Course Name:	**Object Oriented Programming**	Semester:	**III**
Date of Performance:	21 / 07 / 2025	Batch No:	A1
Faculty Name:	Amrita Naiksatam	Roll No:	20
Faculty Sign & Date:		Grade/Marks:	___/15

Experiment No: 1
Title: Basic Java Program with use of Operators and Control Flow

Aim and Objective of the Experiment:
Learn basic Java Program with use of Operators and Control Flow

COs to be achieved:
CO1: Understand concepts of Object Oriented Programming and basic characteristics of Java.

Tools used:
Notepad, Terminal

Theory:
(Mention about data type, operator and flow statement)

Java Scanner Class

Java **Scanner class** allows the user to take input from the console. It belongs to **java.util** package. It is used to read the input of primitive types like int, double, long, short, float, and byte. It is the easiest way to read input in Java program.

Syntax
Scanner sc = **new** Scanner(System.in);

The above statement creates a constructor of the Scanner class having **System.in** as an argument. It means it is going to read from the standard input stream of the program. The **java.util** package should be import while using Scanner class.
It also converts the Bytes (from the input stream) into characters using the platform's default charset.

Method	Description
int nextInt()	It is used to scan the next token of the input as an integer.
float nextFloat()	It is used to scan the next token of the input as a float.
double nextDouble()	It is used to scan the next token of the input as a double.
byte nextByte()	It is used to scan the next token of the input as a byte.
String nextLine()	Advances this scanner past the current line.
boolean nextBoolean()	It is used to scan the next token of the input into a boolean value.
long nextLong()	It is used to scan the next token of the input as a long.
short nextShort()	It is used to scan the next token of the input as a Short.
BigInteger nextBigInteger()	It is used to scan the next token of the input as a BigInteger.
BigDecimal nextBigDecimal()	It is used to scan the next token of the input as a BigDecimal.

```
Scanner sc= new Scanner(System.in);    //System.in is a standard input stream
System.out.print("Enter first number- ");
int a= sc.nextInt();
```

Code:

1. Find the perimeter and area of the circle. Input will be entered by user (You should use Math.PI constant in your program) If input is not valid then print appropriate message.

Program:

```java
import java.util.Scanner;
import java.lang.reflect.Method;

public class Q1_EXP1
{

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

        System.out.print("Enter the radius of the circle: ");
        if (sc.hasNextDouble())
        {
            double r = sc.nextDouble();

            double peri = 2 * (Math.PI) * r;
            double area = (Math.PI) * r * r;

            System.out.println("Perimeter of the circle: " + peri + " unit");
            System.out.println("Area of the circle: " + area + " unit");
        }
        else
        {
                System.out.println("Invalid input.");
        }

        sc.close();
        }
}
```

2. Consider First **n numbers** starting from zero (0).Write a program to calculate sum of all the numbers divisible by 3 and even numbers from 0 to n. Print the sum. If input is not valid then print the appropriate message.

Program:

```java
import java.util.Scanner;

public class Q1_EXP1
{
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter an integer: ");
        if (sc.hasNextInt())
        {
            int n = sc.nextInt();
            if (n>0)
            {
                int sum = 0;

                for (int i = 0; i <= n; i++)
                {
                    if (i % 3 == 0 && i % 2 == 0)
                    {
                        sum += i;
                    }
                }
                System.out.print("Sum: " + sum);
            }
            else
            {
                System.out.println("Integer should be greater than 1.");
            }
        }
        else
        {
            System.out.println("Invalid input.");
        }
        sc.close();
    }
}
```

Output:

1.


```
PS C:\Users\Admin\Documents\SohamGore-A1> java Q1_EXP1.java
Enter the radius of the circle: 5.5
Perimeter of the circle: 34.55751918948772 unit
Area of the circle: 95.03317777109123 unit
PS C:\Users\Admin\Documents\SohamGore-A1> java Q1_EXP1.java
Enter the radius of the circle: Soham
Invalid input.
PS C:\Users\Admin\Documents\SohamGore-A1>
```

2.


```
PS C:\Users\Admin\Documents\SohamGore-A1> java Q2_EXP1.java
Enter an integer: 10
Sum: 6
PS C:\Users\Admin\Documents\SohamGore-A1> java Q2_EXP1.java
Enter an integer: -5
Integer should be greater than 1.
PS C:\Users\Admin\Documents\SohamGore-A1> java Q2_EXP1.java
Enter an integer: Soham
Invalid input.
PS C:\Users\Admin\Documents\SohamGore-A1>
```

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Post Lab Subjective/Objective type Questions:

1. Write a program to find the largest among three numbers x,y, and z. You should use if-then-else construct in Java.

   Program:

```java
import java.util.Scanner;

public class Q1_PS_EXP1
{
        public static void main(String[] args)
        {
                Scanner sc = new Scanner(System.in);

                System.out.print("Enter first number: ");
                int x = sc.nextInt();

                System.out.print("Enter second number: ");
                int y = sc.nextInt();

                System.out.print("Enter third number: ");
                int z = sc.nextInt();

                if (x >= y && x >= z)
                {
                        System.out.println("Largest number is: " + x);
                }
                else if (y >= x && y >= z)
                {
                        System.out.println("Largest number is: " + y);
                }
                else
                {
                        System.out.println("Largest number is: " + z);
                }
                sc.close();
        }
}
```
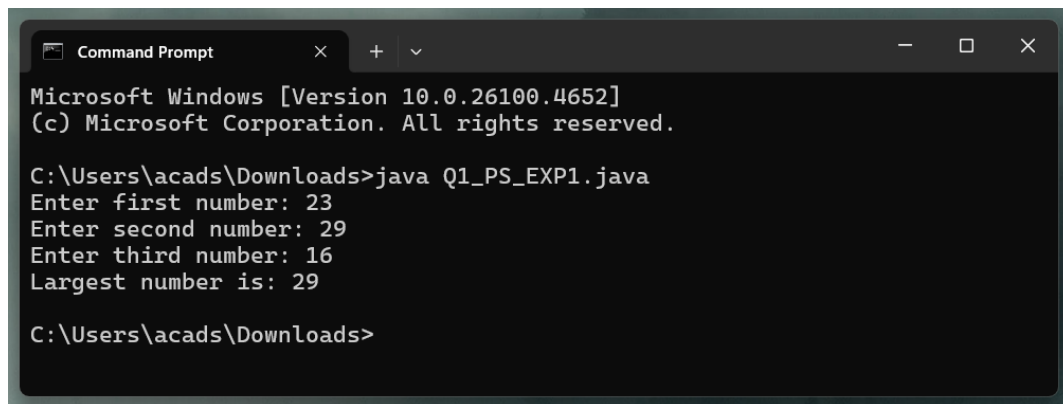
   Output:

```
Command Prompt                                              ×   □   ×

Microsoft Windows [Version 10.0.26100.4652]
(c) Microsoft Corporation. All rights reserved.

C:\Users\acads\Downloads>java Q1_PS_EXP1.java
Enter first number: 23
Enter second number: 29
Enter third number: 16
Largest number is: 29

C:\Users\acads\Downloads>
```

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2. Write a program to check whether the number is an Armstrong number or not.

Program:

```java
import java.util.Scanner;

public class Q2_PS_EXP1
{
        public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter a number: ");
        int num = sc.nextInt();

        int og = num;
        int rem;
        int res = 0;

        while (og != 0)
        {
                rem = og % 10;
                res += rem * rem * rem;
                og /= 10;
        }

        if (res == num)
        {
                System.out.println(num + " is an Armstrong number.");
        }
        else
        {
                System.out.println(num + " is not an Armstrong number.");
        }
        sc.close();
        }
}
```
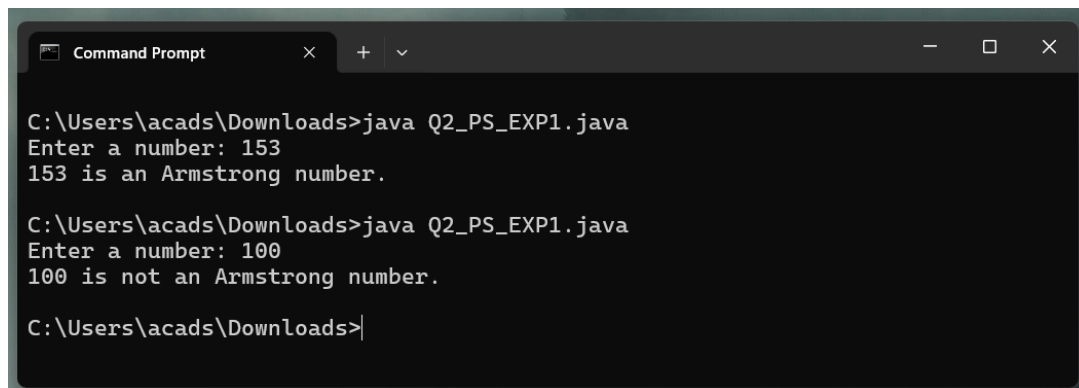
Output:

```
C:\Users\acads\Downloads>java Q2_PS_EXP1.java
Enter a number: 153
153 is an Armstrong number.

C:\Users\acads\Downloads>java Q2_PS_EXP1.java
Enter a number: 100
100 is not an Armstrong number.

C:\Users\acads\Downloads>
```

3. Explain the difference between class and object.

⇨
- A class is a blueprint or template that defines variables and methods.
- An object is an actual instance of a class that occupies memory.
- Class = definition, Object = implementation.

4. Why is java known as platform independent language?

⇨
- Java code is compiled into bytecode, not machine code.
- Bytecode runs on the Java Virtual Machine (JVM).
- JVM is available on all platforms, so the same code runs anywhere.

Conclusion:

Through this experiment, I learned how to write simple Java programs using operators, conditional statements, and user input with the Scanner class. I also understood how to apply control flow logic like if-else to solve basic problems such as finding the largest number and checking Armstrong numbers. This experiment helped build a strong foundation in OOP basics.

Signature of faculty in-charge with Date: