Python Lessons

Introduction:
- ✔ Python is a popular programming language.
- ✔ It was created by "Guido Van Rossum".
- ✔ Python programming language was released in year 1991.
- ✔ It is used for: web development, software development, mathematics and system scripting.

Uses:
- ✔ Python can be used with Database Systems.
- ✔ Python can also read and modify files.
- ✔ Python can be used to handle big data and perform complex mathematics.
- ✔ Python can be used for repaid prototyping or for production ready software development.
- ✔ Python can be used alongside software to create workflows.
- ✔ Python can be use on server side to create web applications.

Why to Choose Python:
- ✔ Python works on many platforms. Like Windows, Mac and Linux.
- ✔ Python has a simple syntax similar to English language.
- ✔ Python executes on interpreter system, it means that code be executed as they have been written.
- ✔ Python has syntax that allows developers to write the program with fewer lines than some other programming languages.
- ✔ Python can be treated in procedural way, an object oriented way and or a functional way.
- ✔ It is possible to write python code by using Integrated Development Environment (IDE).
- ✔ Some of the popular Python IDEs are: PyCharm, Eclipse and Netbeans.
- ✔ Python was designed for readability, and has some similarities to the English language with influence from mathematics.
- ✔ Python relies on indentations, using white-space to define scope such as scope of loops, functions and classes, other programming languages often use curly brackets for this purpose.
- ✔ Python uses new line to complete a command as opposed to other programming languages which often use semicolons or parentheses.

Python Syntax:
- ✔ Python syntax can be executed by writing directly in the command line.
- ✔ Python syntax can also be executed by creating a python file on the server.
- ✔ Using the *.py extension and executing on the command line.
- ✔ Indentation refers to the spaces at the beginning of the code line.
- ✔ In other programming languages the indentation in code is for readability purpose.
- ✔ The indentation in python is very important.
- ✔ Python uses indentation to indicate a block of code.
- ✔ Python will display an error if you forgot the indentation in the block of code.
- ✔ The number of spaces has to be at least one space.
- ✔ You have to use same number of spaces in the same block of code otherwise python will give you an error.

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Python Variables:
- ✔ Variables are created when you assign a value to it.
- ✔ Python has no command for declaring a variable.

Python Comments:
- ✔ Python comments starts with (#) symbol.
- ✔ After (#) symbol every line of code will be turned into python comments.
- ✔ Python has commenting capability for the purpose of in-code documentation.
- ✔ Comments can be used to explain Python code.
- ✔ Comments can be used to make the code more readable.
- ✔ Comments can be used to prevent execution when testing code.
- ✔ Comments can be placed at the end of a line, and Python will ignore the rest of the line.
- ✔ A comment does not have to be text that explains the code, it can also be used to prevent Python from executing code.
- ✔ Python does not have really a syntax for multi-line comments.
- ✔ To add a multi line comment you could insert a (#) hash for each line.
- ✔ You can also use multiline string.
- ✔ Python will ignore string literals that are not assigned to string variables.
- ✔ You can add a multiline string (“””) triple quotes in your code.
- ✔ As long as the string is not assigned to a variable, Python will read the code, but then ignore it, you have made a multiline comment.

Python Variables:
- ✔ Variables are containers for storing data values.
- ✔ Python has no command for declaring a variable.
- ✔ A variable is created the moment you first assign a value to it.
- ✔ Variables do not need to be declared with any particular type and can even change after they have been set.
- ✔ If you want to specify the data type of a variable this can be done with casting.
- ✔ You can get the type of the variable with the type() function.
- ✔ String variables can be declared either by using single or double quotes.
- ✔ Variables name are case-sensitive.
- ✔ The variables can have short names (like x or y) or can have descriptive name (like Age and Gender).

Rules for Python Variables:
- ✔ A variable name must starts with a letter or the underscore character.
- ✔ A variable name cannot start with a number.
- ✔ A variable name can only contain alpha-numeric characters and underscores.
- ✔ Variable name are case-sensitive. Age and AGE are different variables.
- ✔ Variables name with more than one word can be difficult to read. There are several techniques you can use to make them more readable.
- ✔ Camel Case: Each Word, except the first, starts with the capital letter.
- ✔ Pascal Case: Each word starts with capital letter.
- ✔ Snake Case: Each word is separated by an underscore character.
- ✔ Python allows you to assign values to multiple variables in one line. Make sure the number of variables matches the number of values, or else you will get an error.
- ✔ You can also assign single same value to multiple variables.

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- ✔ If you have a collection of values in a list, tuple etc. Python allows you to extract the values into variables. This is called unpacking.
- ✔ The Python print statement is often used to output variables.
- ✔ To combine text and variables Python uses (+) plus operator.
- ✔ You can also use (+) plus operator to add a variable to another variable.
- ✔ For numbers in Python (+) plus operator will work as a addition operator.
- ✔ Variables that are created outside of a function are known as global variables.
- ✔ Global variables can be used by anyone both inside of a function or outside of it.
- ✔ If you create a variables inside of a function then it scope will be local, and hence it will be called local variable.
- ✔ To create a global variable inside a function you can use the global keyword.
- ✔ Also use the global keyword if you want to change a global variable inside a function.

