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Welcome to AP Computer Science

Course Overview:
The purpose of this course is to introduce students to the object-oriented programming paradigm using Java as a programming language. The class is taught in a computer lab allowing students to immediately apply what they have learned in the context of programming projects. Some lecture and direct instruction is given however students spend much of the class time working on assignments. Each project is designed to give students experience with a new topic or concept. In this hands-on project driven environment, I am able to guide students through their work allowing them to develop their problem solving skills and refine good programming technique. This project/problem based approach is directly aligned with the Common Core Learning Standards for Mathematics.

Course Resources:
- BlueJ: A free Java development environment specifically designed for learning Java and objected oriented programming concepts.
  http://www.bluej.org/download/download.html
- CodingBat: A free site of live coding problems to build coding skill in Java, created by Nick Parlante, computer science lecturer at Stanford.
  http://codingbat.com/java
- Java Review for the AP CS A Exam: This great resource, written by Barbara Ericson, is loaded with review questions and clear explanations. Yes, it's free!
  https://runestone.academy/runestone/static/JavaReview/index.html

This course covers the following topics:

I. Object-Oriented Program Design: The overall goal for designing a piece of software (a computer program) is to correctly solve the given problem. At the same time, this goal should encompass specifying and designing a program that is understandable, can be adapted to changing circumstances, and has the potential to be reused in whole or in part. The design process needs to be based on a thorough understanding of the problem to be solved.
A. Program Design
B. Class Design

II. Program Implementation: The overall goals of program implementation parallel those of program design. Classes that fill common needs should be built so that they can be reused easily in other programs. Object-oriented design is an important part of program implementation.
A. Implementation techniques
B. Programming constructs
C. Java library classes (included in the AP Java subset)

III. Program Analysis: The analysis of programs includes examining and testing programs to determine whether they correctly meet their specifications. It also includes the analysis of programs or algorithms in order to understand their time and space requirements when applied to different data sets.
A. Testing
B. Debugging
C. Understand and modify existing code
D. Extend existing code using inheritance
E. Understand error handling
F. Reason about programs
G. Analysis of algorithms
H. Numerical representations and limits

IV. Standard Data Structures: Data structures are used to represent information within a program. Abstraction is an important theme in the development and application of data structures.
A. Simple data types (int, boolean, double)
B. Classes
C. Lists
D. Arrays

V. Standard Algorithms: Standard algorithms serve as examples of good solutions to standard problems. Many are intertwined with standard data structures. These algorithms provide examples for analysis of program efficiency.
A. Operations on data structures previously listed
B. Searching
C. Sorting

VI. Computing in Context: An awareness of the ethical and social implications of computing systems is necessary for the study of computer science. These topics are not addressed in detail, but are considered throughout the course.
A. System reliability
B. Privacy
C. Legal issues and intellectual property
D. Social and ethical ramifications of computer use

All assignments and related course materials for this class are posted on my website. There are typically 15 to 20 assignments due per quarter, requiring students to complete one project nearly every class period. A short quiz will be given almost daily and are announced the class period before they are given.

Grades are determined from a combination projects and quizzes. Each assignment will be given a specific point value. Your average can be determined at any time by adding up the number of points earned and dividing by the total number of possible points.

Late assignments will receive a 1 point deduction for each day late.

Class Expectations

During class time, computers are only to be used for the purpose of this class. If you are using a computer for anything other than work directly relating to this class you will lose credit for the project you are working on and possibly lose your computer privileges.

Students should be attentive to all directions and class discussions, be on time and ready for the beginning of class, be quiet and respectful while others are speaking.