
Java Access Modifiers

In this tutorial, we will learn about the Java Access Modifier, its types, and how to use them with the help of examples.

What are Access Modifiers?

In Java, access modifiers are used to set the accessibility (visibility) of classes, interfaces, variables, methods, constructors, data members, and the setter methods. For example,

```
class Animal {

    public void method1() {...}


   private void method2() {...}

}
```

In the above example, we have declared 2 methods: method1() and method2(). Here,

- `method1` is `public` - This means it can be accessed by other classes.
- `method2` is `private` - This means it can not be accessed by other classes.

Note the keyword `public` and `private`. These are access modifiers in Java. They are also known as visibility modifiers.

> **Note**: You cannot set the access modifier of getters methods.

Types of Access Modifier

Before you learn about types of access modifiers, make sure you know about Java Packages.

There are four access modifiers keywords in Java and they are:

Modifier	Description
Default	declarations are visible only within the package (package private)

Private	declarations are visible within the class only
Protected	declarations are visible within the package or all subclasses
Public	declarations are visible everywhere

Default Access Modifier

If we do not explicitly specify any access modifier for classes, methods, variables, etc, then by default the default access modifier is considered. For example,

```
package defaultPackage;class Logger {

    void message(){

        System.out.println("This is a message");

    }

}
```

Here, the `Logger` class has the default access modifier. And the class is visible to all the classes that belong to the `defaultPackage` package. However, if we try to use the `Logger` class in another class outside of defaultPackage, we will get a compilation error.

Private Access Modifier

When variables and methods are declared `private`, they cannot be accessed outside of the class. For example,

```
class Data {

    // private variable

    private String name;

}

public class Main {

    public static void main(String[] main){
```

```
        // create an object of Data
        Data d = new Data();

        // access private variable and field from another class
        d.name = "Programiz";
    }
}
```

In the above example, we have declared a private variable named `name` and a private method named `display()`. When we run the program, we will get the following error:

```
Main.java:18: error: name has private access in Data
        d.name = "Programiz";
         ^
```

The error is generated because we are trying to access the private variable and the private method of the `Data` class from the `Main` class.

You might be wondering what if we need to access those private variables. In this case, we can use the getters and setters method. For example,

```
class Data {
    private String name;

    // getter method
    public String getName() {
        return this.name;
    }
    // setter method
    public void setName(String name) {
        this.name= name;
    }
}public class Main {
    public static void main(String[] main){
        Data d = new Data();
```

```
        // access the private variable using the getter and setter
        d.setName("Programiz");
        System.out.println(d.getName());
    }
}
```

Output:

```
The name is Programiz
```

In the above example, we have a private variable named `name`. In order to access the variable from the outer class, we have used methods: `getName()` and `setName()`. These methods are called getter and setter in Java.

Here, we have used the setter method (`setName()`) to assign value to the variable and the getter method (`getName()`) to access the variable.

We have used `this` keyword inside the setName() to refer to the variable of the class. To learn more on this keyword, visit Java this Keyword.

> **Note**: We cannot declare classes and interfaces private in Java. However, the nested classes can be declared private. To learn more, visit Java Nested and Inner Class.

Protected Access Modifier

When methods and data members are declared `protected`, we can access them within the same package as well as from subclasses. For example,

```
class Animal {
    // protected method
    protected void display() {
        System.out.println("I am an animal");
    }
}
```

```
class Dog extends Animal {

    public static void main(String[] args) {



        // create an object of Dog class

        Dog dog = new Dog();

         // access protected method

        dog.display();

    }

}
```

Output:

```
I am an animal
```

In the above example, we have a protected method named `display()` inside the `Animal` class. The `Animal` class is inherited by the `Dog` class. To learn more about inheritance, visit Java Inheritance.

We then created an object `dog` of the `Dog` class. Using the object we tried to access the protected method of the parent class.

Since protected methods can be accessed from the child classes, we are able to access the method of `Animal` class from the `Dog` class.

> **Note**: We cannot declare classes or interfaces `protected` in Java.

