

Computer Science FAQ: *What are all the courses like and which should I take?*

QUESTIONS:

Q1: What are "Java" and "Python" and "JavaScript"?

Q2: What is "Programming", anyway?

Q3: Are Java and JavaScript the same thing?

Q4: Why learn Python over Java?

Q5: Why learn Java over Python?

Q6: What do Java and Python have in common?

Q7: Can I take both Java and Python?

Q8: Is Java at CCHS an Advanced Placement course?

Q9: What are the prerequisites for these courses?

Q10: What is the workload like?

Q11: Can you say more about how Python, Java, and JavaScript are used in the tech world?

Q12: What is the Web Development/JavaScript course like?

Q13: What is the Introduction to Computing and Coding course like?

Q14: HOW DO I DECIDE WHICH COURSE TO TAKE???

ANSWERS:

Q1: What are "Java" and "Python" and "JavaScript"? They are all computer programming languages, allowing the programmer to create a limitless number and type of computer applications that are modifiable in almost any way imaginable. There are dozens of other computer languages, but these languages are accessible to high school students and are powerful enough to be useful well beyond high school. JavaScript is also heavily used in developing websites.

Q2: What is "Programming", anyway?

A: Computer Science is a field involving computer programming, algorithm design, application design, and controlling the behavior of hardware and software. Java and Python powerful examples of the hundreds of computer languages one can study. Computer languages have a vocabulary, syntax, and grammar. They allow the programmer to control digital devices in an almost unlimited way, by piecing together blocks of code to accomplish the task desired. Programming involves understanding all the aspects of the language and defining variables, functions (called "methods"), and "classes" and knowing how to work with external libraries of code, all through typing in (not selecting from menus) code to describe the interaction between all of these pieces.

Q3: Are Java and JavaScript the same thing?

A: NO! It's just an unfortunate coincidence of 4 letters that makes people think they are related. While it's true that all programming languages share some features in common, Java and JavaScript are completely separate programming languages and are used in different ways.

Q4: Why learn Python over Java?

(I'll deal with the Web Development/JavaScript course separately...)

The way that Python is structured and written makes it simpler and easier to learn and to use than Java, but it is still a very powerful programming language. Python has some features that make working with graphics a bit easier. For students new to programming, learning Python could be used to prepare them for learning Java or other computer programming languages in the future. If you were to write a program in both Java and Python to accomplish the same task, the Python program would always be significantly shorter. Python is used heavily in commercial applications.

Q5: Why learn Java over Python?

Java is the programming language in which the Advanced Placement test is given. Java is installed on billions of devices around the world and is a sophisticated and powerful object-oriented language. One can write apps for the Android operating system in Java. Programming jobs in Java are currently more plentiful than in Python (although Python is currently in the top 7 programming languages, out of hundreds). Java programs can more easily be turned into stand-alone programs that others can run and Java programs tend to run faster than Python programs. Java is used heavily in commercial applications.

Q6: What do Java and Python have in common?

The software for both Java and Python is "open source" and, therefore, free! Java is an object-oriented language and Python supports object-oriented programming. Since they are both programming languages, both rely on a strong Algebra 2 background for students trying to learn them. They're both fun, rewarding, and useful to learn and are both used heavily in the commercial world.

Q7: Can I take both Java and Python?

Yes. Learning a second programming language will both reinforce what was learned in the first one and introduce new features and approaches not possible in the first. Programming skills would be enriched and enhanced by being able to work in two different languages. Of the two languages, Java is more complex and challenging for a beginner and so a beginner to computer science may want to begin with Python and progress to Java.

Q8: Is Java at CCHS an Advanced Placement course? No. However, most of the topics on the AP exam are covered over the course of the 2 semesters. In the past, students that have done well in both semesters, and have done some extra study in addition to the coursework, have done very well on the AP exam.

Q9: What are the prerequisites for these courses?

It's difficult to nail down a perfect test for whether or not a given student will be successful in these programming classes. A strong ability to think mathematically and logically is certainly important. For Java, add to that a good ability to think abstractly. A strong Algebra 2 background is often cited as a good prerequisite, but students that have done Algebra 1 and Geometry at the Honors level and have some experience with programming could also be successful. Students who are new to coding and do not have a strong mathematical background are more likely to find success in Python.

Q10: What is the workload like?

A: There are two sides to the nature of these courses:

1. They are electives and students are often taking them in addition to a course load of other rigorous academic courses.
2. Java and Python are *languages*, and like learning French, Latin, Chinese, or Spanish, it takes on the feeling of an academic course, in terms of the work it takes to understand a new language.

That being said, the workload is less than a typical math class. There is plenty of time provided during class for working on programming projects, although some work on those projects must be done at home. There are somewhat regular homework assignments, although there is often more than one day given to complete them. There are regular programming project assignments, increasing in complexity as the year goes on. Some students do need significant help outside of class, if they struggle with the concepts.

Q11: Can you say more about how Python and Java are used in the tech world?

A: Examples of popular apps that are written, at least in part, using the given language:

Python: DropBox, Snapchat, Facebook, YouTube, Spotify, Pandora

Java: Facebook, Twitter, Amazon, GoogleDocs, Android apps, Runescape, Angry Birds, League of Legends

Q12: What is the Web Development/JavaScript course like?

A: In the 2018-2019 school year, *Web Development with JavaScript* is a new course. Right now it is challenging to speak to the difficulty level and workload for this course, but here's some information:

- HTML and CSS are languages used to generally create and design websites and they will be taught in this course
- When JavaScript is included in a website, it allows for interactivity, since it is a full programming language and not just a way to design a webpage
- HTML and CSS are relatively straightforward to learn; JavaScript is the challenging part
- JavaScript has been around for awhile as a language but has recently become more powerful with some add-ons and is used more widely than it has been in the past - it's a "rising star", like Python
- JavaScript has parts of it that are like Python and others that are similar to Java

Q13: What is the Introduction to Computing and Coding course like?

A: This course will be new in the 2019-2020 school year. The course should be a great introduction for beginners to ideas about computing, applying computing, thinking like a programmer in real-world situations, and getting exposed to several computer languages and how they function.

Q14: HOW DO I DECIDE WHICH COURSE TO TAKE???

A:

- If you are a freshman and not used to a full high school schedule, taking on Python or Java can be difficult
- If you are really unsure about learning computer programming, Introduction to Computing and Coding is a great option to get an overview of what computer science is like
- If you are confident in your logical thinking skills and ability to learn new complex concepts, Java, Python or Web Development should all be fine
- If you are choosing between Java and Python, remember that Java is a more challenging language to learn, but is also powerful and you could potentially take the AP Computer Science exam. Python is easier for a beginner, but is a great introduction to high-level programming languages.