Python Cheat Sheet

Source: The Python Mega Course by Ardit Sulce

Course link: http://udemy.com/the-python-mega-course

Python Data Types

- **Integers** are used to represent whole numbers:

```
rank = 10
eggs = 12
people = 3
```

- **Floats** represent decimal numbers:

```
temperature = 10.2
rainfall = 5.98
elevation = 1031.88
```

- **Strings** represent text:

```
message = "Welcome to our online shop!"
name = "John"
serial = "R001991981SW"
```

- **Lists** represent arrays of values that may change during the course of the program:

```
members = ["Sim Soony", "Marry Roundknee", "Jack Corridor"]
pixel_values = [252, 251, 251, 253, 250, 248, 247]
```

- **Dictionaries** represent pairs of keys and values:

```
phone_numbers = {"John Smith": "+37682929928", "Marry Simpons": "+423998200919"}
volcano_elevations = {"Glacier Peak": 3213.9, "Rainer": 4392.1}
```

- **Keys** of a dictionary can be extracted with:

```
phone_numbers.keys()
```

- **Values** of a dictionary can be extracted with:

```
phone_numbers.values()
```

- **Tuples** represent arrays of values that are not to be changed during the course of the program:

```
vowels = ('a', 'e', 'i', 'o', 'u')
one_digits = (0, 1, 2, 3, 4, 5, 6, 7, 8, 9)
```

- You can get a list of **attributes** of a data type has using:

```
dir(str)
dir(list)
dir(dict)
```

- You can get a list of Python **builtin functions** using:

```
dir(__builtins__)
```

- You can get the **documentation** of a Python data type using:

```
help(str)
help(str.replace)
help(dict.values)
```

Operations with Data Types

- Lists, strings, and tuples have a **positive index** system:

```
["Mon", "Tue", "Wed", "Thu", "Fri", "Sat", "Sun"]
   0      1      2      3      4      5      6
```

- And they have a **negative index** system as well:

```
["Mon", "Tue", "Wed", "Thu", "Fri", "Sat", "Sun"]
  -7     -6     -5     -4     -3     -2     -1
```

- In a list, the **2nd**, **3rd**, and **4th** items can be accessed with:

```
days = ["Mon", "Tue", "Wed", "Thu", "Fri", "Sat", "Sun"]
days[1:4]
Output: ['Tue', 'Wed', 'Thu']
```

- **First three items of a list**:

```
days = ["Mon", "Tue", "Wed", "Thu", "Fri", "Sat", "Sun"]
days[:3]
Output:['Mon', 'Tue', 'Wed']
```

- **Last three items of a list**:

```
days = ["Mon", "Tue", "Wed", "Thu", "Fri", "Sat", "Sun"]
days[-3:]
Output: ['Fri', 'Sat', 'Sun']
```

- **Everything but the last**:

```
days = ["Mon", "Tue", "Wed", "Thu", "Fri", "Sat", "Sun"]
days[:-1]
Output: ['Mon', 'Tue', 'Wed', 'Thu', 'Fri', 'Sat']
```

- **Everything but the last two**:

```
days = ["Mon", "Tue", "Wed", "Thu", "Fri", "Sat", "Sun"]
days[:-2]
Output: ['Mon', 'Tue', 'Wed', 'Thu', 'Fri']
```

- A dictionary **value** can be accessed using its corresponding dictionary **key**:

```
phone_numbers = {"John":"+37682929928","Marry":"+423998200919"}
phone_numbers["Marry"]
Output: '+423998200919'
```

Functions and Conditionals

- Define **functions**:

```
def cube_volume(a):
    return a * a * a
```

- Write **if-else conditionals**:

```
message = "hello there"

if "hello" in message:
    print("hi")
else:
    print("I don't understand")
```

- Write **if-elif-else conditionals:**

```
message = "hello there"

if "hello" in message:
    print("hi")
elif "hi" in message:
    print("hi")
elif "hey" in message:
    print("hi")
else:
    print("I don't understand")
```

- Use the `and` operator to check if **both conditions** are True at the same time:

```
x = 1
y = 1

if x == 1 and y==1:
    print("Yes")
```

```
else:
    print("No")
```

