# Exercise: First Steps in OOP

This document defines the exercises for the ["Python OOP" course at @Software University.](https://softuni.bg/trainings/4371/python-oop-february-2024)

Please submit your solutions (source code) to all the below-described problems in [Judge](https://judge.softuni.org/Contests/1935/First-Steps-in-OOP-Exercise).

## Shop

Create a class called Shop. Upon initialization, it should receive a name (string) and items (list). Create a method called get\_items\_count() which should return the **number of items** in the store.

### Examples

|  |  |
| --- | --- |
| **Test Code** | **Output** |
| shop = Shop("My Shop", ["Apples", "Bananas", "Cucumbers"])  print(shop.get\_items\_count()) | 3 |

## Hero

Create a class called Hero. Upon initialization, it should receive a name (string) and health (number). Create two additional methods:

* defend(damage) - reduce the given **damage** from the hero's health:
  + if the **health** becomes 0 or less, **set** it **to 0** and **return** **"**{name} was defeated**"**
* heal(amount) - **increase the health** of the hero with the given amount

### Examples

|  |  |
| --- | --- |
| **Test Code** | **Output** |
| hero = Hero("Peter", 100)  print(hero.defend(50))  hero.heal(50)  print(hero.defend(99))  print(hero.defend(1)) | None  None  Peter was defeated |

## Employee

Create class **Employee**. Upon initialization, it should receive **id** (number), **first\_name** (string), **last\_name** (string), and **salary** (number). Create **3 additional instance methods**:

* **get\_full\_name()** - returns **"{first\_name} {last\_name}"**
* **get\_annual\_salary()** - returns the total salary for **12 months**
* **raise\_salary(amount)** - **increases the salary** by the given amount and **returns the new salary**

### Examples

|  |  |
| --- | --- |
| **Test Code** | **Output** |
| employee = Employee(744423129, "John", "Smith", 1000)  print(employee.get\_full\_name())  print(employee.raise\_salary(500))  print(employee.get\_annual\_salary()) | John Smith  1500  18000 |

## Cup

Create a class called Cup. Upon initialization, it should receive size (integer) and quantity (an integer representing **how much liquid** is in it).

The class should have **two methods**:

* fill(quantity) that will **increase** the amount of liquid in the cup with the given **quantity** (if there is **space** in the cup, **otherwise ignore**).
* status() that will **return** the **amount** of **free space** left in the cup.

Submit only the class in the judge system. Do not forget to test your code.

### Examples

|  |  |
| --- | --- |
| **Test Code** | **Output** |
| cup = Cup(100, 50)  print(cup.status())  cup.fill(40)  cup.fill(20)  print(cup.status()) | 50  10 |

## Flower

Create a class called Flower. Upon initialization, the class should receive a name (string) and a water\_requirements (number). The flower should also have an instance attribute called is\_happy (False by default). Add **two additional** **methods** to the class:

* water(quantity) - it will water the flower. **Each time** check if the quantity is **greater than or equal** to the required. If it is - the flower becomes happy (set is\_happy to True).
* status() - it should return "{name} is happy" if the flower **is happy**, otherwise it should return **"**{name} is not happy**"**.

Submit only the class in the judge system.

### Examples

|  |  |
| --- | --- |
| **Test Code** | **Output** |
| flower = Flower("Lilly", 100)  flower.water(50)  print(flower.status())  flower.water(60)  print(flower.status())  flower.water(100)  print(flower.status()) | Lilly is not happy  Lilly is not happy  Lilly is happy |

## Steam User

Create a class called SteamUser. Upon initialization, it should receive a username (string) and games (list). It should also have an **attribute** called played\_hours (**0** by default). Add **three methods** to the class:

* **play(game, hours)**
  + If the **game** is in the **game list, increase** the played\_hours by the given hours and return "{username} is playing {game}**"**
  + Otherwise, return **"**{game} is not in library**"**
* **buy\_game(game)**
  + If the game **is not** in the game list, **add it** and return **"**{username} bought {game}**"**
  + Otherwise, return **"**{game} is already in your library**"**
* **status()** - returns the following:

"{username} has {games\_count} games. Total play time: {played\_hours}**"**

Submit only the class in the judge system.

