operating system are,

- To make the computer system convenient to use in an efficient manner.
- To hide the details of the hardware resources from the users.
- To provide users a convenient interface to use the computer system.
- To act as an intermediary between the hardware and its users, making it easier for the users to access and use other resources.
- To manage the resources of a computer system.
- To keep track of who is using which resource, granting resource requests, and mediating conflicting requests from different programs and users.
- To provide efficient and fair sharing of resources among users and programs.

UNIT- II

INTERNET

The Internet (portmanteau of interconnected network) is the global system of interconnected computer networks that uses the Internet protocol suite (TCP/IP) to link devices worldwide. It is a network of networks that consists of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies. The Internet carries a vast range of information resources and services, such as the inter-linked hypertext documents and applications of the World Wide Web (WWW), electronic mail, telephony, and file sharing.



WWW

World Wide Web, which is also known as a Web, is a collection of websites or web pages stored in web servers and connected to local computers through the internet. These websites contain text pages, digital images, audios, videos, etc. Users can access the content of these sites from any part of the world over the internet using their devices such as computers, laptops, cell phones, etc. The WWW, along with internet, enables the retrieval and display of text and media to your device.



World Wide Web

HISTORY OF INTERNET

The history of the Internet has its origin in the efforts of wide area networking that originated in several computer science laboratories in the United States, United Kingdom, and France. The U.S. Department of Defense awarded contracts as early as the 1960s, including for the development of the ARPANET project, directed by Robert Taylor and managed by Lawrence Roberts. The first message was sent over the ARPANET in 1969 from computer science Professor Leonard Kleinrock's laboratory at University of California, Los Angeles (UCLA) to the second network node at Stanford Research Institute (SRI).

Packet switching networks such as the NPL network, ARPANET, Merit Network, CYCLADES, and Telenet, were developed in the late 1960s and early 1970s using a variety of communications protocols. Donald Davies first demonstrated packet switching in 1967 at the National Physics Laboratory (NPL) in the UK, which became a testbed for UK research for almost two decades. The ARPANET project led to the development of protocols for internetworking, in which multiple separate networks could be joined into a network of networks. The design included concepts from the French CYCLADES project directed by Louis Pouzin.

In the early 1980s the NSF funded the establishment for national supercomputing centers at several universities, and provided interconnectivity in 1986 with the NSFNET project, which also created network access to the supercomputer

sites in the United States from research and education organizations. Commercial Internet service providers (ISPs) began to emerge in the very late 1980s. The ARPANET was decommissioned in 1990. Limited private connections to parts of the Internet by officially commercial entities emerged in several American cities by late 1989 and 1990, and the NSFNET was decommissioned in 1995, removing the last restrictions on the use of the Internet to carry commercial traffic.

In the 1980s, research at CERN in Switzerland by British computer scientist Tim Berners-Lee resulted in the World Wide Web, linking hypertext documents into an information system, accessible from any node on the network. Since the mid-1990s, the Internet has had a revolutionary impact on culture, commerce, and technology, including the rise of near-instant communication by electronic mail, instant messaging, voice over Internet Protocol (VoIP) telephone calls, two-way interactive video calls, and the World Wide Web with its discussion forums, blogs, social networking, and online shopping sites. The research and education community continues to develop and use advanced networks such as JANET in the United Kingdom and Internet2 in the United States. Increasing amounts of data are transmitted at higher and higher speeds over fiber optic networks operating at 1 Gbit/s, 10 Gbit/s, or more. The Internet's takeover of the global communication landscape was rapid in historical terms: it only communicated 1% of the information flowing through two-way telecommunications networks in the year 1993, already 51% by 2000, and more than 97% of the telecommunicated information by 2007. Today, the Internet continues to grow, driven by ever greater amounts of online information, commerce, entertainment, and social networking. However, the future of the global network may be shaped by regional differences.

USE OF INTERNET

- ❖ Internet helps us to share information from any place in the world
- ❖ Internet is a source of lot of information for education purposes
- ❖ Internet enables fast transfer of news or incidents to people
- ❖ Internet can be used for communication from end of the world to the other
- ❖ Without internet, the world would move slow nowadays

Education : Internet is a valuable source for a lot of information. Data and information related all fields are updated in the internet. Students can spend a few minutes over the internet to read their relevant study materials. Many students use internet for intense research on their projects.

Communication : With internet, communication has become better and easier. One can call and talk to someone over the internet. Video calls are an interesting option with communication through internet. Mailing is one another form of communication, which is widely used in daily corporate life.

Current Updates : Daily updates and current happenings are made available in the internet instantly. Internet is considered the real time hub for all updates about politics, sports, entertainment, science, business and many other fields.

Corporate Base : The corporate world relies on internet for file sharing, data transfer, internal communication and external communication; and many other purposes. In simple words, internet forms the base of the corporate today.

E-Commerce : Other than using internet for business purposes, a business itself can be started and accomplished through the internet. E-Commerce has lot of advantages like reaching the customers easily, giving a lot of information about the business, clearing customer queries instantly and making the payment also possible over the internet.

CONNECTION TO INTERNET

There exist several ways to connect to the internet. Following are these connection types available:

1. Dial-up Connection
2. ISDN
3. DSL
4. Cable TV Internet connections
5. Satellite Internet connections
6. Wireless Internet Connections

