

School of Management Studies

This is one of the skill enhancement (4 credits) elective courses in 3rd Semester B.Com programme under CBCS scheme. The main objective of this course is to familiarize the students with the application of computer in business and how it facilitates in business decision making. The entire 20 units have been bifurcated into two parts, Part-A and Part-B. This Part-A consists of three blocks 1, 2 & 3 and in total have 12 units. Part-B consists of two blocks 4 & 5 and has 8 units in total. The brief introduction of Part-A is as follows:

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BLOCK 1

FUNDAMENTALS OF COMPUTERS

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BLOCK 1 FUNDAMENTALS OF COMPUTERS

This is the first block of the course “Fundamentals of Computers”. This block will familiarise you about the basic knowledge of the computers, its types, parts and application in various functions of organizations such as online business, trade, commerce and society at large. It focuses on the various uses of web applications helping the users to do their tasks more conveniently. This block is structured to cover the fundamentals and preliminary aspects of computer. The block on the theme “Fundamentals of Computers” comprises of four units, the detail of which is mentioned below:

- **Unit-1:** This unit gives the basic introduction of computers and its evolution, classification, usages and various components as well as advantages and disadvantages on the other hand. The unit also makes us familiar how Computers being, an integral part of our day to day life and help us in enormous way to reduce our workload to a large extent.
- **Unit-2:** This unit discusses about the application of computers in various segments such as business, trade, commerce, society, organizations, online banking, finance etc. Due to the technological disruptions in the modern era, no business can survive without computers and gadgets. Later part of the unit highlights the importance of computer networks.
- **Unit-3:** This unit focuses on various web-based applications and their usage such as Web Browser, Google Drive, Google sheets, Google slides cloud based system, E-mail, online market place, online auctions, information search, instant messaging services etc.
- **Unit-4:** This unit provides the basic knowledge about the computer software, its functioning, and its development process. Software is the intangible components of a computer which makes the hardware run. The last unit of this block also gives the examples on the importance of software that helps organisations to obtain a competitive edge over others.

UNIT 1 INTRODUCTION TO COMPUTERS

Structure

- 1.0 Objectives
- 1.1 Introduction
- 1.2 Overview of Computers
- 1.3 Evolution of Computers
- 1.4 Classification of Computers
 - 1.4.1 On the Basis of Purpose
 - 1.4.2 On the Basis of Size and Capacity
 - 1.4.3 On the Basis of Data Handling or Technology Used
- 1.5 Components of a Computer System : Hardware & Software
- 1.6 Applications of Computers
- 1.7 Advantages and Disadvantages of Computers
- 1.8 Let Us Sum Up
- 1.9 Key Words
- 1.10 Terminal Questions

1.0 OBJECTIVES

After studying this unit, you should be able to:

- understand the evolution of computers;
- classify computers on the basis of purpose, size and technology;
- describe the various components of computers;
- explain how computers are useful in various areas;
- understand the advantages and disadvantages of computers; and
- differentiate computers from smart phones.

1.1 INTRODUCTION

In the era of machines, computer is the greatest boon to the mankind. The thought came when people wanted a device which could help in calculating problems but now it has become a life savior to human beings and we cannot think of life without computers. Today the word “computer” is not only confined to PC’s but also includes laptops, tablets, smart phones, Electrocardiogram (ECG) machines, etc. This unit would help in understanding the origin and evolution of computers, its classification on the various bases, its components and its applications in today’s world. The unit also makes the learner to know about certain advantages and disadvantages of computers.

1.2 OVERVIEW OF COMPUTERS

A Computer is basically a programmable electronic device which accepts data, performs operations on the given data and presents the results and can also store the data or results as per the requirements. Computers are general-purpose information machines that can perform a variety of tasks on data. These tasks are all related to the four basic computer operations i.e. to accept data (input), process the data, produce output, and store (storage) the results as needed. These days computers do not only come in the form of personal computers (PC), but have taken various shapes. Computers are designed to do everything with available pool of information and are popularly used for controlling small and large machines which would have otherwise be controlled by human. Computers have made their presence in every field and they have their significance almost in every sphere. Computers have taken various forms in contemporary world. Almost everyone use a personal computer at their work space or in their home for performing tasks such as doing calculations, getting information, watching movies, formulating documents, organizing meetings, writing etc.

Smartphone Replacing Computer

Computers of these days are being replaced by Smart phones they can do many things that our everyday laptops, gadgets and desktops offer us. Infact, smart phones are like microcomputers which are capable to access and process host of data and have camera, interfaces, internet browsing, text and instant messaging, Wi-Fi, and Geographical Positioning System (GPS) capabilities. On a Smartphone input can be provided through touch screen interface and output can be seen on the screen.



Fig. 1.1 : Computer Vs Smart phones

Today's smart phones are incredibly more influential as compared to the desktop and laptops we have been using since years ago. Smartphone is an incredibly essential tool in our daily lives; they are smaller in size and are portable which a computer monitor and keyboard aren't. From replying to

emails, to checking out your daily feed on social media, and uploading the occasional selfie to share to the world, smart phones can do a bunch of imaginable things. In addition to performing the basic functions, smart phones are capable enough to perform various computing activities.

Today's smart phones are more advanced than ever before. The beauty in all of this is the enhanced level of productivity that can now be achieved by our smartphones. A smartphone can be quickly and easily transformed into a versatile desktop Personal Computer (PC). Even though it won't totally replace desktop experience but it can come handy when required. Take a Bluetooth keyboard and mouse, along with one of those portable external displays, and you can basically get your desktop setup situated just about anywhere.

1.3 EVOLUTION OF COMPUTERS

When introduced first early in 1940's, computers were very capacious electronic devices that needed bunches of people to handle and operate them. But with the passing of time and evolution of technology, computers of today are very astounding and have gone through a complete overhauling. Computers of now are so tiny that they can fit on your desk, on your lap, or even in your pocket and they are now thousands of times more expeditious. However, there are six apparent generations of computers which are explained below. Every generation of computer is well-defined by a paramount technological development which changes necessarily how computers operate leading to more compressed, inexpensive, but more dynamic, effective and booming machines.

- 1) **First Generation (1940-1956):** The first generation computers used vacuum tubes for circuitry and magnetic drums for memory. The size of first generation computers were very huge taking up the space of almost an entire room. They were very costly to operate and in addition used a large amount of electricity and used to produce lots of heat, which was often the cause of malfunction. These first generation computers relied on 'machine language' (which is the most fundamental programming language that can be understood by computers). These computers were used to solve only single problem at a time and it was very difficult to trace and correct the programming error, if any. The examples of first generation computers are Universal Automatic Computer (UNIVAC) and Electronic Numerical Integrator and Computer (ENIAC).
- 2) **Second Generation (1956-1963):** The second generation of computers was based on the transistors which substituted the vacuum tubes. The transistor was superior to the vacuum tubes in the sense it made computers smaller, faster, cheaper and more energy efficient. It didn't require a complete room anymore. However, even though it was an

improvement over the vacuum tubes to the transistor still generated a great deal of heat which sometimes subjected the computer to damage its internal sensitive parts. This generation of computers used assembly language for programming. In this period, higher level programming language like Common Business-oriented Language (COBOL), Formula Translation (FORTRAN), and Algorithmic Language (ALGOL), Python, were developed.

- 3) **Third Generation (1964-1971):** Third generation of computers brought a significant change in the way of computing. This generation of computers was based on the use of integrated circuits, which drastically increased speed and efficiency of computers. As a result, computer became smaller in size as more components were squeezed onto the single chip. These were the first computers where users interacted using keyboards and monitors which are interfaced with an Operating System (OS), a consequential leap up from the punch cards and printouts. This facilitates these machines to run various applications at once utilizing a central program which functioned to monitor memory. Examples of this generation of computers are IBM-360 and CDC-6400.
- 4) **Fourth Generation (1972-2010):** The fourth generation of computers was based on the use of microprocessors, a single silicon chip on which thousands of integrated circuits were built. The use of microprocessors considerably reduced the size of computers now they can even be fit in the palm of hand. The personal computers and laptop all made use of microprocessors. For the first time in 1981, IBM introduced computers for the home users and in 1984, Macintosh was introduced by Apple. Fourth generation computers could be link together to form a network which eventually led to the expansion, birth and rapid evolution of the Internet. Other primary advances during this period have been the Graphical User Interface (GUI), the mouse and advances in laptop capability etc.
- 5) **Fifth Generation (2010-2020):** The fifth generation of computers began with major innovations in computer architecture like- parallel processing, intelligent programming, application of artificial intelligence, knowledge-based system etc. The essence of fifth generation is to utilize these technologies to ultimately engender machines which can proceed and acknowledge natural language, and have efficiency to determine and organize them. Movies like Terminator series (1, 2 and 3) and robots are based on the concept of fifth generation computers. Fifth generation based robots have been developed which are enormously being used in medical science and research.
- 6) **Sixth Generation (2020 onwards):** The sixth generation of computers is based on the nanotechnology. This generation of computers can be defined as the era of intelligent computer, based on artificial neural

networks or “artificial brains”. Artificial Intelligence (AI) or artificial brains is a concept in programming which enables the devices to think and take actions on their own. These computers have the ability to learn via a variety of advanced algorithms. The generation also introduced voice recognition, which enables the computers to take dictations and recognize words. The use of nanotechnology is a characteristic of sixth generation computers.

1.4 CLASSIFICATION OF COMPUTERS

Various types of computers are available now a day. The function of each type of computer is to process the data and provide some output to the users. However, the techniques utilized by the computers for data processing and handling may differ. Computers can widely be differentiated on the basis of their abilities to process data. They are classified according to the purpose, size and capacity, and data handling or technology used. We can classify the computer according to the following three basis, as mentioned in figure 1.2.

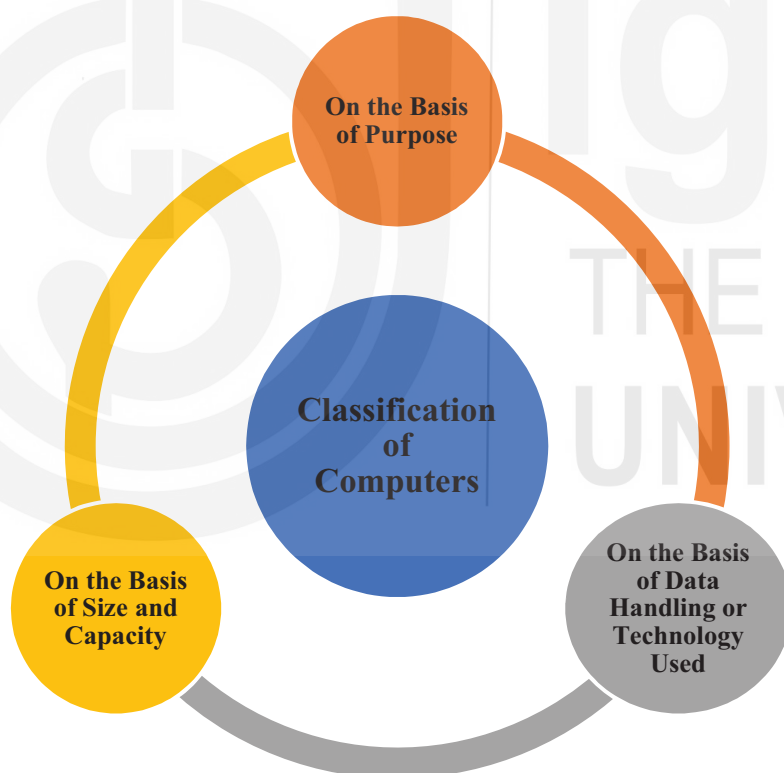


Fig. 1.2: Classification of Computers

1.4.1 On the Basis of Purpose

- 1) **General Purpose Computers:** General purpose computers fulfill general requirements such as gaming, word processing, invoicing etc. these are usually used at home, school, and in offices.

- 2) **Special Purpose Computers:** Special purpose computers are designed to perform specific tasks. These may be used for research activities such as weather forecasting, space research, defense research etc.

