Chapter 3

1. Describe the differences among short-term, medium-term, and long-term scheduling.

**Answer:**

**Short-term** (CPU scheduler): selects a process from those that are in memory and ready to execute, and allocates the CPU to it.

**Medium-term** (memory manager): selects processes from the ready or blocked queue and removes them from memory, then reinstates them later to continue running.

**Long-term** (job scheduler): determines which jobs are brought into the system for processing.

1. Describe the actions taken by the kernel to context-switch between two processes.

**Answer:**

**1.** In response to a clock interrupt, the OS saves the PC and user stack pointer of the currently executing process, and transfers control to the kernel clock interrupt handler,

**2.** The clock interrupt handler saves the rest of the registers, as well as other machine state, such as the state of the floating point registers, in the process PCB.

**3.** The OS invokes the scheduler to determine the next process to execute,

**4.** The OS then retrieves the state of the next process from its PCB, and restores the registers. This restore operation takes the processor back to the state in which this process was previously interrupted, executing in user code with user mode privileges.

1. Including the initial parent process, how many processes are created bythe program shown in Figure Figure 3.32

**Answer:**

16 processes are created.

1. Explain the circumstances when the line of code marked printf("LINEJ") in Figure 3.33 is reached.

**Answer:**

If execlp() run success, it will never preform printf, if execlp() failed, it will perform printf.

1. Using the program in Figure 3.34, identify the values of pid at line A, B, C, and D. (Assume that the actual pids of the parent and child are 2600 and 2603, respectively).

**Answer:**

A: pid = 0;

B: pid1 = 2603;

C: pid = 2603;

D: pid1 = 2600;

Part II

1. Consider Figure 3.2 on page 108 of the text.  Give two example of what would cause a process to transition :

Answer:

1. From running to ready: Running process interrupt by priority process or running process already exceed predefined time limit.
2. From running to waiting: Wait for keyboard input or file input.
3. Notice that the figure does not contain a transition from the ready state to the waiting state.  Explain why this transition is not included.

Answer:

Because without running, process don’t know which event need to wait occur, so there is no ready to waiting.

1. Discuss the relative advantages and disadvantages of message passing, shared memory and pipes approaches to IPC.

Answer:

**Message passing:**

Advantages: The main advantage of message-passing is that it scales to multiple machines, is agnostic about the actual mechanism of delivery.

Disadvantage: programmer has to do everything.

**Shared memory:**

Advantage: Very fast.

Disadvantages: Requires careful locking to avoid trouble. Doesn't work across multiple machines.

**Pipe:**

Ordinary pipes is unidirectional, if two-way communication is required, then two pipes must be used. In addition, ordinary pipes cannot be accessed from outside the process that created it. Parent – child relationship is required.Name Pipes is bidirectional and no parent – child relationship is required.