

- 6) Develop a program to check whether an input number is prime or not using for loop. Program:**

```
import java.util.Scanner;

public class PrimeCheck {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number:");
        int num = sc.nextInt();
        boolean isPrime = true;
        if (num <= 1) {
            isPrime = false;
        } else { for (int i = 2; i <= num / 2; i++) {
            if (num % i == 0) {
                isPrime = false;
                break;
            }
        }
        if (isPrime)
            System.out.println(num + " is a Prime Number.");
        else
            System.out.println(num + " is Not a Prime Number.");
    }
}
```

Output:

Enter a number: 7

7 is a Prime Number.

- 7) Write a program to reverse a number using a while loop.**

Program:

```

import java.util.Scanner;
public class Assigntment7 {
    public static void main(String[] args) {
        Scanner sc = new
        Scanner(System.in);
        System.out.print("Enter a number:
"); int num = sc.nextInt(); int
        rev = 0;

        while (num != 0) {
            int digit = num % 10; rev
            = rev * 10 + digit; num =
            num / 10;
        }

        System.out.println("Reversed Number: " + rev);
    }
}

```

Output:

```

Enter a number: 12345
Reversed Number: 54321

```

8) Create a Java application to generate Fibonacci series up to a given number using do- while loop Program :

```

import java.util.Scanner;

public class FibonacciSeries {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter limit for Fibonacci series: "); int
        n = sc.nextInt();

        int a = 0, b = 1;

```

```

System.out.print("Fibonacci Series: " + a + ", " + b); int
c;
do { c = a +
b; if (c <=
n)
    System.out.print(", " +
c); a = b; b = c;
} while (c <= n);
}
}

```

Output:

Enter limit for Fibonacci series: 20
Fibonacci Series: 0, 1, 1, 2, 3, 5, 8, 13

9) Design a recursive program to compute the factorial of a number using function.

Program:

```

import java.util.Scanner;
public class Assignment9{
static int factorial(int n) {
    if (n == 0 || n == 1)
        return 1;
    else
        return n * factorial(n - 1);
}
public static void main(String[] args) {
    Scanner sc = new
Scanner(System.in);
    System.out.print("Enter a number:
"); int num = sc.nextInt(); int
fact = factorial(num);
    System.out.println("Factorial of " + num + " is: " + fact);
}

```

```
}
```

Output:

```
Enter a number: 5
```

```
Factorial of 5 is: 120
```

10)Implement a program to check whether a given number is an Armstrong number.

Program:

```
import java.util.Scanner;
```

```
public class Assignment10{
```

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

```
        Scanner sc = new
```

```
        Scanner(System.in);
```

```
        System.out.print("Enter a number:
```

```
    "); int num = sc.nextInt();
```

```
    int temp = num; int sum = 0;
```

```
    while (temp != 0) { int digit =
```

```
        temp % 10; sum += digit *
```

```
        digit * digit; temp = temp /
```

```
        10;
```

```
    }
```

```
    if (sum == num)
```

```
        System.out.println(num + " is an Armstrong Number."); else
```

```
        System.out.println(num + " is Not an Armstrong Number.");
```

```
}
```

```
}
```

Output:

```
Enter a number: 153
```

```
153 is an Armstrong Number.
```

11)Write a Java program to find the largest and smallest number in an array.

Program:

```
import java.util.Scanner;

public class Assignment11{
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter number of elements: ");
        int n = sc.nextInt(); int[] arr = new int[n];

        System.out.println("Enter " + n + " elements:");
        for (int i = 0; i < n; i++) {
            arr[i] = sc.nextInt();
        }

        int largest = arr[0]; int
        smallest = arr[0]; for
        (int i = 1; i < n; i++) { if
        (arr[i] > largest) largest
        = arr[i]; if (arr[i] <
        smallest) smallest =
        arr[i];
    }

    System.out.println("Largest number: " + largest);
    System.out.println("Smallest number: " + smallest);
}
}
```

Output:

Enter number of elements: 5

Enter 5 elements:

12

34

45

66

78

Largest number: 78

Smallest number: 12

12)Develop a program to sort an array using bubble sort algorithm.