1.4.2 On the Basis of Size and Capacity

- 1) **Micro Computer:** Micro computers are the smallest computer system. They are mostly single user general purpose computers. They are relatively small in size and inexpensive computer with a microprocessor as its CPU. Their speed as in comparison to mainframe or supercomputer is low and their size range from calculator to desktop. These computers are mainly used for computing purpose and mostly used in educational institutions, home and offices. Examples of micro computers are desktop PCs, Laptop, notebook, personal digital assistance, smartphones, tablets, smartwatches etc.
- 2) **Mini Computers:** Mini computers are larger in size and are suitable for a small business or for a department in a large organization to be used as servers which support hundreds of users at a time in file sharing, printer sharing and storing central information. They were actually designed for control, instrumentation, human interaction, and communication switching and later they became very popular for personal use with evolution. These computers possess greater memory and are capable of handling input output devices. Examples of mini computers are Laptop, PC etc.
- 3) **Mainframe Computers:** Mainframe computers are popularly known as big iron, they are very big in size and very expensive. These computers are capable of supporting thousands of users at a time and have massive data storage capacity. These computers are basically used by big organizations such as banks, E-commerce portals, insurance companies, railways, airlines etc. for bulk data processing such as statistics, census data processing, transaction processing and are widely used as the servers as these systems has a higher processing capability as compared to the other classes of computers.
- 4) **Super Computers:** A super computer is a computer with a high level of performance; they are most powerful and very expensive. Super computers are at the apex of computing system as they have ability to perform billions of instructions per second. Super computers play a very vital role in the field of computation, and are utilized for performing intensive computational tasks in numerous fields such as quantum mechanics, weather forecasting, climate research, oil and gas exploration, molecular modeling, and physical simulations etc. These computers are very costly and are treated as national resources.

Examples of super computers are Parallel Machines (PARAM), Jaguar, Roadrunner, etc.

1.4.3 On the Basis of Data Handling or Technology Used

- 1) **Analog Computer:** Analog computer is a type of computer which uses continuously-changeable aspects of physical fact such as electrical, mechanical, or hydraulic quantities to model the problem being solved. Anything that is variable with respect to time and continuous can be claimed as analog just like an analog clock measures time by means of the distance travelled for the spokes of the clock around the circular dial.
- 2) **Digital Computer:** Digital computers take input data in form of numbers and perform arithmetic and logical operations onto it to get the results. These computers are of high speed and very accurate. Digital computers count and answer the questions by the answer of how many. It can be used for performing mathematical calculations, organizing and analyzing data, controlling industrial and other processes, and to simulate dynamic systems such as global weather patterns. It gives continuous output but users get the output only when the computations are completed. Examples of digital computers are desktops, notebooks, work stations, smart phones etc.
- 3) **Hybrid Computer:** A hybrid computer is a digital computer that accepts analog signals, converts them to digital and processes them in digital form. These computers incorporate the technology of both analog and digital computers. These computers store and process analog signals which have been converted into discrete numbers. Analog-to-digital converters are used to convert analog signals into digital signals. These computers are used in radars. For example, in central national defense and passenger flight radar system.

Check Your Progress A

- 1) What is a computer? What are various features of computer?

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- 2) What are the basic functions of smartphones?

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3) What advancement can be seen in the sixth generation of computers?

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4) Distinguish between Analog computer and Digital Computer.

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1.5 COMPONENTS OF A COMPUTER SYSTEM: HARDWARE & SOFTWARE

Every computer is composed of two basic components called, hardware and software. Hardware includes the tangible parts of the computer which either can be seen or touched, for example, CPU, keyboard, mouse, monitor, LCD screen and printer, whereas, the software are the components which activates the physical parts. Software consists of features that are responsible for directing the tasks to the hardware. Software can be divided into other programs and data. As compared to software, hardware is a physical entity. Both hardware and software are interconnected, without software, the hardware cannot function. However, without the creation of hardware to perform tasks directed by software via the central processing unit, software would be useless below mentioned figures can gives a clear glimpse about the hardwares.



Fig. 1.3: Desktop Vs. Laptop

A detailed explanation on Hardware and Software is given below:

Hardware: Hardware is basically the physical element of a computer. It is also called as the machinery or the equipment of the computer. However, most of a computer's hardware cannot be seen; in other words, it is not an external element of the computer. A computer's hardware is consisted of various different parts, but the most vital of all these is the motherboard. The motherboard is made up of even more parts capable to power and control the computer. Hardware is limited to specifically designed tasks that are, taken independently, are very simple. On the other hand, Software implements algorithms (problem solutions) that allow the computer to complete much more complex tasks.

Software: Software is known as programs or apps, comprising of all the instructions that direct the hardware in performing tasks. These instructions come from a software developer in the form and are accepted by the platform (operating system + CPU) that they are based on. Software is capable enough to perform numerous tasks, compared to hardware that can only perform mechanical tasks they are designed for. Software provides the means for accomplishing many different tasks with the same basic hardware. Practical computer systems divide software systems into two parts:

- 1) **System Software:** System software is designed for controlling and working with computer hardware. It allow users to interact directly with hardware functionality, like the device manager and many of the utilities found in the control panel. It consists of operating systems, device drivers, diagnostic tools, etc. and is almost always pre-installed in computers and smartphones, examples are Windows 10, Linux, Macintosh, Android.
- 2) **Application Software:** Application software is capable of dealing with user inputs and helping them to complete tasks. It resides above the system software and allows users to accomplish one or more tasks. It is programmed for simple as well as complex tasks. It can either be a single program or a group of programs that are referred to as an application suite. Some examples of application software are Word Processing Software, Web Browsing, Spreadsheet Software, Presentation, Graphics, Multimedia YouTube, Computer Aided Design (CAD)/Computer Aided Manufacturing (CAM), sending email, accounting software, customised shopping apps and cloud based applications such as Google docs.

1.6 APPLICATIONS OF COMPUTERS

Computer is a device which can perform a variety of tasks in our daily life. Computers have their utility and applications in every arena, few of its applications in various fields are explained below:

- 1) **Business:** Business has variety of applications of computers. From individual to multinational companies all are using computers for business purpose like payroll calculations, sales analysis, budgeting, financial forecasting, managing employee's database and maintenance of stocks etc. Computers have made it possible for the business to grow rapidly and across boundaries. Computers are extensively used for accounting purposes to handle company financial accounts and inventory management using some accounting software like Tally.
- 2) **Education:** Computers have completely overhauled the education industry by significantly enhancing the performances and delivery of lectures. Various online courses such as Massive Open Online Courseware (MOOC) and distance learning is in trend by utilizing the efficiencies of computers, hundreds of websites are available on internet to deliver free online education in almost every area. The 'E' in E-learning stands for 'Electronic. Henceforth, the unique term 'electronic learning'. The word 'online,' in this contextual, means with an Internet connection or via the Internet. The pedagogy may also refer to a network that can deliver knowledge and skills to one or more individuals. On the other hand, new contemporary of learning appears known as hybrid learning, which is a technique of combining traditional classroom experiences, experiential learning objectives, and digital course delivery that emphasizes using the best option for each learning objective.
- 3) **Banking:** Computers offers various advantages in banking such as self-enquiry facility, signature retrieval facilities, remote banking, centralized information, digital transactions etc. These have helped in minimizing the human efforts, time and cost involved otherwise in doing the transactions in a traditional manner and it makes banking convenient for customers by providing 24×7 access to banking services. Online banking is an electronic payment system that permits its customers to conduct a variety of financial transactions through their respective websites.
- 4) **Communication:** Computers can largely reduce the time taken for communication between different stakeholders. Business can use various methods of communication such as email, live chat tools, whatsapp video or phone conferencing, social networking, web conferencing it in a way improves the functioning of the organisation.
- 5) **Healthcare:** In healthcare, computers offer miraculous therapies to the patients such as ECG, Computed Tomography (CT) scan, X-ray, radiotherapy which was otherwise not possible. With the help of computers most of the medical information from prescription to reports can be digitized. With the help of computers, the record-keeping of medicines as well as patients has become easy. Computer can even keep

track of each and everything going inside the patient's body such as blood pressure and heartbeat etc. which would otherwise have been a cumbersome task. Technology and humans' hand-in-hand for a healthier healthcare. The future of healthcare is shaping up in every aspect with the advancement and development in digital healthcare technologies such as artificial intelligence; VR/AR, 3D-printing, robotics or nanotechnology etc. Artificial Intelligence will control the world within few years. In medicine and healthcare, digital technology could support transmute unsustainable healthcare systems into sustainable ones, equalize the relationship between medical professionals and patients, provide cheaper, faster and more effective solutions for diseases. Technologies in computer age could win the battle for us against cancer, AIDS, Ebola, Corona and could basically lead to healthier individuals living in healthier communities. Atom wise uses supercomputers that cause out therapies from a database of molecular structures. There are certain start-up launched as a virtual search for safe, existing medicines that could be redesigned to treat the pandemics like Corona and Ebola.

- 6) **Personal Use:** Computer can also be used for various personal uses. One can use computer system to keep all the day-to-day details that are essential to keep anywhere. Computers can be used for keeping a track on personal things such as investments, incomes, expenditures, savings etc.
- 7) **Military and Defense:** Computers are the major tools which aid in developing missiles and other equipments in the defense system. Construction of weapons and controlling their function is not possible without the aid of computers. Designing and the maintenance are possible only through computers. Computer builds the links between the soldiers and commanders through the satellite. The computers have played a progressively significant role in the military. The computers in the military have been improved or designed to do a broad range of tasks, such as analyzing intelligence, organizing sensible data for military leaders, geospatial analysis, controlling smart weapons, or communications. Computers are used to track incoming missiles target to destroy them. Computers are used in tanks and planes and ships to target enemy forces, benefit diagnose any problems with the platforms. Computers are used to hold documents, upkeep records and records of events.
- 8) **Insurance:** The emergent technologies those have been enabled by computers only such as Blockchain, Internet of Things (IOT), Artificial Intelligence (AI), Big Data, and Augmented Reality have left a greater impact on the insurance sector. Blockchain, the Distributed Ledger Technology (DLT) ensures that digital data is safe as there are fewer

chances of identity theft or fraud. They also make it easier to authenticate transactions, policies for customers. Insurance companies are keeping all records up-to-date with the help of computers. The insurance companies, finance houses and stock broking firms are widely using computers for their concerns.

Apart from applications of business explained above in various fields, a detailed description on it is given in the second unit named “Application of Computers”.

1.7 ADVANTAGES AND DISADVANTAGES OF COMPUTERS

Computers link us to the world of unknown. They support us to gather knowledge and to synchronize gigantic information from the internet and storing it at last in a customize format. Computers are multitasking and adequate enough to be used virtually anywhere and ubiquitously. Computers are versatile machines as they are flexible in performance and have made human life much faster because of its incredible speed, accuracy and storage with which humans can perform a variety of tasks. With numerous advantages, computers have got some disadvantages which are explained as follows:

Advantages of Computers:

Computers have made human life much faster and easier. It has several advantages:

- 1) **Multitasking:** Computers are multitasking in nature. A lot of tasks can be performed on computers with accuracy which leads to the costs and time saving in a way. Computers can perform trillion of instructions per second. With the help of computers, people can perform multiple tasks, including complex calculations within seconds.
- 2) **Speed:** One of the major advantages of computer is their incredible speed, which helps us in completing numerous tasks just in few seconds. With the help of computers now operations can be performed in fractions of seconds which otherwise, would have taken a lot of time to perform.
- 3) **Storage:** With the help of computers, a huge amount of data can be stored on the computers at a very low cost. Centralizes database of storing information is the main advantage which helps in reducing cost.
- 4) **Accuracy:** One of the root advantages of computer is that it can perform not only calculations but also with utmost accuracy.
- 5) **Data Security:** Data security means protecting the digital data and information from any unauthorised access or breach. Computers with the

help of technologies can provide security from destructive forces and from unwanted action of unauthorized users like cyber attacks or access attacks.

Disadvantages of Computer

As a famous saying states that every coin has two sides, that is equally applicable for computers. With huge advantages computers have got few disadvantages as well. As we know advantage comes with disadvantage, computers are just a machine with no IQ, no feelings, no wisdom and dependency on others is few of the disadvantages of computers rest are explained below:

- 1) **Reduction in employment opportunities:** We can surely see a gradual decrease in the employment opportunities with the emergent technologies coming to the field of computers and such as IoT, AI, blockchain, human robots, human assistance etc. As computers become smarter and more capable, these technologies have taken over the traditional jobs and reduced new emerging employment opportunities to a great extent.
- 2) **Potential of loss of privacy:** With computers storing so much of personal information is highly at risk of getting into the hands of others. Privacy violation means that someone access users' data such as private photos, documents and show it to other people without their permission. Once a malicious person has access to someone's personal information, they can also access their associated online accounts or also can use identity theft to open other accounts, such as a new credit card, debit card under their name.
- 3) **Virus and hacking attacks:** Virus is a type of worm and hacking is simply an unauthorized access over computer for some illicit purpose. Virus can be transferred from email attachment, viewing an infected website advertisement, via portable devices like USB, pen drive. Once virus is transferred in the host computer it can infect and overwrite existing files stored on the computer. Cyber attacks can range from installing spyware on a personal computer to attempting to destroy the infrastructure of entire nations.
- 4) **Cyber Crimes:** With the emergent technologies cybercrimes are at a rise in every single field. Cybercrime is basically a crime in which a computer and network is involved. This is the major disadvantage of computers. It includes crimes such as cyber stalking, identity theft, loss of privacy and information etc. repercussions of those can be huge to the users.

