1. What is an operating system, and why is it essential for a computer?
   - An operating system (OS) is the program that, after being initially loaded into the computer by a boot program, manages all of the other application programs in a computer. The application programs make use of the operating system by making requests for services through a defined application program interface (API).
   - It manages the computer's memory and processes, as well as all of its software and hardware. It also allows you to communicate with the computer without knowing how to speak the computer's language. Without an operating system, a computer is useless.

2. Name some popular operating systems for personal computers.
   - Apple macOS
   - Microsoft Windows
   - Google's Android OS
   - Linux Operating System
   - Apple iOS

3. How does an operating system manage hardware resources like CPU and memory?

   The OS manages hardware resources such as the CPU, memory, storage devices, and input/output devices. It does this through a process known as resource allocation. This involves assigning resources to different tasks and applications based on their priority and need. For instance, the OS determines which processes get access to the CPU, and for how long, in a process known as task scheduling. This ensures that all processes get a fair share of the CPU's time and that the system runs smoothly.

   Memory management is another crucial function of the OS. It keeps track of each byte in a system's memory and which processes are using which memory at any given time. When a process needs to be executed, the OS allocates memory to it. Once the process is complete, the memory is then deallocated and made available for other processes.

4. Explain the concept of a user interface in an operating system

   A user interface (UI) refers to the part of an operating system, program, or device that allows a user to enter and receive information.

5. What are the main components of the Windows operating system?

   Important Components of the Operating System:

   - Process management
   - Files management
   - Command Interpreter
   - System calls
   - Signals
   - Network management
   - Security management
   - I/O device management
   - Secondary storage management
   - Main memory management

6. What are the distinctive features of the macOS operating system?

What is unique about macOS?

MacOS is known for its simple and organized user interface that offers a smooth workflow for the user. All apps are downloaded from the App Store and are organized in only one application drawer called the Launchpad. All related details for each app are consolidated in an Application folder for smooth organization.

7. What is Linux, and how does it differ from Windows and macOS?

Linux is an open-source operating system developed in 1991 by Linus Torvalds. It has since grown into one of the most popular and influential operating systems used worldwide. Unlike Windows and macOS, Linux has a freely available source code.

	Linux	Windows	macOS
Hardware Quality	Versatile, can run on low-spec PCs	Very versatile	Proprietary hardware, very high-end
Cost	Mostly free, some distros have paid versions	Freemium, accessing all features costs approximately $150	Free but comes on an expensive hardware
Software Compatibility	Open-source substitutes for proprietary software	Unparalleled	Has its own app ecosystem
Ease of Installation	Requires some computing knowledge	Easy	Very easy
Security and Stability	The safest and most stable OS	Generally great, requires plenty of frequent updates	Very good, requires only a few periodic updates
Ease of Use	Ease of use determined by the distro	Simple to use	Very easy to use

8. Name some popular Linux distributions (distros).

Debian, Fedora, and Ubuntu.

9. How do you navigate the Linux file system using terminal commands?

The cd (change directory) command moves you into a different directory.

10. What is the purpose of the package manager in Linux?

A package manager keeps track of what software is installed on your computer, and allows you to easily install new software, upgrade software to newer versions, or remove software that you previously installed.

11. Explain the concept of file extensions and their importance.

- In computing, a file extension is a suffix added to the name of a file to indicate the file's layout, in terms of how the data within the file is organized. A file's data must be organized in the correct format to ensure that it can be accessed by the software program associated with the specific file type.
- Extensions tell your computer which application created or can open the file and which icon to use for the file.

12. Explain the concept of multitasking in an operating system

A multitasking operating system is a logical extension of a multiprogramming operating system. Through this system, users can run multiple programs and tasks simultaneously. Without losing data, the operating system keeps track of each job and allows you to switch between jobs without allowing the data to be lost.