OBJECT ORIENTED PROGRAMMING USING JAVA (PRACTICAL LAB)

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4.5CA252C01: OBJECT ORIENTED PROGRAMMING USING JAVA LAB

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1)Print a Hello World message for syntax awareness.

Code

```
class Test {
    public static void main(String[] args) {
        System.out.println("Hello World");
    }
}
```

Output

```
Output
Hello World

=== Code Execution Successful ===
```

2)Calculate Simple Interest by fixing required values.

Code

```
public class Main
{
public static void main (String args[])
{ float p, r, t, si; // principal amount, rate, time and
    respectively.
p = 15000; r = 12; t = 2;
si = (p*r*t)/100;
System.out.println("Simple Interest is: " +si);
}}
```

Output

```
Output
Simple Interest is: 3600.0

=== Code Execution Successful ===
```

3)Calculate area of Circle.

Code

```java
public class Main {
    public static void main(String[] args)
    {
        int radius;
        double pi = 3.142, area;
        radius = 8;
        // calculating the area of the circle
        area = pi * radius * radius;
        // printing the area of the circle
        System.out.println("Area of circle is :" + area);
    }
}
```

Output

```
Output
Area of circle is :201.088

=== Code Execution Successful ===
```

4)Performing Swapping using three variables.

Code

```java
class Main {
    public static void main(String[]args) {
        int a = 20, b=40,c;
        c = a;
        a = b;
        b = c;

        System.out.println("values after swap");
        System.out.println("a = "+a);
        System.out.println("b = "+b);
    }
}
```

5)Calculate sum, average, division, of a student 5 Subjects marks by taking input from user.

Code

Main.java

Share Run

```java
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.println("Enter marks for 5 subjects:");
        int subject1 = input.nextInt();
        int subject2 = input.nextInt();
        int subject3 = input.nextInt();
        int subject4 = input.nextInt();
        int subject5 = input.nextInt();
        int sum = subject1 + subject2 + subject3 + subject4 +
            subject5;
        double average = (double) sum / 5;System.out.println("Sum of
            marks: " + sum);
        System.out.println("Average marks: " + average);

        int divisionExample = sum / 5;
        System.out.println("Integer Division Example (sum / 5): " +
            divisionExample);

        System.out.println("Division using average (sum / 5): " +
            average);
        input.close();
    }
}
```

Output:

Output

```
Enter marks for 5 subjects:
21
25
23
25
21
Sum of marks: 115
Average marks: 23.0
Integer Division Example (sum / 5): 23
Division using average (sum / 5): 23.0

=== Code Execution Successful ===
```

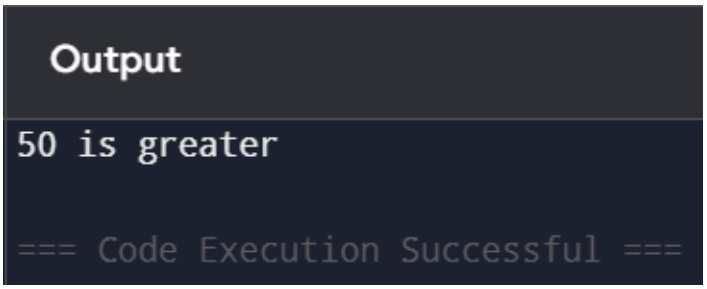
6)Calculate Greater value between two variables by taking input from the user.

Code

Main.java

```java

public class Main
{
    public static void main (String[]args)
    {

        int num1 = 50, num2 = 20;
        if (num1 == num2)
          System.out.println ("both are equal");
        else if (num1 > num2)
            System.out.println (num1 + " is greater");

        else
            System.out.println (num2 + " is greater");

    }
}
```

Output:



7)Perform swapping using using Two variables.

Code

Main.java

Share Run

```java

public class Main {
  public static void main(String[] args) {
    int x = 1;
    int y = 2;

    System.out.println("Before swapping: x = " + x + " y = " + y);
    int temp = x;
    x = y;
    y = temp;

    System.out.println("After swapping: x = " + x + " y = " + y);
  }
}
```

Output:

```
Before swapping: x = 1 y = 2
After swapping: x = 2 y = 1

=== Code Execution Successful ===
```

8)Calculate Greater value between three variables by taking input from the user.

Code

Main.java

```java

public class Main {

    static int biggestOfThree(int x, int y, int z)
    {
    return z > (x > y ? x : y) ? z : ((x > y) ? x : y);
    }
    public static void main(String[] args)
    {
        int a, b, c;
        int largest;
        a = 5;
        b = 10;
        c = 3;
        largest = biggestOfThree(a, b, c);
        System.out.println(largest
                           + " is the largest number.");
    }
}
```

Output:

```
Output
10 is the largest number.

=== Code Execution Successful ===
```

9)Perform arithmetic operations using switch case by taking choice and values from the user.

Code

Main.java

```java
import java.util.Scanner;
public class Main {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.println("Enter first number:");
        double num1 = input.nextDouble();
        System.out.println("Enter second number:");
        double num2 = input.nextDouble();
        System.out.println("Choose an operation:");
        System.out.println("1. Addition (+)");
        System.out.println("2. Subtraction (-)");
        System.out.println("3. Multiplication (*)");
        System.out.println("4. Division (/)");
        int choice = input.nextInt();
        double result = 0;
        switch (choice) {
            case 1:
                result = num1 + num2;
                break;
            case 2:
                result = num1 - num2;
                break;
            case 3:
                result = num1 * num2;
                break;
            case 4:
```

```java
            case 4:
                if (num2 == 0) {
                    System.out.println("Cannot divide by zero.");
                    return;
                } else {
                    result = num1 / num2;
                }
                break;
            default:
                System.out.println("Invalid choice.");
                return;
        }
        System.out.println("Result: " + result);
    input.close();
    }
}
```

Output:

```
Output
Enter first number:
10
Enter second number:
10
Choose an operation:
1. Addition (+)
2. Subtraction (-)
3. Multiplication (*)
4. Division (/)
1
Result: 20.0
```

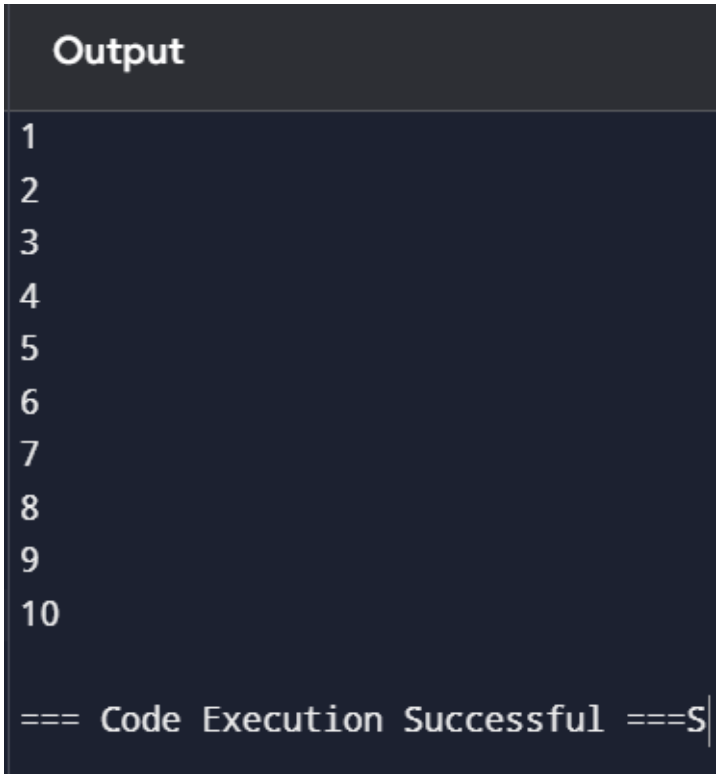
10)Print values using while loop.

Code

Main.java

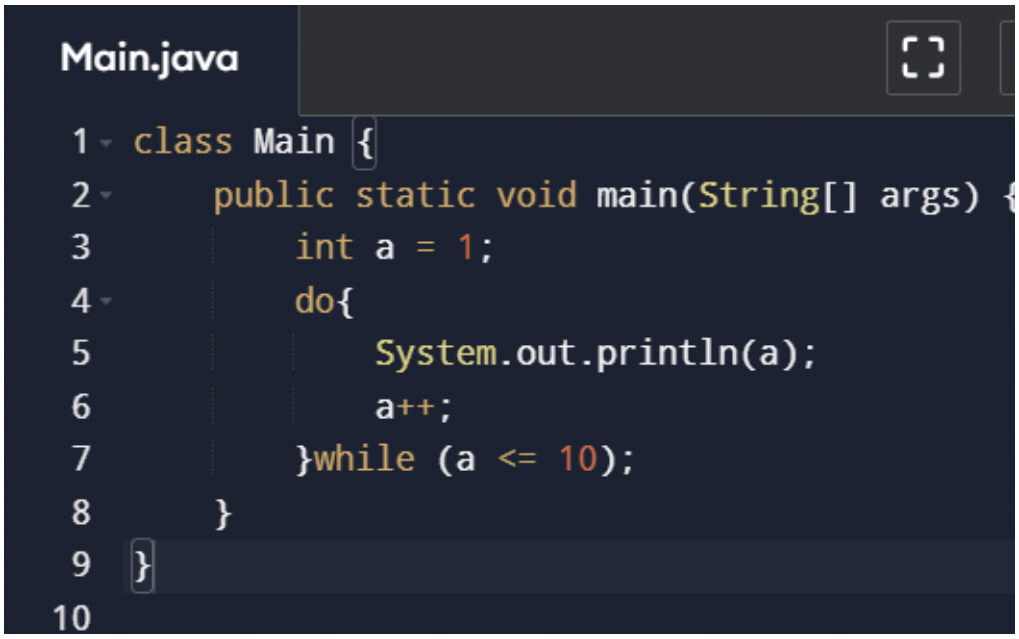
```
1  class Main {
2      public static void main(String[] args) {
3          int a = 1;
4
5          while (a <= 10) {
6              System.out.println(a);
7              a++;
8          }
9      }
10 }
11
```

Output:

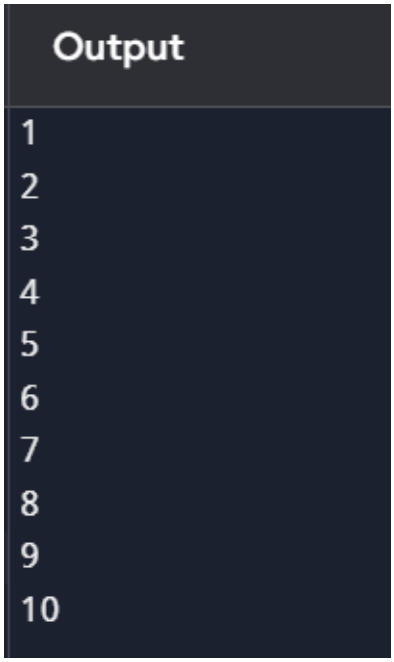


11)Print values using Do while loop.

Code



Output:



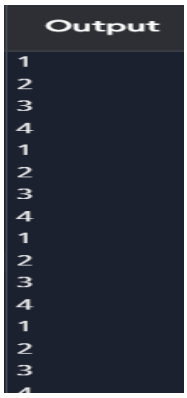
12)Print values using Nested loop for printing b.