Check Your Progress B

1) How the computers have changed the healthcare?

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2) What are the benefits of computers in business?

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3) Explain the Computer Hardware.

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4) How the evolution of computers has reduced the employment opportunities?

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1.8 LET US SUM UP

A Computer is basically a programmable electronic device which accepts data, performs operations on the given data and presents the results and can store the data or results as needed. Computers are general-purpose information machines that can perform a variety of tasks on data. These tasks are all related to the four basic computer operations i.e. to accept data (input), process the data, produce output, and store (storage) the results as needed.

Now, computers are so tiny that they can fit on your desk, on your lap, or even in your pocket and they are now thousands of times more expeditious. However, there are six apparent generations of computers. Each generation is well defined by a paramount technological development that changes necessarily how computers operate leading to more compressed, inexpensive, but more dynamic, effective and booming machines.

Various types of computers are available now days. The function of each type of computer is processing the data and to provide some output to the users and varies on its data processing abilities. They are classified according to the purpose, size, and technology used.

Computer is an electronic device through which a variety of tasks can be performed in our daily life. Computers have their utility and applications in every arena, few of its applications in various areas be it business, education, banking, insurance, healthcare, personal use, military operations, communication etc.

Computers have made human life much faster and easier. It has several advantages such as multitasking, speed, accuracy, data security, storage. As a famous saying states that *“every coin has two sides”*, that’s equally applicable for computers which is a combination of software and hardware. With huge advantages computers have got few disadvantages as well such as reduction in employment, potential loss of privacy, computer virus, cybercrime etc.

1.9 KEY WORDS

Computer: A computer is a programmable device that stores, retrieves, and processes data. The term "computer" was originally given to humans (human computers) who performed numerical calculations using mechanical calculators, such as the abacus and slide rule. The term was later given to a mechanical device as they began replacing the human computers.

Smartphone: A smartphone is a mobile phone that performs many of the functions of a computer, typically having a touch screen interface, Internet access, and an operating system capable of running downloaded apps.

Technology: Technology is the sum of techniques, skills, methods, and processes used in the production of goods or services or in the accomplishment of objectives, such as scientific investigation.

Data: Data are characteristics or information, usually numerical, that are collected through observation. In a more technical sense, data is a set of values of qualitative or quantitative variables about one or more persons or objects.

Process: A process is the instance of a computer program that is being executed by one or many threads. It contains the program code and its activity, depending on the operating system (OS).

Storage: Storage is a process through which digital data is saved within a data storage device by means of computing technology. Storage is a mechanism that enables a computer to retain data, either temporarily or permanently.

Privacy: Privacy is the ability of an individual or group to seclude them or information about themselves, and thereby express them selectively. When something is private to a person, it usually means that something is inherently special or sensitive to them.

Virus: A computer virus is a malicious program that self-replicates by copying itself to another program. In other words, the computer virus spreads by itself into other executable code or documents.

Cybercrime: Cybercrime is a crime in which a computer and network is involved. It includes crimes such as cyber stalking, identity theft, loss of privacy and information etc.

1.10 TERMINAL QUESTIONS

- 1) Explain the evolution of computers over the years.
- 2) How are the computers helpful to human beings? State the examples of real world where computers are prominently being used these days.
- 3) What are the various advantages and disadvantages of computers?
- 4) What are the various classifications of computers?
- 5) How the smartphones have replaced computers?
- 6) Explain the various components of computer hardware and software.

Note: These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for yours practice.

UNIT 2 APPLICATION OF COMPUTERS

Structure

- 2.0 Objectives
- 2.1 Introduction
- 2.2 Role of Computers in Business Organisation
- 2.3 Computers for Society
- 2.4 Role of Computers in Business, Trade and Commerce
- 2.5 Computer Role in Online Business
- 2.6 Computer Role in Online Banking and Finance
 - 2.6.1 Online Banking
 - 2.6.2 Finance
- 2.7 Importance of Computer Networks
- 2.8 Let Us Sum Up
- 2.9 Key Words
- 2.10 Terminal Questions

2.0 OBJECTIVES

After studying this unit, you should be able to:

- highlight the role of computers for the organization and society;
- highlight the significance of computers in online business, trade and commerce;
- highlight the usage of computers in online banking and finance; and
- highlight the importance of computer networks.

2.1 INTRODUCTION

In the previous unit, we learnt how computer have changed in size, shape, usage etc. over period of time. This particular unit will throw a light on how the computers can be applied in daily life to serve the purpose in totality. As the 21st century is looming ahead, we are witnessing the advancement that humanity may never have dreamt of and one of these developments surely is “Computer”. Computers have left their footprints in every area. It can do all the functions at a speedy rate and also helps searching and progressing in every arena be it our homes or businesses applications and usage of computers can be seen everywhere. In coming days, computers will be used to achieve the brilliant goals of success and incomparable development. In India, the accurate knowledge and use of computers will bring an immense change in astonishing way. Computers have their utility everywhere in every

field they are rapidly being used to the work at a great speed and accuracy where data is so complicated to cope up with by the human brains. Computers make such things easy for us; they can store huge data about inventory, plans, procedures etc. With internet, computers are very powerful tools which can be used to share your knowledge and ideas to help others learn or to get guidance from the experts. In short, applications or uses of a computer are countless but basically, they can be described only in three operations namely Process, Store, Transfer.



Fig. 2.1: Computer Applications Description

Let us understand this with some examples, by using spreadsheets computers can processes any financial data and organize it into tables, charts, graphs and reports etc. which can be stored on drive. And the stored files can be transferred to any other person or entity via email. While working on an operating system lets say, Windows 10. You install (store) Windows 10 on your hard drive. When you run a computer, Windows 10 loads (transfers) from hard drive to RAM. The services of Windows 10 are run (processed) by CPU. Let's take another example of a YouTube video. You download (transfer from YouTube server to your computer) a YouTube video and save (store) it on your hard drive. Upon double clicking it, it may load (transfer) into RAM and play (process) in VLC media player. Computers have their significance in every arena be it organization, society, business trade and commerce, online business, online banking and finance that is explained in the further sections of the unit.

2.2 ROLE OF COMPUTERS IN BUSINESS ORGANISATION

Computers have brought away organisations a long way ahead from the age of pen, papers and folders stored in dusty storage of compartments. There are various usages of computers in business organizations from generating reports to communicating with clients. For organizations the role of computer is to support the key aspects of running them, such as communication, record-keeping, decision making, data analysis and more. Every aspect of the modern workplace is improved with the help of computers. They are used in every aspect of a company's operations, including product creation,

marketing, accounting and administration. Every aspect of the modern workplace is improved by the use of computers. Computers have made possible the concepts such as flexible working schedules and remote work forces have become possible enabling employees to work from wherever they want and at whatever times they wish. Some of the applications of computers in business organizations are explained below:

- 1) **Communication:** Computers play a very important role in business organisations to maintain a smooth flow of information and communication between different parties and stakeholders. Business can use various methods of communication such as email, live chat tools, video or phone conferencing, social networking, web conferencing etc. It saves times and also improves the functioning of the organisation. With such advance tools, it also becomes easy for the business to offer customer support to its clients in a timely and efficient manner.
- 2) **Marketing:** Organizations can widely use computers for marketing as most of the marketing is done online via social media, blogging, website development, advertising, e-newsletter etc. IT developers can professionally create a website by using various enticing graphics and content with different forms of media, such as text, images, and videos to make the campaign more attractive and lucid for the audience. By using Search Engine Optimization (SEO) and Web Analytics, the website would appear prominently in Google's search results, which then attracts traffic and ultimately enables the business to sell those products to website visitors.
- 3) **Accounting:** Computers can also help organizations in sorting its large financial data in order to obtain their large and small scale financial positions just by few clicks. Computers are also useful for performing various tasks like invoicing clients, maintaining data about debtors and creditors, calculating payroll, calculating and filing tax forms etc. With the computer, accountants can now focus on the higher level picture of a business's finances, leaving the lower level stuff to the machines.
- 4) **Storage:** Businesses can store enormous data on computers. They don't need huge cabinets for storing data now. With computers and server, organizations are capable of storing and sorting billions of files and enable them to access at any time. Digital storage is much larger and more efficient and secure while compared with the physical storage, as it is more difficult to lose or steal files from a well protected database which is one of the main benefits of the computer.
- 5) **Educational Purposes:** With the access of internet on the computers, organizations can reach the pool of world's information which can be used efficiently to educate its employees such as about the company

policies, software use, as well as standard procedure and safety. Instead of hiring teachers' employees can be educated online. Live webinar, conferences and question and answer sessions can also be conducted. Employees can learn through various media, such as videos, text, etc. which enables them to better understand the subject matter.

- 6) **Research:** Computers make business organisations capable of doing a variety of functions, including research about the competition, as well as knowing about the taste and preferences of its customers. With modern data-mining techniques, a business can acquire insightful information about its customers and competition from all kinds of places, including forums, search engines, industry-specific websites and even from social networks. By conducting online surveys, business can know about the public opinions or while launching any new products and public reactions can also be known by reviewing customers review on different sites.

2.3 COMPUTERS FOR SOCIETY

Computers have an integral role to play in our daily lives. With the help of computers tedious functions can be performed automatically and more efficiently leading to the savings of many hours which would otherwise have been spent on doing the job manually. Computers with their usages are now penetrating through the modern society. They are rapidly being used throughout the various sectors of society be it airports, restaurants, railway stations, banks, medical, agriculture, ticket booking, payment of bills, insurance and shopping etc. Some of the applications of computers in various sectors are explained below:

- In agriculture, computers can considerably change the way tasks and businesses are carried out all over the world. They are helpful in finding out the best possible kinds of soil, plants and checking out which match of these would result in the perfect crops.
- In health sectors, computers are very capable of bringing along a medical revolution. They are widely being used for research regarding blood groups, medical histories, etc. that in a way leads to a better diagnosing pattern and makes health care faster and more efficient. The knowledge that computers are providing in this field may lead to better use and purchase of medicinal drugs and thus ensuring better health.
- Computers are also useful in observing and predicting the patterns of traffic which is a grand benefit to all and helps people in saving the hassle of getting stuck for hours in the roadblocks and traffics.

- Computers can also be used to improve administration throughout the world. By providing daily accurate information to the administration departments, computers may change the way decisions are taken across the globe. Keeping all the above-mentioned things in mind, we must accept that if used the right way, computers are a gift of science to mankind.

2.4 ROLE OF COMPUTERS IN BUSINESS, TRADE AND COMMERCE

Computers and other technological devices have surely changed the way the various functions and operations are conducted in business, trade and commerce. Computers have their significance in every type of business almost every type of business now rely on computers to automate their traditional processes. Computers are widely being used by the businesses as a part of their daily operations. Computers have important effect on business operations and help them to reap efficiencies and advantages. Irrespective of the size of enterprise, technology has both tangible and intangible advantages for all the parties involved in terms of saving costs and time spent for conducting business transactions. In business, trade and commerce, computers are helpful in research, production, distribution, marketing, banking, team management, business automation, data storage, employee management and to increase productivity at a lower cost in less time with higher quality. The various advantages of computers in business, trade and commerce are explained below:

- 1) **Inventory Management:** Computers have revolutionized the inventory management as all type of business, trade and commerce with various raw materials suppliers, manufacturers, wholesalers, retails and Business to Business (B2B) providers are dependent on inventory management processes. Technologies ranging from automatic scanners to radio frequency identification chips now allow businesses to track their inventory from the moment a company buys it from a wholesaler to the moment the products leave the premises in the hands of a customer. Matching computer information to inventory storage spaces helps associates pull stock as quickly as possible. Companies can quickly compare inventory when it comes in the door to order sizes on the computer screen. Organized, efficient inventory control helps minimize inventory costs while meeting customer demand.
- 2) **Easier Financial Record Keeping:** Financial record keeping has become easier and more convenient than the traditional methods with the help of computer enabled technologies. To manage their accounting and finance tasks now companies can use various advanced software

programs available which in a way help them in minimizing manual processes, reducing costs and ensuring protection against human error. In fact, companies often use programs that sync accounting with point-of-sale terminals and bookkeeping programs, such that each purchase or sale transaction is automatically captured in an accounting platform.