Dial-up Connection

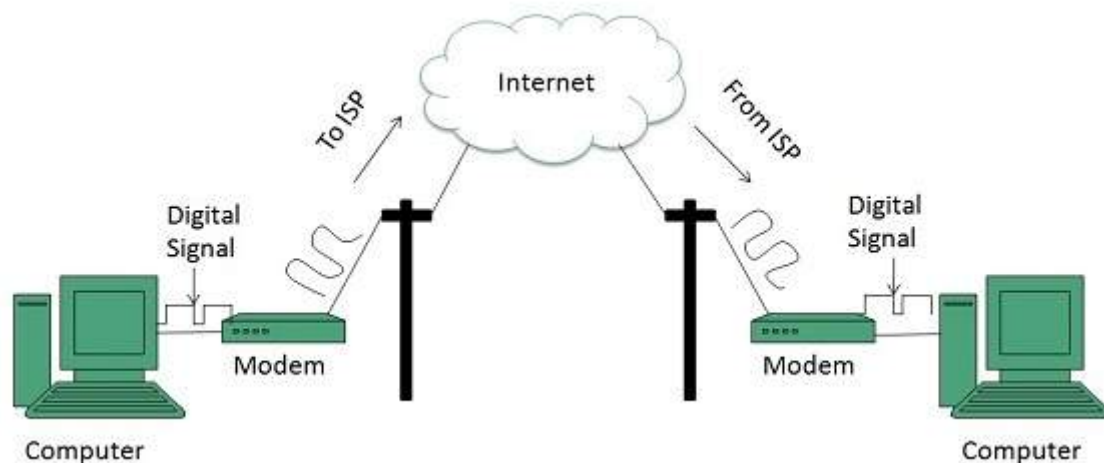
Dial-up connection uses telephone line to connect PC to the internet. It requires a modem to setup dial-up connection. This modem works as an interface between PC and the telephone line.

There is also a communication program that instructs the modem to make a call to specific number provided by an ISP.

Dial-up connection uses either of the following protocols:

1. Serial Line Internet Protocol (SLIP)
2. Point to Point Protocol (PPP)

The following diagram shows the accessing internet using modem:



ISDN

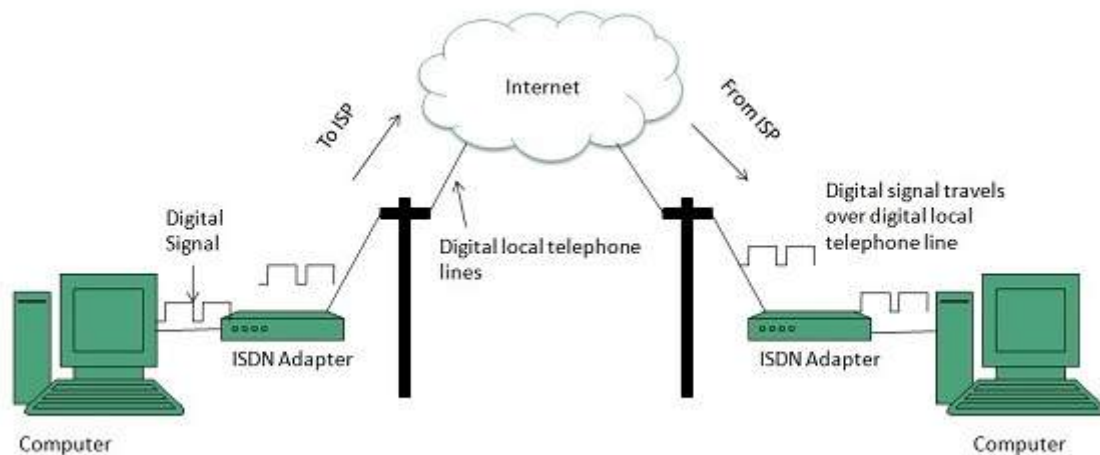
ISDN is acronym of **Integrated Services Digital Network**. It establishes the connection using the phone lines which carry digital signals instead of analog signals. There are two techniques to deliver ISDN services:

1. Basic Rate Interface (BRI)
2. Primary Rate Interface (PRI)

Key points:

- The BRI ISDN consists of three distinct channels on a single ISDN line: two 64kbps B (Bearer) channels and one 16kbps D (Delta or Data) channels.
- The PRI ISDN consists of 23 B channels and one D channels with both have operating capacity of 64kbps individually making a total transmission rate of 1.54Mbps.

The following diagram shows accessing internet using ISDN connection:



DSL

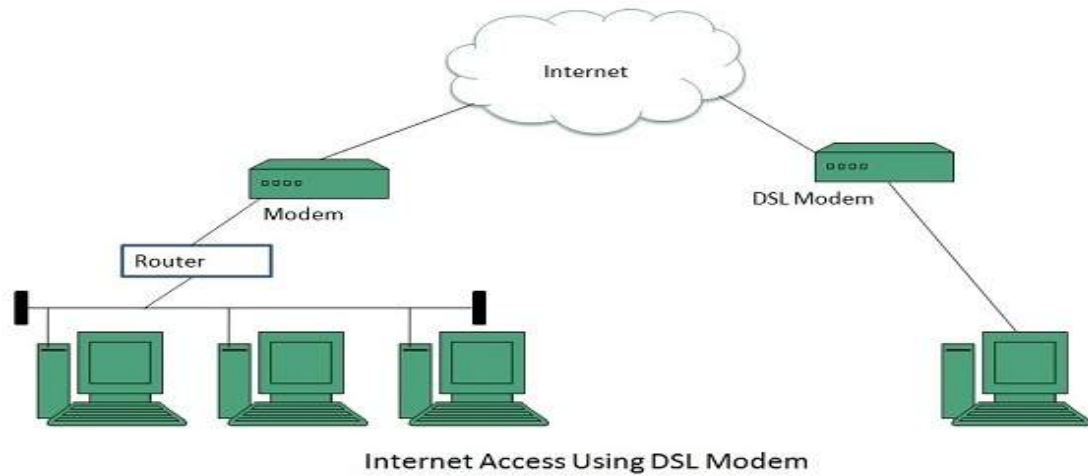
DSL is acronym of **Digital Subscriber Line**. It is a form of broadband connection as it provides connection over ordinary telephone lines.

Following are the several versions of DSL technique available today:

1. Asymmetric DSL (ADSL)
2. Symmetric DSL (SDSL)
3. High bit-rate DSL (HDSL)
4. Rate adaptive DSL (RDSL)
5. Very high bit-rate DSL (VDSL)
6. ISDN DSL (IDSL)

All of the above mentioned technologies differ in their upload and download speed, bit transfer rate and level of service.