Program:

```
import java.util.Scanner;
```

```
public class BubbleSort {
```

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

```
        Scanner sc = new Scanner(System.in);
```

```
        System.out.print("Enter number of elements: ");
```

```
        int n = sc.nextInt(); int[] arr = new int[n];
```

```
        System.out.println("Enter " + n + " elements:");
```

```
        for (int i = 0; i < n; i++) { arr[i] = sc.nextInt();
```

```
}
```

```
        for (int i = 0; i < n - 1; i++) { for
```

```
            (int j = 0; j < n - i - 1; j++) {
```

```
                if (arr[j] > arr[j + 1]) {
```

```
                    int temp = arr[j];
```

```
                    arr[j] = arr[j + 1];
```

```
                    arr[j + 1] = temp;
```

```
}
```

```
}
```

```
}
```

```
        System.out.println("Sorted array:"); for
```

```
            (int i = 0; i < n; i++) {
```

```
                System.out.print(arr[i] + " ");
```

```
    }  
}  
}
```

Output:

Enter number of elements: 5

Enter 5 elements:

50

10

70

5

40

Sorted array:

5 10 40 50 70

13)Implement linear search to find an element in an array.

Program:

```
import java.util.Scanner;
```

```
public class Assignment13 {
```

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

```
        Scanner sc = new Scanner(System.in);
```

```
        System.out.print("Enter number of elements: "); int
```

```
        n = sc.nextInt();
```

```
        int[] arr = new int[n];
```

```
        System.out.println("Enter " + n + " elements:"); for
```

```
        (int i = 0; i < n; i++) {
```

```
            arr[i] = sc.nextInt();
```

```
        }
```

```
        System.out.print("Enter element to search: "); int
```

```
        key = sc.nextInt();
```

```
boolean found = false;

for (int i = 0; i < n; i++) {
    if (arr[i] == key) {
        System.out.println(key + " found at position " + (i + 1));
        found = true;
        break;
    }
}
if (!found)
    System.out.println(key + " not found in the array.");
}
```

Output:

Enter number of elements: 5

Enter 5 elements:

14

98

57

23

12

Enter element to search: 5

5 not found in the array.

14)Implement binary search to find an element in an array.

Program:

```
import java.util.Scanner;
```

```
public class Assignment14 {
```

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

```

Scanner sc = new Scanner(System.in);
System.out.print("Enter number of elements: ");
int n = sc.nextInt(); int[] arr = new int[n];
System.out.println("Enter " + n + " sorted elements:");
for (int i = 0; i < n; i++) {
    arr[i] = sc.nextInt();
}

System.out.print("Enter element to search: "); int
key = sc.nextInt();

int low = 0, high = n - 1;
boolean found = false;

while (low <= high) {
    int mid = (low + high) / 2;
    if (arr[mid] == key) {
        System.out.println(key + " found at position " + (mid + 1));
        found = true;
        break;
    } else if (arr[mid] < key) {
        low = mid + 1;
    } else { high =
        mid - 1;
    }
}
if (!found)
    System.out.println(key + " not found in the array.");
}
}

```

Output:

Enter number of elements: 4

Enter 4 sorted elements:

```
1  
4  
6  
10
```

Enter element to search: 4

4 found at position 2

15)Write a Java program to perform matrix addition using for loop Program:

```
public class MatrixAddition { public  
    static void main(String[] args) {  
  
        int[][] a = {  
            {1, 2, 3},  
            {4, 5, 6},  
            {7, 8, 9}  
        };  
  
        int[][] b = {  
            {9, 8, 7},  
            {6, 5, 4},  
            {3, 2, 1}  
        };  
  
        int rows = a.length; int  
        cols = a[0].length;  
        int[][] sum = new int[rows][cols];  
  
        for (int i = 0; i < rows; i++) { for  
            (int j = 0; j < cols; j++) {  
                sum[i][j] = a[i][j] + b[i][j];  
            }  
        }
```

```

System.out.println("Matrix A:");
for (int i = 0; i < rows; i++) {
    for (int j = 0; j < cols; j++) {
        System.out.print(a[i][j] + " ");
    }
    System.out.println();
}

System.out.println("\nMatrix B:");
for (int i = 0; i < rows; i++) {
    for (int j = 0; j < cols; j++) {
        System.out.print(b[i][j] + " ");
    }
    System.out.println();
}

System.out.println("\nResultant Matrix after
Addition:");
for (int i = 0; i < rows; i++) {
    for (int j = 0; j < cols; j++) {
        System.out.print(sum[i][j] + " ");
    }
    System.out.println();
}
}

```

Output:

Matrix A:

1 2 3

4 5 6

7 8 9

Matrix B:

9 8 7

6 5 4

3 2 1

Resultant Matrix after Addition:

10 10 10

10 10 10

10 10 10

10) Write a java program to find the sum of diagonal elements in an array.