- 3) **Budgeting and Forecasting:** Computers can widely be used for budgeting, forecasting and purpose by using various software and programs such as spreadsheet excel etc. available in the market. This software can help in doing large financial calculations, estimating future sales and business expansions.
- 4) **Storage:** Computers can also be used in storing huge financial data for business by using internet which was earlier needed to be stored in huge cabinets. Computerized storage saves space and provides more data security. Data can be stored centrally for easy access from multiple computers or stored locally for individual use.
- 5) **Efficiency of Operations:** Computers can largely help business in improving their efficiencies by saving involved costs, time and money and understanding its cash flow needs and preserve precious resources. For example, warehouse inventory technologies can assist to understand how best to manage the storage costs of holding the products. Executives can save time and money by holding meetings over the Internet via Skype, video or telephone conferences, Google meet, Zoom, Microsoft team etc. instead at corporate headquarters.
- 6) **Streamlining Business Communications:** One of the many advantages of a computer in business is that it helps employees to communicate more effectively with each other and with external stakeholders such as customers, partners, investors and prospects. Instead of having to hand-write information, business administration professionals can use applications and programs to facilitate communication. There are a number of communication tools that help businesses to effectively communicate such as, email, instant messaging programs like Skype, team collaboration apps like slack, video conferencing tools such as zoom, project management programs such as teamwork. By using communication technology, businesses can increase the speed at which people communicate and remove physical barriers to communication.
- 7) **Managing Customer and Partner Relationships:** Computers have made it possible for the businesses to work in different geographic locations with the help of technology. Many businesses have partners, suppliers and manufacturers in other parts of the world. If customers or partners have a query for the business, they can reach easily by sending an email or message and within few seconds, they can receive a reply.

Being able to communicate and collaborate with them using computer technology enables organizations to improve product quality, enter new markets, improve customer satisfaction and grow their business.

Check Your Progress A

1) How computer in organisations leads to improved communication?

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2) How are computers bringing medical revolution?

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3) What are the advantages of computers to the society?

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4) How can computers ensure more security and safety of confidential information?

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2.5 COMPUTER ROLE IN ONLINE BUSINESS

Advancement of technology has changed the way businesses are conducted. The earlier system of brick and mortar has been replaced by the click and mortar and this is very different than the earlier one. Now, almost every type of business relies on computers for automating their traditional processes.

A large number of businesses are shifting to online platforms. Business by making online presence aims to reach to a global audience to increase their market share and other utilize this in a way to streamline their operations and costs. Businesses are largely dependent on computers and use them as a part of their daily operations along with payment processes and order management. There are many applications of e-commerce such as home banking, shopping in electronic malls, buying stocks, finding a job, conducting an auction, collaborating electronically with business partners around the globe, marketing & advertising and providing customer service. With the help of computers and technology online jobs can be done by sitting anywhere in case employees are not able to go outside. Now we can do our office work by sitting anywhere. Work From Home (WFH) , co working, job sharing, shared space are few of the popular examples in a philosophy of this direction.

2.6 COMPUTER ROLE IN ONLINE BANKING AND FINANCE

The emerging technologies of these days have transformed the banking industry from paper and pen to the digitized and networked services. Technology has revamped the accounting and management system of banking operations and it is now also focusing on changing the way how banks are delivering services to their customers. Along with these, computers have also transformed the financial industry and the way business deals are conducted from offline meeting to the online spaces. Accountants can now keep large amount of data to conduct complex calculations and manage financial transactions all from a computer than storing the data in books. Various applications of computers in online banking and finance are explained below:

2.6.1 Online Banking

- 1) **Plastic Money:** Popularity of credit cards or smart cards like Visa/Maestro has made the banking industry more attractive and flexible than ever before. By using online banking services, customers can very easily apply for smart cards or credit by sitting at their homes and the same can conveniently be delivered to them within a few days this do away the hassles of visiting the bank branches. Credit cards help the customers to borrow a specific amount from the bank for purchasing anything and to repay later. Smart card enables customers to instantly pay for anything and money is on the spot deducted from their bank accounts automatically. Smart cards can also be used for same card to depositing or withdrawing money from their accounts using an ATM machine.

- 2) **Self-Inquiry Facility:** Self enquiry facility provided by banks has actually reduced a lot burden of banks. Now instead of lining up or going to the help desks at the physical branches, customers can avail simple self-inquiry facility to get all the latest information by visiting their bank's website. This saves time on both the sides.
- 3) **Remote Banking:** Banks these days are providing various services online. Customers are no more required to travel for miles and stand in long waiting line to get their banking transactions done such as withdrawals, deposits and another enquiry. Customers now can install various banking app or login to banks website to get their transactions done as per their convenient. Remote banking has immensely help people in rural areas to save their hassles of coming to bank branches and to improve their culture of saving money.
- 4) **Signature Retrieval Facilities:** Computers by using internet technologies have provided services of digital authentication such as E-signature or digital signatures to safeguard the interest of its clients. By using this facility banks verifies customer's signatures while withdrawing a large sum of money from a specific bank account this reduce the chances of frauds, errors/risks that may arise due to forgery.
- 5) **Centralized Information Results to Quick Services:** Centralized storage of information with the banks enables them to transfer information from one branch to another effortlessly with not much time and costs involved and this results in quick services to customers. For example, if a customer registered his account with a rural branch, he can easily get details of his account at the main branch in an urban area.

2.6.2 Finance

- 1) **Financial Trading:** Computer based trading is useful when a trader has a system that allows profitable trading. Computer systems can even trade on the behalf of the users. A computer system can be programmed automatically to execute buy and sell orders when the price of a stock or bond reaches to a certain predefined level, and automatically closes the order when the target price reached below a certain level. Information technology gives instant information to stock traders for making decisions, and allowing them to enter orders that are immediately executed.
- 2) **Financial Information:** Through internet computers can have access to wide pool of financial information through. This enables business operators and individual's access to the information on investment

prospects that helps in conducting a detailed research on its profitability. Apart from this various other financial information such as world prices, tax changes, inflation rate and currency exchange rates are also available on internet which make easier for institutions and individuals to make informed financial decisions.

- 3) **Organizing and Analysing Data and Files:** Computers are very useful in organizing the data efficiently. This makes it easier for anyone to organize and find the information with a few clicks. Computers also help in the facilitation of data analysis. Employees can use various technologies available to understand complex spreadsheets. For example, Microsoft Excel can help businesses to visualize their data in charts and graphs so that trends and anomalies present in data can be spotted easily. This helps the businesses in making more informed decisions. Thus, enables organizations and individuals to plan finances without wasting much of time.
- 4) **Data Storage:** Keeping financial records is critical for organizations, as well as individuals, as it allows tracking of payment records, debts owed, purchases done and bank transactions made. Computers make data storage easily manageable and less bulky. Computers can also enable organizations to store large amounts of files in a small space that allows them to have a large track of historical transactions.
- 5) **Convenience:** Personal finance can be simplified by using information technology. Banks provide data on checking and savings deposits and withdrawals in standardized formats. Customer can easily download account transactions and store records on their computers. Personal finance software includes few additional features like charts and reports that show home users what they are spending money on and where their funds are coming from.
- 6) **Budgeting and Bookkeeping:** Computers are immensely helpful for companies considering financial transactions. Computer systems calculate and display the interest and principal of a loan, and estimate the returns on investment when the company borrows money to expand its operations. Companies can securely transfer data online, and the computer system records all transfers, which simplifies bookkeeping.

2.7 IMPORTANCE OF COMPUTER NETWORKS

Computer networks also known as data networks are chains of nodes linked by communication channels. These nodes can receive, transmit and exchange data between endpoints. The data transmitted can be in the form of voice or video traffic. Computer networks enable the users in accessing remote programs and remote databases either of the same organisation or from different enterprises or public sources. Computer networks provide

communication possibilities faster as compared to other facilities. With these optimal information and communication possibilities, computer networks may increase the organisational learning rate, which is considered as the only fundamental advantage in the prevailing competitive environment.

Types of Computer Networks

There are various types of computer networks. The critical difference in each type lies in the extent of geographical areas they serve and their core purpose. The various types of computer networks are explained below:

- 1) **Personal Area Networks (PAN):** Personal Area Networks are interconnected technology devices that serve a single individual within one facility. It is reachable within a distance of 10 meters and is appropriate for small offices or residences. IT enabled devices include telephones, computers, video game and peripheral devices etc.
- 2) **Local Area Network (LAN):** Local Area Networks are limited to a single building like an official establishment. It covers a defined area. It is useful for resource sharing including file servers, printers and data storage. LAN hardware such as ether net cables and hubs are affordable to acquire and maintain. Small LANs can efficiently manage two to three computers, and large LANs can host thousands of servers. Internet connectivity can either be wired or wireless. It is popular with many establishments because of its higher speed and lower set up costs.
- 3) **Metropolitan Area Networks (MAN):** Metropolitan Area Network covers a much larger area as compared to Local Area Network. MAN includes configured computers covering a town, city or campus. On the basis of connections, MAN can connect either a single area or cross several miles. MAN is basically a series of several LANs linked to create a greater network.
- 4) **Wide Area Networks (WAN):** Wide Area Networks cover a larger geographical area as compared to the Metropolitan Area Networks and can connect a country or even continents. The computers are interlinked through various cables, optical fibers or satellites. The users can access the network through modems. WANs basically comprised several smaller networks of LANs and MANs. The internet which consists of networks and gateways is an example of a public WAN.
- 5) **Home Area Network (HAN):** Home Area Network is a computer network limited to a defined boundary like a house or home office. It is a type of IP based LAN which can either be wired or wireless. HAN is a broadband connection available to users using a wired or wireless modem. It consists of shared devices like faxes, printers, scanners etc.

Advantages of Computer Networks:

Following are the advantages of computers networks:

- 1) **Overcoming Geographic Distances:** Computer networks popularly helps in overcoming the geographical limitation in a city or even across countries. Computers that need to communicate with other computers are often located in different parts of the world, and needs computer networks to pass information across long distances to overcome those geographical limitations.
- 2) **Allowing Information Sharing:** Computer networks allow sharing of information by allowing connected people or computers to access information on databases distributed in varying locations. There are databases hosted on several computers. People or computers may need to access the data in these databases. In the absence of computer networks, it would take a long time in selecting and transporting the required data from the database to the requiring users. With the help of computer networks, anyone can conveniently access the databases for retrieving the data.
- 3) **Supporting Distributed Processing:** Computer networks help to support processing distributed in many different locations. These different locations can either be physically close together inside a single computer room, or they can be separated by a long distance across mountains and oceans. Physical transportation of the intermediately processed data is unrealistic. Hence, a computer network becomes crucial in distributed processing. It allows timely passing of semi-processed data between computers located in distributed locations.

Check Your Progress B

- 1) What is Plastic Money?
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- 2) Differentiate between LAN and WAN.
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- 3) How can computers lead to more convenience while sorting huge financial data and information?
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4) What is the role of computers in online business?

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2.8 LET US SUM UP

For every kind of business, we can think of using computers in performing day to day operations in one way or another. The survival of these days' businesses is not possible without online presence. From generating reports to communicating with clients, business needs computers for performing almost each and every task. The uses of computer have brought away the business a long way ahead from the age of pen, paper, and their uses are simply countless. In the business organizations, computers help in many areas ranging from communication, marketing, and documentation to research. Technology is helpful in understanding behaviour of the users, how users interact in our site and what minor tweaks can be helpful in finding their right products.

Computers play an integral role in our day to day lives. Along with their uses at offices and home they are popularly being used in all kinds of sectors and businesses. They are used at airports, restaurants, railway stations, banks etc. Computers can also drastically change the way agricultural tasks and businesses being carried out across the world. In agriculture, computers are useful in finding out the best possible kinds of soil, plants and checking which match of these would result in the perfect crops.

