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CLASS: BCA 2C

ROLL NO: 24/SCA/BCA(AI&ML)/39

ASSIGNMENT

Q1: Write a program to find the average and and sum of the N numbers using Command Line Argument?

```
public class SumAndAverage {
    public static void main(String[] args) {
        int sum = 0;
        int count = args.length;

        for (String num : args) {
            sum += Integer.parseInt(num);
        }

        double average = (double) sum / count;

        System.out.println("Sum: " + sum);
        System.out.println("Average: " + average);
    }
}
```

Output:

```
Sum: 150
Average: 30.0
```

Q2: Write a program to demonstrate type Casting?

```
public class TypeCastingDemo {
    public static void main(String[] args) {
        int num = 10;
        double d = num;
        System.out.println("Implicit Casting (int to double): " + d);

        double x = 10.5;
        int y = (int) x;
        System.out.println("Explicit Casting (double to int): " + y);
    }
}
```

Output:

```
Implicit Casting (int to double): 10.0
Explicit Casting (double to int): 10
```

Q3: Write a program to generate prime Numbers Between 1 and Given Number?

```
public class PrimeNumbers {
    public static void main(String[] args) {
        int n = 50;

        System.out.println("Prime numbers between 1 and " + n + " are:");
        for (int i = 2; i <= n; i++) {
            if (isPrime(i)) {
                System.out.print(i + " ");
            }
        }
    }
```

```
    static boolean isPrime(int num) {
        if (num < 2) return false;
        for (int i = 2; i * i <= num; i++) {
            if (num % i == 0) return false;
        }
        return true;
    }
}
```

OUTPUT:

```
Prime numbers between 1 and 50 are:
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47
=== Code Execution Successful ===
```

Q4: Write a program to demonstrate Nested Switch?

```
import java.util.Scanner;

public class NestedSwitchDemo {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter department (BCA, Btech): ");
        String dept = scanner.next();
        System.out.println("Enter year (1-4): ");
        int year = scanner.nextInt();

        switch (dept.toUpperCase()) {
            case "BCA":
                switch (year) {
                    case 1: System.out.println("Subjects: Math, Physics"); break;
                    case 2: System.out.println("Subjects: Data Structures, OOPs"); break;
```

```
                case 3: System.out.println("Subjects: DBMS, Networks"); break;
                case 4: System.out.println("Subjects: AI, Cloud Computing"); break;
                default: System.out.println("Invalid year.");
            }
            break;
        case "Btech":
            switch (year) {
                case 1: System.out.println("Subjects: Math, CS"); break;
                case 2: System.out.println("Subjects: AI, Digital Electronics"); break;
                case 3: System.out.println("Subjects: DSA, MS"); break;
                case 4: System.out.println("Subjects: WT, AI&ML"); break;
                default: System.out.println("Invalid year.");
            }
            break;
        default:
            System.out.println("Invalid department.");
    }
    scanner.close();
  }
}
```

OUTPUT:

```
Enter department (BCA, Btech):
BCA
Enter year (1-4):
2
Subjects: Data Structures, OOPs
```

Q5: Write a program to Calculate Area of a Circle Using Radius?

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

```
public class CircleArea {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter radius: ");
        double radius = scanner.nextDouble();

        double area = Math.PI * radius * radius;
        System.out.println("Area of the circle: " + area);
        scanner.close();
    }
}
```

OUTPUT:

```
Enter radius: 5
Area of the circle: 78.53981633974483

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

Q6: Write a program to Find GCD of Two Numbers?

```
import java.util.Scanner;

public class GCD {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter first number: ");
        int a = scanner.nextInt();
        System.out.print("Enter second number: ");
        int b = scanner.nextInt();
```