Python Data Types:

- ✔ Built-in Data Types:
- ✔ In programming, data type is an important concept.
- ✔ Variables can store data of different types and different type can do different things.
- ✔ Python has the following data types built-in by default in these categories.
- ✔ Text Type: str()
- ✔ Numeric types: int(), float(), complex()
- ✔ Sequence types: list, tuple and range.
- ✔ Mapping type: dict.
- ✔ Set types: set, frozenset
- ✔ Boolean type: bool
- ✔ Binary types: bytes, bytearray and memoryview
- ✔ You can get the data type of any object by using the type() function.
- ✔ In Python, the data type is set when you assign a value to a variable.
- ✔ If you want to specify the data type you can use the constructor of the specified data type.

Pythons Numbers:

- ✔ There are three types of numerics are there:
- ✔ Int.
- ✔ Float.
- ✔ Complex.
- ✔ Variables of numerics are created when you assign a value to them.
- ✔ To verify the type of an object in Python, use the type() function.
- ✔ Int or Integer, is a whole number positive or negative without decimals of unlimited length.
- ✔ Float or Floating Point Number is a number, positive or negative, containing one or more decimals.
- ✔ Float can also be a scientific numbers with an "e" to indicate the power of 10.
- ✔ Complex numbers are written with a "j" as the imaginary part.
- ✔ You can convert from one type to another with the int(), float() and complex() methods.
- ✔ You cannot convert complex data type variable to another data type variable.
- ✔ Python has a built-in module called random that can be used to make random numbers.
- ✔ Python is an Object Oriented Language, and as such it uses classes to define data types including its primitive types.
- ✔ Casting in Python is therefore is done using constructor functions. Inf(), float(), complex() and str().

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Python Strings:

- ✔ Strings in Python are surrounded by either single quotation marks or double quotations mark.
- ✔ You can display a string literal with the print() function.
- ✔ Assigning a string to a variable is done with the variable name followed by an equal sign and the string.
- ✔ You can assign a multiline string by using the three quotations marks.
- ✔ Like many other programming languages strings in Python, are arrays of bytes representing unicode characters.
- ✔ Python does not have a character data type, a single character is simply a string with a length of one.
- ✔ Square brackets can be used to access elements of the String.
- ✔ Strings are arrays, we can loop through characters in a string.
- ✔ To get the length of the string, use len() function.
- ✔ To check if a certain phrase or character is present in s string, we can use in keyword.
- ✔ To check if a certain phrase or a character is not present in a string, we can use the keyword not in.
- ✔ You can return a range of characters by using the slice syntax. Just specify the start index and the end index, which will be separated by a colon to return a part of the string.
- ✔ By leaving out the start index the range will start at the first character.
- ✔ By leaving out the end index, the range will go to the end.
- ✔ Use the neagative indexes to start the slice from the end of the string.
- ✔ Python has a set of built-in methods that you can use on string.
- ✔ The lower() method returns the string in lower case.
- ✔ The upper() method returns the string in upper case.
- ✔ White-space is the space before and or after the actual text and very often you want it to remove this white-space.
- ✔ The strip() methods removes any white-space from the beginning or the end.
- ✔ The split() method returns a list where the text between the specified separator becomes the list items.
- ✔ To concatenate or combine two strings you can use the (+) plus operators.
- ✔ We can combine strings and numbers by using format() method.
- ✔ The format() method takes the passed arguments, format them, and places them in the string where the placeholders {} are presents.
- ✔ The format() methods takes unlimited arguments and are placed into the respective placeholders.
- ✔ You can use index numbers {0} to be sure the arguments are placed in the correct placeholder.
- ✔ To insert characters that are illegal in a string, use an escape character.
- ✔ An escape character is a backslash \ followed by the character you want to insert.
- ✔ An example of illegal character is double quote inside the string that is surrounded by double quotes.
- ✔ You will get an error if you use double quotes inside a string that is surrounded by double quotes. To fix this problem use the escape character \".
- ✔ Other characters we can use are:
- ✔ Single Quote.
- ✔ Backslash.
- ✔ New line.

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- ✔ Carriage Return.
- ✔ Tab.
- ✔ Backspace
- ✔ Form Feed.
- ✔ Octal value.
- ✔ Hexa Value.
- ✔ Python has a set of string method built-in method that you can use on string.
- ✔ All string methods returns new value. They do not change the original string.

Python Booleans:
- ✔ Boolean represents one of two values: True or False.
- ✔ In programming you often need to know if an expression is True or False.
- ✔ You can evaluate any expression in Python, and get one of two answers: True or False.
- ✔ When you compare two values, the expression is evaluated and Python returns the Boolean answer.
- ✔ When you run a condition in an if statement, Python returns True or False.
- ✔ The bool() function allows you to evaluate any value, and give you True or False in return.
- ✔ Almost any value is evaluated to True if it has some sort of content.
- ✔ Any string, is True except an empty string.
- ✔ Any number is True, except 0.
- ✔ Any List, Tuple, Set and Dictionary are True except empty one.
- ✔ Python has also many built-in functions that return a boolean value like the isinstance() function which can be used to determine if an object is of a certain data type.