Code

Main.java

```
1  class Main {
2      public static void main(String[] args) {
3          int a,b;
4          for (a=1;a<=4;a++){
5          for (b=1;b<=4;b++)
6              System.out.println(b);
7
8          }
9      }
10 }
```

Output:



13) Print values using Nested loop for printing a.

Code

Main.java

```java
class Main {
    public static void main(String[] args) {
        int a,b;
        for (a=1;a<=4;a++){
        for (b=1;b<=4;b++)
            System.out.println(a);

        }
    }
}
```

Output

```
1
1
1
1
2
2
2
2
3
3
3
3
4
4
4
4

=== Code Execution Successful ===
```

14)Print values using Nested loop for printing * .

Code

Main.java

```java
class Main {
    public static void main(String[] args) {
        int a,b;
        for (a=1;a<=4;a++){
        for (b=1;b<=4;b++)
            System.out.println("*");

        }
    }
}
```

Output

Output

```
*
*
*
*
*
*
*
*
*
*
*
*
*
*
*
*

=== Code Execution Successful ===
```

15)Print values using Nested loop for printing reverse b.

Code

```
class Main {
    public static void main(String[] args) {
        int a, b;
        for (a = 4; a >= 1; a--) {
            for (b = 4; b >= a; b--) {
                System.out.println(b);
            }
        }
    }
}
```

Output

```
Output
4
4
3
4
3
2
4
3
2
1

=== Code Execution Successful ===
```

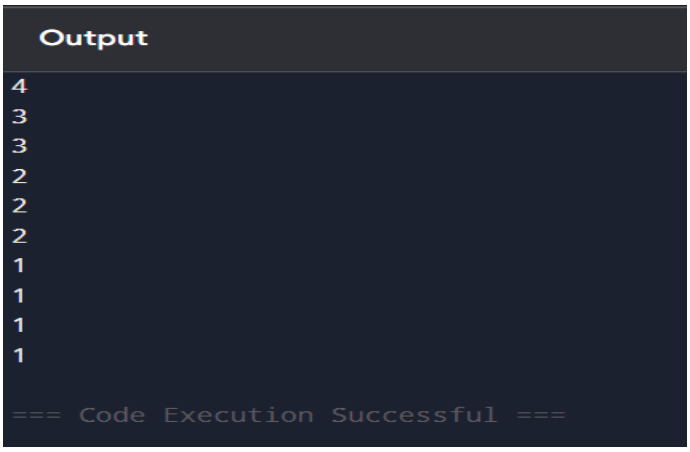
16)Print values using Nested loop for printing reverse a.

Code

Main.java

```java
class Main {
    public static void main(String[] args) {
        int a, b;
        for (a = 4; a >= 1; a--) {
            for (b = 4; b >= a; b--) {
                System.out.println(a);
            }
        }
    }
}
```

Output



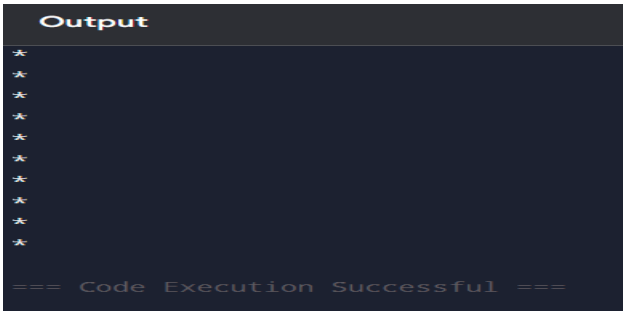
17) Print values using Nested loop for printing reverse *.

Code

Main.java

```java
class Main {
    public static void main(String[] args) {
        int a, b;
        for (a = 4; a >= 1; a--) {
            for (b = 4; b >= a; b--) {
                System.out.println('*');
            }
        }
    }
}

```

Output



18)Input and Output of 1D Array.