The following diagram shows that how we can connect to internet using DSL technology:



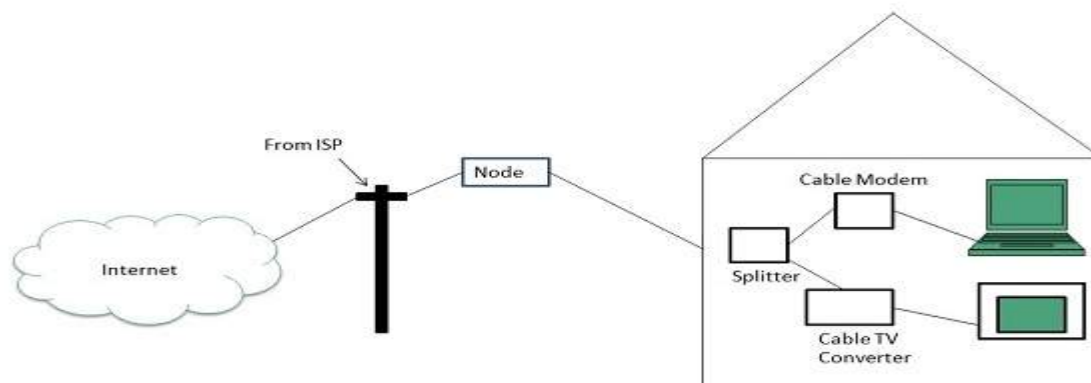
Cable TV Internet Connection

Cable TV Internet connection is provided through Cable TV lines. It uses coaxial cable which is capable of transferring data at much higher speed than common telephone line.

Key Points:

- A cable modem is used to access this service, provided by the cable operator.
- The Cable modem comprises of two connections: one for internet service and other for Cable TV signals.
- Since Cable TV internet connections share a set amount of bandwidth with a group of customers, therefore, data transfer rate also depends on number of customers using the internet at the same time.

The following diagram shows that how internet is accessed using Cable TV connection:



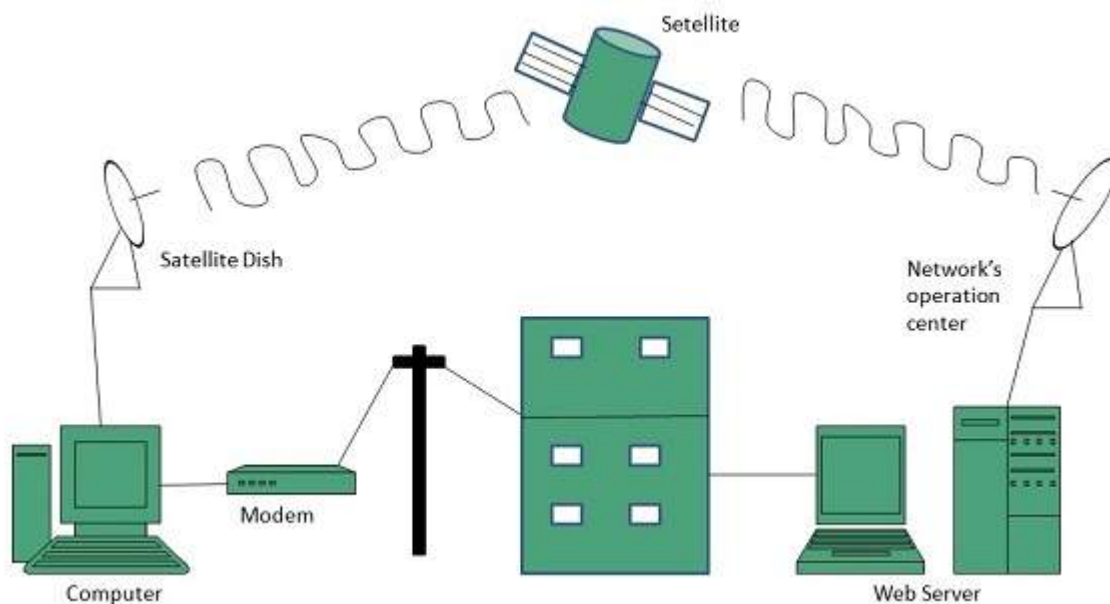
Satellite Internet Connection

Satellite Internet connection offers high speed connection to the internet. There are two types of satellite internet connection: one way connection or two way connection.

In one way connection, we can only download data but if we want to upload, we need a dialup access through ISP over telephone line.

In two way connection, we can download and upload the data by the satellite. It does not require any dialup connection.

The following diagram shows how internet is accessed using satellite internet connection:



Wireless Internet Connection

Wireless Internet Connection makes use of radio frequency bands to connect to the internet and offers a very high speed. The wireless internet connection can be obtained by either WiFi or Bluetooth.

Key Points:

- Wi Fi wireless technology is based on IEEE 802.11 standards which allow the electronic device to connect to the internet.
- Bluetooth wireless technology makes use of short-wavelength radio waves and helps to create personal area network (PAN).

WEB PAGE

A web page (also written as webpage) is a document that acts as a web resource on the World Wide Web. In order to display a web page, a web browser is needed to retrieve web pages from the Internet. When accessed by a web browser it may be displayed as a web page on a monitor or mobile device. Typical web pages are hypertext documents which contain hyperlinks, often referred to as links, for browsing to other web pages.

The term web page usually refers to what is visible, but may also refer to the contents of the source code itself, which is usually a text file containing hypertext written in HTML or a comparable markup language. Most desktop web browsers include the ability to view the source code, but this ability may be missing or hidden on mobile browsers. Web browsers will frequently have to access multiple web resource elements, such as style sheets, scripts, and images, while presenting each web page.

MODEM

Modem is short for "Modulator-Demodulator." It is a hardware component that allows a computer or another device, such as a router or switch, to connect to the Internet. It converts or "modulates" an analog signal from a telephone or cable wire to digital data (1s and 0s) that a computer can recognize. Similarly, it converts digital data from a computer or other device into an analog signal that can be sent over standard telephone lines.

