B.ed (1.5) IUB **Computer Application**

Marks distribution

Sessional Marks **20**

1. **Assignments** (5)
2. **Presentation** (5)
3. **Attendance** (10)

**Mid** **(30)**

1. **Mcq** (10)
2. **Short & Long** (20)

**Finals (50)**

Mcq (20)

Short & Long (30)

**LECTURE #1**

**INTRODUCTION TO COMPUTERS**

**Basic Computer Terminology**

Computers are an integral part of every part of human life. A computer in itself is a wide term. It includes various concepts, terms, and terminologies. It is very essential to understand each and every component of a computer and its terminologies to understand a computer as a whole. In this article, we will look at the most basic computer terminology

## Basic Computer Terminologies

### 1. CPU

CPU means ‘Central Processing Unit’. This is the place of computer data handling. Moreover, it does all the data manipulation, calculations and formatting data for output. Hence, whenever someone buys a computer he/she becomes more conscious about the CPU and its capabilities.



The execution of the instructions within the computer system is very fast. It measures it in cycles of time and refers it to as megahertz. That’s why the ‘Mhz’ of a computer’s processor is sometimes referred to as the clock speed. Think about CPUs (and aligned circuitry) beating like a heart, this pulsing/beating is expressed as “MHz” e.g. 2000Mhz.

### 2. RAM

Specifically, RAM stands for “Random Access Memory” or “Ready Access Memory”. It is a temporary notepad where your computer sends information to disk, or to the storage place of instructions from other input devices. The term “random access” indicates that memory locations in RAM are accessible in any order unlike sequential access of a data cassette tape.

### 3. Hard-disk Drive

Your computers hard disk drive is like an audio CD that you possess at home – except your computer can read and write to it. In other words, your computer can take data from your hard drive (to process it in the CPU or place it in RAM to work with).

Also, it can record the results of the work it does back to the disk, which is “writing to disk”. The abbreviation HDD stands for “hard disk drive”.

If you open your HDD, you would find a pancake stack on double-sided disks.

### 4. Floppy Disk

You can also read and write data in a floppy disk. Simply, it is smaller than HDD and portable – you can take it to another computer and read from it there also. Floppy disks are sometimes called “secondary storage devices”. They were known as ‘floppy’ originally because they were 5¼ inches in width and floppy. They could carry almost 720kb of data. Today, however floppy disks are smaller, rigid, and can carry more data like 1.44Mb.

### 5. Hardware

Hardware is the term referring to all the physical parts in a computer system. It includes the monitor, the keyboard, the mouse, the main case which stores the RAM, CPU and the motherboard.

### 6. Software

‘Software’ is the term which refers to the instructions needed to make a computer work. It is intangible in nature. The software is also known as a “program”. Also, it is a set of computer files which are used to perform various actions on the computer. You can have a program for ‘word processing’. The software can be transferred to a compact disk and floppy disks, but usually, sit on the computers hard drive waiting to be “run”.

# Input and Output (I/O) Devices

The computer is a very versatile machine. It can easily process different types of data. To work with these data, we require different types of devices. These devices can help us enter data into the computer. These devices are called input and output devices. They mainly cover devices like mouse, keyboard, printer, speaker, joystick, etc which can be used with a computer.

### The Big Picture

A computer system has three main components: *hardware, software*, and *people*. The equipment associated with a computer system is called *hardware*. *Software* is a set of instructions that tells the hardware what to do. People, however, are the most important component of a computer system - people use the power of the computer for some purpose. In fact, this course will show you that the computer can be a *tool* for just about anyone from a business person, to an artist, to a housekeeper, to a student - an incredibly powerful and flexible tool.

Software is actually a computer *program*. To be more specific, a program is a set of step-by-step instructions that directs the computer to do the tasks you want it to do and to produce the results you want. A computer programmer is a person who writes programs. Most of us do not write programs, we use programs written by someone else. This means we are *users* - people who purchase and use computer software.

### Hardware: Meeting the Machine

What is a computer? A six-year-old called a computer "radio, movies, and television combined!" A ten-year-old described a computer as "a television set you can talk to." The ten-year-old's definition is closer but still does not recognize the computer as a machine that has the power to make changes.

A computer is a machine that can be programmed to accept data (input), process it into useful information (output), and store it away (in a secondary storage device) for safekeeping or later reuse. The processing of input to output is directed by the software but performed by the hardware.

To function, a computer system requires four main aspects of data handling: input, processing, output, and storage. The hardware responsible for these four areas operates as follows:

* Input devices accept data in a form that the computer can use; they then send the data to the processing unit.
* The processor, more formally known as the central processing unit (CPU), has the electronic circuitry that manipulates input data into the information people want. The central processing unit executes computer instructions that are specified in the program.
* Output devices show people the processed data-information in a form that they can use.
* Storage usually means *secondary storage*. Secondary storage consists of devices, such as diskettes, which can store data and programs outside the computer itself. These devices supplement the computer's *memory*, which, as we will see, can hold data and programs only temporarily.

Now let us consider the equipment related to these four aspects of data handling in terms of what you would find on a personal computer.

### Your Personal Computer Hardware

Let us look at the hardware in terms of a personal computer. Suppose you want to do word processing on a personal computer, using the hardware shown in Figure 1.

