Introduction to Objects

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Working with Object Instances

Review of Procedural Programming

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```
def func1(x, y):
    statement1
    statement2
        ⋮
    return z

def func2():
    statement50
    statement51
        ⋮
    return

    ⋮
```

Review of Procedural Programming

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```
a few input statements
out1 = func1(input1,
input2)
func2()
out2 = func3(out1)
    ⋮
```

Review of Procedural Programming

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def func1(x, y):
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```

```
a few input statements
out1 = func1(input1,
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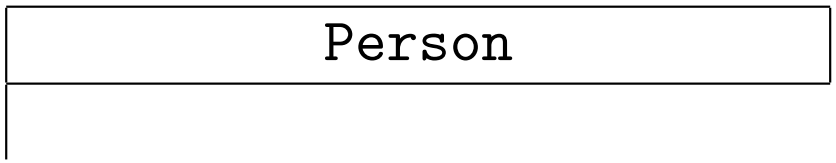
out2 = func3(out1)
    ⋮
print(func10(out9, out10))
```

Object-Oriented Programming

Object-Oriented Programming



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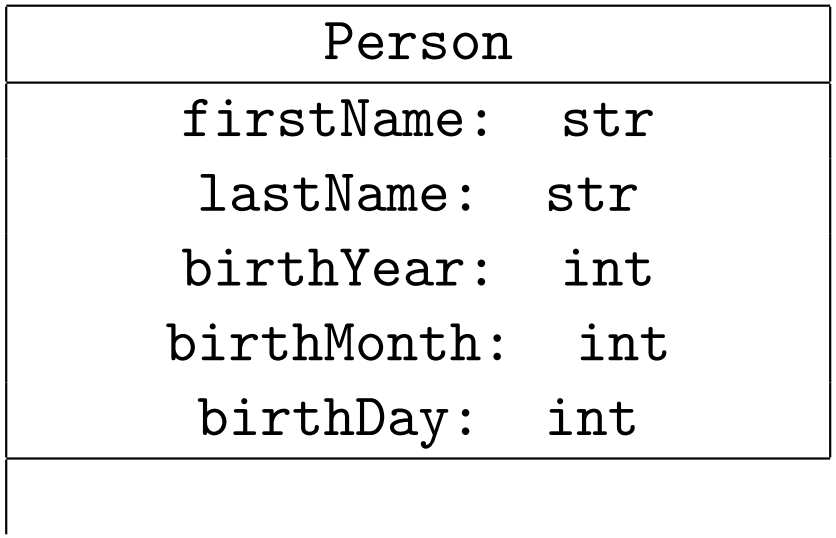

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Person
firstName: str lastName: str birthYear: int birthMonth: int birthDay: int
__init__(name="", DOB="") __str__(): returns str

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john = Person()
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john = Person()
john.setName("John
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print(john)
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```
john = Person()
john.setName("John
Johnson")
john.setDOB("01/01/2001")
print(john)
if john.canVote():
    print(john.getName() +
          " can vote")
```

UML Diagrams

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firstName: str lastName: str birthYear: int birthMonth: int birthDay: int
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- and *methods*:
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  - `getName()`
  - `__init__()`

Encapsulation

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- Person class had data:
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  - `lastName`
  - `birthYear`
  - ...
- and *methods*:
  - `setName(name)`
  - `getName()`
  - `__init__()` – *constructor*

Terminology

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- `Person`

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- `Person` `class`

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- `john`

Terminology

- `Person  class`
- `john  instance of Person`

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- `john.firstName`

Terminology

- `Person` `class`
- `john` `instance of Person` `Person object`
- `john.getName()` *method* of the `Person` class
- `john.firstName` *attribute* of the `Person` class

Familiar built-in classes

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- `list`
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- `tuple`
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- `set`

Concept Check!

Perform the following tasks, given the Car class UML diagram:

Car
make: str model: str year: int
__init__(make, model, year) setInfo(make, model, year) getInfo(): returns make, model, year

1. Create a car object
2. Get the car's info

Concept Check!

Perform the following tasks, given the Car class UML diagram:

Car
make: str model: str year: int
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1. Create a car object `myCar = Car("Toyota", "Corolla", 2015)`
2. Get the car's info

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__init__(make, model, year) setInfo(make, model, year) getInfo(): returns make, model, year

1. Create a car object
```
myCar = Car("Toyota", "Corolla", 2015)
```
2. Get the car's info
```
make, model, year = myCar.getInfo()
```

OOP vs. Procedural Programming

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Each has pros and cons

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Rule of thumb:

- Use procedural programming when offering one-time services (like converting a single temperatures from Fahrenheit to Celsius)
- Use OOP when you are providing a service that is driven by data, such as implementing a database
- No one says these have to be mutually exclusive, you can (and should) mix both in a single project