

## Working with Variables

### What is a variable?

One of the most important things a computer program has to do is remember things, so for example, the bank has a program that remembers your bank balance, the email system has a program that remembers your password, the web browser has to have a way of remembering your favourite webpages. To help us understand how these programs remember things, we'll talk about variables.

We already know the idea of a variable from maths, I'm sure we can all remember having to solve equations like the following:

$$2X - 10 = 0$$

And we would do the following:

$$2X = 10$$

$$X = 5$$

In another problem we might get the following:

$$3X + 12 = 0$$

And we would do:

$$3X = -12$$

$$X = -4$$

So the general idea is clear, the variable "X" is used to represent a number, and at different times the variable can represent different values, the same way the value stored in your bank account can change over time ;-)

### Variables in Programming

In programming, variables work in a similar way, but instead of working out what value a variable has, you as the programmer have to tell the computer the value of the variable. And at another point in the program, you can change that value.

In Python we can tell the computer the value of the variable as follows:

$$X = 5$$

So what we are telling the computer is that "the variable X is equal to 5", or a better way of saying it is "X gets the value 5" or "X is assigned the value 5".

#### *Damian's Concept of Variables*

I like to think of a variable as a metal bucket, and the name of the variable is painted on the outside of the bucket, and you can put a number into the bucket, and later on you can take that number out of the bucket and replace it with another number.