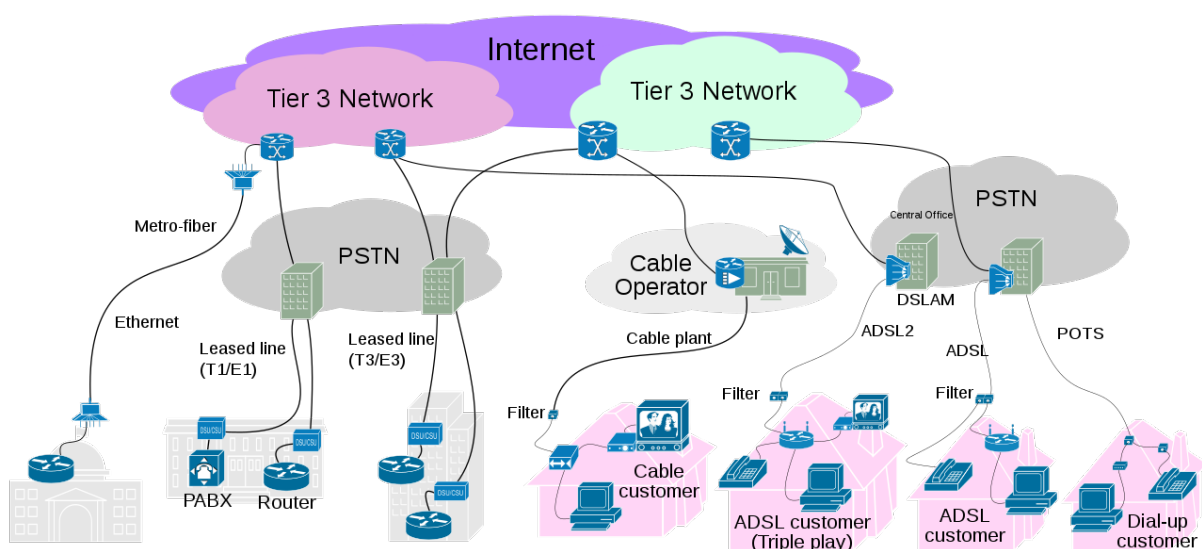
The first modems were "dial-up," meaning they had to dial a phone number to connect to an ISP. These modems operated over standard analog phone lines and used the same frequencies as telephone calls, which limited their maximum data transfer rate to 56 Kbps. Dial-up modems also required full use of the local telephone line, meaning voice calls would interrupt the Internet connection.

Modern modems are typically DSL (Digital Subscriber Line) or cable modems, which are considered "broadband" devices. DSL modems operate over standard telephone lines, but use a wider frequency range. This allows for higher data transfer rates than dial-up modems and enables them to not interfere with phone calls. Cable modems send and receive data over standard cable television lines, which are typically coaxial cables. Most modern cable modems support DOCSIS (Data Over Cable Service Interface Specification), which provides an efficient way of transmitting TV, cable Internet, and digital phone signals over the same cable line.



Modem

INTERNET SERVICE PROVIDERS



An Internet service provider (ISP) is an organization that provides services for accessing, using, or participating in the Internet. Internet service providers may be organized in various forms, such as commercial, community-owned, non-profit, or otherwise privately owned.

Internet services typically provided by ISPs include Internet access, Internet transit, domain name registration, web hosting, Usenet service, and colocation.

E-mail and Voice Mail

Electronic mail (email or e-mail) is a method of exchanging messages ("mail") between people using electronic devices. Invented by Ray Tomlinson, email first entered limited use in the 1960s and by the mid-1970s had taken the form now recognized as email. Email operates across computer networks, which today is primarily the Internet. Some early email systems required the author and the recipient to both be online at the same time, in common with instant messaging. Today's email systems are based on a store-and-forward model. Email servers accept, forward, deliver, and store messages. Neither the users nor their computers are required to be online simultaneously; they need to connect only briefly, typically to a mail server or a webmail interface for as long as it takes to send or receive messages.

Usage

❖ Business and organizational use

Email has been widely accepted by business, governments and non-governmental organizations in the developed world, and it is one of the key parts of an 'e-revolution' in workplace communication (with the other key plank being widespread adoption of high speed Internet). A sponsored 2010 study on workplace communication found 83% of U.S. knowledge workers felt email was critical to their success and productivity at work.

It has some key benefits to business and other organizations, including:

❖ Facilitating logistics

Much of the business world relies on communications between people who are not physically in the same building, area, or even country; setting up and attending an in-person meeting, telephone call, or conference call can be inconvenient, time-consuming, and costly. Email provides a method of exchanging information between two or more people with no set-up costs and that is generally far less expensive than a physical meeting or phone call.

❖ Helping with synchronization

With real time communication by meetings or phone calls, participants must work on the same schedule, and each participant must spend the same amount of time in the meeting or call. Email allows asynchrony: each participant may control their schedule independently.

❖ Reducing cost

Sending an email is much less expensive than sending postal mail, or long distance telephone calls, telex or telegrams.

❖ Increasing speed

❖ Much faster than most of the alternatives.

❖ Creating a "written" record

Unlike a telephone or in-person conversation, email by its nature creates a detailed written record of the communication, the identity of the sender(s) and recipient(s) and the date and time the message was sent. In the event of a contract or legal dispute, saved emails can be used to prove that an individual was advised of certain issues, as each email has the date and time recorded on it.

❖ Email marketing

Email marketing via "opt-in" is often successfully used to send special sales offerings and new product information. Depending on the recipient's culture, email sent without permission, such as an "opt-in", is likely to be viewed as unwelcome "email spam".

