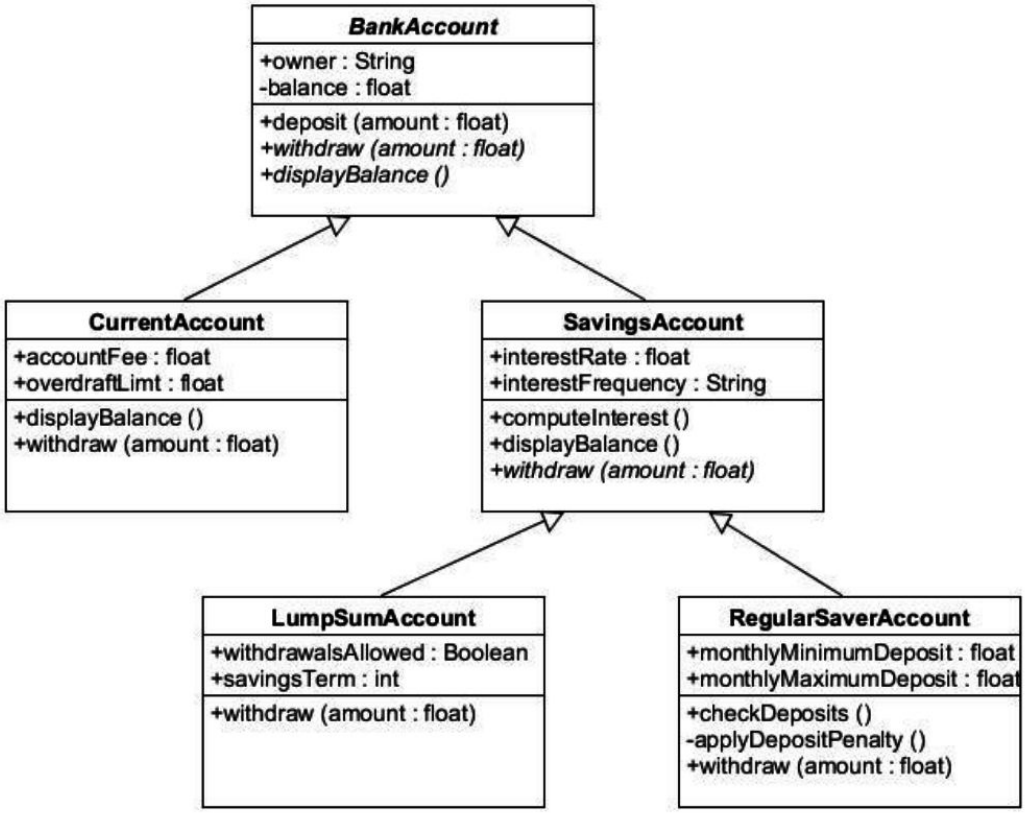
Tutorial

Inheritance, UML

Exercise 1. UML to Python

Implement the classes, methods, and attributes from the below UML Class diagram in Python. The init method has been intentionally left out; you must implement this method for each class. Pay close attention to inheritance! You can use the **`pass`** keyword as function bodies.



Exercise 2. Text to Python

Create a class **`Reptile`**. Each **`Reptile`** instance has the following attributes:

- A **`Reptile`** can be aquatic, terrestrial, or amphibious, depending on where the reptile lives (or is able to live). Each **`Reptile`** has a parameter **`Habitat`** to capture this behaviour.
- The attribute **`Endotherm`** is a Boolean value specifying whether the reptile has the ability to regulate its own body temperature or not.
- **`Reptile`** has the abstract method **`talk()`** which prints out a text representation of the noise a specific reptile makes. As there is no generic or common noise among members of the reptile family, this method should not be implemented in the **`Reptile`** class.
- **`Reptile`** also has the abstract method **`swim().`** When called, reptiles that can swim will print out a message to say they are swimming and reptiles that cannot swim will print out a message to say that they are drowning.
- Create 3 new classes – **`Turtle`**, **`Snake`**, and **`Crocodile`** – that extend/inherit from the **`Reptile`** class. Implement the abstract methods of Reptile in each.
- Implement the **`__init__()`** method in each class. Implement the **`__repr__()`** method for each of these classes and have it print out a statement specifying what animal it is.
- Optional: Implement one or two class-specific methods for the **`Turtle`**, **`Snake`** and **`Crocodile`** classes.

Create a class **Zoo** which is instantiable and has the following attributes:

- Each **`Zoo`** holds a collection of animals (reptiles). The method **`add()`** adds an instance of an animal to a particular Zoo instance.
- **`Zoo`** has a method **`printAnimals()`** that iterates over each animal in a Zoo instance and prints the animal's type (as in ”Turtle” or ”Snake”) and then calls the **`talk()`** method for each.

Create an instance of **`Zoo`** and a few instances of each of **`Turtle`**, **`Snake`**, and **`Crocodile`**. Add all reptile instances to the zoo instance and then call the zoo's **`printAnimals()`** method. Verify that for each reptile instance, a **`talk()`** statement was printed.

Exercise 3. Text to UML Class Diagram

Create a UML Class diagram from the text given in Exercise 2 (excluding the last paragraph on creating class instances, etc.).