Java Fundamentals

Objectives, Syntax, and Core Features

by BPI

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OBJECTIVES

- Define Java and describe its purpose
- Explain how Java works internally
- Identify and explain the core features of Java
- Recognize the structure of a basic Java program
- Write simple Java program
- Apply basic rules of Java syntax
- Understand the purpose of variables

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WHAT IS JAVA?

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Introduction to Java

Java is a programming language that lets you talk to a computer and tells the computer what to do.
It is used to create applications from simple programs to large enterprise systems/applications.

How Does Java Works?

- **You write code in a file with a .java extension**
- **Java converts it into a machine language version called bytecode**
- **The Java Virtual Machine (JVM) runs that bytecode**

What is Java Virtual Machine (JVM)?

- **It serves as the translator between you and the computer**

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WHY JAVA?

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Introduction to Java

- High Performance
- Dynamic
- Supports Concurrent Programming (Multithreaded)
- Strong Memory Management
- Platform Independence
- Object-Oriented Design
- Strong Typing and Reliability
- Huge Ecosystem
- Performance and Scalability
- Security

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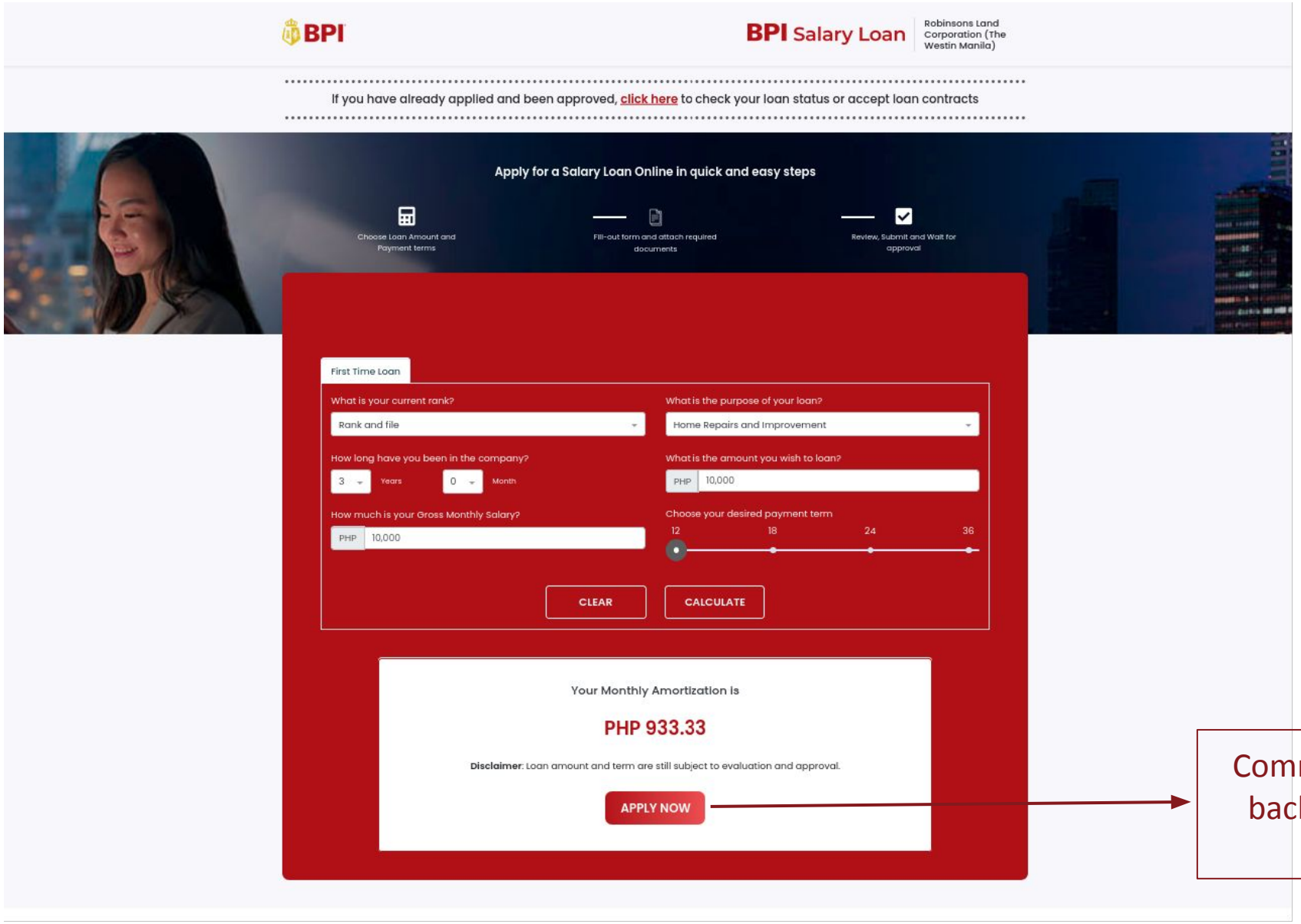
Introduction to Java



Communicates with the backend upon click of button

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BASIC JAVA SYNTAX & VARIABLES

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Introduction to Java

Example

```
/*
* This is a simple Java program.
* Class Name: HelloWorld
* Purpose: To print "Hello World!" on the screen.
*/
public class HelloWorld {
   public static void main(String[] args) {
       System.out.println("Hello World!"); // Displays Hello World!
   } // end of main method

} // end of HelloWorld class
```

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JAVA SYNTAX

- **Case Sensitivity**
  - **Main is ≠ to main**
  - **Println is ≠ to println**

- **Statements end with semicolon (;)**

- **Comments (Ignored by the computer)**
  - **Single-line comments**
    Example:

```
// This is a single-line comment
```

  - **Multi-line comments**
  - **Example:**

```
/*
This is a multiline comment.
You can write explanations here.
It can span multiple lines.
*/
```

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Java Console Input and Output

- Console Output
  - Use *System.out.print()* or *System.out.println()*
  - println vs print
- Console Input
  - Reads input from the user
  - `import java.util.Scanner;`
  - `Scanner input = new Scanner(System.in);`

Common Input Methods

- nextLine()
  - Reads a whole line
- nextInt()
  - Reads an integer
- nextDouble()
  - Reads a decimal
- next()
  - Reads a single word

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VARIABLES

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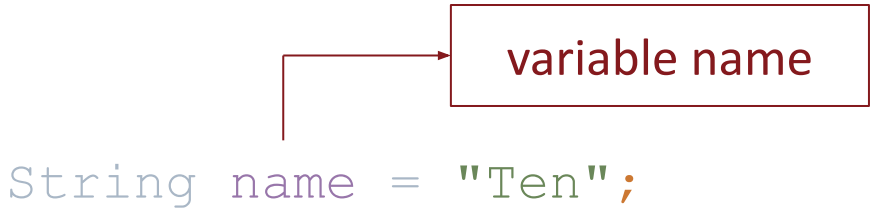
Variables

- A variable is a named container that stores a value so the program can use it later.
- It is a named storage space in the computer's memory where you can save and reuse a value.
- Should be meaningful and not just any text.

Example



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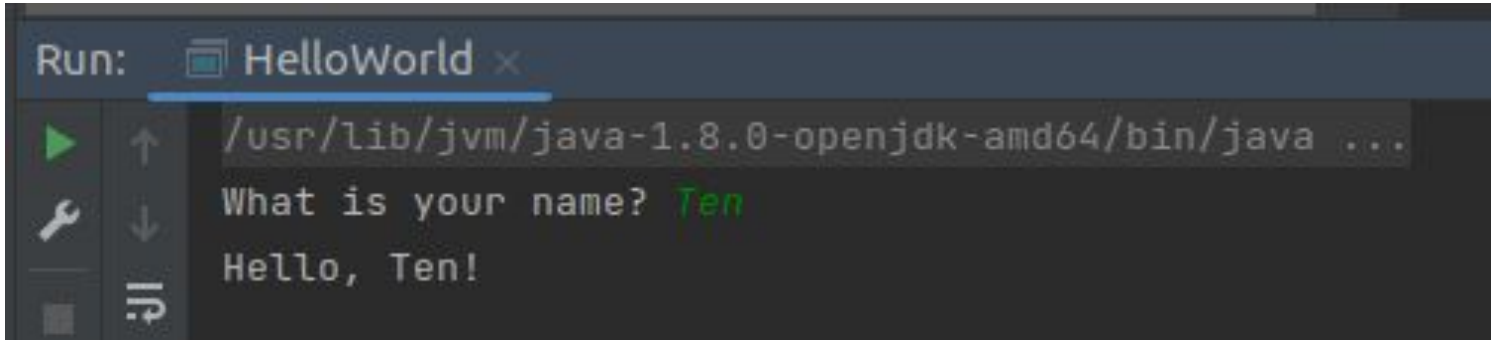
ACTIVITY 1 - BASIC JAVA SYNTAX AND VARIABLES

Objective: Apply basic Java syntax rules.