### Examples

|  |  |
| --- | --- |
| **Test Code** | **Output** |
| user = SteamUser("Peter", ["Rainbow Six Siege", "CS:GO", "Fortnite"])  print(user.play("Fortnite", 3))  print(user.play("Oxygen Not Included", 5))  print(user.buy\_game("CS:GO"))  print(user.buy\_game("Oxygen Not Included"))  print(user.play("Oxygen Not Included", 6))  print(user.status()) | Peter is playing Fortnite  Oxygen Not Included is not in library  CS:GO is already in your library  Peter bought Oxygen Not Included  Peter is playing Oxygen Not Included  Peter has 4 games. Total play time: 9 |

## Programmer

Create a class called Programmer. Upon initialization, it should receive - name (string), language (string), and skills (integer). The class should have **two methods**:

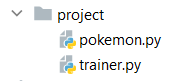
* **watch\_course(course\_name, language, skills\_earned)**
  + If the programmer's **language** is **the same as** the **one on the course, increase his skills** with the given amount and return a message **"**{name} watched {course\_name}**"**.
  + Otherwise return **"**{name} does not know {language}**"**.
* **change\_language(new\_language, skills\_needed)** 
  + If the programmer **has the skills** and the **new** **language is not the same as his**, **change** his language to the new one and return **"**{name} switched from {previous\_language} to {new\_language}**"**.
  + If the programmer **has the skills**, but the given **language is equal** to his return **"**{name} already knows {language}**"**.
  + In the last case, the programmer does **not have enough skills**, so return **"**{name} needs {needed\_skills} more skills**"** and **do not change his language**.

Submit only the class in the judge system.

### Examples

|  |  |
| --- | --- |
| **Test Code** | **Output** |
| programmer = Programmer("John", "Java", 50)  print(programmer.watch\_course("Python Masterclass", "Python", 84))  print(programmer.change\_language("Java", 30))  print(programmer.change\_language("Python", 100))  print(programmer.watch\_course("Java: zero to hero", "Java", 50))  print(programmer.change\_language("Python", 100))  print(programmer.watch\_course("Python Masterclass", "Python", 84)) | John does not know Python  John already knows Java  John needs 50 more skills  John watched Java: zero to hero  John switched from Java to Python  John watched Python Masterclass |

## \* Pokemon Battle

***Note: For this problem, please submit a zip file containing a separate file for each of the classes, with the class names provided in the problem description, and include them in a module named project.***

You are tasked to create **two classes**: **a Pokemon** class in the **pokemon.py** file and **a Trainer** class in the **trainer.py** file.

The **Pokemon** class should receive a **name** (string) and **health** (int) upon initialization. It should also have a method called **pokemon\_details** that returns **the information about the pokemon: "{pokemon\_name} with health {pokemon\_health}"**

The **Trainer** class should receive a **name** (string). The Trainer should also have an attribute **pokemons** (list, empty by default). The Trainer has **three methods**:

* **add\_pokemon(pokemon: Pokemon)**
  + Adds the **pokemon to the collection** and **returns** **"Caught {pokemon\_name} with health {pokemon\_health}"**. **Hint**: use the pokemon's details method.
  + If the pokemon is already in the collection, return **"This pokemon is already caught"**
  + **Hint**: to import the **Pokemon** class, you should add **"from project.pokemon import Pokemon"**
* **release\_pokemon(pokemon\_name: string)** 
  + Check if you have a pokemon with that name and **remove it from the collection**. In the end, returns **"You have released {pokemon\_name}"**
  + If there **is no pokemon** with that name in the collection, return **"Pokemon is not caught"**
* **trainer\_data()**
  + The method returns the information about the trainer and his pokemon's collection in the format:

**"Pokemon Trainer {trainer\_name}  
 Pokemon count {the amount of pokemon caught}  
 - {pokemon\_details1}**

**...  
 - {pokemon\_detailsN}"**

### Examples

|  |  |
| --- | --- |
| **Test Code** | **Output** |
| pokemon = Pokemon("Pikachu", 90)  print(pokemon.pokemon\_details())  trainer = Trainer("Ash")  print(trainer.add\_pokemon(pokemon))  second\_pokemon = Pokemon("Charizard", 110)  print(trainer.add\_pokemon(second\_pokemon))  print(trainer.add\_pokemon(second\_pokemon))  print(trainer.release\_pokemon("Pikachu"))  print(trainer.release\_pokemon("Pikachu"))  print(trainer.trainer\_data()) | Pikachu with health 90  Caught Pikachu with health 90  Caught Charizard with health 110  This pokemon is already caught  You have released Pikachu  Pokemon is not caught  Pokemon Trainer Ash  Pokemon count 1  - Charizard with health 110 |