Thread Assignment

Course Name: Operating Systems

Semester: Spring 2020

Design a multithreaded program that will perform the following task-

$$A = 1! + 2! + 3! + \ldots + n!$$

- The main thread will take input of an integer (n).
- The main thread will create n additional threads.
- The main thread will pass each additional thread a unique integer (1 to n) as parameter.
- Each additional thread will calculate the factorial of the parameter it has received from main thread.
    - 1^{st} additional thread will calculate 1!
    - 2^{nd} additional thread will calculate 2!
    - 3^{rd} additional thread will calculate 3!
    - …
    - n^{th} additional thread will calculate n!
- Each additional thread will print the calculated factorial-
    - 1^{st} additional thread will print, "This is Thread 1, factorial = 1"
    - 2^{nd} additional thread will print "This is Thread 2, factorial = 2"
    - 3^{rd} additional thread will print "This is Thread 3, factorial = 6"
    - …
    - n^{th} additional thread will print "This is Thread n, factorial = n!"
- The main thread will wait for all additional threads to complete their tasks. Then the main thread will add the n no of factorials received from n additional threads.
- The main thread will print "This is main thread. Value of A = ?"

Sample I/O

4 // value of n This is Thread 1, factorial = 1 This is Thread 2, factorial = 2 This is Thread 3, factorial = 6 This is Thread 4, factorial = 24 This is main thread. Value of A = 33.	6 // value of n This is Thread 1, factorial = 1 This is Thread 2, factorial = 2 This is Thread 3, factorial = 6 This is Thread 4, factorial = 24 This is Thread 5, factorial = 120 This is Thread 6, factorial = 720 This is main thread. Value of A = 873.