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| **Figure 1: Personal Computer** |

Word processing software allows you to input data such as an essay, save it, revise and re-save it, and print it whenever you wish. The input device, in this case, is a keyboard, which you use to type in the original essay and any changes you want to make to it. All computers, large and small, must have a central processing unit within the personal computer housing. The central processing unit under the direction of the word processing software accepts the data you input through the keyboard. Processed data from your personal computer is usually output in two forms: on a screen and eventually by a printer. As you key in the essay on the keyboard, it appears on the screen in front of you. After you examine the essay on the screen, make changes, and determine that it is acceptable, you can print the essay on the printer. Your secondary storage device in this case is a diskette, a magnetic medium that stores the essay until it is needed again.

Now we will take a general tour of the hardware needed for input, processing, output, and storage. These same components make up all computer systems, whether small, medium, or large. In this discussion we will try to emphasize the types of hardware you are likely to have seen in your own environment. These topics will be covered in detail in later chapters.

### Input: What Goes In

Input is the data that you put into the computer system for processing. Here are some common ways of feeding input data into the system:

* Typing on a keyboard. Computer keyboards operate in much the same way as electric typewriter keyboards. The computer responds to what you enter; that is, it "echoes" what you type by displaying it on the screen in front of you.
* Pointing with a mouse. A mouse is a device that is moved by hand over a flat surface. As the ball on its underside rotates, the mouse movement causes corresponding movement of a pointer on the computer screen. Pressing buttons on the mouse lets you invoke commands.
* Scanning with a flatbed scanner, wand reader or bar code reader (Figure 3).

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| **Figure 3: Flatbed Scanner** |

* Flatbed scanners act like a copying machine by using light beams to scan a document or picture that is laid upon its glass face. A great way to send pictures through email! Bar scanners, which you have seen in retail stores, use laser beams to read special letters, numbers, or symbols such as the zebra-striped bar codes on many products.

You can input data to a computer in many other interesting ways, including writing, speaking, pointing, or even by just looking at the data. We will examine all these in detail in a later chapter.

### The Processor and Memory: Data Manipulation

In a computer the processor is the center of activity. The processor, as we noted, is also called the central processing unit (CPU). The central processing unit consists of electronic circuits that interpret and execute program instructions, as well as communicate with the input, output, and storage devices.

It is the central processing unit that actually transforms data into information. Data is the raw material to be processed by a computer. Such material can be letters, numbers, or facts like grades in a class, baseball batting averages, or light and dark areas in a photograph. Processed data becomes *information*, data that is organized, meaningful, and useful. In school, for instance, an instructor could enter various student grades (data), which can be processed to produce final grades and perhaps a class average (information). Data that is perhaps uninteresting on its own may become very interesting once it is converted to information. The raw facts (data) about your finances, such as a paycheck or a donation to charity or a medical bill may not be captivating individually, but together, these and other acts can be processed to produce the refund or amount you owe on your income tax return (information).

Computer memory, also known as primary storage, is closely associated with the central processing unit but separate from it. Memory holds the data after it is input to the system and before it is processed; also, memory holds the data after it has been processed but before it has been released to the output device. In addition, memory holds the programs (computer instructions) needed by the central processing unit.

### Output: What Comes Out

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| **Figure 3: Monitor** | **Figure 4: Printer** |

Output, the result produced by the central processing unit, is a computer's whole reason for being. Output is usable information; that is, raw input data that has been processed by the computer into information. The most common forms of output are words, numbers, and graphics. Word output, for example, may be the letters and memos prepared by office people using word processing software. Other workers may be more interested in numbers, such as those found in formulas, schedules, and budgets. In many cases numbers can be understood more easily when output in the form of charts and graphics.

The most common output devices are computer screens (Figure 3)and printers (Figure 4). Screens can vary in their forms of display, producing text, numbers, symbols, art, photographs, and even video-in full color. Printers produce printed reports as instructed by a computer program, often in full color.

You can produce output from a computer in other ways, including film and voice output. We will examine all output methods in detail in a later chapter.

### Secondary Storage

Secondary storage provides additional storage separate from memory. Secondary storage has several advantages. For instance, it would be unwise for a college registrar to try to keep the grades of all the students in the college in the computer's memory; if this were done, the computer would probably not have room to store anything else. Also, memory holds data and programs only temporarily. Secondary storage is needed for large volumes of data and also for data that must persist after the computer is turned off.

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| **Figure 5: Hard Disk** | **Figure 6: Hard Disk Pack** |

The two most common secondary storage mediums are magnetic disk and magnetic tape. A magnetic disk can be a diskette or a hard disk. A diskette is usually 3-1/2 inches in diameter (in some rare cases older disks are 5-1/4 inches). A diskette is removable so you can take your data with you. Hard disks, shown in Figure 5, have more storage capacity than diskettes and also offer faster access to the data they hold. Hard disks are often contained in disk packs shown in Figure 6 that is built into the computer so your data stays with the computer. Disk data is read by disk drives. Personal computer disk drives read diskettes; most personal computers also have hard disk drives. Modern personal computers are starting to come with removable storage media, like Zip disks. These disks are slightly larger than a diskette and can be inserted and removed like a diskette, but hold much more data than a diskette and are faster for the CPU to access than a diskette. Most modern computers also come with a CD-ROM drive. A CD is an *optical disk*, it uses a laser beam to read the disk. CD's are removable and store large volumes of data relatively inexpensively. Some CD drives are *read only memory (ROM)*, which means that your computer can read programs from CD's, but you can not save data to the CD yourself. Recently CD-RW drives and disks have become widely available that allow you to create your own CDs by "writing" data such as music and photos to the CD.