Create a program that

Sample Output

- 

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DATA TYPES

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OBJECTIVES

- Identify the data types in Java
- Explain the purpose of each data type
- Differentiate Primitive vs Non-Primitive data types
- Declare and initialize variables correctly
- Understand the use and purpose of typecasting and parsing
- Perform implicit and explicit typecasting
- Use of wrapper classes to parse String

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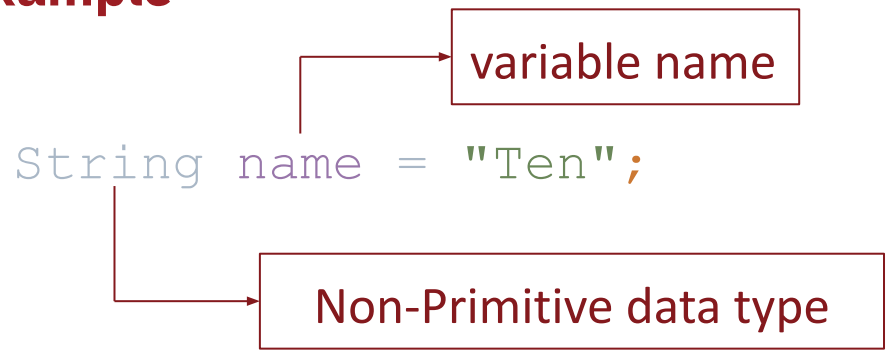
Data Types

- Tells Java what kind of information you want to store in a variable.

Why Does Data Types Matter?

- Java needs to know how much space to reserve in memory
- What kind of operations are allowed

Example



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2 Main Categories of Data Types in Java

- **Primitive Data Types**
  - Built-in types
  - Stores simple values (numbers, letters, true/false)

- **Non-Primitive Data Types**
  - Complex types built from primitive types

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PRIMITIVE DATA TYPES

- byte
  - Whole number
  - Very small range
- short
  - Whole number
  - Larger than byte
- int
  - Most common whole number type
- long
  - Very large whole numbers
- float
  - Holds decimal numbers
  - Smaller precision
  - Must add f at the end
  - Example: `float price = 19.99f;`
- double
  - Holds decimal numbers
  - More precise
  - Most commonly used for decimals
  - Example: `double height = 5.8;`
- char
  - Single character
  - Example: `char grade = 'A';`
- boolean
  - True or False value
  - Example: `boolean isStudent = true;`

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NON-PRIMITIVE DATA TYPES

- **String**
  - Most common
  - Stores text
  - Example:

```
String name = "Juan";
```

- **Arrays**
  - Stores multiple values
  - Example:

```
int[] numbers = {1, 2, 3};
```

- **Classes**
  - User-defined types
  - Example: `class Person { }`

- **Objects**
  - Instances of classes
  - Example:

```
Student student = new Student();
```

- **Interfaces**
  - Blueprint for classes
  - Example:

```
interface Animal {}
```

- **Wrapper Classes**
  - Primitive but Object version
  - Example:

```
Integer x = 10;
```

  - Integer (for int)
  - Double (for double)
  - Boolean (for boolean)
  - Character (for char)

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TYPECASTING

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Typecasting

- Converting one data type into another

2 Types of Typecasting

- Widening (Implicit)
  - Done automatically by Java
  - Ordering (byte -> short -> int -> long -> float -> double)
  - Example:

```
int num = 10;
double result = num; // int converted to double automatically
```

- Narrowing (Explicit)
  - Done manually
  - Syntax: (targetDataType) <variableName>
  - Example:

```
double x = 10.75;
int y = (int) x; // Convert double to int
```

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PARSING

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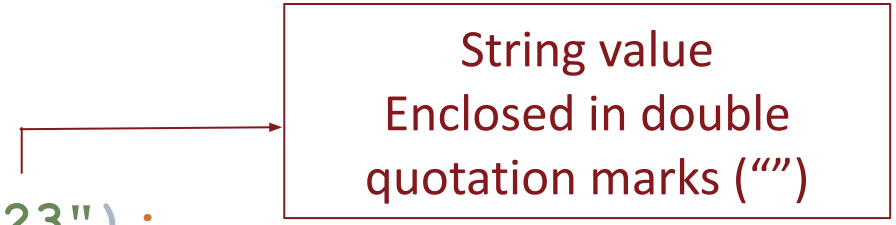
Parsing

