CT/2021/034

Worksheet 06
CTEC 22043
Object Oriented Programming

Q1.

pet.java

```
package Q_01;

public class pet {

        private String name;
        public String getName() {
            return name;
        }
        public void setName(String petName) {
            name = petName;
        }
        public String speak() {
            return "I'm your cuddly little pet.";
        }
    }
```

Cat.java

```
package Q_01;

public class cat extends pet {
    @Override
    public String speak() {
        return "";
    }
}
```

Dog.java

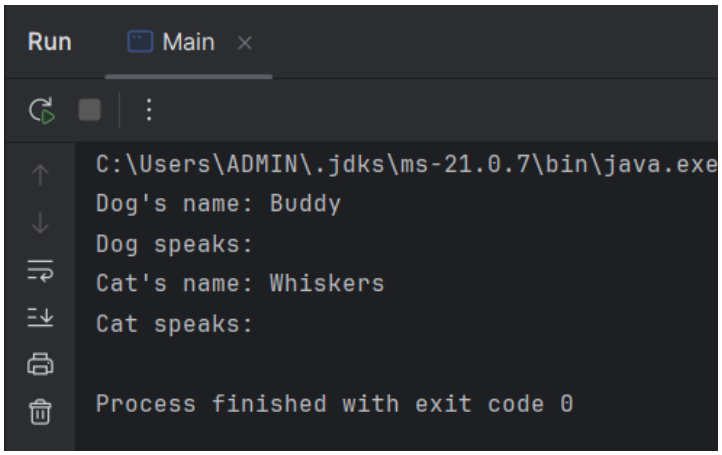
```
package Q_01;

public class Dog extends pet {
    @Override
    public String speak() {
```

```
        return ""; // Returns an empty string
    }
}
```

Main.java

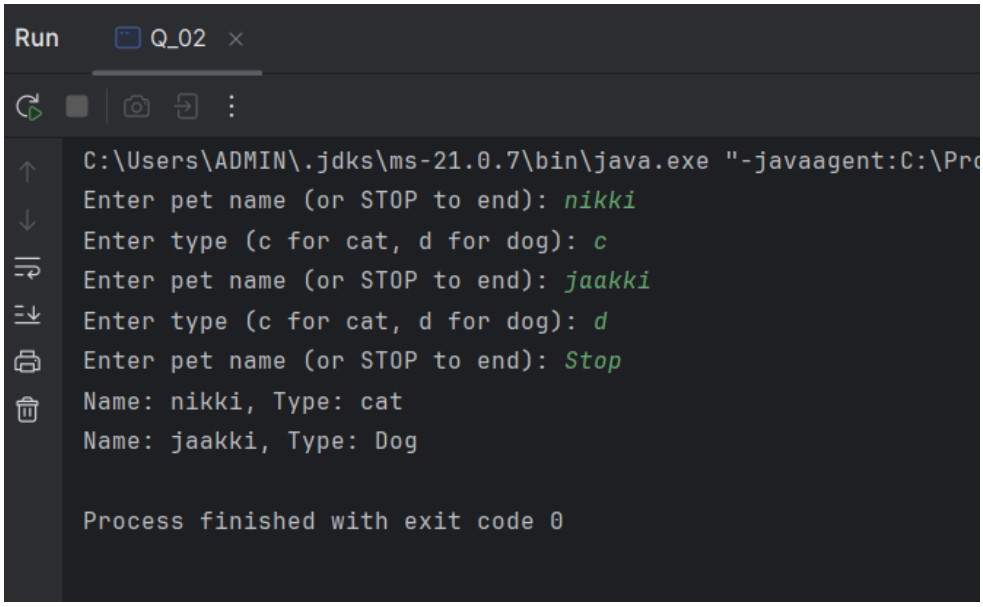
```
package Q_01;

public class Main {
    public static void main(String[] args) {
            // Create a Dog object
            Dog myDog = new Dog();
            myDog.setName("Buddy");
            System.out.println("Dog's name: " +
myDog.getName());
            System.out.println("Dog speaks: " +
myDog.speak());

            // Create a Cat object
            cat myCat = new cat();
            myCat.setName("Whiskers");
            System.out.println("Cat's name: " +
myCat.getName());
            System.out.println("Cat speaks: " +
myCat.speak());
        }
    }
```

