MF 703: Programming for Mathematical Finance

Course Website
http://cs-people.bu.edu/azs/mf703/

Course Description
MF 703 develops computational problem-solving skills for mathematical finance in the Python and C++ languages. The course will cover the fundamentals of programming, including working with data (numbers, strings and lists), arithmetic, functions, recursion, iteration, data files, graphing, and object-orientation.

Finance-specific applications will include: the time value of money and bond pricing/analytics, descriptive statistics for quantifying risk/return in stock investments, matrix operations and linear algebra, options pricing algorithms, Monte-Carlo simulation, minimum variance portfolios and the efficient frontier.

Additionally, we will discuss the differences between Python and C++, and develop techniques in profiling to quantify the running time of programs to understand which tool is appropriate in a given situation.

Class Meetings
• Section Z1: TR, 12:30pm-2:00pm, HAR 310
• Section Z2: TR, 2:00pm 3:30pm, HAR 208

Instructor
Aaron Stevens, Senior Lecturer, Department of Computer Science.
Email: azs@bu.edu
Office: PSY 228B.
Office Hours: Mondays 3-4pm; Wednesdays 2-3pm; Fridays 1-2pm.

Teaching/Learning Method
Learning to program is a skill that takes practice, similar to learning a sport or a musical instrument. You cannot learn to play basketball by simply watching the Celtics; rather, you need to go to the gym and practice your shots. This course is designed around a set of weekly assignments, which you must complete in order to master the material. It is not possible to learn how to program by simply “watching.” To become a programmer, you must actively program!

In general, this class will be teaching by examples. Students must come to class with a laptop computer and the required software installed and be prepared to follow along with and discuss the examples in class. All example code will be posted online after class, but students will obtain the greatest benefit from writing the example in class.

Assignments will often be very time consuming, so you must plan ahead and start early. Each week's assignment is due on the Sunday following the week of class and is a necessary building block for the following week's material.

Textbooks
We will use the following online textbooks:

*How to Think Like a Computer Scientist with Python 3*
by Peter Wentworth, Jeffrey Elkner, Allen B. Downey, and Chris Meyers
http://openbookproject.net/thinkcs/python/english3e/

*C++ Programming*
by WikiBooks

Specific readings will be assigned each week per the schedule page. Read the assigned sections BEFORE coming to class, and bring question to discuss in class.

*Syllabus: Fall 2016*
MF 703: Programming for Mathematical Finance

Grading/Requirements

- Weekly assignments (50% of the final grade)
- Exams: one midterm exam (25%) and a final exam (25%)

To pass the course, you must earn a passing grade for each of the three components.

Collaboration Policy and Individual Work

With respect to MF703, plagiarism is specifically defined to include (but is not limited to) the following:

- collaboration on the code you write (unless you are specifically instructed to do so on a specific task)
- copying any part of someone else's program, even if you have permission and/or have modified the code
- sharing or giving your code or even a subset of your code to another student to review
- reviewing another student’s solution (including from past semesters)

It is my policy to use automatic plagiarism detection software, and suspicious similarities will be uncovered. It is the student's responsibility to know and understand the provisions of the Question School of Management's Academic Conduct Code, copies of which are available here:

http://questromworld.bu.edu/acc/

What is acceptable collaboration?

Collaboration is recommended in understanding programming concepts and system features. You are encouraged to discuss the labs, the homework problem statements and expected output, and to seek and receive help with the Python programming language and any IDE or other debugging tools.

However, each student must write his or her own code and other deliverables independently.

Administrative Policies

The official administrative business of this class will be conducted by email. Grade questions or requests for review, notification of absence, etc. will be processed via email so that we both have a written record of what was agreed.

Attendance and discussion/asking questions are expected and will be reflected in your grade. If you must be absent, please email me in advance to let me know why you won't be in class, and to let me know what you will do to keep up with the assignments. MF703 is not a correspondence course. Inadequate attendance is sufficient grounds for a grade of F.

There will be no make-up quizzes or exams. If you have to miss a quiz for a medical reason or other extreme circumstances, you must inform me in advance. You will have the opportunity to write the quiz as an ungraded take-home assignment and then count your final exam score in its place.

No special make-up work will be accepted after the end of the semester. Don’t even ask. In the event of a documented major medical problem, a grade of Incomplete will be given pending the submission of complete work. However, make up work “to improve one’s grade” will not be accepted.

Requests for review or re-grading of quizzes or assignments should be brought to your TF or instructor by email (preferred) or in office hours, no later than 2 weeks after the quiz/homework has been returned, and absolutely no later than the last class day of the semester.

Syllabus: Fall 2016