UNIT 05

Software System

Short Introduction of Unit

Software is an integral part of any computing system, acting as the intermediary between the user and the hardware. In this chapter, we will explore the significance of system software and application software, understanding their roles, functions and applications in various domains.

Q.1 Discuss the importance of system software in a computing system. Also describe the role of application software with suitable examples. 09505001

Ans. Software is a collection of programs and instructions that tell a computer what to do and how to do. Without software, computers would be useless machines.

Types of Software

1. System Software

System software is designed to manage the system resources and provide a platform for application software to run. It acts as a bridge between the hardware and the user applications. Here are some examples:

- **Operating Systems:** Examples include Microsoft Windows, macOS, and Linux.
- **Device Drivers:** These include printer drivers, graphics card drivers, and sound card drivers.
- **Utility Programs:** Examples are antivirus software, disk cleanup tools, and backup software.

2. Application Software

Application software is designed to help users perform specific tasks. These programs are built to fulfill user needs and are typically more varied than system software. Examples include:

- **Word Processors:** Such as Microsoft Word and Google Docs.
- **Web Browsers:** Such as Google Chrome, Mozilla Firefox, and Safari.
- **Games:** Such as Minecraft, Fortnite, and Among Us.
- **Media Players:** Such as VLC Media Player and Windows Media Player.

Q.2 Describe the role of operating systems, utility software, and device drivers, providing examples of each. 09505002

Ans. An **Operating System (OS)** is a type of system software that manages all the hardware and software on a computer. It acts as an intermediary between the computer hardware and the user applications. The operating system ensures that different programs and users running on a computer do not interfere with each other. Some most commonly used operating systems are:

Windows
A popular OS for personal computers developed by Microsoft. It has a start menu, taskbar, and windows for applications.

macOS: An OS for Apple's Mac computers. It has a dock at the bottom of the screen and unique features like Mission Control.

Linux: An open-source OS that is used for everything from servers to desktop computers. It can look different depending on the distribution (version) you use.

Android: An OS for smartphones and tablets, developed by Google. It is used on many different devices from various manufacturers.

iOS: An OS for iPhones and iPads, developed by Apple. It is known for its smooth performance.

Let's study some key functions of an operating system.

Utility Programs

Utility programs are essential components of system software that enhance the functionality of a computer system. They perform various tasks to ensure smooth operation and efficient management of hardware, software, and data. Here are some common utility programs along with their functionalities in real-life scenarios.

Device Drivers

A device driver is like a translator between the computer and its gadgets.

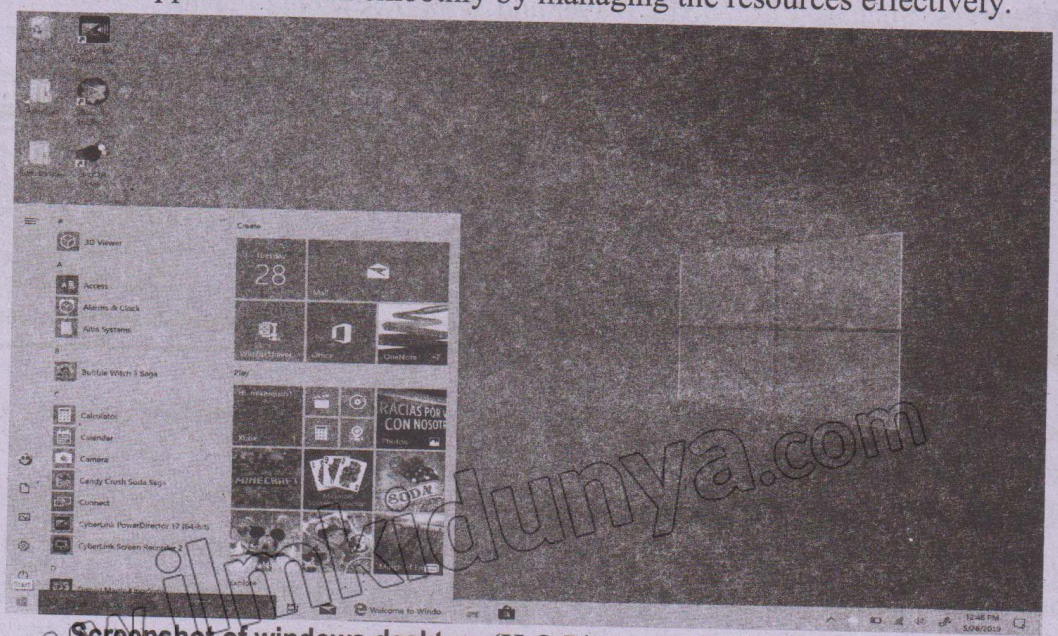
Example: Think of a device driver like a TV remote control.

