Software Assignment

Guang Heng Xian (21153324)

Jamie Lee (18029770)

Jamie Corstorphine (21155713)

**Program Design:**

The program was designed using the C# language, running a console application. The user is prompted to input at least four currencies out of the allowed currencies, and the program will attempt to find an arbitrage opportunity and print it out to the user. Next, the program prompts the user to input a pair of currencies (source and terminal), and the program will attempt to output the best conversion rate path from the source currency to the terminal currency.

The program reads a key from the **key.txt** file to call the API. If the program begins crashing after trying to retrieve the exchange rates, you may create a new email address using the 10 minute mail (<https://10minutemail.com/>) and register a new account at the API service (<https://www.exchangerate-api.com/>) to generate a new key. Once you have generated a new key, you may paste it into the **key.txt** file, and the program will continue working.

**How to run the program:**

You may run the program directly by running the .exe file. If your computer does not allow you to run the .exe program, you will need to install Visual Studio (<https://visualstudio.microsoft.com/vs/>) and .NET6.0 (<https://dotnet.microsoft.com/en-us/download/dotnet/6.0>), then open the .sln file in Visual Studio. The program will be runnable afterwards.

**Findings**

Here is an example of the input and output of the program:

A screen shot of a computer

Description automatically generated

In this first example, we want to draw conclusions between the currencies AUD, NZD, USD, CNY, HKD, and EUR. The program has found an arbitrage opportunity from AUD->CNY->HKD->USD->AUD. The program then displays the best conversion rates between two currencies, and upon entering CNY EUR, the program has detected that there is a negative cycle along the path from CNY->EUR, so the program is unable to detect the exact path. However, the program will still output the exact best change rate from CNY->EUR, which is 0.8641960203285104.

A screen shot of a computer

Description automatically generated

In this second example, the currencies we wish to draw conclusions on is CNY, CAD, CHF, KRW, SEK, INR, and BRL. In this case, there is an arbitrage opportunity found using the cycle CNY->SEK->INR->BRL->CNY. When we ask the program for the best conversion rate from CAD->CHF, the program has found the path and the path is not included inside a negative cycle, so the program is able to output the path. In this case, the path of the best conversion rate from CAD->CHF is CAD->CNY->CHF.

Please note that the API updates every hour on the free tier. The results produced in the future may not be identical to the results produced at the time which this report was written.