Public Access Modifier

When methods, variables, classes, and so on are declared `public`, then we can access them from anywhere. The public access modifier has no scope restriction. For example,

```
// Animal.java file// public classpublic class Animal {

    // public variable

    public int legCount;
```

```
    // public method
    public void display() {
        System.out.println("I am an animal.");
        System.out.println("I have " + legCount + " legs.");
    }
}
// Main.javapublic class Main {
    public static void main( String[] args ) {
        // accessing the public class
        Animal animal = new Animal();

        // accessing the public variable
        animal.legCount = 4;
        // accessing the public method
        animal.display();
    }
}
```

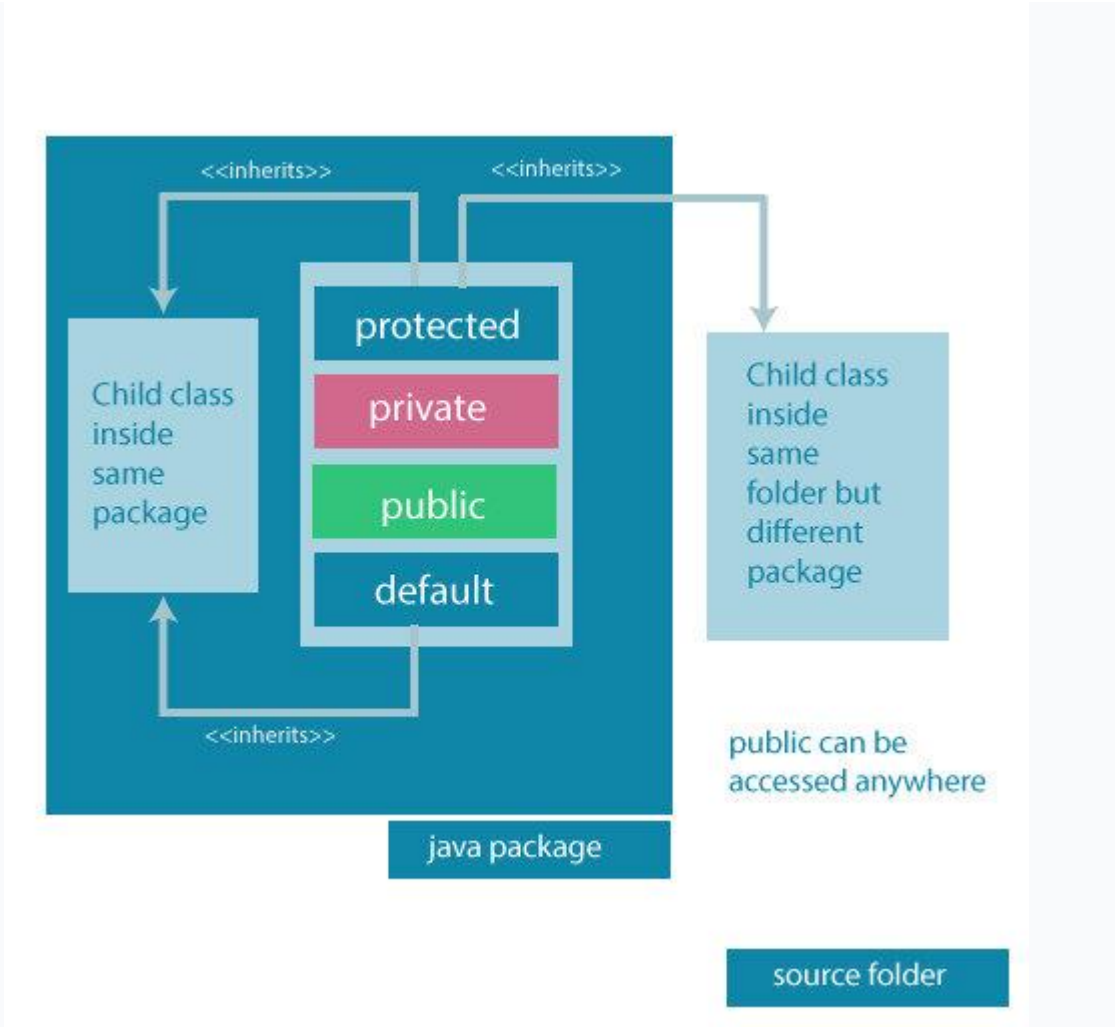
Output:

```
I am an animal.
I have 4 legs.
```

Here,

- The public class `Animal` is accessed from the `Main` class.
- The public variable `legCount` is accessed from the `Main` class.
- The public method `display()` is accessed from the `Main` class.

Access Modifiers Summarized in one figure



Accessibility of all Access Modifiers in Java

Access modifiers are mainly used for encapsulation. I can help us to control what part of a program can access the members of a class.