Fundamentals of Python

Review the fundamentals of Python with this short e-book. Check out the table of contents to navigate to each topic.

Contents

Variables

A variable is a name associated with a value. It can be named anything, but:

- It cannot start with a number.
- It cannot contain spaces.
- The only symbol it can contain is the underscore.

Correct

```
response
top500
one_apple
first_numbers
_usernames
_last_
current_
```

Incorrect

```
top 500
one apple
1st_numbers
^last_
$current
response#
```

Strings

A string is a sequence of characters surrounded by quotation marks: single quotes `''` or double quotes `""`

- Anything surrounded by the quotation marks indicate a string.
- Every opening quote must have a closing quote to form a string.
- If opening a string with a single quote, the closing quote must be a single quote as well.

Correct

```
"This is a sample string using double quotes"
'This is a sample string using single quotes'
'This is a normal string'
'50 + 51'
```

Incorrect

```
'This string will end here.' From here the continuation is not a string'
'This is an Incorrect string"
"Same as this one'
```

Integers

An integer is a whole number of any length that can be positive or negative, written without a fractional element.

Examples

`-1` `0` `1` `86400`

Floats

A float is a number that can be positive or negative written with a fractional element.

Examples

`-100.54` `1.0` `59.1`

Booleans

One of two values: `True` and `False`.

Extra Resources

1. What are variables?
2. Strings and numbers
3. String formatting
4. Strings, Variables, and Getting Input from Users

Lists

- An ordered, sequential data type.
- Used to store multiple elements in one variable.
- Defined by using a pair of square brackets.

```python
shopping_list = ['cereals', 'milk', 'cherries']
midterm_grades = [4, 9, 6, 6]
```

- Lists can contain different data types.

```python
phone_numbers = ['james', 8067366796]
```

- Each element in a list has a position (index) through which it can be accessed.

```python
shopping_list[0]  # cereals
shopping_list[1]  # milk
shopping_list[2]  # cherries
```

Extra Resources

1. What is a list?
2. Split, join, and slices
3. Extending Python lists

Tuples

- Similar to lists, but are **immutable**.
- Defined by separating multiple values with commas.
- For better readability, it can be surrounded by parentheses (brackets).

```
shopping_list = 'apples', 'milk', 'cherries'
midterm_grades = 4, 9, 6, 6
phone_numbers = 'james', 8067366796
better_readability = ('with', 'parenthesis')
```

Sets

- An unordered data type.
- Elements cannot be accessed by their indices.
- Defined by using a pair of curly braces.

```
shopping_list = {'apples', 'milk', 'cherries'}
```

Extra Resources

1. Basic Python collections
2. Sets - 30 Days of Python
3. Python set operators

Dictionaries

- Defined with 3 key components: curly braces, keys, and values.
- Keys must be strings or other hashable values.
- Values associated to each key can be anything.
- Dictionaries can be defined in one line:

```python
employees = {'ID': 16915, 'name': 'James', 'department': ['Sales', 'Accounting']}
```

- Or in multiple lines to aid readability:

```python
employees = {
  'ID': 16915,
  'name': 'James',
  'department': ['Sales', 'Accounting']
}
```

- Access values in a dictionary by using square brackets and the key:

```python
employees['name']  # 'James'
```

Extra Resources

1. What is a dictionary?
2. Updating Python dictionaries