

Project 3— Multithread Programming (in Java)-**80 points****(Due date: 10/15/2010/Friday Midnight at Moodle)**

Your name:	Date:
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=====How To Submit—Read Carefully, Please!=====

1. Create a directory “**project3_YourLastName**” (you must use this format for the directory name for this project; **Use Your Last Name. For example, if your last name is Smith, you should create directory with the name of “project2_Smith”**
 2. Create “**project31src**”, “and “**project32src**”, and **project33src**” subdirectories under “project3_YourLastName” directory.
 3. When having finished your project, copy the **source files (*.java, or *.c)** to these subdirectories, respectively—you should keep this folders clean: *only source code* files included.
 4. A “readme” file is required for the project write-up that tells how to compile/run the programs and result screenshots ... keep this readme simple!
 5. Compress the “**project3_YourLastName**” directory and its contents into a **zip** or **rar** file with same name.
 6. Submit the compressed file to the instructor by email.
 7. **Penalty** for NOT following these submission instructions (10% ~100%).
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1. (35 points) Write a Java thread program that creates **2 threads**: 1) one for summation (i.e., given a positive integer N , to calculate $sum = 0 + 1 + 2 + 3 + \dots + N$); 2) another for multiplication (i.e., given a positive integer N , to calculate $product = 1 * 2 * 3 * \dots * N$).
 - The sample code (Figure 4.11 on page 164 of the textbook and Slide 25 of Chapter 4 on the course website) is a good source to an easy start-up.
 - The program will read an integer input from the command line and then display the results with brief explanation (for example, “thread one: for the summation of 1 through N, the result is ...”), like the following:

```
D:\Salem\2010Fall\CSC280\assignments\project3\project31src>
D:\Salem\2010Fall\CSC280\assignments\project3\project31src>java Project31src 2
The sum of 0, 1, ... through 2 is 3
The product of 1, 2, through 2 is 2

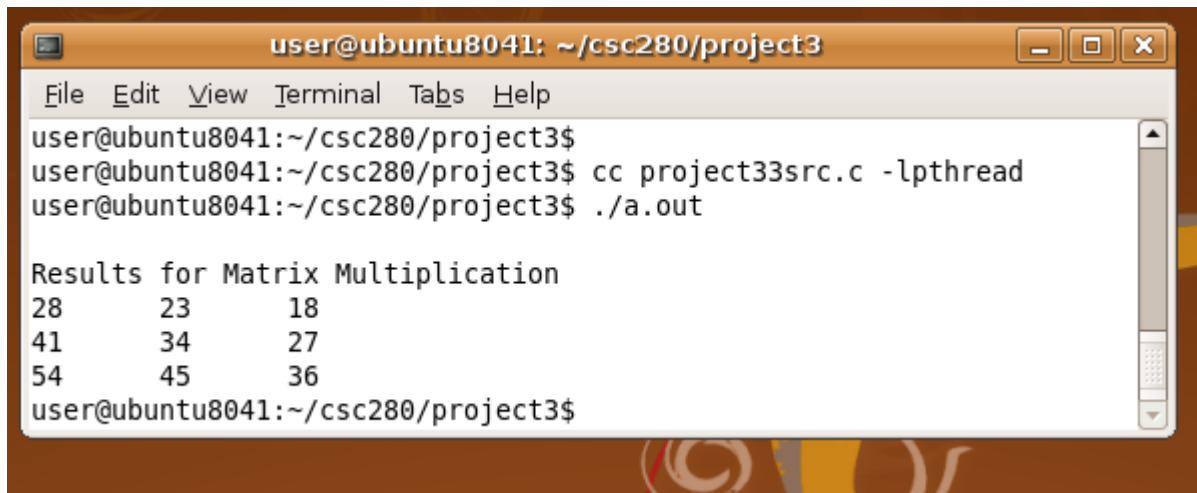
D:\Salem\2010Fall\CSC280\assignments\project3\project31src>java Project31src 10
The sum of 0, 1, ... through 10 is 55
The product of 1, 2, through 10 is 3628800
```

2. (45 points) Complete the Matrix Multiplication Project as described in the textbook (pages 178—181 or the electronic photocopies on the course website).

- You need first read through the text for this project. Pay attention to those parts for Java programming. They (together with the Figure 4.11) provide sufficient information on writing a Java program for this project.
- You need to create $M \times N$ threads (refer to the text for what are M and N).
- Java GUI is not required. Standard input/output are enough—or to make things simple, you don't have to read, just declare variables with initial values shown on p.179.
- The output (on a command line/terminal) should be formatted like a matrix shown in the following (a 3x3 matrix) (using “\t” , and spaces in the standard output):

```
D:\Salem\2010Fall\CSC280\assignments\project3\project32src>javac Project32src.java
D:\Salem\2010Fall\CSC280\assignments\project3\project32src>java Project32src
Matrix Multiplication Results
28      23      18
41      34      27
54      45      36
```

3. (Bonus, 30 points) Redo the Matrix Multiplication Project in Ubuntu (on the VMware player) in C with Pthread (you should use “cc project33.c -lpthread” to generate the executable file). The output will like the following:



```
user@ubuntu8041: ~/csc280/project3
File Edit View Terminal Tabs Help
user@ubuntu8041:~/csc280/project3$
user@ubuntu8041:~/csc280/project3$ cc project33src.c -lpthread
user@ubuntu8041:~/csc280/project3$ ./a.out

Results for Matrix Multiplication
28      23      18
41      34      27
54      45      36
user@ubuntu8041:~/csc280/project3$
```