Output



Q2

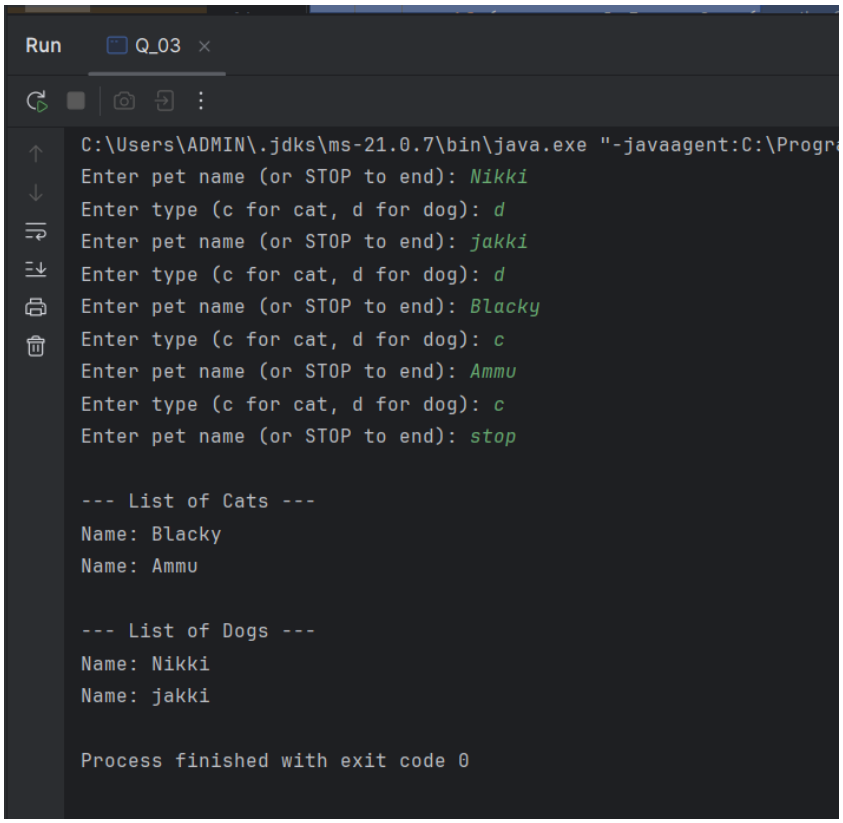
```
package Q_02;

import Q_01.cat;
import Q_01.Dog;
import Q_01.pet;
import java.util.Scanner;

        public class Q_02 {
            public static void main(String[] args) {
                Scanner input = new Scanner(System.in);
                pet[] pets = new pet[100]; // maximum 100
pets
                int count = 0;

                while (true) {
                    System.out.print("Enter pet name (or STOP
to end): ");
                    String name = input.nextLine();
                    if (name.equalsIgnoreCase("STOP")) break;

                    System.out.print("Enter type (c for cat,
d for dog): ");
                    String type = input.nextLine();

                    pet pet;
                    if (type.equalsIgnoreCase("c")) {
                        pet = new cat();
                    } else {
                        pet = new Dog();
                    }

                    pet.setName(name);
                    pets[count++] = pet;
                }

                for (int i = 0; i < count; i++) {
                    System.out.println("Name: " +
pets[i].getName() + ", Type: " +
pets[i].getClass().getSimpleName());
                }
            }
        }
```



Q3.

```
package Q_03;
import Q_01.cat;
import Q_01.Dog;
import Q_01.pet;
import java.util.ArrayList;
import java.util.Scanner;

public class Q_03 {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        ArrayList<pet> pets = new ArrayList<>();

        while (true) {
            System.out.print("Enter pet name (or STOP to
end): ");
            String name = input.nextLine();
            if (name.equalsIgnoreCase("STOP")) break;

            System.out.print("Enter type (c for cat, d for
dog): ");
            String type = input.nextLine();

            pet pet = type.equalsIgnoreCase("c") ? new cat()
: new Dog();
            pet.setName(name);
            pets.add(pet);
        }
        System.out.println("\n--- List of Cats ---");
        for (pet p : pets) {
            if (p instanceof cat) {
                System.out.println("Name: " + p.getName());
            }
```

```
        }
        System.out.println("\n--- List of Dogs ---");
        for (pet p : pets) {
            if (p instanceof Dog) {
                System.out.println("Name: " + p.getName());
            }
        }
    }
}
```