The banking sector has popularised the use of technology in serving its client's firstly and also to do more with less. The emerging technologies of these days have transformed the banking industry from paper and pen to the digitized and networked services. Technology has revamped the accounting and management system of banking operations and it is now also focusing on changing the way how banks are delivering services to their customers.

Computer networks also known as data networks are chains of nodes linked by communication channels. These nodes can receive, transmit and exchange data between endpoints. The data transmitted can be in the form of voice or video traffic. Computer networks enable the users in accessing remote programs and remote databases either of the same organisation or from different enterprises or public sources.

2.9 KEY WORDS

Computer: Computer is an electronic device which helps in computations in which we feed input and get the results. Computers can vary on the basis of size, capacity and technology used.

Organization: An organization refers to a group of people working together for a common goal such as a corporation, a union, a neighborhood association or a charity.

Society: A society is a collective group of individuals who are involved in persistent social interaction or a large social group sharing the same territorial boundaries and are typically subject to the same political authority and dominant cultural outlooks.

Trade: Trade refers to a basic economic concept that involves the buying and selling of goods and services in return of compensation paid by a buyer to the seller.

Commerce: Commerce involves the exchange of goods and services on a large scale. It includes legal, economic, political, social, cultural and technological systems prevalent in a country or in international trade.

Computer Networks: Computer networks or data networks are chains of nodes linked by communication channels. Computer networks enable the users in accessing the remote programs and remote databases either of the same organization or from different enterprises or public sources.

2.10 TERMINAL QUESTIONS

- 1) What are the various applications of computers for organisations?
- 2) How are computers helping the society for betterment?
- 3) What do you mean by Wide Area Network? How does it differ from a Local Area Network?
- 4) What is role of computers in online business?
- 5) What are the applications of computers for business, trade and commerce?
- 6) What are the Computer Networks? Explain their importance and various types.
- 7) Explain the utilities of computers in online Banking and Finance.

<p>Note: These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for yours practice.</p>

UNIT 3 WEB APPLICATIONS

Structure

- 3.0 Objectives
- 3.1 Introduction
- 3.2 Web Browser
- 3.3 Google Drive
 - 3.3.1 What is Google Docs?
 - 3.3.2 File Storage and Synchronization Service
 - 3.3.3 Setting up of a Google Account
 - 3.3.4 Navigating Google Docs
 - 3.3.5 Creating New Google Docs Projects
 - 3.3.6 Google Sheets
 - 3.3.7 Google Slides
 - 3.3.8 Google Suite
 - 3.3.9 Sharing, Publishing and Collaborating
 - 3.3.10 Google Forms
- 3.4 Cloud Based System
- 3.5 Let Us Sum Up
- 3.6 Key Words
- 3.7 Terminal Questions

3.0 OBJECTIVES

After studying this unit, you should be able to:

- understand Web Based Application;
- understand Web Browser and its types;
- understand how to use Google Drive; and
- highlight the functions of Cloud Based System and its usability.

3.1 INTRODUCTION

Web based application enables information processing function to be initiated over a network using protocol. The web application uses a website as the front-end, allowing users to access the application from any device. They run inside a web browser. Web based applications are also known as web apps. The common web applications include E-mail, online market place, online auctions, information search, instant messaging services and many other functions.

Unlike web applications in their primitive form as a repository of interlinked web pages, a web based application in this context is software-like, i.e. application logic is significant in defining the behavior of the application rather than navigation paths as represented by hyperlinks in Universal Resource Locator (URL). They are comparable to traditional Graphical User Interface (GUI), Client/Server Applications that are not based on the web.

3.2 WEB BROWSER

Web browser, in short browser, is special application software designed to enable the users to view and read hypertext documents. The user can also navigate from one web page to another web page with minimal effort. There are two types of web browsers:

- **Graphical Web Browser:** It allows using point and click method to view, read, and jump from one web page to another web page. For example, Internet Explorer, Google Chrome. Google Chrome is a cross-platform web browser developed by Google. It was first released in 2008 for Microsoft Windows, and was later ported to Linux, MacOS, iOS, and Android where it is the default browser built into the OS.
- **Non Graphical Web Browser:** In character based method, it doesn't allow the same method as allowed by the graphical web browser. For view, read and navigate from one web page to another web page keyboard is used instead of mouse. For example, it allows user to highlight the word by using arrow up and down keys and then press the enter key.

3.3 GOOGLE DRIVE

Google Drive is a file storage and synchronization service developed by Google. Launched on April 24, 2012, Google Drive allows users to store files on their servers, synchronize files across devices, and share files.



Source: Google

Fig. 3.1: Google Drive

3.3.1 What is Google Docs?

Google Docs is a free web- based application in which documents and spreadsheet can be created, edited and stored online. Files can be accessed through a network of networks i.e. internet. It is a part of a comprehensive package of online applications offered by and associated with Google.

Users of Google Docs can import, create, edit and update documents and spreadsheets in various fonts and file formats, combining text with formulas, lists, tables and images. It is compatible with most presentation software and word processor applications. Work can be published as a Web page or as a print-ready manuscript for further reading.

3.3.2 File Storage and Synchronization Service

File storage is also called file-level or file-based storage that stores data in a hierarchical structure. The data is saved in files and folders, and presented to both the system storing it and the system retrieving it in the same format. In different operating system, it is accessed in different ways like in Unix or Linux it is used by Network File System (NFS) and Server Message Block (SMB) protocol by Microsoft Windows.

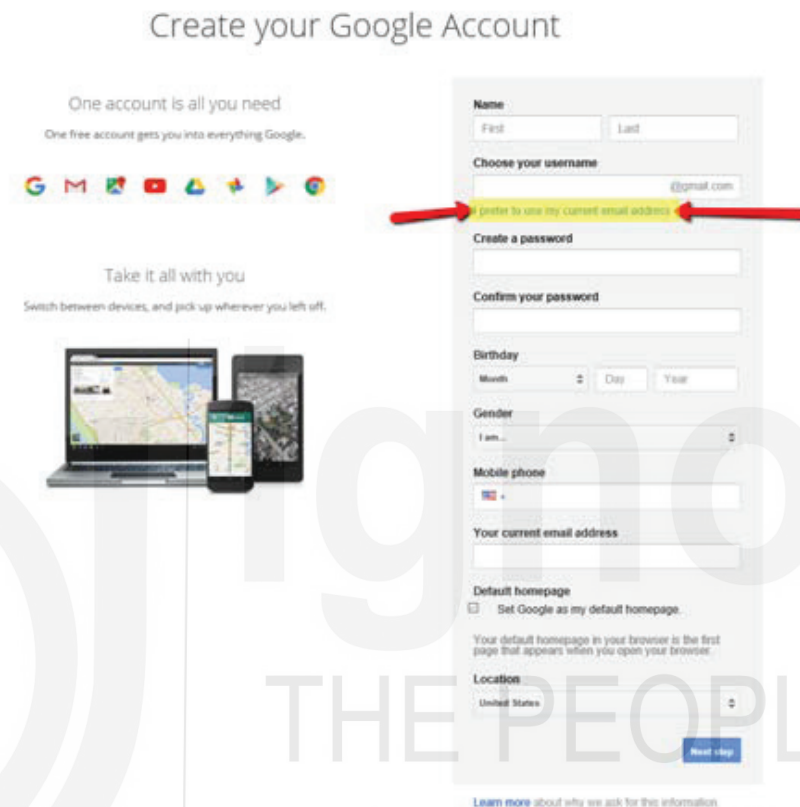
File synchronization is a method of keeping files up to date that are stored in several different physical locations. Synchronization can be “two-way” or “one-way”.

- **Two-Way Synchronization:** Two-way Synchronization is also known as bi-directional synchronization or both-ways synchronization. This process of synchronization copies files in both directions to reconcile the changes as required. Files are expected to change in both locations. The two locations are considered alike. For example: if a file is newer in location X, it will be copied to location Y. But if a file is newer in location Y it will be copied to location X. Similarly, if a file is deleted from location X, it will be deleted from location Y as well and vice versa.
- **One-Way Synchronization:** One-way Synchronization is also known as file mirroring / file replication / file backup. Under it, files are expected to change in one location only. To reconcile the changes, the synchronization process copies files only in one direction. The two locations are not considered equivalent. One location is considered the source and the other is considered the target. Files are pushed from source to target (or files are pulled from source to target, but always in one direction only). This creates an exact 1:1 replica of all files in source to target. This is very useful and effective for backup purposes since only changed/new files are copied. For example, if a file is newer in location X (source), it will be copied to location Y (target). But, if a file is newer in location Y, it will not be copied to location X. Similarly, if a file is

deleted from location X, it will be deleted from location Y. But, a file deleted in location Y is restored using the file in location X.

3.3.3 Setting Up of a Google Account

The Google account can be created by using these 8 steps. With the help of Google account you can access other products of Google like YouTube, Google play, Google drive, Google chat etc.



Source: Google

Fig.3.2: Creating Google Account

You can use the username and password to sign in the Gmail and they are as follows:

- Go to Google's sign up page in your preferred web browser.
- Enter the First name, last name, then user name (unique) & password. Keep in mind that your username will become your Gmail address, so pick something you're prepared to type in or spell out a lot.
- As a next step enter mobile number, recovery email id, date of birth, and gender as asked by Google.
- Click Next.
- If your first username choice it taken, the username box will turn red. Enter a different username in the text box of select one of the suggestions below the username box.

- Click Next.
- Enter your birth date and gender. Google requires all account users to be at least 13 years old and some countries have even higher age requirement, and in order to have an account that can use Google Pay or a credit card to pay for anything, the account holder must be 18 years old.
- Google will present the terms, conditions, and privacy policies for your Google Account. Once you've read everything over, click I agree and thus, your Google Account will be created.

3.3.4 Navigating Google Docs

To navigate the Google docs one has to visit to docs.google.com. On clicking on the link Google doc window will appear on the computer screen. You have to sign in using your email id (abc@gmail.com). Once you sign in, on the left corner of the screen, a menu bar will appear which will have 5 options.

- **Google Doc:** This option will take to the new doc in the Google where one can able to create, look at, and save documents. The Google doc will provide various templates like Resume Sheriff, Resume Coral, Letter Spearmint, Project proposal topic, Brochure Geometric, Report Luxe.
- **Google Sheets:** Google Sheets supports cell formulas typically found in most desktop spreadsheet packages. These functions can be used to create formulas that manipulate data and calculate strings and numbers.
- **Google Slides:** It is a presentation editor in the Google Docs.
- **Google Form:** With Google Forms, one can create and analyze surveys right in their mobile or web browser.
- **Google Drive:** It provides file storage and synchronization service.

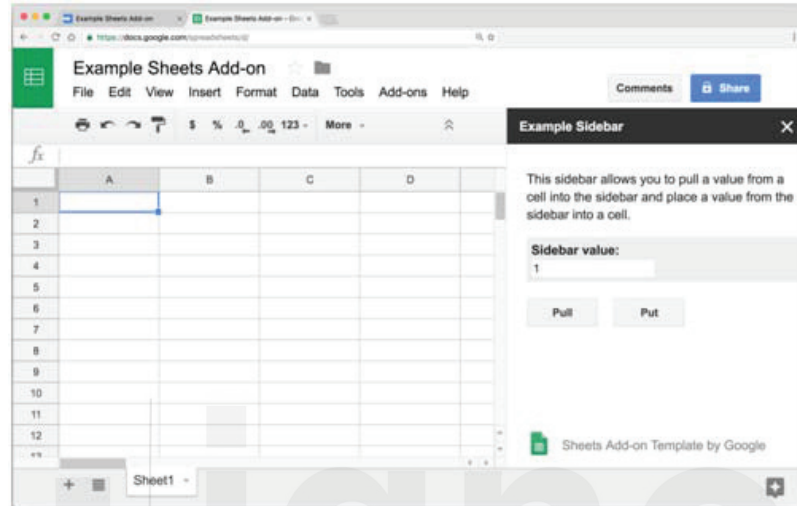
3.3.5 Creating New Google Docs Projects

Google Docs is used to import, create, edit and update documents and spreadsheets in various fonts and file formats, combining text with formulas, lists, tables and images. To create new Google Docs projects one has to follow the following instructions

- Go to docs.google.com
- In Google Drive option, click New > Google Sheets > Blank spreadsheet.
- Click untitled spreadsheet and enter a new title for your project plan.
- Add column headings. For example, you might track the tasks for a project and include columns for task owner, due date, status, and comments.
- Add content to the sheet to track the project plan. After you share the sheet, other people can add content as well.

