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CS372 Operating System Homework 1

2.1 What is the purpose of system calls?

When requesting services from the operating system, System calls are used for those user level processes.

2.2 What are the five major activities of an operating system with regard to process management?

- The creation and deletion of both user and system processes
- The suspension and resumption of processes
- The provision of mechanisms for process synchronization
- The provision of mechanisms for process communication
- The provision of mechanisms for deadlock handling

2.13 Describe three general methods for passing parameters to the operating system.

- Pass parameters in registers
- Registers pass starting addresses of blocks of parameters
- Parameters can be placed, or *pushed,* onto the *stack* by the program,
- and *popped* off the stack by the operating system

2.18 What are the two models of interprocess communication? What are the strengths and weaknesses of the two approaches?

1. Shared-memory model.
Strength:
Shared memory communication is faster the message passing model when the processes are on the same machine.
Weaknesses:
Different processes need to ensure that they are not writing to the same location simultaneously.
Processes that communicate using shared memory need to address problems of memory protection and synchronization.

2. Message-passing model.
Strength:
Easier to implement than the shared memory model
Weakness:
Communication using message passing is slower than shared memory because of the time involved in connection setup

2.21 What is the main advantage of the microkernel approach to system design? How do user programs and system services interact in a microkernel architecture? What are the disadvantages of using the microkernel approach?

Advantages:

1. Adding a new service does not require modifying the kernel,
2. It is more secure as more operations are done in user mode than in kernel mode.
3. A simpler kernel design and functionality typically results in a more reliable operating system.

User programs and system services interact in a microkernel architecture by using interprocess communication mechanisms such as messaging. Messages are conveyed by the operating system.
The primary disadvantages of the microkernel architecture is that the overheads associated with interprocess communication and the frequent use of the operating system's messaging functions in order to enable the user process.