Magnetic tape, which comes on a reel or cartridge shown in Figure 7,

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| **Figure 7: Magnetic Tape** |

is similar to tape that is played on a tape recorder. Magnetic tape reels are mounted on tape drives when the data on them needs to be read by the computer system or when new data is to be written on the tape. Magnetic tape is usually used for creating backup copies of large volumes of data because tape is very inexpensive compared to disks and CDs.

We will study storage media in a later part of the course.

### The Complete Hardware System

The hardware devices attached to the computer are called peripheral equipment. Peripheral equipment includes all input, output, and secondary storage devices. In the case of personal computers, some of the input, output, and storage devices are built into the same physical unit. In many personal computers, the CPU and disk drive are all contained in the same housing; the keyboard, mouse, and screen are separate.

In larger computer systems, however, the input, processing, output, and storage functions may be in separate rooms, separate buildings, or even separate countries. For example, data may be input on terminals at a branch bank and then transmitted to the central processing unit at the headquarters bank. The information produced by the central processing unit may then be transmitted to the international offices, where it is printed out. Meanwhile, disks with stored data may be kept in bank headquarters and duplicate data kept on disk or tape in a warehouse across town for safekeeping.

Although the equipment may vary widely, from the simplest computer to the most powerful, by and large the four elements of a computer system remain the same: input, processing, output, and storage. Now let us look at the way computers have been traditionally classified.

### Classification of Computers

Computers come in sizes from tiny to monstrous, in both appearance and power. The size of a computer that a person or an organization needs depends on the computing requirements. Clearly, the National Weather Service, keeping watch on the weather fronts of many continents, has requirements different from those of a car dealer's service department that is trying to keep track of its parts inventory. And the requirements of both of them are different from the needs of a salesperson using a small laptop computer to record client orders on a sales trip.   
  
*Supercomputers*   
The mightiest computers-and, of course, the most expensive-are known as supercomputers (Figure 1-6a). Supercomputers process billions of instructions per second. Most people do not have a direct need for the speed and power of a supercomputer. In fact, for many years supercomputer customers were an exclusive group: agencies of the federal government. The federal government uses supercomputers for tasks that require mammoth data manipulation, such as worldwide weather forecasting and weapons research. But now supercomputers are moving toward the mainstream, for activities as varied as stock analysis, automobile design, special effects for movies, and even sophisticated artworks (Figure 1-7).   
  
*Mainframes*

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| **Figure 8: Mainframe Computer** |
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| **Figure 9: Mainframe Computer** |

In the jargon of the computer trade, large computers are called mainframes. Mainframes are capable of processing data at very high speeds-millions of instructions per second-and have access to billions of characters of data. The price of these large systems can vary from several hundred thousand to many millions of dollars. With that kind of price tag, you will not buy a mainframe for just any purpose. Their principal use is for processing vast amounts of data quickly, so some of the obvious customers are banks, insurance companies, and manufacturers. But this list is not all-inclusive; other types of customers are large mail-order houses, airlines with sophisticated reservation systems, government accounting services, aerospace companies doing complex aircraft design, and the like.

In the 1960s and 1970s mainframes dominated the computer landscape. The 80s and early 90s had many people predicting that, with the advent of very powerful and affordable personal computers, that mainframes would become extinct like the huge dinosaurs in nature's progression. However, with the incredible explosion of the Internet in the mid 90s, mainframes may have been reborn. The current World Wide Web is based on the *client/server* paradigm, where *servers* on the Internet, like LL Bean's Web Server, provide services, like online shopping, to millions of people using personal computers as clients. The capacity required of these servers may be what saves the mainframe!   
  
*Personal Computers*   
Personal computers are often called PCs. They range in price from a few hundred dollars to a few thousand dollars while providing more computing power than mainframes of the 1970s that filled entire rooms. A PC usually comes with a *tower* that holds the main circuit boards and disk drives of the computer, and a collection of *peripherals*, such as a keyboard, mouse, and monitor.

In the new millennium there are two main kinds of PCs: the Apple Macintosh line, and "all of the others". The term "PC" or "IBM" refers to "all of the others", which is a historical artifact back to the days when IBM and Apple were the two main competitors in the market and IBM called its machine a "personal computer". So, although a Macintosh is a personal computer, the term "PC" often means a machine other than a Macintosh.

Macintoshes and PCs, in general, can not run software that was made for the other, without some special technology added to them. They run on different microprocessors. A PC is based on a microprocessor originally made by the Intel company (such as Intel's *Pentium*, although other companies such as AMD now make "Pentium clones" that can run PC software.). Macintoshes use a PowerPC processor, or on older Macintoshes a processor made by Motorola. Also, the operating system software that runs the two kinds of computers is different. PCs usually use an Operating System made by Microsoft, like *Windows98* or *Windows2000*. Macintoshes use a different operating system, called *MacOS*, made by Apple. There are efforts to make the two kinds of computers compatible. As Apple continues to lose its share of the market, Apple has the incentive to either join the rest or disappear.

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| **Figure 10: Notebook Computer** |

*Notebook Computers*   
A computer that fits in a briefcase? A computer that weighs less than a newborn baby? A computer you do not have to plug in? A computer to use on your lap on an airplane? Yes, to all these questions. Notebook computers, also known as Laptop computers, are wonderfully portable and functional, and popular with travelers who need a computer that can go with them. Most notebooks accept diskettes or network connections, so it is easy to move data from one computer to another. Notebooks are not as inexpensive as their size might suggest; many carry a price tag equivalent to a full-size personal computer for business. They typically have almost as much computer capacity in terms of speed and storage. They do not offer the full expandability for supporting peripherals as a personal computer. For instance a MIDI computer music keyboard may not be adaptable to a notebook computer. However, more and more peripherals are providing connectivity to laptops through a technology called PCMCIA which allows peripherals to be plugged into notebook computers through credit card sized cards that easily slip into the side of a notebook computer. Normal sized PCs are still more powerful, flexible, and cheaper, but notebooks are becoming more competitive every day.

