Booting the computer

When you boot, or turn on, your computer, either a BIOS or UEFI microchip is activated. The **Basic Input/Output System (BIOS)** is a microchip that contains loading instructions for the computer and is prevalent in older systems. The **Unified Extensible Firmware Interface (UEFI)** is a microchip that contains loading instructions for the computer and replaces BIOS on more modern systems.

The BIOS and UEFI chips both perform the same function for booting the computer. BIOS was the standard chip until 2007, when UEFI chips increased in use. Now, most new computers include a UEFI chip. UEFI provides enhanced security features.

The BIOS or UEFI microchips contain a variety of loading instructions for the computer to follow. For example, one of the loading instructions is to verify the health of the computer's hardware.

The last instruction from the BIOS or UEFI activates the bootloader. The **bootloader** is a software program that boots the operating system. Once the operating system has finished booting, your computer is ready for use.

User

The first part of the process is the user. The user initiates the process by having something they want to accomplish on the computer. Right now, you're a user! You've initiated the process of accessing this reading.

Application

The application is the software program that users interact with to complete a task. For example, if you want to calculate something, you would use the calculator application. If you want to write a report, you would use a word processing application. This is the second part of the process.

Operating system

The operating system receives the user's request from the application. It's the operating system's job to interpret the request and direct its flow. In order to complete the task, the operating system sends it on to applicable components of the hardware.

Hardware

The hardware is where all the processing is done to complete the tasks initiated by the user. For example, when a user wants to calculate a number, the CPU figures out the

answer. As another example, when a user wants to save a file, another component of the hardware, the hard drive, handles this task.

After the work is done by the hardware, it sends the output back through the operating system to the application so that it can display the results to the user.

The OS at work behind the scenes

Consider once again how a computer is similar to a car. There are processes that someone won't directly observe when operating a car, but they do feel it move forward when they press the gas pedal. It's the same with a computer. Important work happens inside a computer that you don't experience directly. This work involves the operating system.

You can explore this through another analogy. The process of using an operating system is also similar to ordering at a restaurant. At a restaurant you place an order and get your food, but you don't see what's happening in the kitchen when the cooks prepare the food.

Ordering food is similar to using an application on a computer. When you order your food, you make a specific request like "a small soup, very hot." When you use an application, you also make specific requests like "print three double-sided copies of this document."

You can compare the food you receive to what happens when the hardware sends output. You receive the food that you ordered. You receive the document that you wanted to print.

Finally, the kitchen is like the OS. You don't know what happens in the kitchen, but it's critical in interpreting the request and ensuring you receive what you ordered. Similarly, though the work of the OS is not directly transparent to you, it's critical in completing your tasks.