- Converting a String into a primitive number.
- Essential when reading user input
- Example:




```
int num = Integer.parseInt("123");
double price = Double.parseDouble("9.99");
```

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ACTIVITY 2 - TYPECASTING AND PARSING BETWEEN DATA TYPES

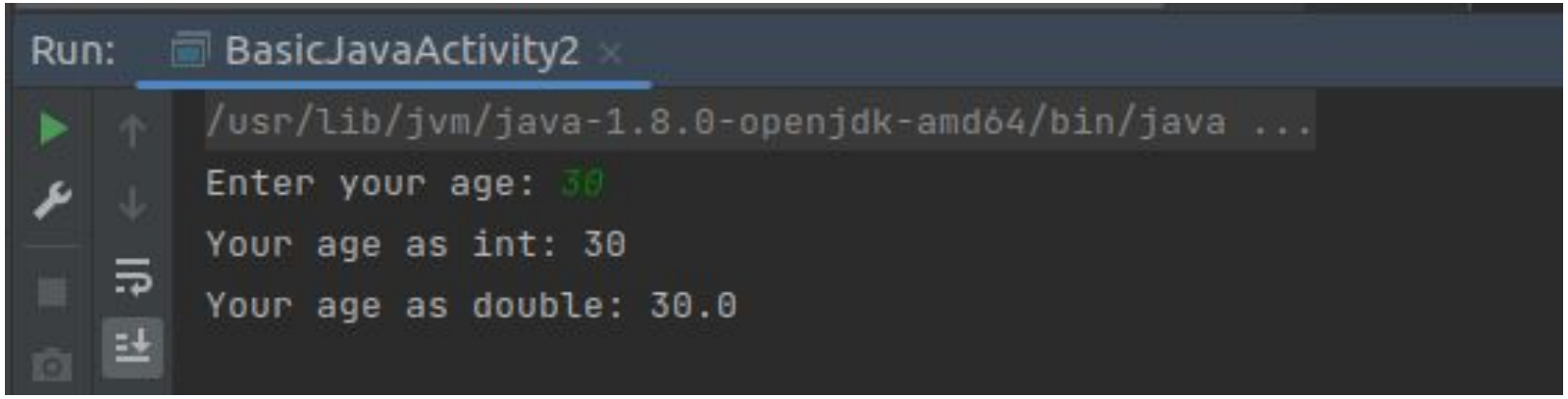
Objective: Practice typecasting and parsing between data types

Write a Java program that asks the user to enter their age.

Your program must perform the following:

1. Read the user's age as a String using Scanner.
2. Convert the String into an int.
3. Convert the int into a double.
4. Display both the int and double versions of the age.

Sample Output:

- 

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OPERATORS

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OBJECTIVES

- Understand the role of operators
- Identify the different types of operators in Java
- Apply correct operator in expressions
- Demonstrate effects of increment and decrement operators

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OPERATORS

1. Arithmetic Operators
- Used for basic mathematical operations

Operator	Name	Description	Example
+	Addition	Adds together two values	x + y
-	Subtraction	Subtracts one value from another	x - y
*	Multiplication	Multiplies two values	x * y
/	Division	Divides one value by another	x / y
%	Modulus	Returns the division remainder	x % y
++	Increment	Increases the value of a variable by 1	++x
--	Decrement	Decreases the value of a variable by 1	--x

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Relational/Comparison Operators

- Used to compare two values
- It always give a boolean result (true/false)

Operator	Description	Comparing	Returns
==	equal to	x == 8	false
		x == 5	true
		x == "5"	true
===	equal value and equal type	x === 5	true
		x === "5"	false
!=	not equal	x != 8	true
!==	not equal value or not equal type	x !== 5	false
		x !== "5"	true
		x !== 8	true
>	greater than	x > 8	false
<	less than	x < 8	true
>=	greater than or equal to	x >= 8	false
<=	less than or equal to	x <= 8	true

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Assignment Operators

- Used to store a value in a variable

Operator	Example	Same As
=	x = 5	x = 5
+=	x += 3	x = x + 3
-=	x -= 3	x = x - 3
*=	x *= 3	x = x * 3
/=	x /= 3	x = x / 3
%=	x %= 3	x = x % 3

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Logical Operators

- Used to combine or reverse true/false values

Operator	Name	Description	Example
&&	Logical and	Returns true if both statements are true	x < 5 && x < 10
||	Logical or	Returns true if one of the statements is true	x < 5 || x < 4
!	Logical not	Reverse the result, returns false if the result is true	!(x < 5 && x < 10)

