BASIC SOFTWARE MANAGEMENT.

SOFTWARE (PROGRAM)

Software refers to a set of instructions or programs that tell a computer how to perform specific tasks.

There are two main types of software;

1. System software
2. Application software

System software.

System software is the type of software that controls the computer system and runs the application software.

System software is software that directly operates the computer hardware and provides the basic functionality to the users as well as to the other software to operate smoothly.

Types of system software.

System software is divided into three main categories.

1. Operating systems
2. Utility programs
3. Programming languages

Operating system

An operating system (OS) is a software /program that manages hardware and software resources and provides common services to the computer system.

An operating system (OS) is a fundamental software component that acts as an intermediary between computer hardware and application software.

It provides a set of services and functions that allow both users and application programs to interact with the computer's hardware in a convenient and efficient manner.

Examples of common operating systems.

- Microsoft Windows
- macOS
- Linux
- Unix
- Android
- iOS
- Chrome OS
- BSD (Berkeley Software Distribution):
- Solaris:
- IBM z/OS

Functions of an operating system.

1. **Configuring Devices:**
    - **Function:** Involves recognizing and configuring hardware devices attached to the computer, such as printers, scanners, and storage devices.
    - **Example:** When a new printer is connected to a computer, the operating system configures the necessary drivers and settings to enable communication with the printer.
2. **Spooling Print Jobs:**
    - **Function:** Spooling (Simultaneous Peripheral Operations On-Line) involves managing print job queues to improve printing efficiency. Print jobs are temporarily stored in a spool directory before being sent to the printer.
    - **Example:** Multiple users can send print jobs to a printer, and the operating system spools these jobs to a queue, allowing the printer to process them one after another.
3. **Memory Management:**
    - **Function:** Manages the computer's memory, allocating and deallocating space for programs and data to ensure efficient utilization.

- **Example:** When a program is executed, the operating system allocates memory space for its instructions and data. It also frees up memory when the program is no longer in use.

4. **Administering Security:**
    - **Function:** Ensures the integrity, confidentiality, and availability of data and resources by implementing access controls, user authentication, and other security measures.
    - **Example:** User accounts, passwords, and permissions are managed by the operating system to control access to files and system resources.
5. **Providing Network Capability:**
    - **Function:** Facilitates communication between devices in a network, enabling data transfer and resource sharing.
    - **Example:** An operating system manages network connections, allowing users to access files on remote servers, browse the internet, and communicate with other devices on the network.
6. **Managing Storage Devices:**
    - **Function:** Controls and organizes storage devices such as hard drives and SSDs, managing file systems, directories, and file storage.
    - **Example:** The operating system keeps track of the files stored on a hard drive, organizes them into directories, and manages the allocation of storage space.
7. **User Interface:**
    - **Function:** Provides a means for users to interact with the computer. This can be through a graphical user interface (GUI) or a command-line interface (CLI).
    - **Example:** The desktop environment in Windows or the graphical interface in macOS allows users to interact with the operating system and run applications.
8. **File Management:**
    - **Function:** Organizes and controls access to files and directories on storage devices.
    - **Example:** Users can create, delete, copy, and move files and folders using file management tools provided by the operating system. The file system ensures the logical organization of data on storage devices.

Software version and software release

A “version" typically refers to the specific iteration of a product, while a "release" refers to the distribution of that version to users.

Software update and software upgrade

A software update is typically a release containing enhancements to the current version. An upgrade is a whole new version of software that represents a significant change or major improvement.

Utility programs

Utility programs are software that enhance existing functions and provide services not provided by other system software.

They are typically focused on system management, maintenance, optimization, and security, offering additional features and tools to improve the overall user experience and ensure the smooth operation of the computer.

Examples of common utility programs

1. **Backup Utility:**
    - **Explanation:** A backup utility is designed to create copies of important data to prevent data loss in case of system failure, hardware issues, or accidental deletion.

- **Example:** Windows Backup and Restore, macOS Time Machine, and third-party tools like Acronis True Image.

