Varendra University

Dept. of CSE

Course Name: Parallel Processing and Distributed System Lab

Course Code: CSE 434

Lab Assignment

Total Marks: 10

Assignment 1: Distributed Calculator with Parallel Processing

Objective: Create a calculator application (GUI) that can perform complex mathematical operations, using RMI (Remote Method Invocation) to distribute the calculations across multiple remote servers. Use multithreading to process calculations in parallel.

Instructions:

1. **Basic Functionality**: Your calculator should support three complex operations:
    - **Matrix Multiplication**: Multiply two matrices.
    - **Sorting Large Arrays**: Sort an array with a large number of elements.
    - **Prime Number Finder**: Identify all prime numbers within a large range.
2. **Using RMI**:
    - Use RMI to allow the calculator to send operations to remote servers.
    - For example, when the user selects matrix multiplication, the calculator should send this task to a server that will handle the calculation.
3. **Multithreading**:
    - Set up each server to process multiple requests at once using threads. This allows the calculator to handle multiple calculations in parallel, speeding up the process.
    - For instance, if a user inputs multiple tasks, the calculator can process them simultaneously rather than waiting for one to finish.
4. **Sub-Task Model**:
    - Each large calculation should be divided into smaller steps (sub-tasks) that can run in parallel.
    - For instance, in matrix multiplication, split the calculation into parts, with each thread responsible for computing a portion of the result.

5. **Error Handling and Limitations**:
    - Add simple error handling to manage cases where a server may be unavailable or overloaded.

Submission guideline:

You have to submit your source code along with any necessary configuration files.

- Create a folder containing the source code along with any necessary configuration files.
- Make a single zip file.
- Name the zip file with your ID number.
- Submit the zip file.
- **Finally, you have to submit a lab-report (Hard-copy) on your project (Introduction:** describing how you implemented RMI and multithreading**, code, screenshot of your interface and output).**