Ardent Academy for Gifted Youth
Regular Session 2018-2019
AP Computer Science A
(Introduction to Programming in Java)

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Introduction

Welcome to AP Computer Science A (Introduction to Programming in Java)! This is an introductory course in the fundamentals of programming that takes place over thirty (30) class meetings of three (3) hours each session for a total of thirty (90) hours of instruction. The material covered is equivalent to the first semester of a college computer science major course, which aligns roughly with the Advanced Placement (AP) Computer Science A curriculum. Students in this course are enrolled either to learn the standard APCS-A curriculum for the 2019 AP exam, or to develop programming skills in Java for use in math, science, engineering, and other interdisciplinary projects.

Prerequisites

You will not need any prior programming experience to take this course, although some previous experience with learning languages like Scratch, Python, and others can be beneficial. However, you do need to be familiar with the basic "files and folders" paradigm of modern computer operating systems like Microsoft Windows and Mac OS. You also should be comfortable with using a web browser, searching for materials on the Internet, and downloading/installing software on your computer. If you are not yet computer literate, please ask us for materials to assist you with the core competency requirements.

Required Materials

Each student must bring their own laptop and charging device to class each meeting. Ardent Academy does not provide computers for student use.

Please ensure that any parental controls on your device that may prevent you from downloading or installing any software are completely disabled. If your parent or guardian is unable to allow you full access to your machine, then you will not be able to successfully complete this course.

Network Use Policy

Ardent Academy provides access to the Internet for students enrolled in our classes to access shared resources through our Content Management System (CMS) called **eLearning** which is accessible at: **http://elearning.ardentacademy.com**. You will need a login and password to access eLearning, which is provided for you when you register for the class. Please see an Ardent Academy administrator at the front desk to receive your access credentials.

Please be aware that while connected to Ardent Academy's local area network, your use of network resources will be monitored, and there is no expectation that any data traveling to and from your device will be private. *At no time should our network resources be used for peer-to-peer (P2P) services, gaming, social media, or non-course-related use.*

Behavior Policy

Ardent Academy courses function very much like college-level classes, where students are asked to engage in intensive study of challenging material in a setting that requires individual discipline, focus, and adaptability. Playing video games, chatting online with friends, and other non-academic activities are prohibited during class.

There are no grade-school style infraction mandates (i.e., "three strikes" or warning levels), and we are committed to providing a balanced, supportive, learning environment for all students. Those students who are unable to maintain proper respect and decorum while interacting with the instructor or their peers will be dropped from the course at the first offense.

Textbooks

There are two primary textbooks used for this course. The first is available at no charge, and presents a very traditional approach to computer science:

Eck, David J., *Introduction to Programming Using Java, Seventh Edition*. New York: Self-published, 2016. Online: http://math.hws.edu/javanotes/

The second is a printed textbook, which has been available in several versions over the years:

Horstmann, Cay, *Big Java: Early Objects, Fifth Edition*. New Jersey: John Wiley & Sons, Inc., 2014.

Horstmann, Cay, *Java Concepts, Sixth Edition*. New Jersey: John Wiley & Sons, Inc., 2009.

The more recent versions of the book can be very costly, while the scaled-down older editions may not come with as much material, but what is not present are later chapters that are outside the scope of the AP Computer Science A curriculum. The older versions can be found used online for under $20, and all of the fundamental concepts that we cover in the course have not changed since they was published.

I also highly recommend acquiring the following for test preparation should you elect to move onto the second semester of AP Computer Science A. The suggestions and test strategies are invaluable, and the example questions are much more difficult than the real exam:

Teukolsky, Roselyn, *Barron's AP Computer Science A, 8th Edition*. New York: Barron's Education Series, Inc., 2018.

While digital versions of these texts are available, they may be difficult to read on your machine while also working on code simultaneously, so we encourage you to obtain a print version where possible, especially since it is easier to take notes in them. Supplementary text materials will be provided at no cost to students in PDF format.

Software

You will need to download and install the following software for this course:

BlueJ is an Integrated Development Environment (IDE) used specifically for beginning programmers. It has a number of features, particularly a graphical layout of objects, that is beneficial for understanding some of the core principles behind Object Oriented Programming (OOP). You can download a free copy from **www.bluej.org**.

If you have previous programming experience, you are welcome to download the Java Developer Kit (JDK) separately from Oracle, and use any IDE of your choice, including Eclipse, IntelliJ IDEA, or Netbeans. We are unable to provide any direct user support for these other software packages, so please only elect to use these if you have the background and expertise to use them on your own.

Curriculum

This course covers the following concepts:

- Fundamentals of Computing
- Binary, Hexadecimal, Decimal
- Integrated Development Environments (IDE)
- Input, Output
- Operators (Mathematical and Boolean)
- Variables and Data Types
- Decision Structures
- Loop Structures
- Methods (Functions)
- Unit and Integration Testing
- Classes and Objects
- Object Oriented Programming Basics
- Inheritance and Polymorphism
- Abstract Classes and Interfaces
- Recursion and Algorithm Analysis
- Searching and Sorting
- Data Structures

Please look at the Topic Outline provided for you in the AP Course Description for a more detailed look at the scope (not necessarily the sequence) of the material covered in this class.

About the Instructor

Mr. Gene Wie earned his B.S. Information and Computer Science degree from the University of California, Irvine. His major research areas were Software Engineering and Information Systems, and he was part of a student team that developed the initial prototype of MCM (Motion Capture Music), a software system for music composition

that generated sound from real-time input from the Vicon8 Motion Capture System. He spent several years in the industry as a programmer, web developer, beta tester, and technical writer before making a career change to music performance and education. He has taught AP Computer Science at St. Margaret's Episcopal School since 2008, and Python, Java, and AP Computer Science courses at Ardent Academy since 2012. Through the limbART Project, he has mentored high school and college students in creating lightweight 3D-printed prosthetic devices for children with physical challenges to play the violin. He also serves as Music Director of the Community Youth Orchestra of Southern California, Artistic Director of the St. Margaret's Summer Music Festival, and Coordinator of ChamberArtsFest. Over the past two decades he has appeared on violin, viola, clarinet, and saxophone with the Elegie String Quartet, Monarch String Quartet, Blackbird Music Project, and numerous local professional ensembles.
www.genewie.com

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