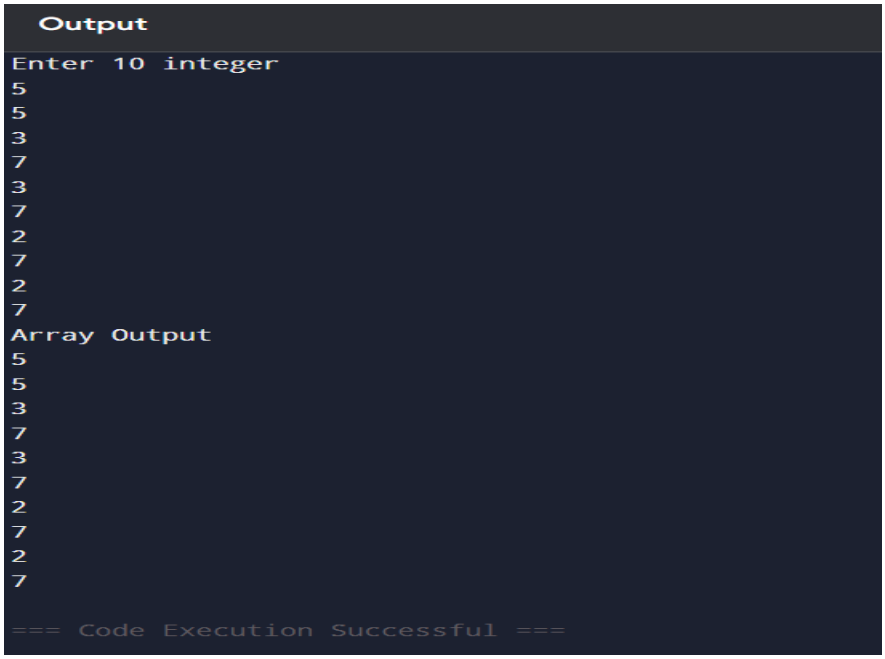
Code

Main.java

Share Run

```
1  import java.util.Scanner;
2  class Main {
3      public static void main(String[] args) {
4          Scanner k = new Scanner(System.in);
5          int a[] = new int[10];
6          System.out.println("Enter 10 integer");
7          for (int i = 0; i < 10; i++) {
8              a[i] = k.nextInt();
9          }
10         System.out.println("Array Output");
11         for (int i = 0; i < 10; i++) {
12             System.out.println(a[i]);
13         }
14     k.close();
15     }
16 }
```

Output



19) Calculate the Sum and Average of 1D Array elements.

Code

Test.java

Share Run

```java
import java.util.Scanner;
class Test {
    public static void main(String[] args) {
        int[] a = new int[10];
        int count = 0;
        int sum = 0;
        Scanner k = new Scanner(System.in);
        for (int i = 0; i < 10; i++) {
            System.out.print("Enter a number: ");
            a[i] = k.nextInt();
        }
        for (int i = 0; i < 10; i++) {
            sum += a[i];
            count++;
        }
        float avg = (float) sum / count;
        System.out.println("Sum is " + sum);
        System.out.println("Average is " + avg);
        System.out.println("Count of Array Elements: " + count);
        k.close();
    }
}
```

Output

Output

```
Enter a number: 10
Enter a number: 23
Enter a number: 54
Enter a number: 34
Enter a number: 56
Enter a number: 45
Enter a number: 5
Enter a number: 3
Enter a number: 6
Enter a number: 7
Sum is 243
Average is 24.3
Count of Array Elements: 10

=== Code Execution Successful ===
```

