Teacher Training Notes

Session 2

Slide 1 – Review

* Let’s have a refresh of last week’s lesson.

Slide 2 - Text Editor

* The text editor is what we use to run all our scripts, the link for this is…

Slide 3 - Running a Python Script

* Once we have written a script, we then run it.
* To do that we open a terminal and type python3 and the name of your script.py

Slide 4 - Running a Python Script

* Here is an example of running a script and the output.

Slide 5 – Variables

* A variable is a container for a value.
* The equals sign assigns your value to the variable you have just created.

Slide 6 - Variables

* These are all examples of variables;
* the variable name holds the value Charlie,
* the variable age holds the value 27
* the variable left\_to\_pay holds the value 29.99
* the variable has\_paid holds the value False

Slide 7 - Data Types

* In Python, there are many data types to become familiar with.

Slide 8 - Data Types

* We went over the following data types last week.
* Read examples from the slides.

Slide 9 - Numerical Operators

* These are similar to the ones you may have learnt previously in maths lessons with a few new additions.

Slide 10 - Numerical Operators

* Read through the box, working out each example.
* Exponent is the same as the power to, 4\*\*2 is 4 \*4 so 16.
* Modulus gives you the remainder, so when 10 is divided by 3 the remainder is 1

Slide 11 - Comments

* Comments are useful when you want to leave notes on your code.
* This is useful for when you want to come back to your code to remember what it does.
* When multiple people are working on one bit of code, comments are also useful to understand what other people have done.

Slide 12 – Comments

* To write a comment in Python, you start the line with #, anything after this will be a comment and will not run when you run your script.
* As per the examples, you can write these before, after or on the same line as your code.

Slide 13 – Casting

* Casting is used to convert one data type to another data type.
* This is useful when concatenate two strings, as you cannot concatenate a string and a number so you may need to cast an integer to a string.
* Or when you want to add two numbers together but one is a string, you can cast the string to an integer to add them together.

Slide 14 - Casting

* The first example is casting a float to an integer, to do this, you put int() and then the data into the brackets.
* The second example is casting an integer to a float, to do this, you put float() and then the data into the brackets.
* The last example is casting a float to an string, to do this, you put string() and then the data into the brackets.

Slide 15 – Index

* The index is the position of the characters. Normally, a count begins at 1, in Python and most programming languages, the count always starts at 0.

Slide 16 - Index

* By knowing the index, you can print out specific letters.
* So for word Charlie is stored in the variable name, the first print will print out ‘C’ as this has index 0 and the second print will print out ‘h’ as this has index 1.

Slide 17 – Input

* To get information from the user, we can use an input. If the input is stored in a variable, whatever the user enters is stored in the variable.

Slide 18 - Input

* The first print in the example, will print Hello and whatever the name the user enters.
* The second will first get the user input for age and cast it to a integer so it can be used in the second variable age\_in\_10\_years when being added to 10.
* Lastly, it is all put together, as you are concatenating a string and the new age, the age has to be cast back into a string.

Slide 19 – Questions?

* Does anyone have any questions from last week’s content?

Slide 20 – Conditionals

* Today, we will start by looking at conditional statements.

Slide 21 – If

* First, is the if statement.
* If a condition is True, then do this, if it is False, then don’t do anything.

Slide 22 – If example

* In this example, ‘This is always shown’ will be printed as True is always True.

Slide 23 – If syntax

* This is the syntax for an if statement, if the expression is True, run the bit of code.

Slide 24- Indenting

* In Python, indenting is very important. It tells the computer which parts of code are related to each other and what order to run the code in.

Slide 25 - Indenting

* In this example, the print statement is indented which means that it will only run if the if statement is True. If it was not indented, it would have run anyway.

Slide 26 – Comparators

* Comparators are used to compare statements. Again, you may have seen some of these during maths lessons.

Slide 27 – Comparator

* Read from the example on the slides. Express the difference between = which assigns a value for a variable and == which means equals to.

Slide 28 – Comparators

* The example on screen, shows the different comparators being used.
* The first one shows if the name variable has the same value as “Alice”, then print “Hello Alice” – what would be printed in this case? Yes, it woule be Hello Alice.
* The second shows the does not equal comparator – what would be printed? You are not Charlie.
* Lastly is the great than or equal to – what would be printed here? You are over 21.

