

KOLT Python

Error Handling, File Input & Output

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**KOÇ
UNIVERSITY**

OFFICE OF LEARNING AND TEACHING



Agenda

1. Recap

Python Data Model

Data Structures

2. Dictionaries

3. Error/Exception Handling

4. File Input/Output

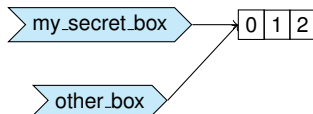
Mutability

Immutable: An `object` with a fixed value.

- **int, float, long complex, strings, frozenset, tuples**
- Such an object cannot be altered
- A new object has to be created if a different value has to be stored

Python Data Model

```
my_secret_box = [0, 1, 2]
other_box = my_secret_box
other_box.remove(2)
print(my_secret_box)
```



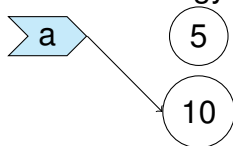
Variables are more like **labels** pointing to **values**!
Assignment links **variables** to **values**!

Object

Everything is an object in Python. Even though variables **do not** have `types`, each object has a **fixed** `type`.

↪ Values at the right side of our label analogy are objects!

```
a = 5  
a = 10
```



Object

Each object has an `identity`, this value can be obtained by using `id()` function.

`==` operator compares values, `is` operator compares identities.

```
a = 1000
b = 1000
a == b    # => True
a is b    # => False
```

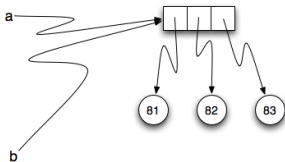
Almost always use `==` to compare values!

Aliasing & Cloning

- More than one variables can refer to **same object**!
- What if we want to clone/copy instead of aliasing?
- For lists, `list.copy()` \Rightarrow returns a shallow copy of the list.
- Shallow: only copy the references, not inner values.

```
>>> import copy
```

```
copy.copy(x) : shallow copy, copy.deepcopy(x) : deepcopy
```



Tuples

- **Immutable** sequence(ordered) of elements.
- Similar to `lists`, you can use **indexing**, **slicing**, and iterate over using `for` loops.
- Elements cannot be added/removed/changed once the tuple is created.
- How to create tuples?

```
my_tuple = (1, [1, 2], 'a')
```

- `len(my_tuple) ⇒`
3

- `my_tuple.append(3) ⇒`

```
AttributeError: 'tuple' object has no  
attribute 'append'
```


Tuples

`()` or `tuple()`: empty tuple,
`(3):int` **3**,
`(3,):tuple` **containing 3**

```
my_list = [1, 2, 3]
my_tuple = ('a', my_list) # ('a', [1, 2, 3, 4])
my_list.append(4)
print(my_tuple)
my_list += [5, 6, 7] # my_list.extend(...)
print(my_tuple)
my_tuple += (1, 2) # my_tuple = my_tuple + (1, 2)
print(my_tuple)
```

Sets

- **Unordered** sequence of **unique** elements.
- **Cannot** use indexing/slicing, can iterate with `for` loops.
- **Mutable**, `add(element)`, `remove(element)` methods.
- Python also has **immutable** sets: `frozenset`
- How to create sets?
`my_set = {1, 2, 3, 4, 2}`
- How to create empty sets?
`set()` (`{ }` is reserved for `dict`)
- Can compute set operations: **union**, **intersection**, **difference**, **symmetric difference**.

1. Recap



2. Dictionaries



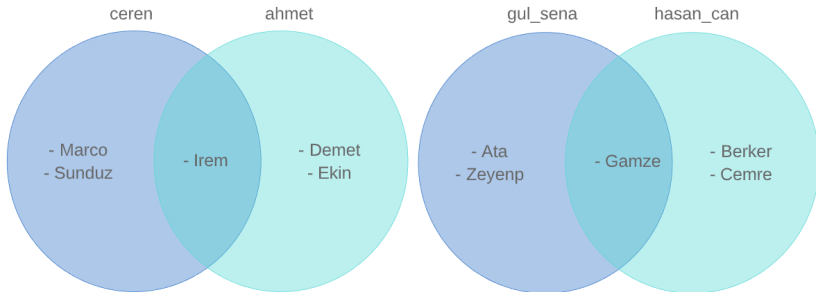
3. Error/Exception Handling



4. File Input/Output



Sets



Sets

```

ceren = {'Marco', 'Irem', 'Sunduz'}
gul_sena = {'Gamze', 'Ata', 'Zeynep'}
hasan_can = {'Gamze', 'Berker', 'Cemre'}
ahmet = {'Irem', 'Demet', 'Ekin'}

# intersection &
print(gul_sena.intersection(hasan_can))  # => {'Gamze'}
print(ceren & gul_sena)  # => set()
# union |
print(ceren.union(ahmet))  # => {'Ekin', 'Irem', 'Demet',
                                # 'Marco', 'Sunduz'}
print(hasan_can | ceren | gul_sena | ahmet)  # => all names
# difference -
print((gul_sena - hasan_can))  # => {'Zeynep', 'Ata'}
# symmetric_difference ^
print(ceren.symmetric_difference(ahmet))
# => {'Marco', 'Ekin', 'Sunduz', 'Demet'}
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- `d = {'one': 1, 'two': 2, 'three': 3, 'four': 4}`
- How to access values? `print(d['one'])` # \Rightarrow 1

Attendance

Fill out the attendance form:
tiny.cc/kolt-hackathon

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```
while True:
print('Hello')
# IndentationError: expected an indented block
```

Easy to detect: Your code will not work :)

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- Too much effort, and probably we cannot list every condition.
- Solution is `try-except-finally` blocks.

Try Except Blocks

```
try:
    <risky-statements>
    <risky-statements>
    <risky-statements>
    ...
except ValueError as valError:
    print('value error', valError)
except (RuntimeError, TypeError, NameError):
    print('One of the above errors, but not ValueError')
else:
    print('No errors')
finally:
    print('This always runs')
```

Try Except Blocks

```
def divide(x, y):  
    try:  
        result = x / y  
    except ZeroDivisionError:  
        print("division by zero!")  
    else:  
        print("result is", result)  
    finally:  
        print("executing finally clause")
```

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 - 'a': append mode, adds content to the end of file

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- **Always** close the file when you are done: `f.close()`

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- Close the file when you are done.
- `f.close()`

Lecture In-Class Exercises

You can find the in-class exercises' starter codes here:

<https://github.com/koltpython/python-slides/tree/master/Lecture7/lecture-examples>