```
        int gcd = findGCD(a, b);
        System.out.println("GCD of " + a + " and " + b + " is: " + gcd);
        scanner.close();
    }

    static int findGCD(int a, int b) {
        while (b != 0) {
            int temp = b;
            b = a % b;
            a = temp;
        }
        return a;
    }
}
```

OUTPUT:

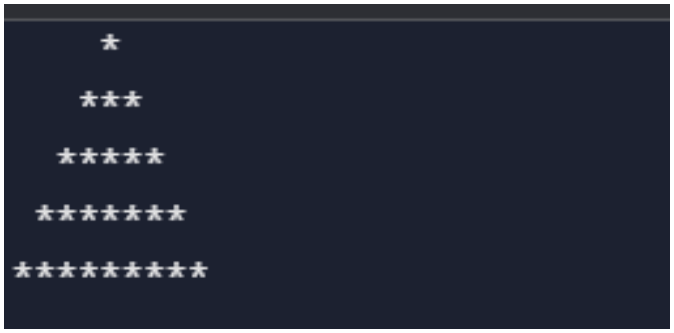
```
Enter first number: 3
Enter second number: 7
GCD of 3 and 7 is: 1
```

Q7:Write a program to generate pyramid of stars using nested for loops?

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

```
        int rows = 5;

        for (int i = 1; i <= rows; i++) {
            for (int j = rows - i; j > 0; j--) {
                System.out.print(" ");
            }

            for (int k = 1; k <= (2 * i - 1); k++) {
                System.out.print("*");
            }
            System.out.println();
        }
    }
}
```

OUTPUT:



Q8: Write a program to reversed pyramid using for loops & decrement operator?

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

```
        int rows = 5;

        for (int i = rows; i >= 1; i--) {
            for (int j = 0; j < rows - i; j++) {
                System.out.print(" ");
            }

            for (int k = (2 * i - 1); k > 0; k--) {
                System.out.print("*");
            }
            System.out.println();
        }
    }
}
```

OUTPUT:

Q9:Write a program to find the factorial of a given number using recursion?

```
public class FactorialRecursion {

    public static int factorial(int n) {
```

```
        if (n == 0 || n == 1)
            return 1;
        return n * factorial(n - 1);
    }

    public static void main(String[] args) {
        int num = 5;
        System.out.println("Factorial of " + num + " is: " +
factorial(num));
    }
}
```

Output:

```
Factorial of 5 is: 120

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

Q10:Write a program to design a class using abstract methods and abstract classes.

```
abstract class Animal {
    abstract void makeSound();
}

class Dog extends Animal {
    void makeSound() {
        System.out.println("Bark!");
    }
}
```

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

OUTPUT:

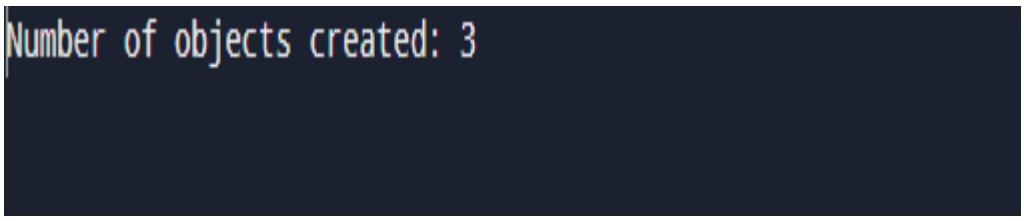
```
Bark!
```

Q11:Write a program to count the number of objects created for a class using static member function.

```
class ObjectCounter {
    static int count = 0;



    ObjectCounter() {
        count++;
    }

    static void showCount() {
        System.out.println("Number of objects created: " + count);
    }
}

public class ObjectCountDemo {
    public static void main(String[] args) {
        ObjectCounter obj1 = new ObjectCounter();
```

```
        ObjectCounter obj2 = new ObjectCounter();
        ObjectCounter obj3 = new ObjectCounter();

        // Display object count
        ObjectCounter.showCount();
    }
}
```

OUTPUT:



Q12: Write a program to demonstrate the use of function overloading.

```
class OverloadExample {

    void display(int a) {
        System.out.println("Integer value: " + a);
    }

    void display(int a, double b) {
        System.out.println("Integer: " + a + ", Double: " + b);
    }

    void display(String str) {
        System.out.println("String: " + str);
    }
}

public class FunctionOverloading {
    public static void main(String[] args) {
        OverloadExample obj = new OverloadExample();
```

```
        obj.display(10);
        obj.display(5, 3.14);
        obj.display("Hello, Java!");
    }
}
```

OUTPUT: