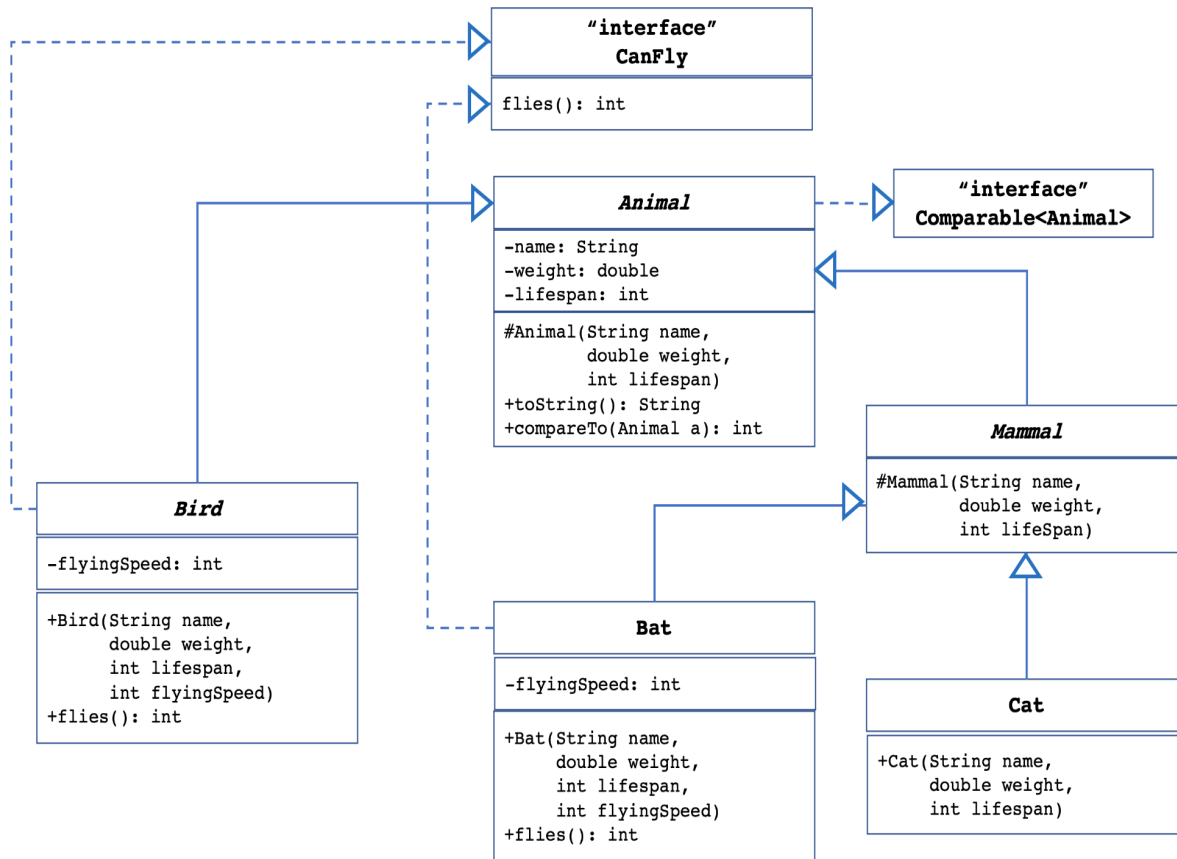


## Programming and Data Structures

### Test #1

1. Implement the class hierarchy shown in the UML diagram below:



Note the following:

- The interface **CanFly** has one abstract method **flies()**. You do not need to create or import the interface **Comparable<E>** because it is already available in the package **java.lang**.
- The classes **Animal** and **Mammal** are abstract.
- The concrete classes **Bird**, **Bat**, and **Cat** do not override the method **toString()**.
- The method **flies()** returns the value of the data member **flyingSpeed** in the classes **Bird** and **Bat**.

e. You should not add any data members or methods to any of the classes.

2. Create a class **Test** for the test program. The program should read the file **animals.txt**, store the animal information in an array of type **Animal**, and allow the user to select one of the following operations: view all animals, view flying animals, and sort animals by weight. Do not write your own sort method; use **java.util.Arrays.sort()**. Your program should handle the exceptions: **InputMismatchException** for user input and **FileNotFoundException** when opening the file for reading.

3. Test your program for all the operations. A sample run is provided below for testing.

4. Submit the files **Animal.java**, **Mammal.java**, **CanFly.java**, **Bird.java**, **Cat.java**, **Bat.java**, and **Test.java** on course site.

5. **Javadoc comments are not required.**

===== Sample run =====

Select an operation:

1: view all animals

2: view flying animals

3: sort animals by weight

4: exit

1

Type	Name	Weight(oz)	Lifespan(years)
Bat	Ghost	0.50	20
Bird	Parrot	59.20	50
Cat	Persian	128.00	15
Bat	HorseShoe	0.30	7
Bat	Bulldog	0.99	10
Cat	Sphynx	160.00	10
Bird	Owl	32.00	25
Bird	Hummingbird	0.16	5
Cat	Munchkin	96.00	12

Select an operation:

- 1: view all animals
- 2: view flying animals
- 3: sort animals by weight
- 4: exit

2

Type	Name	Weight(oz)	Lifespan(years)	Flying Speed(mph)
Bat	Ghost	0.50	20	100
Bird	Parrot	59.20	50	50
Bat	HorseShoe	0.30	7	18
Bat	Bulldog	0.99	10	83
Bird	Owl	32.00	25	20
Bird	Hummingbird	0.16	5	61

Select an operation:

- 1: view all animals
- 2: view flying animals
- 3: sort animals by weight
- 4: exit

3

Type	Name	Weight(oz)	Lifespan(years)
Bird	Hummingbird	0.16	5
Bat	HorseShoe	0.30	7
Bat	Ghost	0.50	20
Bat	Bulldog	0.99	10
Bird	Owl	32.00	25
Bird	Parrot	59.20	50
Cat	Munchkin	96.00	12
Cat	Persian	128.00	15
Cat	Sphynx	160.00	10

Select an operation:

- 1: view all animals
- 2: view the animals that fly
- 3: sort animals by weight
- 4: exit

4