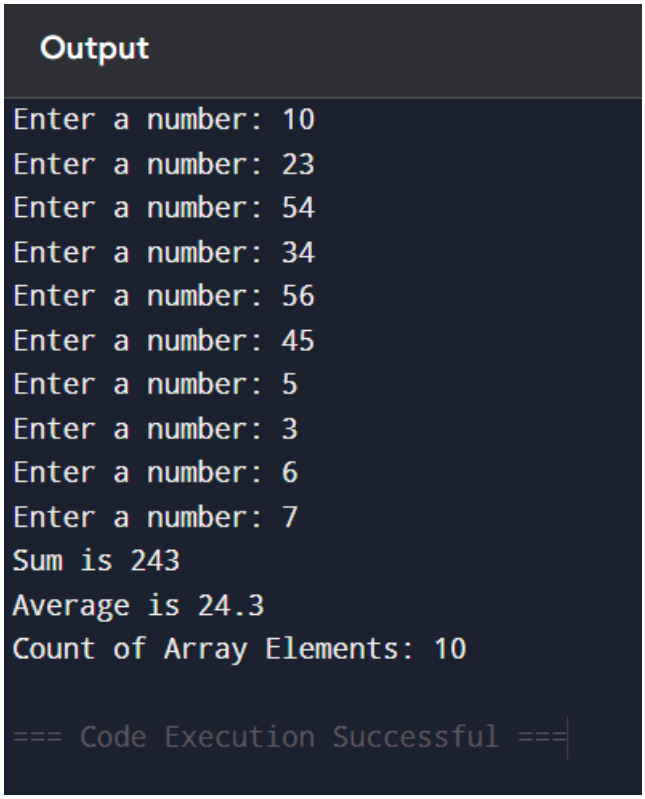
20) Apply the searching in 1D Array and take input from the user for element searching.

Code

Main.java

```java
import java.util.Scanner;
class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the number of elements: ");
        int size = scanner.nextInt();
        int[] arr = new int[size];
        for (int i = 0; i < size; i++) {
            System.out.print("Enter value " + (i + 1) + ": ");
            arr[i] = scanner.nextInt(); }
        System.out.print("Enter the value to be searched: ");
        int searchValue = scanner.nextInt();
        boolean found = false;
        for (int i = 0; i < size; i++) {
            if (arr[i] == searchValue) {
                found = true;
                break;
            }}
        if (found) {
            System.out.println("Value found!");
        } else {
            System.out.println("Value not found!");
        }
        scanner.close();
    }
}
```

Output



21) Input and Output of 2D Array.

Code

Main.java

Share Run

```java
import java.util.Scanner;
public class Main {
    public static void main(String[] args) {
        Scanner k = new Scanner(System.in);
        int[][] a = new int[4][4];
        System.out.println("Enter values for the array:");
        for (int i = 0; i < 4; i++) {
            for (int j = 0; j < 4; j++) {
                a[i][j] = k.nextInt();
            }
        }
        System.out.println("Contents of the array:");
        for (int i = 0; i < 4; i++) {
            for (int j = 0; j <= 1; j++) {
                System.out.print(a[i][j] + " ");
            }
            System.out.println();
        }
        k.close();
    }
}
```

Output

Output

```
Enter values for the array:
34 5 3 6
5 6 2 6
3 6 8 2
4 7 2 7
Contents of the array:
34 5
5 6
3 6
4 7

=== Code Execution Successful ===
```

22) Addition of 2D Arrays.

Code

Main.java

Share Run

```java
import java.util.Scanner;
class Main {
    public static void main(String[] args) {
        int[][] a = new int[4][4];
        int[][] b = new int[4][4];
        int[][] sum = new int[4][4];
        Scanner k = new Scanner(System.in);
        System.out.println("Enter values for the first :");
        for (int i = 0; i < 4; i++) {
            for (int j = 0; j < 4; j++) {
                a[i][j] = k.nextInt();
            } }
        System.out.println("Enter values for the second:");
        for (int i = 0; i < 4; i++) {
            for (int j = 0; j < 4; j++) {
                b[i][j] = k.nextInt();
            }}
        for (int i = 0; i < 4; i++) {
            for (int j = 0; j < 4; j++) {
                sum[i][j] = a[i][j] + b[i][j]; }}
        System.out.println("Sum of the two matrices:");
        for (int i = 0; i < 4; i++) {
            for (int j = 0; j < 4; j++) {
                System.out.print(sum[i][j] + " ");
            } System.out.println();
            }}}
```

Output

```
Output
Enter values for the first :
4 5 67 3
3 6 3 7
6 2 74 7
3 7 3 7
Enter values for the second:
2 5 7 8
3 7 4 8
3 6 7 4
3 6 3 7
Sum of the two matrices:
6 10 74 11
6 13 7 15
9 8 81 11
6 13 6 14

=== Code Execution Successful ===
```

23) Perform the following operations on 1 Dimensional array.