- Use the `or` operator to check if **at least one condition** is True:

```
x = 1
y = 2

if x == 1 or y==2:
    print("Yes")
else:
    print("No")
```

- Check if a value is of a particular **type** with **isinstance**:

```
isinstance("abc", str)
isinstance([1, 2, 3], list)
```

or directly:

```
type("abc") == str
type([1, 2, 3]) == lst
```

Processing User Input

- A Python program can get **user input** via the `input` function:
- The **input function** halts the execution of the program and gets text input from the user**:**

```
name = input("Enter your name: ")
```

- The input function converts any **input to a string**, but you can convert it back to int or float:

```
experience_months = input("Enter your experience in months: ")
experience_years = int(experience_months) / 12
```

- You can also **format strings** with:

```
name = "Sim"
experience_years = 1.5
print("Hi {}, you have {} years of experience".format(name, experience_years))
```

Output: `Hi Sim, you have 1.5 years of experience.`

Python Loops

- A **for-loop** is useful to repeatedly execute a block of code.
- You can create a **for-loop** like so:

```
for letter in 'abc':
    print(letter.upper())
```

Output:

```
A B C
```

As you can see, the for-loop repeatedly converted all the items of `'abc'` to uppercase.

- The name after `for` (e.g. `letter`) is just a variable name
- You can loop over **dictionary keys** as follows:

```
phone_numbers = {"John Smith":"+37682929928","Marry Simpons":"+423998200919"}
for value in phone_numbers.keys():
    print(value)
```

Output:

```
John Smith Marry Simpsons
```

- You can loop over **dictionary values**:

```
phone_numbers = {"John Smith":"+37682929928","Marry Simpons":"+423998200919"}
for value in phone_numbers.values():
    print(value)
```

Output:

`+37682929928` `+423998200919`

- You can loop over **dictionary items**:

  ```
  phone_numbers = {"John Smith":"+37682929928","Marry Simpons":"+423998200919"}
  for key, value in phone_numbers.items():
      print(key, value)
  ```

  Output:

  ```
  John Smith +37682929928
  Marry Simpons +423998200919
  ```

- We also have **while-loops**. The code under a while-loop will run as long as the while-loop condition is true:

  ```
  while datetime.datetime.now() < datetime.datetime(2090, 8, 20, 19, 30, 20):
      print("It's not yet 19:30:20 of 2090.8.20")
  ```

  The loop above will print out the string inside `print()` over and over again until the 20th of August, 2090.

List Comprehensions

- A list comprehension is an expression that creates a list by iterating over another container.
- A **basic** list comprehension:

  ```
  [i*2 for i in [1, 5, 10]]
  ```

  Output: `[2, 10, 20]`

- List comprehension with **if** condition:

```
[i*2 for i in [1, -2, 10] if i>0]
```

Output: `[2, 20]`

- List comprehension with an **if and else** condition:

```
[i*2 if i>0 else 0 for i in [1, -2, 10]]
```

Output: `[2, 0, 20]`

More on Functions

- Functions can have more than one **parameter**:

```
def volume(a, b, c):
    return a * b * c
```

- Functions can have **default** parameters (e.g. `coefficient`):

```
def converter(feet, coefficient = 3.2808):
    meters = feet / coefficient
    return meters

print(converter(10))
```

Output: `3.0480370641306997`

Arguments can be passed as **non-keyword** (positional) arguments (e.g. `a`) or **keyword** arguments (e.g. `b=2` and `c=10`):

```
def volume(a, b, c):
    return a * b * c

print(volume(1, b=2, c=10))
```

- An **args** parameter allows the function to be called with an arbitrary number of non-keyword arguments:

```
def find_max(*args):
    return max(args)
print(find_max(3, 99, 1001, 2, 8))
```

