AP® Computer Science A
2012 Syllabus

Garfield High School, Fall 2012 – Spring 2013 (2 Semesters)

Instructor Contact Information:

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Description

Advanced Placement® Computer Science is a fast-paced course equivalent to a college introductory programming class. We will learn about the exciting kinds of diverse problems tackled by computer science while exploring the field's most important tool – programming. Our focus will be on developing systematic problem-solving strategies that can be applied to real-world problems. The course will be anchored around projects that will allow us to explore a broad range of fields that leverage programming. Through these, we will study common, reusable algorithms that we will learn to analyze for correctness and speed.
This course will cover fundamentals of programming syntax and methodology using the Java, a widely used programming language. Java is just one example of a language used to create software and we will focus on gaining general skills that can be applied to other common languages. No matter what field you choose to make your career in, this course will provide you with valuable insights into how to solve problems systematically, how computers work and how large projects are managed.

Goals

Successful completion of this course and its projects will prepare students for the AP® exam and for a second-semester college programming course. Students will be able to:

- design, implement and debug computer-based solutions to problems in diverse application areas
- use, implement and analyze common algorithms and data structures
- write clear and efficient code using good Java syntax and programming style
- know when and how to use Java library classes
- read, understand and contribute to large programs consisting of several classes
- identify and discuss the major hardware and software components of a computer system
- recognize the ethical and social implications of computer use and software creation

Credits: This class earns 1.0 CTE/Occupational Education credit (for both semesters) and prepares for AP® CS A exam for college credit. In addition, successful completion of this course (with a B or better) can earn student Tech Prep credit from Seattle Central Community College at no cost as well as earn University of Washington credits through their UW in HS program, which costs about $349. Further details of these programs will be presented in class.

Prerequisite:

AP® CS requires continued success in mathematics with at least completion of Algebra I and strong critical-reading skills. <u>No previous programming course or experience needed.</u> As an Advanced Placement college preparation class, students are expected to work independently, being self-driven to complete assignments and projects by due dates, take notes, and devote additional work time at home or after school as needed; 2-4 hours of homework may be necessary each week.

Expectations

This course follows the University of Washington CS 142 course, and students are expected to function independently as will be required in college. We will be moving at a fast pace to cover all the necessary material for the AP® CS Exam in early May, and future lessons build upon previous one's. Students are required to keep up with the pace, and this typically requires a few hours of homework each week. Class lectures, assignments and projects are posted daily on our class website (under AP CS at www.garfieldcs.com), and students missing class are expected to make up work promptly. Students in this course will be expected to:

- ask for help as necessary significantly before deadlines
- complete projects independently demonstrating their own work
- follow collaboration policies and periodically work in small groups
- turn in assignments before their deadlines
- contribute to making the classroom an effective learning environment
- respect all members of the class at all times and allow everyone to contribute

Course Materials and Required Supplies

Lectures will follow the textbook by Reges & Stepp, "Building Java Programs", Addison Wesley. Copies of the book will be available for loan to students who need additional review, but it is not required for this class. Class presentations and code samples will be posted on line and there are several supplemental video lessons and labs from the UW instructors to support material; these resources will be available from the course website and in class.

Since this is an Advanced Placement® class, it will use resources from the College Board, including the AP® GridWorld Case Study. Additional AP® CS material will be reviewed and discussed as the date of the exam approaches. Students are highly encouraged to take the AP® Computer Science A exam to earn them possible college credit.

We will be using several different software tools in the course, specifically the Java SDK and jGrasp. All of them are installed on the computers in the lab. Most of the software is free and available for anyone to download and use on their own computers. So you can also work at home or anywhere you have full access to another computer.

Required Supplies: Student must have writing instruments (pens and/or pencils), paper and a binder for the class everyday to keep notes and maintain a journal. Handouts will be given periodically that will enhance note taking and should be collected in a binder. These handouts

and your class notes can be used for most of the exams in this class, except for both semesters' final Practice AP exams. In order to work on your projects & classwork outside of school, you will need a flash drive to transport programs back and forth. It is highly recommended to maintain backup copies of your work in case one copy becomes corrupted or is lost.

Corporate Classroom Environment:

In this Career and Technical Education (CTE) course, the classroom culture will be that of a professional workplace, and students will be treated as responsible employees working together to produce quality products – their assignments and projects. Students will be taught business practices and given significant leadership roles in running the class; this will demonstrate the higher level of expectations and distributed management of a real workplace. Collaboration, innovation, and critical thinking as well as safe technology practices will be stressed to ensure students are developing solid 21st Century skills. Detailed classroom standards, procedures and rules will be established together, discussed and clearly posted. Leadership, employability, and technology skills will be appraised as part of this CTE class.