- **TV (Device):** It can change channels, adjust the volume, and more, but it needs instructions.
- **Remote Control (Driver):** Sends the correct signals to the TV to perform these actions.
- **Computer:** You decide what you want to watch or adjust and use the remote control to tell the TV.

Managing Hardware Resources

One of the primary functions of an operating system is to manage the hardware resources of a computer system. This includes the CPU, memory, disk drives, and peripheral devices such as printers and keyboards.

Example: When you open a web browser while listening to music on your computer, the operating system allocates CPU time and memory to both the web browser and the music player. It ensures that both applications run smoothly by managing the resources effectively.



Screenshot of windows desktop (H.Q Picture is available on Pg# 237)

Q.3 Differentiate between GUI and CLI. 09505003

Ans. The operating system provides a User Interface (UI) that allows users to interact with the computer.

There are two main types of user interfaces:

- **Graphical User Interfaces (GUIs)**
- **Command-Line Interfaces (CLIs)**

Graphical User Interface (GUI)

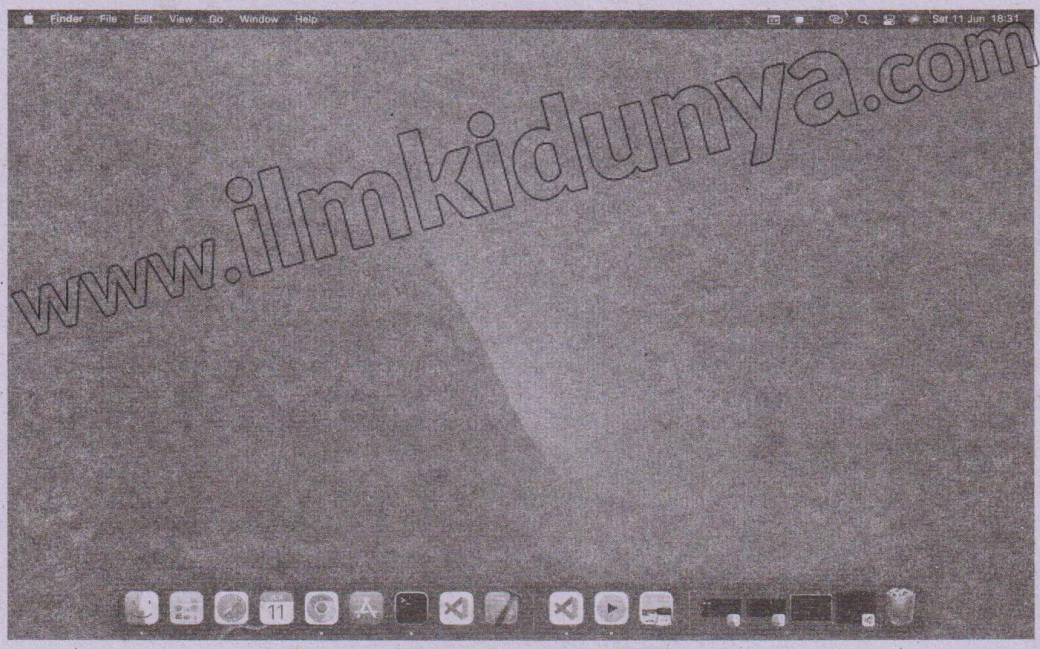
A GUI allows users to interact with the Computer using visual elements such as windows, icons, and menus. This type of interface is user-friendly and intuitive, making it easy for users to navigate and perform tasks.

