ACCESS MODIFIERS IN JAVA

"A VISUAL, BEGINNER-FRIENDLY GUIDE TO JAVA ACCESS MODIFIERS."

- 'WHY CAN'T I ACCESS THIS VARIABLE?'
- 'COMPILATION ERROR - WHAT DOES THAT MEAN?'
- 'MY CODE WORKED YESTERDAY, WHY NOT TODAY?'
- 'HOW DO I KNOW WHAT TO MAKE PUBLIC VS PRIVATE?'

SOUND FAMILIAR? ACCESS MODIFIERS SOLVE ALL OF THESE!"

```
// This WON'T work - why?
class Student {
    private String name;
}

public class Main {
    public static void main(String[] args)
{
        Student s = new Student();
        s.name = "John"; // ERROR!
    }
}
```

THE 4 JAVA ACCESS LEVELS:

MORE RESTRICTIVE

PRIVATE - ONLY THIS CLASS

DEFAULT - SAME PACKAGE

PROTECTED - PACKAGE + CHILD CLASSES

PUBLIC - EVERYONE, EVERYWHERE

LESS RESTRICTIVE

PRIVATE

- ✅ ONLY ACCESSIBLE WITHIN THE SAME CLASS
- ✅ PERFECT FOR SENSITIVE DATA
- ✅ FORCES YOU TO USE PROPER METHODS
- ✅ PREVENTS ACCIDENTAL CHANGES

```
public class Student {
    private int marks;          // Only this class can access
    private String password;

    // Proper way to access private data
    public int getMarks() {
        return marks;
    }

    public void setMarks(int newMarks) {
        if(newMarks >= 0 && newMarks <= 100) {
            this.marks = newMarks;
        }
    }
}
```

DEFAULT

- ✅ NO KEYWORD NEEDED - JVM TAKES CARE OF IT!
- ✅ SAME PACKAGE
- ✅ GREAT FOR HELPER CLASSES
- ✅ KEEPS RELATED CLASSES TOGETHER

“DEFAULT” IS ALSO CALLED “PACKAGE-PRIVATE”

```
package college;

class Library {              // default access
    String location = "Block A";    // default access

    void issueBook() {    // default access
        System.out.println("Book issued!");
    }
}

class Student {
    public static void main(String[] args) {
        Library lib = new Library();  // Works - same package!
        lib.issueBook();              // Works - same package!
    }
}
```

PROTECTED

- ✅ SAME PACKAGE + CHILD CLASSES (INHERITANCE)
- ✅ PERFECT FOR PARENT-CHILD RELATIONSHIPS
- ✅ ALLOWS EXTENDING FUNCTIONALITY
- ✅ MORE FLEXIBLE THAN PRIVATE
- ✅ SUBCLASSES IN OTHER PACKAGES

```
package university;

public class Person {
    protected String name;      // Child classes can access
    protected int age;

    protected void sleep() {    // Child classes can use
        System.out.println("Sleeping...");
    }
}

class Student extends Person {
    public void study() {
        name = "John";          // Can access protected field
        sleep();                // Can use protected method
        System.out.println(name + " is studying");
    }
}
```

PUBLIC

✅ ACCESSIBLE FROM ANYWHERE
✅ PERFECT FOR MAIN METHODS
✅ CONSTANTS
✅ THINGS EVERYONE SHOULD USE

⚠️ BE CAREFUL: ONCE PUBLIC, EVERYONE DEPENDS ON IT!

```
public class Calculator {
    public static final double PI = 3.14159;  // Everyone can use

    public static int add(int a, int b) {     // Everyone can call
        return a + b;
    }

    public static void main(String[] args) {  // Entry point
        System.out.println("2 + 3 = " + add(2, 3));
    }
}
```

QUICK REFERENCE

Modifier	Same Class	Same Package	Subclass	Everywhere
private	✅	❌	❌	❌
default	✅	✅	❌	❌
protected	✅	✅	✅	❌
public	✅	✅	✅	✅