**Basic Python**

**Python Syntax**

A Python script can be written in Python interactive shell or in the code editor. A Python file has an extension .py.

**Python Indentation**

An indentation is a white space in a text. Indentation in many languages is used to increase code readability, however Python uses indentation to create block of codes. In other programming languages curly brackets are used to create blocks of codes instead of indentation. One of the common bugs when writing python code is wrong indentation.

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| Python  >>> “Hello World!” => This will cause an indentation error >>>“Hello World!” => This won’t cause an indentation error |

**Comments**

Comments are very important to make the code more readable and to leave remarks in our code. Python does not run comment parts of our code. Any text starting with hash(#) in Python is a comment.

Example: Single Line Comment

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| --- |
| # This is the first comment  # This is the second comment  # Python is eating the world |

Example: Multiline Comment

Triple quote can be used for multiline comment if it is not assigned to a variable

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| --- |
| """This is multiline comment  multiline comment takes multiple lines.  python is eating the world  """ |

**Data types**

In Python there are several types of data types

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| --- | --- | --- |
| **Datatypes** | **Types/Description** | **Example** |
| Numbers | Integers | Integer (-ve, zero and +ve) numbers Example: ... -3, -2, -1, 0, 1, 2, 3.. |
| Float | Decimal number Example ... -3.5, -2.25, -1.0, 0.0, 1.1, 2.2, 3.5 … |
| Complex | 1 + j, 2 + 4j |
| String | A collection of one or more characters under a single or double quote. If a string is more than one sentence, then we use a triple quote. | 'Finland' 'Python' 'I love teaching' 'I hope you are enjoying the first day of 30DaysOfPython Challenge' |
| Booleans | A Boolean data type is either a True or False value. T and F should be always uppercase. | True # Is the light on? If it is on, then the value is True  False # Is the light on? If it is off, then the value is False |
| List | Python list is an ordered collection which allows to store different data type items. A list is similar to an array in JavaScript. | [0, 1, 2, 3, 4, 5] # all are the same data types - a list of numbers ['Banana', 'Orange', 'Mango', 'Avocado'] # all the same data types - a list of strings (fruits) ['Finland','Estonia', 'Sweden’, ‘Norway'] # all the same data types - a list of strings (countries) ['Banana', 10, False, 9.81] # different data types in the list - string, integer, boolean and float |
| Dictionary | A Python dictionary object is an unordered collection of data in a key value pair format. | { 'first\_name':'Asabeneh', 'last\_name':'Yetayeh', 'age':250,  'is\_married':True, 'skills':['JS', 'React', 'Node', 'Python'] } |
| Tuple | A tuple is an ordered collection of different data types like list, but tuples cannot be modified once they are created. They are immutable. | ('Asabeneh', 'Pawel', 'Brook', 'Abraham', 'Lidiya') # Names ('Earth', 'Jupiter', 'Neptune', 'Mars', 'Venus', 'Saturn', 'Uranus', 'Mercury') # planets |
| Set | A set is a collection of data types like list and tuple. Unlike list and tuple, set is not an ordered collection of items. Like in Mathematics, set in Python stores only unique items. | {2, 4, 3, 5} {3.14, 9.81, 2.7} # order is not important in set |

**Variables**

Variables store data in a computer memory. Mnemonic variables are recommended to use in many programming languages. A mnemonic variable is a variable name that can be easily remembered and associated. A variable refers to a memory address in which data is stored. Number at the beginning, special character, hyphen is not allowed when naming a variable. A variable can have a short name (like x, y, z), but a more descriptive name (firstname, lastname, age, country) is highly recommended.

Python Variable Name Rules

* A variable name must start 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 (A-z, 0-9, and \_)
* Variable names are case-sensitive (firstname, Firstname, FirstName and FIRSTNAME) are different variables)

Here are some examples of valid variable names:

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| firstname  lastname  age  country  city  first\_name  last\_name  capital\_city  \_if # if we want to use reserved word as a variable  year\_2021  year2021  current\_year\_2021  birth\_year  num1  num2 |

Invalid variables names

|  |
| --- |
| first-name  first@name  first$name  num-1  1num |

We will use standard Python variable naming style which has been adopted by many Python developers. Python developers use snake case(snake\_case) variable naming convention. We use underscore character after each word for a variable containing more than one word (e.g. first\_name, last\_name, engine\_rotation\_speed). The example below is an example of standard naming of variables, underscore is required when the variable name is more than one word.

When we assign a certain data type to a variable, it is called variable declaration. For instance, in the example below my first name is assigned to a variable first\_name. The equal sign is an assignment operator. Assigning means storing data in the variable. The equal sign in Python is not equality as in Mathematics.

Example:

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| --- |
| # Variables in Python  first\_name = 'Asabeneh'  last\_name = 'Yetayeh'  country = 'Finland'  city = 'Helsinki'  age = 250  is\_married = True  skills = ['HTML', 'CSS', 'JS', 'React', 'Python']  person\_info = {  'firstname':'Asabeneh',  'lastname':'Yetayeh',  'country':'Finland',  'city':'Helsinki'  } |