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Increment/Decrement

- Used to increase or decrease the value of a variable by one

2 Types of Increment Operators

- Prefix Increment Operator (++x)
- Postfix Increment Operator (x++)

2 Types of Decrement Operators

- Prefix Decrement Operator (--x)
- Postfix Decrement Operator (x--)

String Concatenation

- Joins text
- Example:

```
String name = "Juan";
System.out.println("Hello " + name + "!");
```

Ternary Operator

- Short if-else
- Example:

```
int age = 18;
String result = (age >= 18) ? "Adult" : "Minor";
```

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METHODS

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OBJECTIVES

- Understand the purpose of methods
- Identify the structure of a method
- Differentiate types of method
- Learn how to declare and call methods
- Understand passing of parameter/s
- Apply methods to organize code

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Method

- A method is like a small program inside your class
- It performs a specific task when you call it

Why use methods?

- Avoid repeating code
- Organize code into small tasks
- Make code easier to understand
- Reuse the same logic anytime

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Method that returns a value

- Gives back a result using the keyword ***return***
- Example: `public int displayNumber() { return 10; }`

Method with parameters

- Requires input values
- Example: `public void greet(String name) { }`

Method with no return

- Performs an action but does not return anything
- Uses the keyword ***void***
- Example: `public void display() { }`

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Introduction to Java

ACTIVITY 3 - USE OF METHODS AND OPERATORS

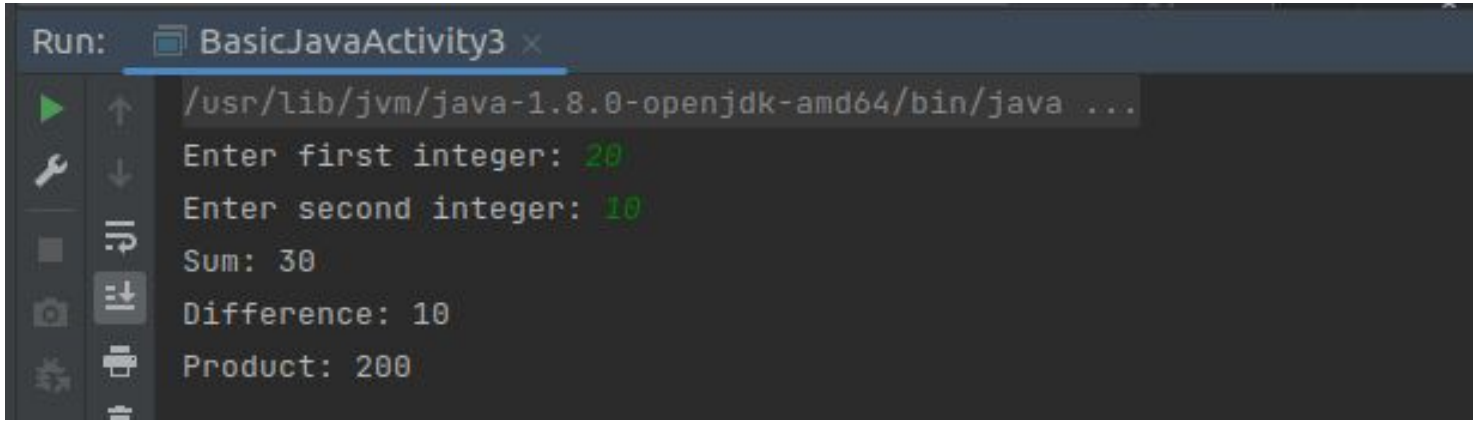
Objective: Practice creating methods and using operators

Write a Java program that asks the user for two integers.

Your program must perform the following:

1. **Compute sum, difference and product**
2. **Display all three results**

Sample Output:

- 

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CONTROL STRUCTURES & LOOPS

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OBJECTIVES

- Understand the purpose of control structures
- Learn how to use selection statements
- Apply relational and logical operators in conditions
- Understand the concept of loops

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Control Structures

- Allows your program to make decisions and control the flow of execution

Types of Control Structures

1. if statement
   - Runs code only if the condition is true

2. if-else statement
   - If the if condition is false, the else part runs/executes

