Finance 6320

Introduction to Computational Finance

Welcome to Fin6320: Computational Finance!

A Bit About Me

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What do you want to know about me? Now's your chance to ask!

Agenda for Today

- Syllabus
- Course Overview

Computational Finance

- Computational Finance
- Financial Computing

What's the difference? There is a difference to use the two terms interchangeably. They are related for sure, but we will define them as follows.

Definitions

Financial Computing

- Financial computing is about operationalizing financial theories through software.

Computational Finance

- Computational finance is about financial methods that require substantial computing, such as the Monte Carlo method.

The Combination

- There is no clear separation between them, and this class is about both!

Introduction to Python

- Interpreted
- Dynamically typed
- High level (hardware abstracted)
- Highly productive
- De facto standard for scientific computing & data science
- General purpose (youtube, websites, etc)

Introduction to Cython

- A creole language
- Mostly Python syntax with C static types
- Compiled to C or C++ binary
- Used to make extension modules for Python
- Very little overhead beyond C/C++
- Retain much of Python's ease of use

Introduction to C++

- Systems programming language (compiled, close to the hardware)
- The de facto standard for performant code
- Differences between C and C++
- We will focus on ***modern C++***

C++: I am your father

The Monte Carlo Method

The wikipedia article defines gives the following defintion:

Monte Carlo methods are a broad class of computational algorithms that rely on repeated random sampling to obtain numerical results. Their essential idea is using randomness to solve problems that might be deterministic in principle. They are often used in physical and mathematical problems and are most useful when it is difficult or impossible to use other approaches. Monte Carlo methods are mainly used in three distinct problem classes: optimization, numerical integration, and generating random draws from a probability distribution.