A-level ICT

SENIOR Five term 2

TOPIC 2/2: Computer Software

Competency: The learner installs and maintains computer software to ensure optimal functionality and performance.

Programs and software

Program and software are instructions given to the computer to perform a specific task

A program is a small block of code or a set of instruction the system to do its task

Software is a set of programs which instructs computer just like program does. But the functionalities and features of software are more complex compared to that of a program.

Types of software

1. **System software**

   System Software is **the type of software that is the interface between application software and the** system

   Features of system software

   - System Software is closer to the system
   - Generally written in a low-level language
   - The system software is difficult to design and understand
   - Fast in speed
   - Less interactive
   - Smaller in size
   - Hard to manipulate

   Examples of System Software

(i) Operating system **manages hardware, software resources, and provides common services for computer** programs.

Functions of operating system

- manages files,
- manages memory,
- manages processes,
- handles input and output,
- controls peripheral devices like disk drives and printers
- provide the interface between computer hardware and peripheral devices
- Configuring devices.
- Accomplish booting processes
- Monitoring system performance.
- Administering security.

Examples of operating systems

(a) Microsoft Windows

Advantages of windows operating system

- User-friendly graphical user interface (GUI).
- Wide range of compatible software and applications.
- Extensive hardware support for various devices.
- Regular updates and security patches for improved performance.
- Familiarity, as it's a widely used operating system.
- Standard operating system for high-end gaming
- Available at different configurations and price points

Disadvantages of windows operating system

- Security Vulnerabilities. One of the most significant drawbacks of the Windows Operating System is its vulnerability to security threats such as viruses, malware,
- High Resource Requirements such as higher RAM, advanced processors, and substantial storage space
- Are expensive.
- Frequent Updates be disruptive, requiring significant installation time and system restarts.
- Compatibility Issues: new window versions are incompatible with older applications and hardware
- Privacy Concerns.
- System Stability: some window features are unstable leading to data loss
- Bloatware/unnecessary pre-installed software that consumes space and sometimes slowing the computer
- Limited customization can be a drawback for users who wish to tailor their operating system to their specific needs and preferences.

- Licensing Restrictions limits distribution and use

(b) Linux Operating System

Advantages of Linux Operating system

- **O**pen-source nature: Linux is freely available and customizable.
- Security: Linux is more secure than other operating systems.
- Easy and frequent software updates.
- Variety of distributions: Choose from various Linux distributions based on your requirements.
- Cost-effectiveness: Linux is freely available on the internet.
- **Stable**

Disadvantages of Linux operating system

- Steeper learning curve compared to other operating systems.
- Limited software availability.
- Hardware compatibility issues.
- Lack of standardization.
- Difficult setup, installation, and use for inexperienced users.

(c) Apple mac OS
(d) Google's Android OS
(e) Apple iOS

(ii) Drivers allow operating system to communicate with hardware devices like printer, graphic cards, network adapters etc.

(iii) Utility software performs tasks to enhance productivity, efficiency, functionality, or maintenance of a computer system to ensure the system runs smoothly.

Example of Utility software

- Antivirus software for virus protection.
- Disk cleanup
- File management tools for managing files.
- Compression tools for reducing file size.
- Disk management tools for managing storage.
- Debuggers for examination and modifying data
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(iv) Firmware is low-level software embedded in hardware devices, providing control and communication between the devices and other system components.

(v) Boot loaders are responsible for loading operating system into computer's memory when the system is powered on

(vi) Language processors/translators translate high-level programming languages into machine codes that the computer can execute.

Types of programming language translators

- **Interpreters** convert high-level language to machine language line by line.

- **Compilers** convert entire high-level language programs to machine language at once.
- **Assemblers** translate assembly language programs to machine language.

Compiler, interpreter, and assembler are different in that the compiler In contrast, an interpreter The assembler

(ii) Resource allocation is system software that allocate resources like CPU time, memory space and input/output devices to various programs and users

(iii) Security and Access control ensures that unauthorized user does not access the system and that data is protected from corruption and loss.

(iv) Communication Software: **Communication** software allows us to transfer data and programs from one computer system to another.

2. Application software

Application Software is a program that is created to perform a specific task for a user.

Feature of Application Software:

- Perform more specialized tasks like word processing, spreadsheets, email, photo editing, etc.
- It needs more storage space as it is bigger in size
- Easy to design and more interactive for the user
- Generally written in a high-level language

Qualities of good application software

- **Functionality:** It refers to the degree of performance of the software.
- **Reliability:** A set of attribute that Bear on the capability of software to.
- **Efficiency:** It refers to the ability of the software to use System.
- **Usability:** It refers to the extent to which the software can be used with.
- **Maintainability:** Refers to the ease with which the modifications can be made in a software system to extend its functionality, improvement, performance or correct errors. Maintainability covers Testability, Stability, Changeability, Analyzability.
- **Robustness:** It refers to the degree to which the software can keep on functioning in spite of being provided with invalid data.
- **Integrity:** It refers to the degree to which Unauthorized Access to the software data can be prevented.

Examples of application software

- **Word processing software**
- **Graphic software**
- **Spreadsheet software**
- **Presentation software**
- **Database software**

- **Web browsers**
- **Multimedia software**

(i) A **word processor** is software program that **lets users create, edit, print, and save text documents.** This allows a user to create and manipulate documents that contain text and graphics.

Examples of word processing software:

Microsoft word, Word pad, AmiPro, PC Write, Mac Write, Lotus word, Pro Notepad, Word star, Corel word perfect, Microsoft, pocket word

Uses of word processor

- document creation: letters, report, resume, stories and essays
- edits and formats documents
- provides templates for documents like business letters, invoices etc.
- mail merge: automating the process of sending personalized letter or email to multiple recipients
- Creates academic papers and articles
- Creates tables charts and lists of organized information effectively
- Automatically checks and corrects spelling and grammatical errors

Advantages of processor document

- Easily edited
- Easily stored and retrieved
- Shared easily

(ii) Spreadsheet software organizes data in rows and column and also performs calculations.

Examples of spread sheet software include: Microsoft excel, Corel Quattro pro, Lotus 123, Microsoft pocket.

Uses spreadsheet software

- For budgeting and financial management
- For inventory management
- To facilitate data analysis by creating charts and graphs to
- To analyze research data
- Used to create financial statements
- Used to prepare statistical reports

Advantages of spreadsheet software in preparing budgets

- Offer limitless customization

- Handles vast amount of data
- Makes adjustment of figures easy
- Organizes and makes tracking of income and expenditure easy
- Makes calculation easy
- Provide flexibility in how to manage and analyze the budget
- Enhances visualization through use graphs
- Provides storage and easy accessibility options
- Cheap because most spread software like Google Sheets is free

(iii) Desktop publishing software is used to create the following: Text books Corporate news letters Marketing literature Product catalogues Annual reports Business cards Calendars Flyers

Features of desktop publishing software include

- **Text tools** that allow creation of documents with various fonts, text wrapping, drop caps and paragraph styles
- **Graphic tools** for easy insertions and edit of images
- **Page layout** tools such as grinds and guides to align elements precisely on page and use of layers to organize different elements on separate layer to easier editing and complex designing.
- **Provision for master templates** with consistent headers, footers and other repeating elements
- **Interactive elements** such as hyperlinks and multimedia integration tools for audio and videos into a document.
- **Provision of stylish templates** for brand development and maintenance.

(iv) Data management software/database, defines, creates, edits and manages vast amounts of data databases.

Examples of database software: Microsoft access, Claris file marker pro, D-base, Fox pro, Paradox, Oracle

Features of database

- **Data Storage and Management:** it enables storage, retrieval and management of large volume data.
- **Data Security:** Database software protects data form unauthorized access and cyber threats. It includes features for data encryption, access control and regular backups to ensure data integrity and security.
- **Data Analysis and Reporting:** it enables users to perform complex queries and generate reports
- **Multi-user Access**: it supports concurrent access by multiple users, allowing team to collaborate and access the same data simultaneously
- **Web Application:** many web applications rely on database to store user data, preferences and activity logs

- **Backup and Recovery:** Database software contains tools for backing up data and recovering it in case of hardware failure.
- **Data Integration:** it can integrate data from various sources, providing a unified view of information.
- **Scalability:** modern database software can handle increasing amounts of data and users, making it suitable for growing businesses and applications.

