Hello, my name is <name>

An introduction to OOP in Python with UML

Kristoffer Nielbo

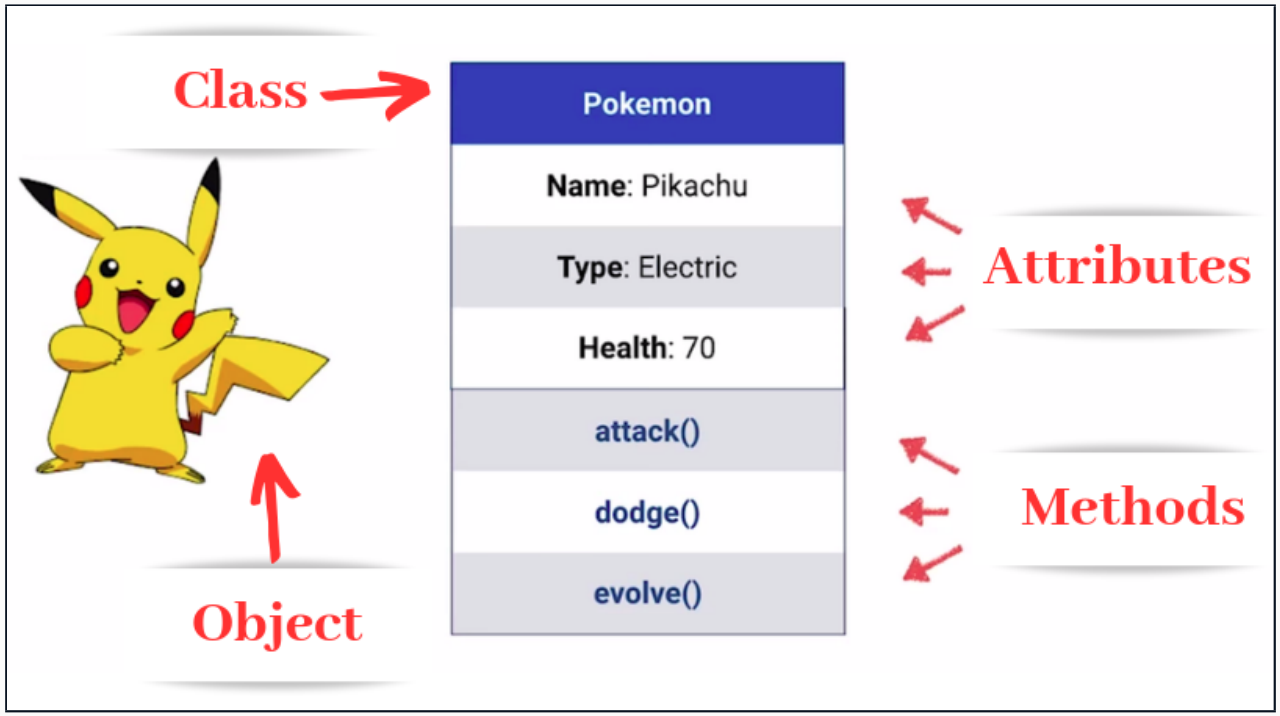
Center for Humanities Computing AArhus|chcaa.io
aarhus university, denmark

CENTER FOR HUMANITIES
COMPUTING AARHUS

Introduction

```
1  class Person:
2     def __init__(self, name, age=None, sex=None):
3        self.name = name
4        self.age = age
5        self.sex = sex
6
7     def says(self, message = '...'):
8        print(f'{self.name}: {message}')
9
10 class Researcher(Person):
11    def __init__(self, pay=10, areas=['research'],  **kwargs):
12       super(Researcher, self).__init__(**kwargs)
13       self.areas = areas
14
15 if __name__ == '__main__':
16    kln = Researcher(
17          name='Kristoffer L. Nielbo',
18          age=44, sex='male',
19          areas=['Operations Research', 'interactive HPC']
20       )
21
22    kln.says(message = 'hello and welcome to PftH-23!')
```

