**Pakistan School, Ministry of Education, Kingdom of Bahrain**

**ONLINE GUDIANCE AND SUPPORT FOR HSSC-I(Computer Science)**

**Ch 1: Overview of computer system**

**Q: Write down brief introduction to computers**

**Ans: INTRODUCTION TO COMPUTERS**

A computer is an electronic device that accepts data as Input, Process and produces the results as Output. It is a programmable machine that executes a programmed list of instructions that it is provided.

**Main parts of computers**

Computers are composed of the

1. central processing unit (CPU)
2. input devices,
3. output devices,
4. primary storage,
5. secondary storage,
6. communication devices.

 The CPU is the main component of a computer that interprets and executes instructions. A digital computer is a machine that can solve problems for people by carrying out instructions given to it. A digital computer consists of an interconnected system of processors, memories and input/output devices.

A simple computer system is shown in fig



**Q: What do you know of computing devices.**

 All machines, components or devices that contain embedded, specialized computers are called computing devices. For example ATM machine, Digital alarm clock, Digital washing machine, Microwave oven, Toys, Cell phones, CD player, etc. are computing devices.

All these devices contain embedded computer chips which allow these devices to do special computing tasks, for example the computer of ATM machine gives banking transactions facilities, the computer of Digital alarm clock sets the time for alarm and manages calendar, and the computer of Digital washing machine can be programmed to wash clothes. Some important computing devices are shown in **fig**.

  

**Q: Describe briefly basic operations of computer.**

**Ans:** Any computer system, regardless of its size, is capable of performing the following basic operations

It include following operations:

1. Input
2. Processing
3. Output
4. Storage

**i. Input operation:** Accepting data for processing from an input device.

**ii. Processing operations:** Performing arithmetic and logical operations. Arithmetic operations include addition, subtraction, multiplication and division while logical operations include comparison of different values and decision making.

**iii. Output operation:** Sending results to an output device.

**iv. Storage operation:** Writing data to a storage device such as hard disk or USB flash drive.

The purpose of a computer system is to accept data, process it and as a result of processing, produce output in the form of useful information. The input unit of computer presents data to the processor for processing. The results of processing of the data are displayed on the monitor screen, printed on paper or sent to any other output or storage device.

**Q: Describe Classification of Digital Computers**

There are several factors that make computers different from each other. These factors are physical size, cost, speed, etc. Based on these factors, computers are classified into four categories.

1. Supercomputer
2. Mainframe computer
3. Minicomputer
4. Microcomputer
5. **Supercomputer**: Supercomputers are the largest, the most expensive and powerful computers. They are used to process complex calculations as well as designing and controlling of complicated machines, such as rockets and fighter planes.

Supercomputers are also used in nuclear research and weather forecasting which requires huge amount of calculations to be performed at high speed.

The best known supercomputers are built by Cray Inc. an American supercomputers manufacturers and IBM. In Pakistan supercomputers are used in many organizations, like Atomic Energy Research Centre.

1. **Mainframe computer**: These are larger, more expensive and more powerful computers compared to minicomputer but less powerful than supercomputer.

**Use:** They are used in large corporations, banks, universities and scientific laboratories.

Mainframes usually fill a large room because they include many types of peripheral devices.

**Speed:** A typical mainframe can execute about trillion instructions per second (TIPS) and can support thousands of users. Some examples of mainframe are IBM’s zEnterprize EC12, EC 196 and HP 16500 Series.

1. **Minicomputer:**

**Size:** These computers are larger and more expensive than microcomputers. Minicomputer and its peripheral equipment can usually fill a small room.

Minicomputers can support hundreds of users at a time.

**Speed:** Minicomputers are faster than microcomputers. They can execute billions of instructions per second (BIPS). These computers can process more data than microcomputers.

**Used in:** Minicomputers are widely used in industrial process control, scientific research and small business applications. Due to advancement of technology, the difference between the performance of microcomputer and minicomputer is gradually decreasing. As a result, modern microcomputers are replacing the more expensive minicomputers.

