KOLT Python

Error Handling, File Input & Output

Ahmet Uysal

Monday 11th November, 2019

Agenda

Python Data Model

Data Structures

1. Error/Exception Handling

2. File Input/Output

Mutability

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a = 5
a = 10
a += 3
```

```
hello = 'hello'
hallo = hello[0] + 'a' + hello[2:]
```

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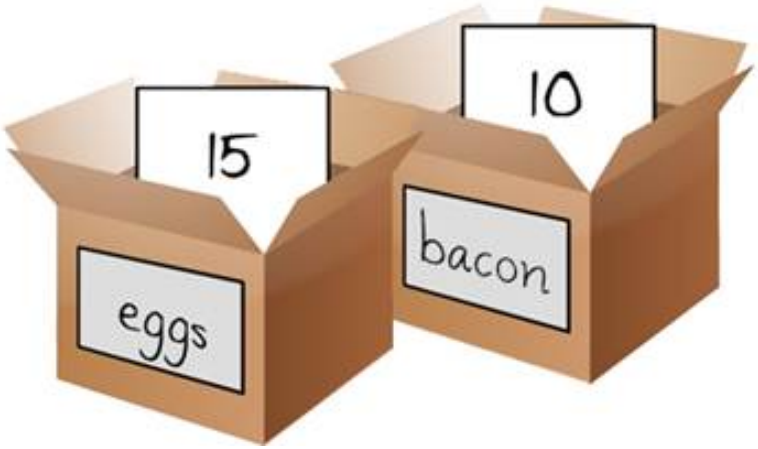

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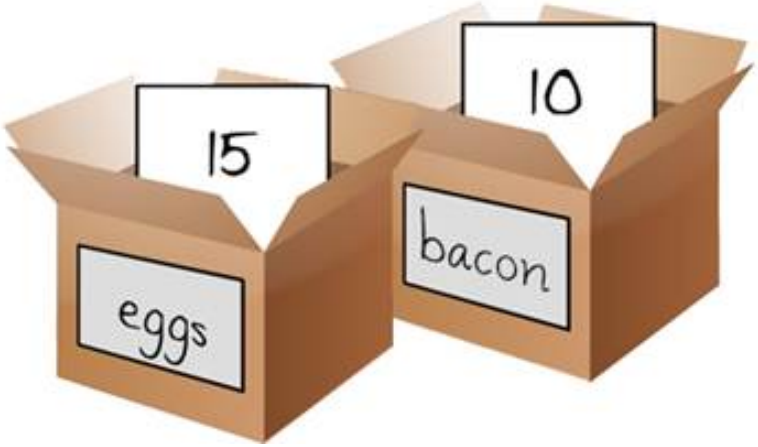

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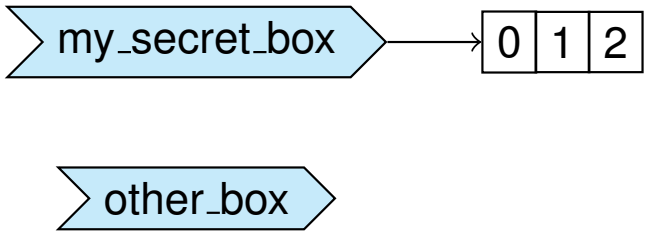

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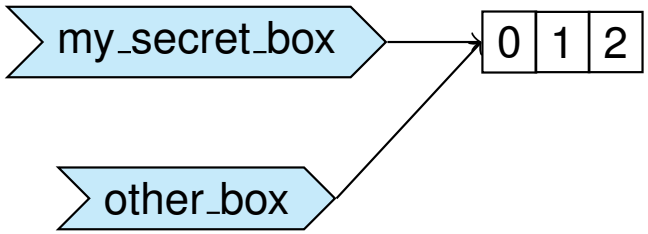

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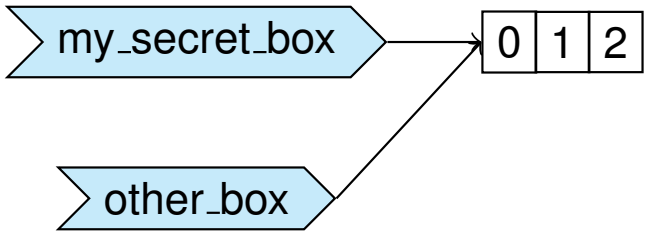

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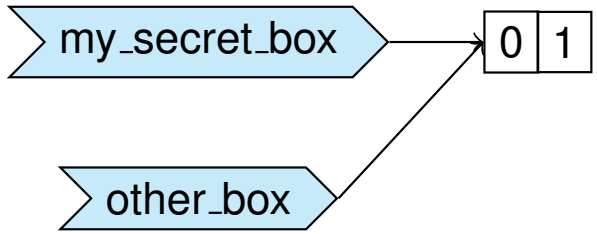

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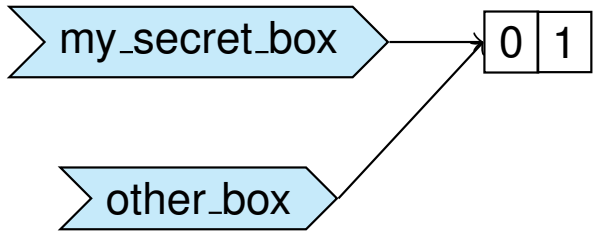

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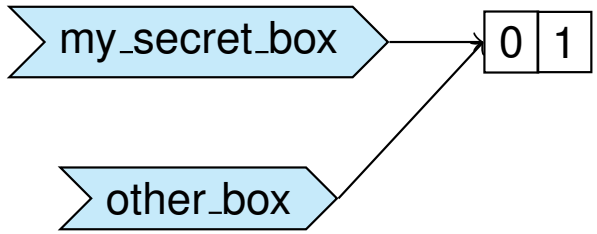

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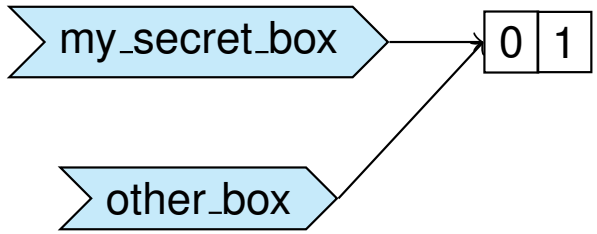

Variables are more like **labels** pointing to **values**!