Count Array Elements

Sum of array elements

Search an element of value in the Array

Calculate the Average of the array elements

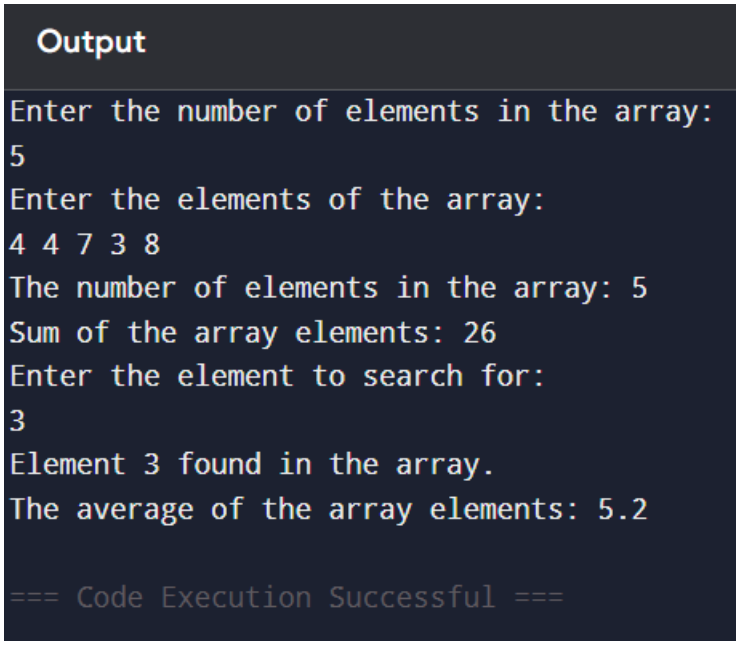
Code

Main.java

Share Run

```java
import java.util.Scanner;
class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter the number of elements in the
            array: ");
        int n = scanner.nextInt();
        int[] arr = new int[n];
        System.out.println("Enter the elements of the array:");
        for (int i = 0; i < n; i++) {
            arr[i] = scanner.nextInt();}
        int count = arr.length;
        System.out.println("The number of elements in the array: " +
            count);
        int sum = 0;
        for (int i = 0; i < n; i++) {
            sum += arr[i];}
        System.out.println("Sum of the array elements: " + sum);
        System.out.println("Enter the element to search for: ");
        int searchValue = scanner.nextInt();
        boolean found = false;
        for (int i = 0; i < n; i++) {
            if (arr[i] == searchValue) {
                found = true;
                break;}}
        if (found) {
```

Output



24) Perform the following operations on 2 Dimensional array.

Addition of 2 matrices.

Subtraction of 2 matrices.

Searching an element in 2 D Array.

Code

Main.java

Share Run

```java
import java.util.Scanner;
class Main{
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter rows and columns: ");
        int rows = scanner.nextInt(), cols = scanner.nextInt();
        int[][] matrix1 = new int[rows][cols], matrix2 = new
            int[rows][cols];
        System.out.println("Enter elements of first matrix:");
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) matrix1[i][j] = scanner
                .nextInt();
        }
        System.out.println("Enter elements of second matrix:");
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) matrix2[i][j] = scanner
                .nextInt();
        }
        System.out.println("Addition:");
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) {
                System.out.print((matrix1[i][j] + matrix2[i][j]) + "
                    ");
            }
            System.out.println();
        }
```

Code

Output

```
Enter rows and columns: 4 4
Enter elements of first matrix:
3 4 5 3
4 6 4 3
3 6 3 6
3 6 3 7 3
Enter elements of second matrix:
2 5 6 7
3 6 3 7
3 6 3 7
3 4 7 4
Addition:
6 6 10 9
11 9 10 6
10 9 9 9
10 9 7 14
Subtraction:
0 2 0 -3
-3 3 -2 0
-4 3 -3 3
-4 3 -1 0
Enter element to search: Found at (0, 1)

=== Code Execution Successful ===
```

25) Write a program for function calling using Classes.