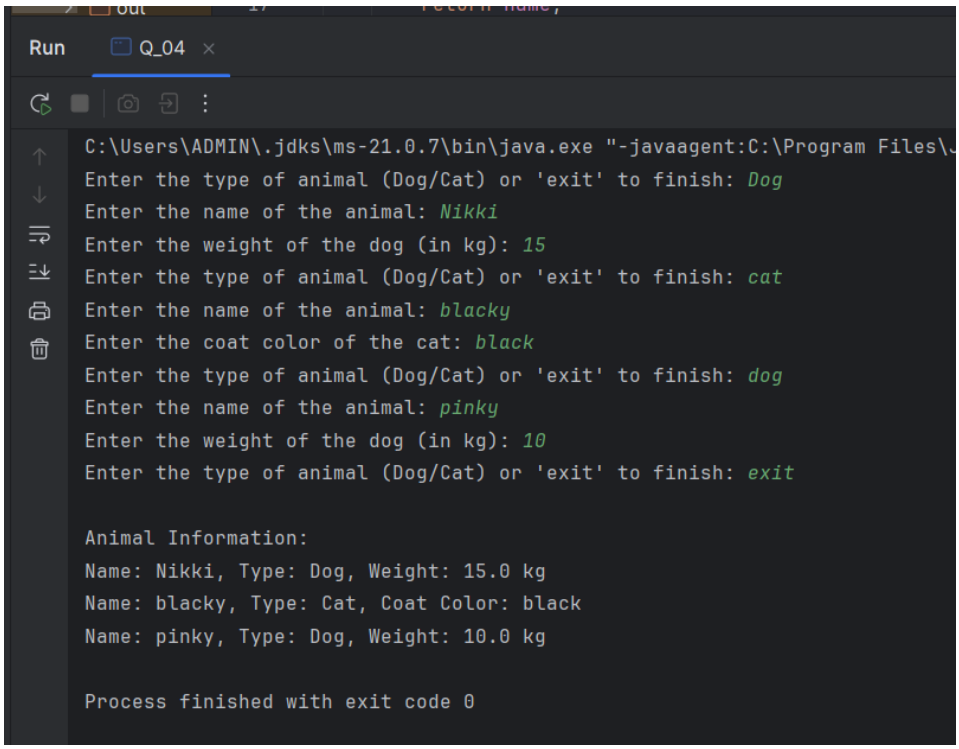
Q4.

```
Package Q_04;
import java.util.ArrayList;
import java.util.List;
import java.util.Scanner;

class Dog {
    private String name;
    private String type;
    private double weight;

    public Dog(String name, double weight) {
        this.name = name;
```

```
        this.type = "Dog";
        this.weight = weight;
    }

    public String getName() {
        return name;
    }

    public String getType() {
        return type;
    }

    public double getWeight() {
        return weight;
    }

    public void setWeight(double weight) {
        this.weight = weight;
    }

    @Override
    public String toString() {
        return "Name: " + name + ", Type: " + type + ",
Weight: " + weight + " kg";
    }
}

class Cat {
    private String name;
    private String type;
    private String coatColor;

    public Cat(String name, String coatColor) {
        this.name = name;
        this.type = "Cat";
        this.coatColor = coatColor;
    }

    public String getName() {
        return name;
    }

    public String getType() {
        return type;
    }

    public String getCoatColor() {
        return coatColor;
    }

    public void setCoatColor(String coatColor) {
```

```
        this.coatColor = coatColor;
    }

    @Override
    public String toString() {
        return "Name: " + name + ", Type: " + type + ", Coat
Color: " + coatColor;
    }
}

public class Q_04 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        List<Object> animals = new ArrayList<>();

        while (true) {
            System.out.print("Enter the type of animal
(Dog/Cat) or 'exit' to finish: ");
            String animalType = scanner.nextLine().trim();

            if (animalType.equalsIgnoreCase("exit")) {
                break;
            }

            System.out.print("Enter the name of the animal:
");
            String name = scanner.nextLine().trim();

            if (animalType.equalsIgnoreCase("dog")) {
                System.out.print("Enter the weight of the dog
(in kg): ");
                double weight = 0;
                while (true) {
                    try {
                        weight =
Double.parseDouble(scanner.nextLine().trim());
                        break;
                    } catch (NumberFormatException e) {
                        System.out.print("Invalid input.
Please enter a valid number for weight: ");
                    }
                }
                animals.add(new Dog(name, weight));

            } else if (animalType.equalsIgnoreCase("cat")) {
                System.out.print("Enter the coat color of the
cat: ");
                String coatColor = scanner.nextLine().trim();
                animals.add(new Cat(name, coatColor));
            } else {
                System.out.println("Invalid animal type.
```

```
Please enter 'Dog' or 'Cat'.");
                }
            }

            System.out.println("\nAnimal Information:");
            for (Object animal : animals) {
                System.out.println(animal.toString());
            }

            scanner.close();
        }
}
```



Q5.

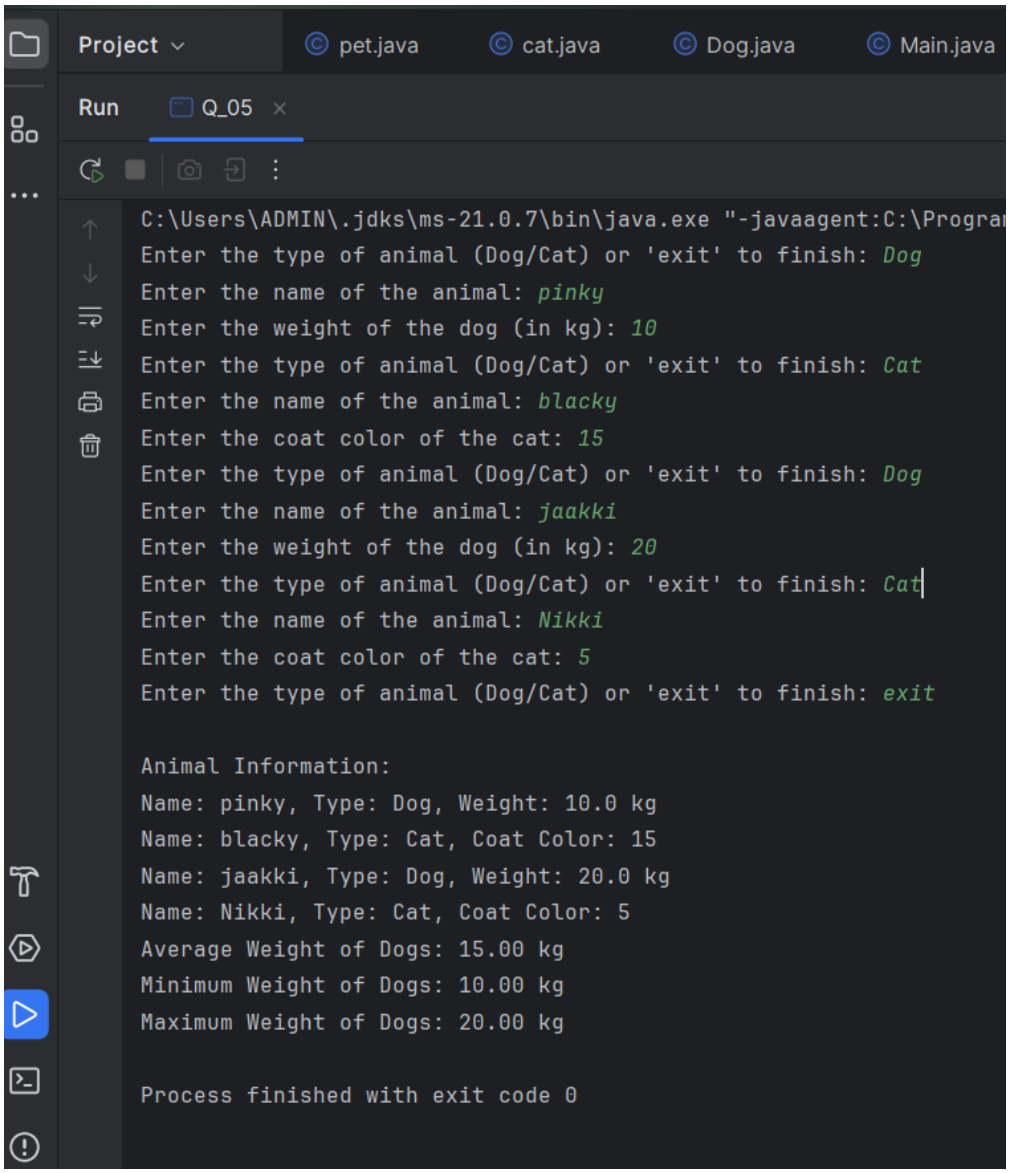
```
package Q_05;
import java.util.ArrayList;
import java.util.List;
import java.util.Scanner;

class Dog {
    private String name;
    private String type;
    private double weight;

    public Dog(String name, double weight) {
```

```
        this.name = name;
        this.type = "Dog";
        this.weight = weight;
    }

    public String getName() {
        return name;
    }

    public String getType() {
        return type;
    }

    public double getWeight() {
        return weight;
    }

    public void setWeight(double weight) {
        this.weight = weight;
    }

    @Override
    public String toString() {
        return "Name: " + name + ", Type: " + type + ",
Weight: " + weight + " kg";
    }
}

class Cat {
    private String name;
    private String type;
    private String coatColor;

    public Cat(String name, String coatColor) {
        this.name = name;
        this.type = "Cat";
        this.coatColor = coatColor;
    }

    public String getName() {
        return name;
    }

    public String getType() {
        return type;
    }

    public String getCoatColor() {
        return coatColor;
    }
```

```
    public void setCoatColor(String coatColor) {
        this.coatColor = coatColor;
    }

    @Override
    public String toString() {
        return "Name: " + name + ", Type: " + type + ", Coat
Color: " + coatColor;
    }
}

public class Q_05 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        List<Object> animals = new ArrayList<>();

        while (true) {
            System.out.print("Enter the type of animal
(Dog/Cat) or 'exit' to finish: ");
            String animalType = scanner.nextLine().trim();

            if (animalType.equalsIgnoreCase("exit")) {
                break;
            }

            System.out.print("Enter the name of the animal:
");
            String name = scanner.nextLine().trim();

            if (animalType.equalsIgnoreCase("dog")) {
                System.out.print("Enter the weight of the dog
(in kg): ");
                double weight = 0;
                while (true) {
                    try {
                        weight =
Double.parseDouble(scanner.nextLine().trim());
                        break;
                    } catch (NumberFormatException e) {
                        System.out.print("Invalid input.
Please enter a valid number for weight: ");
                    }
                }
                animals.add(new Dog(name, weight));

            } else if (animalType.equalsIgnoreCase("cat")) {
                System.out.print("Enter the coat color of the
cat: ");
                String coatColor = scanner.nextLine().trim();
                animals.add(new Cat(name, coatColor));
            } else {
```

```
                System.out.println("Invalid animal type.
Please enter 'Dog' or 'Cat'.");
            }
        }

        System.out.println("\nAnimal Information:");
        for (Object animal : animals) {
            System.out.println(animal.toString());
        }

        // Create an array to hold only Dog objects
        Dog[] dogArray = new Dog[animals.size()];
        int dogCount = 0;

        // Populate the dogArray with Dog objects
        for (Object animal : animals) {
            if (animal instanceof Dog) {
                dogArray[dogCount++] = (Dog) animal;
            }
        }

        // Calculate average, minimum, and maximum weights
        if (dogCount > 0) {
            double totalWeight = 0;
            double minWeight = Double.MAX_VALUE;
            double maxWeight = Double.MIN_VALUE;

            for (int i = 0; i < dogCount; i++) {
                double weight = dogArray[i].getWeight();
                totalWeight += weight;
                if (weight < minWeight) {
                    minWeight = weight;
                }
                if (weight > maxWeight) {
                    maxWeight = weight;
                }
            }

            double averageWeight = totalWeight / dogCount;

            System.out.printf("Average Weight of Dogs: %.2f
kg%n", averageWeight);
            System.out.printf("Minimum Weight of Dogs: %.2f
kg%n", minWeight);
            System.out.printf("Maximum Weight of Dogs: %.2f
kg%n", maxWeight);
        } else {
            System.out.println("No dogs were entered.");
        }

        scanner.close();
```

```
    }
}
```



Q6

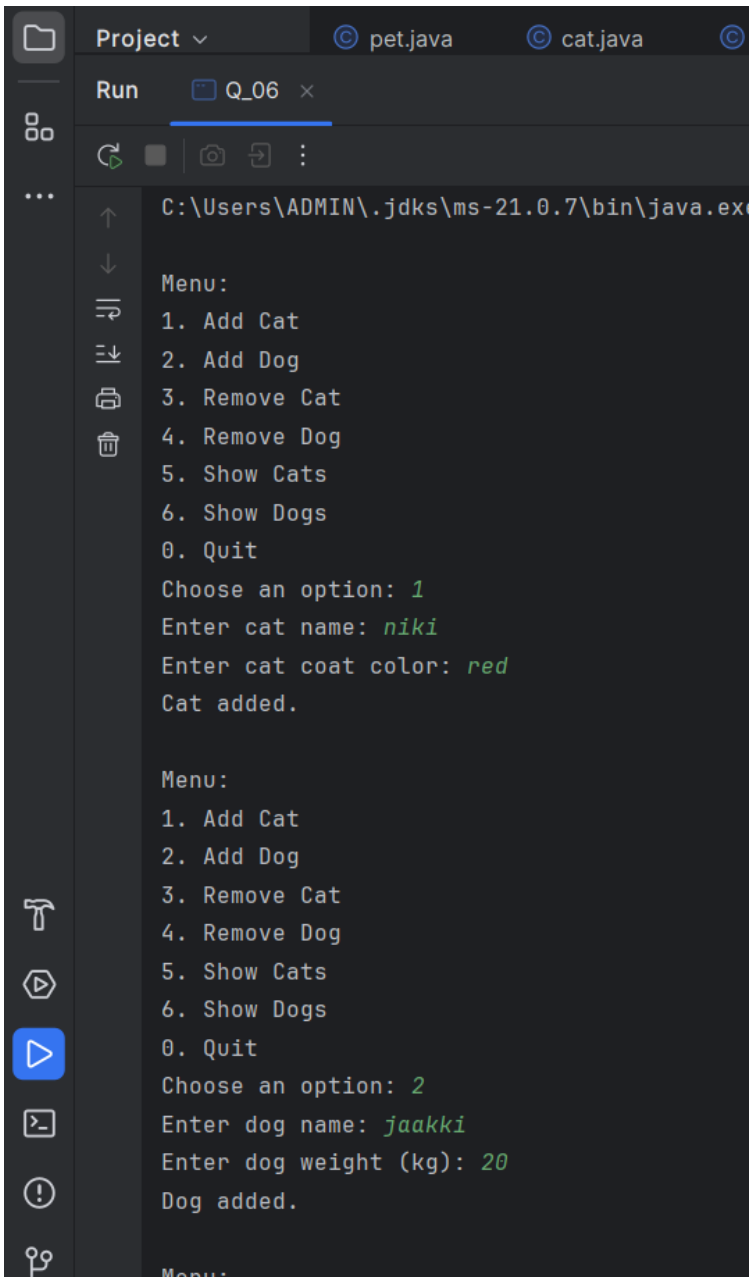
```
package Q_06;
import java.util.ArrayList;
import java.util.Scanner;

class Dog {
    private String name;
    private double weight;

    public Dog(String name, double weight) {
        this.name = name;
        this.weight = weight;
```

```
    }

    public String getName() {
        return name;
    }

    public double getWeight() {
        return weight;
    }

    public String toString() {
        return "Dog - Name: " + name + ", Weight: " + weight
+ " kg";
    }
}

class Cat {
    private String name;
    private String coatColor;

    public Cat(String name, String coatColor) {
        this.name = name;
        this.coatColor = coatColor;
    }

    public String getName() {
        return name;
    }

    public String getCoatColor() {
        return coatColor;
    }

    public String toString() {
        return "Cat - Name: " + name + ", Coat Color: " +
coatColor;
    }
}

public class Q_06 {
    public static void main(String[] args) {
        ArrayList<Dog> dogs = new ArrayList<>();
        ArrayList<Cat> cats = new ArrayList<>();
        Scanner scanner = new Scanner(System.in);
        int choice;

        while (true) {
            System.out.println("\nMenu:");
            System.out.println("1. Add Cat");
            System.out.println("2. Add Dog");
            System.out.println("3. Remove Cat");
```

```
            System.out.println("4. Remove Dog");
            System.out.println("5. Show Cats");
            System.out.println("6. Show Dogs");
            System.out.println("0. Quit");
            System.out.print("Choose an option: ");
            choice = scanner.nextInt();
            scanner.nextLine();

            if (choice == 0) {
                System.out.println("Goodbye!");
                break;
            }

            switch (choice) {
                case 1:
                    System.out.print("Enter cat name: ");
                    String catName = scanner.nextLine();
                    System.out.print("Enter cat coat color:
");
                    String coatColor = scanner.nextLine();
                    cats.add(new Cat(catName, coatColor));
                    System.out.println("Cat added.");
                    break;
                case 2:
                    System.out.print("Enter dog name: ");
                    String dogName = scanner.nextLine();
                    System.out.print("Enter dog weight (kg):
");
                    double weight = scanner.nextDouble();
                    scanner.nextLine();
                    dogs.add(new Dog(dogName, weight));
                    System.out.println("Dog added.");
                    break;
                case 3:
                    System.out.print("Enter cat name to
remove: ");
                    String removeCatName =
scanner.nextLine();
                    boolean catRemoved = false;
                    for (int i = 0; i < cats.size(); i++) {
                        if
(cats.get(i).getName().equalsIgnoreCase(removeCatName)) {
                            cats.remove(i);
                            catRemoved = true;
                            System.out.println("Cat
removed.");
                            break;
                        }
                    }
                    if (!catRemoved) {
                        System.out.println("Cat not found.");
```

```
                    }
                    break;
                case 4:
                    System.out.print("Enter dog name to
remove: ");
                    String removeDogName =
scanner.nextLine();
                    boolean dogRemoved = false;
                    for (int i = 0; i < dogs.size(); i++) {
                        if
(dogs.get(i).getName().equalsIgnoreCase(removeDogName)) {
                            dogs.remove(i);
                            dogRemoved = true;
                            System.out.println("Dog
removed.");
                            break;
                        }
                    }
                    if (!dogRemoved) {
                        System.out.println("Dog not found.");
                    }
                    break;
                case 5:
                    if (cats.isEmpty()) {
                        System.out.println("No cats in the
list.");
                    } else {
                        System.out.println("Cats:");
                        for (Cat c : cats) {
                            System.out.println(c);
                        }
                    }
                    break;
                case 6:
                    if (dogs.isEmpty()) {
                        System.out.println("No dogs in the
list.");
                    } else {
                        System.out.println("Dogs:");
                        for (Dog d : dogs) {
                            System.out.println(d);
                        }
                    }
                    break;
                default:
                    System.out.println("Invalid option.");
            }
        }

        scanner.close();
```

```
        }
}
```


