

Introduction to Java: Classes and Objects

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Lecturer 5

Object-Oriented Programming (OOP) in Java

- • Java is an Object-Oriented Programming language.
- • OOP principles: Encapsulation, Inheritance, Polymorphism, Abstraction.

What is a Class?

- • A class is a blueprint for creating objects.
- • It defines properties (variables) and behaviors (methods).

Example of a Java Class

- `class Car {`
- `String brand;`
- `int speed;`
- `void displayInfo() {`
- `System.out.println("Brand: " + brand);`
- `}`
- `}`

What is an Object?

- • An object is an instance of a class.
- • It has state (variables) and behavior (methods).

Creating an Object in Java

- `Car myCar = new Car();`
- `myCar.brand = "Toyota";`
- `myCar.speed = 120;`
- `myCar.displayInfo();`

Instance Variables

- • Defined inside a class but outside methods.
- • Each object has its own copy of instance variables.

Example of Instance Variables

- class Student {
- String name;
- int age;
- }

Constructors in Java

- • Special method used to initialize objects.
- • Has the same name as the class.
- • No return type.

Default Constructor Example

- `class Person {`
- `Person() {`
- `System.out.println("Constructor called!");`
- `}`
- `}`

Parameterized Constructor Example

- class Person {
- String name;
- Person(String n) {
- name = n;
- }
- }

Methods in Java

- • Methods define behaviors.
- • Can take parameters and return values.

Method Syntax

- returnType methodName(parameters) {
- // Method body
- }

Example of a Method

- `int add(int a, int b) {`
- `return a + b;`
- `}`

Calling a Method

- `Calculator calc = new Calculator();`
- `int sum = calc.add(10, 5);`

Summary: Classes & Objects

- • A class is a blueprint for objects.
- • Objects are instances of classes.
- • Instance variables store object-specific data.

Summary: Constructors

- • Constructors initialize objects.
- • Default and Parameterized constructors exist.

Summary: Methods

- • Methods define behaviors.
- • They can take arguments and return values.

Homework Assignment

- 1. Create a 'Book' class with title, author, price.
- 2. Create a 'BankAccount' class with deposit and withdraw methods.

Thank You!