❖ Personal use

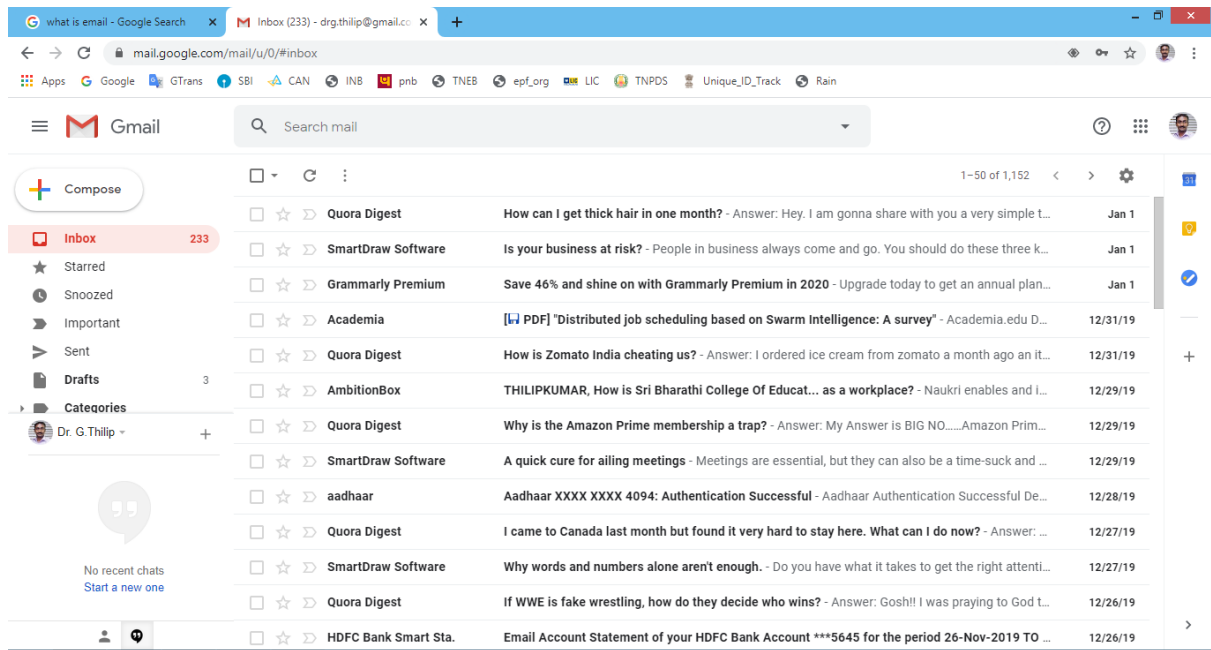
❖ Personal computer

Many users access their personal email from friends and family members using a personal computer in their house or apartment.

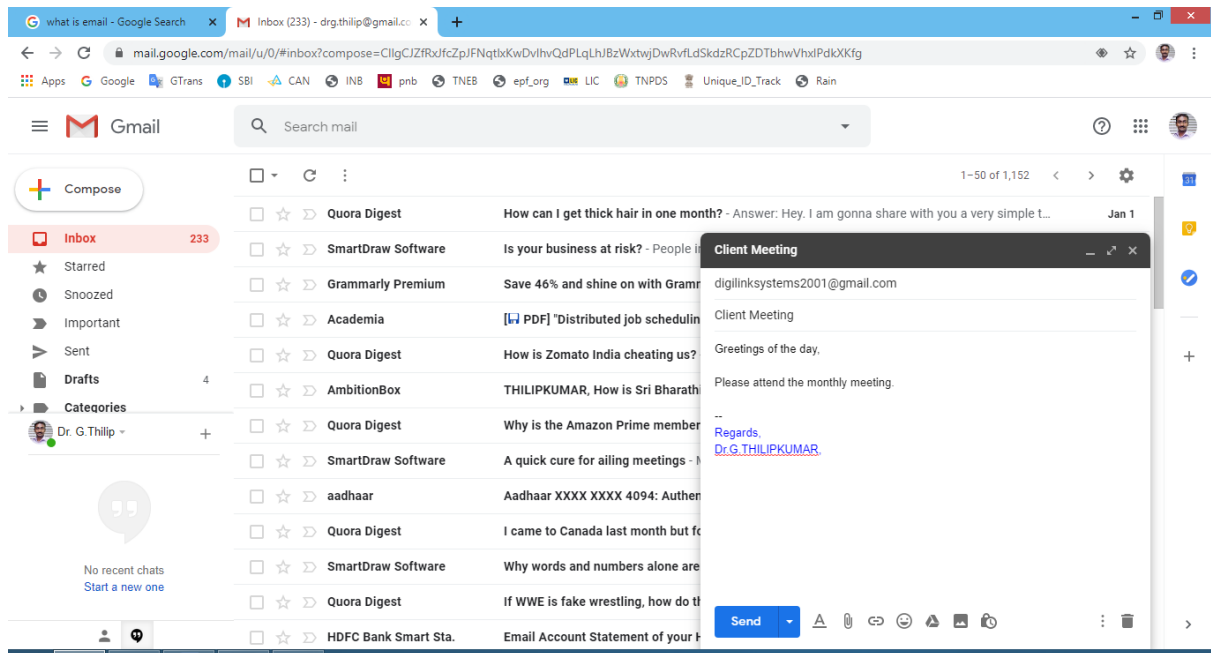
❖ Mobile

Email has become used on smart phones and on all types of computers. Mobile "apps" for email increase accessibility to the medium for users who are out of their home. While in the earliest years of email, users could only access email on desktop computers, in the 2010s, it is possible for users to check their email when they are away from home, whether they are across town or across the world. Alerts can also be sent to the smart phone or other device to notify them immediately of new messages. This has given email the ability to be used for more frequent communication between users and allowed them to check their email and write messages throughout the day. As of 2011, there were approximately 1.4 billion email users worldwide and 50 billion non-spam emails that were sent daily.