Assignment links **variables** to **values**!

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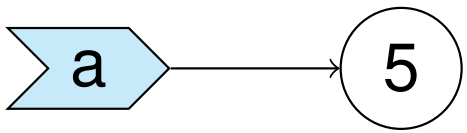

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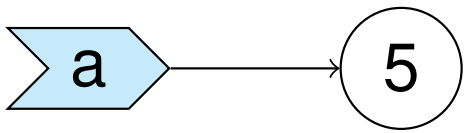

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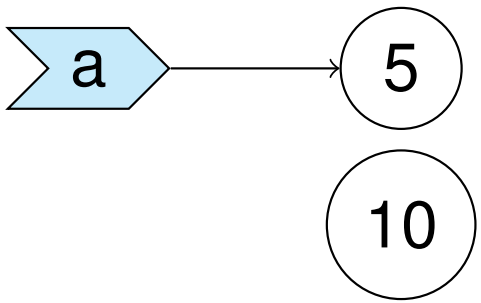

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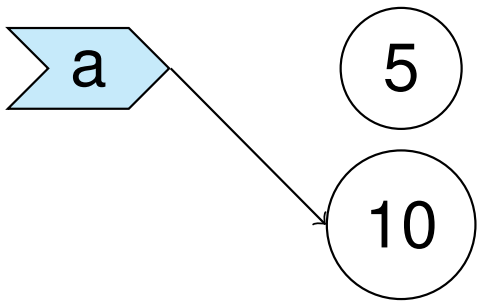

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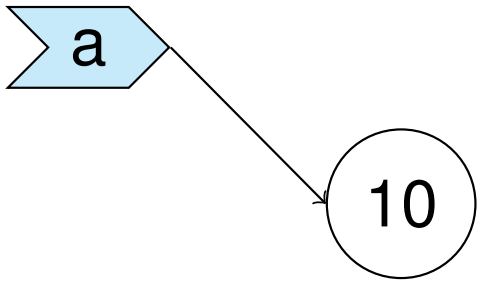

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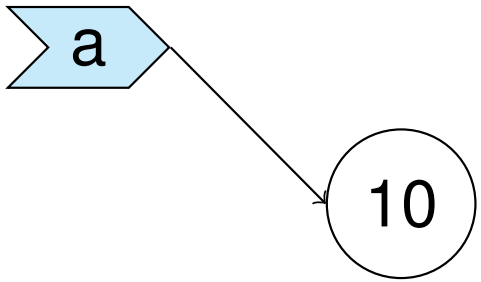

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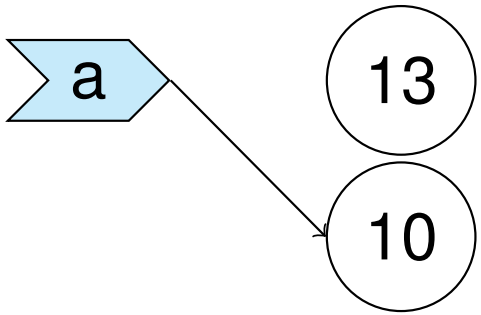

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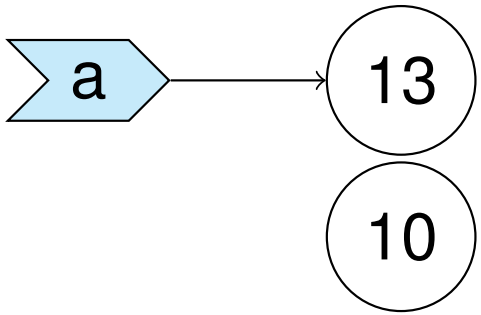

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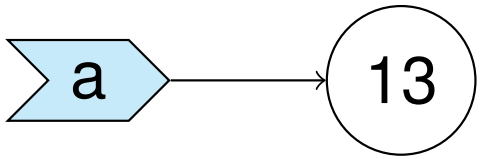

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print(a)
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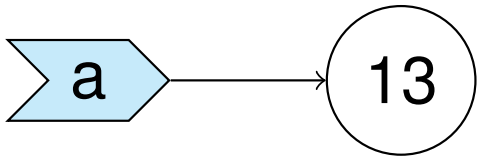


Object

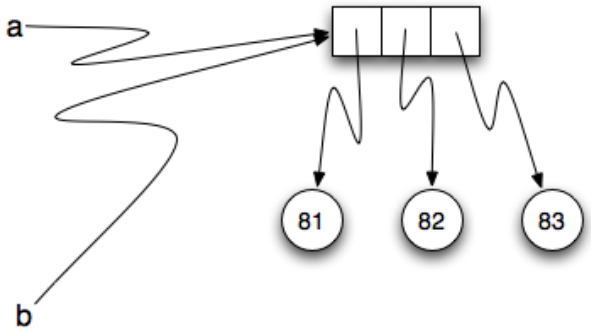
Each object has an `identity`, this value can be obtained by using **`id()`** function.
`==` operator compares values, **`is`** operator compares identities.

