Lecture #2: Functions, Mutability, Input, and Strings

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Functions

Functions

Python functions are just like any other programming language's functions. The following is the general syntax:

```python
def iamafunction(ARG1, ARG2, ARG3=None, ARG4=b):
    something
    return OUTPUT
```

Arguments are optional. There can be multiple, and there are optional arguments that default to something if not passed to the function.

Returns are also optional. There can also be multiple things returned, returning as a tuple

Mutable vs Immutable

A Immutable variable is one that can cannot change it's value after creation, while a multable variable is one that can

I will show some examples. To know if one is multable or not by re-assignment, one can check it's ID

Sequences

A sequences is a positionally ordered collection of items. For example, a list:

```
a = [2, 5, 7, 3, 6, 8, 6]
```

A tuples is a immutable listm, i.e cannot be changed after it's creation

```
a = (2, 5, 7, 3, 6, 8, 6)
# This should throw an error
a[2] = 34
```

Sets

A set an un-orderd list that is immutable

It is the least used type

```
a = {2, 5, 7, 3, 6, 8, 6}
b = {5, 2}
# This should throw an error
print(a[5])
print(a-b)
```

Strings

A string is also a sequence by itself

```
a = "Hello World!"
print(a[2])
```

Bytearray

A binary list

```
a = bytearray([234, 12, 34, 65])
```

There are a couple of methods one can do with sequences, such as (shown on screen)

One can index a Python list with [START:END]. You can also have negatives

Dictionaries

What?

A variable to map keys to values. Think of it as a list but you choose the index

```
a = {'resistor': 1E3, 'tollerance': '+-yes'}
```

No Duplicates

A dictionary cannot have the same key

```python
# This cause the first `number` key set to be ignored
a = {'number': 1E3, 'number': 34, 'fruit': 'banana'}
```

Input

Input

The input function allows you to type text into your application

```
a = input("Please enter something :) ")
```

String Formatting

Variables in Strings?

Python strings can be formatted to add text, similar to printf

```python
a = 123
# The following are all the same, from least to most
↪ preferable
print("This is a number %s" % a)
print("This is a number {:d}".format(a))
print(f"This is a number {a:d}")        # Since Python
↪ 3.6
```

Formatting List

The format can be found in the docs, but here are a couple

```python
print(f"Numbers: {123:d}")
print(f"Numbers: {123:05d}")
print(f"Numbers: {123:x}")
print(f"Numbers: {123.0:.2f}")
print(f"Numbers: {0.0000000000562:g}")
print(f"Numbers: {"Text!":s}")
```

The end