**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.

a. Create your own expression using 5 “+” and “-“ operators.

b. List your expression and the result below.

5+3-2

6

2. Complete “Lesson 3: Math – More Operators” by typing the sample commands in the black area of the IDE.

a. Create your own expression using 5 “\*” and “/” operators.

b. List your expression and the result below.

5\*3/2

7.5

3. Complete “Lesson 3: Math – More Division” by typing the sample commands in the black area of the IDE.

a. Create one division expression that gives a whole number answer

b. And one division expression that gives a decimal number answer.

c. List your expressions and the results below.

a)100/2 b) 5/2

50 2.5

4. Complete “Lesson 3: Math – Floats” by typing the sample commands in the black area of the IDE.

a. Use the “round()” function for the expressions you created in question #3 above.

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

round(2.5) round(50)

2 50

5. Read through “Lesson 3: Math – Comparison Operators”.

a. Why do you think Equals is “==” instead of “=”?

I think Equals is “==” instead of “=” because “==" is a question whereas “=” is telling the computer what the Variable stands for.

b. What does “=” mean?

“=” means equal.

6. Complete “Lesson 3: Math – Practice” and “Lesson 3: Math – Practice Answers” by typing the sample commands in the black area of the IDE.

a. Create an expression using 5 different operators that returns a “True” result

50<10+20+25+2

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

50>10+20+25+2

c. List your expressions and the results returned below.

50<10+20+25+2

True

50>10+20+25+2

False

7. Complete “Lesson 4: Strings – Strings” and “Lesson 4: Strings – Examples” by typing the sample commands in the black area of the IDE.

a. Explain why typing “apple” works and why typing apple without quotes gives an error.

Typing apple doesn’t work because unlike “apple” you’re not telling that computer that apple is a character so the computer doesn’t know what you’re talking about and goes through its data base looking for an answer and when it can’t find anything it says error.

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

“2+5” doesn’t equal 7 because when you add “ ” it means anything in between those is a character so the computer gets confused.

8. Complete “Lesson 4: Strings – Operators” by typing the sample commands in the black area of the IDE.

a. Explain why typing “ap5pl” + “e” works and why typing “apple” - “e” gives an error.

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

9. Complete “Lesson 4: Strings – Indexes” by typing the sample commands in the black area of the IDE.

a. List the letters in your first name and the index for each letter in your first name.

10. Complete “Lesson 4: Strings – Indexes Examples” by typing the sample commands in the black area of the IDE.

a. Explain why print(“Hello!”[4]) does not print “l”.

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

11. Complete “Lesson 4: Strings – Rules” by typing the sample commands in the black area of the IDE.

a. Explain why print(“Hello!”[7]) 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.

a. What do you get if you type puppies / 3?

Name error and not defined

b. Why doesn’t typing kittens / 3 work?

It doesn’t work because the computer went through its memory of thing we have type and since we have never wrote what puppies / 3 mean, we don’t get a answer.

2. Complete “Lesson 5: Variables – Assign a New Value” by typing the sample commands in the black area of the IDE.

a. Explain how the following sequence of commands works:

First we give puppies a value and then we tell the computer that puppies = puppies / 6 meaning puppies = 36/6 so puppies was substitute with 36 and divided by 6 give puppies a new value of 6.0

· puppies = 36

· puppies = puppies / 6

· puppies

3. Read through “Lesson 5: Variables – Rules”.

4. Complete “Lesson 5: Variables – Math Operators” by typing the sample commands in the black area of the IDE.

a. Explain what happens for following sequence of commands:

A error happen because you can’t add a str and a int.

· colour = “red”

· puppies = 36

· colour + puppies

5. Complete “Lesson 5: Variables – String Operators” by typing the sample commands in the black area of the IDE.

a. Explain why the following commands give different results:

· Color + day \* fishes

· ( Color + day ) \* fishes

The results are different because the order of the operation changes without the bracket.

6. Complete “Lesson 5: Variables – Indexes” by typing the sample commands in the black area of the IDE.

a. What is the index of ‘r’ in “watermelon”?

The index of ‘r’ in watermelon is 5.

b. Write an expression using mynumber to return ‘r’

7. Complete “Lesson 5: Variables – Assignments or Comparisons” by typing the sample commands in the black area of the IDE.

a. What is the difference between “=” and “==”?

The difference between “=” and “==” is that “=” means your giving the answer were as “==” is

b. Create your own mnemonic to remember this difference.

8. Complete “Lesson 6: Errors – Examples” by typing the sample commands in the black area of the IDE.

a. What doesn’t “friend” + 5 work?

“friend” + 5 doesn’t work because friend is a str whereas 5 int therefore they can not be added

b. What is the difference between int and str?

The difference between int and str is that int is a number whereas str is a word.

9. Read through “Lesson 6: Errors – Parts of an Error Message”.

a. Is “friend” + 5 an example of:

i. A Syntax Error?

ii. A Runtime Error?

iii. A Logic Error?

10. Read through “Lesson 6: Errors – Fixing Errors”.

a. Use the ‘print’ command to print your first name and last name.

11. Complete “Lesson 7: Booleans – Types of Data” by typing the sample commands in the black area of the IDE.

a. What is the value of: type(“True”)

b. What is the value of: type( True )

c. Why is the result different?

The result is different because for a. you actually stated to the computer that you just typed in a word so it gave you a answer in the same format unlike for b.

12. Complete “Lesson 7: Booleans – What Is A Boolean” by typing the sample commands in the black area of the IDE.

a. Why do you think that having a Boolean data type is important in computer programming?

A Boolean data type is important in computer programming because it is used to control programing structures

13. Complete “Lesson 7: Booleans – Trying Out Booleans” by typing the sample commands in the black area of the IDE.

a. Why do you think that there is no Maybe” Boolean data value in computer programming?

Boolean data has no maybe because it follows the law of excluded middle.

**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.

a. Try the following Python statements and record the results.

i. True and True

Ture

ii. True and False

False

iii. False and True

False

iv. False and False

False

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

c. 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.

a. Try the following Python statements and record the results.

i. True or True

True

ii. True or False

True

iii. False or True

True

iv. False or False

False

b. 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.

a. Try the following Python statements and record the results.

i. not (True or True)

True

ii. not (True or False)

iii. not (False or True)

iv. not (False or False)

b. 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.

a. Explain why the following two Python statements give different results.

i. not (True or True)

ii. not True or True

b. Explain why the following two Python statements give the same results.

i. not (True and True)

ii. not True and True

5. Complete “Lesson 7: Booleans – Practice” by typing the sample commands in the black area of the IDE.

a. Create three more practice expressions similar to those in the tutorial.

b. 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.

a. Create a list of your favorite sports teams.

b. Assign your list to a variable.

c. 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.

a. What is the list index of the last team in your list of favorite sports teams.

b. In the tutorial, the error produced by typing “fruit[3]” is an example of:

i. A Syntax Error?

ii. A Runtime Error?

iii. 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.

9. Complete “Lesson 9: Logic – Making Decisions” by typing the sample commands in the white area of the IDE.

a. Modify the tutorial code to print “Hi Alfred!” based on a decision using numbers

10. Complete “Lesson 9: Logic – Adding A Choice” by typing the sample commands in the white area of the IDE.

a. Modify the tutorial code to print your first name or your last name based on a choice (using “else”).

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

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