Arbitrage Assistant – A2

Minor Project

IBM Career Education

Disclaimer

This Software Requirements Specification document is a guideline. The document details all the high level requirements. The document also describes the broad scope of the project. While developing the solution if the developer has a valid point to add more details being within the scope specified then it can be accommodated after consultation with IBM designated Mentor.

INTRODUCTION

The purpose of this document is to define scope and requirements of an Arbitrage Assistant (A2) for the financial analysts of a leading financial institution. Since any arbitrage opportunity lasts for very short period, therefore the proposed system will be expected to automate the discovery of potential arbitrage opportunities quickly.

This document is the primary input to the development team to architect a solution for this project.

System Users

The entire team of financial analysts of the software services company is expected to benefit from the Arbitrage Assistant, A2.

Assumptions

1. The scope of this project is limited to FOREX arbitrage resulting from differentials in the price of a currency in various International markets.
2. The FOREX data will be uploaded as CSV file in A2. To further simplify, it is assumed that the CSV file has been prepared taking in to account different markets and their exchange rates.

REQUIREMENTS

A2 will accept a CSV file containing conversion rates among currencies. The file will be in a matrix format (always n x n) where each row and column headings will be various currency symbols and each matrix element will specify the conversion factor for the corresponding row to column currency. Here is an example:

```
     USD       EUR       GBP
USD, 1.00000, 0.78834, 0.63710
EUR, 1.26813, 1.00000, 0.87080
GBP, 1.56686, 1.23793, 1.00000
```

For the table, we can clearly see that GBP 100000 will buy us USD 156986. Since the number of currencies can be variable, during upload A2 will require (a) number of currencies and (b) CSV file name.

After the upload, it will automatically identify the potential arbitrage opportunities and display each opportunity in a tabular format, where the potential arbitrage cycle elements will be highlighted in yellow color with bold. Here is a sample of one opportunity:

```
     USD       EUR       GBP
USD, 1.00000, 0.78834, 0.63710
EUR, 1.26813, 1.00000, 0.87080
GBP, 1.56686, 1.23793, 1.00000
```

A2 will be a web based system so that financial analysts can use it from anywhere.

About Arbitrage

Arbitrage is a mechanism of taking advantage of inconsistent exchange rates in different markets by selling in one market and simultaneously buying in another. Please remember that this differential does not last long and prices stabilize quickly. Therefore, an arbitrageur must spot opportunities quickly and act very rapidly; also the arbitrageurs do not take risks or limit their risks to bare minimum.

A simple example is difference in spot exchange rates in London and New York FOREX markets for USD/GBP conversion as shown in the previous table.

More details can be found in standard textbooks and on the web. An article on arbitrage is located at http://en.wikipedia.org/wiki/Arbitrage URL.

Solution Strategy Hint

One possibility is to model this problem as negative cycle detection in a weighted edge diagraph, where a negative cycle would be an arbitrage opportunity.

DEVELOPMENT ENVIRONMENT

A2 will be developed as a web application using Java and DB2 database. Eclipse will be used as the IDE for the same. You may consider using a JavaScript framework like jQuery/Prototype/ Scriptaculous.