**Outline**

Access the Python Development environment and follow the tutorial to gain an initial exposure to a programming language. Begin to develop an familiarity with basic programming concepts.

**Objectives**

* Use correct terminology to describe programming concepts;
* Describe the types of data that computers can process and store (e.g., numbers, text);
* Explain the difference between constants and variables used in programming;
* Use variables, expressions, and assignment statements to store and manipulate numbers and text in a program

**Materials**

* Python3 Development Environment at: //repl.it/
* Python Tutorial at: <http://www.letslearnpython.com/learn/>

**Accessing the Python3 Web IDE Environment**

Accessing the IDE

* Go to: <https://repl.it/>
* Select Python3
* Sign-up / Create an account
* Make sure you can remember your account information for the rest of the course.

Using the IDE

* Use the black area like a calculator to try simple statements or commands
* Use the white area to create programs with multiple statements

**Accessing the Tutorial**

Accessing the Tutorial

* Go to: <http://www.letslearnpython.com/learn/>
* Read up to “Lesson 3: Math”

**Level 1: Basic Math & Strings**

Access the Tutorial and start at “Lesson 3: Math”.

Questions

1. Complete “Lesson 3: Math – Math Basics” by typing the sample commands in the black area of the IDE.
   1. Create your own expression using 5 “+” and “-“ operators.
   2. List your expression and the result below.



1. Complete “Lesson 3: Math – More Operators” by typing the sample commands in the black area of the IDE.
   1. Create your own expression using 5 “\*” and “/” operators.
   2. List your expression and the result below.



1. Complete “Lesson 3: Math – More Division” by typing the sample commands in the black area of the IDE.
   1. Create one division expression that gives a whole number answer
   2. And one division expression that gives a decimal number answer.
   3. List your expressions and the results below.



1. Complete “Lesson 3: Math – Floats” by typing the sample commands in the black area of the IDE.
   1. Use the “round()” function for the expressions you created in question #3 above.
   2. List your “round()” expressions and the results they return below.



1. Read through “Lesson 3: Math – Comparison Operators”.
   1. Why do you think Equals is “==” instead of “=”?
   2. What does “=” mean?

Equal is “==” because one symbol sets a value for different variables

1. Complete “Lesson 3: Math – Practice” and “Lesson 3: Math – Practice Answers” by typing the sample commands in the black area of the IDE.
   1. Create an expression using 5 different operators that returns a “True” result
   2. And an expression using 5 different operators that returns a “False” result.
   3. List your expressions and the results returned below.





1. Complete “Lesson 4: Strings – Strings” and “Lesson 4: Strings – Examples” by typing the sample commands in the black area of the IDE.
   1. Explain why typing “apple” works and why typing apple without quotes gives an error.

Python cannot read stings without quotations as python cannot follow complete words unless they’re in quotes.

* 1. Also explain why “2 + 5” does not equal 7.

When it’s inside quotes, it is a string that python reads, and not a command which is being executed.

1. Complete “Lesson 4: Strings – Operators” by typing the sample commands in the black area of the IDE.
   1. Explain why typing “appl” + “e” works and why typing “apple” - “e” gives an error.

“appl” + “e” works due to it formulating a complete word while “apple” +”e” makes an incorrect spelling error which results in an error.

* 1. Also explain why “Hello” \* 10 works but why “Hello” / 10 doesn’t work.

“Hello” \* 10 works due to it multiplying it 10 times. However, “Hello” / 10 does not work as you cannot divide a word like hello by 10 and display it as tenths for “hello”.

1. Complete “Lesson 4: Strings – Indexes” by typing the sample commands in the black area of the IDE.
   1. List the letters in your first name and the index for each letter in your first name.

R A A K I N

0 1 2 3 4 5

1. Complete “Lesson 4: Strings – Indexes Examples” by typing the sample commands in the black area of the IDE.
   1. Explain why print(“Hello!”[4]) does not print “l”.

Python begins to count at 0, so [4] would then be “o”

* 1. What does print(“Hay, Bob!”[4]) print? For a hint try print(“Hay, Bob!”[3]) and print(“Hay, Bob!”[5])

It prints “ “ because a space is counted in the indexes.

1. Complete “Lesson 4: Strings – Rules” by typing the sample commands in the black area of the IDE.
   1. Explain why print(“Hello!”[7]) gives an error.

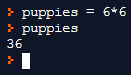
It gives an error because there are only 5 indexes and there is no characters assigned to 7. Therefore, this gives an error.

**Level 2: Booleans & Variables**

Access the Tutorial and start at “Lesson 5: Variables”

Questions

1. Complete “Lesson 5: Variables – Save a Value” by typing the sample commands in the black area of the IDE.
   1. What do you get if you type puppies / 3?



* 1. Why doesn’t typing kittens / 3 work?

It does not work due to their being no value assigned to kittens for python to divide by 3.

1. Complete “Lesson 5: Variables – Assign a New Value” by typing the sample commands in the black area of the IDE.
   1. Explain how the following sequence of commands works:
      * puppies = 36
      * puppies = puppies / 6
      * puppies

The first line creates the variable name “puppies”, and the numerical value which is given is 36. The second line takes the puppies value which then assigns a new value of the old one which is now divided by 6. The third line should display the variable value/ the final answer which is going to be 6.

1. Read through “Lesson 5: Variables – Rules”.
2. Complete “Lesson 5: Variables – Math Operators” by typing the sample commands in the black area of the IDE.
   1. Explain what happens for following sequence of commands:
      * colour = “red”
      * puppies = 36
      * colour + puppies

First line assigns red to the variable colour. The second line assigns 36 to the variable puppies. The third line adds colour and puppies together. However, this does not work as you cannot add a string and an integer together.

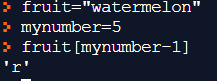
1. Complete “Lesson 5: Variables – String Operators” by typing the sample commands in the black area of the IDE.
   1. Explain why the following commands give different results:
      * Color + day \* fishes
      * ( Color + day ) \* fishes

The following commands give different results as in one sequence the output is formed by the day being multiplied then have colour added to it. The second line includes brackets to it in which the colour and the day are both added together before being multiplied by fishes.

1. Complete “Lesson 5: Variables – Indexes” by typing the sample commands in the black area of the IDE.
   1. What is the index of ‘r’ in “watermelon”?

The index will be 4 due to the first letter being known as “0” in python.

* 1. Write an expression using mynumber to return ‘r’



1. Complete “Lesson 5: Variables – Assignments or Comparisons” by typing the sample commands in the black area of the IDE.
   1. What is the difference between “=” and “==”?

The difference between “=” and “==” is that one equal sign adds a value to a new or existing variable while two equal signs asks python to tell if both sides are equal to each other or not which outputs either true or false

* 1. Create your own mnemonic to remember this difference.

“=” number/value and “==” true or false.

1. Complete “Lesson 6: Errors – Examples” by typing the sample commands in the black area of the IDE.
   1. What doesn’t “friend” + 5 work?

“friend” does not work because python doesn’t know if it should add the value or concatenate them because one of the variables is a integer and the other is a string (“friend”).

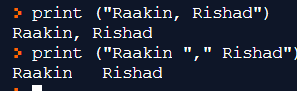
* 1. What is the difference between int and str?

Int means integer, str means string which can only be a combination of characters.

1. Read through “Lesson 6: Errors – Parts of an Error Message”.
   1. Is “friend” + 5 an example of:
      1. A Syntax Error?
      2. A Runtime Error?
      3. A Logic Error?

“Friend” + 5 is a syntax error because you cannot add a string and an integer together.

1. Read through “Lesson 6: Errors – Fixing Errors”.
   1. Use the ‘print’ command to print your first name and last name.



1. Complete “Lesson 7: Booleans – Types of Data” by typing the sample commands in the black area of the IDE.
   1. What is the value of: type(“True”)

Strings

* 1. What is the value of: type( True )

Boolean

* 1. Why is the result different?

These results are different because one value is in quotes which is string that python tells us while the other value is without any quotations and tells python that its another value that fits into another kind.

1. Complete “Lesson 7: Booleans – What Is A Boolean” by typing the sample commands in the black area of the IDE.
   1. Why do you think that having a Boolean data type is important in computer programming?

Boolean data type is important in computer programming as when they are making programs, most of the time there is always a true or false application which has different executions for the Boolean values.

1. Complete “Lesson 7: Booleans – Trying Out Booleans” by typing the sample commands in the black area of the IDE.
   1. Why do you think that there is no Maybe” Boolean data value in computer programming?

I believe that there is no maybe, as in computer programming there is no maybe because the value or result is a defined result, and based on the code which the developer has created or written and is operated an action based on that. They can also use the type() function for more than 2 values.

**Level 3: Lists & Logic**

Access the Tutorial and start at “Lesson 7: Booleans”

Questions

1. Complete “Lesson 7: Booleans – AND Comparisons” by typing the sample commands in the black area of the IDE.
   1. Try the following Python statements and record the results.
      1. True and True



* + 1. True and False



* + 1. False and True



* + 1. False and False



* 1. Explain if there are any other combinations of True / False.

No, there are no other combinations of True and False because there are only 2 options which only makes 4 combinations due to it being 2\*2.

* 1. Explain how the AND operator is similar to a math operator and how it is different.

The “AND” operator is similar to the math operator because it also tells python to compare the two sides and see if these values are false or true. If these values are false, Python will output False. If the values are true then Python will output it as true.