```
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()` ⇒ 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

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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)
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- How to create empty sets? `set()` ({ } is reserved for `dict`)
- Can compute set operations: **union**, **intersection**, **difference**, **symmetric difference**.

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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- How to access values? `print(d['one'])` # ⇒ 1

Confused Section Leader Gul Sena

```
# I need a way to keep track of my students
my_students = {'Ayse': ['economics', 'freshman'],
               'Emir': ['psychology', 'master'],
               'Emirhan': ['business administration', 'junior'],
               'Furkan': ['law', 'junior'],
               'Mahsa': ['material science', 'phd'],
               'Meva': ['international relations', 'freshman']}

for student, info in my_students.items():
    print(f'{student} studies {info[0]}')
# Emir left my class :(
my_students.pop('Emir')
# someone new in my class
my_students['Canan'] = ['industrial engineering', 'junior']
# Ayse passed another year
my_students['Ayse'][1] = 'sophomore'
```

Attendance

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tiny.cc/kolt-python

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Password: **G2WIN**

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

Context Managers

What if something bad happens before we close the file?

```
f = open('my_file.txt', 'r') as f:
    # Content of my_file.txt: '1,0,2'
values = f.read().split(',')
# What happens?
result = int(values[0]) / int(values[1])
f.close()
```

```
# Safer approach, file is closed
# even when we encounter an exception
with open('my_file.txt', 'w') as f:
    f.write('Hello, world!')
```

Example: XXX