CS1B

Advanced Data Structures & Algorithms in Java

Dept. of Computer Science, Foothill College

Course Description

In CS1B you will learn intermediate concepts in Java Object-orienged programming. My goal in this course is to make you comfortable and excited about core concepts such as OOP project design, polymorphism, inheritance and Java specific features such as interfaces, abstract classes, generics, the Collections framework. You will build a cumulative incorporating Model View Controller approach in building a cumulative project that visualized data from data.worldbank.org site.

We will use a test driven development (TDD) approach in implementing our applications. The goal of this approach is to minimize bloated code by first defining how a feature is used before we start development. Otherwise, if we dive into writing code as soon as we talk to the client (or in this class read a programming assignment description), we run the risk of spending lots of time on code and features that the user never uses, or writing buggy code that makes our application fail. Our goal is to write good object oriented application(s) that the user would want to use!

Your job is to continuously improve your implementation. So, if you find a bug in your implementation or determine that your approach resulted in an incomplete feature, then isolate the problem and work on one feature at a time until it meets all the test requirements.

Prerequisite: C S 1A or 1AH.

Advisory: Demonstrated proficiency in English by placement as determined by score on the English placement test OR through an equivalent placement process OR completion of ESLL 125 & ESLL 249.

Topics we will cover are:

- Writing a test class
- Debugging via IntelliJ
- Accessor Methods
- Multi-Dimensional Arrays
- Inheritance
- Equality of Objects
- Enhanced File I/O
- Customized Exception class
- Interfaces in Java

- Abstract classes
- Nodes and LinkedLists
- Arrays vs Lists
- Good Design Principles
- Java Generics
- Functors: Comparable vs Comparator, Iterators
- Java GUI and Event Driven Development
- Shallow vs Deep Copy.
- Traversing using an Iterator
- Introduction to Recursion.
- java.util.Collections utility class vs java.util.Collection interface.

Development tools we discuss:

- Debugging via your integrated development environment (IDE).
- Introduction to version control via git.
- Parsing a Comma Separated Value (CSV) file.

Recommended textbook: Introduction to Java Programming Comprehensive by Liang

Laboratory

Laboratory option of this class is conducted online. The amount of time you spend varies greatly with the individual. Some students take 10 hours, some take 20 hours.

I believe that most of your learning will take place while you are working on your laboratory assignments. Therefore, every week you will be working on an assignment and each assignment is a computer program. It is impossible to succeed in this class without studying *every single week* of the quarter. All assignments must be submitted to your assigned github.com course organization repository. All programming assignments will be due 8 am of the specified day. I only grade one submission and that is the last submission to your repository.

You may turn in programming assignments 24 hours late for a 10% penalty excluding assignments which state that late submissions are not accepted. After one day late, submissions are not accepted. This means that 24 hours after the due date you will only be able to view your repository and not modify it. Always check the contents of your repository to make sure that you successfully submitted all required files.

Communication

Course instructor: Mazloom, Bita. Typically you will ask questions through the private or public messaging here in Canvas and only use email of mazloombita AT foothill.edu if you have trouble logging in.

Office hours: Contact me at Mondays and Wednesdays 4 to 5 pm in room 4308. Tuesdays 10:55 to

11:25 am LAHS room 915. Fridays 3 to 4 pm online. For changes refer to course announcements.

Grading

Course grades will be on the basis of the following distribution of credit:

72% Programming project assignments in Java + 5% weekly discussion under Answer the Instructor's Weekly Questions Here + 5% public discussion forums related to assignments, IDE, version control, course examples and typos + 9% Midterm exam available online during Wednesday 20th of February + 9% Final exam available online during Wednesday 20th of March.

If you earn 98% (or more) of the points available in the class, you get an A+; 95% earns an A; 90% earns an A-; 88% earns a B+; 85% earns a B; 80% earns a B-; 78% earns a C+; 70% earns a C; 60% earns a D; and below 60% earns an F.

Academic Dishonesty

Collaboration is only permitted when specifically allowed for—otherwise, you must do your own work. On assignments you may collaborate with at most one other person (who must be named). However, the work you turn in MUST BE YOUR OWN. Your solution must have your "thumbprint" on it and not be the same as any other student's. If two students turn in work that is identical or similar in "thumbprint", both students receive zero. This applies to all or a portion of the work.

Student Learning Objectives

You can see the SLOs for this class at
http://www.fgamedia.org/faculty/loceff/cs_courses/common/slos/cs_slos_1.html

#1 Java Inheritance: A successful student will be able to write and debug Java programs which make use of inheritance, i.e., the "is a" relationship, common to all OOP languages. Specifically, the student will define base and derived classes and use common techniques such as method chaining in his or her programs.

#2 Basic Java Abstract Data Types: A successful student will be able to use the Java environment to define the basic abstract data types (stacks, queues, lists) and iterators of those types to effectively manipulate the data in his or her program.

#3 Java Generics: A successful student will be able to define and use Java generics to make their data and algorithms work with a variety of data types.

Disability Accomodations

To obtain disability-related accommodations, students must contact Disability Resource Center (DRC) as early as possible in the quarter. To contact DRC, you may: Visit DRC in Room 5400 or mail DRC at adaptivelearningdrc AT foothill DOT edu or call DRC at 650-949-7017 to make an appointment If you already have an accommodation notification from DRC, please contact me privately to discuss your needs.

Other Opportunities for Learning

If you have question about opportunities in Computer Science? Check out the CS Opportunities Blog at http://csopportunities.blogspot.com/