3.3.6 Google Sheets

This application was added by Google for its users in 2006. This is a simple and inclusive way of creating datasheets for business purposes as compared to Microsoft Excel wherein the features and functions are quite complex. Google sheets help you in performing these tasks:



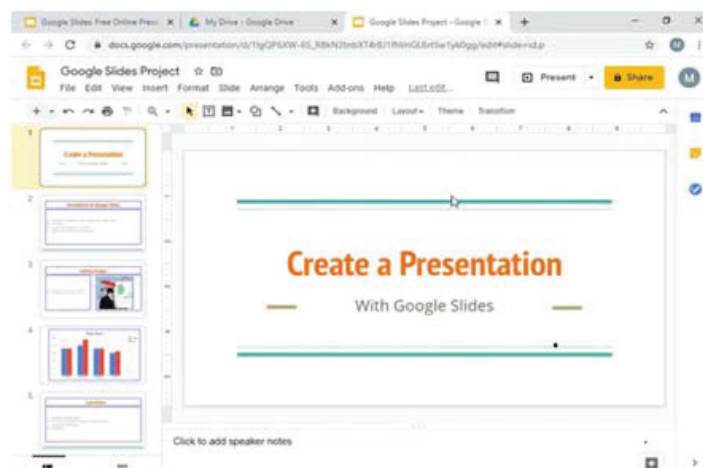
Source: Google

Fig. 3.3: Making Spread Sheet through Google Sheet

- Create basic spreadsheets from scratch
- Upload spreadsheets in XLS or CVS format (basic formats of spreadsheet files)
- Easy to edit the spreadsheets because of familiar user interface
- Sharing spreadsheets with others is easy.
- Edit the sheets with others in real time (same time many people can edit the spreadsheet).

3.3.7 Google Slides

This is web based application just like Power Point which helps you in making presentations. Functions performed by Google slides are:



Source: Google

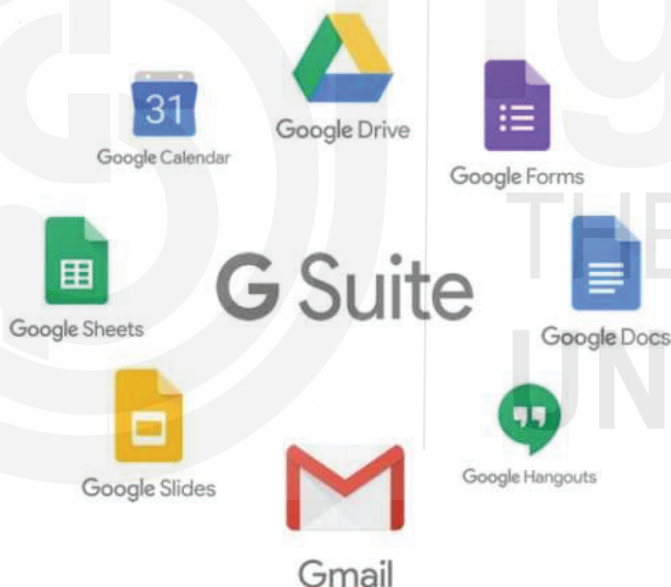
Fig. 3.4: Making Presentation in Google Slide

- Create and edit presentations
- Editing and sharing done at the same time with others.
- Importing files from other sources and converting them to Google presentations.
- Insert images and videos in your ppt.
- Embedding your PPT in a website.

3.3.8 Google Suite

This is one of the application tools which are created to make functioning of business a little smoother. The other well known and popular application for small businesses is Microsoft office. Some of the apps are easily and freely available to all the users and consumers of computers, laptops and Smartphone.

Google office suite is second choice for businesses to manage their tasks of presentations and document creation. The most widely used feature of Google office suite is Gmail. The other apps that come along with Google suite are:



Source: Google

Fig. 3.5: G Suite

- **Calendar:** This is used for keeping a check on different appointments and meeting project deadlines.
- **Google Plus:** A social network where you can post and get connected to people from the world.
- **Docs:** Google suite's word processing application.
- **Slides:** A basic presentation package.
- **Sheets:** Spreadsheet for managing data.
- **Forms:** An application for creating simple and useful forms and questionnaires for collection of feedback and relevant information from the customers.

- **Keep:** A note making tool.
- **Sites:** A website builder.
- **Hangouts:** A chat tool to have an interaction with employees online.
- **Hangouts Meet:** A video conferencing tool.

Google suite is made keeping in mind the requirements of small business managing people and for those who wants to use it for free can also look for different tools available. The various reasons to buy Google office suite are mentioned below

- It provides user management and admin features across multiple users.
- It has some secure and private collaboration features
- It has an impressive storage capacity.
- It gives you the ability to use your own email domain.
- Whenever there is a problem in navigating through the tools, it has human support available all the time.

3.3.9 Sharing, Publishing and Collaborating

This is one of the highlighting features of Google docs and Google Drive wherein a user can share and collaborate with multiple users at the same time.

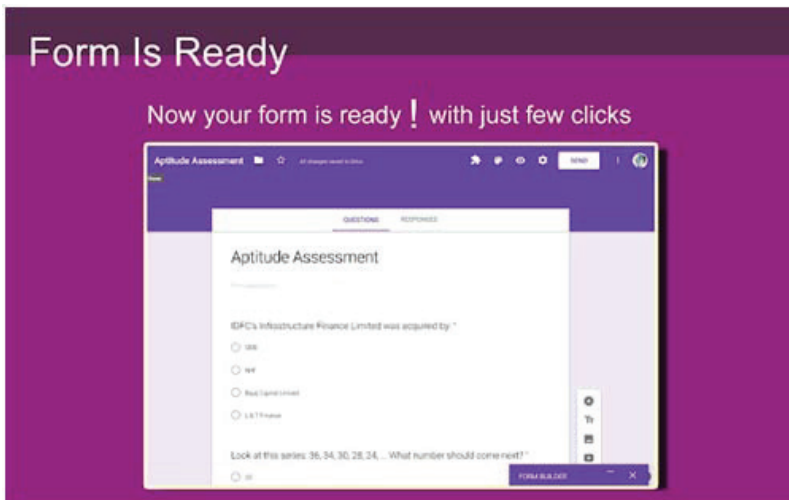
- It enables users to set the visibility of the document to other users.
- It allows you to invite individuals to view and edit the document and saving the changes as soon as these are being done in the document.
- It allows users to switch owners of the document whenever one person leaves the organization or a specific project.
- It allows users to collect feedback of others in form of comments on the documents.

Publishing helps a user or manager of the project in the following:

- Create an HTML version of a document that you can embed in blogs, Google Sites, and more.
- Show your document to large web audiences. Up to 50 people can view a Google Doc at a time, but a published web page has much higher limits.
- Publish a one-time snapshot of a living document.
- Publish individual sheets or cell selections in a Google Spreadsheet.

3.3.10 Google Forms

This feature is useful to make forms for collecting various inputs from employees, customers on the products, services and other policies which are part of an organization.



Source: Google

Fig 3.6 : Making form through Google form

- Visit docs.google.com/forms
- Choose a template or blank form. Templates like event registration form, event feedback, job application etc are available to choose from.
- Google forms page have two tiles at the top: one is of questions and other is of responses.
- Google form editor is very simple and easy to navigate through. It is self explanatory and gives you directions whenever there is a problem.
- After adding the questions, user has the option to choose from the multiple categories of answers given in drop down menu. This drop down help user to select the best suitable option for the questions asked in the form.
- It helps user in collecting data and simultaneously showing results in form of pie chart. This also allows copying responses in a spreadsheet which saves time of a user.

3.4 CLOUD BASED SYSTEM

Cloud based system is a new technology providing computing services (server, storage, data base, networking, intelligence etc.) over the internet at lower cost.

Cloud Computing can be defined as the practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer. Companies offering these computing services are called cloud providers and typically charge for cloud computing services based on usage.

With the help of cloud based system person access services on demand and only pay for the services that one is using. It provides more flexible resources

than server based system. Due to low cost, self service, greater security and improved performance it is very popular.

Check Your Progress A

1) What are the various functions performed by Google slides?

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2) Differentiate between graphical and non-graphical web browser.

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3) What do you understand by cloud based system?

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4) What are the uses of Google slides?

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5) What is Cloud Computing?

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3.5 LET US SUM UP

Web browser, in short browser, is special application software designed to enable the users to view and read hypertext documents. The user can also jump from one web page to another web page with minimal effort. There are two types of web browsers graphical web browser and non-graphical web browser.

Google Docs is a free web-based application in which documents and spreadsheet can be created, edited and stored online. Files can be accessed through a network of network i.e. internet. It is a part of a comprehensive package of online applications offered by and associated with Google.

Google sheet was added by Google for its users. This is a simple and inclusive way of creating datasheets for business purposes as compared to Microsoft Excel wherein the features and functions are quite complex. This is web based application just like Power Point which helps you in making presentations.

Google office suite is one of the office application tools which are created to make functioning of business a little smoother. The other well known and popular application for small businesses is Microsoft office. Some of the apps are easily and freely available to all the users and consumers of computers, laptops and Smartphone.

Cloud base system is a new technology providing computing services (serves, storage, data base, networking, intelligence etc.) over the internet at lower cost.

Cloud Computing can be defined as the practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer. Companies offering these computing services are called cloud providers and typically charge for cloud computing services based on usage.

3.6 KEY WORDS

Google Doc: Google docs is a free web-based application in which documents and spreadsheet can be created, edited and stored online. Files can be accessed through a network of network i.e. Internet

Google Slide: This is web-based application just like PowerPoint which helps you in making presentations.

Google Office Suite: Google office suite is second choice for businesses to manage their tasks of presentations and document creation. The most widely used feature of Google office suite is Gmail.

Google Sheets: This application was added by Google for its users in 2006. This is a simple and inclusive way of creating datasheets for business purposes as compared to Microsoft Excel wherein the features and functions are quite complex.

Web Browser: Web browser, in short browser, is special application software designed to enables the users to view and read hypertext documents. The user can also jump from one web page to another web page with minimal effort.

3.7 TERMINAL QUESTIONS

- 1) What is web browser? Explain its various types.
- 2) How to make Google forms?
- 3) What are various steps involved in setting up Google account?
- 4) What are the usages of Google drive?
- 5) What is file storage and synchronization? Distinguish between one way and two-way synchronization.
- 6) What do you understand by Google sheets? Explain their usability.
- 7) What is Google office suite? What are the different apps that come with Google office suite?

Note: These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for yours practice.

UNIT 4 BASICS OF COMPUTER SOFTWARE

Structure

- 4.0 Objectives
- 4.1 Introduction
- 4.2 Software and its Types
 - 4.2.1 System Software
 - 4.2.2 Application Software
 - 4.2.3 Google Chrome
 - 4.2.4 App Based Software
- 4.3 Windows Operating System
- 4.4 Android Operating System for Mobile
- 4.5 Free and Open Software
- 4.6 Google Play Store
- 4.7 Let Us Sum Up
- 4.8 Key Words
- 4.9 Answers to Check Your Progress
- 4.10 Terminal Questions

4.0 OBJECTIVES

After studying this unit, you should be able to:

- understand Software and their types;
- understand the use of Windows Operating System;
- understand the use of Android Operating System;
- understand the application of Free and Open Software; and
- highlight the use of Google Play Store for Application Based Software.

4.1 INTRODUCTION

Computer hardware is only as effective as the instructions we give it, and those instructions are contained in software. Software not only directs the computer to manage its internal resources, but also enables the user to tailor a computer system to provide specific business value.

Hence, Software is a generic term for organized collections of computer data and instructions, often broken into two major categories: system software that provides the basic non task-specific functions of the computer, and application software which is used by users to accomplish specific tasks. It is surprising to many people that at the corporate level, software expenditures

(development and purchase) typically are a much larger cost than is hardware.

In this unit, we learn that computer software, in its various types. Complexities in software must be understood in order to truly be able to exploit the power of modern information technologies. This unit, explain the learners about the concepts of software, how it works, and how it is created. Along the way we provide examples of software's critical role in maintaining organizational competitiveness.

4.2 SOFTWARE AND ITS TYPES

Software consists of a set of instructions that directs computer to perform the designated/ specific task. It is a common term used to describe various programs used for computer and other related devices operations. Hardware basically is the physical part of a computer whereas what happens in the hardware is because of software. The variable and non- physical instructions given with the help of scripts, applications and programs of computer are used to describe software.

