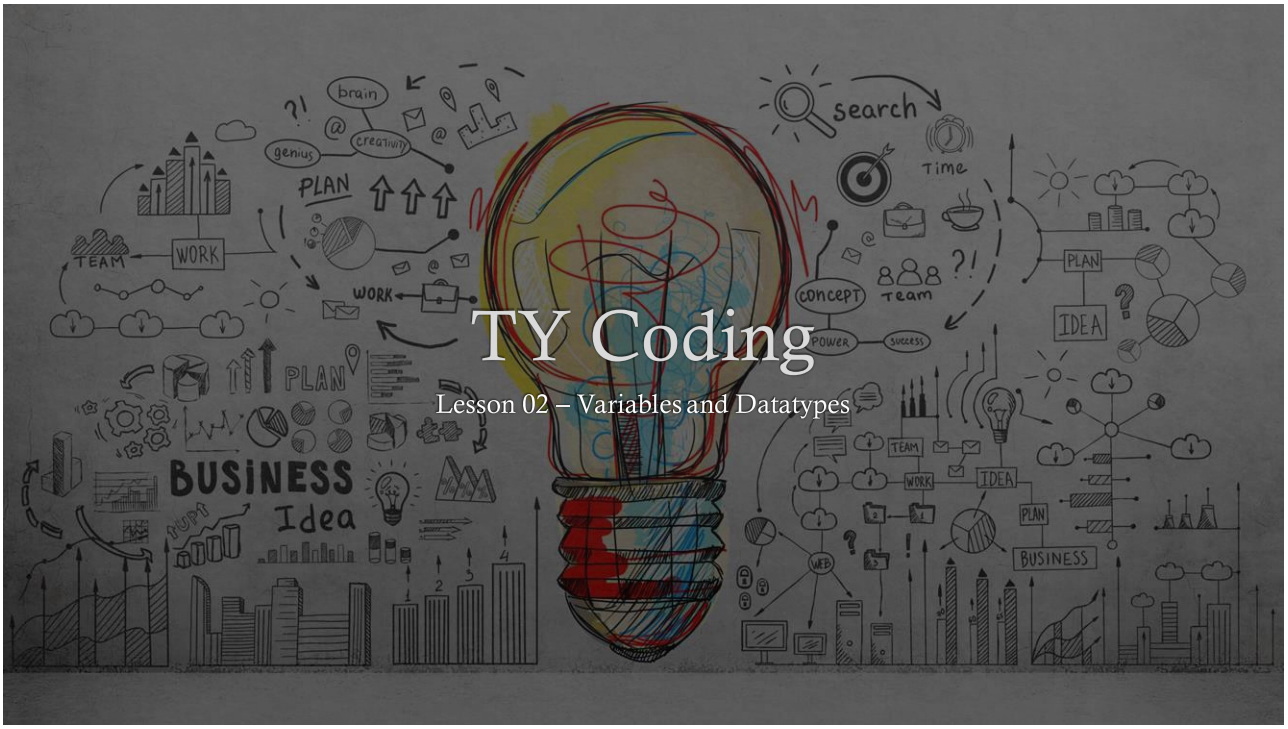
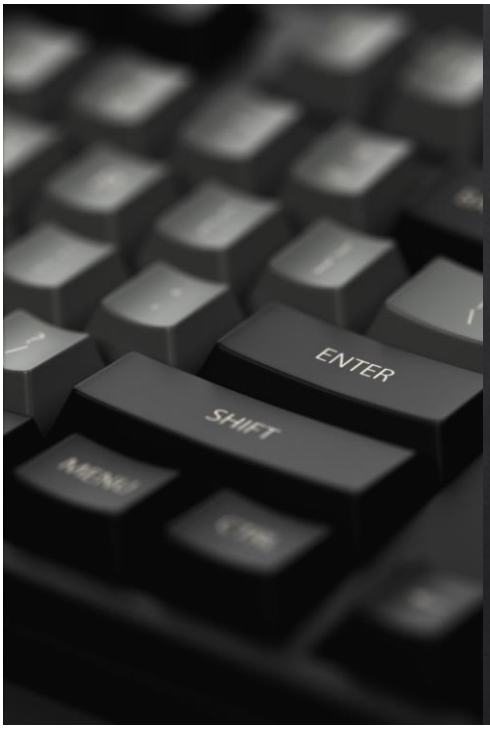