 **Examples of minicomputer** are IBM System/36 and HP 3000.

1. **Microcomputers**:

**Size**: Microcomputer is the smallest and least expensive computer. Its small size is a result of LSI (Large Scale Integration) and VLSI (Very large Scale Integration) technologies. A microcomputer can easily fit on a desktop or in a briefcase in the form of laptop computer.

**Speed**: A modern microcomputer can execute millions of instructions per second (MIPS). Although, this is very fast but it is much slower than minicomputers and mainframes. A typical microcomputer consists of a Keyboard, a Mouse, a Monitor and System Unit.

**Use**: Microcomputers are used at home for personal use as well as for business applications. **Examples:** Some examples of microcomputer are IBM Thinkpad, Toshiba Satellite series, Dell XPS, HP Envy series and Apple series

**Q: What do you know about Mobile computing?**

**Ans:** It refers to a variety of small portable devices that allow people to access data and information from anywhere in a wireless network system. Mobile computing devices run on batteries and have limited functionality as compared to laptops.

Popular mobile computing devices are tablet PCs, PDAs (Personal Digital Assistants) and smartphones.

**Q: Describe IoT.**

**Ans:** Internet of Things (IoT) is the interconnection between computer network and physical devices to collect and exchange data. Devices used in daily life can be equipped with wireless connectivity, and embedded with software, sensors, actuators, cameras, microphones and other instruments that enable them to collect and share data.

 All kinds of household items can be modified to work in an Internet of Things system. These device are known as **smart devices** and they are designed in such a way that they can interact with human beings through wireless connection.

**Application of IoT:** Smart home is a popular application of IoT. In future, IoT will allow us to switch on air conditioning before reaching home or switch off lights after leaving home. There are homes equipped with various types of electronic devices that can be controlled remotely with smart phone or computer through IoT system.

**Q: What do you know about Cloud Computing? Write down its advantages & Disadvantages.**

**Ans:** Cloud computing means instead of buying and installing your own computer system and software at your workplace, you can get it as a service provided and managed by another company. You can perform your computing tasks through access to service over the Internet. It does not matter where the hardware and software is located. It is just somewhere in the “cloud”. It is a way of outsourcing your computing requirements.

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| **Advantage** | **Disadvantage** |
| you don’t have to buy and maintain a complex computer system. | it requires a reliable high speed broadband connection functioning the whole time you are working. |
| This cuts cost of buying computers and peripherals. |  |
| No need to worry about equipment going out of date and other problems related with system security and reliability. | Another disadvantage of cloud computing is the privacy and security risk of having valuable data on someone else’s system in an unknown location. |

**Q: What do you know about data centers?**

**Ans:** Data center is a centralized location for collecting, storing, processing and distribution of vast amount of data. It consists of servers, routers, switches and backup equipment.

A data center facility usually requires air conditioning, fire suppression, smoke detection and security entry. It may be housed in a room, an entire building or a group of buildings.

**Used in :**Organizations such as government agencies, banks, educational institution, telecommunication companies and social networking services use large amount of data and thus have requirement for data center.

Many companies are moving their data centers to cloud services to cut the cost of running their own computing networks and servers

**Q: Define Hardware & software.**

**Ans:**  All physical components of computer system, such as monitor, keyboard, hard disk, printer, along with the circuitry connecting them are known as computer hardware. Computer hardware is what you can physically touch and see.

In simple words all tangible parts of computer system are referred as hardware.

**For example**: CPU, Keyboard, Mouse etc.

Software is any set of instructions, also called programs, which are given to the computer to perform any task or to do any activity. It tells the computer what to do and how to do. Programming languages are used to prepare software. A computer cannot do anything on its own. It must be instructed to do a desired job.

**For example**: MS Word, MS Excel, Windows

**Q: List types of software.**

**Ans:** Computer software can be classified into the following types.

* 1. System Software
	2. Application Software
	3. Internet Applications
	4. Licensed Software, Open Source Software, Shareware and Freeware

**Q: Describe system software with its types. Also describe in detail.**

**Ans:** System software is a collection of system programs that control and coordinate the activities of a computer system. System software consists of a collection of operative programs required to control computer hardware and also to execute application software.

The purpose of system software is to make the use of computer more effective and efficient. A computer without some kind of system software would be ineffective and impossible to operate.

Some examples of system software are:

* 1. Operating system
	2. Device Drivers
	3. Utility Software
	4. Language Processors/Translators

 **a. Operating System:** Operating system manages the hardware and software resources of a computer system, such as CPU, storage devices and all the input/output devices. Some commonly used operating systems are Windows, Linux, Mac OS and Android.

**Operating system performs the following tasks**.

 • Allocates system resources

• Manages files by maintaining a proper file and folder system

• Loads and executes application software

• Controls the operation of all the input/output devices

• Maintains security

 • Controls network operations

• Provides user interface

 **b. Device Drivers:** Device drivers are system software that controls the operation of hardware devices. When we attach any type of device, such as printer, scanner, network card, or digital camera to a computer, it will not work without a device driver. We have to first install the driver of a device in our computer before using it.

Device drivers are provided by device manufacturers. Some devices like Mouse, Keyboard, Monitor, USB Flash drive, etc. are **“Plug n Play”** devices. Their software is preinstalled with Windows. When attached, the computer system automatically recognize them.

**c. Utility Software**: Utility software (or simply utilities) provides additional facilities to carry out tasks which are beyond the capabilities of the operating system. A few important utilities are

* Disk defragmenter
* Disk cleaner
* File compression utilities
* Antivirus utility
* File manager
* Network utilities
* Utilities to configure hardware devices.

**d. Language Processors/Translators** :The computer can only understand machine language which consists of 0’s and 1’s. Therefore, any program written in assembly language or high level language must be translated to machine language before execution by the computer. Language processors are used to translate computer programs into machine language.

The types of language processors are:

* Assembler
* Compiler
* Interpreter.

**Assembler** is software that translates assembly language program into machine language. Assembly language consists of symbolic abbreviations called mnemonics which must be translated into machine language before execution by the computer. Each computer has its own assembly language.

**Compiler** is software that translates a program written in a high level language into machine language. It converts the entire program into machine language before execution by the computer.

**Interpreter** is software that translates high level language into machine language but it translates one instruction at a time and executes it immediately before translating the next instruction.

**Q: Describe Application software with its types. Also describe in detail.**

**Ans:** Application software is a set of programs designed to perform a specific task. For example, application software for payroll processing produces pay slips and application software for processing examination results produces mark sheets along with some other statistical reports.

Some examples of application software are:

1. Productivity Software
2. Business Software
3. Entertainment Software
4. Educational Software

 **a) Productivity Software**: Productivity software is used to improve the way people do their work. It speeds up the daily routine tasks performed by individuals and teams by eliminating the repetitive tasks. Productivity software includes:

* Word-processing
* Spreadsheet
* Database management
* Graphics software.

**b) Business Software** : Business software is used to run business activities. It helps in efficiently running business functions of a company.

 Examples of business software are:

* Payroll
* Accounting
* Inventory
* Retail software.

**c) Entertainment Software** : Entertainment software is used to entertain people.

 It includes games, audio video player, etc.

**d) Educational Software** : Educational software is used for learning purpose. Examples of educational software are programs that teach about human body, working of an engine, solar system, typing, foreign language, music and subjects like Mathematics, Physics, Chemistry, etc.

**Q: List any three internet applications**

**Ans:** These are:

1. Web Applications
2. Cloud Computing Applications
3. Social Media Network Applications

**Q. What do you know about web applications**

**Ans:** A Web application is a program that runs on a remote server while its users interact with it through a Web browser. Some common Web applications include web-based email programs (such as Gmail, Hotmail), online ticketing service, on line banking service, online auction, online retail sales, instant messaging services, etc.

**Q. What do you know about Cloud Computing Applications**

**Ans:** Cloud application is a program that supports cloud computing. A cloud application is entirely stored on a remote server and is delivered over the Internet through a Web browser. Users of a cloud application need a computer with a high speed Internet connection.

