

Internship Subject 2009-2010

Building a Real-Time Arbitrage Trading Robot

Arbitragis Trading, Paris, France

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Abstract

You have learned in graduate school that stocks follow a brownian movement and that it is hence impossible to predict the future to make money on the markets. This is wrong. The well-known mathematical relationship between derivatives futures and their cash underlying is :

$$F = Se^{r \frac{t}{360}} - \sum_i D_i$$

This mathematical relationship is sometimes violated, especially when markets are dislocating like now: investors may sell futures massively without looking at the value of the underlying stocks. In that case, an arbitrageur just needs to buy the futures and sell the basket of stocks. In real-life, things are not so easy, and a lot of expertise is needed in order to indulge in such arbitrage activities. We intend to build a trading robot that partly relies on these kinds of inefficiencies to trade financial markets. We are looking for a competent intern proficient in C++. Proficiency in finance is not needed, but preferable.

Keywords: derivatives pricing, C++, multithreading, event-driven programming, real-time programming, financial markets, arbitrage, basket trading, parallel computing.

1 Who are we ?

Arbitragis Trading is a leader in quantitative trading. We build our own models and softwares in order to trade financial markets with a highly quantitative bias. Most of our trading is done by our computers that trade the markets without human intervention. Trading is done with our own capital, which allows us to be extremely creative in the Research and Development process.

Our alumni work in trading rooms at JP Morgan, SocGen, Citibank or BNP. Some continue their studies at El Karoui's DEA or Harvard.

We also like to maintain a close relationship with the academic world : we also teach computational finance at Ecole Centrale Paris [Click here for the schedule and the agenda.](#), and you will also take advantage of our research and vision.

2 Internship subject

We propose an internship subject that aims at building a trading robot that will trade the markets automatically. You will have access to our own API that will allow your robot to connect to the market, receive real-time quotes and trade as well to our massive database. Programming will be done exclusively in C++ and will require an in-depth knowledge of oriented object programming and design patterns.

3 Development Steps

We will explain to you in details how arbitrageurs work and make money consistently by taking advantages of market anomalies. Then, we will show you how to use our internal software libraries in order to build this tool. You will conform to our programming guidelines and your code will be subject to code reviews from other people in your firms who will help you improve your code.

4 Tools Given by Arbitragis

Selected students will need to be extremely proficient in C++. Ideally, they will have programmed more than 5000 lines of codes in C++ before coming. Do not apply if you are not good in C++ and if you do not like this language.

5 What you will gain from this experience

You will gain a massive expertise in C++ and in quantitative finance that will be useful for your career as future Traders or developers of high-level financial applications. Your knowledge and understanding of derivatives will be extremely high. You will benefit from a very competent staff which will help you if you need so that you spend as little time possible.

Eventually, you will benefit from our trading methodologies, know-how, and vision. You will benefit from the expertise of a competent and available staff that will help you whenever you need. Our development methodologies based on agile programming and our expertise in financial markets will allow you to a superb application within an extremely short period of time.

6 How to apply ?

Please send a resume in PDF form only to stages@arbitragis.com. This document can also be found on <http://www.arbitragis-research.com>.

7 Who should apply ?

Students from Ensimag, Epita / Epitech, EFREI and other computer science schools,

8 Internship dates

Dates are flexible starting from January 2010 or later, for 3 months or more.