1. Create one superclass HillStations and three subclasses Manali, Mussoorie, Gulmarg. Subclasses extend the superclass and override its location() and famousFor() method. i.call the location() and famousFor() method by the Parent class', i.e. Hillstations class. As it refers to the base class object and the base class method overrides the superclass method; the base class method is invoked at runtime. ii.call the location() and famousFor() method by the all subclass',and print accordingly.

Program 1:

```
class HillStations:
    def location(self):
        return "Location: Undefined"

    def famousFor(self):
        return "Famous for: Undefined"



class Manali(HillStations):
    def location(self):
        return "Location: Himachal Pradesh, India"

    def famousFor(self):
        return "Famous for: Adventure sports and scenic beauty"



class Mussoorie(HillStations):
    def location(self):
        return "Location: Uttarakhand, India"

    def famousFor(self):
        return "Famous for: Hill station charm and viewpoints"
```

```python
class Gulmarg(HillStations):

    def location(self):

        return "Location: Jammu and Kashmir, India"


    def famousFor(self):

        return "Famous for: Skiing and snow-capped mountains"
```

Output:

Location: Undefined

Famous for: Undefined

Location: Himachal Pradesh, India

Famous for: Adventure sports and scenic beauty

Location: Uttarakhand, India

Famous for: Hill station charm and viewpoints

Location: Jammu and Kashmir, India

Famous for: Skiing and snow-capped mountains

2.Write a Java program that demonstrates method overriding by creating a superclass called Animal and two subclasses called Dog and Cat. ● The Animal class should have a method called makeSound(), which simply prints "The animal makes a sound." ● The Dog and Cat classes should override this method to print "TheCat/The dog meows/barks" respectively. ● The program should allow the user to create and display objects of each class.

Program

```java
class Animal {

    public void makeSound() {

        System.out.println("The animal makes a sound.");

    }

}


class Dog extends Animal {

    public void makeSound() {
```

```java
        System.out.println("The dog barks.");
    }
}


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


public class Main {
    public static void main(String[] args) {
        Animal animal = new Animal();
        Dog dog = new Dog();
        Cat cat = new Cat();
}
}
```

Output:

The animal makes a sound

    The dog barks.

   The cat meows.

3.Write code to determine if the String is Palindrome .

Program :

```java
import java.util.Scanner;


public class StringPalindrome {


    public static void main(String[] args) {
```

```java
        Scanner input = new Scanner(System.in);
        System.out.print("Enter a String to check for Palindrome: ");
        String s1=input.nextLine();
        String s2="";

        for(int i=s1.length()-1;i>=0;i--)
          s2=s2+s1.charAt(i);


        System.out.println("Original string=" + s1);
        System.out.println("Reverse string=" + s2);
      if(s1.equals(s2))
          System.out.println("The Given String is a Palindrome");
       else
          System.out.println("The Given String is a Not a Palindrome");



    }


}
```

Output:

Enter a String to check for Palindrome: madam

Original string=madam

Reverse string=madam

The Given String is a Palindrome

4.You need to find and print all the unique characteristics in the given string.

Input String: java

Program :

```java
import java.util.Scanner;
public class Sameness{
  public static void main (String[]args){
```

```java
        Scanner kb = new Scanner (System.in);
         String word = "";


         System.out.println("Enter a word: ");
         word = kb.nextLine();


         uniqueCharacters(word);
    }


      public static void uniqueCharacters(String test){
         String temp = "";
            for (int i = 0; i < test.length(); i++){
               if (temp.indexOf(test.charAt(i)) == - 1){
                  temp = temp + test.charAt(i);
             }
           }


         System.out.println(temp + " ");


       }
    }
```
Output:

Enter a word:

java

jv