

Introduction to Java

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Unit 1: Introduction to Java

1.1 Basic Functions in Java

Java is a versatile and widely-used programming language designed for building secure, high-performance applications. It follows an object-oriented approach that makes it easy to create modular and maintainable code. Here are some fundamental concepts:

- Variables and Data Types: Java supports various data types such as int, float, char, and boolean. Variables must be declared before use.

Example:

```
int number = 10;
float price = 19.99f;
boolean isJavaFun = true;
```

- Operators: Java provides arithmetic operators (+, -, *, /, %), relational operators (==, !=, >, <), and logical operators (&&, ||, !).

- Control Structures: Java uses conditional (if, else if, switch) and looping structures (for, while, do-while) to control the flow of execution.

1.2 Looping in Java

Loops allow repeated execution of code blocks. Java offers three main types of loops:

1. For Loop: The for loop is used when the number of iterations is known.

Example:

```
for (int i = 0; i < 5; i++) {
    System.out.println(i);
}
```

2. While Loop: The while loop executes as long as the given condition is true.

Example:

```
int i = 0;
while (i < 5) {
    System.out.println(i);
    i++;
}
```

3. Do-While Loop: Similar to the while loop, but guarantees at least one execution.

Example:

```
int i = 0;
do {
    System.out.println(i);
    i++;
} while (i < 5);
```

Exercise Paper-1

1. Write a program that calculates the sum of the first 100 natural numbers using a for loop.
2. Implement a program that prints the multiplication table for a number entered by the user using a while loop.

Unit 2: Packages in Java

2.1 Introduction to Packages

Packages are used to group related classes and interfaces, making it easier to manage and organize code. The java.util package, for instance, contains utility classes like Scanner, ArrayList, and more.

- Creating a Package: To create a package, declare it at the beginning of the file.

Example:

```
package mypackage;
public class MyClass {
    public static void main(String[] args) {
        System.out.println("This is a package example.");
    }
}
```

- Importing a Package: Use import to bring in other packages.

Example:

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

Exercise Paper-2

1. Create a package called utilities and implement a class that performs mathematical operations like addition and subtraction.
2. Use a package to organize multiple classes that represent different geometric shapes (e.g., Circle, Square, Rectangle).