TY Coding

Lesson 02 – Variables and Datatypes

1

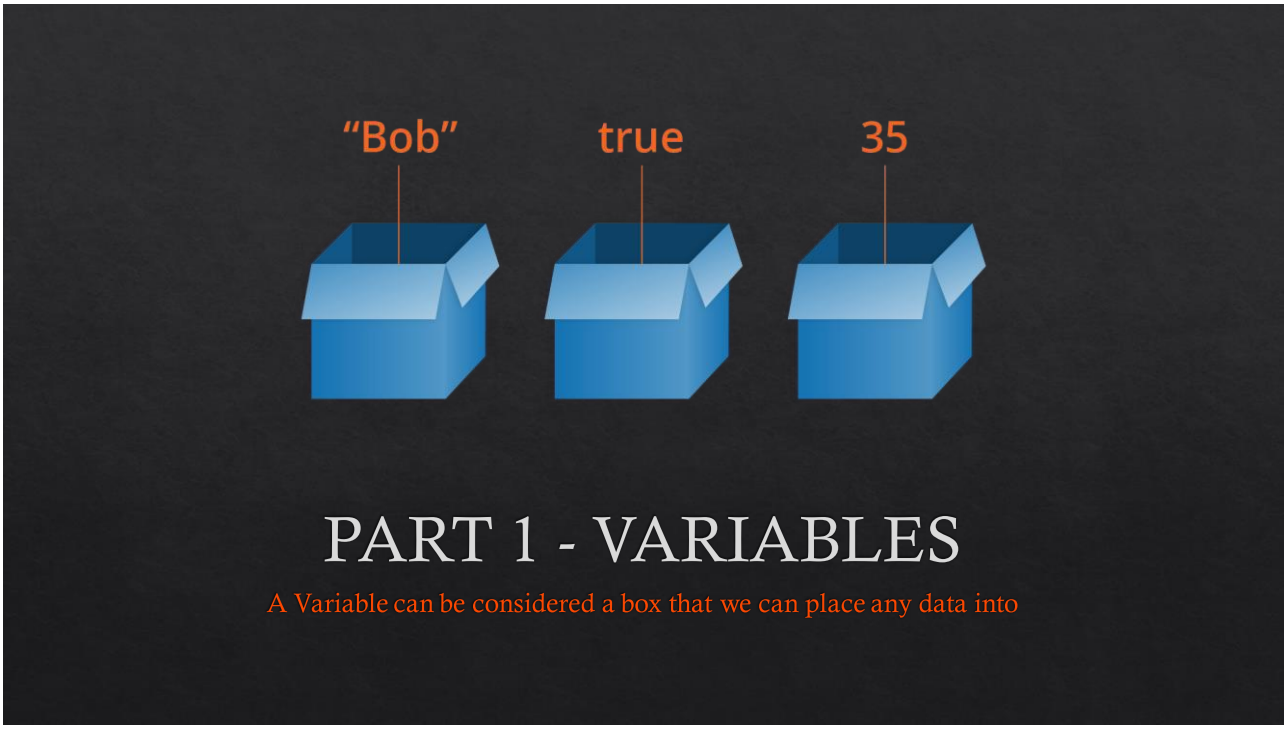


LESSON 1 RECAP

IN THE FIRST LESSON WE LEARNED ABOUT:

- ✓ Characters: which are any single thing we can output using our keyboard.
- ✓ Strings: which are groups of 2 or more characters.
- ✓ Quotation marks: that characters and strings need to be surrounded by quotation marks.
- ✓ Functions: which are reusable pieces of code that do a task for us.
- ✓ How to use the print function to output to our screens: print()

2



PART 1 - VARIABLES

A Variable can be considered a box that we can place any data into

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VARIABLES

What is a variable?

- A variable is a container that we can create in our program to store a value.
- What values can a variable store?
- In python, there are different types of values which we call data types.
- A variable can be used to store any of these data types.

Data type	Short-hand name	Description of data type	Example of data type
Integer number	int	An int is a whole number	10
Floating point number	float	A float is a decimal number	3.14
Character	char	A single keyboard digit	"A"
String	str	A sentence or collection of characters	"My favourite food is pizza"
Boolean	bool	Holds the value of either True or False	True

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VARIABLES

Creating a variable

- To create a variable, we type (or "declare") the name of the variable, and then we assign a value to the variable.
- In python, the assignment operator is "=" which you know as the equals sign.
- Let's suppose we want to create one variable to store a string with our favourite animal in it and another variable to store our birth year.
- Which in our code editor, looks like:

My_favourite_animal = "hippopotamus"

My_birth_year = 2004

Variable name	Assignment operator	value
my_favourite_animal	=	"hippopotamus"
my_birth_year	=	2004

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VARIABLES

General RULES FOR NAMING YOUR VARIABLES

1. Can contain only numbers, letters and underscores.
2. Must not start with a number (but it may contain one).
   a) My_income_1 is okay.
   b) 1_my_income is not okay.
3. No spaces in the variable name.
4. No special characters (such as '@').
5. Must not be a python keyword (e.G. true, none, false, break).
6. Don't make your variable names too long.
7. The python naming convention is to use all lowercase letters, joined by underscores:
   a) E.G. my_variable, my_age, house_width, number_of_pets

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VARIABLES

EXAMPLES OF VARIABLES:

```
name = "john“
age = 15
latest_grade = "b“
grade_point_average = 3.8
is_a_student = true
```

- The variable: name contains the string value: "john"
- The variable: age contains the integer value: 15
- The variable: latest_grade contains the character value: "b"
- The variable: grade_point_average contains the float value: 3.8
- The variable: is_a_student contains the boolean value: true

Nb you will notice that you do not need "quotation marks" when assigning int, float & boolean values!