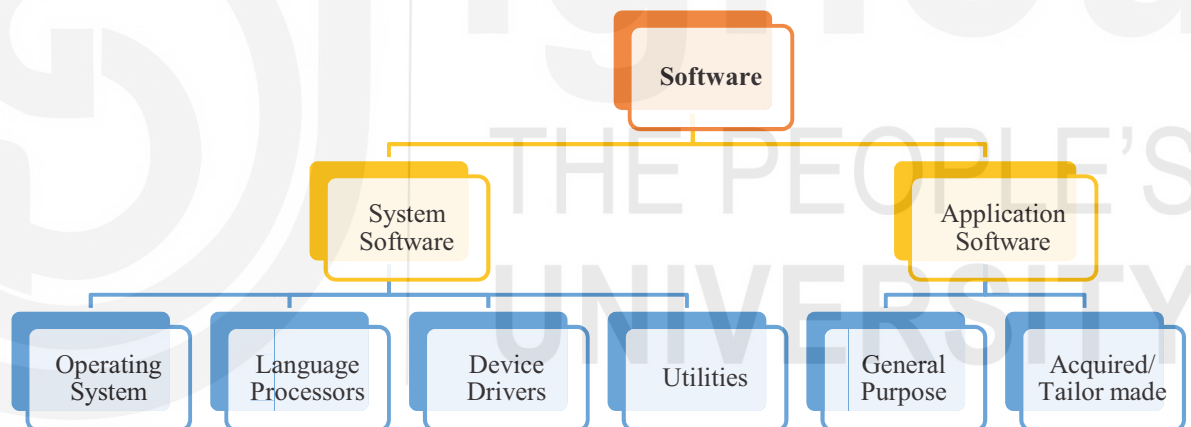


Fig. 4.1: Types of Software

4.2.1 System Software

System software acts as an intermediary between the computer system and software applications. This includes set of programs which carry out the task of operating and managing computer hardware system. The new CD given by the supplier or manufacturer along with the computer system contains some software. This is system software which actually makes a computer system functional. It provides hardware the support to create, edit, store and retrieve a file. The most basic examples of system software are DOS, Windows, Linux, Unix etc.

1) Functions of System Software

- a) It controls the execution of programs, storage of information and resource processing of the computer.
- b) It supports programs in the form of utilities and libraries which provide routine service functions to allied computer programs and users.
- c) In the form of language translators and programming language, it helps in creation of different computer programs.

2) Types of System Software

Operating system: This is the program that acts as an interface between the user and the computer hardware. It manages the overall functioning of computer and execution of application programs along with other resources like CPU, memory, I/O devices. This is also known as supervisor program because of its service of inputting the programs which are needed to run each application and to increase the computer system capabilities.

Three basic purpose of operating system are:

- a) It works as an interface between the user and the computer hardware making it easier to code, create, and debug application programs of the system.
- b) It manages the computer's resources which include memory, CPU, disk drives, printers and other hardware etc.
- c) It increases the efficiency of system's resources and control the allocation of resources among the different tasks and users.

Some important functions of operating system

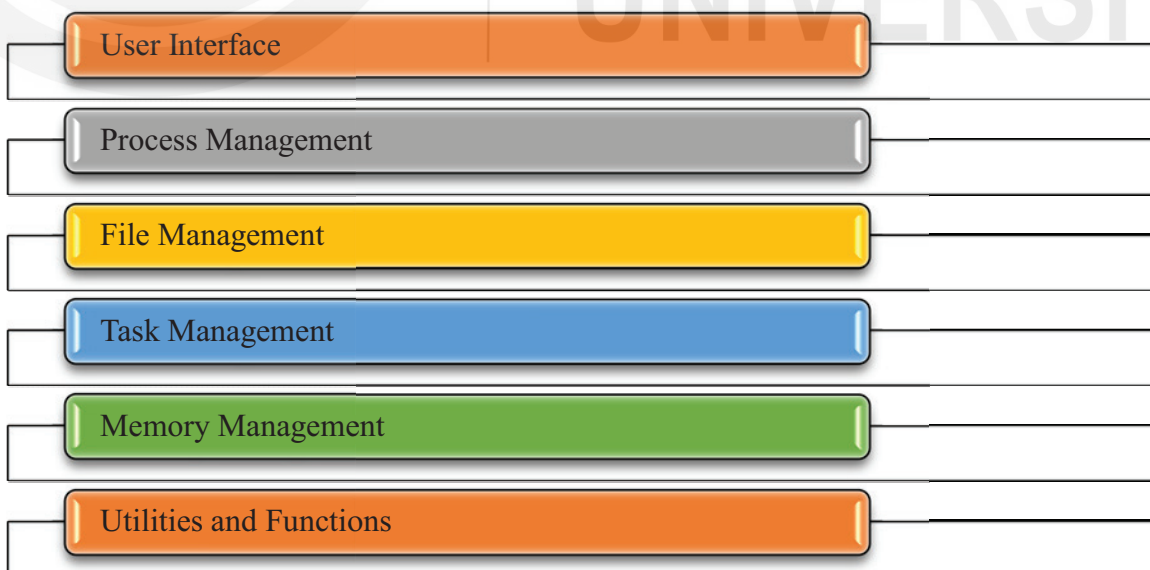


Fig. 4.2: Functions of Operating System

- a) **User Interface:** It is that part of operating system which allows a user to communicate with the computer for accessing files, loading programs and other tasks. The two types of interfaces are Graphic User Interface and Command line interface. The GUI is most commonly used interface also known as WIMP (Windows, Icons, Menus, and Pointers) interface which makes it easier to navigate through the mouse and work on computer. The Command line interface is only for those who have knowledge of giving proper instructions and commands to execute a particular instruction.
- b) **Process Management:** A process is a program in execution which needs certain resources, including CPU time, memory, files in order to complete a task. The operating system performs functions with respect to process management are:
- Allocation of resources to processes
 - Creating and deleting the processes
 - Sharing and exchanging information through processes
 - Creating synchronization within the processes
- c) **File Management:** A file is a collection of information. It can be stored on the secondary storage keeping in mind the long run requirement of the information. File management includes keeping a track of physical location of files and organizing them into directories for easy accessibility.
- d) **Memory Management:** Primary memory where large array of bytes or words are being stored is managed by operating system. The program which needs to be executed has to be stored in the main memory and this memory can be directly accessed by the CPU. The function performed by memory management is to keep track of memory used for a particular process and for how much time. The operating system decides about the allocation and reallocation of memory by a process.
- e) **Utilities and other Functions:** The operating system helps users by providing software which can be used for finding files, diagnosing and repairing system problems (troubleshoot), cleaning up the hard drive of system etc. some stand alone utilities like desktop enhancer, antivirus programs, file conversion, data recovery can also be used by the end users.

Some other important functions include:

- Security management
- CPU time management
- Device management

- Job accounting
- Error detecting aids
- Virus protection

Types of Operating System: There are various types of Operating System which have its utility and explained as follows:

1) Batch Operating System

In this, user submits the job to the operator with the help of some off-line device like punch cards. The operator then sorts the program/ data on the basis of pre defined sequence of commands as single unit and then collects the data and programs in a batch and processes it for the execution. In this operating system, CPU idle time increases because of the variation in processing speed of different I/O devices. There is a limitation of no interaction between the user and the job. Examples are the operating system used for payroll system, bank statements etc.

2) Real Time Operating System

It is a data processing multitasking operating system where the functions are performed with a time constraint. This operating system has very less response time (time taken by the system to respond to an input and display of required information). These are used in scientific experiments, medical imaging systems, industrial control systems, etc. The two types of real OS are:

- **Hard Real Time Operating System:** In this real OS, completion time taken by a task can be guaranteed.
- **Soft Real Time Operating System:** In this real OS, time is not guaranteed and it gives priority to the task unless it is completed and then moves on to other tasks.

3) Time Sharing Operating System

In this operating system, users are allowed to use resources like CPU, memory of a computer system simultaneously. The end users who are located at various terminals can use the same computer resources with the help of time sharing technique. For example, many users are logged on to the same mainframe computer and they all can use the resources like CPU, memory of mainframe computer. The major advantages given this operating system are that it is time saving and simultaneously many people can work on it?

4) Distributed Operating System

This operating system uses multiple central processors to serve multiple users with multiple real time applications. The multiple processors which

are also termed as nodes, sites communicate with one another with the help of communication lines/ telephone lines, high speed buses.

The main objective of distributed system is to share the remote resources in a controlled manner. This operating system which runs on multiple processors tries to make several machines to behave like a single machine. Some of the problems faced by distributed systems are of security related issue, loss of messages in the network and overloading issues. Example where applications of distributed computing are used: WWW, Internet, Intranet etc.

5) Network Operating System

In this operating system, activities of multiple computers are coordinated via a network. It is designed to support and manage personal computers, workstations and servers connected to Local Area Network. It helps servers to be remotely accessible by different systems and by different locations. Examples of NOS are Uniplexed Information and Computing Service (UNIX), Lovable Intellect Not Using XP (Linux), Macintosh Operating System (Mac OS) and others.

4.2.2 Application Software

The term end user program is given to application software because of its usage and ease it provides to its users in the form of different applications. Application software is set of program which enhances the overall functioning of computer system. The end users are being provided with applications like word processors, database programs, presentation programs, spreadsheets etc. Application software is dependent on system software. The user can use a computer system when system software is there and then to perform specific tasks application software is used.

There are applications which end users can only access with the help of web browsers like web based email, social media platform though these are now available in the form of application also but you need to have proper account in order to avail the service of these applications.

The categories are made on the basis of usage of such software:

1) General Purpose Software

Such software is being developed after keeping in mind the basic requirements of general users at large. These are not specifically designed for an organization and cater to the needs of business, common users and for scientific applications also. These are available for all types of users with certain features and functions that can be performed using general purpose software. MS-Word, Excel, Power point, TALLY,

Computer Aided Design (CAD) are some of the general purpose application software.

- Word –Processing software: MS Word, Apple Works
- Spreadsheet software: MS Excel, Quattro, Lotus 1-2-3
- Database software: MS Access, FileMaker Pro
- Graphics software: Photoshop, MS Paint, Adobe Photoshop
- Multimedia software: VLC Player, Windows Media Player
- Web Series Software: Netflix, YouTube, Prime Video
- Accounting Software: Tally, Busy, TurboTax
- Banking Software: Peoplesoft, Finnacle, SAP-AG

Check Your Progress A

1) Define Software and their types.

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2) Distinguish between Application Software and System Software.

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3) State whether the following statements are True or False

- i) Software is available to help you with all kinds of task
- ii) Operating system is a link between end user and machine
- iii) Google chrome is not application software
- iv) Android operating system is used for mobile only
- v) Free and open software cannot use for commercial purpose

4.2.3 Google Chrome

This is a cross platform web browser developed by Google in 2008. The first version was compatible with Microsoft Windows but later versions ported to Linux, MacOS, iOS and Android. The chrome is one of important product of

brand Google. Google is a search engine whereas Google Chrome is a web browser. This browser is the most widely used browser all over the world because of its speed, easy navigation on the web and good safety approach for internet surfers. There are certain features like Incognito mode which makes it different from other web browsers.

4.2.4 App Based Software

The basic difference between an App and Application is of the number of functions to be carried out. An App is software designed for a single purpose and performs single function whereas an Application can perform variety of functions. This can be understood in one line – “Apps are Small Applications”.

These app based software are the ones which enhances the functioning of system. Examples can be of Calculator, Skype, Office 365, etc. which basically help end users to perform tasks more efficiently.

4.3 WINDOWS OPERATING SYSTEM

The computer system is always supported with system software and the major component of system software is operating system. The operating system is present in computer like devices including Desktop computers, laptop, Smart phone, Tablet computer, smart watches etc.

Windows is the operating system of Microsoft Inc. It acts as an interface between the hardware and other software on the computer. It performs all the functions which are done by an operating system like allocation of resources, manages different programs and executes with the help of input/output devices.



Source: Microsoft

Fig. 4.3: Windows Operating System

Major Attributes of Windows

The following are the features of Windows:

- **Interactive Package:** The operating system ensures the communication between the end user and computer is effortless and hence, the features are easy and quick to understand.

