The aim of this project is to develop a simple TCP-based client server application. Your TCP client/server will communicate over the network and exchange data. The server will start in passive mode listening for a transmission from the client. The client will then start and contact the server (on a given IP address and port number). The user of the client application types in a word that will be sent to the server; the server will send back a copy of the word.

If the server is down then the client must display an error message.

If server is running, then the client will ask the user to select one of the options:

1) open mode
2) secure mode
3) quit application

In the open mode, the word is sent to the server in clear text. On the other hand, in secure mode, the word is encrypted using a shared encryption key.

Note that the client code and server code should not be on the same host. Your work should demonstrate that the client and server can communicate using a network connection.

You may use any programming language to write the code. Make sure to cite any references you used in writing your code. You may work in teams where the maximum number of students is 4.

Your submission should include the following:

1. Report: A well-structured and formatted report containing:
    a) Steps for **socket programming** client-server connection for TCP.
    b) Your project code and comments.
    c) Snapshots of the application outputs.
    d) Problems that encountered you and how you fixed these problems.
2. A clear demo video of you running your program with different cases.

Make sure you submit your project no later than Sunday February 12 , 2023 (11:59 PM)