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VARIABLES

Variables and the print function

If you remember from last week, we used the print() function to print out strings. We can also use the print() function to print out variables! And the good news is that it works pretty much the same way.

Let's say we have 2 variables that contain our pets name and what year we are in, in school.

pets_name = "bob ross" ← remember we must use "quotation marks" for a string.

pchool_year = 4 ← recall there are no need for quotation marks for an int, float or bool value.

So, let's print these variables using the print function:

print(pets_name)
print(school_year) ← we can simply place the variables inside the print function to output them.

Will give the output:

Bob ross

4

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OPERATORS

What are operators?

There are different types of operators, we will be focusing on:

Arithmetic operators

Arithmetic operators are used with numeric values to perform common mathematical operations. Addition, subtraction, multiplication etc…

Assignment operators

Assignment operators are used to assign values to variables.

In python the "=" is the main assignment operator.

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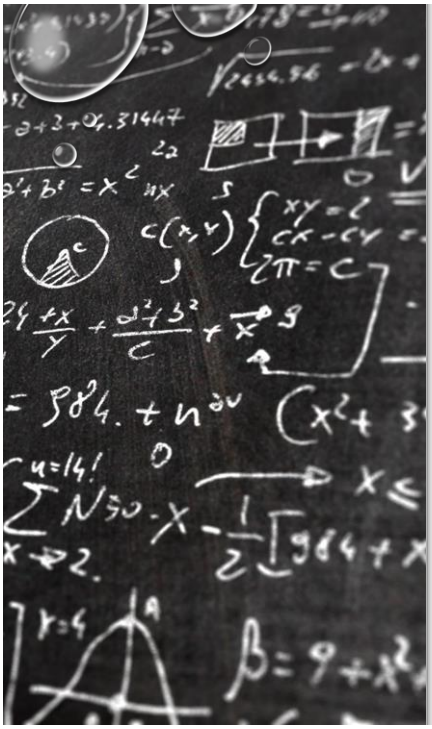

OPERATORS

Operators and the print function

- We can use the print() function to print out the results of maths problems.
- Let's say we wanted to know what 188 + 68 * 1 + 3 was
- We can use the python and the print function to tell us.
- Print(188 + 68 * 1 + 3) will output the answer: 259

And we can do this with:

- **Subtraction**: print(10-6) will output the answer: 4
- **Multiplication**: print(5 * 4) will output the answer: 20
- **Division**: print(100 / 20) will output the answer: 5

Python follows the **pemdas order of operations.** Which stands for:

Parentheses, exponent, multiplication, division, addition and subtraction.

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ARITHMETIC OPERATORS

Operator	Name	Description	Example	In words
+	Addition	Standard addition	1 + 7 = 8	One plus seven is eight
-	Subtraction	Standard subtraction	5 – 3 = 2	Five minus three is two
*	Multiplication	Standard multiplication	6 * 4 = 24	Six times four is twentyfour
/	Division	Standard division	18 / 6 = 3	Eighteen divided by six is three
%	Modulus	Like standard division, but the answer is the remainder.	10 % 3 = 1	Ten divided by three, leaves a remainder of one
**	Exponentiation	Multiplies the left value to the power of the right value	2 ** 5 = 32	Two to the power of five is thirtytwo
//	Floor division	Like standard division, but the answer discards the remainder.	10 // 3 = 3	Ten floor divided by three is three and we discard the remainder of one.

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ASSIGNMENT OPERATORS

Operator	Description	E.g. (number starts as 5)	Is the same as	Answers
=	Assigns a value to a variable	number = 5	The variable number contains a value of 5	number equals: 5
+=	Increment a variable by the amount specified after the = symbol	number += 7	number = number + 7	number now equals: 12 (number = 5 + 7)
-=	Deincrement a variable by the amount specified after the = symbol	number -= 3	number = number - 3	number now equals: 2 (number = 5 - 3)
*=	Multiply a variable by the amount specified after the = symbol	number *= 4	number = number * 4	number now equals: 20 (number = 5 * 4)
/=	Divide a variable by the amount specified after the = symbol	number /= 5	number = number / 5	number now equals: 1 (number = 5 / 5)
%=	Mod a variable by the amount specified after the = symbol	number %= 3	number = number % 3	number now equals: 2 (number = 5 % 3)
**=	Multiplies a variable to the power of the amount specified after the = symbol	number **= 4	number = 5 ** 4	number now equals: 625 (number = 5 ** 4)
//=	Floor divide a variable by the amount specified after the = symbol	number //= 2	number = number // 2	number now equals: 2 (number = 5 // 2)

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SUMMARY

Today you learned about:

- ✓ Variables
  - ✓ Variables are containers that hold a value.
- ✓ Data types, that characters and strings are datatypes and some new datatypes:
  - ✓ Integers (whole numbers)
  - ✓ Floats (decimals)
  - ✓ Booleans (true or false)
- ✓ Operators
  - ✓ That you can use operators to assign values (e.G. The = assignment operator)
  - ✓ That you can use operators to do maths using python (e.G. The + addition operator)
- ✓ How to use the print function with variables and operators.

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