Example: Microsoft Windows and macOS are operating systems that use GUIs. Users can click on icons to open applications, drag and drop files to move them, and use menus to access different functions.

Command-Line Interface (CLI)

A CLI requires users to type text commands to perform specific tasks. This interface is more flexible and powerful, but it can be more difficult for beginners to use.

Example: Linux and Disk Operating System (DOS) provide CLIs. User can type commands to copy files, run programs, and configure system settings.



Screenshot of a macOS desktop

Q.4 Describe the process of using utility software to optimize system performance and maintain security. Provide detailed steps and examples of common utility tools. 09505004

Ans. The operating system is responsible for running applications on a computer. loads applications into memory, allocates the necessary resources, and manage their execution. The OS also ensures that applications do not interfere with each other and that they run efficiently.

Example: When you open a word processor like Microsoft Word, the operating system loads the application into the computer's memory and allocates CPU time for it to run. If you open multiple applications, the OS manages the distribution of resources so that all applications can run simultaneously without performance issues.

1. Utility Programs

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management of hardware, software, and data. Here are some common utility programs along with their functionalities in real-life scenarios.

2. Disk Cleanup

Functionality: Disk Cleanup scans your hard drive for temporary files, cached files, and other unnecessary items that can be safely deleted.

Real-life Scenario

After using your computer for a while, you notice it's running slower than usual. Running Disk Cleanup can help reclaim disk space, potentially improving performance.

3. Antivirus Software

Antivirus software scans files and incoming data for known viruses and malware signatures. It also provides real-time protection to prevent virus attacks.

Real-life Scenario

You receive an email attachment from an unknown sender Before opening it, you run your antivirus software to scan for any potential threats, ensuring your computer remains safe.

4. Backup Software

Backup software schedules regular backups of files and folders to external drives, cloud storage, or network locations. It allows for full system backups or selective file backups.

Real-life Scenario

You accidentally delete an important presentation file. Using backup software, you retrieve the latest backup version of the file, ensuring minimal disruption to your work.

5. File Compression Tools

File compression tools compress one or multiple files into a single archive format (e.g., ZIP, RAR) while preserving data integrity. They also provide options for encryption and password protection.

Did You Know?

File compression tools reduce file size to save storage space and make file transfer faster.

Real-life Scenario

You need to send a large folder of high-resolution photos via email. Using a file compression tool, you create a ZIP archive to reduce file size, making it easier and quicker to upload and send.

These essential programs are essential for maintaining the efficiency, security, and reliability of your computer system.

Q.5 Explain how to install, update, and troubleshoot device drivers for hardware components.

09505005

Ans. Installing, updating, and debugging device drivers are critical steps in ensuring that hardware components perform properly and efficiently. Drivers serve as an interface between the operating system and the hardware, translating commands to ensure correct communication.

Automatic Installation via Plug-and-Play

Modern operating systems, like Windows or macOS, often detect and install drivers automatically for Plug-and-Play devices.

Steps

1. Connect the hardware to the computer (e.g., via USB, HDMI, or other interfaces).
2. The operating system searches its built-in driver library or the internet for the appropriate driver.
3. Once found, the driver is installed, and the device is ready for use.

Example: Connecting a USB mouse or keyboard typically requires no manual intervention as the OS installs the drivers automatically.

Using Automatic Updates

Most modern operating systems automatically update drivers to ensure compatibility and performance.

Steps

1. Open the system settings or control panel.
2. Ensure automatic updates are enabled. For example, in Windows, check for updates via *Settings > Update & Security > Windows Update*.
3. If a driver update is available, it will be downloaded and installed automatically.

Example: Windows Update regularly provides updates for common hardware components like network adapters and display drivers.