Grading

Over the course of the year, you will complete roughly ten programming projects and one open-ended final project. That's where the learning happens, so these are weighed heavily. Points will be distributed between categories in approximately this way:

25% - Daily Class Work: exercises, worksheets and daily participation
40% - Programming Projects
35% - Exams: tests and quizzes
Final grade will be based on your weighted score following the Seattle Public School District Grading Policy (PDF).

Daily Class Work:

Class material will be delivered by lessons, demonstrations, group activities, discussions and videos as well as online research and reading. For each new topic there will typically be an introductory presentation, worksheet and/or computer lab exercises to allow students to practice new skills and ensure they fully understand the material. I will usually check these exercises & worksheets during class to provide more immediate feedback and help guide you to completion. Due dates will be set for these exercises and points recorded for their completion.

The class moves very quickly and builds on previous material; therefore students are encouraged heavily to keep up with the daily classwork so they have the knowledge for future lessons. For full credit, classwork needs to be completed by their due date usually coinciding with the due date of the corresponding project. After the due date, students will earn 75% of full credit if the work is done before the corresponding exam or quiz. If class work is turned in after the exam or quiz, only 50% of full credit will be given. If a student is absent they will need to make arrangements to have these due dates adjusted, and it is their responsibility to keep on track and catch up with

classwork to be prepared to take exams and quizzes with the remainder of the class. This will allow timely feedback of test material and minimize the possibility of cheating.

In addition, most periods will begin with a "warm up" that is designed to get students thinking about computer science; these will be a variety of activities including introductory questions for a new subject, reflections on recent assignments, brain-teaser puzzles, thoughts about technology in the recent news, or an exercise highlighting a tricky area of the previous day's lesson. Students will start working individually on the "warm up" as they enter the class, then after the bell and taking attendance, the class will discuss the warm up, sometimes collecting students' responses for closer review. Our Corporate Classroom culture requires students to be respectful of others at all times, contribute in discussions, help each other collaboratively, attend class, and take on occasional leadership roles. Points may be given weekly reflecting student's participation in warm up's and adherence to the Corporate Classroom expectations. Bonus points will be given for outstanding examples supporting our classroom culture, initiative and leadership.

Programming Projects
Programming projects will be due typically bi-weekly. It will be up to you to budget your time – I will give you opportunities to work in class but most assignments will require outside work as well. That means you will need to find access to a computer with a Java compiler. Instructions for getting your own machine set up are on the course website and the CS lab will be available for use after school most days.
I understand that things come up, so I will give you <u>a total of 6 "late days" for projects to use as needed for the entire year</u>. These will allow you to turn in assignments late without penalty. You may use up to 3 on any given assignment and any remaining at the end of the year will be turned into extra credit. Late assignments will otherwise receive a 10% off per day late. If you have an excused absence, you must talk to me before the due date to make appropriate arrangements. The final project will provide you with greater freedom in design and implementation. You will work in pairs to complete a sizable project of your choice.

Collaboration
The programming projects should be your individual work. I encourage you to talk to your classmates, parents or me about how you are approaching a problem but ultimately the work you turn in must be your own. A good rule of thumb is that you should be speaking in English rather than in Java when discussing a project and should never look at someone else's code. I will use a software system to compare recent student submissions as well as those from previous offerings of this course. Evidence of copying or sharing code may result in a 0 for the assignment and/or disciplinary action from Garfield administration. Assisting each other on classroom assignments is permitted and at times encouraged; that is your chance to acquire the skills to complete the projects.

Exams
Quizzes and exams will be given periodically to assess understanding of programming concepts. Most quizzes and exams will be open-notes to emulate a real programming environment as well

as to encourage you to keep well organized records. Semester final exams are designed to simulate the AP test and notes will not be allowed.

Getting Help

You may sometimes get stuck while working on an assignment for this class – please ask for help, we have additional resources! I will try to make myself available most days after school and you can also usually find me in the room during lunch and 5th period. I encourage you to make an appointment to make sure I'll be there. I will also strive to answer all e-mail within 24 hours.

Feedback

You have a great opportunity to shape the class into something you enjoy by providing lots of suggestions. You can always talk to me before/after class or send me e-mail. If you'd prefer to remain anonymous, I have posted a form on the website.

Note: This syllabus builds upon previous years' Garfield High School AP CS classes.