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| **Figure 11: Handheld Computer** |

*Getting Smaller Still*   
Using a pen-like stylus, pen-based computers accept handwritten input directly on a screen. Users of the handheld pen-based computers, also called personal digital assistants (PDA), like the Palm, enjoy having applications such as calendars, address books, and games readily available. Recent PDA's offer Internet access, email, and cellular telephoning.

### Internet and Networking

The Internet is the most widely recognized and used form of *computer network* . Networks connect computers to each other to allow communication and sharing of services. Originally, a computer user kept all the computer hardware in one place; that is, it was centralized in one room. Anyone wanting computer access had to go to where the computer was located. Although this is still sometimes the case, most computer systems are decentralized. That is, the computer itself and some storage devices may be in one place, but the devices to access the computer-terminals or even other computers-are scattered among the users. These devices are usually connected to the computer by telephone lines. For instance, the computer and storage that has the information on your checking account may be located in bank headquarters. but the terminals are located in branch banks all over town so a teller in any branch can find out what your balance is. The subject of decentralization is intimately tied to data communications, the process of exchanging data over communications facilities, such as the telephone.

A network uses communications equipment to connect computers and their resources. In one type of network, a local area network (LAN), personal computers in an office are hooked together so that users can communicate with each other. Users can operate their personal computers independently or in cooperation with other PCs or mainframes to exchange data and share resources. We discuss computer networks in detail in a later chapter.

### Software: Telling the Machine What to Do

In the past, when people thought about computers, they thought about machines. The tapping on the keyboard, the clacking of the printers, the rumble of whirling disk drives, the changing flashes of color on a computer screen-these are the attention-getters. However, it is really the software- the planned, step-by-step instructions required to turn data into information-that makes a computer useful.

**Categories of Software.**   
Generally speaking, software can be categorized as system software or applications software. A subset of system software is an operating system, the underlying software found on all computers. Applications software, software that is applied, can be used to solve a particular problem or to perform a particular task. Applications software may be either custom or packaged. Many large organizations pay programmers to write custom software, software that is specifically tailored to their needs. We will use several forms of system software (e.g. Windows 2000, MacOS) and several application software programs (e.g. Word, Excel, PowerPoint) in this course.

**Some Task-Oriented Software.**   
Most users, whether at home or in business, are drawn to task-oriented software, sometimes called productivity software, that can make their work faster and their lives easier. The collective set of business tasks is limited, and the number of general paths towards performing these tasks is limited, too. Thus, the tasks and the software solutions fall, for the most part, into just a few categories, which can be found in most business environments. These major categories are word processing (including desktop publishing), spreadsheets, database management, graphics, and communications. We will present a brief description of each category here.   
  
*Word Processing/Desktop Publishing*   
The most widely used personal computer software is word processing software. This software lets you create, edit, format, store, and print text and graphics in one document. In this definition it is the three words in the middle-edit, format, and store-that reveal the difference between word processing and plain typing. Since you can store the memo or document you type on disk, you can retrieve it another time, change it, reprint it, or do whatever you like with it. You can see what a great time-saver word processing can be: unchanged parts of the stored document do not need to be retyped; the whole revised document can he reprinted as if new.

As the number of features in word processing packages has grown, word processing has crossed the border into desktop publishing territory. Desktop publishing packages are usually better than word processing packages at meeting high-level publishing needs, especially when it comes to typesetting and color reproduction. Many magazines and newspapers today rely on desktop publishing software. Businesses use it to produce professional-looking newsletters, reports, and brochures-both to improve internal communication and to make a better impression on the outside world.

*Electronic Spreadsheets*   
Spreadsheets, made up of columns and rows, have been used as business tools for centuries (Figure 11). A manual spreadsheet can be tedious to prepare and, when there are changes, a considerable amount of calculation may need to he redone. An electronic spreadsheet is still a spreadsheet, but the computer does the work. In particular, spreadsheet software automatically recalculates the results when a number is changed. This capability lets business people try different combinations of numbers and obtain the results quickly. This ability to ask "What if . . . ?" helps business people make better, faster decisions. In this course, we use Microsoft's *Excel* spreadsheet application software.

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| **Figure 11: Spreadsheet Software** |

*Database Management*   
Software used for database management-the management of a collection of interrelated facts-handles data in several ways. The software can store data, update it, manipulate it, report it in a variety of views, and print it in as many forms. By the time the data is in the reporting stage-given to a user in a useful form-it has become information. A concert promoter, for example, can store and change data about upcoming concert dates, seating, ticket prices, and sales. After this is done, the promoter can use the software to retrieve information, such as the number of tickets sold in each price range or the percentage of tickets sold the day before the concert. Database software can be useful for anyone who must keep track of a large number of facts. Database software is shown in Figure 12.

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| **Figure 12: Database Software** |

*Graphics*   
It might seem wasteful to show graphics to business people when standard computer printouts are readily available. However, graphics, maps, and charts can help people compare data and spot trends more easily, and make decisions more quickly. In addition, visual information is usually more compelling than a page of numbers. We use Microsoft's *PowerPoint* and Adobe's *Photoshop* application software for graphics. We use it in two ways: for doing original drawings, and for creating visual aids to project as a support to an oral presentation.  
  
