Assignment 2: Transport Protocols

User Manual
This user manual describes how to compile, configure, and use the solution. Also, describes where and how the testing was done (e.g., home, university, office), what works, and what does not.

What you will receive
You will receive four C++ files named, client.cpp, indirectionServer.cpp, translatorService.cpp, currencyConverterService.cpp, and votingService.cpp

How to compile, configure and run
Please compile each file using this command:

g++ -Wall [filename].cpp -o [executable]

Please run each micro service (translatorService.cpp, currencyConverterService.cpp, votingService.cpp) executable.

For the voting micro service
-    You must enter the date and time for when you want voting to end
-    Month (0-11, 0 being January), Day (1-31), Hour (0-24), Minute (0-60)

Please run the indirectionServer.cpp executable.
You will be prompted for the port number and IP address of each micro service, enter those. Translator Service is running on port 8001. Currency Converter Service is running on port 8002. Voting Service is running on port 8003.
The indirection server should now be ready to use.

Please run the client.cpp executable.
You will be prompted to enter the port number and IP address of the indirection server, enter those. Indirection Server is running on port 8080.
The client should now be ready to use.

How to use the client
You will be given an option of services to choose from, please choose one (1, 2 or 3)
You also have the option to exit by typing in "exit", this will close the client program.

1.   Translator Service
     a.   You are prompted to enter an English word.
     b.   If the word exists in the dictionary, a French translation will be outputted, otherwise, you will be notified.
     c.   Here is a list of English words you can translate: Hello, School, Computer, Engineering, Write.
     d.   You are then asked if you want to continue using this micro service or exit this micro service.

2.   Currency Converter Service
     a.   You are prompted to enter a conversion request.
     b.   If the service can convert the currency, the converted currency will be outputted, otherwise, the appropriate error message is displayed.
     c.   You are then asked if you want to continue using this micro service or exit this micro service.

3.   Voting Service
     a.   You can choose three options listed below:
          i.   Show Candidates:
                1.   Will display a list of candidates with their respective IDs.
          ii.   Secure Voting:
                1.   You can vote for a specific candidate by ID.
                2.   You must enter a valid ID.
                3.   You must vote before voting time ends.
                4.   You can only vote once.
          iii. Voting Summary:
                1.   Will display a list of candidate IDs with their respective number of votes.
                2.   You cannot view voting summary if you haven't voted yet, and if voting time is not over yet.
     b.   You are then asked if you want to continue using this micro service or exit this micro service.

Where and how was the testing done?
The testing was done on my local MacBook Pro using the loopback interface.
I also tested on three different Linux lab machines. I had all three micro services running on one machine, indirection server running on another machine, and client running on another machine.

What works and what does not?
-    The client and indirection server work.
-    The translator service can provide a French translation of five English words.
-    The currency converter can convert CAD currencies to USD, EUR, GBP, and BTC.
-    The voting service allows you to view candidates, do secure voting, and view voting summary.
-    The voting service, secure voting encryption works.
-    The voting service has a universal time when voting stops, before this time clients can vote, after this time clients can view the voting summary if they have voted.
-    UDP socket times out on recvfrom() in 1 second if no data is received and the appropriate action is taken.