# Exercise: Defining Classes

Problems for exercise and homework for the [Python OOP Course @SoftUni](https://softuni.bg/courses/python-oop). Submit your solutions in the SoftUni judge system at <https://judge.softuni.bg/Contests/1935>

## Car

Create a class called Car. Upon initialization it should receive a name, model and engine (all strings). Create a method called get\_info() which will return a string in the following format:   
**"**This is {name} {model} with engine {engine}**"**.

### Examples

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| --- | --- |
| **Test Code** | **Output** |
| car = Car("Kia", "Rio", "1.3L B3 I4")  print(car.get\_info()) | This is Kia Rio with engine 1.3L B3 I4 |

## 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 **amount of items** in the store.

### Examples

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| **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 functions:

- defend(damage) - Deal the given **damage** to the hero; if the **health** is 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

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| **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 |

## Steam User

Create a class called SteamUser. Upon initialization it should receive username (string), 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 user **games 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** already in the user's **games**, **add it** and return **"**{username} bought {game}**"**
  + Otherwise return **"**{game} is already in your library**"**
* **stats()** - returns "{username} has {games\_count} games. Total play time: {played\_hours}**"**

### Examples

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| **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.stats()) | Peter is playing Fortnite  Oxygen Not Included 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), skills (integer). The class should have **two methods**:

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

### Examples

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| **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 |

***Note: For the rest of the problems 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.***

## Pokemon Battle

You are tasked to create **two classes**: **a Pokemon** class and **a Trainer** class. 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 of the pokemon: "{pokemon\_name} with health {pokemon\_health}"**

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

* **add\_pokemon(pokemon: Pokemon)**
  + Add the **pokemon to the collection**. After adding the pokemon, it **should return** **"Caught {pokemon\_name} with health {pokemon\_health}"**. Note: use the pokemon's details method.
  + If the pokemon is already in the collection, it should return **"This pokemon is already caught"**
* **release\_pokemon(pokemon\_name: String)** 
  + Check if you have a pokemon with the name and **remove it from the collection**. It should return **"You have released {pokemon\_name}"**
  + If there **isn't a pokemon** with that name in the collection, return **"Pokemon is not caught"**
* **trainer\_data()**
  + The method returns the information of the trainer with his pokemon in this format:

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

**...  
 - {pokemon\_details}**

**"**

### Examples

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| **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.release\_pokemon("Pikachu"))  print(trainer.trainer\_data()) | Pikachu with health 90  Caught Pikachu with health 90  Caught Charizard with health 110  You have released Pikachu  Pokemon Trainer Ash  Pokemon count 1  - Charizard with health 110 |

## Guild System

You are tasked to create **two classes**: **a Player** class and **a Guild** class. The **Player** class should receive a **name** (string), **hp** (int) and **mp** (int) upon initialization. The Player also has 2 attributes: **skills** (empty dictionary) and **guild** set to **"Unaffiliated"** by default.

The Player class should also have **two methods**:

* **add\_skill(skill\_name, mana\_cost)**
  + Add the skill to the collection. Return **"Skill {skill\_name} added to the collection of the player {player\_name}"**
  + If the skill is already in the collection, return **"Skill already added"**
* **player\_info()** 
  + Returns the player's information, including his/her skills, in this format:

**"Name: {player\_name}  
 Guild: {guild\_name}  
 HP: {hp}**

**MP: {mp}**

**==={skill\_name\_1} – {skill\_mana\_cost}**

**==={skill\_name\_2} – {skill\_mana\_cost}**

**...**

**==={skill\_name\_N} – {skill\_mana\_cost}**

**"**

The Guild class receive a **name** {string}. It creates **a list of players** (empty by initialization). The class also has 3 methods:

* **assign\_player(player: Player)**
  + Add the player to the guild. Return **"Welcome player {player\_name} to the guild {guild\_name}".** Remember to change the player's guild in the player class.
  + If the player is already in the guild, return **"Player {player\_name} is already in the guild."**
  + If the player is in another guild, return **"Player {player\_name} is in another guild."**
* **kick\_player(player\_name: String)**
  + Remove the player to the guild. Return **"Player {player\_name} has been removed from the guild.".** Remember to change the player's guild in the player class.
  + If the isn't a player with that name in the guild, return **"Player {player\_name} is not in the guild."**
* **guild\_info()** 
  + Returns the guild's information, including the players in the guild, in this format:

**"Guild: {guild\_name}  
 {player's info}  
"**

### Examples

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| **Test Code** | **Output** |
| player = Player("George", 50, 100)  print(player.add\_skill("Shield Break", 20))  print(player.player\_info())  guild = Guild("UGT")  print(guild.assign\_player(player))  print(guild.guild\_info()) | Skill Shield Break added to the collection of the player George  Name: George  Guild: Unaffiliated  HP: 50  MP: 100  ===Shield Break – 20  Welcome player George to the guild UGT  Guild: UGT  Name: George  Guild: UGT  HP: 50  MP: 100  ===Shield Break – 20 |

## Spoopify

You are tasked to create **three classes**: **a Song** class, **an Album** class and **a Band** class.

