

**Name :** Animesh Kewale

- 1) Develop a Java program to take user input for name and age and display a welcome message.**

**Program:**

```
import java.util.Scanner;  
  
public class Assignment1 {  
  
    public static void main(String[] args) {  
  
        Scanner obj = new Scanner(System.in);  
  
        String name;  
  
        System.out.print("Enter Your name : ");  
  
        name = obj.nextLine();  
  
        System.out.print("Enter Your Age : ");  
  
        int age = obj.nextInt();  
  
        System.out.format("Welcome %s!\nAge : %d", name, age);  
  
    }  
}
```

**Output :**

Enter Your name : Animesh Enter

Your Age : 18

Welcome Animesh!

Age : 18

- 2) Write a Java program that takes two numbers and performs basic arithmetic operations (+, -, , /).**

**Program:**

```
import java.util.Scanner;  
  
public class Assignment2 {  
  
    public static void main(String[] args) {  
  
        Scanner obj = new Scanner(System.in);  
  
        int a, b;
```

```

System.out.print("Enter First No :");
a = obj.nextInt();

System.out.print("Enter Second No :");
b = obj.nextInt();

System.out.println("1. Addition");
System.out.println("2. Subtraction");
System.out.println("3. Multiplication");
System.out.println("4. Division");
System.out.print("Enter your choice:
"); int ch = obj.nextInt();

if (ch == 1) {
    System.out.format("%d + %d = %d", a, b, a + b);
} else if (ch == 2) {
    System.out.format("%d - %d = %d", a, b, a - b);
} else if (ch == 3) {
    System.out.format("%d * %d = %d", a, b, a * b);
} else if (ch == 4) {
    System.out.format("%d / %d = %d", a, b, a / b);
} else {
    System.out.print("Invalid choice!");
}
}
}

```

**Output:**

Enter First No : 10

Enter Second No : 5

1. Addition

2. Subtraction

3. Multiplication

4. Division

Enter your choice: 3

$$10 * 5 = 50$$

**3) Create a program to convert temperature from Fahrenheit to Celsius. Program :**

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

```
public class Assignment3 {  
    public static void main(String[] args) {  
        Scanner obj = new Scanner(System.in);  
        System.out.print("Enter Temperature in Fahrenheit : ");  
        float fahrenheit = obj.nextFloat();  
  
        float celsius = (5 * (fahrenheit - 32)) / 9f;  
        System.out.println("Value of temperature in °C : " + celsius);  
    }  
}
```

**Output:**

Enter Temperature in Fahrenheit : 98.6

Value of temperature in °C : 37.0

**4) Design a Java application to calculate simple interest using the formula:  $SI = (P \times R \times T) / 100$ .**

**Program:**

```
import java.util.Scanner;  
public class Assignment4 {  
    public static void main(String[] args) {  
        Scanner obj = new Scanner(System.in);  
        System.out.print("Enter Principal amount: ");  
        int p = obj.nextInt();
```

```

System.out.print("Enter Rate: ");
float r = obj.nextFloat();
System.out.print("Enter Time:
"); float t = obj.nextFloat();

float si = (p * r * t) / 100;
System.out.print("Simple Interest: " + si);
}
}

```

**Output:**

Enter Principal amount: 10000

Enter Rate: 5

Enter Time: 2

Simple Interest: 1000.0

**5) Write a Java program to determine whether a given year is a leap**

**year. Program :**

```

import java.util.Scanner;
public class Assignment5 {
    public static void main(String[] args) {
        Scanner obj = new Scanner(System.in);
        System.out.print("Enter Year: ");
        int year = obj.nextInt();

        if ((year % 100 != 0 && year % 4 == 0) || (year % 400 == 0)) {
            System.out.print("Leap year");
        } else {
            System.out.print("Not Leap year");
        }
    }
}

```

**Output:**

Enter Year: 2024

Leap year

**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[][] c = new int[3][3];  
        for (int i = 0; i < 3; i++) {  
            for (int j = 0; j < 3; j++) {  
                c[i][j] = a[i][j] + b[i][j];  
            }  
        }  
        for (int i = 0; i < 3; i++) {  
            for (int j = 0; j < 3; j++) {  
                System.out.print(c[i][j] + " ");  
            }  
            System.out.println();  
        }  
    }  
}
```

```
{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