**Chapter 4**

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| **Num** | **Multiple Choice Answers** | **Matching Answers** |
| 1 | D | I |
| 2 | B | J |
| 3 | B | G |
| 4 | C | E |
| 5 | A | H |
| 6 | A | F |
| 7 | A | C |
| 8 | B | D |
| 9 | D | A |
| 10 | C | B |

**Open Ended Questions:**

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

System software works with end users, application software, and computer hardware to handle most technical details. System software is not a single program. Rather it is a collection or a system of programs that handle hundreds of technical details with little or no user intervention.

System software consists of four types of programs:

* **Operating systems** coordinate computer resources, provide an interface between users and the computer, and run applications.
* **Utilities**, also known as service programs, perform specific tasks related to managing computer resources.
* **Device drivers** are specialized programs that allow particular input or output devices to communicate with the rest of the computer system.
* **Language translators** convert the programming instructions written by programmers into a language that computers understand and process.
* 系统软件又称后台软件，负责处理技术细节，帮助用户方便安全地使用计算机系统。包括四类软件：操作系统、工具软件、设备驱动程序、计算机语言翻译程序。
* 操作系统：管理和调度计算机资源，提供用户界面，支持应用程序运行。
* 工具软件：又称服务软件，帮助用户方便、快捷、安全地使用计算机，如磁盘清理、病毒查杀、定期备份等。
* 设备驱动程序：在输入输出设备和其它系统资源之间建立通讯连接的专用软件。
* 计算机语言翻译程序：将程序指令转换为机器语言指令。

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

An operating system is a collection of programs that handle many of the technical details related to using a computer. The operating system is considered the most important type of computer program. Without an operating system, your computer would be useless.

Every computer has an operating system and every operating system performs a variety of functions. These functions can be classified into three groups:

* **Managing resources:** Operating systems coordinate all the computer’s resources including memory, processing, storage, and devices such as printers and monitors. They also monitor system performance, schedule tasks, provide security, and start up the computer.
* **Providing user interface:** Operating systems allow users to interact with application programs and computer hardware through a user interface. Almost all operating systems use a graphical user interface (GUI). A graphical user interface uses graphical elements such as icons and windows.
* **Running applications:** Operating systems load and run applications such as word processors and spreadsheets. Most operating systems support multitasking**,** or the ability to switch between different applications stored in memory. With multitasking, you could have Word and Excel running at the same time and switch easily between the two applications. The program that you are currently working on is described as running in the foreground**.** The other program or programs are running in the background**.**

Operating systems have several features in common with application programs including:

* **Icons** – graphic representations for a program, type of file, or function.
* **Pointer** – controlled by a mouse, trackpad, or touchscreen, the pointer changes shape depending upon its current function.
* **Windows** – rectangular areas for displaying information and running programs
* **Menus** – provide a list of options or commands
* **Tabs** – divide menus into major activity areas
* **Dialog boxes** – provide information or request input.
* **Help** - provides online assistance for operating system functions and procedures.
* **Gesture control** – ability to control operations with finger movements such as swiping, sliding, and pinching.

The three main categories of operating systems are:

* **Embedded operating systems** are used in cell phones and tablets, as well as video game systems and thousands of other small electronic devices. Also known as **real-time operating systems (RTOS)**, these operating systems are uniquely designed to work exclusively with (i.e., embedded into) a particular device’s hardware. Typically designed for a specific application, embedded operating systems are essential in the evolution of IoT where many everyday devices can communicate with one another.
* **Stand-alone operating systems** are used by a single desktop or laptop computer. Also called **desktop operating systems,** these operating systems are located on the computer’s hard disk. Often desktop computers and laptops are part of a network. In these cases, the desktop operating system works with the network to share and coordinate resources.
* **Network operating systems** (NOS) are used to control and coordinate computers that are networked or linked together. Network operating systems are typically located on one of the connected computers’ hard disks. Called the **network server,** this computer coordinates all communication between the other computers.
* 操作系统：最重要的系统软件，负责处理技术细节。主要功能包括：管理和调度计算机资源，提供用户界面，支持应用程序运行。分为三大类：（1）、嵌入式操作系统，应用于移动式设备；（2）、单机版操作系统，应用于台式机等大多数终端设备；（3）、网络版操作系统，应用于服务器。

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

Utilities are specialized programs designed to make computing easier. The most essential are:

* Search programs provide a quick and easy way to search or examine an entire computer system to help you find specific applications, data, or other files.
* Storage management programs help solve the problem of running out of storage space by providing lists of application programs, stored videos, and other program files so that you can eliminate unused applications or archive large files elsewhere.
* Backup programs make copies of files to be used in case the originals are lost or damaged. Windows 11 comes with a free backup program, the File History tool, and macOS has a backup feature named Time Machine.
* Antivirus programs guard your computer system against viruses or other damaging programs that can invade your computer system. Popular antivirus programs include Norton AntiVirus and Bitdefender’s Antivirus Plus.
* Troubleshooting or diagnostic programs recognize and correct problems, ideally before they become serious.
* Virtual assistants are utilities that accept commands through text or speech to allow intuitive interaction with your computer, cell phone, or tablet and coordinate personal data across multiple applications. Microsoft Windows 11 has the virtual assistant Cortana, and Apple’s macOS has Siri.

Utility Suites combine several programs into one package. These suites provide a variety of utilities. Some programs improve hard disk efficiency, while other programs protect systems from dangerous viruses.

* 工具软件又称服务软件，帮助用户方便、快捷、安全地使用计算机。常见工具软件包括：文件搜索工具、磁盘清理工具、病毒查杀工具、磁盘碎片整理工具、定期备份工具等。
* 工具软件包将多种工具软件集成到一个软件包中，提供各种服务。