> **Did you know?**
> A plug and Play (**PnP**) device automatically configure itself when connected to a computer, simplifying installation and use.

Troubleshooting

Troubleshooting device drivers for hardware components is essential when devices fail to function properly or cause errors. Problems may arise from outdated, corrupted, or incompatible drivers. Here's a step-by-step guide to troubleshooting drivers effectively:

- Pinpoint the Problem
- Install the Latest Driver
- Restore the Previous Driver
- Reconfigure the Driver
- Test for Compatibility
- Run Diagnostic Utilities
- Use a Different Machine for Testing

> **Did you know?**
> The first operating system was created in the **1950s** for **IBM** computers and was called **GM-NAA I/O**.

Q.6 Discuss the main functions of commonly used application software, such as word processing & spread sheet. 09505006

Ans. Application software refers to programs designed to perform specific tasks for users, ranging from productivity and creativity to entertainment and education.

Commonly used application software

1. Word Processing Software

Word processing software is a type of application software used for creating, editing, formatting, and printing documents. These software programs are essential tools for writing letters, reports, essays, and other text-based documents.

Example of Word Processing Software

- **Microsoft Word:** Available on Windows and macOS, Microsoft Word is one of the most widely used word processors. It offers a range of features including text formatting, spell check, grammar check, and the ability to insert images, tables, and charts.
- **Google Docs:** A web-based word processor available on any operating system with internet access. Google Docs allows for real-time collaboration, where multiple users can edit a document simultaneously. It also integrates with other Google services.
- **Apple Pages:** Available on macOS and iOS, Apple Pages provides a user- friendly interface with powerful tools for creating beautiful documents. It includes templates, design tools, and easy integration with other Apple products.

- **LibreOffice Writer:** Available on Windows, macOS, and Linux, LibreOffice Writer is a free and open-source word processor. It offers a robust set of features similar to Microsoft Word, making it a great alternative for users who prefer open-source software.

2. Spreadsheet Software

Spreadsheet software is a type of application software used for organizing, analyzing, and storing data in tabular form. Spreadsheets consist of a grid of cells arranged in rows and columns, where users can input data, perform calculations, and create charts.

Examples of Spreadsheet Software

- **Microsoft Excel:** Available on Windows and macOS, Microsoft Excel is one of the most widely used spreadsheet programs. It offers powerful features including complex formulas, pivot tables, and a variety of chart options.
- **Google Sheets:** A web-based spreadsheet available on any operating system with internet access. Google Sheets allows for real-time collaboration, where multiple users can edit a spreadsheet simultaneously. It also integrates with other Google services.
- **Apple Numbers:** Available on macOS and IOS, Apple Numbers provides a user-friendly interface with strong visualization tools for creating visually appealing spreadsheets. It includes templates and easy integration with other Apple products.
- **LibreOffice Calc:** Available on Windows, macOS, and Linux, LibreOffice Calc is a free and open-source spreadsheet program. It offers a robust set of features similar to Microsoft Excel, making it a great alternative for users who prefer open-source software.

Q.7 How Graphic Designing Software is used? Give some examples. 09505007

Ans. Graphic design software is a type of application software used for creating, editing, and managing visual content. These programs provide tools for drawing, painting, photo editing, and creating illustrations, making them essential for designers, artists and anyone involved in visual media. Graphic design software is used in various industries, including advertising, web design, publishing, and multimedia production.

Example of Graphic Design Software

- **Adobe Photoshop:** Available on Windows and macOS, Adobe Photoshop is one of the most popular graphic design programs. It offers powerful tools for photo editing, digital painting, and graphic design.
- **Adobe Illustrator:** Available on Windows and macOS. Adobe Illustrator is a vector graphics editor used to create logos, illustrations, and scalable graphics that maintain quality at any size.
- **CorelDRAW:** Available on Windows and macOS, CorelDRAW is a vector graphics editor known for its user-friendly interface and robust feature set, ideal for creating professional graphics and layouts.
- **GNU Image Manipulation Program (GIMP):** Available on Windows, macOS, and Linux, GIMP is a free and open-source graphic design program. It offers many features similar to Adobe Photoshop, making it a great alternative for users who prefer open-source software.
- **Canva:** A web-based graphic design tool accessible on any operating system with internet access. Canva provides an easy-to-use interface with a wide range of templates and design elements, making it perfect for beginners and professionals alike.

