JAVA TASK-3

Write a Java program that demonstrates various OOP concepts including class design, inheritance, abstraction, polymorphism, encapsulation, method overriding, and method overloading.

CODE:

Main.java > ...

```java
// Base class (Superclass)
class Animal {
    private String name; // Encapsulation

    public Animal(String name) {
        this.name = name;
    }

    public String getName() { // Encapsulation
        return name;
    }

    public void setName(String name) { // Encapsulation
        this.name = name;
    }

    // Method that can be overridden
    public void makeSound() {
        System.out.println(x:"Some generic animal sound");
    }

    // Overloaded method
    public void eat() {
        System.out.println(name + " is eating.");
    }

    // Overloaded method with different parameters
    public void eat(String food) {
        System.out.println(name + " is eating " + food + ".");
    }
}

// Derived class (Subclass)
class Dog extends Animal {
    public Dog(String name) {
        super(name);
    }

```

```java
    // Method overriding
    @Override
    public void makeSound() {
        System.out.println(x:"Woof");
    }
}

// Another derived class (Subclass)
class Cat extends Animal {
    public Cat(String name) {
        super(name);
    }

    // Method overriding
    @Override
    public void makeSound() {
        System.out.println(x:"Meow");
    }
}

public class Main {
    Run | Debug
    public static void main(String[] args) {
        // Creating objects (Polymorphism)
        Animal myDog = new Dog(name:"Buddy");
        Animal myCat = new Cat(name:"Whiskers");

        // Calling methods
        myDog.makeSound(); // Output: Woof
        myCat.makeSound(); // Output: Meow

        // Encapsulation demonstration
        myDog.setName(name:"Rex");
        System.out.println("Dog's new name: " + myDog.getName());

        // Method overloading demonstration
        myDog.eat(); // Output: Rex is eating.
        myCat.eat(food:"fish"); // Output: Whiskers is eating fish.
    }
```

OUTPUT:

```
PS C:\Users\SWETHA BENNY\Documents\javaProject> javac Main.java
>> java Main
>>
Woof
Meow
Dog's new name: Rex
Rex is eating.
Whiskers is eating fish.
```