C++ Programming Design Test

April 2020

1. Write a simple server-client program to measure the Round-Trip Time between two machines. Please note that there is no NTP/PTP running on them and their clocks may be different.

2. Given three time series, x, y_lo and y_hi stored in three static integer arrays of length N. Time series x contains the independent variable, whereas y_lo and y_hi contain the low and high observations of the dependent variable y. Write a function with x, y_lo and y_hi as input argument to devise an algorithm to find the linear regression between x and y with the error function defined below:
    a. If the estimate of y lies between the low and high observations, error is zero.
    b. If the estimate of y is above y_hi, error is y – y_hi, and,
    c. If the estimate of y is below y_lo, error is y_lo – y.

    The output of the function should give the slope and intercept rounded to 2 decimal places. When there are more than one possible solution, choose the solution with the largest absolute slope as the final result.

3. Write a function that takes two sockets as input in which one socket is a connected TCP socket and the other is an UDP socket. The TCP socket should receive a stream of 4-byte integers and the UDP socket should receive a series of 4-byte datagrams continuously. The content from both data source are the same. Your function should be able to receive data from both connections concurrently and print out the latest received integer. Please note that the two data sources are **not** sending data at the same rate, i.e. you have to take care of the data synchronization between the two sources.

Requirements:

- For Question 2, the data is provided by Yubo in a separate csv file in the email.
- Answers MUST be written in C++
- Provide your answers to each question in a Source Code File with clear comments