For instance, Gmail Inbox

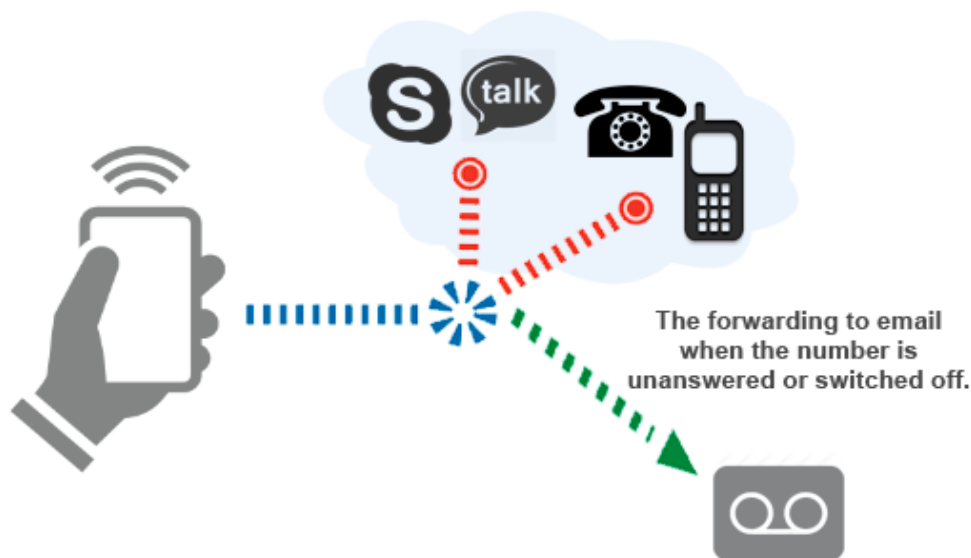


Compose – For sending mails



Voice Mail

A voicemail system (also known as voice message or voice bank) is a computer-based system that allows users and subscribers to exchange personal voice messages; to select and deliver voice information; and to process transactions relating to individuals, organizations, products, and services, using an ordinary telephone. The term is also used more broadly to denote any system of conveying a stored telecommunications voice messages, including using an answering machine. Most cell phone services offer voicemail as a basic feature; many corporate private branch exchanges include versatile internal voice-messaging services, and *98 vertical service code subscription is available to most individual and small business landline subscribers.



Features

Voicemail systems are designed to convey a caller's recorded audio message to a recipient. To do so they contain a user interface to select, play, and manage messages; a delivery method to either play or otherwise deliver the message; and a notification ability to inform the user of a waiting message. Most systems use phone networks, either cellular- or landline-based, as the conduit for all of these functions. Some systems may use multiple telecommunications methods, permitting recipients and callers to retrieve or leave messages through multiple methods such as PCs, PDA, cell phones, or smartphones.

Voice mail Applications

- IVR Voice Recognition
- Corporate voicemail
- Public telephone services
- Unified messaging
- Virtual telephony
- Instant messaging in voice
- Unified messaging with VoIP

CREATING E-MAIL ADDRESS

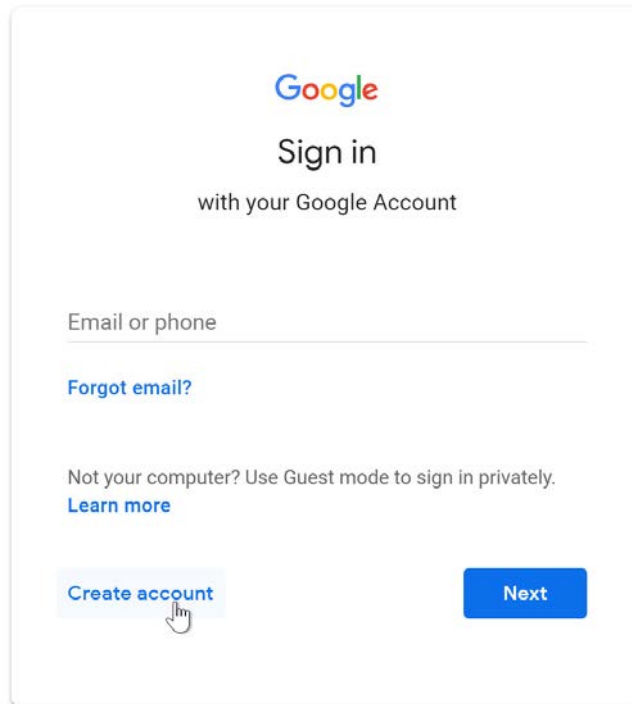
Setting up a Gmail account is easy. You will begin by creating a Google account, and during the quick sign-up process you will choose your Gmail account name. In this lesson, we'll show you how to set up your Google account for Gmail, add and edit contacts, and edit your mail settings.

Setting up a Gmail account

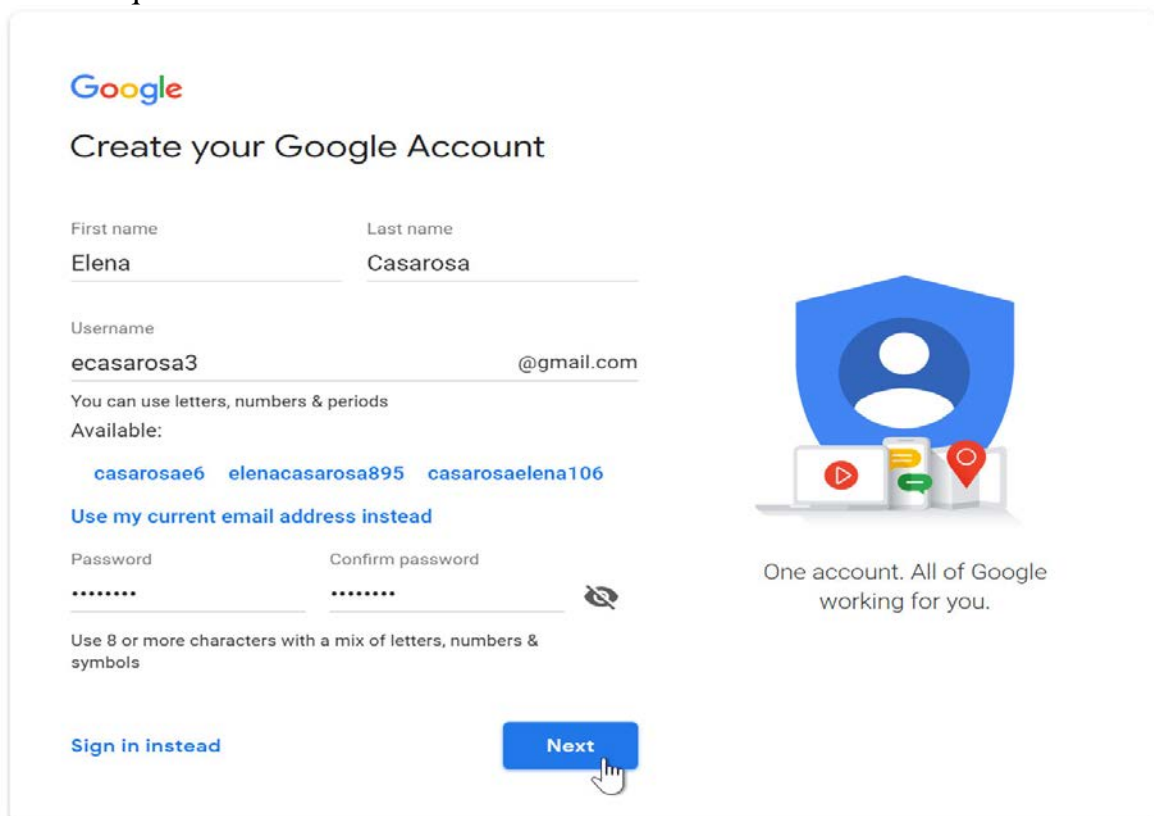
To create a Gmail address, you'll first need to create a Google account. Gmail will redirect you to the Google account sign-up page. You'll need to provide some basic information like your name, birth date, gender, and location. You will also need to choose a name for your new Gmail address. Once you create an account, you'll be able to start adding contacts and adjusting your mail settings.