*Communications*   
We have already described communications in a general way. From the viewpoint of a worker with a personal computer at home, communications means-in simple terms-that he or she can hook a phone up to the computer and communicate with the computer at the office, or get at data stored in someone else's computer in another location.  We use Microsoft's *Internet Explorer* application software for doing email, World Wide Web browsing, and participating in Internet discussion groups

**Email**

Electronic mail is a method of exchanging messages 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.

The general format of an email address is local-part@domain, and a specific example is jsmith@example.com. An address consists of two parts. The part before the @ symbol (local-part) identifies the name of a mailbox. This is often the username of the recipient, e.g., jsmith.

**Parts of an email message**

* Subject. Subject is a description of the topic of the message and displays in most email systems that list email messages individually. ...
* Sender (From). This is the sender's Internet email address. ...
* Date and time received (On). ...
* Reply-to. ...
* Recipient (To:). ...
* Recipient email address. ...
* Attachments.
* Cc , BCC

**EMAIL SERVICE PROVIDER**

Here, we shall look at 11 solid email services that you should consider if you are planning to switch email service providers.

* Gmail. Gmail is arguably the best email service provider at the moment. ...
* Zoho Mail. ...
* Outlook.com (Reinvented Hotmail) ...
* Mail.com. ...
* Yahoo! Mail. ...
* GMX. ...
* ProtonMail. ...
* AOL Mail.

Most popular email service provider

Hotmail

Hotmail is the most popular email service with 325 million unique visitors, followed by Yahoo with 298 million and Gmail with 289 million, according to data from ComScore released in 2012

**WHAT IS BACKUP**

In information technology, a backup, or data backup is a copy of computer data taken and stored elsewhere so that it may be used to restore the original after a data loss event. The verb form, referring to the process of doing so, is "back up", whereas the noun and adjective form is "backup".

**WHAT IS RECOVERY**

PC recovery is the process of recovering a PC from software- or hardware-based problems and restoring it to normal working condition. It enables PC users to regain basic operations on their computers after experiencing a crash, corruption, physical/technical error or other problems that have made the PC inaccessible.

**What is Cloud Computing?**

Cloud computing is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user. The term is generally used to describe data centers available to many users over the Internet.

How it works?

Information and data is stored on physical or virtual servers, which are maintained and controlled by a cloud computing provider, such as Amazon and their AWS product. As a personal or business cloud computing user, you access your stored information on the 'cloud', via an Internet connection.

DATABASE

A database management system (DBMS) is system software for creating and managing databases. The DBMS provides users and programmers with a systematic way to create, retrieve, update and manage data.A DBMS makes it possible for end users to create, read, update and delete data in a database.

DDBMS

A distributed database is a database in which not all storage devices are attached to a common processor. It may be stored in multiple computers, located in the same physical location; or may be dispersed over a network of interconnected computers.

**PRIVACY AND SECURITY**

Security is about the safeguarding of data, whereas privacy is about the safeguarding of user identity. ... Security refers to protection against the unauthorized access of data. We put security controls in place to limit who can access the information

Units of measurements

Unit of Measurements Storage measurements: The basic unit used in computer data storage is called a bit (binary digit). Computers use these little bits, which are composed of ones and zeros, to do things and talk to other computers. All your files, for instance, are kept in the computer as binary files and translated into words and pictures by the software (which is also ones and zeros). This two number system, is called a “binary number system” since it has only two numbers in it. The decimal number system in contrast has ten unique digits, zero through nine.

Computer Storage units

Bit BIT 0 or 1 Kilobyte KB 1024 bytes Megabyte MB 1024 kilobytes Gigabyte GB 1024 megabytes Terabyte TB 1024 gigabytes

Size example • 1 bit - answer to an yes/no question • 1 byte - a number from 0 to 255. • 90 bytes: enough to store a typical line of text from a book. • 4 KB: about one page of text. • 120 KB: the text of a typical pocket book. • 3 MB - a three minute song (128k bitrate) • 650-900 MB - an CD-ROM • 1 GB -114 minutes of uncompressed CD-quality audio at 1.4 Mbit/s • 8-16 GB - size of a normal flash drive

**Speed measurement**

: The speed of Central Processing Unit (CPU) is measured by Hertz (Hz), Which represent a CPU cycle. The speed of CPU is known as Computer Speed. CPU SPEED MEASURES 1 hertz or Hz 1 cycle per second 1 MHz 1 million cycles per second or 1000 Hz 1 GHz 1 billion cycles per second or 1000 MHz

**COMPUTER CLASSIFICATION**

Computers classification\*\*\* Computers can be generally classified by size and power as follows, though there is Considerable overlap: • Personal computer: A small, single-user computer based on a microprocessor. In addition to the microprocessor, a personal computer has a keyboard for entering data, a monitor for displaying information, and a storage device for saving data.

• workstation : A powerful, single-user computer. A workstation is like a personal computer, but it has a more powerful microprocessor and a higher-quality monitor.

• minicomputer : A multi-user computer capable of supporting from 10 to hundreds of users simultaneously.

• mainframe : A powerful multi-user computer capable of supporting many hundreds or thousands of users simultaneously.

• supercomputer : An extremely fast computer that can perform hundreds of millions of instructions per second.

