

1. Describe system software. Discuss each of the four types of system programs.

System software is a program that control computer's hardware and all applications and it manages its resources with memory, processors, and devices. System software is typically bundled with a computer's operating system.

Here is the four types of system programs:

1. Operating system - manage and control all computer resources and application.
2. Utilities - design to help with the system maintenance, optimize and troubleshoot.
3. Device drives - particular type of software program that enables the operating system to communicates with and control devices.
4. Firmware - special form of software that enable a devices to perform function without the need of install additional software.

2. Define operating systems. Describe the basic features and the three categories of operating systems.

Operating system is a collection of programs that handle a technical tasks and manage all the other application programs in a computer. A few functions of an operating system are to schedule task, provide security, start-up the computer and provide user interface such as graphical user interface. Basic feature of OS is to booting (starting and restart) the computer, file and folder to share the programs data and to store all related files, and a few common in application software such as Menu (it allow user to select specific action, like saving a document, open files and accessing help resources), Windows (it serve as the primary interface for display and interact with application content), and Icons (to serve as a visual - represent a file and any program)

Three categories of OS:

- * Embedded operating system in smartphone, smartwatch and video game system
- * Stand alone operating system - called as a desktop and its function independently
- * Network operating system - such as windows server, Linux and Unix (specialized software that manage and control network resources.

3. What are mobile operating systems? Describe leading mobile operating systems.

Mobile operating system is an embedded operating system that is less complicated and more specialized for wireless. It controls and manages the hardware and software of mobile devices such as smartphones, tablets and smartwatches. The leading mobile operating system is Android (developed by Google, known for its customization options and flexibility), iOS (developed by Apple, designed for iPhone and iPad users, known for its strong security and user-friendly interface), and Windows Phone (developed by Microsoft, its feature is a new user interface based on the Metro design language).

4. What are desktop operating systems? Compare Windows, Mac OS, Linux and Chrome OS. Discuss virtualization.

Desktop operating system is a software that manages a computer's hardware and software resources, it provides a user interface to interact.

Comparison of Operating System:

- Windows - most widely used OS for personal computers and user-friendly interface, example of Windows is Windows 10 (merge Windows desktop and mobile OS) and Windows 11 (can input information through touch, writing and speaking)
- Mac OS - developed by Apple brand, the most advanced desktop operating system, focused performance, stability and strong security.
- Linux - it's a version of Unix, alternative to Windows, the open source is free, and robust security features.
- Chrome OS - a cloud-based OS developed by Google, designed for Chromebook, and strong integration with Google.

Virtualization is an ability to support multiple operating systems on a single physical machine, it allows multiple OS to run concurrently on a single physical computer, example of VM is VirtualBox, VMware and Hyper-V.

5. Discuss utilities. What are the most essential utilities? What is a utility suite?

Utilities are specialized programs to make computing easier, it's a software tool designed to help users manage and maintain their computer system. The most essential utilities are troubleshooting utilities (recognizes and corrects problems), antivirus (to protect the computers), backup programs (to create backup of important files, copies of files and recover them if necessary), and file compression programs (compress file and reduces size to save storage space). Utility suites combine several programs into one package, it's less expensive and a few of popular suites are Bit Defender, Norton Defender, and Kaspersky.