Java Lab Session 1: Introduction to Java Programming

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Introduction

In this session, we'll cover the fundamentals of Java programming and get started with writing our first Java programs.

Setup and Installation

To start working with Java, you need to install the JDK (Java Development Kit):

1. Download JDK from Oracle's website
2. Install JDK on your system
3. Configure environment variables (JAVA_HOME, PATH)

Your First Java Program

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

Code Explanation

- `public class HelloWorld`: Defines a public class named HelloWorld
- `public static void main(String[] args)`: The main method - entry point of the program
- `System.out.println()`: Prints output to the console

Compiling and Running

To compile and run your program:

```
javac HelloWorld.java
java HelloWorld
```

Data Types in Java

Primitive Data Types

```java
// Integer types
int age = 25;
long population = 7000000000L;

// Floating-point types
float price = 19.99f;
double pi = 3.14159265359;

// Character type
char grade = 'A';

// Boolean type
boolean isStudent = true;
```

Reference Types

```java
String name = "John Doe";
String[] courses = {"Java", "Python", "C++"};
```

Operators

Arithmetic Operators

```java
int a = 10;
int b = 3;

int sum = a + b;       // Addition: 13
int diff = a - b;      // Subtraction: 7
int product = a * b;   // Multiplication: 30
int quotient = a / b; // Division: 3
int remainder = a % b; // Modulus: 1
```

Comparison Operators

```java
int x = 5;
int y = 10;

boolean isEqual = (x == y);         // false
boolean isNotEqual = (x != y);      // true
boolean isGreater = (x > y);        // false
boolean isLess = (x < y);           // true
```

Control Flow Statements

if-else Statement

```java
int score = 85;

if (score >= 90) {
    System.out.println("Excellent");
} else if (score >= 70) {
    System.out.println("Good");
} else {
    System.out.println("Pass");
}
```

for Loop

```java
for (int i = 1; i <= 5; i++) {
    System.out.println("Number: " + i);
}
```

while Loop

```java
int count = 0;
while (count < 5) {
    System.out.println("Count: " + count);
    count++;
}
```

Lab Exercises

1. Write a program that takes two numbers from the user and prints their sum
2. Write a program that checks if a number is even or odd
3. Write a program that prints numbers from 1 to 10

Summary

In this session, we covered:

- Structure of a Java program
- Data types (primitive and reference)
- Operators (arithmetic and comparison)
- Control flow statements (if-else, for, while)

Resources

- Official Java Documentation
- Java Tutorial - W3Schools
- Java Programming Tutorial