3. else-if statement
   - Multiple conditions

4. switch
   - Used when checking one value against multiple cases

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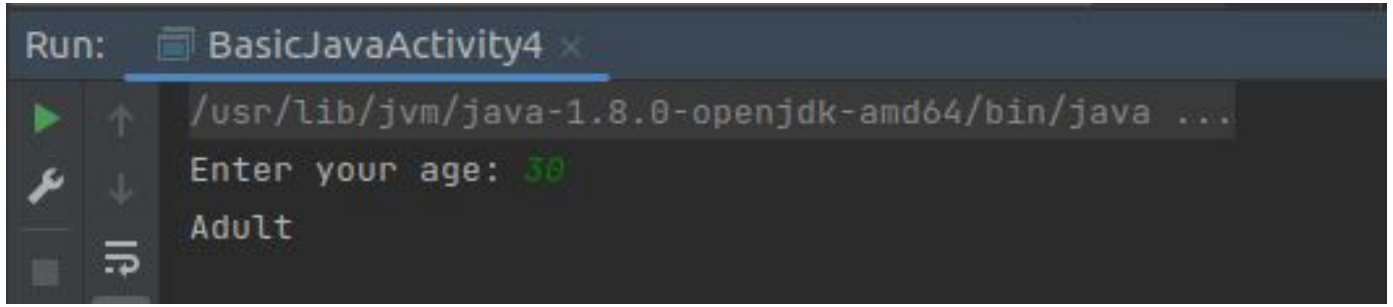
ACTIVITY 4 - CONDITIONAL STATEMENTS

Objective:

Write a Java program that asks for your age and prints the following:

- “Minor” if age is < 18
- “Adult” if age is between 18-59
- “Senior” if age is 60 and above

Sample Output:

- 

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LOOPS

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Loops in Java

- Allows your program to repeat actions without writing the same code many times

Types of Loops

1. for loop
   - Used when you know how many times you want to repeat

2. while loop
   - Used when you don't know exactly how many times but repeat while the condition is true

3. do-while loop
   - Similar to while but runs at least once

4. Enhanced for loop (for-each)
   - Used for looping through arrays and collections

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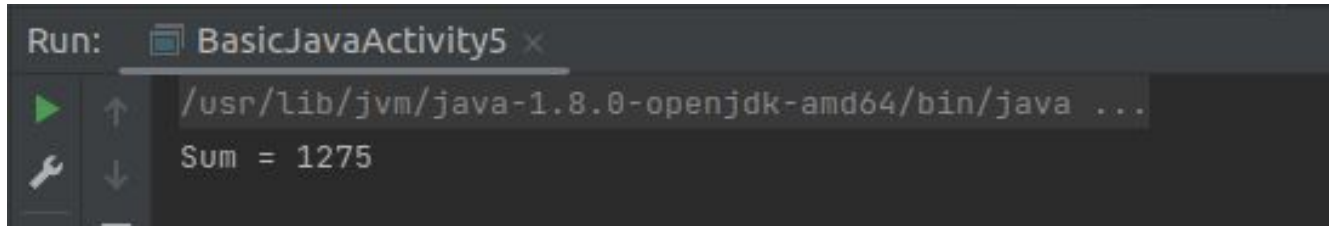
ACTIVITY 5 - LOOP

Objective: Practice creating methods and using operators

Write a Java program that prints the sum of numbers from 1 to 50.

Sample Output:

- 

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QUESTIONS?

Thank you for learning Java Fundamentals

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GROUP PROJECT

Objective: Apply Basic Java learning

Create a console-based Student Grade Management System

The system must allow the user to perform the following actions:

1. Input student details
2. Input number of subjects
3. Input grades per subject
4. Compute average grades of all subjects
5. Determine if grade is pass or fail

Student details must contain the following information:

- Student name
- Student ID
- Number of subjects
- Grades for each subject

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Sample Output

- **Menu**

```
===== STUDENT GRADING SYSTEM =====
A - Add Student Information
B - Compute Student Average
C - Display Student Information
D - Exit
```

- **If Option A - Add Student Information**

```
Enter choice: A
Enter student name: JUAN DELA CRUZ
Enter student ID: 20251124
Enter number of subjects: 2
Enter grade for subject 1: 90
Enter grade for subject 2: 87
===== STUDENT SAVED =====
```

- **If Option B - Compute Student Average**

```
===== STUDENT GRADING SYSTEM =====
A - Add Student Information
B - Compute Student Average
C - Display Student Information
D - Exit
Enter choice: B
Average: 88.5
Status: PASS
```

- **If Option C - Display Student Info**

```
Enter choice: C

===== STUDENT SUMMARY =====
Student Name: JUAN DELA CRUZ
Student ID: 20251124
Average Grade: 88.5
Status: PASS
==========================
```

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