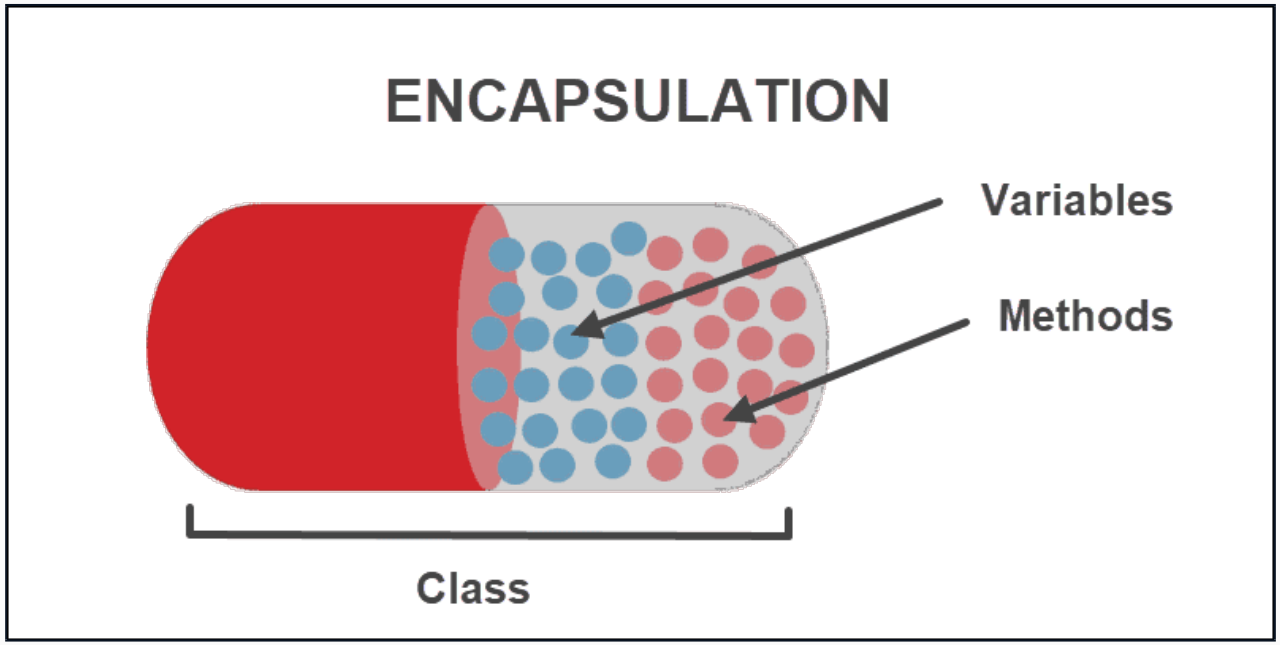
Object



A collection of data and associated behaviors, source: W. Robson

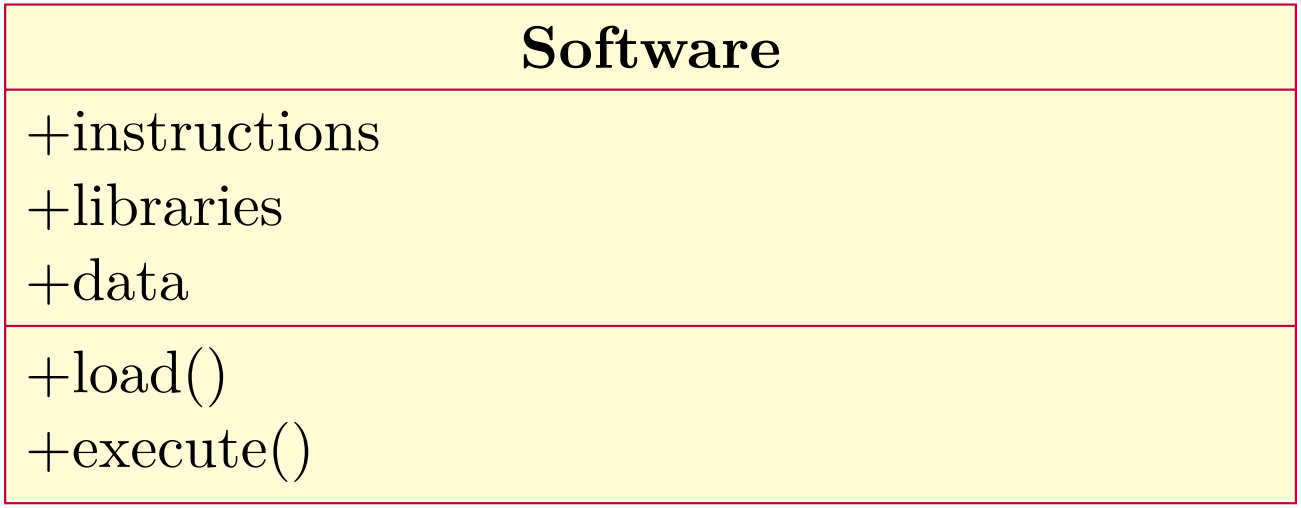
- an object is an instance of a class that defines a set of attributes and behaviors shared by all objects of that class
- a context-specific model of a type of entity in some system

ENCAPSULATION



Bundling of data and methods operating on said data into one unit. Encapsulation provides the basic property to hide data, thereby providing security to user data.

TASK-SPECIFIC ABSTRACTION #1



– the level of detail of the abstraction, is specific to the task

Object analysis

"Hello, my name is prof. Kristoffer Nielbo, I work at Aarhus University-DK with *humanities computing* and *culture analytics*. I currently have two primary research projects: *FabulaNet* and *News Information Decoupling*"

Implicit knowledge

- 'Kristoffer Nielbo' → (male & age)
- 'at Aarhus University' → (researcher → pay grade)
- 'primary research projects' → principal investigator
- principal investigator *is a* researcher *is a* person
- ...

Objects and Data

– object or instance diagram of a `Person`:

Kristoffer: Person
name = Kristoffer L. Nielbo
age = 45
sex = Male

– data represent `attributes` of an object

Object and Inheritance

– the instance is also a Researcher, and a Researcher `is a` Person

Kristoffer: Researcher
name = Kristoffer L. Nielbo age = 45 sex = Male pay = 10 areas = humanities computing, culture analytics

- Researcher is a subclass of Person and `inherits` attributes

Objects and Behavior

– A PI is a Researcher is a Person, but a PI has additional 'Pain and Suffering'

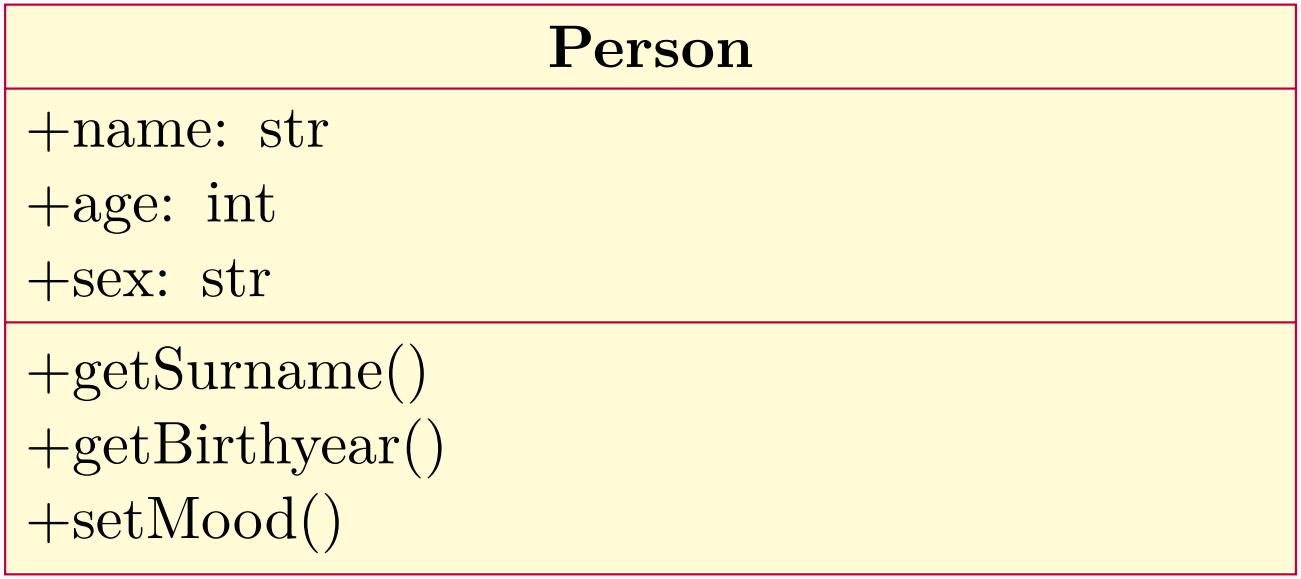
Kristoffer: Principal Investigator
name = Kristoffer L. Nielbo age = 45 sex = Male pay = 10 areas = humanities computing, culture analytics
+pain & suffering: 10%

– an object is a collection of data and behaviors
– an object is a hierarchical composite that inherits data and behaviors

Class Design

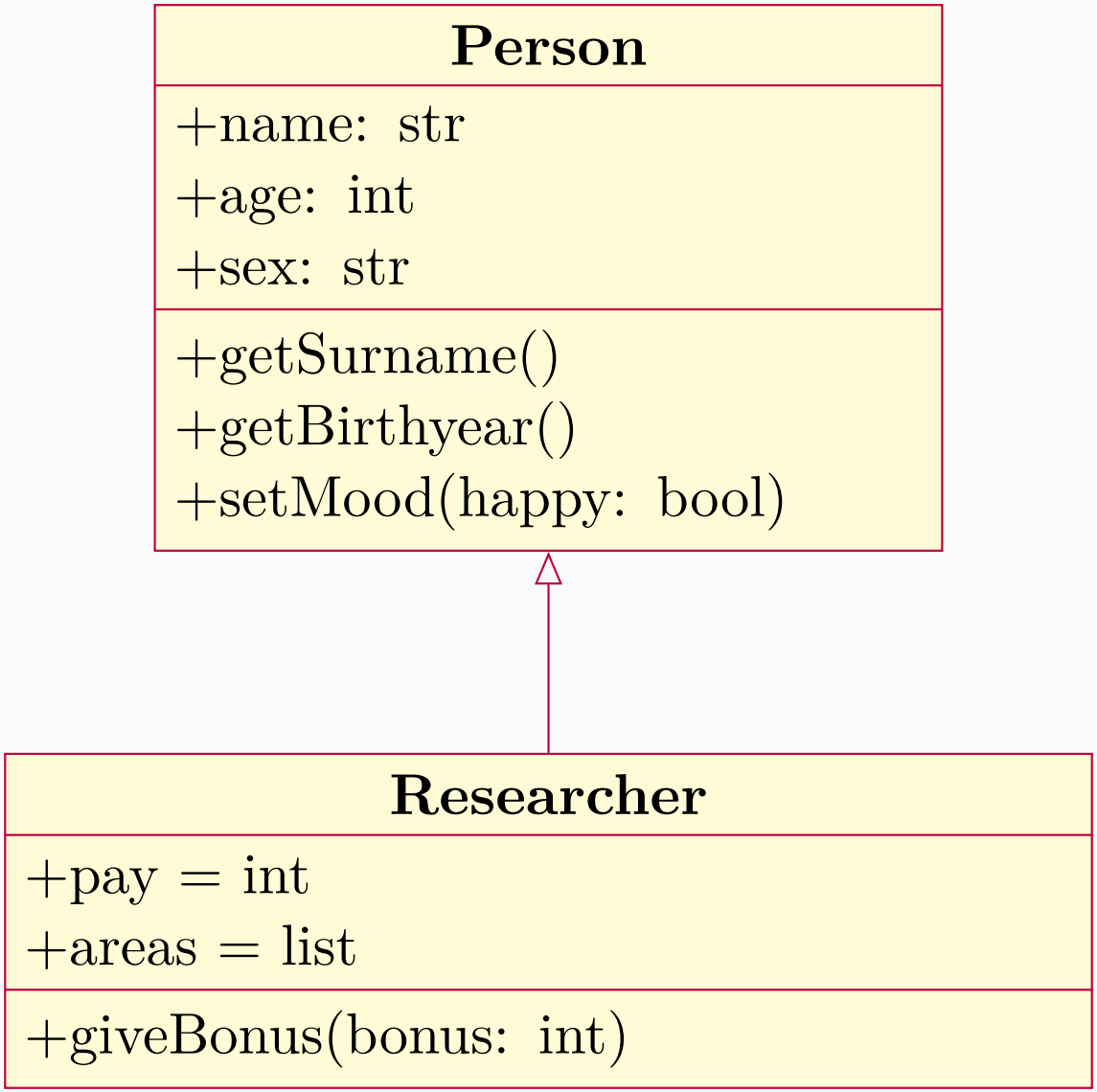
`print(`
“Hello, my name is `<name>`,
I work at Aarhus University-DK with `<area-1>` and `<area-2>`.
I currently have `<count(projects)>` primary research projects:
`<project-1>` and `<project-2>`”
`)`