Topic Wise Short Questions (Additional)

System & Application Software

Q.1 What is software? 09505008

Ans: Software is a collection of programs and data that instructs a computer how to do specific tasks. Software often comes with accompanying documentation.

Q.2 What are the types of software? 09505009

Ans: Software can be classified into the following types:

- **System software**
- **Application software**

Q.3 Describe System software. 09505010

Ans. The software used to control, monitor, or facilitate the use of the computer is called system software.

Types of system software

Following are the types of system software.

- **Operating system**
- **Device drivers**
- **Utility programs**
- **Language processors**

Q.4 What is application software? 09505011

Ans. The Application software is a program created to perform a specific task for user. Application software is developed for computer users to solve their problems such as preparing a letter, creating a presentation or managing a database.

Types of application software

Commonly used application software is following:

- Productivity software.
- Business software.
- Entertainment software.
- Education software.

Q.5 Define Operating System (OS). 09505012

Ans. An operating system is a set of programs running on a computer system and providing an environment in which other programs can be executed and the computer system can be used efficiently. **Examples:** MS windows, DOS, UNIX etc

Q.6 Discuss the functions of Operating System (OS). 09505013

Ans. The following tasks are performed by the operating system.

- Manages hardware resources.
- It controls the operation of input/output and storage devices.
- It detects hardware failures and displays messages to fix them.
- Loads and executes programs.

Q.7 Describe the basic functions of Device Drivers. 09505014

Ans. A device driver is system software that controls the operation of a computer device. When users attach a device such as printer or scanner to their computer, they should install its driver also to make it operational. Device drivers are provided by device manufactures.

Q.8 Why system software is essential? 09505015

Ans. System software is essential for the operation of a computer system, acting as an intermediary between the hardware and the user applications. It ensures that the hardware components of a computer work together efficiently and provides a stable environment for application software to run.

Q.9 What are the most commonly used Operating Systems? 09505016

Ans. Some most commonly used operating systems are:

- **Windows**
- **macOS**
- **Linux**
- **Android**
- **IOs**

Q.10 What do you know about Linux? 09505017

Ans. An open-source OS that is used for everything from servers to desktop computers. It can look different depending on the distribution (version) you use.

Q.11 How OS helps in running applications? 09505018

Ans. The operating system is responsible for running applications on a computer. Loads

applications into memory, allocates the necessary resources, and manage their execution. The OS also ensures that applications do not interfere with each other and that they run efficiently.

Q.12 Why Antivirus software is used? 09505019

Ans. Antivirus software scans files and incoming data for known viruses and malware signatures. It also provides real-time protection to prevent virus attacks.

Q.13 What do you know about file compression? 09505020

Ans. File compression tools compress one or multiple files into a single archive format (e.g., ZIP, RAR) while preserving data integrity. They also provide options for encryption and password protection.

Q.14 Give some examples of word processing software. 09505021

Ans. Example of Word Processing Software:

- **Microsoft Word**
- **Google Docs**
- **Apple Pages**
- **LibreOffice Writer**

Q.15 Explain the purpose of using spread sheet software. 09505022

Ans. Spreadsheet software is a type of application software used for organizing, analyzing, and storing data in tabular form. Spreadsheets consist of a grid of cells arranged in rows and columns.

Q.16 Give some examples of using spread sheet software. 09505023

Ans. Examples of Spreadsheet Software:

- **Microsoft Excel**
- **Google Sheets**
- **Apple Numbers**
- **LibreOffice Calc**

Q.17 What do you know about Apple Numbers? 09505024

Ans. Available on macOS and iOS, Apple Numbers provides a user-friendly interface with strong visualization tools for creating visually appealing spreadsheets. It includes templates and easy integration with other Apple products.