To create an account:

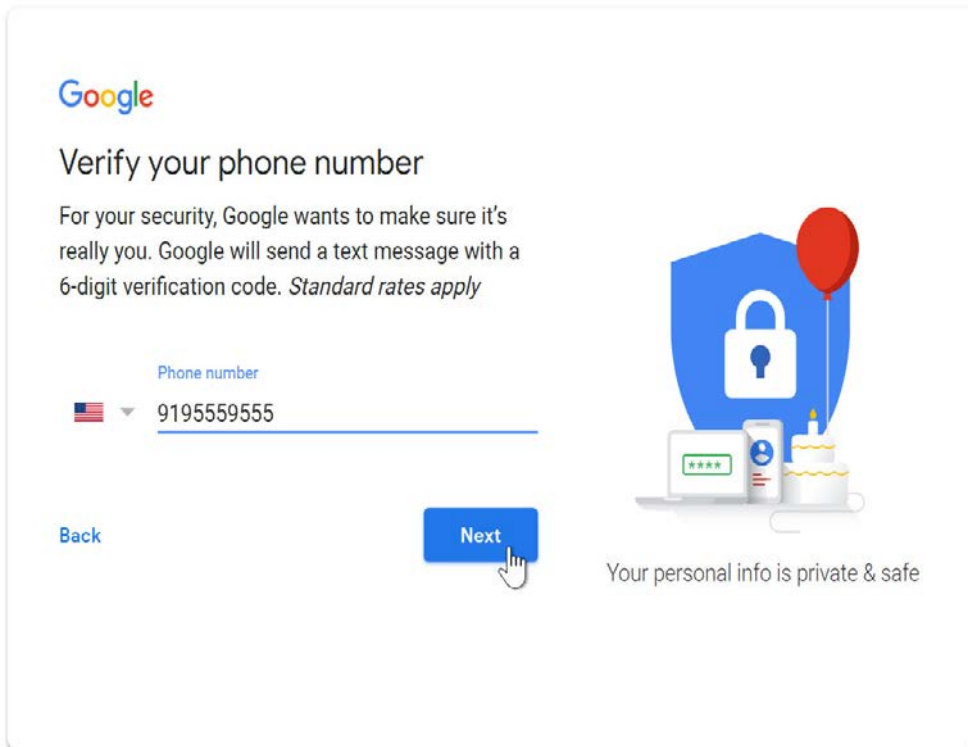
1. Go to www.gmail.com.
2. Click Create account.



3. The sign-up form will appear. Follow the directions by entering the required information.



- Next, enter your phone number to verify your account. Google uses a two-step verification process for your security.




Google


Verify your phone number

For your security, Google wants to make sure it's really you. Google will send a text message with a 6-digit verification code. *Standard rates apply*

Phone number

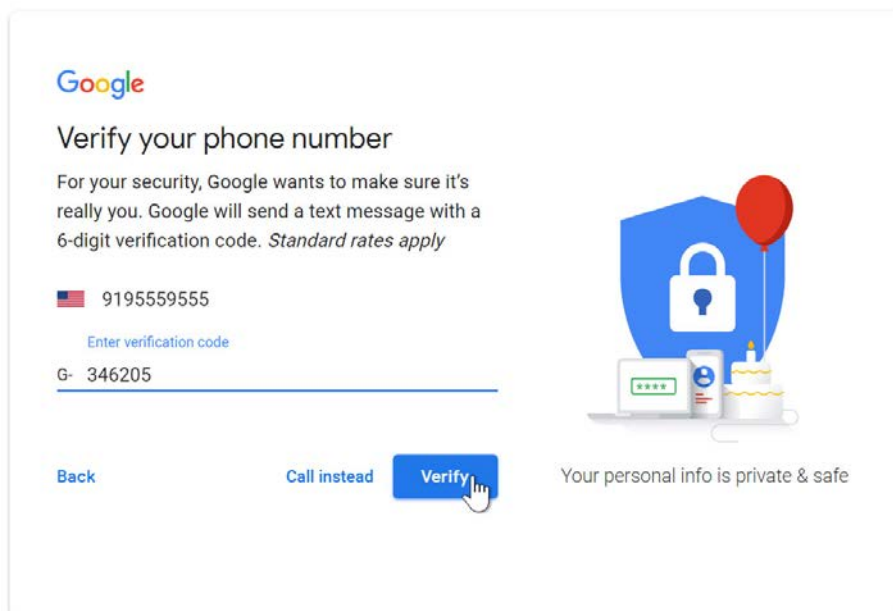
 9195559555

Back Next



Your personal info is private & safe


- You will receive a text message from Google with a verification code. Enter the code to complete the account verification.