(v) **Presentation** software is used to combine text, graphics, animations, audio and video in presentation

Examples of presentation software: Microsoft PowerPoint, Google slide, Keynote

Uses Presentation software

- **Teaching**
- **Lectures**
- **Demonstration**
- **Project report**
- **Workshops**
- **Marketing reports**
- **training**

(vi) Web browsers: a web browser is a program used to access and view websites or website information.

Example of web browsers: Google chrome, opera, Internet Explorer, Mozilla Firefox

(vii) A **multimedia program,** multimedia application, or any multimedia software is software that plays or records and creates audio and video files.

3. Tailor-made software

It is software that is developed specifically for some specific organization or other user.

4. Off-shelf programs/software

Off-the-shelf/ out-of-the-box software is ready-made software, usually commercial, designed to serve a broad audience with common needs.

Examples of off-self software

- **Editor programs-** examples include Photoshop, Lightroom, Facetune
- **Mail services-** examples include Gmail, Outlook, Zohomail
- **Media players-** examples are VLC, Windows Media player
- **Operating systems-** examples are Windows, Mac
- **Electronic Mail:** Enables messages to be sent over an internet connection. Examples of these kinds of software include Gmail (Google), Yahoo Mail, and Hotmail (Microsoft).

- **Anti-Virus Software:** These types of software applications have been developed to protect computer systems from malicious software programs. Examples include Norton and Kaspersky.
- **Customer Relationship Management:** As the name suggests, CRM software like Salesforce and Hubspot are used by businesses to manage relationships with their customers.
- **Graphic Design:** These software applications help users create graphics, manipulate images, and touch-up photos, among other functions. Adobe Photoshop, Illustrator, Canva, and Figma are well-known examples of the software.
- **Communication:** Software like WhatsApp, Slack, and Microsoft Teams enable communication in real-time between people in different parts of the globe.
- **Task Management:** ClickUp and Trello are two examples of task management software used by (usually remote) teams to track tasks.

Elements of the "off-the-shelf" software

(i) They are standardized programs that massively produced and ready for use

(ii) They are not explicitly tailored but rather universal and made for widespread business use

(iii) Are easily integrated with existing systems without complex configurations.

Advantages of off-self software

- Lower initial cost and cost-effectiveness
- Quicker and easier to implement and use
- Proven reliability and quality
- Regular updates and support
- Available training resources and community support
- Owned by someone else, so they foot the development/upgrade costs

Disadvantages of off-self software

- **Lack of customization:** off-self software are designed for wide audience and may not meet specific needs.
- **Limited Scalability:** off-self software my fail to scale effectively to growing business demand.
- Off-self software may fail to integrate with existing system leading to **compatibility problems**.
- **Limited Control**: the user has limited control over the software's features and updates. If the vendor decides to change or discontinue the product, the user has no choice.
- **Security Concerns**: Since off-the-shelf software is widely used, it can be a more attractive target for cyber-attacks.

- **Off**-self software may have **unnecessary functionalities** while **lacking some that are crucial** for a specific business

5. Packaged software

Packaged software is a collection of programs that perform similar functions or have similar features. For example, Microsoft Office includes multiple applications such as Excel, word, PowerPoint etc. Video and audio editing software may also be available as packaged software, used for editing music and video files used in a movie.

Advantages of packaged software

- Initial cost is cheaper than custom counterpart
- Allow trial period before buying
- Easily distributed
- Availability of updates
- Offer community support
- Mitigates security issues;
- Decreases risks for business disruption;

Disadvantages of packaged software

- Packaged software is a standard program solution and may not be appropriate for all organizations.
- It is costly to maintain when future upgrades are required, or new versions are needed.
- It is time-consuming to install and maintain.
- Limited customization
- Extra features when required have to be purchase independently
- Unneeded software in the package take up computer space.