Q.18 Why we use graphic designing software? 09505025

Ans. Graphic design software is a type of application software used for creating, editing, and managing visual content. These programs provide tools for drawing, painting, photo editing, and creating illustrations, making them essential for designers, artists and anyone involved in visual media.

Q.19 Describe the role of Canva. 09505026

Ans. A web-based graphic design tool accessible on any operating system with internet access. Canva provides an easy-to-use interface with a wide range of templates and design elements, making it perfect for beginners and professionals alike.

Q.20 What is the purpose of Adobe Photoshop? 09505027

Ans. Available on Windows and macOS, Adobe Photoshop is one of the most popular graphic design programs. It offers powerful tools for photo editing, digital painting, and graphic design.

Topic Wise Multiple Choice Questions (Additional)

Choose the correction option.

Software & Utility Programs

1. The first computer virus was created in? 09505028

(a) 1970 (b) 1971 (c) 1972 (d) 1973

2. What was the name of first created virus? 09505029

(a) Greeper (b) Creeper

(c) OS (d) UDP

3. **Which of the following is NOT a characteristic of a software system?** 09505030
   (a) Scalability (b) Tangibility
   (c) Maintainability (d) Reliability
4. **What is the primary goal of software design in system development?** 09505031
   (a) Writing code
   (b) Minimizing system errors
   (c) Defining the system architecture
   (d) Testing the software
5. **In software systems, modularity refers to:** 09505032
   (a) Testing individual components separately
   (b) Breaking a system into smaller, manageable parts
   (c) Using external libraries in a project
   (d) Writing reusable code
6. **Which term describes software that is designed to adapt to changes in user needs?** 09505033
   (a) Portable software
   (b) Configurable software
   (c) Flexible software
   (d) Robust software
7. **The term "middleware" in software systems refers to:** 09505034
   (a) Software that bridges communication between systems
   (b) Tools for debugging software
   (c) User-facing applications
   (d) Backend databases
8. **What does "scalability" mean in a software system?** 09505035
   (a) Ability to function with minimal resources
   (b) Ability to expand and handle increased workloads
   (c) Ability to integrate with third-party software
   (d) Ability to prevent system crashes
9. **Which of the following ensures data consistency in a software system?** 09505036
   (a) Fault tolerance
   (b) Transaction management
   (c) Scalability
   (d) Modular design
10. **Which type of software testing focuses on the entire software system's performance?** 09505037
    (a) Unit Testing
    (b) Integration Testing
    (c) System Testing
    (d) Regression Testing
11. **What does "version control" in software development refer to?** 09505038
    (a) Writing the initial code for a software system
    (b) Managing changes to source code over time
    (c) Monitoring system uptime and performance
    (d) Testing software before release

Answer Key

1	b	2	b	3	b	4	c	5	b	6	c	7	a	8	b	9	b	10	c
11	b																		

Solved Exercise

Choose the correct option.

1. **What is the primary function of an operating system?** 09505039
   (a) To create documents
   (b) To manage hardware resources and provide a user interface
   (c) To perform calculations
   (d) To design graphics
2. **Which software is used to enhance system performance and security?** 09505040
   (a) Operating system
   (b) Utility software
   (c) Application software
   (d) Device drivers

