

Your New World of:

Programming & Computer Science



#172045323

Computer Science and Programming are a **big deal!** The reality is almost every aspect of our lives are now intimately connected to computers and software. Our jobs, education, entertainment are all powered by software and computers. It makes sense that we should at least know a bit about this stuff.

All the apps, software, and other technology took many hours by many people to develop. So how did they do it?

Well... that's a long story but fortunately we can simplify the story with two words: Problem Solving!

Single most important skill for you to develop as programmer (or computer scientist) is problem solving.

Problem solving means the ability to formulate problems, think creatively about solutions, and express a solution clearly and accurately. As it turns out, the process of learning to program is really just problem solving.

All computer programming includes common concepts, tools, trick, methods that you can use to solve problems.

This class is where you can learn about **all the common concepts, tools, tricks, and methods** needed to solve problems with programming.



More About Programs

A **program** is a **sequence of instructions** that you give to a computer when you want it to carry out a specific task or solve a problem.

The instructions might be as simple as displaying information on a webpage. Or as complicated as getting a Tesla® to avoid an accident.

The details of a computer program may look different in different programming languages, but a few basic elements are in every computer program:



1. Input

- Get data from the keyboard, a file, or some other device.



2. Output

- Display data on the screen or send data to a file or other device.



3. Math and logic

- Perform basic mathematical operations like addition and multiplication or logical operations.



4. Making decisions:

- Check for certain conditions and execute the appropriate sequence of statements.



5. Repetition

- Perform some actions repeatedly

Believe it or not, that's pretty much all there is to it. Every program you've ever used, no matter how complicated, is made up of instructions that usually contain what we see above.

What is Debugging?

Programming can sometimes be a complex process with lots of **code**. Since it is done by human beings, errors often occur. Programming errors are called **bugs** and the process of tracking them down and correcting them is called **debugging**. You'll have to get used to debugging (**it's part of the process**). Often you will think that your program should work perfectly, but it won't...because of "**bug**". Bugs can be as simple as a missing semi-colon, or as complex as an error in logic.



Methods for finding bugs:

1. Read **error messages** carefully. Examine parts of the program the error message refers to.
2. Going through you code line by line checking for **syntax errors**.
3. Breaking the code up and testing parts of it to see what sections are working and where the trouble spots might be.
4. Ask a friend or your instructor to look at your code. Just like proof reading, usually a fresh pair of eyes is better at catching errors.

The Python Programming Language

Why Learn Python?



1. Python is popular/powerful/versatile

Python is one of the most popular and versatile computer programming languages at the moment. Google, Facebook, and NASA are only some of the many large companies that use Python to power their projects.

2. It's fun and easy to use.

Python has a reputation of being one of the easier computer programming languages to use. Even though it can be used to do very advanced things, it is easy to jump into, complete projects, and solve problems right away.

Python seems to **be the choice for Computer Science students and educators**. There is literally thousands of resources dedicated to help you learn python and create cool projects.

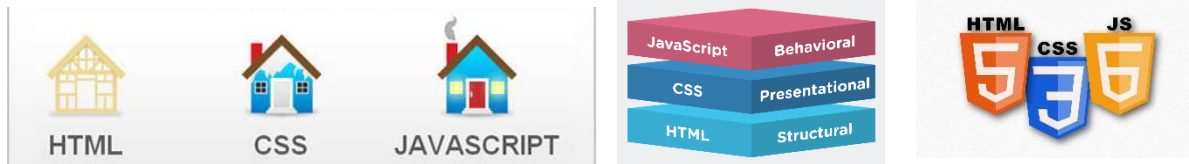
C – Programming Language.



Another programming language you will be using is RobotC – or “C”. It can be said that **'C' is the base language for programming languages**. C is special because it can give you access to the actual physical memory of computer you are working on. It's still a very popular language. Hardware, circuits, robots, as well as operating systems can be programmed with C. Places you can find C:

1. Adobe applications developed using 'C' programming language.
2. Google's Chrome is built using 'C' programming language.
3. NASA uses C to program some of its robotics and ground control systems.

Web Development - Programming (HTML, CSS, JavaScript)

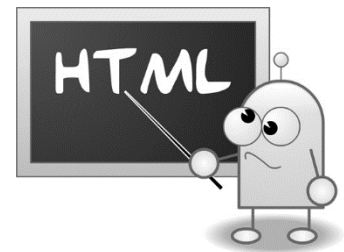


It could be argued that today's world is dependent on internet. Understanding how the internet works and learning to develop content for the internet are extremely valuable skills in computer programming.

Fundamental Aspects of Web Programming:

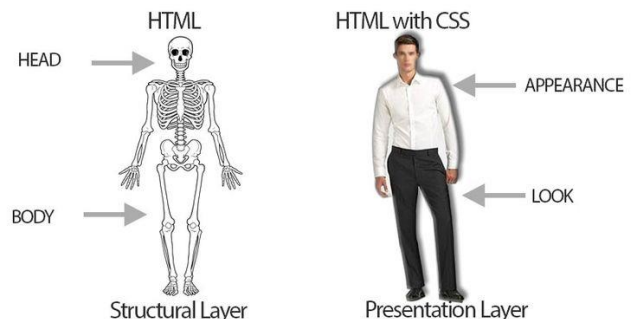
1. HTML

HTML -(Short for **H**yper**T**ext**M**arkup **L**anguage) is the programming language used to **display content on the web**. HTML is the underpinning of the entire internet. Every page out there is written in HTML. HTML is a basic scaffolding that we can use to display text, images, videos, and links on a webpage.



2. CSS

CSS – (Cascading Style Sheets) is used to control the **style** of an HTML document. The color, fonts, position of elements are all controlled with CSS



3. JavaScript

JavaScript is an actual “computer programming” language that is used to create the interactivity of a website. It allows the webpage to collect, process and present information. You can create actual games, apps, and animation with JavaScript.



It is the goal of this section of the course is to have students develop the knowledge and skills in HTML, CSS, and JavaScript to create professional looking content for the Web and get a better understanding of how web-based applications are created.

What the heck is an IDE?

An integrated development environment (IDE) is a software application that provides a **space for computer programmers to create code**. An IDE normally consists text editor, automation tools and a debugger.

1. Some of us will be using the RobotC IDE to code our Robots.
2. For Python some of you will start with **Trinket** as an IDE. **Trinket** is great because it allows you to create and run Python code **online**. This allows you to save, run, and **share** your work easily. Later, if you are looking for more features and power in your python coding, you can investigate how to get Python's own IDE downloaded onto your own machine.