2. **Disk Repair:**
   - **Explanation:** Disk repair utilities are used to scan and fix issues with storage devices, including hard drives and SSDs, to ensure data integrity and prevent data loss.
   - **Example:** CHKDSK (Check Disk) for Windows, Disk Utility for macOS, and fsck for Linux.
3. **File Installer:**
   - **Explanation:** File installers are programs that install/ add software applications on a computer, copying necessary files and configuring the system for the new application.
   - **Example:** Windows Installer (MSI files), macOS Installer Packages (PKG files), and Linux package managers like apt or yum.
4. **File Uninstaller:**
   - **Explanation:** File uninstallers remove software applications from a computer, ensuring that all associated files and configurations are properly deleted.
   - **Example:** Windows Control Panel (Add or Remove Programs), macOS Applications folder, and third-party tools like Revo Uninstaller.
5. **Defragmentation utility:**
   - **Explanation:** Defragmentation utilities organize scattered data on storage devices to improve access times and overall system performance.
   - **Example:** Windows Disk Defragmenter, macOS Optimize Storage, and third-party tools like Defraggler.
6. **Diagnostic Utility:**
   - **Explanation:** Diagnostic utilities help identify and troubleshoot hardware or software issues, providing information to users and system administrators.
   - **Example:** Windows System Diagnostic, macOS Apple Diagnostics, and Linux system monitoring tools like top or htop.
7. **Antivirus:**
   - **Explanation:** Antivirus utilities protect a computer from malicious software (viruses, malware, etc.) by detecting, preventing, and removing threats.
   - **Example:** Norton Antivirus, McAfee, Windows Defender, and Avast.
8. **Screen Saver:**
   - **Explanation:** Screen savers display animated or static images on the screen when the computer is idle, primarily for entertainment or energy-saving purposes.
   - **Example:** Bubbles, Mystify, and 3D Text screen savers on Windows.
9. **Cryptographic Utility:**
   - **Explanation:** Cryptographic utilities provide tools for encryption and decryption of data, ensuring secure communication and protecting sensitive information.
   - **Example:** BitLocker for Windows, FileVault for macOS, and GPG (GNU Privacy Guard) for various platforms.
10. **File Compression Utility:**
    - **Explanation:** File compression utilities reduce the size of files or folders to save storage space and facilitate faster file transfers.
    - **Example:** WinZip, WinRAR, 7-Zip, and macOS built-in Archive Utility.
11. **File Viewer Utility:**
    - **Explanation:** File viewer utilities allow users to open and view different types of files without the need for the original application that created them.

- **Example:** Adobe Acrobat Reader for PDFs, Microsoft Word Viewer, and image viewers like IrfanView.

Programming language.

A programming language is a set of rules and symbols that allows humans to communicate instructions to a computer, enabling the creation of software and applications.

Examples of programming languages

- Python
- BASIC
- R
- Go
- Java
- C
- C++
- C#
- HTML
- CSS
- jinja
- ruby
- JavaScript
- Perl
- PHP

Application software/application systems

Application software, commonly referred to as "applications" or "apps," is a type of computer software designed to perform specific tasks for end-users.

Unlike system software, which manages and facilitates the operation of computer hardware and provides foundational services, application software is created to meet the needs of users in various domains. It enables users to accomplish specific functions, such as document editing, web browsing, communication, entertainment, and more.

Types/ categories of application software

There are two main types of application software

1. Custom-made / tailor made / bespoke software.
2. Off the shelf / vendor off/ commercial software

Custom made software

This is software designed at user's request to perform a specific task.

Custom software, also known as bespoke or tailor-made software, is specifically developed for a particular organization, business, or individual. It is designed to meet unique requirements and can be highly customized to address specific needs.

Examples: An inventory management system designed for a specific business; a customer relationship management (CRM) system tailored to a company's processes.

Off the shelf/ vendor off software

This is software designed to meet needs of a variety of end users. off-the-shelf applications are pre-built and available for purchase or download. They are developed to meet the needs of a broad user base and are not tailored to any specific organization or individual.

Examples of the off the shelf software

1. **Word Processing Software:**
   - **Example:** Microsoft Word, Google Docs, LibreOffice Writer.
   - **Functionality:** These programs are designed for creating, editing, and formatting text-based documents. They often include features like spell-check, formatting options, and collaboration tools.
2. **Spreadsheet Software:**
   - **Example:** Microsoft Excel, Google Sheets, LibreOffice Calc.
   - **Functionality:** Spreadsheet software helps users organize data in rows and columns. It's commonly used for tasks such as budgeting, financial analysis, and data manipulation.
3. **Presentation Software:**
   - **Example:** Microsoft PowerPoint, Google Slides, LibreOffice Impress.