Program:

```
class DiagonalSum { public static void  
    main(String[] args) {  
        int[][] matrix = {  
            {1, 2, 3},  
            {4, 5, 6},  
            {7, 8, 9}  
        };  
        int sum = 0  
        for (int i = 0; i < matrix.length; i++) {  
            sum += matrix[i][i]; // Primary diagonal elements  
        }  
    }
```

```
    System.out.println("Sum of diagonal elements: " + sum);  
}
```

Output:

Sum of diagonal elements: 15

11) Check whether a given string is a

palindrome. Program: import

```
java.util.Scanner; public class
```

```
Assignment17{
```

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

```
        Scanner sc = new Scanner(System.in);
```

```

System.out.print("Enter a string: ");
String str = sc.nextLine();

String rev = "";
int len = str.length();

for (int i = len - 1; i >= 0; i--) {
    rev = rev + str.charAt(i);
}

if (str.equalsIgnoreCase(rev))
    System.out.println(str + " is a Palindrome String.");
else
    System.out.println(str + " is Not a Palindrome String.");
}
}

```

Output:

```

Enter a string: Nayan
Nayan is a Palindrome String.

```

12) Count the number of vowels, consonants, digits, and special characters in a string.

Program:

```

class CharacterCount {

    public static void main(String[] args) {
        String str = "Hello Java 123!";

        int vowels = 0, consonants = 0, digits = 0, specialChars = 0;

        str = str.toLowerCase(); // Convert to lowercase for easier checking

        for (int i = 0; i < str.length(); i++) {
            char ch = str.charAt(i);

```

```

if (ch >= 'a' && ch <= 'z') { if (ch == 'a' || ch == 'e' || ch == 'i'
    || ch == 'o' || ch == 'u')
    vowels++;
else consonants++;

} else if (ch >= '0' && ch <= '9') { digits++;

} else if (ch != ' ') { // Ignore spaces
    specialChars++;

}

}

System.out.println("String: " + str);
System.out.println("Vowels: " + vowels);
System.out.println("Consonants: " + consonants);
System.out.println("Digits: " + digits);
System.out.println("Special Characters: " + specialChars);
}
}

```

Output:

String: hello java 123!

Vowels: 4

Consonants: 5

Digits: 3

Special Characters: 1

13) Program to reverse the string using predefined methods in String class.

Program:

```
import java.util.Scanner;
```

```

public class Assignment19 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a string: ");

```

```
String str = sc.nextLine();
String reversed = new StringBuilder(str).reverse().toString();
System.out.println("Reversed String: " + reversed);
}
}
```

Output:

Enter a string: Abhi

Reversed String: ihbA

14) Write a program to remove duplicate characters from a string.

Program:

```
class RemoveDuplicates { public static
    void main(String[] args) {
        String str = "programming";
        String result = "";

        for (int i = 0; i < str.length(); i++) {
            char ch = str.charAt(i); if
                (result.indexOf(ch) == -1) {
                    result += ch;
                }
        }

        System.out.println("Original String: " + str);
        System.out.println("String after removing duplicates: " + result);
    }
}
```

Output:

Original String: programming

String after removing duplicates: programming

15) Develop a Java program to count the frequency of each word in a sentence.

Program:

```
import java.util.Scanner;

public class WordFrequencySimple {
    public static void main(String[] args) {
        Scanner obj = new Scanner(System.in);

        System.out.print("Enter a sentence: "); String
        sentence = obj.nextLine();

        String words[] = sentence.toLowerCase().split(" "); int
        count[] = new int[words.length];

        // Initialize count array for (int i =
        0; i < words.length; i++) {
            count[i] = 1;
        }

        for (int i = 0; i < words.length; i++) {
            if (words[i].equals("visited"))
                continue;

            for (int j = i + 1; j < words.length; j++) {
                if (words[i].equals(words[j])) {
                    count[i]++;
                    words[j] =
                    "visited";
                }
            }
        }
    }
}
```

```

System.out.println("\nWord Frequency:");
for (int i = 0; i < words.length; i++) {
    if (!words[i].equals("visited"))
        System.out.println(words[i] + " : " + count[i]);
}
obj.close();
}
}

```

Output:

Enter a sentence: Palloti is college,college

Word Frequency:

palloti : 1

is : 1

college,college : 1

16) Design a class BankAccount with methods for deposit, withdraw, and balance inquiry.

