Types, Statements and Other Goodies

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Module Overview

- Data Types
- Flow Control
- Loops
- Dictionaries
- Exceptions
- Other Data Types

Types in Python – Wait, What?

Python vs. the Others... again

```
// C# or Java
int answer = 42;
String name = "PythonBo”;
```

```
# Python
answer = 42
name = "PythonBo"
```

Combining Data Types

Python 3.6.0 Shell

```
Python 3.6.0 (default, Feb 24 2017, 11:58:14)
[GCC 4.2.1 Compatible Apple LLVM 8.0.0 (clang-800.0.42.1)] on darwin
Type "copyright", "credits" or "license()" for more information.
>>> def add_numbers(a, b):
        print(a + b)


>>> add_numbers(5, 11)
16
>>> add_numbers(5, "something")
Traceback (most recent call last):
  File "<pyshell#4>", line 1, in <module>
    add_numbers(5, "something")
  File "<pyshell#2>", line 2, in add_numbers
    print(a + b)
TypeError: unsupported operand type(s) for +: 'int' and 'str'
>>>
```

Type Hinting

```
def add_numbers(a: int, b: int) -> int:
    return a + b
```

Integers and Floats

```
answer = 42
pi = 3.14159
answer + pi = 45.14159  # Don't worry about conversion!
int(pi) == 3
float(answer) == 42.0
```

Strings

```
'Hello World' == "Hello World" == """Hello World"""
"hello".capitalize() == "Hello"
"hello".replace("e", "a") == "hallo"
"hello".isalpha() == True
"123".isdigit() == True  # Useful when converting to int
"some,csv,values".split(",") == ["some", "csv", "values"]
```

String Format Function

```
name = "PythonBo"
machine = "HAL"
"Nice to meet you {0}. I am {1}".format(name, machine)
f"Nice to meet you {name}. I am {machine}"
```

Boolean and None

```
python_course = True
java_course = False
int(python_course) == 1
int(java_course) == 0
str(python_course) == "True"

aliens_found = None
```

If Statements

```
number = 5
if number == 5:
    print("Number is 5")
else:
    print("Number is NOT 5")
```

Truthy and Falsy Values

```
number = 5
if number:
    print("Number is defined and truthy")


text = "Python"
if text:
    print("Text is defined and truthy")
```

Boolean and None

```
python_course = True
if python_course:  # Not python_course == True
    print("This will execute")


aliens_found = None
if aliens_found:
    print("This will NOT execute")
```

Not If

```
number = 5
if number != 5:
    print("This will not execute")


python_course = True
if not python_course:
    print("This will also not execute")
```

Multiple If Conditions

```
number = 3

python_course = True

if number == 3 and python_course:
    print("This will execute")


if number == 17 or python_course:
    print("This will also execute")
```

Ternary If Statements

```
a = 1

b = 2

"bigger" if a > b else "smaller"
```

Lists

```
student_names = []
student_names = ["Mark", "Katarina", "Jessica"]
```

Getting List Elements

```
student_names = ["Mark", "Katarina", "Jessica"]

student_names[0] == "Mark"

student_names[2] == "Jessica"

student_names[-1] == "Jessica"
```

Changing List Elements

```
student_names = ["Mark", "Katarina", "Jessica"]

student_names[0] = "James"

student_names == ["James", "Katarina", "Jessica"]
```

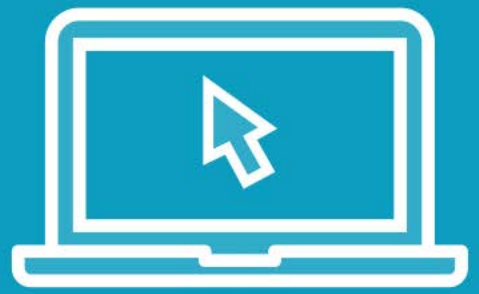
List Functions

```
student_names = ["Mark", "Katarina", "Jessica"]

student_names[3] = "Homer"  # No can do!

student_names.append("Homer")  # Add to the end

student_names == ["Mark", "Katarina", "Jessica", "Homer"]

"Mark" in student_names == True  # Mark is still there!

len(student_list) == 4  # How many elements in the list

del student_names[2]  # Jessica is no longer in the list :(

student_names = ["Mark", "Katarina", "Homer"]
```

List Slicing

```
student_names = ["Mark", "Katarina", "Homer"]

student_names[1:] == ["Katarina", "Homer"]

student_names[1:-1] == ["Katarina"]
```

Demo



Break and Continue

Printing List Elements

```
student_names = ["Mark", "Katarina", "Jessica"]
print(student_names[0])
print(student_names[1])
print(student_names[2])
...
```

For Loop

```
for name in student_names:
    print("Student name is {0}".format(name))
```

Other Code

```
for (var i = 0; i < someArray.length; i++) {
    var element = someArray[i];
    console.log(element);
}
```

While Loops

```
x = 0
while x < 10:
    print("Count is {0}".format(x))
    x += 1
```

Infinite Loops

```
num = 10
while True:
    if num == 42:
        break
    print("Hello World")
```

Dictionaries

```
student = {
    "name": "Mark",
    "student_id": 15163,
    "feedback": None
}
```

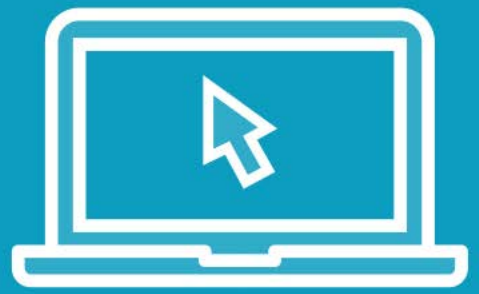
List of Dictionaries

```
all_students = [
    {"name": "Mark", "student_id": 15163 },
    {"name": "Katarina", "student_id": 63112 },
    {"name": "Jessica", "student_id": 30021 }
]
```

Dictionary Data

```
student["name"] == "Mark"

student["last_name"] == KeyError

student.get("last_name", "Unknown") == "Unknown"

student.keys() = ["name", "student_id", "feedback"]

student.values() = ["Mark", 15163, None]

student["name"] = "James"

del student["name"]
```

Demo



Exceptions

Other Data Types

```
complex

long  # Only in Python 2

bytes and bytearray

tuple = (3, 5, 1, "Mark")

set and frozenset

set([3, 2, 3, 1, 5]) == (1, 2, 3, 5)
```

Summary

- Data types
- Lists
- Dictionaries
- For and while loops
- Exception handling