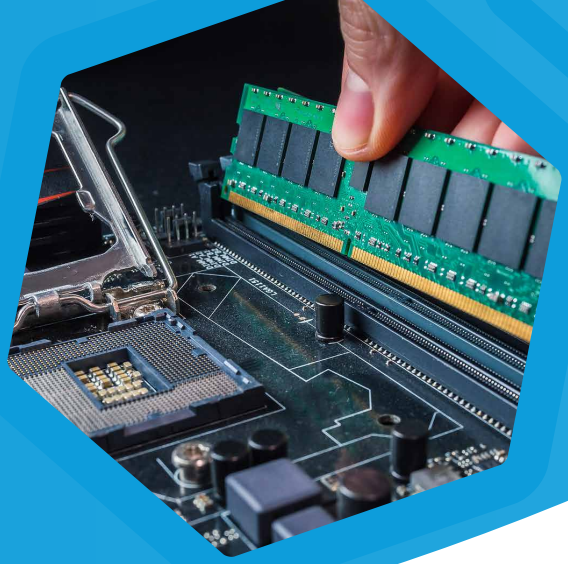

IT Fundamentals

Unit - Hardware

Lesson 3.1.1 - Purpose of Operating Systems

IT Fundamentals Objectives (FC0-U61)

Objective 3.1 - Explain the purpose of operating systems

- Interface between applications and hardware
- Disk management
- Process management/scheduling
    - Kill process/end task
- Application management
- Memory management
- Device management
- Access control/protection

Grade Level(s)

8, 9

Cyber Connections

- **Hardware & Software**

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Teacher Notes:

Purpose of Operating Systems

What is an operating system?

An operating system is the software that controls the ***interface between applications and hardware.*** This interface can either be a graphical user interface (GUI), such as Windows 10 or macOS Catalina, or it can be a command line interface (CLI), such as MS-DOS or some Python interpreters. Regardless of the type of operating system, it will always be the intermediary between the computer programs and the hardware for the computer.

What does an operating system manage?

The operating system manages a lot of things, one being the disk management. The ***disk management*** is where the operating systems controls and maintains where all the data is stored on the disks. These files being stored need to be stored in specific ways to allow faster access when using them, this system of storing files is known as a file system. There are many different types of file systems, such as FAT32, NTFS, etc.

The operating system also manages processes and applications, known as ***process management*** and ***application management.*** When an operating system is running, there will be many processes occurring simultaneously, such as an internet browser, music player, and a text editor. The operating system will manage all of these processes so it can run them all at the same time efficiently. The operating system will control ***scheduling*** for the processes which determines how much processing power each process gets. This keeps the machine running smoothly while multiple programs are running at once by managing the memory. ***Memory management*** is important to make sure that the system is not using more memory than it has, while also running at maximum capacity. The operating system will also have the power to ***kill processes,*** or end them, this is also known as ***task kill.***

The operating system is also in charge of managing devices. ***Device management*** happens in a few ways. Devices have to be kept track of and the system has to know what programs can have access to certain ones. The operating system will also check the status of devices to make sure they are up to date and running effectively. Devices also have policies set by the operating system that determines when they can be used and with how much processing power.

Teacher Notes:

Lastly, one of the main things that an operating system manages is the ***access control*** and ***protection.*** Certain users (or groups) should only have access to certain files and applications, the operating system manages who has access to what stuff. It also tracks what users have been accessing what files, this can be used for auditing purposes. All of this helps keep the machine and it's data secure.