Code

Main.java

```java
class Test {
    void d() {
        System.out.println("I am in the body of Class");
    }
}
class Main {
    public static void main(String[] args) {
        Test k = new Test();
        k.d();
    }
}
```

Output

```
Output
I am in the body of Class

=== Code Execution Successful ===
```

26) Write a program for input, sum and multiplication by taking input from the user using function calling by classes.

Code

Main.java

Share Run

```java
import java.util.Scanner;
class Main {
    int a, b;
    void input() {
        Scanner k = new Scanner(System.in);
        System.out.println("Enter two numbers:");
        a = k.nextInt();
        b = k.nextInt();
    }
    void sum() {
        int sum = a + b;
        System.out.println("Sum is: " + sum);
    }
    void multiply() {
        int mul = a * b;
        System.out.println("Multiplication is: " + mul);
    }
    public static void main(String[] args) {
        Main obj = new Main();
        obj.input();
        obj.sum();
        obj.multiply();
    }
}
```

Output

Output

```
Enter two numbers:
3 5
Sum is: 8
Multiplication is: 15

=== Code Execution Successful ===
```

27) write a program for single level inheritance.

Code

Main.java

Share Run

```java
public class Main {
    public static void main(String[] args) {
        B obj = new B();
        obj.m();
        obj.m2();
    }
}
class A {
    int a;
    A() {
        a = 10;
    }
    void m() {
        System.out.println("Base class");
    }
}
class B extends A {
    int b;
    B() {
        b = 20;}
    void m2() {
        int c = a + b;
        System.out.println("Sum is " + c);
        System.out.println("Derived class");
    }
}
```

Output

Output

```
Base class
Sum is 30
Derived class

=== Code Execution Successful ===
```

28) Program for multi level Inheritence.

Code

Main.java

Share Run

```java
public class Main {
    public static void main(String[] args) {
        C obj = new C();
        obj.m();
        obj.m2();
        obj.m3();  }}
class A {
    int a;
    A() {
        a = 10;}
    void m() {
        System.out.println("Base class"); }}
class B extends A {
    int b;
    B() {
        b = 20;
    }
    void m2() {
        int c = a + b;
        System.out.println("Sum is " + c);
        System.out.println("Derived class B");
    }}
class C extends B {
    void m3() {
        System.out.println("Derived class C");}}
```

Output

Output

```
Base class
Sum is 30
Derived class B
Derived class C

=== Code Execution Successful ===
```

29) Write program for This Keyword.

Code

Main.java

```java
public class Main {
    int a;
    public void d(int a) {
        this.a = a;
        System.out.println("Value of a: " + this.a);
    }
    public static void main(String[] args) {
        Main obj = new Main();
        obj.d(10);
    }
}
s
```

Output

Output

```
Value of a: 10

=== Code Execution Successful ===
```

30) Program for Super Keyword.

Code

Main.java

Share Run

```java
public class Main {
    public static void main(String[] args) {
        B obj = new B();
        obj.display();
        obj.add();
    }
}
class A {
    int a;
A() {
        a = 10;
    }
    public void display() {
        System.out.println("Base class");
    }
}
class B extends A {
    int b;
    public void add() {
        int sum = a + b;
        System.out.println("Sum: " + sum);
    }
}
```

Output

Output

```
Base class
Sum: 10

=== Code Execution Successful ===
```