Laptop and Smartphone Computers LAPTOP: A laptop is a battery or AC-powered personal computer that can be easily carried and used in a variety of locations. Many laptops are designed to have all of the functionality of a desktop computer, whichmeans they can generally run the same software and open the same types of files. However, some laptops, such as netbooks, sacrifice some functionality in order to be even more portable.

Netbook: A netbook is a type of laptop that is designed to be even more portable. Netbooks are often cheaper than laptops or desktops. They are generally less powerful than other types of computers, but they provide enough power for email and internet access, which is where the name "netbook" comes from.

Mobile Device: A mobile device is basically any handheld computer. It is designed to be extremely portable, often fitting in the palm of your hand or in your pocket. Some mobile devices are more powerful, and they allow you to do many of the same things you can do with a desktop or laptop computer. These include tablet computers, e-readers, and smartphones.

Tablet Computers: Like laptops, tablet computers are designed to be portable. However, they provide a very different computing experience. The most obvious difference is that tablet computers don't have keyboards or touchpads. Instead, the entire screen is touch-sensitive, allowing you to type on a virtual keyboard and use your finger as a mouse pointer. Tablet computers are mostly designed for consuming media, and they are optimized for tasks like web browsing, watching videos, reading e-books, and playing games. For many people, a "regular" computer like a desktop or laptop is still needed in order to use some programs. However, the convenience of a tablet computer means that it may be ideal as a second computer.

Smartphones: A smartphone is a powerful mobile phone that is designed to run a variety of applications in addition to phone service. They are basically small tablet computers, and they can be used for web browsing, watching videos, reading e-books, playing games and more.

**CHARACTERISTICS OF COMPUTER**

Characteristics of Computer Speed, accuracy, diligence, storage capability and versatility are some of the key characteristics of a computer. A brief overview of these characteristics are

• Speed: The computer can process data very fast, at the rate of millions of instructions per second. Some calculations that would have taken hours and days to complete otherwise, can be completed in a few seconds using the computer. For example, calculation and generation of salary slips of thousands of employees of an organization, weather forecasting that requires analysis of a large amount of data related to temperature, pressure and humidity of various places, etc.

• Accuracy: Computer provides a high degree of accuracy. For example, the computer can accurately give the result of division of any two numbers up to 10 decimal places.

• Diligence: When used for a longer period of time, the computer does not get tired or fatigued. It can perform long and complex calculations with the same speed and accuracy from the start till the end.

• Storage Capability: Large volumes of data and information can be stored in the computer and also retrieved whenever required. A limited amount of data can be stored, temporarily, in the primary memory. Secondary storage devices like floppy disk and compact disk can store a large amount of data permanently.

• Versatility: Computer is versatile in nature. It can perform different types of tasks with the same ease. At one moment you can use the computer to prepare a letter document and in the next moment you may play music or print a document. Computers have several limitations too. Computer can only perform tasks that it has been programmed to do.

Computer cannot do any work without instructions from the user. It executes instructions as specified by the user and does not take its own decisions.

**Computer Viruses**

\* Viruses: A virus is a small piece of software that piggybacks on real programs. For example, a virus might attach itself to a program such as a spreadsheet program. Each time the spreadsheet program runs, the virus runs, too, and it has the chance to reproduce (by attaching to other programs) or wreak havoc.

•E-mail viruses: An e-mail virus travels as an attachment to e-mail messages, and usually replicates itself by automatically mailing itself to dozens of people in the victim's e-mail address book. Some e-mail viruses don't even require a double-click -- they launch when you view the infected message in the preview pane of your e-mail software [source: Johnson].

•Trojan horses: A Trojan horse is simply a computer program. The program claims to do one thing (it may claim to be a game) but instead does damage when you run it (it may erase your hard disk). Trojan horses have no way to replicate automatically.

•Worms: A worm is a small piece of software that uses computer networks and security holes to replicate itself. A copy of the worm scans the network for another machine that has a specific security hole. It copies itself to the new machine using the security hole, and then starts replicating from there, as well.

**What are some tips to avoid viruses and lessen their impact?**

\*  Install anti-virus software from a reputable vendor. Update it and use it regularly.

 In addition to scanning for viruses on a regular basis, install an "on access" scanner (included in most anti-virus software packages) and configure it to start each time you start up your computer. This will protect your system by checking for viruses each time you run an executable file.

 Use a virus scan before you open any new programs or files that may contain executable code. This includes packaged software that you buy from the store as well as any program you might download from the Internet.

 If you are a member of an online community or chat room, be very careful about accepting files or clicking links that you find or that people send you within the community.

 Make sure you back up your data (documents, bookmark files, important email messages, etc.) on disc so that in the event of a virus infection, you do not lose valuable work.

**Information Network**

LAN

A LAN (Local Area Network) is a system whereby individual PCs are connected together within a company or organization

WAN

A WAN (Wide Area Network) as the name implies allows you to connect to other computers over a wider area (i.e. the whole world).

**Uses of Network**

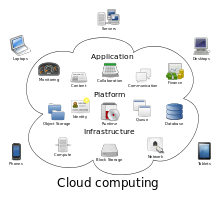
If ten people are working together within an office it makes sense for them all to be connected.

•In this way the office can have a single printer and all ten people can print to it. •In a similar way other devices such as modems or scanners can be shared. •Even more useful is the ability to share information when connected to a network.

**Computer Accessories**

Modem Short for “MODulate/DEModulate”. The modem sends information from your computer across the telephone system.

The modem at the other end of the phone line, converts the signal back into a format that can be used by the receiving computer.