3. **What role do device drivers play in a computer system?** 09505041
   (a) Manage Files
   (b) Facilitate communication between hardware devices and the operating system
   (c) Create Presentations
   (d) Enhance Graphic performance
4. **Which of the following is an example of application software?** 09505042
   (a) Microsoft Word
   (b) BIOS
   (c) Disk Cleanup
   (d) Device Manager
5. **What is the main purpose of a spreadsheet software?** 09505043
   (a) To edit text documents
   (b) To organize and analyze data
   (c) To create visual content
   (d) To enhance system security
6. **How does utility software differ from application software?** 09505044
   (a) Utility software manages hardware, while application software performs specific tasks for users
   (b) Utility software creates documents, while application software manages hardware
   (c) Utility software performs specific tasks for users, while application software manages hardware
   (d) Utility software is free, while application software is paid
7. **Which type of software would you use to design a logo?** 09505045
   (a) Operating system
   (b) Spreadsheet software
   (c) Graphic design software
   (d) Utility software
8. **What is the function of system software?** 09505046
   (a)To facilitate communication between hardware and software
   (b) To perform specific tasks for the user
   (c) To Create visual content
   (d) To organize and analyze data
9. **Why are operating system updates important?** 09505047
   (a) They increase screen brightness
   (b) They add more fonts
   (c) They enhance security and fix bugs
   (d) They improve battery life
10. **What is a common task you can perform using word processing software?** 09505048
    (a) Create and edit text documents
    (b) Manage hardware resources
    (c) Enhance system performance
    (d) Organize and analyze data

Answer Key

1	b	2	b	3	b	4	a	5	b	6	a	7	c	8	a	9	c	10	a

Short Questions

Q.1 Define system software and provide two examples. 09505049
Ans: Short Question No. 3
Q.2 Explain the primary functions of an operating system. 09505050
Ans: Short Question No. 6
Q.3 What is utility software and why is it important? 09505051
Ans: Utility programs are essential components of system software that enhance the functionality of a computer system. They perform various tasks to ensure smooth operation and efficient management of hardware, software, and data.

Q.4 Describe the role of device drivers in a computer system. 09505052

Ans: Short Question No. 7

Q.5 Differentiate between system software and application software with examples.

Ans: Short Question No. 3,4

Q.6 What are the main functions of spreadsheet software? 09505053

Ans: Short Question No. 15

Q.7 How can graphic design software be used in the field of education?

Ans. Graphic design software can be used in education to create visually appealing information such as infographics, presentations, e-books, and interactive learning resources. It helps to explain complex ideas, boosts creativity, and makes learning more engaging and visually appealing to kids.

Q.8 What is the significance of data backups and how can they be performed? 09505054

Ans. Backup software schedules regular backups of files and folders external drives, cloud storage, or network locations. It allows for full system backups or selective file backups.

Long Questions

Q.1 Discuss the importance of system software in a computing system. 09505055

Ans. Long Question No. 1 (Before Point # 2)

Q.2 Describe the role of operating systems, utility software, and device drivers, providing examples of each. 09505056

Ans. Long Question No. 2

Q.3 Explain the differences between system software and application software. 09505057

Ans. Purpose: System software manages and operates computer hardware, making it possible for application software to run. Application software helps the user to perform specific tasks.

Examples: System software includes operating systems and device drivers. Application software includes word processors, web browsers, and games.

Installation: System software is usually pre-installed on a computer, while application software can be installed by the user as needed.

Q.4 Describe the process of using utility software to optimize system performance and maintain security. Provide detailed steps and examples of common utility tools. 09505058

Ans. The operating system is responsible for running applications on a computer. Loads applications into memory, allocates the necessary resources, and manage their execution. The OS also ensures that applications do not interfere with each other and that they run efficiently.

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These essential programs are essential for maintaining the efficiency, security, and reliability of your computer system.

Q.5 Explain how to install, update, and troubleshoot device drivers for hardware components. 09505059

Ans. Long Question No. 5

Q.6 Discuss the main functions of commonly used application software, such as word processing & spread sheet. 09505060

Ans. Long Question No. 6

Activities

Activity 1

09505061

Make a list of all the software you use on your computer or tablet. Categorize them into system software and application software. Discuss with your classmates which software you find most useful and why.

Ans. Lab Work/ Class Work/Practical Work.

Activity 2

09505062

Explore the task manager (Windows) or activity monitor (Mac) on your computer. Identify the different running applications and observe how much CPU and memory each application is using. Discuss why the operating system's role in managing these resources is crucial for the computer's performance.