Program :

```

class BankAccount {
    double balance = 1000;

    void deposit(double amount) {
        balance += amount;
        System.out.println("Deposited: " + amount);
    }

    void withdraw(double amount) {
        if (amount > balance)
            System.out.println("Insufficient Balance");
        else
            {
                balance -= amount;
                System.out.println("Withdrawn: " + amount);
            }
    }
}

```

```

}

void checkBalance() {
    System.out.println("Current Balance: " + balance);
}

public static void main(String[] args) { BankAccount
    b = new BankAccount();
    b.deposit(500);
    b.withdraw(300);
    b.checkBalance();
}

}

```

Output:

```

Deposited: 500.0
Withdrawn: 300.0
Current Balance: 1200.0

```

17) Design a Java class Employee with the following:A method empDetails() to accept and display employee details.A method salary() to compute basic salary components.A method total() to calculate the total salary (including allowances/deductions).

Program:

```

import java.util.Scanner;

class Employee { String
    name;
    int id;
    double basic, hra, da, totalSalary;

    void empDetails() {
        Scanner obj = new Scanner(System.in);
        System.out.print("Enter Employee ID: ");
        id = obj.nextInt();
        System.out.print("Enter Employee Name: ");
        name = obj.next();
    }
}
```

```

System.out.print("Enter Basic Salary: ");
basic = obj.nextDouble();

System.out.println("\nEmployee Details:");
System.out.println("ID: " + id);
System.out.println("Name: " + name);
System.out.println("Basic Salary: " + basic);

}

void salary() {
    hra = basic * 0.10;
    da = basic * 0.05;
    System.out.println("\nHRA: " + hra);
    System.out.println("DA: " + da);
}

void total() {
    totalSalary = basic + hra + da;
    System.out.println("\nTotal Salary: " + totalSalary);
}

public static void main(String[] args) { Employee
    e = new Employee();
    e.empDetails();
    e.salary();
    e.total();
}
}

```

Output:

```

Enter Employee ID: 101
Enter Employee Name: Animesh
Enter Basic Salary: 20000
Employee Details:

```

ID: 101

Name: Animesh Basic

Salary: 20000.0

HRA: 2000.0

DA: 1000.0

Total Salary: 23000.0

18) Create a Student class with marks in 3 subjects and compute the result with percentage.

Program:

```
import java.util.Scanner;
```

```
class Student {  
    String name; int  
    rollNo; int m1,  
    m2, m3;  
    float total, percentage;  
  
    void getDetails() {  
        Scanner obj = new Scanner(System.in);  
        System.out.print("Enter Student Name: ");  
        name = obj.nextLine();  
        System.out.print("Enter Roll Number: "); rollNo  
        = obj.nextInt();  
        System.out.print("Enter marks in Subject 1: "); m1  
        = obj.nextInt();  
        System.out.print("Enter marks in Subject 2: "); m2  
        = obj.nextInt();  
        System.out.print("Enter marks in Subject 3: ");  
        m3 = obj.nextInt();  
    }
```

```

void calculateResult() {
    total = m1 + m2 + m3;
    percentage = (total / 300) * 100;
}

void display() {
    System.out.println("\nStudent Details:");
    System.out.println("Name: " + name);
    System.out.println("Roll No: " + rollNo);
    System.out.println("Marks: " + m1 + ", " + m2 + ", " + m3);
    System.out.println("Total Marks: " + total);
    System.out.println("Percentage: " + percentage + "%");
}

public static void main(String[] args) { Student
    s = new Student();
    s.getDetails();
    s.calculateResult();
    s.display();
}

```

Output:

Enter Student Name: Animesh

Enter Roll Number: 101

Enter marks in Subject 1: 85

Enter marks in Subject 2: 90

Enter marks in Subject 3: 80

Student Details:

Name: Animesh

Roll No: 101

Marks: 85, 90, 80

Total Marks: 255.0

Percentage: 85.0%

19) Write a program to count number of object/instances created in a class.

Program:

```
class ObjectCount {  
    static int count = 0;  
  
    ObjectCount() {  
        count++;  
    }  
  
    public static void main(String[] args) {  
        ObjectCount o1 = new ObjectCount();  
        ObjectCount o2 = new ObjectCount();  
        ObjectCount o3 = new ObjectCount();  
        System.out.println("Number of objects created: " + count);  
    }  
}
```

Output:

Number of objects created: 3