Person

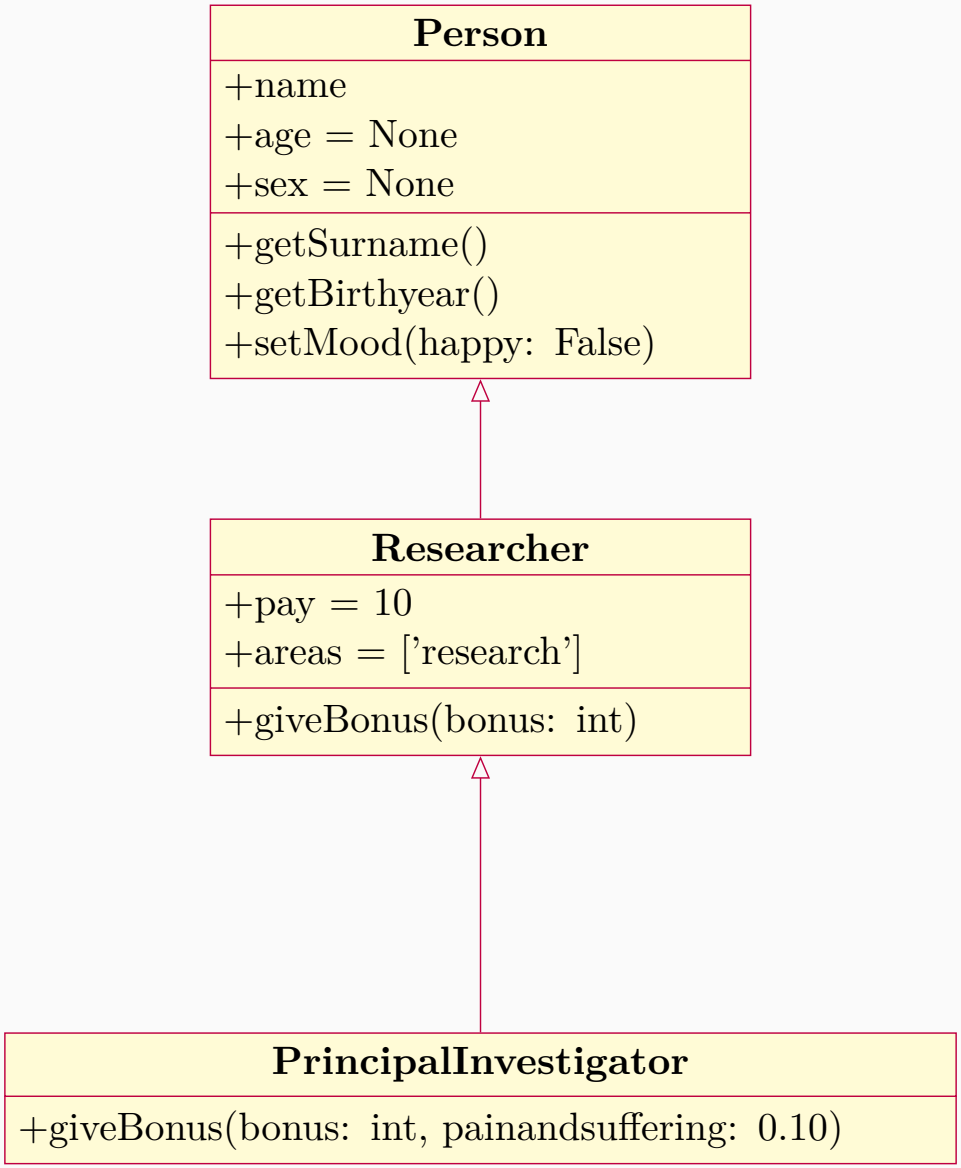


- a class defines a set of attributes shared by all objects of that class

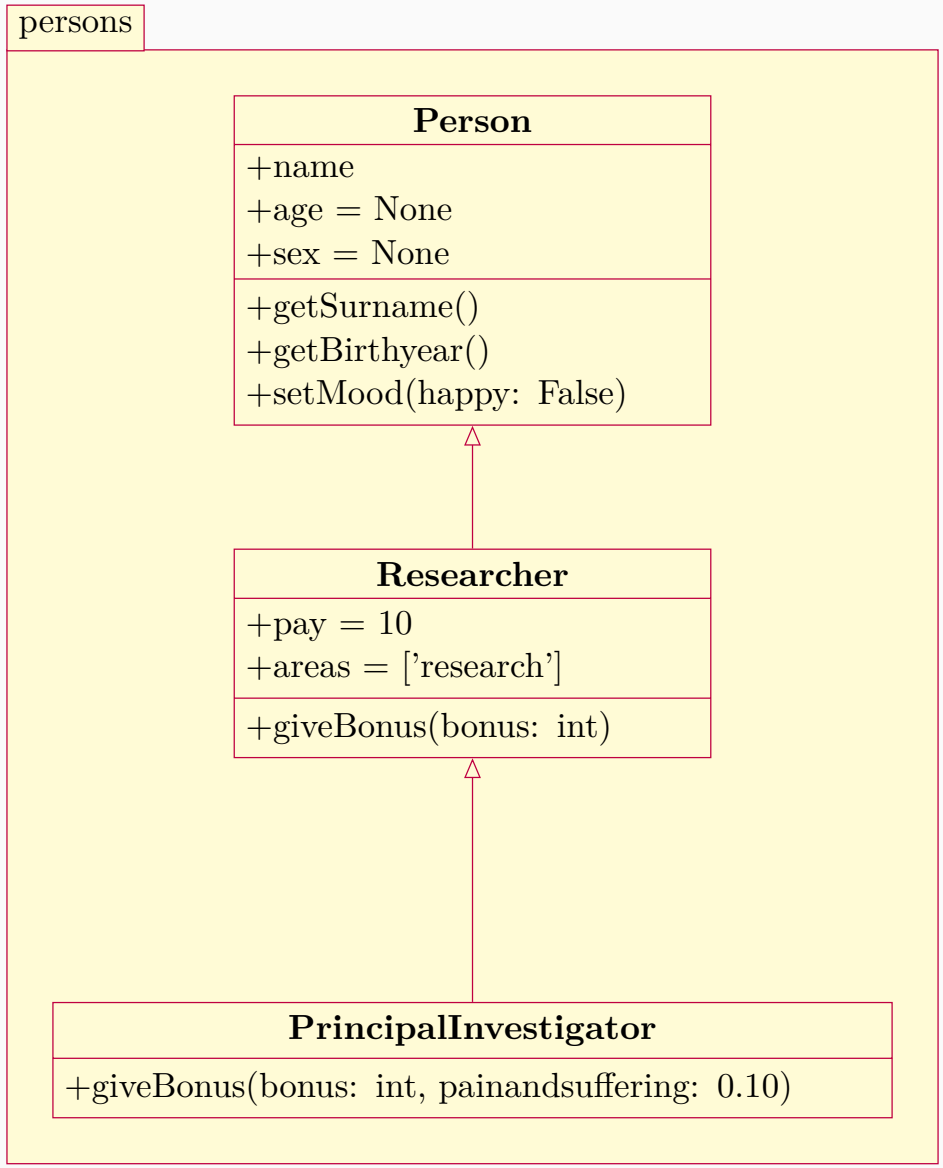
Inheritance



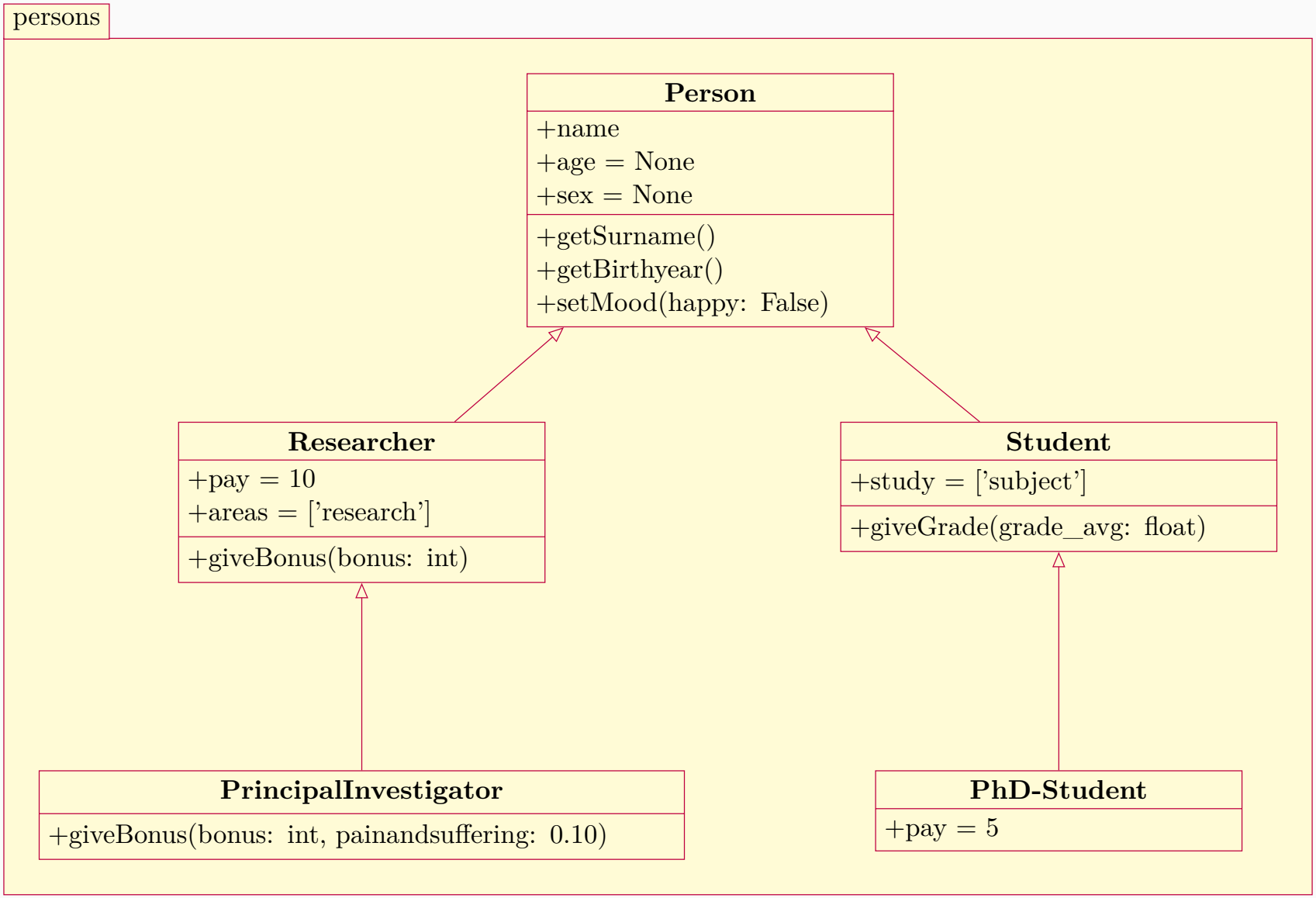
Multiple Inheritance



Module


persons
Person
+name
+age = None
+sex = None
+getSurname()
+getBirthyear()
+setMood(happy: False)
Researcher
+pay = 10
+areas = ['research']
+giveBonus(bonus: int)
PrincipalInvestigator
+giveBonus(bonus: int, painandsuffering: 0.10)

Framework


persons
Person
+name
+age = None
+sex = None
+getSurname()
+getBirthyear()
+setMood(happy: False)
Researcher
+pay = 10
+areas = ['research']
+giveBonus(bonus: int)
Student
+study = ['subject']
+giveGrade(grade_avg: float)
PrincipalInvestigator
+giveBonus(bonus: int, painandsuffering: 0.10)
PhD-Student
+pay = 5

```
if questions:
   try:
      answer()
   except RunTimeError:
      pass
   else:
      print('break')
```