操作系统作业3

1. What are the two models of interprocess communication? What are the strengths and weaknesses of the two approaches?
2. What are the benefits of multi-threading? Which of the following components of program state are shared across threads in a multithreaded process?

a. Register values

b. Heap memory

c. Global variables

d. Stack memory

1. Consider the following code segment:

**pid t pid;**

**pid = fork();**

**if (pid == 0) *{* /\* child process \*/**

**fork();**

**thread create( . . .);**

***}***

**fork();**

a. How many unique processes are created?

b. How many unique threads are created?

1. The program shown in the following figure uses Pthreads. What would be the output from the program at LINE C and LINE P?

Figure: C program for Question 4.

1. What are the differences between ordinary pipe and named pipe?
2. What is race condition? Which property can guarantee that race condition will not happen?
3. The first known correct software solution to the critical-section problem for two processes was developed by Dekker. The two processes, P0 and P1, share the following variables:

boolean flag[2]; /\* initially false \*/

int turn;

The structure of process Pi (i == 0 or 1) is shown in the following Figure; the other process is Pj (j == 1 or 0). Prove that the algorithm satisfies all three requirements for the critical-section problem.



Figure: The structure of process Pi for Question 7.

1. Can strict alternation and Peterson’s solution sastify all the requirements as a solution of the critical-section problem? Please explain why.
2. What is semaphore? How to use semaphore to implement section entry and section exit (no busy waiting)? Please give the code.
3. What is deadlock? List the four requirements of deadlock.