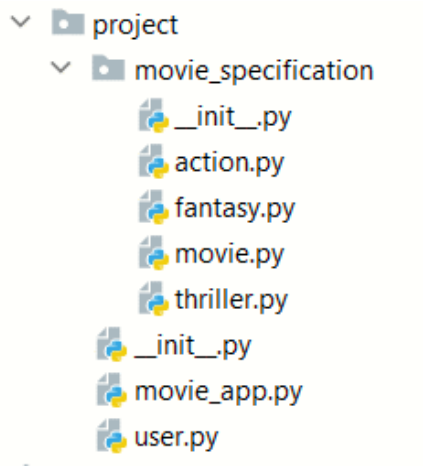
Python OOP Exam - Movie App

Submit your solutions in the SoftUni judge system at https://judge.softuni.org/Contests/Practice/Index/3431#0

You are given a task to create a basic class application.

You will be provided with a **skeleton** that includes all the folders and files you will need.

Note: You are not allowed to change the folder and file structure and change their names!



Judge Upload

For the **first 2 problems**, create a **`zip`** file with the **`project` folder** and **upload it** to the judge system.

For the **last problem**, create a **`zip`** file with the **`test` `folder`** and **upload it** to the judge system.

You do not need to include **in the zip file** your **`venv`**, **`.idea`**, **`pycache`**, and **`__MACOSX`** (for Mac users), so you do not exceed **the maximum allowed size** of **`16.00 KB`**.

Structure (Problem 1) and Functionality (Problem 2)

Our first task is to implement the **structure and functionality** of all the classes (properties, methods, inheritance, etc.)

You are **free to add additional attributes** (instance attributes, class attributes, methods, dunder methods, etc.) to simplify your code and increase readability as long as it does not change the project's result according to the requirements and the program works properly.

1. Class User

In the **user.py** file, the class **`User`** should be implemented.

Structure

The class should have the following attributes:

- **`username: str`**
  - A string that represents the username of the user
  - If the name is **an empty string,** raise a **`ValueError`** with the message **`"Invalid username!"`**
- **`age: int`**
  - An integer that represents the age of the user

    - If the value of age **is under 6**, raise a **`ValueError`** with the message **`"Users under the age of 6 are not allowed!"`**
- **`movies_liked: list`**
    - An **empty** list that will contain **all movies** (objects) **liked by the user**
- **`movies_owned: list`**
    - An **empty** list that will contain **all movies** (objects) **owned by the user**

Methods

__init__(username: str, age: int)

In the **`__init__`** method all the needed attributes must be set.

__str__()

Override the **`__str__()`** to **return the string**:

`"Username: {username}, Age: {age}"`

`"Liked movies:"`

`"{details() of each movie liked by the user, on separate lines}"`

- If no liked movies: **`"No movies liked."`**

`"Owned movies:"`

`"{details() of every movie owned by the user}"`

- If no owned movies: **`"No movies owned."`**

2. Class Movie

In the **`movie.py`** file, the class **`Movie`** should be implemented. It is a **base class** for any **genre of movie,** and it **should not be able to be instantiated**.

Structure

The class should have the following attributes:

- **`title: str`**
    - A string that represents the title of the movie
    - If the title **is an empty string,** raise a **`ValueError`** with the message **`"The title cannot be empty string!"`**
- **`year: int`**
    - An integer that represents the year when the movie was released
    - If the year **is under 1888**, raise **`ValueError`** with the message **`"Movies weren't made before 1888!"`**
- **`owner: User`**
    - A user object that represents the one who made the movie
    - If the owner is **NOT** an object of type **`User`**, raise a **`ValueError`** with the message **`"The owner must be an object of type User!"`**
- **`age_restriction`**: **`int`**
    - The movie is **unsuitable** for people **under the given age**. The age restriction value **depends** on the **movie genre**.
- **`likes: int`**

- It represents the number of likes of the movie
- It should be set to 0 by default

Methods

__init__(title: str, year: int, owner: object, age_restriction: int)

In the **__init__** method all the needed attributes must be set.

details()

It returns a string with **information** about the **movie** by its **type**.

3. Class Fantasy

In the **fantasy.py** file, the class **Fantasy** should be implemented.

If **no age restriction** is given, it should be set to **6 (years)**.