Output: `1001`

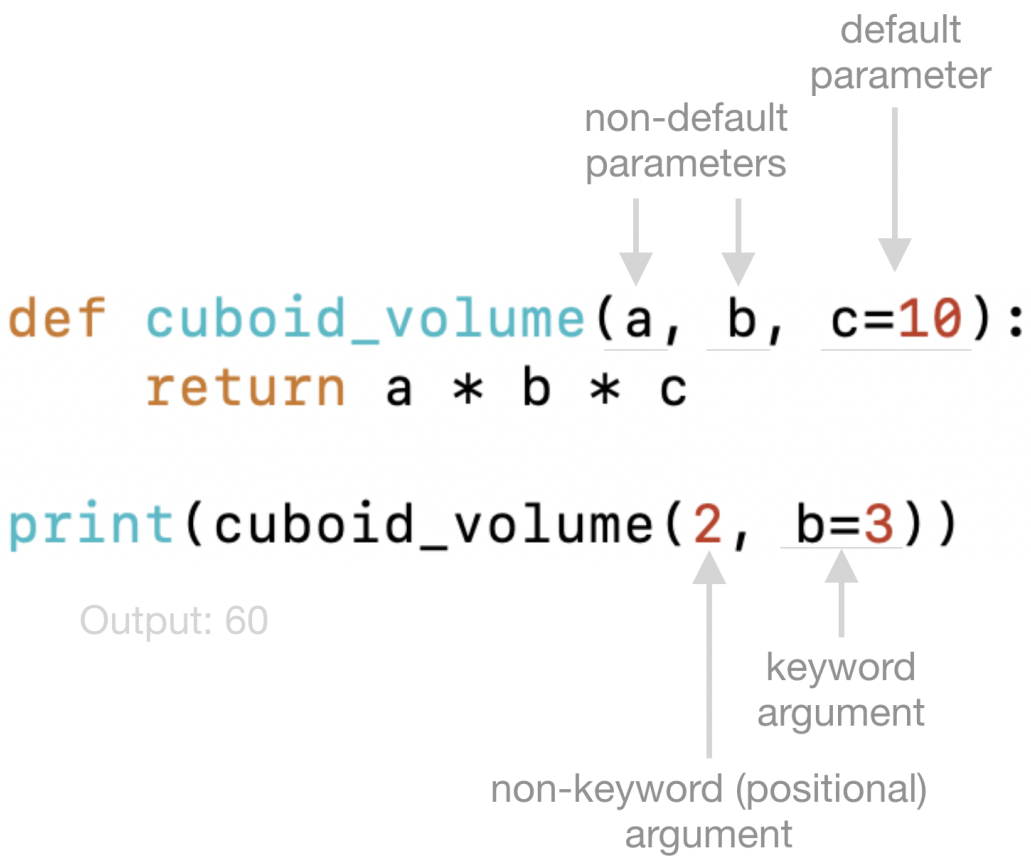
- A ***kwargs** parameter allows the function to be called with an arbitrary number of keyword arguments:

```
def find_winner(**kwargs):
    return max(kwargs, key = kwargs.get)

print(find_winner(Andy = 17, Marry = 19, Sim = 45, Kae = 34))
```

Output: `Sim`

- Here is a visual summary of function elements:



File Processing in Python

- You can **read** an existing file with Python:

```
with open("file.txt") as file:
    content = file.read()
```

- You can **create** a new file with Python and **write** some text on it:

```
with open("file.txt", "w") as file:
    content = file.write("Sample text")
```

- You can **append** text to an existing file without overwriting it:

```
with open("file.txt", "a") as file:
    content = file.write("More sample text")
```

- You can both **append and read** a file with:

```
with open("file.txt", "a+") as file:
    content = file.write("Even more sample text")
    file.seek(0)
    content = file.read()
```

Python Modules

- **Builtin objects** are all objects that are written inside the Python interpreter in C language.
- **Builtin modules** contain builtins objects.
- Some builtin objects are not immediately available in the global namespace. They are parts of a builtin module. To use those objects the module needs to be **imported** first. E.g.:

```
import time
time.sleep(5)
```

- **A list of all builtin modules** can be printed out with:

```
import sys
sys.builtin_module_names
```

- **Standard libraries** is a jargon that includes both builtin modules written in C and also modules written in Python.
- **Standard libraries** written in Python reside in the Python installation directory as *.py* files. You can find their directory path with `sys.prefix`.
- **Packages** are a collection of *.py* modules.
- **Third-party libraries** are packages or modules written by third-party persons (not the Python core development team).
- Third-party libraries can be **installed** from the terminal/command line:

  Windows:

  `pip install pandas` or use `python -m pip install pandas` if that doesn't work.

- Mac and Linux:

  `pip3 install pandas` or use `python3 -m pip install pandas` if that doesn't work.