- **Functionality:** Presentation software allows users to create slideshows for business presentations, educational purposes, or other visual communication needs.

4. **Desktop Publishing Software:**
    - **Example:** Adobe InDesign, QuarkXPress.
    - **Functionality:** Desktop publishing software is used for designing and formatting documents with a focus on layout, typography, and graphical elements. It's often used for creating brochures, magazines, and newsletters.
5. **Database Management Systems (DBMS):**
    - **Example:** Microsoft Access, MySQL, Oracle Database.
    - **Functionality:** DBMS helps users manage and organize data efficiently. It includes tools for creating, modifying, and querying databases.
6. **Web Authoring Software:**
    - **Example:** Adobe Dreamweaver, WordPress.
    - **Functionality:** Web authoring software assists in creating and designing websites. Users can visually design web pages and manage website content.
7. **Web Browsers:**
    - **Examples:** Google Chrome, Mozilla Firefox, Microsoft Edge, Safari.
    - **Functionality:** Web browsers allow users to access and navigate the internet. They interpret and display web content, including text, images, videos, and interactive elements.
8. **Multimedia Applications:**
    - **Examples:** Adobe Premiere Pro (video editing), Adobe Photoshop (image editing), Audacity (audio editing).
    - **Functionality:** Multimedia applications handle various types of media, such as images, videos, and audio. They enable editing, creation, and manipulation of multimedia content.

How to install software

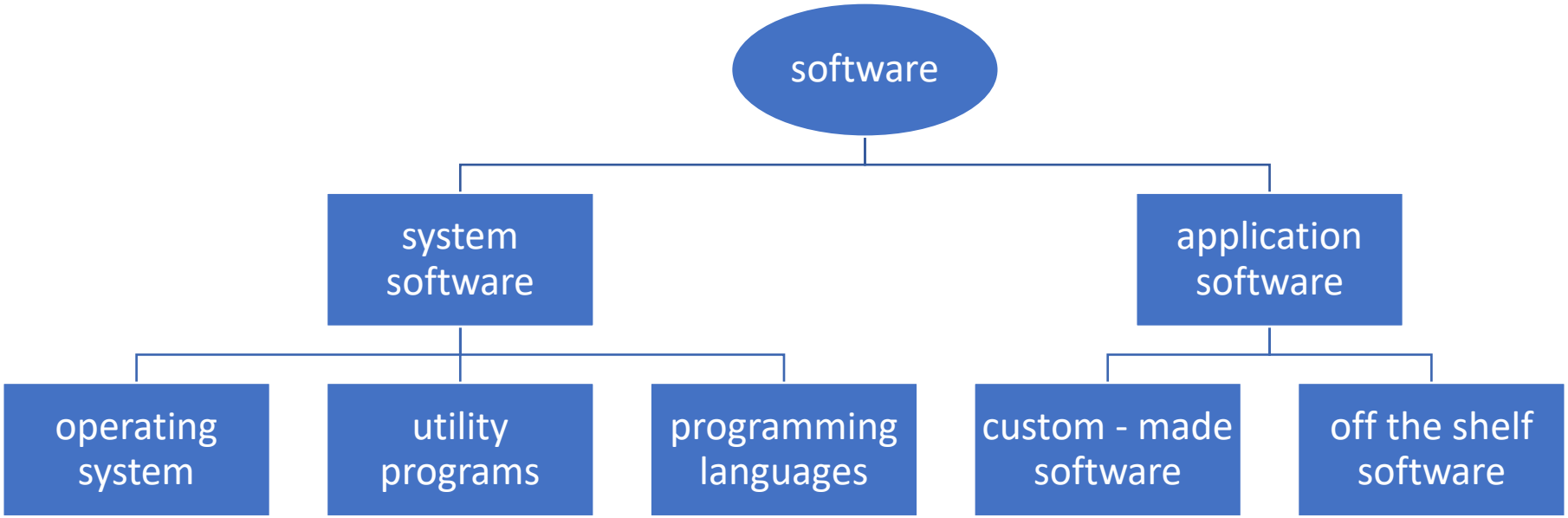
Sure, here are the general steps to install software:

- Download the Software: Download the software's installation file from a trusted source. Be careful about the websites you download files from, as many viruses and malware come from downloads from malicious sources.
- Locate the Installation File: After downloading, locate the installation file, usually an `.exe` file for Windows. This file is often in your Downloads folder.
- Run the Installation File: Double-click the installation file to start the installation process. If there are multiple setup or install files, locate the executable file or double-click each setup or install file until you find the file that starts the installation.
- Follow the Installation Instructions: A dialog box will appear with instructions for the installation. Follow these instructions.
- Reboot if Necessary: After installing a new program, if it prompts you to reboot the computer, do so.

How to uninstall a software program

- Open Control Panel: Press the Windows key, type “Control Panel”, and press Enter.
- Go to Programs: Under the Programs section, click the “Uninstall a program” link.
- Select the Program: In the new window, select the program you want to uninstall and click the “Change”, “Remove”, or “Uninstall” button.
- Follow the Instructions: Follow the directions on the screen.

Chapter summary



ELECTRONIC WASTE MANAGEMENT

E-waste management refers to the proper handling, recycling, and disposal of electronic waste, which includes discarded electronic devices and equipment.

E-WASTE

E-waste, short for electronic waste, refers to discarded electronic devices and equipment.

These items have reached the end of their useful life or are no longer in use, leading to their disposal or recycling.

E-waste encompasses a wide range of electronic devices, both large and small, and can include items such as:

Class of E-waste	Examples
Consumer electronics	Mobile phones Computers (desktops, laptops) Printers Televisions DVD players Cameras Audio equipment (headphones, speakers)
Office equipment	Copiers Fax machines Scanners
Home appliances	Refrigerators Washing machines Microwave ovens Air conditioners
Information technology (IT) equipment	Servers Networking equipment
Electronic equipment	Circuit boards Microchips Semiconductors

Dangers of E-waste

1. **Environmental Pollution**: Improper disposal of e-waste can lead to the release of hazardous substances into the environment, contaminating soil, water, and air.
2. **Toxic Chemical Exposure**: E-waste often contains toxic materials such as lead, mercury, cadmium, and brominated flame retardants, which can pose serious health risks if not handled properly.
3. **Health Risks for Workers**: Individuals involved in informal e-waste recycling, often in developing countries, may be exposed to harmful chemicals and suffer from health issues such as respiratory problems, skin disorders, and neurological damage.

4. **Water Contamination**: Leaching of chemicals from e-waste can contaminate groundwater, affecting water quality and potentially entering the food chain.
5. **Air Pollution**: Burning or incinerating e-waste can release toxic fumes into the air, contributing to air pollution and respiratory problems for nearby communities.
6. **Soil Degradation**: The disposal of e-waste in landfills can lead to soil degradation and reduce the fertility of the land.
7. **Resource Depletion**: E-waste represents a loss of valuable resources, including metals and rare minerals, that could be recovered through proper recycling and reuse.
8. **Electronic Data Security Risks**: Improper disposal of electronic devices may result in the exposure of sensitive information, posing a risk to data security and privacy.
9. **Biodiversity Impact**: Contaminated water and soil from e-waste can negatively impact ecosystems and biodiversity, affecting plants, animals, and microorganisms.
10. **Global Trade Issues**: The export of e-waste to developing countries, where regulations may be lax, can contribute to environmental and health problems, creating ethical concerns in the global waste trade.