Slide 29 – Else

* If the first condition is false, you can use an else statement, to run a separate piece of code. It can used as a catch all.

Slide 30 – Else

* In this example, if 1 is equal to 1, the program would print ‘Yes’, if it was false, it would have printed ‘No’.

Slide 31 – Else

* This is the syntax for the if and else statement.

Slide 32 – Else

* In the first example, if the variable name matches the string ‘Alice’, then the program will print Hello Alice, if it didn’t, it would print, You are not Alice.
* In the second example, if the ages is greater or equal to 21, it would print You are 21 or over, otherwise, it would print You are 20 or younger.

Slide 33 – Coding Time - Section A

* Now, it’s your time to try some coding, please refer to Section A on your worksheets.
* You’ll have 20 minutes on this.

Slide 34 – Elif

* If you want to have multiple if statements, and have multiple statements checked, that’s where you have an elif statement.
* The syntax would be an if statements, followed by elif statements and ending with an else statement.

Slide 35 – Elif example

* In this example, the first statement is checked, does the variable name have an equal value to Alice, it doesn’t.
* Then the second statement is checked, does the variable name have an equal value to Alice, it does so Hello Bob is printed.
* As the elif statement is satisfied, the else statement is not checked,

Slide 36 - Elif

* This example will take the user’s input and match it against each of the conditions.
* What would be printed if the user had entered 12? You are 13 or younger.
* And what about if the user printed 18? You are 18.

Slide 37 - And, Or, Not

* You can combine conditional with the and, or or not statements.
* When using and, if one of the conditions is false, the result would be false.
* When using or, if one of the conditions is true, the result will be true.

Slide 38 - And, Or, Not

* In the first example, the age has be to greater than 12 and less than 20 for the statement to be printed. If just one of the statements were false, the whole thing would not print.
* In the second example, if the age is less than 13 or greater than 19, the statement will be printed. Even if one of the statements is false, the statement would still be printed.
* In the last example, we are checking the age is not larger than 12 or less than 20, then the statement will be printed. If not statements are useful for filtering data.

Slide 39 – Coding Time - Section B

* Now, it’s your time to try some coding, please refer to Section A on your worksheets.
* You’ll have 20 minutes on this.

Slide 40 – List

* In Python, there are different ways to collect data. One of the ways is through a list.
* Lists are strings, captured in square brackets, separated by commas.

Slide 41 - List

* In this example, it shows how you create a list.
* You state the name of the list, followed by what you want to include in it.
* You can use the index to print one of the strings in the list.

Slide 42 - List — Append

* To add to a list, you use append.
* You state the name of your list.append and the new string, surrounded by brackets.

Slide 43 - List — Change

* To change an item in a list, you state the name of the list, the index of what you want to change and the new value.

Slide 44 - List — Delete

* To delete an item in a list, you write del then brackets and the name of the list with the index of the item you want to delete.

Slide 45 - List — In

* You can use an if statement to check if an item exists in your list.

Slide 46 - List — Length

* You can check how many items are in a list using the length function.

Slide 47 - List — Sort

* To sort the list alphabetically, you can use the sort function.

Slide 48 - Coding Time - Section C

* Now, it’s your time to try some coding, please refer to Section A on your worksheets.
* You’ll have 20 minutes on this.

Slide 49 - For Loops

* A for loop iterates through a collection of items.

Slide 50 - For Loops

* This for loop will go through each name in the list and print them out, one after the other.

Slide 51 - For Loops

* When creating a for loop, you create a variable that can be named anything after the for, that represents each item that will be printed.
* After the in, is the name of the list that you want the loop to run through.

Slide 52 - For Loops

* This for loop uses a range instead of a list.
* The range is 5, as Python starts the count from 0, it prints the number 0-4.

Slide 53 – Ranges

* You can use a range to determine how many times you want a loop to run for.

Slide 54 – Ranges

* As per the first example, if you state range with one number in the bracket, the loop will run that number of times, so this loop will run 10 times.
* The second example, if you put two numbers separated by a comma, the first number will be the starting number for the loop, the second is the character it will run to.
* The last example, the first number is the starting number, the second number is the ending number, the last number is the increment between each step.

Slide 55 - Coding Time - Section D

* Now, it’s your time to try some coding, please refer to Section A on your worksheets.
* You’ll have the rest of the lesson to finish this as well as any other questions.