PH502: Scientific Programming Concepts

Irish Centre for High End Computing (ICHEC)

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Overview

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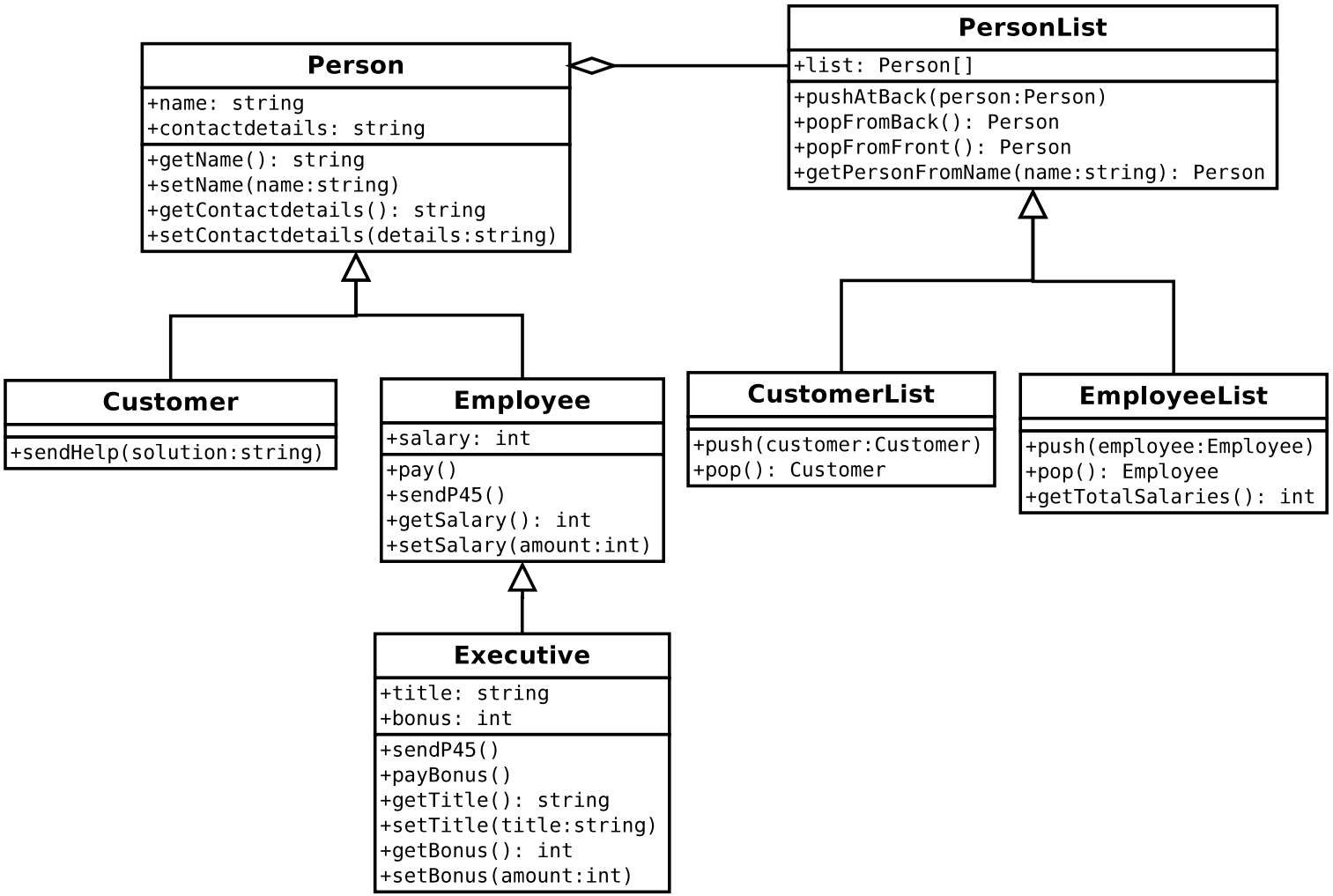
- Applying OOP to our problem.
- We might get something like this.

Back to the Example

- What classes would you define to represent the good people of the company?
  - One way to do it would be to have a Person superclass with two subclasses: Customer and Employee.
  - Executive could be a subclass of Employee.
- What classes would you define to represent lists of people?
  - We could define a PersonList class that would store an ordered list of Person objects and know how to add/remove one at the front and back of the list.
  - CustomerList and EmployeeList could be subclasses of PersonList, and implement simple 'pop' and 'push' methods which would in turn call the correct one inherited from the superclass.

Class diagram for our example



OO-Running it... (1)

- The arrow notation -> denotes the calling of a method.

```
elist = new EmployeeList()
clist = new CustomerList()
e = new Employee('john doe', 'j@d.ie', 30000)
elist->push(e)
e = new Employee('sean lee', 's@l.ie', 29000)
elist->push(e)
e = new Employee('mary kyneeeeee', 'm@a.ie', 31000)
elist->push(e)
c = new Customer('bob wheatleyy', 'b@w.net')
clist->push(c)
c = new Customer('alice martins', 'a@m.com')
clist->push(c)
```

OO-Running it... (2)

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```
e = elist->getPersonFromName("mary kyneeeeee")
e->modifyName("mary kyne")
c = clist->getPersonFromName("bob wheatleyy")
c->modifyName("bob wheatley")
c = clist->pop()
c->sendHelp()
delete c
e = elist->pop()
e->sendP45()
delete e
```

Wrapping up...

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- Object-Oriented design is a data-centered approach.
- It is based on defining a collection of interacting, related *Classes*.
  - A Class defines the *Attributes* (the content) and the *Methods* (the behaviour) of the Objects deriving from it.
- This model provides *Encapsulation* of data and functions.
- *Inheritance* is the process through which subclasses can 'specialise' a superclass.
- A well-designed OO model will result in readable, extensible, reusable code.