**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.**

5+12

5-12

* 1. **List your expression and the result below.**

5+12=17

5-12=-7

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.**

5\*4

5/2

* 1. **List your expression and the result below.**

20

2.5

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**

Round(8/4)

* 1. **And one division expression that gives a decimal number answer.**

8/3

* 1. **List your expressions and the results below**.

Round(8/4)=2

8/3=2.666

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.**

Round(8/4)

Round(8/3)

* 1. **List your “round()” expressions and the results they return below.**

Round(8/4)=2

Round(8/3)=3

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

== means equal to. = means you’re asking for an answer to a question. If you were to type 5==6, you would get the answer false because 5 isn’t equal to 6. If you type 5+6 you would get an answer because when you use =, it means an answer that is a number.

* 1. **What does “=” mean?**

= in python is asking for an answer that is a number. If you were to use =, you wouldn’t get an a

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**

1+6-3==2+5-3

* 1. **And an expression using 5 different operators that returns a “False” result.**

2-5+12==5-1+6

* 1. **List your expressions and the results returned below.**

1+6-3==2+5-3

True

2-5+12==5-1+6

False

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.**

This is because if the words or numbers are in quotes, it is seen as a string. Anything can be typed in strings but without the quotations, only numbers will work.

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

Because it was typed in quotations so it was seen as a string.

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.**

Because python sees this as adding 2 strings together. It doesn’t know that it is spelling a word. When using strings, you cannot take away letters from words. Therefore “apple”-“e” will not work

* 1. **Also explain why “Hello” \* 10 works but why “Hello” / 10 does work.**

Because you are using concatenate. When you are using strings, the \* is used for putting strings side by side. And it isn’t considered multiplying so the / won’t work because you can’t take strings away from each other if you are starting with only one string.

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.**

Harshveer h-0 a-1 r-2 s-3 h-4 v-5 e-6 e-7 r-8

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”.**

In computer programming, instead of starting with the number 1, 0 is used first so the 4th letter in the word ‘hello’ is the 5th letter.

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

Because in between the , and B, there is a space. This is a character therefore it is numbered with 4. If you were to try using 3 or 5 instead of 4, you would get a comma or a letter.

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.**

Because there is no character at the 7th spot. The word ends on a 6th character

**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?**

12

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

because a value was assigned to the word puppies. If the value was assigned to the word kittens then there would also be an answer

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**

python was told that the value of puppies is 36, 36=36/6, answer is puppies

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**

the word colour was given the value red, puppies was given the value 36, colours+puppies= red 36

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**

Because of the way the brackets are set up differently

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”?**

4

* 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 “==”?**

== is asking equal to and = is asking to an answer

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

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?**

Because “friend” is a string and 5 is an integer. Python can’t combine these 2 together

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

Int is an integer and str is a string

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

Print(harshveer)

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”)**
   2. **What is the value of: type( True )**
   3. **Why is the result different?**

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?**
2. **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?**

**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**
      2. **True and False**
      3. **False and True**
      4. **False and False**
   2. **Explain if there are any other combinations of True / False.**
   3. **Explain how the AND operator is similar to a math operator and how it is different.**
2. **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**
      2. **True or False**
      3. **False or True**
      4. **False or False**
   2. **Explain how the OR operator is similar to the AND operator and how it is different.**
3. **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)**
      2. **not (True or False)**
      3. **not (False or True)**
      4. **not (False or False)**
   2. **Explain how the combination of the NOT & OR operators is similar to the AND operator by itself and how it is different.**
4. **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**
   2. **Explain why the following two Python statements give the same results.**
      1. **not (True and True)**
      2. **not True and True**
5. **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**
6. **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.**
7. **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?**
8. **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**
2. **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”).**
3. **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.**