Getting User Input in Java

In Java, to take input from the user, we typically use the `Scanner` class from the `java.util` package. Here's a step-by-step guide on how to do it.

Steps to Get User Input:

1. **Import the Scanner class**:
   - This is used to take input from the user.
2. **Create an object of Scanner class**:
   - This object will be used to read different types of inputs.
3. **Use the appropriate method**:
   - For example, `nextInt()` for integer input, `nextLine()` for strings, etc.

Example Code (Taking User Input)

```
import java.util.Scanner;

public class UserInputExample {
    public static void main(String[] args) {
        // Create a Scanner object
        Scanner scanner = new Scanner(System.in);

        // Taking user input for an integer
        System.out.print("Enter your age: ");
        int age = scanner.nextInt();

        // Taking user input for a string
        System.out.print("Enter your name: ");
        scanner.nextLine();  // To consume the leftover
newline character
        String name = scanner.nextLine();

        // Displaying the input
        System.out.println("Hello, " + name + "! You are " +
age + " years old.");

        // Close the scanner
        scanner.close();
    }
}
```

Explanation:

1. **`nextInt()`** – Reads an integer input.
2. **`nextLine()`** – Reads a string input. After using `nextInt()`, we use `scanner.nextLine()` to consume the leftover newline character, which is important before reading a string.
3. **`scanner.close()`** – Closes the scanner to avoid resource leaks (good practice).

Practice Questions for Beginners

Question 1: Taking Two Numbers as Input

Write a Java program that takes **two numbers** as input from the user, adds them, and prints the result.

Expected Output:

```
Enter first number: 10
Enter second number: 20
Sum is: 30
```

Question 2: Taking User's Name and Age

Write a program that asks the user to input their **name** and **age**. Then, display a greeting message.

Expected Output:

```
Enter your name: Neeraj
Enter your age: 23
Hello, Neeraj! You are 23 years old.
```

Question 3: Temperature Conversion

Write a program that takes **temperature in Celsius** as input from the user and converts it to **Fahrenheit**.

Formula:

```
Fahrenheit = (Celsius * 9/5) + 32
```

Expected Output:

```
Enter temperature in Celsius: 30
Temperature in Fahrenheit: 86.0
```

Question 4: Area of a Circle

Write a program that takes the **radius** of a circle as input from the user and calculates the **area** of the circle.

Formula:

```
Area = π * radius^2
```

Expected Output:

```
Enter radius: 5
Area of the circle: 78.54
```

What are Operators in Java?

Operators are special symbols used to perform **operations** on variables and values.

Example:

```
int a = 10 + 5;  // '+' is an operator
```

Types of Operators in Java

Java provides several types of operators. Here's a complete list:

1. Arithmetic Operators:

Operator	Meaning	Example	Result
+	Addition	5 + 3	8
-	Subtraction	5 - 3	2
*	Multiplication	5 * 3	15
/	Division	6 / 3	2
%	Modulus (Remainder)	5 % 2	1

2. Relational (Comparison) Operators

Used to compare two values. Returns `true` or `false`.

Operator	Meaning	Example	Result
==	Equal to	5 == 5	true
!=	Not equal to	5 != 3	true
>	Greater than	5 > 3	true
<	Less than	5 < 3	false
>=	Greater than or equal	5 >= 5	true
<=	Less than or equal	5 <= 4	false

3. Logical Operators

Used to combine multiple conditions.

Operator	Meaning	Example	Result
&&	Logical AND	(5 > 3 && 4 > 2)	true
||	Logical OR	(5 > 3 || 4 > 2)	Logical OR
!	Logical NOT	!(5 > 3)	false

4. Assignment Operators

Used to assign values to variables.

Operator	Meaning	Example	Equivalent To
=	Assignment	x = 5	—
+=	Add and assign	x += 5	x = x + 5
-=	Subtract and assign	x -= 3	x = x - 3
*=	Multiply and assign	x *= 2	x = x * 2
/=	Divide and assign	x /= 2	x = x / 2
%=	Modulus and assign	x %= 2	x = x % 2

5. Unary Operators

Works with a single operand.

Operator	Meaning	Example	Result
+	Unary plus (positive value)	+a	+a
-	Unary minus (negative value)	-a	-a
++	Increment	a++ or ++a	a = a + 1
--	Decrement	a-- or --a	a = a - 1
!	Logical NOT	!true	false

6. Bitwise Operators *(used for binary operations)*

Operator	Meaning	Example
&	Bitwise AND	a & b
`	Bitwise OR	A | b
^	Bitwise XOR	a ^ b
~	Bitwise NOT	~a
<<	Left shift	a << 2
>>	Right shift	a >> 2

7. Ternary Operator (Shortcut for if-else)

```
variable = (condition) ? value_if_true : value_if_false;
```

Example:

```
int age = 18;
String result = (age >= 18) ? "Adult" : "Minor";
System.out.println(result);  // Output: Adult
```

Simple Practice Questions (for Beginners)

1. **Take two numbers from the user and print their sum, difference, product, and division.**
2. **Write a program to check if a number is even or odd using `%` and `if` condition.**
3. **Take a user's age and print "Adult" or "Minor" using the ternary operator.**
4. **Use logical operators to check if a person can vote (age ≥ 18 and has voter ID).**