Variables

Understanding and conceptualizing variables

A variable (in math) is a place holder. It represents something else and thing can be subject to change. For example:

If we were to make some kind of cube with the equation:

cube = X * Y * Z

X=Length
Y=Height
Z=width

The X Y and Z in this formula can be anything we want. We *could* make them a predetermined number but that would remove the ability and functionality to be able to manipulate the cube by way of user input. But remember that in computer programming a variable can be predetermined.

Example:

x=400px

So it is better for us to keep these as variables that can be subject to change at our convenience.

So, for us to be able to do anything with this, we must determine the values of X Y and Z. We can do this in many ways. For example we could do this with an input field that the front end user could put a number value in, press

submit and let the program do the work to calculate the dimensions of the cube.

Variable Storage

Now that we can wrap our heads around why we would use a variable, we also have to remember that variables have to be stored somewhere, or rather; variables are a form of storage.

When we declare a variable we are also adding that thing to memory. Short term memory to be exact (RAM) unless it is otherwise saved to file. This is how the program is able to spit back out the variables contents.

Below is a simple variable in python:

```
first_name = 'John'
```

In this case, if I ever call on `first_name` it will always be John. Because this is a predetermined variable, but with that said, when

I declare the variable `first_name` as the string of `'John'` the program commits this information to RAM memory. So that if I for example tell it to `print (first_name)` it knows what to put on the screen.

Below is a more complex variable in python:

```
user = input(str('What is your name?'))
```

In the above example, there is some added functionality. Now I have added the ability for a user to input the string, by asking the question (the question is a string) 'what is your name?'.

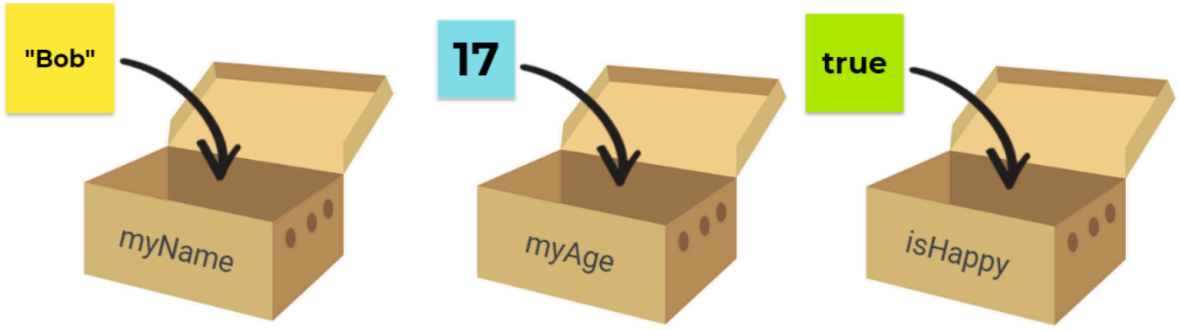
The outcome of this would be, if I went on to `print (user)` the string that the user input into the text box would of been committed to RAM and would be put back onto the screen.

So lets note:

A variable is just a container for some information that we will later use.

It can be predetermined (like a set string, integer, boolean, string and so on).

Or it can be not undetermined (like a user input).



Variables in different programming languages

In different languages variables are created similarly but also a little different. Some languages are less strict and some are more strict. Think of it like: when we speak, we could be very strict in our vocabulary or less strict.

JS

```
var first_name = 'Anthony';
```

In JS we just say that we are making a variable and tell it what the name of it is and then what the contents is;

PHP

```
<?php
$first_name = 'Anthony';
?>
```

In PHP we just say that we are making a variable using a $ and what the contents is;

Python

```
first_name = 'Anthony'
```

Python is very easy, just name the variable and tell it what the contents is

C#

```
string name = "Anthony";
```

In C# we have to be a bit more strict. We have to tell it what the data type is specifically then name the variable and tell it what the contents

is

- `int` - stores integers (whole numbers), without decimals, such as 123 or -123
- `double` - stores floating point numbers, with decimals, such as 19.99 or -19.99
- `char` - stores single characters, such as 'a' or 'B'. Char values are surrounded by single quotes
- `string` - stores text, such as "Hello World". String values are surrounded by double quotes
- `bool` - stores values with two states: true or false

Naming Convention

When it comes to coding, we want to make sure we are giving the proper names to things. When we learned HTML we learned that when we name classes, we want to name them in such a

way that when we look at it, we know exactly what it is without having to have any guess work. We want to keep this same practice when we make variables.

The following example is in Python:

```
first_name = input(str('What is your first name?'))
last_name = input(str('What is your last name?'))
address = input(str('What is your address?'))
```

When we look at these variables, we know exactly what they are. This is how we want to name our variables because if we have a program that consists of 1000s of lines of code, we want to be able to read these and be able to easily identify what they are.

Naming Convention Contd

Another aspect of naming convention are the different cases we can use.

camelCase

Always starts with a lower case letter and each following word is delimited by a capital letter.

snake_case

Snake case delimits words with a _

PascalCase

Pascal case uses a capital letter on each word