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Dept : CSE

1.

```
// Superclass Animal
class Animal {
    public void makeSound() {
        System.out.println("The animal makes a sound.");
    }
}

// Subclass Dog
class Dog extends Animal {
    @Override
    public void makeSound() {
        System.out.println("The dog barks.");
    }
}

// Subclass Cat
class Cat extends Animal {
    @Override
    public void makeSound() {
        System.out.println("The cat meows.");
    }
```

```
}

// Main class
public class Main {
    public static void main(String[] args) {
        // Creating objects of each class
        Animal animal = new Animal();
        Dog dog = new Dog();
        Cat cat = new Cat();

        // Displaying objects
        System.out.println("Animal:");
        animal.makeSound(); // Output: The animal makes a sound.

        System.out.println("\nDog:");
        dog.makeSound();    // Output: The dog barks.

        System.out.println("\nCat:");
        cat.makeSound();    // Output: The cat meows.
    }
}
```

2.

```
// Abstract class Vaccine
abstract class Vaccine {
    int age;
    String nationality;

    public Vaccine(int age, String nationality) {
        this.age = age;
        this.nationality = nationality;
    }

    // Concrete method for first dose
    public void firstDose() {
        if (nationality.equals("Indian") && age >= 18) {
            System.out.println("First dose administered. Please pay Rs. 250.");
        } else {
            System.out.println("You are not eligible for the first dose.");
        }
    }

    // Concrete method for second dose
    public void secondDose() {
        System.out.println("You can take the second dose only after completing the first dose.");
    }
```

```
    // Abstract method for booster dose
    public abstract void boosterDose();
}

// Implementation class
class VaccinationSuccessful extends Vaccine {
    public VaccinationSuccessful(int age, String nationality) {
        super(age, nationality);
    }

    // Implementation of booster dose method
    @Override
    public void boosterDose() {
        System.out.println("You are eligible for the booster dose.");
    }
}

// Main class
public class Vaccination {
    public static void main(String[] args) {
        // Creating an instance of the implementation class
        Vaccine vaccine = new VaccinationSuccessful(20, "Indian");

        // Invoking methods accordingly
```

```
        vaccine.firstDose();
        vaccine.secondDose();
        vaccine.boosterDose();
    }
}
```

3.

```
def is_palindrome(s):
    s = s.lower()  # Convert to lowercase to ignore case sensitivity
    return s == s[::-1]

# Test the function
input_string = "Madam"
if is_palindrome(input_string):
    print(f"{input_string} is a palindrome.")
else:
    print(f"{input_string} is not a palindrome.")
```

Output

Madam is a Palindrome

4.

```
 def unique_characters(input_string):
```

```
    unique_chars = set(input_string)
    print("Unique characters in the string:", ' '.join(unique_chars))

# Test the function
input_string = "java"
unique_characters(input_string)
```

Output

jv