- **Menu Driven Package:** The windows operating system makes easier for end users to perform several functions without learning different commands. This makes the navigation smoother by use of menu and simply clicking on these menus will serve the purpose.
- **Program Manager:** MS Windows acts as a manager by controlling, coordinating and manipulating the processing of other programs.
- **Multi-tasking Package:** This feature of windows operating system has increased the productivity and reduced the time taken by end users to complete their tasks. This feature helps end users to perform multi task simultaneously.

4.4 ANDROID OPERATING SYSTEM FOR MOBILE

Android Operating System was initially conceptualized as an Operating System for Cameras but soon mobile handset became its destination, that too at a time when mobile handset arena was dominated largely by Nokia's Symbian Operating System whereas Blackberry dominated business circles.

Android was developed by a company called Android Inc. which was founded in Palo Alto, California, USA in the year 2003 by four founders namely Rich Mines, Nicks Sears, Chris White, and Andy Rubin. Later on Android Inc. was purchased by Google in the year 2005 and since then Android Operating System is Google's propriety.

Currently Android Operating system is not only used in Mobile Handset but also on wearable devices, game consoles, TVs, PCs among others. Android is an open source Operating System based on Linux Kernel. Open Source basically means that its original source code is freely available for its redistribution and modification. Since its beginning, the original Android Operating System has gone through many releases and all of them have been named alphabetically.



Source: Android

Fig. 4.4: Android Operating System

Its releases (in order of its releases) are Cupcake, Donut, Éclair, Froyo, Gingerbread, Honeycomb, Ice Cream Sandwich, Jelly Bean, Kitkat, Lollipop, Marshmallow, Nougat, Oreo and Pie. Android's popularity can be attributed largely to its free customization (being open source) and extensively larger pool of Applications (hereafter referred as Apps) available on its Play Store, a feature which other Mobile Operating Systems such as Symbian and Blackberry could not cope with. Despite of huge popularity that Android possesses, it often has to bear with a complaint that various releases of Android takes significant time to get updated on mobile devices and this is largely due to hardware variation and delays caused in customization testing.

The Interface of Android is a touch interface based on Direct Manipulation wherein Users are shown various Icons, Widgets and a keyboard on the devices' screen. These Icons, representing various Apps and other Device related activities, are then accessed by various touch activities like swiping (swipe in and swipe out), tapping, pinching, and reverse pinching. Android mobile devices also have a status bar which has various information on device and how to connect.

This Status Bar is also customizable which means users can decide which of the functionalities should be visible on the Status Bar. The status bar can be "pulled" down to reveal a notification screen which allows the Users to tap an icon on the notification in order to access corresponding Apps and Widgets further.

Android Operating System, in conjunction with device hardware and various onboard sensors like GPS, orientation sensors, accelerometers, gyroscopes, barometers, magnetometers, proximity sensors, pressure sensors, thermometers, gives additional functionalities to the installed Apps and Widgets. In addition to this, Google Play Store contains various Third Party Apps which are developed on Android SDK using C, C++, Java and GO programming languages.

Majority of these Apps are free but some are also paid. The open nature of along with Play Store feature of Android Operating System made it the most sought after Mobile Operating System in no time. As Android runs on Mobile devices, battery consumption has always been in middle of debate. Android OS handles this by invariably shutting down Apps that have been inactive for a long time.

However, with advancement in the hardware technology, battery capacity and RAM size has grown significantly and this has given Android more opportunities to grow in terms of functionalities and utilities. As stated earlier, Android is based on Linux Kernel on top of which lies Middleware, various Libraries and Android Runtime which is the Runtime Environment in

which applications' by the code are compiled into machine code. Above this lies the Application Framework and the Application itself.

The overall architecture of Android OS and the applications running over it is very robust and strong when compared with other Mobile OS. As on date, it is estimated that 70-80% of the mobile devices run on Android OS which is seconded by iOS of Apple.

4.5 FREE AND OPEN SOFTWARE

Going by the literal meaning, free means something that comes at zero cost and Open means with zero restrictions. In connection with Software, Free and Open Software means Software that comes with a freedom to use distribute and modify and this happens when its source code is available in public domain free of cost without any restrictions to the manner of its use.

It may be noted that Software can be Free and Open separately as well as simultaneously. Software that is neither Free nor Open can be Closed Source and/or Proprietary in nature. There exists many Free and Open Software and some of them are Linux (along with Unix in Command form), Android, MySQL, Python, PHP, Open Office, Postfix, WordPress etc. It is quite obvious that development of Software does come with cost. Thus Free and Open Software (commonly referred as FOSS) very often are created in collaboration and its funding are done via various newsgroups and web forums.

OSI Affiliates, July 18, 2012



Source: Free and open Source Software

Fig. 4.5: Open Source Initiative

Richard Matthew Stallman is considered as the founder of Free and Open Software when he announced GNU Project in 1983. His initiative was later on succeeded by Linus Torvalds when he created Linux Kernel. With other similar initiatives that came one by one later, Open Source Initiative was founded in the year 1998 and similar four other entities later on. However, there has been much opposition to FOSS as many software companies and their representatives claimed that it's an Intellectual Property destroyer. When we have to sum up characteristics of FOSS, it can be stated that Users have freedom for personal use and customization. Also, as its source code is out in public domain, there are no hidden threats related to its privacy and security. As stated earlier, its free of cost or at max, it comes with negligible cost that is usually sought for software developmental work only. It has to be however noted that FOSS is not free in its true terms as it usually come with License that defines the permissible modification and thus restricts modifications within predefined framework. One of such License is GNU GPL (General Public License). For UNIX, the concerned License was called BSD License and other similar Licenses are Apache License, Eclipse Public License, and Mozilla Public License. FOSS has been facing constraints mainly due to limited funding for its projects along with competition from proprietary software which offers regular updates and robust maintenance mechanism. Still FOSS has come a long way from its initial hurdles and is continuing to grow on and on.

4.6 GOOGLE PLAY STORE

Google Play Store is a Digital Service that is developed and maintained by Google on its Android Mobile Operating System. It basically consists of Android running applications, games, music, movie rentals, e-books and many more that users can browse, download and install on their Android Mobile Devices. All of these Apps etc are developed using Android Software Development Kit (SDK) and published through Google in the Play Store.

Some of the content are paid whereas some are free to download. Google or the concerned App Developer specify separate payment method or through the Network Carrier for the Paid contents. Google Play Store was earlier known as Android Market with separate applications for Books (called Google eBook Store) and Music (called Google Music).



Source: Google

Fig. 4.6: Google Play

Later on, Google Play Store combined functionality of all three of them. Going by the literal meaning, Google Play Store is not meant merely for Games. Instead it reflects playful nature that Google envisaged in designing Google Play Store. Any Developer (of apps) who wishes to launch his/her Apps in Google Play Store need to first register on Google Play Developer Console Account. Such Developers can even control which of the Countries his/her Apps would be available for Users. It need to be noted that Google places some restrictions on the types of apps that can be published, in particular not allowing sexually explicit content, child endangerment, violence, bullying & harassment, hate speech, gambling, illegal activities.

Google periodically detects filters and deletes all such non-permissible Apps. It is estimated that millions of applications are available in Google Play Store as on date. Similarly, Google Play Games feature of Play Store offers both single-player and real-time multiplayer gaming capabilities. Google Play Music and Movie offers music (and movie) streaming service that are available on demand anytime. With the release of each version of Android and advent of hardware capabilities, Google Play Store has grown in content that users believe are quite rich and robust than compared to similar stores available for other Mobile Operating Systems. It may be noted that Google has an automated antivirus system, called Google Bouncer, to scan both new and existing apps for malware which was later rebranded as Google Play Protect. Despite all these, Google Play Store has been facing worse situation for unsecure apps that have been periodically detected to contain malwares which steals Users content and personal information.

Google however has maintained that it takes all necessary steps to avoid such instances. Another matter that Google Play Store has been facing very often is about Patent wherein App Developers camouflage others' Apps as their own resulting in Google facing Patent Suites. Despite all these, Google Play Store continues to win hearts of millions of its users mainly due to the fact already stated earlier.

1) Acquired/Tailor Made Software

The organization whose requirements are specific to their own business then they ask developers to come up with software having the same features. There is some software available online whose free version can be used and for using it for a longer time, end users have to pay some price to purchase them. There are other ways also which are used by software developers to provide the utilities of that software like

- **Customized and Tailor-made:** the customized software is required for some specific functions which an organization/person needs to perform. The tailor-made software can be developed using in-house developers or it can also be outsourced from other experts. Some examples can be Gmail, Microsoft Outlook,
- **Ready to use/ Pre-written Software:** the name suggests the feature of ready to use software. These are readymade software packages available in the market which can be used according to their requirements.
- **Public Domain Software:** these are the software available for public at large. This software is made keeping in mind the basic needs of end-users.

2) Language Processors

This is used for translating the programmer's instructions into a form that can be interpreted and executed by a computer system. The programmers use different computer languages which are translated by language processors for execution.



Fig. 4.7: Translation process

The three different language processors are

- Compiler
- Interpreter
- Assembler

3) Device drivers

- It is also known as hardware driver which helps one or more hardware devices to communicate with a computer's operating system.

- It acts as a translator that helps input/ output device by communicating the instructions in the language in which the system can understand.
- The device drivers are either provided by manufacturers or are in-built in the components of OS.
- It is essential for a computer system to have device drivers for smooth functioning.

4) Utilities

- A utility program is basically built to perform specific tasks like “run” desktop program which is used for specific purposes and some commands are being given in order to have desired results.
- Utility programs are used for finding files, diagnosing and repairing system problems, cleaning up hard drive and storing files virtually.
- Some utilities used are for desktop enhancement, file conversion, disk formatting, backup utility, data recovery etc.

Check Your Progress B

- 1) State whether the following statements are True or False
 - i) Antivirus is utility software
 - ii) Drivers are system software
 - iii) Windows 10 is application software
 - iv) Android operating system can be used on TV's
 - v) Google Play Store cannot accessed at Table computer
- 2) Fill in the blanks
 - i) _____ is used to accomplish specific task.
 - ii) Google _____ is a web browser.
 - iii) Linux is a _____.

4.7 LET US SUM UP

Computer software brings the machine to life. Ingredient that enables a computer to perform task is software. Software is of two types (i) System Software (ii) Application software. This software performs different tasks in computer system. System software is used to run different hardware while application software is use to run different application like Word, Excel, PowerPoint, Media Player, SPSS, Tally, Photoshop etc.

Window operating system is commonly used OS, it is a popular graphical user interface which is present in computer devices like Desktop computer, Laptop, Smartphone, Tablet computer, Smart watches etc.

Android is a widely used mobile based operating system. Although, initially it is designed for cameras, Now-a-day's Android OS is also used for wearable device, games console, smart TVs etc. This operating system supports Google play store which is digital services for downloading different type of mobile applications.

4.8 KEY WORDS

Computer Software: Computer software is a collection of data or computer instructions that tell the computer how to work. This is in contrast to physical hardware, from which the system is built and actually performs the work. It is basically the ingredients that enable computer to perform task

Operating System (OS): An operating system is software which performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices such as disk drives and printers.

Android (OS): Android is a mobile operating system based on a modified version of the Linux kernel and other open source software, designed primarily for touch screen mobile devices such as smart phones and tablets.

Google Play Store: Google Play, formerly Android Market, is a digital distribution service operated and developed by Google. It serves as the official app store for the Android operating system, allowing users to browse and download applications developed with the Android software development kit and published through Google.

Application Software: Application software is a set of programs which enhance the overall functioning of the computer system. Application software is dependent on system software. The user can use a computer system when system software is there and then to perform specific tasks application software is used.

System Software: System software acts as an intermediary between the computer system and software applications. This includes set of programs which carry out the task of operating and managing computer hardware system.

4.9 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress A

3 (i) True ii) True iii) False iv) False v) False

Check Your Progress B

1 (i) True ii) True iii) False iv) True v) False

2 (i) Application Software ii) Chrome iii) Operating System

4.10 TERMINAL QUESTIONS

- 1) Name and differentiate the two main categories of computer software.
- 2) Why application software is considered to be an important? Explain in detail with its suitable applications.
- 3) Explain operating system and their type.
- 4) Google Chrome is application software. Explain.
- 5) How is Android operating system different from another operating system?
- 6) Name and Explain utilities of some free and open software.
- 7) Why does Google play store is important application for Android OS?

Note: These questions are helpful to understand this unit. Do efforts for writing the answer of these questions but do not send your answer to university. It is only for yours practice.

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