**What is programming?**

**And why should I learn it?**

Computers are an electronic device with a variety of parts. However the most important part is the CPU (Central Processing Unit). This device is able to take digital instructions and data, manipulate that data (or memory locations) and then save that data (for later manipulations or permanent storage). These digital instructions are what we call programs.

There are some programming languages that work directly with the CPU while others develop instructions that are run through another program (an interpreter or a compiler) before reaching CPU. Languages which work directly with the CPU are said to have a lower level of abstraction and include languages like Assembler, C and C++. Languages that work with an interpreter are said to have a higher level of abstraction such as Python or Ruby. Lower level language are usually faster to execute (run) but more difficult to program due to the need to write much of the code in mathematical notations while higher level abstraction programs are easier to write but might run slower. In practise the speed of CPUs today and the efficiency of many interpreters means that this speed distinction is not so important in most cases.

There are two basic approaches to programming, one called procedural and one called object oriented. Procedural languages develop programs that are much like a recipe or reading a book. They start at the beginning and move step by step until they reach the end. Almost all languages can be used procedurally but some languages (like VBScript, Javascript , BASIC, Pascal, COBOL) are designed that way.

Object Orientated languages use the concept of a class. This means they can just exist and it is up to the user how they operate, very much like the way you use the Internet or a word processor. Most modern languages are designed around the use of classes (including Java, Python, C++).

This course will give you the basics of programming so all the lessons could apply to any language. In this course we have chosen to use Python as the programming language, it works well as both a procedural language and an object oriented language. Python was chosen because it has a high level of abstraction making it easier to learn.

The question if often asked Which is the best language? The short answer is all of them. There are many languages and all have their uses, all are good for some tasks and all have problems in some areas. There is a site called 99-bottles-of-beer.net which is a collection of computer programs which output the famous song. At present there are 1436 different languages on the site, many in a variety of versions.

We will be teaching you programming, not just how the program in one particular language.

The reason to learn programming varies from student to student but could include:

* To see if this is an area of real interest for you and maybe build a career
* To gain a basic understand of how software works and why it often doesn’t work
* To gain and understanding of what the development process actually is
* In your job you will be working with software that is running on other software, you need at least a basic understanding of what software actually is and what it does
* To gain an appreciation of how hard it really is to get something that does truly “just work

However the best answer is probably this:

***learning to program is an iterative process of removing the magic from computing***