

CS331: Programming Language Lab

(<https://www.iitg.ac.in/asahu/cs331/>)

Assignment I: Basic Java Concurrent Programming

Deadline: 11.55 PM IST, 26th Jan 2020

- Part (A): Design and implement a java multithreaded program to estimate the value of PI using Monte-Carlo Simulation. The number of points should be 10^6 and you should compute the same using 4 to 16 threads. The number of threads should be one argument to the program.

[[you may refer to any material for estimation of the value of PI using Monte-Carlo Simulation. <https://www.geeksforgeeks.org/estimating-value-pi-using-monte-carlo/>]]

- Part (B): Design and implement a java multithreaded program for approximating the following integration using composite Simpson 1/3 rule. The number of points should be $> 10^6$ and compute the value of integration using 4 to 16 threads. The number of threads should be one argument to the program.

$$\int_{-1}^1 \frac{1}{\sqrt{2\pi}} e^{-x^2/2} dx$$

[[you may refer to any material for Simpson rule. <https://www.math24.net/simpsons-rule/>]]

- Part (C): Design and implement a java multithreaded program to compute matrix multiplication $C=A \times B$. Assume both A and B are square matrices of row size $N=1000$. Initialize all the elements of both A and B matrix with a random number between 0 to 10. Compute both initialization and matrix multiplication computation using 4 to 16 threads. The number of threads should be one argument to the program.

Submission Procedure:

- Upload your assignments code in the compressed folder (tgx/zip/gz) to MS team Grp_PLLab-CS331-2021 before the deadline.
- Please embed comments, how to run and required inputs properly in the code, or a separate readme file**
- Source code will be checked for plagiarism, which can detect variable/function name change, minor structure change (while loop to for loop, vice versa), code displacement/repositioning.
- Plagiarism case leads to F grades for both source candidate and destination candidate.** Make your code different from the internet code if available freely.