# Assignment 8

```
package AssignmentSelf;
import java.util.List;
import java.util.LinkedList;
import java.util.Collection;
import java.util.Collections;
import java.util.Comparator;
import java.util.Iterator;
import java.io.FileInputStream;
import java.io.FileOutputStream;
import java.io.ObjectInputStream;
import java.io.ObjectOutputStream;
import java.io.Serializable;
//Define the main test class
public class Tester {
 // Entry point of the program
 public static void main(String[] args) {

     // Create instances of Cat and Dog objects
     Cat cat1 = new Cat("Lily", "yellow", 12);
     Cat cat2 = new Cat("Jet", "black", 10);
     Dog dog1 = new Dog("Cow", "black", 14);
     Dog dog2 = new Dog("Rough", "white", 8);
     // Initialize a LinkedList to hold Animal objects
     List<Animal> mylist = new LinkedList<>();
     mylist.add(cat1);
     mylist.add(cat2);
     mylist.add(dog1);
     mylist.add(dog2);
     // Print out all animal information
     for (Animal animal : mylist) {
         System.out.println(animal.toString());
     }

     // Sort the list by name using Animal class's compareTo method
     Collections.sort(mylist);
     System.out.println("");
     // Print out the sorted animal information again
     for (Animal animal : mylist) {
         System.out.println(animal.toString());
     }

     // Define an inner class for sorting animals by breed
     class Inner implements Comparator<Animal> {
         public int compare(Animal a1, Animal a2) {
             return a1.getBreed().compareTo(a2.getBreed());
         }
     }
     Inner inn = new Inner(); // Instantiate the inner class
     Collections.sort(mylist, inn); // Use the inner class to sort the list
```

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        System.out.println("");
        // Use an iterator to print the sorted list
        Iterator<Animal> itr = mylist.iterator();
        while (itr.hasNext()) {
            Animal animal = itr.next();
            System.out.println(animal.toString());
        }

        // Define another inner class for sorting by size
        class Inner2 implements Comparator<Animal>{
            public int compare(Animal a1, Animal a2) {
                return Integer.compare(a1.getSize(), a2.getSize());
            }
        }
        Inner2 inn2 = new Inner2(); // Instantiate the second inner class
        Collections.sort(mylist, inn2); // Use the second inner class to sort the list

        // Reset the iterator and print the final sorted list
        itr = mylist.iterator();
        System.out.println("");
        while(itr.hasNext()) {
            Animal animal = itr.next();
            System.out.println(animal.toString());
        }

        // Serialize the list to a file
        try {
            FileOutputStream fileStream = new FileOutputStream("Animal.dat");
            ObjectOutputStream os = new ObjectOutputStream(fileStream);
            os.writeObject(mylist);
            os.close();
        } catch (Exception e) {
            e.printStackTrace();
        }

        // Deserialize the list from the file and print it
        try {
            FileInputStream fileStream = new FileInputStream("Animal.dat");
            ObjectInputStream os = new ObjectInputStream(fileStream);
            List<Animal> list = (List<Animal>)os.readObject();
            System.out.println("");
            Iterator<Animal> iter = list.iterator() ;
            while(iter.hasNext()) {
                Animal animal = iter.next();
                System.out.println(animal.toString());
            }

        }catch(Exception e) {
            e.printStackTrace();
        }
    }
}
```

```java
package AssignmentSelf;
import java.io.Serializable;
//Define an abstract Animal class that implements Serializable and Comparable
interfaces
public abstract class Animal implements Serializable, Comparable<Animal>{
	// Properties of the animal
	private String name;
	private String breed;
	private int size;