If the age restriction given **is less than 6**, raise a **ValueError** with the message **"Fantasy movies must be restricted for audience under 6 years!"**

Methods

__init__(title: str, year: int, owner: object, age_restriction: int)

In the **__init__** method all the needed attributes must be set.

details()

It should return a string **on one line** in the format:

```
"Fantasy - Title:{movie_title}, Year:{movie_year}, Age restriction:{movie_age_restriction}, Likes:{movie_likes}, Owned by:{movie_owner_username}"
```

4. Class Action

In the **action.py** file, the class **Action** should be implemented.

If **no age restriction** is given, it should be set to **12 (years)**.

If the age restriction given **is less than 12**, raise a **ValueError** with the message **"Action movies must be restricted for audience under 12 years!"**

Methods

__init__(title: str, year: int, owner: object, age_restriction: int)

In the **__init__** method all the needed attributes must be set.

details()

It should return a string **on one line** in the format:

```
"Action - Title:{movie_title}, Year:{movie_year}, Age restriction:{movie_age_restriction}, Likes:{movie_likes}, Owned by:{movie_owner_username}"
```

5. Class Thriller

In the **`thriller.py`** file, the class **`Thriller`** should be implemented.

If **no age restriction** is given, it should be set to **16** (years).

If the age restriction **is less than 16**, raise a **`ValueError`** with the message **`"Thriller movies must be restricted for audience under 16 years!"`**

Methods

__init__(title: str, year: int, owner: object, age_restriction: int)

In the **`__init__`** method all the needed attributes must be set.

details():

It should return a string **on one line** in format:

`"Thriller - Title:{movie_title}, Year:{movie_year}, Age restriction:{movie_age_restriction}, Likes:{movie_likes}, Owned by:{movie_owner_username}"`

6. Class MovieApp

In the **`movie_app.py`** file, the class **`MovieApp`** should be implemented. It will contain **all the functionality** of the project.

Structure

The class should have the following attributes:

- **`movies_collection`**: **`list`**
  - An **empty** list that will contain **all the movies** (objects)
- **`users_collection`**: **`list`**
  - An **empty** list that will contain **all the users** (objects)

Methods

__init__()

In the **`__init__`** method all the needed attributes must be set.

register_user(username: str, age: int)

Creates an **instance of the User class** with the given username and age, and:

- If the user (object) is **not in the `users_collection` list,** add him/her and **return the message `"{username} registered successfully."`**
- If a user with the **same username** is already **registered**, raise an **`Exception`** with the message **`"User already exists!"`**

upload_movie(username: str, movie: Movie)

Only the owner of the given movie can upload it.

The method adds the movie to the user's **`movies_owned`** list as well as the **`movies_collection`** list:

- If the addition is successful, returns the message: **"{username} successfully added {movie_title} movie."**
- If the user with the username provided is **not registered in the app**, raise an **Exception** with the message: **"This user does not exist!"**
- If the user exists, but he/she is **not the owner** of the given movie, raise an **Exception** with the message: **"{username_given} is not the owner of the movie {movie_title}!"**
- If the **movie object is already uploaded**, raise an **Exception** with the message: **"Movie already added to the collection!"**

edit_movie(username: str, movie: Movie, **kwargs)

Only the owner of the movie given can edit it. You will always be given usernames of registered users.

In this method, as kwargs you can receive **one or more** key-value pairs. Each key will be a movie's attribute name (**"title"**, **"year"**, or **"age_restriction"**), and the value will be the **new value** for **that attribute**. You **will not** receive anything different from the keys mentioned above.

The method **edits the movie attributes** with the given values and returns the message **"{username} successfully edited {movie_title} movie."**

- If the movie **is not uploaded**, raise an **Exception** with the message **"The movie {movie_title} is not uploaded!"**
- If the user **does not own that movie,** raise an **Exception** with the message **"{username given} is not the owner of the movie {movie_title}!"**

delete_movie(username: str, movie: Movie)

Only the owner of the movie given can delete it. You will always be given usernames of registered users.