The **Song** class should receive a **name** (string), **length** (float) and **single** (bool) upon initialization. It has **one** method:

* **get\_info()**
  + Returns the information of the song in this format: **"{song name} – {song length}"**

The **Album** class should receive a **name** (string) and **songs(one, many or none)** **as arguments** upon initialization. It also has an **attribute published** (**False** by default). It has **four** methods:

* **add\_song(song: Song)**
  + Adds the **song to the album**. Return **"Song {song name} has been added to the album {name}."**
  + If the song is **single**, return **"Cannot add {song name}. It's a single"**
  + If the album is **published**, return **"Cannot add songs. Album is published."**
  + If the song is **already added**, return **"Song is already in the album."**
* **remove\_song(song\_name: str)**
  + Removes the song with the given name and return **"Removed song {song name} from album {name}.**
  + If the song is not in the album, return **"Song is not in the album."**
  + If the album is published, return **"Cannot remove songs. Album is published."**
* **publish()**
  + Publish the album and return **"Album {name} has been published."**
  + If the album is published, return **"Album {name} is already published."**
* **details()**
  + Returns the information of the album, with the songs in it, in this format:

**"Album {name}**

**== {first\_song info}**

**== {second\_song info}**

**…**

**== {n\_song info}**

**"**

The **Band** class should receive a **name** (string) upon initialization. It also has an **attribute albums** (**empty list**). It has **three** method:

* **add\_album(album: Album)**
  + Adds an **album to the collection** and returns **"Band {name} has added their newest album {name}."**
  + If the album **is already added**, return **"Band {name} already has {album name} in their library."**
* **remove\_album(album\_name: str)**
  + Removes the album from the collection and returns **"Album {name} has been removed."**
  + If the album is **published**, return **"Album has been published. It cannot be removed."**
  + If the album is **not in the collection**, return **"Album {name} is not found."**
* **details()**
  + Returns the information of the band, with their albums, in this format:

**"Band {name}**

**{album details}**

**...**

**{album details}**

**"**

### Examples

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| **Test Code** | **Output** |
| song = Song("Running in the 90s", 3.45, False)  print(song.get\_info())  album = Album("Initial D", song)  second\_song = Song("Around the World", 2.34, False)  print(album.add\_song(second\_song))  print(album.details())  print(album.publish())  band = Band("Manuel")  print(band.add\_album(album))  print(band.remove\_album("Initial D"))  print(band.details()) | Running in the 90s - 3.45  Song Around the World has been added to the album Initial D.  Album Initial D  == Running in the 90s - 3.45  == Around the World - 2.34  Album Initial D has been published.  Band Manuel has added their newest album Initial D.  Album has been published. It cannot be removed.  Band Manuel  Album Initial D  == Running in the 90s - 3.45  == Around the World - 2.34 |

## Todo List

You are tasked to create **two classes**: **a Task** class and **a Section** class. The **Task** class should receive a **name** (string), and a **due\_date** (str) upon initialization. The Task also has **two attributes**: **comments** (empty list) and **completed** set to **False** by default.

The **Task** class should also have **five methods**:

* **change\_name(new\_name: str)**
  + Change **the name of the task** and return **the new name**.
  + If the new name **is the same as the current name**, return **"Name cannot be the same."**
* **change\_due\_date(new\_date: str)** 
  + Change **the due date of the task** and return **the new date**.
  + If the new **date is the same as the current date**, return **"Date cannot be the same."**
* **add\_comment(comment: str)**
  + Add a comment to the task.
* **edit\_comment(comment\_number: int, new\_comment: str)**
  + If the **comment\_number is in the comments**, change **the comment** and **return all of the comments**, separated **by comma and space (", ")**
  + If the comment\_number **is not in the comments**, return **"Cannot find comment."**
* **details()**
  + Return the task's details in this format:

**"Name: {task\_name} - Due Date: {due\_date}"**

The **Section** class should receive a **name** (string) upon initialization. The Task also has **one attributes**: **tasks** (empty list)

The Section class should also have **four methods**:

* **add\_task(new\_task: Task)**
  + Add a **new task** to the collection. **Return "Task {task details} is added to the section"**
  + If the task **is in the collection**, return **"Task is already in the section {section\_name}"**
* **complete\_task(task\_name: str)** 
  + Change the task to **completed**. Return **"Completed task {task\_name}"**
  + If the task is not found, return **"Could not find task with the name {task\_name}"**
* **clean\_section()**
  + Removes all of the **completed tasks** and returns **"Cleared {amount of removed tasks} tasks."**
* **view\_section()**
  + Return information about the section and it's tasks in this format:

**"Section {section\_name}:**

**{details of the first task}**

**{details of the second task}**

**...**

**{details of the n task}**

**"**

### Examples

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| **Test Code** | **Output** |
| task = Task("Make bed", "27/05/2020")  print(task.change\_name("Go to University"))  print(task.change\_due\_date("28.05.2020"))  task.add\_comment("Don't forget laptop")  print(task.edit\_comment(0, "Don't forget laptop and notebook"))  print(task.details())  section = Section("Daily tasks")  print(section.add\_task(task))  second\_task = Task("Make bed", "27/05/2020")  section.add\_task(second\_task)  print(section.clean\_section())  print(section.view\_section()) | Go to University  28.05.2020  Don't forget laptop and notebook  Name: Go to University - Due Date: 28.05.2020  Task Name: Go to University - Due Date: 28.05.2020 is added to the section  Cleared 0 tasks.  Section Daily tasks:  Name: Go to University - Due Date: 28.05.2020  Name: Make bed - Due Date: 27/05/2020 |