AP Computer Science A Summer Assignment 2023

If you haven't taken APCS Principles you need that class first

Congratulations on your choice of AP Computer Science for the 2021-2022 academic year. In this course, you will learn the fundamentals of computer programming using the Java programming language and by doing well on the AP exam you may earn college credit. This course will prepare you for further study in computer programming and is the first step in preparing for a career in software engineering or information technology (IT). The skills you learn will also be useful in other technical fields, such as science.

You do not need to have prior programming experience, but you must be very comfortable with computers. Learning a computer programming language is much like learning any language in that you must learn proper spelling, syntax, and structure. You will be learning the Java Language, one of the most popular languages in the world, and you will be programming using object-oriented design methodology.

We will be doing a lot of coding during the school year in class, but there will be times when it is necessary to do work outside of the computer lab. It is essential that you have access to a computer (not Chromebook) at home. If you do not have a computer at home, then it will be necessary for you to be able to stay after school to complete programming assignments in the lab. On the first day of school, I will provide instructions on how to set-up and install a Java working environment at home.

To be a good computer scientist, you have to enjoy problem solving. That is what it is all about: working out the best way to do things. You also have to be able to think in a logical way: be a bit of a Vulcan (look it up). What does that mean? It just means being able to think precisely, extracting all the knowledge possible from a situation just by pure reasoning. It is about being able to say what is definitely the case given what is already know…and it is fun to do. Logic has been called "the calculus of computer science." More than anything else, this course will allow you to develop logical reasoning and problem solving ability.

All of the assignments are due on the first day of class with no exception. These assignments will count as your first grades. If you are having trouble with some of the questions, please contact me at rsweeney@scspk12.org. I will be checking my email on a regular basis throughout the summer.

Best of luck with the assignment! I look forward to seeing you in August!

Mrs. Sweeney

AP Computer Science Summer Assignment

1. During the first couple of classes, we will be going over quickly how to convert between number systems (decimal, binary, and hexadecimal). There are many videos onl8ine that explain conversion between number systems. Watch at least the following video that can be accessed by the link below.

   https://www.youtube.com/watch?v=aW3qCcH6Dao

   If you need explanation, watch additional videos on YouTube.

2. After watching the required video and/or other videos, complete the **Number Systems Practice Problems worksheet** that is attached to this packet. Show all work to support your answers. (Print out and turn in on first day of class)

3. Watch these three videos (each less than 5 minutes) and start thinking of what is possible with computers.
   a. A Day Made of Glass..Made possible by Corning (2011)
      https://www.youtube.com/watch?v=6Cf7IL_eZ38
   b. Then watch A Day Made of Class 2: Unpacked. The Story Behind Corning's Vision.
      https://www.youtube.com/watch?v=X-GXO_urMow
   c. Make the Future – A Career in Computer Science.
      https://www.youtube.com/watch?v=nvhYDTh9T2A

4. Read Chapter 1 "The Way of the Program." (Feel free to read beyond chapter 1). Go to http://greenteapress.com/thinkapjava/ and either download onto your computer or read it online thinkapjava.pdf "**How to Think like a Computer Scientist/think Java**" by Allen B. Downey. We will be using this book during the school year.
   a. Complete the Questions (attached as "How to Think Like a Computer Scientist"). Turn this in on the first day of school as a Google Doc into Classroom.

How to Think Like a Computer Scientist – Summer Assignment (20 pts)

1. How is thinking like a computer scientist similar to the thinking involved in engineering and other sciences?
2. What is the single most important skill for a computer scientist?
3. Describe the differences between a low level and a high level language?
4. What are the advantages of programming in a high level language?
5. What does portable mean?
6. What language is used in AP Computer Science?
7. What is a compiler?
8. What is source code?
9. What is debugging?
10. What are your personal goals for this course?