Good practices for management of E- waste

Implementing good practices in electronic waste (e-waste) management is crucial for minimizing environmental impact, promoting sustainability, and addressing potential health hazards. Here are several effective practices in e-waste management:

1. **Electronic Waste Recycling:**
    - Establish and promote e-waste recycling facilities to safely dismantle and process electronic devices.
    - Encourage consumers to drop off old electronics at designated recycling centres.
    - Support and promote certified e-waste recycling companies that adhere to environmental standards.
2. **Take-Back Programs:**
    - Implement take-back programs where manufacturers or retailers take back old electronic devices for proper recycling or disposal.
    - Collaborate with electronics manufacturers to establish convenient collection points for consumers to return end-of-life products.
3. **Extended Producer Responsibility (EPR):**
    - Enforce EPR policies that make manufacturers responsible for the proper disposal and recycling of their products.
    - Encourage manufacturers to design products with recyclability and ease of disassembly in mind.
4. **Donation and Reuse Programs**:
    - Promote the donation of functional electronic devices to charities, schools, or community organizations.
    - Establish programs that refurbish and redistribute used electronics to extend their lifespan.

5. **Awareness and Education:**
    - Conduct public awareness campaigns to educate consumers about the environmental impact of e-waste and the importance of proper disposal.
    - Provide information on recycling options and locations.
6. **Data Security Measures**:
    - Implement secure data wiping or destruction protocols before recycling electronic devices to ensure the protection of sensitive information.
7. **Government Regulations and Policies:**
    - Enforce and strengthen regulations related to e-waste management to ensure compliance by manufacturers, retailers, and consumers.
    - Develop policies that incentivize sustainable practices and penalize improper disposal.
8. **Innovation in Design**:
    - Encourage manufacturers to design products with modular components, making it easier to upgrade or repair and extending the overall lifespan.
9. **Promote the use of eco-friendly materials in electronic device manufacturing.**
10. **Local Collection Events**:
    - Organize periodic e-waste collection events in communities to encourage responsible disposal and recycling.
    - Provide incentives, such as discounts on new electronic products, for participating in these events.
11. **International Collaboration**:
    - Facilitate international cooperation to address the global nature of e-waste, sharing best practices and promoting responsible waste management on a global scale.

STAKE HOLDERS IN E-WASTE MANAGEMENT

Stake holder	How they can be involved in e-waste management
Government	• Enforce and strengthen regulations related to e-waste management. • Implement Extended Producer Responsibility (EPR) policies. • Support and promote certified e-waste recycling companies.
manufacturers and producers	• Design products with recyclability and ease of disassembly in mind. • Implement take-back programs for end-of-life products. • Adhere to EPR policies and support recycling initiatives.

consumers	• Participate in take-back programs and drop off old electronics at designated recycling centers. • Support donation and reuse programs by giving away functional devices. • Educate themselves about the environmental impact of e-waste and practice responsible disposal.
Non government organisations (NGOs)	• Facilitate donation and reuse programs by accepting functional electronic devices. • Raise awareness about e-waste issues and promote responsible disposal practices.
Educational institutions	• Incorporate e-waste awareness and responsible disposal practices into educational curricula. • Participate in or organize e-waste collection events.

IMPORTANCE OF E-WASTE MANAGEMENT

Proper e-waste management is crucial for various reasons, encompassing environmental, health, and economic considerations.

1. **Environmental Protection:** Prevents the release of hazardous materials into the environment, reducing soil, water, and air pollution.
2. **Resource Conservation:** Recycles valuable materials from electronic devices, conserving resources and reducing the need for mining and extraction.
3. **Health and Safety:** Minimizes health risks associated with exposure to toxic substances found in e-waste, protecting both workers and communities.
4. **Prevention of Soil and Water Contamination:** Avoids the leaching of hazardous chemicals from e-waste into the soil and groundwater, safeguarding ecosystems and preventing contamination of water sources.
5. **Reduced Greenhouse Gas Emissions:** Proper recycling reduces the energy required for raw material extraction and processing, contributing to lower greenhouse gas emissions.
6. **Circular Economy Promotion:** Encourages the development of a circular economy by recycling and reusing electronic components, reducing the demand for new raw materials.

7. **Data Security:** Ensures secure data destruction or wiping, protecting sensitive information from falling into the wrong hands during the disposal process.
8. **Job Creation:** Supports the growth of the e-waste recycling industry, creating employment opportunities and contributing to economic development.
9. **Global Collaboration:** Promotes international cooperation in addressing the global issue of e-waste, sharing knowledge, and working towards common solutions.
10. **Sustainable Development:** Aligns with principles of sustainable development by minimizing environmental impact, promoting responsible consumption, and fostering a balance between economic, social, and environmental considerations.