Python Operators:
- ✔ Operators are used to perform operations ion variables and values.
- ✔ Python divides the operators in the following groups.
- ✔ Arithmetic Operators.
- ✔ Assignment Operator.
- ✔ Comparison Operators.
- ✔ Logical Operators.
- ✔ Identity Operators.
- ✔ Membership Operators.
- ✔ Bitwise Operators.

Python Arithmetic Operators:s
- ✔ Arithmetic operators are used with numeric values to perform common mathematical operations.
- ✔ Arithmetic Operators are:
- ✔ Addition (+).
- ✔ Subtraction (-).
- ✔ Multiplication (*).
- ✔ Division (/).
- ✔ Modulus (%).
- ✔ Exponential (**).
- ✔ Floor Division (//).

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Python Assignment Operator:
- ✔ Assignment operator are used to assign values to variables.
- ✔ Assignment operators are:
- ✔ Equal-to operator (=).
- ✔ (+=).
- ✔ (-=).
- ✔ (*=).
- ✔ (/=).
- ✔ (&=).
- ✔ (//=).
- ✔ (**=).
- ✔ (&=).
- ✔ (|=).
- ✔ (^=).
- ✔ (>>=).
- ✔ (<<=).

Python Comparison Operator:
- ✔ Comparison operators are used to compare two values.
- ✔ Comparison operators are:
- ✔ Equal (==).
- ✔ Not Equal (!=).
- ✔ Greater Than (>).
- ✔ Less Than (<).
- ✔ Greater Than Equal To (>=).
- ✔ Less Than Equal-to (<=).

Python Logical Operators:
- ✔ Logical operators are used to combine conditional statements.
- ✔ Logical Operators are:
- ✔ and.
- ✔ Or
- ✔ not

Python Identity Operators:
- ✔ Identity operators are used to compare the objects, not if they are equal, but if they are actually the same object, with same memory location.
- ✔ Identity Operators are:
- ✔ is.
- ✔ is not.

Python Membership Operator.
- ✔ Membership operators are used to test if a sequence is present in an object.
- ✔ in.
- ✔ not in.

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Python Bitwise Operator:
- ✔ Bitwise operator is used to compare binary numbers.
- ✔ Bitwise operators are:
- ✔ Bit and (&)
- ✔ Bit or (|)
- ✔ Bit not (~)
- ✔ Bit xor (^)
- ✔ Zero Fill Left Shift (<<).
- ✔ Zero Fill Right Shift (>>).

Python Lists:
- ✔ Lists are used to store multiple items in a single variable.
- ✔ Lists are one of four built-in data types in Python used to store collections of data, the other three are Tuple, Set and Dictionary, all with different qualities and usage.
- ✔ Lists are created using square brackets.
- ✔ Lists items are ordered, changeable and allow duplicate values.
- ✔ List items are indexed, the first item has index [0], the second item has index [1] etc.
- ✔ Lists items can be ordered and cannot be changed because list items have a defined order.
- ✔ If you add new items to the list, the new item will be placed at the end of the list.
- ✔ There are some list methods, that will change the order but in general, the order of the items will not change.
- ✔ Lists in python are changeable, we can add, edit and even remove an item from the list after it was created.
- ✔ To get the list items count use the len() method.
- ✔ List items can be of any data type.
- ✔ Lists are defined as object with the data type "list"
- ✔ It is also possible to use the list() constructor when creating a new list.

Python Collections:
- ✔ Python Programming Language has four (4) collections data types. They are:
- ✔ List: Liss are ordered, changeable and can contain duplicate values.
- ✔ Tuple: Tuple are ordered but unchangeable and allows duplicate values.
- ✔ Set: Set are unordered and unindexed and cannot have duplicate values.
- ✔ Dictionary: Dictionary is ordered, changeable and cannot have duplicated values.
- ✔ As of Python version 3.7, dictionaries are ordered.
- ✔ In Python version 3.6, dictionaries are unordered.
- ✔ List Items are indexed and accessed by an index number. The first item has index 0.
- ✔ Negative indexing means start from the end. -1 refers to the last item, -2 refers to the second last item.
- ✔ Range can be specified by specifying start and end ranges, Python will return a new list within the defined ranges.
- ✔ Check the specified item in list you have to used in keyword.
- ✔ To change the value of a specific index, just mention that index in square brackets and then assign new value to that index.
- ✔ If you want to change some list items that create a new list with the specific index ranges.
- ✔ If you add more value to the specified index range then additional values will be added after range value and previous value will be moved further.

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- ✔ The length of list will be changed when the number of items is greater than the specified after changing some items.
- ✔ The insert() method will insert new item at the specified index of the list.
- ✔ The append() method will add new value to the end of the list. Aka new index will be created.
- ✔

Python File Handling:
Python MySQL:

Refs:
Continue From Python Add List Items: https://www.w3schools.com/python/python_lists_add.asp

Python Files: https://www.w3schools.com/python/python_file_handling.asp

Python MySql: https://www.w3schools.com/python/python_mysql_getstarted.asp