Lab 3

1. You are tasked with developing a banking system simulation by creating a class called BankAccount. This class should represent a bank account with attributes for the account number, the account holder's name, and the current balance. The class should provide methods to allow users to deposit money into the account, withdraw money from the account, and check the current balance. The design should ensure that the account maintains proper state and handles basic banking operations.

Example Scenario:

- A user creates a new bank account with an account number, their name, and an initial balance of 0.
- The user deposits money into their account.
- The user attempts to withdraw money, ensuring they cannot withdraw more than their current balance.
- The user checks their account balance and retrieves account details.

Example Input:

1. Create a new bank account:
    - Account Number: "123456"
    - Account Holder Name: "John Doe"
    - Initial Balance: 0.0

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2. Perform operations:
    - Deposit 1000.0 EGP.
    - Withdraw 500.0 EGP.
    - Check Balance.
    - Withdraw 600.0 EGP (should fail due to insufficient funds).
    - Check Balance again.

Example Output:

1. Account Creation:
    - Account Number: 123456
    - Account Holder Name: John Doe
    - Initial Balance: 0.0 EGP
2. After Deposit:
    - Deposit Amount: 1000.0 EGP
    - New Balance: 1000.0 EGP
3. After Withdrawal:
    - Withdrawal Amount: 500.0 EGP
    - New Balance: 500.0 EGP
4. Checking Balance:
    - Current Balance: 500.0 EGP

5. Attempt to Withdraw More Than Balance:
    - Withdrawal Attempt: 600.0 EGP
    - Output: "Insufficient funds. Withdrawal failed."
6. Final Balance Check:
    - Current Balance: 500.0 EGP

Additional Considerations:

- The class should handle edge cases such as depositing negative amounts or withdrawing amounts greater than the balance, providing appropriate messages for each case.
- Make sure to adhere to OOP principles like encapsulation, ensuring that attributes are private and accessible only through methods.
- The program should be structured in a way that encourages clean and maintainable code, allowing for easy expansion or modifications in the future.

2. The Movie Review Management System is designed to allow users to manage their movie reviews effectively. This system will provide an interface for users to add, delete, and view reviews and ratings for various movies. Users can contribute their opinions on movies, and the system will calculate and display average ratings based on all submitted reviews.

Example Input and Output

Example 1: User Creation and Movie Creation

Input:

1. Create User:
   - Name: "John Doe"
2. Create User:
   - Name: "Sarah Smith"
3. Create Movie:
   - Title: "The Dark Knight"
   - Director: "Christopher Nolan"
   - Actors: ["Christian Bale", "Heath Ledger", "Aaron Eckhart"]

Output:

User 'John Doe' created.

User 'Sarah Smith' created.

Movie 'The Dark Knight' created by 'Christopher Nolan' with actors: Christian Bale, Heath Ledger, Aaron Eckhart.

Example 2: Adding Reviews

Input:

1. John adds a review:
    - Review: "A brilliant movie with outstanding performances!"
    - Rating: 5
2. Sarah adds a review:
    - Review: "Good, but a bit too dark for me."
    - Rating: 4

Output:

Review added by John Doe: "A brilliant movie with outstanding performances!" with rating 5.

Review added by Sarah Smith: "Good, but a bit too dark for me." with rating 4.

Example 3: Movie Details with Reviews

Input:

1. User requests movie details for "The Dark Knight".

Output:

Movie: The Dark Knight

Director: Christopher Nolan

Actors: Christian Bale, Heath Ledger, Aaron Eckhart

Reviews:

- Review: "A brilliant movie with outstanding performances!" | Rating: 5 - Review: "Good, but a bit too dark for me." | Rating: 4

Average Rating: 4.5

Example 4: Deleting a Review

Input:

1. John deletes his review:

○ Review: "A brilliant movie with outstanding performances!"

Output:

Review deleted by John Doe: "A brilliant movie with outstanding performances!" Movie: The Dark Knight

Director: Christopher Nolan

Actors: Christian Bale, Heath Ledger, Aaron Eckhart

Reviews:

- Review: "Good, but a bit too dark for me." | Rating: 4

Average Rating: 4.0

Example 5: User Submitted Reviews

Input:

1. User requests to see all reviews submitted by John.

Output:

John Doe's Submitted Reviews:

- "A brilliant movie with outstanding performances!"

3. Create a Java program that defines a base class called Building and two subclasses called ResidentialBuilding and CommercialBuilding. The program will demonstrate concepts of inheritance, encapsulation, and polymorphism in object-oriented programming by calculating the total rent for different types of buildings.

Input/Output Example

Input:

- For a ResidentialBuilding:
  - address: "123 Main St"
  - numberOfFloors: 5
  - totalArea: 1500.0
  - numberOfApartments: 10
  - rentPerApartment: 1200.0
- For a CommercialBuilding:
  - address: "456 Market St"
  - numberOfFloors: 10
  - totalArea: 5000.0
  - officeSpace: 4000.0
  - rentPerSquareMeter: 25.0

Output:

Building Details:

Address: 123 Main St

Number of Floors: 5

Total Area: 1500.0 sq. meters

Number of Apartments: 10

Rent Per Apartment: 1200.0

Total Rent: 12000.0

Building Details:

Address: 456 Market St

Number of Floors: 10

Total Area: 5000.0 sq. meters

Office Space: 4000.0 sq. meters Rent Per Square Meter: 25.0

Total Rent: 100000.0

Required:

1. You are required to solve all the above questions and deliver them online through a Google form that will be available for you in the next few days.
2. The deadline for the delivery is Friday, October 18, 2024, at 11 PM.

What to be delivered:

- On the Google form, you should deliver a zipped file that contains the .java files.
- Your zip file should be named as id_groupNumber. For example, 4678_G2. Policies:
- You should work individually.
- Delivering a copy will be severely penalized for both parties, so delivering nothing is so much better than delivering a copy.
- No late submission is allowed.

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