1. Complete “Lesson 7: Booleans – OR Comparisons” by typing the sample commands in the black area of the IDE.
   1. Try the following Python statements and record the results.
      1. True or True



* + 1. True or False



* + 1. False or True



* + 1. False or False



* 1. Explain how the OR operator is similar to the AND operator and how it is different.

It is similar because these operators tell python to look at both of the values, and see if one of the values are true. If the value is true, the output is true. However, python only outputs false if both of the values are incorrect.

1. Complete “Lesson 7: Booleans – NOT Comparisons” by typing the sample commands in the black area of the IDE.
   1. Try the following Python statements and record the results.
      1. not (True or True)



* + 1. not (True or False)



* + 1. not (False or True)



* + 1. not (False or False)



* 1. Explain how the combination of the NOT & OR operators is similar to the AND operator by itself and how it is different.

They are similar as the value from the OR operator is true. The AND operator on the other hand, evaluates which would come out false because not always that both values will turn out true. The NOT operator changes so that the output is always false like the AND operator. If the values are the same for both sides, the results will turn out opposite because the OR and AND would give both the same answer, which then the NOT operator will switch it to the incorrect answer.

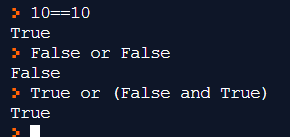
1. Complete “Lesson 7: Booleans – Expressions” by typing the sample commands in the black area of the IDE.
   1. Explain why the following two Python statements give different results.
      1. not (True or True)
      2. not True or True

They both give different results because in the first expression, Python solves the OR operator and outputs True for the NOT operator to then change it to false. For the second expression, python assumes that the first two values are “not true” as a value. “Not true” is false which then outputs an incorrect answer.

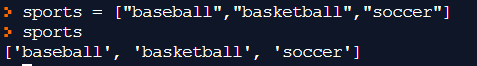
* 1. Explain why the following two Python statements give the same results.
     1. not (True and True)
     2. not True and True

They both give the same results because for the first expression due to the result being true from the AND operator, and the NOT operator switches it to the opposite operator which is false. The second expression compares two things with the AND operator “Not True” which then makes it false and outputs as false.

1. Complete “Lesson 7: Booleans – Practice” by typing the sample commands in the black area of the IDE.
   1. Create three more practice expressions similar to those in the tutorial.
   2. Provide the results for your practice expressions



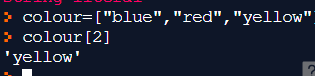
1. Complete “Lesson 8: Lists – A Collection of Objects” by typing the sample commands in the black area of the IDE.
   1. Create a list of your favorite sports teams.
   2. Assign your list to a variable.
   3. Confirm that your variable and your list are the same.



1. Complete “Lesson 8: Lists – List Indexes” by typing the sample commands in the black area of the IDE.
   1. What is the list index of the last team in your list of favorite sports teams.
   2. In the tutorial, the error produced by typing “fruit[3]” is an example of:
      1. A Syntax Error?
      2. A Runtime Error?
      3. A Logic Error?

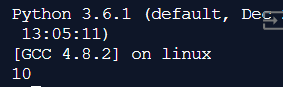
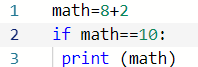
“fruit[3]” is an index error because there is no index 3 in the fruit list.

1. Complete “Lesson 8: Lists – Practice” and “Lesson 8: Lists – Practice Answers” by typing the sample commands in the black area of the IDE.

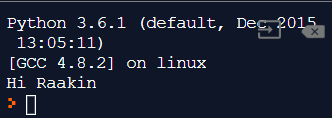
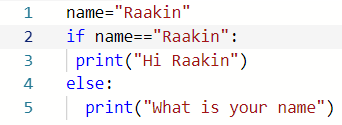


NOTE: Starting with Lesson 9 you should use the WHITE area of the IDE for entering example code with multiple statements.

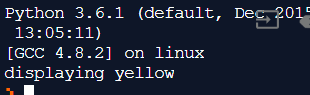
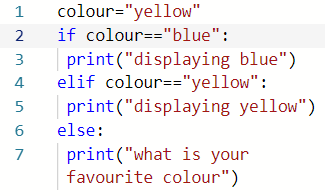
1. Complete “Lesson 9: Logic – Making Decisions” by typing the sample commands in the white area of the IDE.
   1. Modify the tutorial code to print “Hi Alfred!” based on a decision using numbers



1. Complete “Lesson 9: Logic – Adding A Choice” by typing the sample commands in the white area of the IDE.
   1. Modify the tutorial code to print your first name or your last name based on a choice (using “else”).



1. Complete “Lesson 9: Logic – Adding Many Choices” and “Lesson 9: Logic – Practice” by typing the sample commands in the white area of the IDE.



* 1. Modify the tutorial code and “elif” statements to make a choice using at least 4 of your friends names.

