**Exercise 1:**

**Create a Java class named MathUtils with a static method add, which takes two integers as input parameters and returns their sum.**

public class MathUtils {

public static int add(int a, int b) {

return a + b;

}

}

**Add a static variable counter to the MathUtils class. Increment this counter every time the add method is called.**

public class MathUtils {

private static int counter;

public static int add(int a, int b) {

counter++;

return a + b;

}

public static int getCounter() {

return counter;

}

}

**Create another static method in the MathUtils class called getCounter, which returns the current value of the counter.**

// Answer provided top.

**Exercise 2:**

**Implement a class called StringUtils with a static method reverse, which takes a String as input and returns the reverse of the input String.**

public class StringUtils {

public static String reverse(String input) {

StringBuilder reversed = new StringBuilder(input);

return reversed.reverse().toString();

}

}

**Add a static variable numberOfReversals to the StringUtils class. Increment this variable every time the reverse method is called.**

public class StringUtils {

private static int numberOfReversals;

public static String reverse(String input) {

numberOfReversals++;

StringBuilder reversed = new StringBuilder(input);

return reversed.reverse().toString();

}

public static int getNumberOfReversals() {

return numberOfReversals;

}

}

**Create a static method in the StringUtils class called getNumberOfReversals, which returns the current value of the numberOfReversals.**

// Answer provided in top.

**Exercise 3:**

**Create a BankAccount class with a static variable interestRate. Implement a static method setInterestRate, which allows setting the interest rate for all instances of BankAccount.**

public class BankAccount {

private double balance;

private static double interestRate;

public static void setInterestRate(double rate) {

interestRate = rate;

}

// Other methods and constructors here...

}

**Add instance variables accountNumber and balance to the BankAccount class. Implement a static method getInterestAmount that takes a BankAccount object as input and returns the interest amount based on the interestRate and the balance.**

public class BankAccount {

private int accountNumber;

private double balance;

private static double interestRate;

public static void setInterestRate(double rate) {

interestRate = rate;

}

public static double getInterestAmount(BankAccount account) {

return account.balance \* interestRate;

}

// Other methods and constructors here...

}

**Exercise 4:**

**Create a Student class with instance variables name and age. Implement a static method isEligibleForVoting, which takes a Student object as input and returns true if the student's age is 18 or above; otherwise, returns false.**

public class Student {

private String name;

private int age;

public Student(String name, int age) {

this.name = name;

this.age = age;

}

public static boolean isEligibleForVoting(Student student) {

return student.age >= 18;

}

// Other methods here...

}

**Add a static variable totalStudents to the Student class. Increment this variable every time a new Student object is created.**

public class Student {

private String name;

private int age;

private static int totalStudents;

public Student(String name, int age) {

this.name = name;

this.age = age;

totalStudents++;

}

public static int getTotalStudents() {

return totalStudents;

}

// Other methods here...

}

**Now, let's create a Main class to test the implementations:**

public class Main {

public static void main(String[] args) {

// Exercise 1

int sum = MathUtils.add(5, 7);

System.out.println("Sum: " + sum);

MathUtils.add(2, 3);

MathUtils.add(10, 15);

System.out.println("Counter: " + MathUtils.getCounter());

// Exercise 2

String originalString = "hello";

String reversedString = StringUtils.reverse(originalString);

System.out.println("Reversed: " + reversedString);

StringUtils.reverse("world");

StringUtils.reverse("java");

System.out.println("Number of Reversals: " + StringUtils.getNumberOfReversals());

// Exercise 3

BankAccount.setInterestRate(0.05);

BankAccount account1 = new BankAccount();

account1.setBalance(1000);

System.out.println("Interest amount for account1: " + BankAccount.getInterestAmount(account1));

// Exercise 4

Student student1 = new Student("Alice", 20);

Student student2 = new Student("Bob", 17);

System.out.println(student1.getName() + " is eligible for voting: " + Student.isEligibleForVoting(student1));

System.out.println(student2.getName() + " is eligible for voting: " + Student.isEligibleForVoting(student2));

System.out.println("Total number of students: " + Student.getTotalStudents());

}

}