

## Homework Assignment 1: Chapter 2

- 2.1 What is the purpose of system calls?  
2.2 What are the five major activities of an operating system with regard to process management?  
2.13 Describe three general methods for passing parameters to the operating system.  
2.18 What are the two models of interprocess communication? What are the strengths and weaknesses of the two approaches?  
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?
- 2.1. System calls provide an interface to the services made available by an operating system and can be grouped roughly into six major categories: process control, file manipulation, device manipulation, information maintenance, communications, and protection.
- 2.2. Process creation/deletion, process suspension/resumption, process synchronization, process communication, and deadlock handling.
- 2.13. Passing parameters directly through registers, storing parameters in a block or table in memory and the passing the address of the block through a register, and parameters also can be pushed onto the stack by the program and popped off the stack by the operating system.
- 2.18. Message-parsing model (MPM) and shared-memory model (SMM). Pros of MPM: useful for exchanging smaller amounts of data, because no conflicts need be avoided. It is also easier to implement than is SMM for inter-computer communication. Pros of SMM: allows maximum speed and convenience of communication, since it can be done at memory transfer speeds when it takes place within a computer. Cons of SMM: problems exist, however, in the areas of protection and synchronization between the processes sharing memory.
- 2.21. Microkernel approach structures the operating system by removing all nonessential components from the kernel and implementing them as system and user-level programs resulting in a smaller kernel. The client program and service communicate indirectly by exchanging messages with the microkernel. Advantages: All new services are added to user space and consequently do not require modification of the kernel, the operating system is easier to port from one hardware design to another, and the microkernel provides more security and reliability, since most services are running as user—rather than kernel—processes, if a service fails, the rest of the operating system remains untouched.