[](https://en.wikipedia.org/wiki/File:Cloud_computing.svg)

**Cloud computing** is shared pools of configurable computer [system resources](https://en.wikipedia.org/wiki/System_resource) and higher-level services that can be rapidly [provisioned](https://en.wikipedia.org/wiki/Provisioning) with minimal management effort, often over the [Internet](https://en.wikipedia.org/wiki/Internet). Cloud computing relies on sharing of resources to achieve coherence and [economies of scale](https://en.wikipedia.org/wiki/Economies_of_scale), similar to a [public utility](https://en.wikipedia.org/wiki/Public_utility).

Cloud computing shares characteristics with:

* [Client–server model](https://en.wikipedia.org/wiki/Client%E2%80%93server_model)—*Client–server computing* refers broadly to any [distributed application](https://en.wikipedia.org/wiki/Distributed_application) that distinguishes between service providers (servers) and service requestors (clients)
* [Computer bureau](https://en.wikipedia.org/wiki/Computer_bureau)—A [service bureau](https://en.wikipedia.org/wiki/Service_bureau) providing computer services, particularly from the 1960s to 1980s.
* [Grid computing](https://en.wikipedia.org/wiki/Grid_computing)—"A form of distributed and parallel computing, whereby a 'super and virtual computer' is composed of a [cluster](https://en.wikipedia.org/wiki/Cluster_(computing)) of networked, [loosely coupled](https://en.wikipedia.org/wiki/Loose_coupling) computers acting in concert to perform very large tasks."
* [Fog computing](https://en.wikipedia.org/wiki/Fog_computing)—Distributed computing paradigm that provides data, compute, storage and application services closer to client or near-user edge devices, such as network routers. Furthermore, fog computing handles data at the network level, on smart devices and on the end-user client side (e.g. mobile devices), instead of sending data to a remote location for processing.
* [Mainframe computer](https://en.wikipedia.org/wiki/Mainframe_computer)—Powerful computers used mainly by large organizations for critical applications, typically bulk data processing such as: [census](https://en.wikipedia.org/wiki/Census); industry and consumer statistics; police and secret intelligence services; [enterprise resource planning](https://en.wikipedia.org/wiki/Enterprise_resource_planning); and financial [transaction processing](https://en.wikipedia.org/wiki/Transaction_processing).
* [Utility computing](https://en.wikipedia.org/wiki/Utility_computing)—The "packaging of [computing resources](https://en.wikipedia.org/wiki/Computational_resource), such as computation and storage, as a metered service similar to a traditional public utility, such as electricity."
* [Peer-to-peer](https://en.wikipedia.org/wiki/Peer-to-peer)—A distributed architecture without the need for central coordination. Participants are both suppliers and consumers of resources (in contrast to the traditional client–server model).
* [Green computing](https://en.wikipedia.org/wiki/Green_computing)
* [Cloud sandbox](https://en.wikipedia.org/wiki/Sandbox_(Cloud))—A live, isolated computer environment in which a program, code or file can run without affecting the application in which it runs.

Cloud computing exhibits the following key characteristics:

* Agility for organizations may be improved, as cloud computing may increase users' flexibility with re-provisioning, adding, or expanding technological infrastructure resources.
* Cost reductions are claimed by cloud providers. A public-cloud delivery model converts [capital expenditures](https://en.wikipedia.org/wiki/Capital_expenditure) (e.g., buying servers) to [operational expenditure](https://en.wikipedia.org/wiki/Operational_expenditure). This purportedly lowers [barriers to entry](https://en.wikipedia.org/wiki/Barriers_to_entry), as infrastructure is typically provided by a third party and need not be purchased for one-time or infrequent intensive computing tasks. Pricing on a utility computing basis is "fine-grained", with usage-based billing options. As well, less in-house IT skills are required for implementation of projects that use cloud computing. The e-FISCAL project's state-of-the-art repositorycontains several articles looking into cost aspects in more detail, most of them concluding that costs savings depend on the type of activities supported and the type of infrastructure available in-house.
* [Device and location independence](https://en.wikipedia.org/wiki/Device_independence) enable users to access systems using a web browser regardless of their location or what device they use (e.g., PC, mobile phone). As infrastructure is off-site (typically provided by a third-party) and accessed via the Internet, users can connect to it from anywhere.
* [Maintenance](https://en.wikipedia.org/wiki/Software_maintenance) of cloud computing applications is easier, because they do not need to be installed on each user's computer and can be accessed from different places (e.g., different work locations, while travelling, etc.).
* [Multitenancy](https://en.wikipedia.org/wiki/Multitenancy) enables sharing of resources and costs across a large pool of users thus allowing for:
  + centralization of infrastructure in locations with lower costs (such as real estate, electricity, etc.)
  + peak-load capacity increases (users need not engineer and pay for the resources and equipment to meet their highest possible load-levels)
  + utilisation and efficiency improvements for systems that are often only 10–20% utilised.
* [Performance](https://en.wikipedia.org/wiki/Computer_performance) is monitored by IT experts from the service provider, and consistent and loosely coupled architectures are constructed using [web services](https://en.wikipedia.org/wiki/Web_services) as the system interface.
* [Resource pooling](https://en.wikipedia.org/wiki/Pooling_(resource_management)) is the provider’s computing resources are commingle to serve multiple consumers using a multi-tenant model with different physical and virtual resources dynamically assigned and reassigned according to user demand. There is a sense of location independence in that the consumer generally have no control or knowledge over the exact location of the provided resource.[[*citation needed*](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]
* [Productivity](https://en.wikipedia.org/wiki/Productivity) may be increased when multiple users can work on the same data simultaneously, rather than waiting for it to be saved and emailed. Time may be saved as information does not need to be re-entered when fields are matched, nor do users need to install application software upgrades to their computer.
* Reliability improves with the use of multiple redundant sites, which makes well-designed cloud computing suitable for [business continuity](https://en.wikipedia.org/wiki/Business_continuity) and [disaster recovery](https://en.wikipedia.org/wiki/Disaster_recovery)
* Scalability and [elasticity](https://en.wikipedia.org/wiki/Elasticity_(cloud_computing)) via dynamic ("on-demand") [provisioning](https://en.wikipedia.org/wiki/Provisioning) of resources on a fine-grained, self-service basis in near real-time (Note, the VM startup time varies by VM type, location, OS and cloud providers), without users having to engineer for peak loads. This gives the ability to scale up when the usage need increases or down if resources are not being used.
* [Security](https://en.wikipedia.org/wiki/Computer_security) can improve due to centralization of data, increased security-focused resources, etc., but concerns can persist about loss of control over certain sensitive data, and the lack of security for stored [kernels](https://en.wikipedia.org/wiki/Kernel_(operating_system)). Security is often as good as or better than other traditional systems, in part because service providers are able to devote resources to solving security issues that many customers cannot afford to tackle or which they lack the technical skills to address. However, the complexity of security is greatly increased when data is distributed over a wider area or over a greater number of devices, as well as in multi-tenant systems shared by unrelated users. In addition, user access to security [audit logs](https://en.wikipedia.org/wiki/Audit_log) may be difficult or impossible. Private cloud installations are in part motivated by users' desire to retain control over the infrastructure and avoid losing control of information security.