Project
pet.java
cat.java
Run
Q_06
C:\Users\ADMIN\.jdks\ms-21.0.7\bin\java.ex
Menu:
1. Add Cat
2. Add Dog
3. Remove Cat
4. Remove Dog
5. Show Cats
6. Show Dogs
0. Quit
Choose an option: 1
Enter cat name: niki
Enter cat coat color: red
Cat added.
Menu:
1. Add Cat
2. Add Dog
3. Remove Cat
4. Remove Dog
5. Show Cats
6. Show Dogs
0. Quit
Choose an option: 2
Enter dog name: jaakki
Enter dog weight (kg): 20
Dog added.

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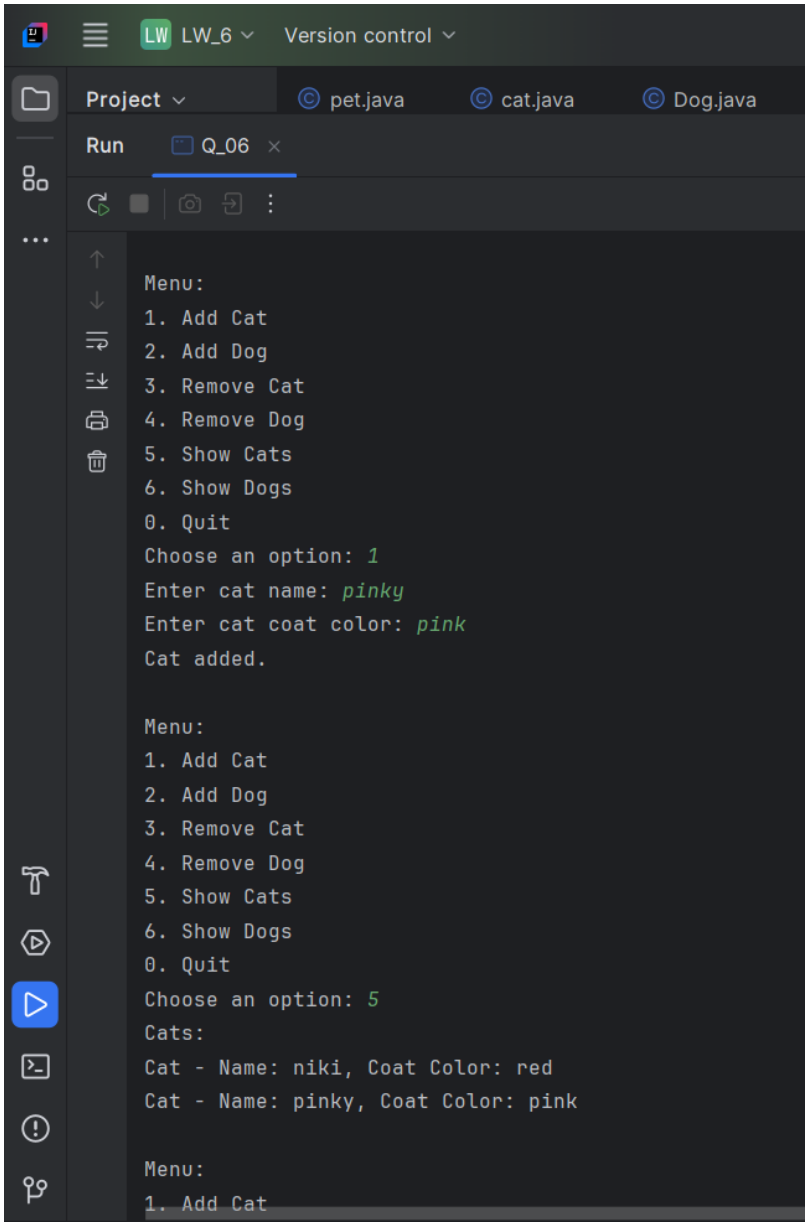
LW_6
Version control
Project
pet.java
cat.java
Dog.java
Run
Q_06
Menu:
1. Add Cat
2. Add Dog
3. Remove Cat
4. Remove Dog
5. Show Cats
6. Show Dogs
0. Quit
Choose an option: 1
Enter cat name: pinky
Enter cat coat color: pink
Cat added.
Menu:
1. Add Cat
2. Add Dog
3. Remove Cat
4. Remove Dog
5. Show Cats
6. Show Dogs
0. Quit
Choose an option: 5
Cats:
Cat - Name: niki, Coat Color: red
Cat - Name: pinky, Coat Color: pink
Menu:
1. Add Cat

