

# Core Java (Fundamentals)

- Variables, Data Types, and Operators
  - Variables store data. Example: `int x = 10;`
  - Data Types: `int`, `double`, `char`, `boolean`, `String`
  - Operators: `+`, `-`, `*`, `/`, `%`, `==`, `!=`, `>`, `<`, `&&`, `||`
- Control Flow Statements
  - if-else: Checks condition. Example: `if (x > 0) {...}`
  - switch-case: Checks multiple values.
  - Loops: `for`, `while`, `do-while` for repeating tasks.
- Arrays and Strings
  - Arrays: `int[] arr = {1,2,3};`
  - Strings: `String s = "Hello";`
- Object-Oriented Programming (OOP)
  - Classes and Objects: `class Car { } -> new Car();`
  - Inheritance: `class Dog extends Animal`
  - Polymorphism: Method overloading/overriding
  - Encapsulation: Private fields + public getters/setters
  - Abstraction: abstract class or interface
- Exception Handling
  - try-catch-finally blocks to handle errors.
  - Custom exceptions: `class MyEx extends Exception {}`
- Java Memory Management
  - Stack: local variables
  - Heap: objects
  - Garbage Collector cleans unused objects.
- Access Modifiers

- public: everywhere
- private: within class
- protected: same package + subclass
- default: package-level

#### - Packages and Imports

- Packages group classes. Example: java.util
- Import with: import java.util.Scanner;

#### - Static and Final Keywords

- static: class-level. final: constant.

#### - Enums

- Enum defines constants. Example: enum Day { MON, TUE }