

MAT 450 — Operating Systems

Homework #1, Due on Wednesday, February 23rd, 2005

In this homework you will be implementing Fibonacci numbers using a created process and interprocess communication. There will be two programs. The parent will `fork()` to create a child. The child will then call the second program through `execlp`.

Project Requirements:

1. This program will be structured using shared memory as described in Section 3.5.1 of your book. As a first step, it will be useful for you to review the code segments in your book and to download the code segments on my webpage. Many of these steps are completed for you in one of the two example programs.
2. The program first requires creating the data structure for the shared-memory segment.
3. As explained on page 119 of your book, the parent process will progress through the following steps:
 - (a) Accept the parameter passed on the command line and perform error checking to ensure that the parameter is \leq `MAX_SIZE`.
 - (b) Create a shared memory segment of the size of the shared data.
 - (c) Attach the shared memory segment to its address space.
 - (d) Set the value of *size* to the parameter on the command line.
 - (e) Fork the child process and invoke the `wait()` system call to wait for the child to finish.
 - (f) When the child finishes, output the value of the Fibonacci sequence (of size *size*) stored in the shared memory segment.
 - (g) Detach and destroy the shared memory segment.

The child should be an entirely separate program from the parent. It should follow the following steps:

- (a) Run `execlp` to load the child program with the segment id as an argument on the command line.
- (b) Attach to the memory segment given by the command line.
- (c) Compute *size* numbers in the Fibonacci sequence and store the results in the shared memory segment
- (d) exit the child program