Software version and a release

A **software version** is software distributed but differs from other/earlier forms of similar software in some features and identified by a unique set of numbers and letters.

A **software release** is the distribution of the final version or the newest version of software

Shareware

It refers to copyrighted software distributes free for a trial period and payment is required for continued use after the trial period. For example antivirus software such as McAfee, Kaspersky. Motorbikes, computer car racing simulation

Freeware software

It refers to copyrighted software provided at no cost to the user by an individual or company. For example games like Dave, solitaire and antivirus software.

Examples of freeware

- Web browsers: Mozilla Firefox, Google Chrome
- Media players: VLC
- Antivirus programs: Avast, AVG
- Office suites: OpenOffice, LibreOffice
- Games: MineCraft, Doom

Public domain software

It free software donated for public use with no copyright restrictions. For example parliament news, news papers

Software Piracy

Software piracy is the **unauthorized use, copying or distribution of copyrighted software**

Precautions taken to prevent software piracy

- Comply with Piracy Regulations.
- Utilize End-user License Agreement.
- Utilize General Public License.
- Use a License Key Management System.
- Introduce a Subscription Model.
- Release an Improved Version of the Pirated Software.

Step-by-Step Guide: Installing an Operating System

1. **Prepare Installation Media**
    - Download the OS (e.g., Windows, Linux, macOS installer).
    - Create a bootable USB/DVD using tools like Rufus or Etcher.
2. **Insert Installation Media**
    - Plug in the USB/DVD into the computer.
3. **Enter BIOS/UEFI Settings**
    - Restart the computer and press the BIOS key (often **F2, F10, DEL, ESC**).
    - Set the boot order to prioritize USB/DVD.
4. **Boot from Installation Media**
    - Save BIOS settings and restart.
    - The computer will boot into the OS installer.
5. **Start Installation Process**
    - Select language, region, and keyboard layout.
    - Choose “Install OS.”
6. **Partition the Hard Drive**
    - Select the drive where the OS will be installed.

- Create or format partitions if necessary.

7. **Install OS Files**
   - The installer copies files and sets up the system.
   - This may take several minutes.
8. **Configure Settings**
   - Enter username, password, and computer name.
   - Set time zone and network preferences.
9. **Finalize Installation**
   - Restart the computer.
   - Remove the USB/DVD.
   - The OS boots up for the first time.
10. **Install Drivers & Updates**
    - Update system drivers (graphics, network, etc.).
    - Run OS updates for security and performance.

Step-by-Step Guide: Installing a Software Application

1. **Obtain the Software**
   - Download from the official website or insert installation disc.
   - Ensure it matches your OS version (Windows/Linux/macOS).
2. **Run the Installer**
   - Double-click the setup file (e.g., .exe, .msi, .dmg).
3. **Follow Setup Wizard**
   - Accept license agreement.
   - Choose installation location (default is usually fine).
4. **Select Installation Options**
   - Choose typical or custom installation.
   - Custom allows you to select specific features.
5. **Install the Application**
   - Click “Install” and wait for files to copy.
6. **Complete Installation**
   - Click “Finish.”
   - Restart computer if prompted.
7. **Launch the Application**
   - Find it in Start Menu (Windows), Applications folder (macOS), or Linux menu.
8. **Update & Configure**
   - Check for updates.
   - Configure settings (preferences, accounts, etc.).

Ways by which hearing impaired individuals can benefit from ICT

Hearing-impaired individuals benefit from ICT through tools like captioning, speech-to-text apps, video relay services, smart wearables, and accessible learning platforms, which enhance communication, education, independence, and social inclusion.

Key Ways ICT Benefits Hearing-Impaired Individuals

(i) **Real-time captioning:** Automatic subtitles in video calls, lectures, and media make communication accessible.
(ii) **Speech-to-text applications:** Apps like Google Live Transcribe convert spoken words into text instantly.
(iii) **Assistive listening devices:** Bluetooth hearing aids, FM systems, and cochlear implants amplify sound.
(iv) **Video relay services:** Enable sign language users to communicate with hearing individuals via interpreters.
(v) **Sign language apps:** Translate between spoken language and sign language for easier interaction.
(vi) **Accessible education platforms:** ICT ensures inclusive learning with captioned lectures, visual aids, and interactive tools.
(vii) **Smart wearables:** Devices detect environmental sounds (alarms, doorbells) and alert users through vibrations or notifications.
(viii) **Social inclusion tools:** ICT reduces isolation by enabling participation in conversations, workplaces, and communities.

