University of Lincoln
School of Computer Science
CMP9133M – Advanced Programming
Workshop 11

Task (assessed): TCP Socket - Compute Statistics on Number List

1. Write a C++ program for the client that allows the user to input a list of numbers.
2. Implement functionality to send the list of numbers to the server over a TCP socket connection.
3. Write a C++ program for the server that listens for incoming connections on a specified port.
4. Implement functionality to receive the list of numbers from the client.
5. In the server program, parse the received list of numbers and compute the average, minimum, maximum, and median values.
6. Send the computed statistics (average, minimum, maximum, and median) back to the client.
7. Implement error handling mechanisms for cases such as network communication errors, invalid input, or incorrect message formatting.
8. The client program should receive the computed statistics from the server and display them to the user.
9. Consider using appropriate data structures and algorithmic approaches to calculate the statistics efficiently.
10. Test the program with various input scenarios, including empty lists, lists with duplicate numbers, and lists with an odd or even number of elements.

This task focuses on setting up a client-server system using TCP sockets, sending data from the client to the server, and performing statistical calculations on the received data in the server. It involves parsing, calculations, and proper handling of different scenarios. Students should also consider data validation and error handling to ensure the program is robust.