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CS 5343/7343

1. (must be answered by CS 7343 students only)

   The Fibonacci sequence is the series of numbers 0, 1, 1, 2, 3, 5, 8, ... Formally, it can be expressed as:

   $$fib_0 = 0$$
   $$fib_1 = 1$$
   $$fib_n = fib_{n-1} + fib_{n-2}$$

   Write a multithreaded program that generates the Fibonacci sequence. This program should work as follows: On the command line, the user will enter the number of Fibonacci numbers that the program is to generate. The program will then create a separate thread that will generate the Fibonacci numbers, placing the sequence in data that can be shared by the threads (an array is probably the most convenient data structure). When the thread finishes execution, the parent thread will output the sequence generated by the child thread. Because the parent thread cannot begin outputting the Fibonacci sequence until the child thread finishes, the parent thread will have to wait for the child thread to finish. Use the techniques described in Section 4.4 to meet this requirement.

2. This question involves implementing several different process scheduling algorithms. The scheduler will be assigned a predefined set of tasks and will schedule the tasks based on the selected scheduling algorithm. Each task is assigned a priority and CPU burst.

   The following scheduling algorithms will be implemented:

   a. First-come, first-served (FCFS), which schedules tasks in the order in which they request the CPU.
   b. Shortest-job-first (SJF), which schedules tasks in order of the length of the tasks' next CPU burst.
   c. Priority scheduling, which schedules tasks based on priority.
   d. Round-robin (RR) scheduling, where each task is run for a time quantum (or for the remainder of its CPU burst).
   e. Priority with round-robin, which schedules tasks in order of priority and uses round-robin scheduling for tasks with equal priority.

Note: Please see supportingDocumentFile for a complete description of this Homework. There are supporting Java files for this assignment that will be provided in Canvas/Files/Homework3. You may choose any programming language that you would like for this homework.