Ways by which visual impaired individuals can benefit from ICT

ICT (Information and Communication Technology) has transformed the lives of **visually impaired individuals**, making education, communication, and daily living more accessible. Here are the main ways:

Communication & Accessibility

- **Screen readers** – software like JAWS, NVDA, and VoiceOver read text aloud from the screen.
- **Speech recognition** – tools like Dragon NaturallySpeaking allow users to dictate instead of typing.
- **Braille displays** – electronic devices convert on-screen text into Braille.
- **Text-to-speech apps** – convert written content into spoken words for easier access.

Education & Learning

- **Accessible e-books** – digital books with audio narration or Braille compatibility.

- **Learning platforms with accessibility features** – tools like Microsoft Teams and Google Classroom provide captions, audio descriptions, and screen reader support.
- **Virtual classrooms** – allow participation without physical barriers.

Daily Living & Independence

- **Navigation apps** – GPS-based apps (e.g., Seeing AI, Be My Eyes) guide visually impaired users through environments.
- **Smart assistants** – voice-controlled devices (Alexa, Siri, Copilot) help with reminders, calls, and information.
- **Object recognition apps** – AI apps identify objects, colors, and text through a smartphone camera.
- **Banking & shopping apps** – accessible apps allow independent financial transactions and online shopping.

Common Software Problems & Solutions

Common software problems include crashes, slowness, errors, and freezing, often solved by restarting the app/device, updating software/drivers/OS, checking for malware, closing background apps, or reinstalling the program; deeper issues might stem from outdated software or compatibility conflicts needing more involved solutions like system upgrades or developer fixes.

Common Problems & Solutions:

1. **Slow Performance/Freezing**

   Problem: Apps lag, system freezes, slow response times.

   Solutions:

   - **Restart:** Close and reopen the app; reboot the computer to clear memory.
   - **Task Manager:** Use Ctrl+Shift+Esc (Windows) to close demanding background apps.
   - **Updates:** Ensure OS, drivers, and the app itself are updated.
   - **Clean Up:** Run Disk Cleanup or optimize your hard drive.

2. **Software Crashes/Errors**

   Problem: Apps unexpectedly close or display error messages.

   Solutions:

- **Admin Rights:** Run the program as an administrator.
- **Reinstall:** Uninstall and then reinstall the software to replace corrupted files.
- **Compatibility:** Check if the app is compatible with your OS.

3. **Driver Issues**

   Problem: Hardware functions (like printers, graphics) don't work, causing crashes.

   Solutions:

   - **Update/Reinstall Drivers:** Get the latest drivers from the manufacturer's website.
   - **Update OS:** Ensure your operating system is current, as it affects drivers.

4. **Malware & Security Threats**

   Problem: Unwanted pop-ups, data theft, system instability.

   Solutions:

   - **Antivirus:** Run regular, full system scans with reputable antivirus software.
   - **Be Cautious:** Avoid suspicious downloads and links.

5. **Obsolete Software**

   Problem: Incompatibility with newer systems, lack of security updates.

   Solutions:

   - **Upgrade:** Move to modern, maintained software or upgrade existing systems.

6. **Internet/Connectivity Problems**

   Problem: Slow downloads, pages not loading.

   Solutions:

   - **Check Connection:** Restart router/modem, test speed, check for background downloads.
   - **Browser Cache:** Clear your browser's cache and cookies.

General Troubleshooting Steps:

(i) **Restart** the app, then the computer.

(ii) **Update** everything: software, drivers, operating system.

(iii) **Scan** for malware.

(iv) **Reinstall** the problematic program.

(v) **Check** for compatibility or system requirements.

Thank You

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