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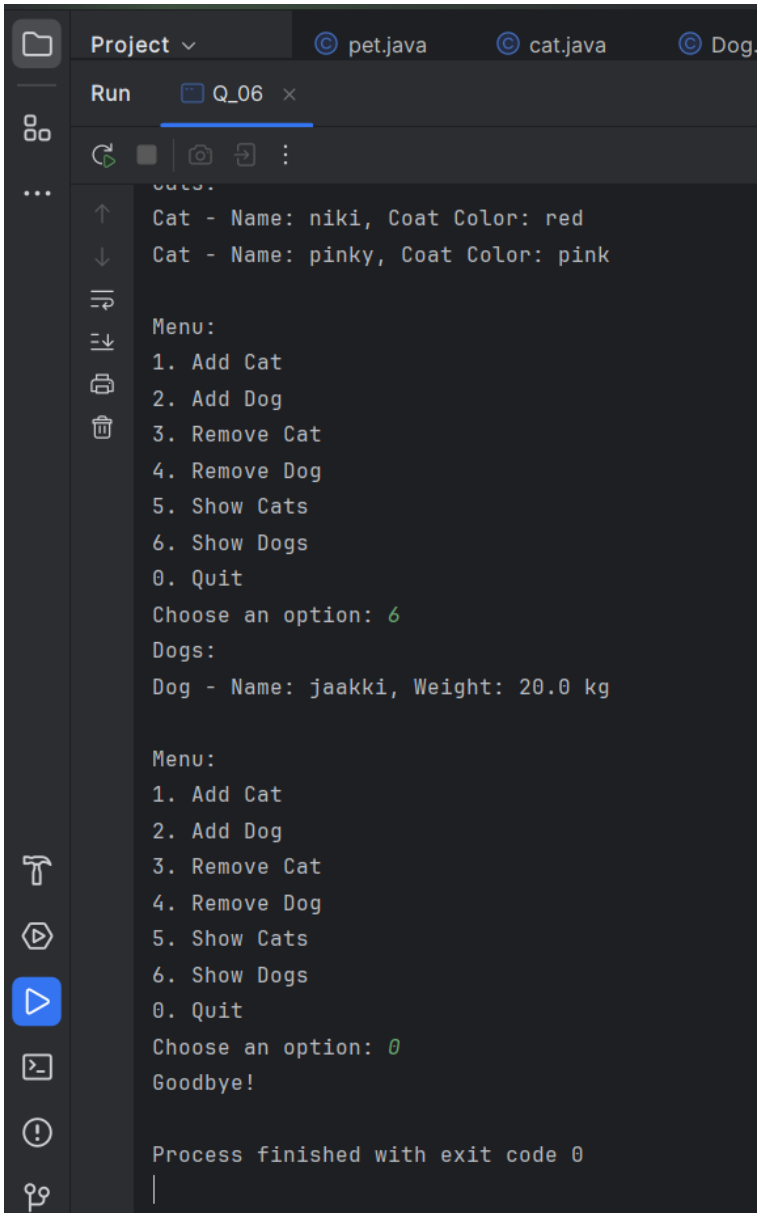
Project
pet.java
cat.java
Dog.
Run
Q_06
Cat - Name: niki, Coat Color: red
Cat - Name: pinky, Coat Color: pink
Menu:
1. Add Cat
2. Add Dog
3. Remove Cat
4. Remove Dog
5. Show Cats
6. Show Dogs
0. Quit
Choose an option: 6
Dogs:
Dog - Name: jaakki, Weight: 20.0 kg
Menu:
1. Add Cat
2. Add Dog
3. Remove Cat
4. Remove Dog
5. Show Cats
6. Show Dogs
0. Quit
Choose an option: 0
Goodbye!
Process finished with exit code 0