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Pre-class Assignment #2

1. Give the definition of operating system kernel.

    The lowest level of software running on the system, with full access to all of the capabilities of the hardware.

2. What is the purpose of an operating system kernel?

    The purpose of an operating system is to implement a restricted environment for untrusted software to run without complete system access.

3. What is a program?

    Some code written in a high level language by a programmer that is converted into an executable image by the compiler.

4. What stages does a program go through between editing source code and execution?

    1. User edits source code
    2. Compiler creates an executable image
    3. Operating system sends a copy to the process and kernel

5. What is a process?

    The abstraction for protection provided by the operating system kernel, or the execution of an application program with restricted rights.

6. How is a process related to a program?

    A process is an instance of a program running on a system.

7. What is dual-mode execution?

This type of execution adds a single bit to every instruction that checks if the program has permission to run the current step.

8. Name the two modes.

Kernel mode, User mode

9. What are privileged instructions?

Privileged instructions are only available to the the kernel and not to any user code. Essentially all instruction that have the potential to be unsafe are prohibited.

10. What should happen if a user program attempts to execute a privileged instruction?

The program can perform a special system call to change its privilege level to essentially become the operating system kernel.