**Grid Computing**

Grid computing is the use of widely distributed computer resources to reach a common goal. The grid can be thought of as a distributed system with non-interactive workloads that involve a large number of files

OPERATING SYSTEM?

Interaction between user and system.

File mangemnt

Memory

Process

Input output

# What Is Database Architecture?

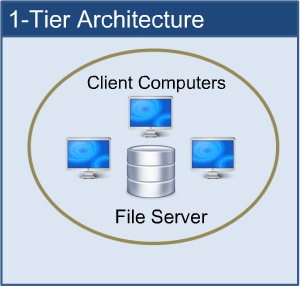
Database architecture uses programming languages to design a particular type of software for businesses or organizations.Database architecture focuses on the design, development, implementation and maintenance of computer programs that store and organize information for businesses, agencies and institutions. A database architect develops and implements software to meet the needs of users.

The design of a DBMS depends on its architecture. It can be centralized or decentralized.

1. **1-tier architecture**
2. **2-tier architecture**
3. **3-tier architecture**

# **1-tier architecture:**

One-tier architecture involves putting all of the required components for a software application or technology on a single server or platform.

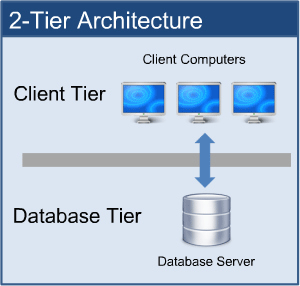


1-tier architecture

Basically, a one-tier architecture keeps all of the elements of an application, including the interface, Middleware and back-end data, in one place. Developers see these types of systems as the simplest and most direct way.

# 2-tier architecture:

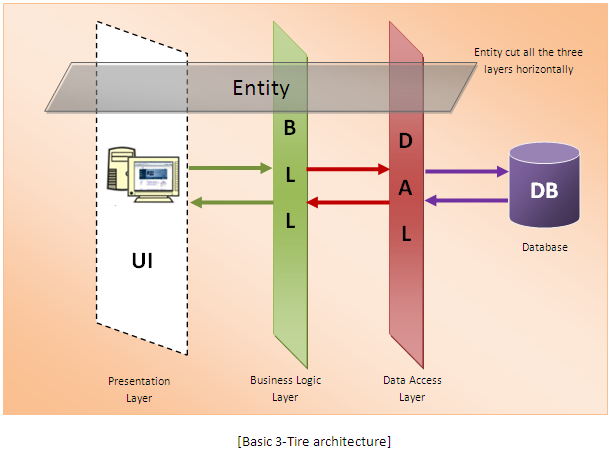
The two-tier is based on Client Server architecture. The two-tier architecture is like client server application. The direct communication takes place between client and server. There is no intermediate between client and server.



2-tier architecture

# **3-tier architecture:**

A 3-tier architecture separates its tiers from each other based on the complexity of the users and how they use the data present in the database. It is the most widely used architecture to design a DBMS.



3-tier architecture

This architecture has different usages with different applications. It can be used in web applications and distributed applications. The strength in particular is when using this architecture over distributed systems.

* **Database (Data) Tier** − At this tier, the database resides along with its query processing languages. We also have the relations that define the data and their constraints at this level.
* **Application (Middle) Tier** − At this tier reside the application server and the programs that access the database. For a user, this application tier presents an abstracted view of the database. End-users are unaware of any existence of the database beyond the application. At the other end, the database tier is not aware of any other user beyond the application tier. Hence, the application layer sits in the middle and acts as a mediator between the end-user and the database.
* **User (Presentation) Tier** − End-users operate on this tier and they know nothing about any existence of the database beyond this layer. At this layer, multiple views of the database can be provided by the application. All views are generated by applications that reside in the application tier.