DebateGuru Computer Science Course Offerings

Introduction to Programming using Java (Intro to Java)
Object-Oriented Programming using Java (Intermediate Java)

Course Instructor: Atharva Shah (https://www.atharvashah.org)
Course Website: TBD

Pricing

Pricing shall be as follows:

- $350 for Introduction to Programming using Java
- $250 for Object-Oriented Programming using Java
- **Discount:** $500 for a bundle including both courses.

Course details

- Intended age range: Any, but student should be competent in basic mathematics.
- Student must have a drive for programming: course will move quickly.
- Prerequisites: Device must be able to run eclipse
- 1-hour Discussion section each week for questions. Students will also explain their solution to the problem in as simple language as possible, building technical speaking and presentation skills.
- 2 in-depth lecture videos each week (~15-20 mins)
- 2x 30 min office hours per week (usually weekday evenings, TBD)
- Access to class repository
    - Scaffolding code for weekly assignments
    - Solutions posted after the weekly Discussion

Course Syllabus

Weeks 1-6 are Intro to Java
Weeks 7-10 are Intermediate Java

Note: Weekly assignments subject to change.

Week 1: Basics of Computing & setup

- Lecture 1: basics of computing
- Lecture 2: setting up eclipse + running your first program
- Weekly assignment: Setup eclipse, weekly DI will be dedicated to helping students with setup issues.

Week 2: Primitives, operators, stdin

- Lecture 1: primitive data types, basic operators
- Lecture 2: Scanner class to get data from console
- Weekly assignment: Calculate volume + surface area of cylinder given user input.

Week 3: Logical operators & if/else blocks

- Lecture 1: Logical operators (AND, OR, NOT)
- Lecture 2: Basic if/else, compare primitives and String contents
- Weekly assignment: Create a series of conditionals to represent real-world problems. Eg temperature ranges, etc.

Week 4: Loops + Strings
- Lecture 1: for/while loop
- Lecture 2: String and commonly used methods
- Weekly assignment: Print a number's digits in backwards order.

Week 5: Arrays + Strings
- Lecture 1: Declaring and accessing array elements + common mistakes
- Lecture 2: Iterating over an array, 2d arrays
- Weekly assignment: Load user input into the array. Then apply a computation across the array.

Week 6: Functions + Course 1 capstone project
- Lecture 1: Intro to functions (params + return type)
- Lecture 2: Edge cases & boundary checks
- Weekly assignment: Write several utility mathematical functions (eg absolute value, power, factorial, distance formula)

Week 7: Classes & Objects
- Lecture 1: Introducing classes vs objects + instantiating objects
- Lecture 2: Class vs instance fields/methods + multiple file paradigm
- Weekly assignment: Write a Vector3d class, with support for vector addition, dot product, cross product, magnitude, and normalization. Utilize class and instance methods/fields appropriately.

Week 8: Exceptions + Polymorphism
- Lecture 1: Try/catch + when to use
- Lecture 2: Polymorphism (advantages, disadvantages, super())
- Weekly assignment: Write a Shape class + subclasses (eg Rectangle, Square), along with functions (area, perimeter).

Week 9: Essential Classes
- Lecture 1: ArrayList + HashMap – when to use them
- Lecture 2: Basic reading and writing to files
- Weekly assignment: Write a simple application that loads in test scores from a file, computes average, median, and standard deviation, sorts the scores in descending order, then writes the output to an output file. ArrayList should be used.

Week 10: Advanced Topics Teaser
- Lecture 1: Concurrency basics
- Lecture 2: Networking basics
- Weekly assignment (optional): Chat client/server