**Q. What do you know about Social Media Network Applications?**

**Ans:** Social media is an Internet-based communication system that allows the creation and exchange of information, ideas, common interests and other forms of expression. Social media websites connect users with their friends, family and colleagues through the use of Internet.

Some popular examples of social media are:

* Facebook
* Twitter
* WhatsApp.

**Facebook:** Facebook is one of the fastest growing free social networking services used by millions of people all over the world. It allows registered users to create profile and exchange messages, photos, videos and links with other users. It helps users stay updated with what is happening around the world. It provides a platform by which users can create groups and pages based on their common interests and share views and ideas.

 **Twitter:** Twitter is an online news and social networking service which allows subscribers to broadcast short messages to other subscribers of the service. The short messages known as “tweets” are restricted to 140 characters. It is free to join service.

It is totally different from email and more like a news broadcast. Users of Twitter service type short statements about what is going on in their life, what they are doing and what their thoughts and opinions are on specific topics or current affairs. People all over the world are continually broadcasting tweets which can be viewed by anyone.

**WhatsApp:** WhatsApp is a free instant messaging service for smartphone users to exchange text, photos, videos and audio messages through Internet. It has become the largest messaging service around the world. WhatsApp is very popular among teenagers because of features like group chatting, voice messages and location sharing. It was started for Android mobile devices but now it is available for iPhone, BlackBerry, Windows Phone and Nokia smartphone also.

**Q Differentiate b/w License software & Open source software.**

**Ans:**

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| **License software** | **Open source** |
| A software license is a legal agreement that specifies the terms of use for a computer program. | It is computer software that is available in the form of source code that allows users to study, change and improve it. |
| It defines the rights of the software developer and the user. When a person purchases  he is allowed to use the software, which means he is not the owner of the software. | Open Source Software Open source software is free for inspection, modification and distribution. |
| Generally all the system software and application software is licensed. | It allows certain rights which are normally protected by Copyright Law.  |
| The software license deals with the Copyright Law. Copyright law prevents illegal copying of computer software. It allows creators of computer software to benefit financially from their software and to retain some control over how it is used.  |  |
| When the software is given away free, it makes it difficult for the software creators to stay in business. This makes it improper to make copies of software and sell it. Software that is copied and sold without the permission of the owner is known as pirated software and it is violation of copyright.  |  |
| Examples of licensed software are Microsoft Windows and Microsoft Office. | Linux operating system is an open source software. |
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**Q Differentiate b/w shareware & Freeware**

**Ans:**

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| **Shareware** | **Freeware** |
| Shareware is given to people free of charge for a limited time period. After the expiry time, this software should be purchased for further usage. | Freeware is available for use, free of cost. It is usually full version of the software for an unlimited period of time. |
| Shareware is a trial version and its functionality is limited. | This software may have restrictions in term of use. For example, it may be allowed for personal or academic use only or for non-profit use. |
| There are some types of shareware which are available as full version but they stop working at the end of trial period. The trial period is usually 30 or 60 days. Some shareware can be downloaded from Internet. |  |
| For examples some Antivirus software are shareware.  | Some examples of freeware are Skype, Viber and Mozilla Web browser. |

**Q. Select the best answer for the following MCQs.**

i. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the following is the smallest computer.

 A. Mainframe B. Minicomputer C. Microcomputer D. Supercomputer

 ii. How many instructions per second a Minicomputer can execute?

A. Thousands of instructions B. Millions of instructions

 C. Billions of instructions D. Above trillion instructions

 iii. What type of software MS Word is?

 A. System software B. Application software C. Utility software D. Language processor

iv. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_device is most suitable for playing games.

 A. Mouse B. Keyboard C. Joystick D. Light pen

vi. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Software controls the operation of a hardware device.

 A. Utility software B. Language processor C. Application software D. Device driver

vii. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Software converts computer programs to machine language.

 A. Utility program B. Device driver C. Language processor D. Application software

viii. Which of the following is productivity software?

 A. Spreadsheet software B. Utility software C. Windows 7 D. Compiler