This method **deletes the movie** given in both **movies_collection** and user's **movies_owned** lists. Then, it should return the message **"{username} successfully deleted {movie_title} movie."**

- If the movie is **not uploaded,** raise an **Exception** with the message **"The movie {movie_title} is not uploaded!"**
- If the user **does not own that movie,** raise **Exception** with the message **"{username given} is not the owner of the movie {movie_title}!"**

like_movie(username: str, movie: Movie)

Owners cannot like their own movies. You will always be given usernames of registered users and uploaded movies.

This method increases the value of the movie **attribute likes** by **1** and **adds** the movie to the **user's list movies_liked**. Then, it returns the message **"{username} liked {movie_title} movie."**

- If the user **is also the owner**, **raise** an **Exception** with the message **"{username} is the owner of the movie {movie_title}!"**
- If the user **already liked** that movie, **raise** an **Exception** with the message **"{username} already liked the movie {movie_title}!"**

dislike_movie(username: str, movie: Movie)

Only the user who has liked the movie can dislike it. You will always be given usernames of registered users and uploaded movies.

This method decreases the value of the movie **attribute likes** by **1** and **removes** that movie from the user's **movies_liked** list. Then, it returns the message **"{username} disliked {movie_title} movie."**

- If the user **didn't like that movie** in the first place, raise an **`Exception`** with the message **`"{username} has not liked the movie {movie_title}!"`**

display_movies()

This method sorts all movies uploaded by the **year in descending order**. If there are **two or more movies of the same year**, sort them by **title**:

- It should return the **details() for each movie** on **separate lines** in the format.
- If there are **no movies uploaded**, it returns: **`"No movies found."`**

__str__()

This method should return a string **on 2 lines** for all users' **usernames** and movies **titles** in the following format:

`"All users: {all users' usernames separated by a comma and a space ", "}"`

- If no users: **`"All users: No users."`**

`"All movies: {all movies' titles separated by a comma and a space ", "}"`

- If no movies: **`"All movies: No movies."`**

Examples

Test Code

`from project.movie_app import MovieApp`
`from project.movie_specification.fantasy import Fantasy`
`from project.movie_specification.action import Action`
 	
`movie_app = MovieApp()`
`print(movie_app.register_user('Martin', 24))`
`user = movie_app.users_collection[0]`
`movie = Action('Die Hard', 1988, user, 18)`
`print(movie_app.upload_movie('Martin', movie))`
`print(movie_app.movies_collection[0].title)`
`print(movie_app.register_user('Alexandra', 25))`
`user2 = movie_app.users_collection[1]`
`movie2 = Action('Free Guy', 2021, user2, 16)`
`print(movie_app.upload_movie('Alexandra', movie2))`
`print(movie_app.edit_movie('Alexandra', movie2, title="Free Guy 2"))`
`print(movie_app.like_movie('Martin', movie2))`
`print(movie_app.like_movie('Alexandra', movie))`
`print(movie_app.dislike_movie('Martin', movie2))`
`print(movie_app.like_movie('Martin', movie2))`
`print(movie_app.delete_movie('Alexandra', movie2))`
`movie2 = Fantasy('The Lord of the Rings', 2003, user2, 14)`
`print(movie_app.upload_movie('Alexandra', movie2))`
`print(movie_app.display_movies())`
`print(movie_app)`

Output
Martin registered successfully. Martin successfully added Die Hard movie. Die Hard Alexandra registered successfully. Alexandra successfully added Free Guy movie. Alexandra successfully edited Free Guy 2 movie. Martin liked Free Guy 2 movie. Alexandra liked Die Hard movie. Martin disliked Free Guy 2 movie. Martin liked Free Guy 2 movie. Alexandra successfully deleted Free Guy 2 movie. Alexandra successfully added The Lord of the Rings movie. Fantasy - Title:The Lord of the Rings, Year:2003, Age restriction:14, Likes:0, Owned by:Alexandra Action - Title:Die Hard, Year:1988, Age restriction:18, Likes:1, Owned by:Martin All users: Martin, Alexandra All movies: Die Hard, The Lord of the Rings

Task 3: Unit Tests

You will **be provided with another skeleton** for this problem. **Open** the **new skeleton** as a **new project** and write tests for the **`Plantation`** class. The class will have some methods, fields, and one constructor working properly. **Cover the whole class with unit tests** to make sure that the class is working as intended. You are **NOT ALLOWED** to **change any class**. Submit **only the test** folder.