	//Constructor
	public Animal() {
		this.name = "null";
		this.breed = "null";
		this.size = 0;
	}
	public Animal(String name, String breed, int size) {
		this.name = name;
		this.breed = breed;
		this.size = size;
	}
	// Implement the compareTo method from the Comparable interface for sorting by
name
	public int compareTo(Animal animal) {
		return name.compareTo(animal.getName());
	}
	// Getter and Setter methods
	public void setName(String name) {
		this.name = name;
	}
	public String getName() {
		return name;
	}
	public void setBreed(String breed) {
		this.breed = breed;
	}
	public String getBreed() {
		return breed;
	}
	public void setSize(int size) {
		this.size = size;
	}
	public int getSize() {
		return size;
	}
	// Return a string representation of the animal information
	public String toString() {
		return getClass().getSimpleName() + " Name is " + name + ", breed is " +
breed + ", size is " + size;
	};
```

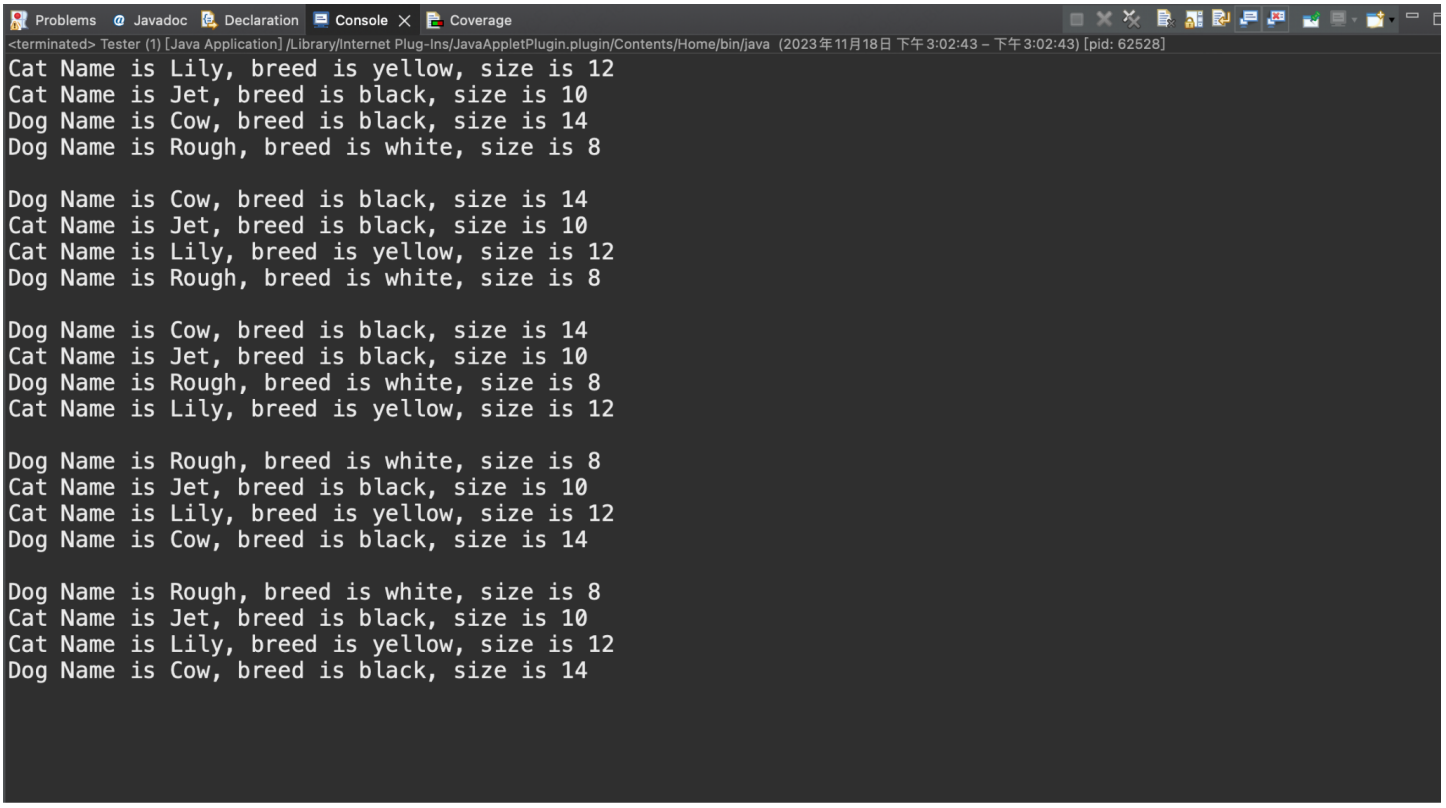
```
}


package AssignmentSelf;
// Cat class that extends Animal
public class Cat extends Animal {
    // Constructor for Cat that calls the superclass constructor
    public Cat(String name, String breed, int size) {
        super(name, breed, size);
    }

    // Method to return the sound a cat makes
    public String sound() {
        return "meow";
    }
}


package AssignmentSelf;
//Dog class that extends Animal
public class Dog extends Animal {
      // Constructor for Dog
      public Dog(String name, String breed, int size) {
            super(name,breed,size);
      }
       // Method to return the sound a dog makes
      public String sound() {
            return "woo";
      }
}
```

Result:


Problems
Javadoc
Declaration
Console
Coverage
<terminated> Tester (1) [Java Application] /Library/Internet Plug-Ins/JavaAppletPlugin.plugin/Contents/Home/bin/java (2023年11月18日 下午3:02:43 – 下午3:02:43) [pid: 62528]
Cat Name is Lily, breed is yellow, size is 12
Cat Name is Jet, breed is black, size is 10
Dog Name is Cow, breed is black, size is 14
Dog Name is Rough, breed is white, size is 8
Dog Name is Cow, breed is black, size is 14
Cat Name is Jet, breed is black, size is 10
Cat Name is Lily, breed is yellow, size is 12
Dog Name is Rough, breed is white, size is 8
Dog Name is Cow, breed is black, size is 14
Cat Name is Jet, breed is black, size is 10
Dog Name is Rough, breed is white, size is 8
Cat Name is Lily, breed is yellow, size is 12
Dog Name is Rough, breed is white, size is 8
Cat Name is Jet, breed is black, size is 10
Cat Name is Lily, breed is yellow, size is 12
Dog Name is Cow, breed is black, size is 14
Dog Name is Rough, breed is white, size is 8
Cat Name is Jet, breed is black, size is 10
Cat Name is Lily, breed is yellow, size is 12
Dog Name is Cow, breed is black, size is 14