Google

Verify your phone number


For your security, Google wants to make sure it's really you. Google will send a text message with a 6-digit verification code. *Standard rates apply*

 9195559555

Enter verification code

G- 346205

Back Call instead Verify




Your personal info is private & safe


6. Next, you will see a form to enter some of your personal information, like your name and birthday.

Google

Elena, welcome to Google

 ecasarosa3@gmail.com

Phone number (optional)

 9195559555

We'll use your number for account security. It won't be visible to others.

Recovery email address (optional)

We'll use it to keep your account secure

Month	Day	Year
March	02	1982

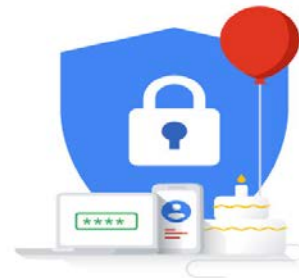
Your birthday

Gender

Female

[Why we ask for this information](#)

[Back](#) [Next](#)



Your personal info is private & safe

7. Review Google's Terms of Service and Privacy Policy, then click I agree.

Google


Privacy and Terms

We also combine this data among our services and across your devices for these purposes. For example, depending on your account settings, we show you ads based on information about your interests, which we can derive from your use of Search and YouTube, and we use data from trillions of search queries to build spell-correction models that we use across all of our services.

You're in control
Depending on your account settings, some of this data may be associated with your Google Account and we treat this data as personal information. You can control how we collect and use this data now by clicking "More Options" below. You can always adjust your controls later or withdraw your consent for the future by visiting My Account (myaccount.google.com).

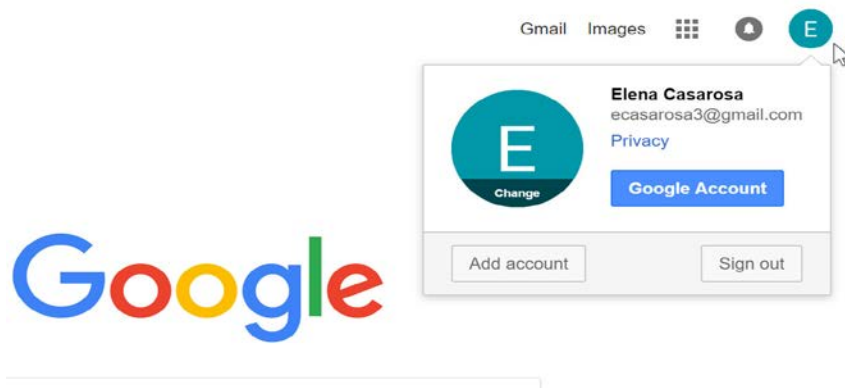
[MORE OPTIONS](#)

[Cancel](#) [I agree](#)



You're in control of the data we collect & how it's used

8. Your account will be created.



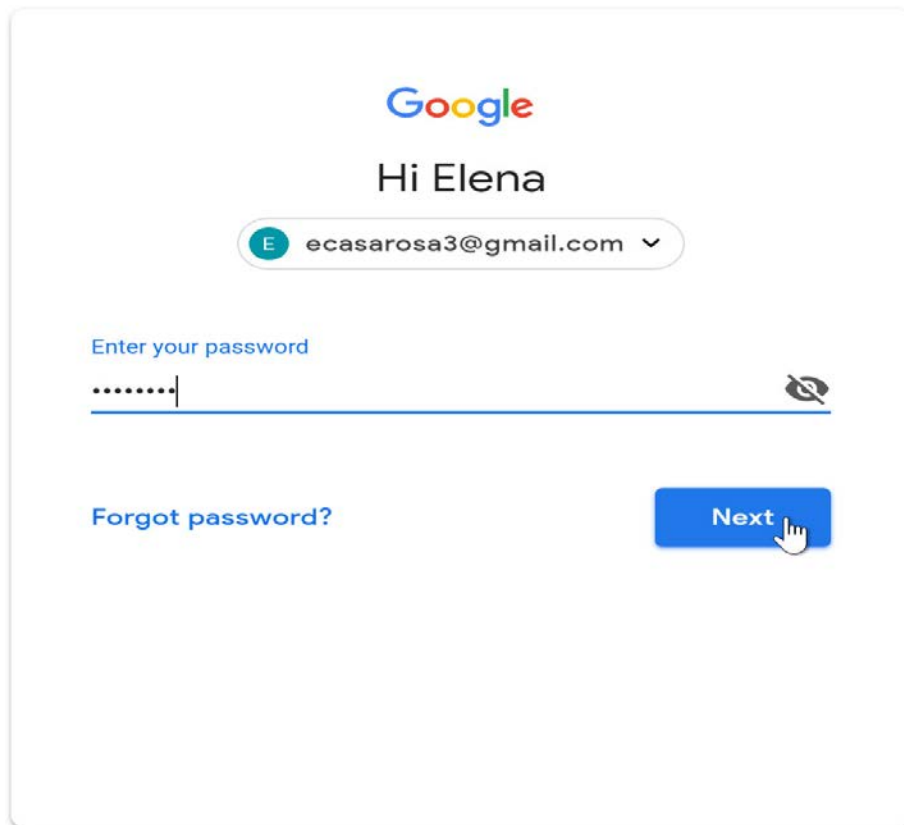
Just like with any online service, it's important to choose a strong password—in other words, one that is difficult for someone else to guess. For more information, review our lesson on creating strong passwords.

Signing in to your account

When you first create your account, you will be automatically signed in. Most of the time, however, you'll need to sign in to your account and sign out when you're done with it. Signing out is especially important if you're using a shared computer (for example, at a library or office) because it prevents others from viewing your emails.

To sign in:

1. Go to www.gmail.com.
2. Type your user name (your email address) and password, then click Next.



To sign out:

In the top-right corner of the page, locate the circle that has your first initial (if you've already selected an avatar image, it will show the image instead). To sign out, click the circle and select Sign out.

