



## BAHRIA UNIVERSITY (KARACHI CAMPUS)

### Object Oriented Programming (CSC- 210)

Assignment 02

Spring 2023

Class: BSE 2B

Course Instructor: Engr. MAHAWISH

Assignment Date: 17 Apr 2023

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Shift: Morning

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**Question:** Explain and compare the various access modifiers used in Java and give a separate code example for each of them.

### Solution:

## Access Modifiers in Java:

Access Modifiers are used to control the level of access that other classes have to fields, methods, and inner classes of a class. There are four access modifiers in Java:

1. Public.
2. Private.
3. Protected.
4. Default.

### 1) Public:

Public access modifier allows unrestricted access to the class, method or field from any other class or package. A public field, method, or inner class can be accessed from anywhere in the program, by any other class.

#### Example:

```
public class Person {
    public String name;
    public int age;

    public Person(String name, int age) {
        this.name = name;
        this.age = age;
    }

    public void sayHello() {
        System.out.println("Hello, my name is " + name + " and I am " + age +
" years old.");
    }
}
```

## 2)Private:

Private access modifier restricts access to the class, method, or field to only the same class in which it is declared. No other class or package can access it. A private field, method, or inner class can only be accessed within the same class. It cannot be accessed by any other class, even subclasses.

### Example:

```
public class Logger {  
    private String format;  
    public String getFormat() {  
        return this.format;  
    }  
    public void setFormat(String format) {  
        this.format = format;  
    }  
}
```

## 3)Protected:

Protected access modifier allows access to the class, method or field from the same class, package, and subclasses. A protected field, method, or inner class can be accessed by the same class, by subclasses of the same class, and by other classes in the same package.

### Example:

```
public class Animal {  
    protected String name;  
    protected void setName(String name) {  
        this.name = name;  
    }  
}  
public class Dog extends Animal {  
    public void bark() {  
        System.out.println(name + " says woof!");  
    }  
}  
public class Main {  
    public static void main(String[] args) {  
        Dog dog = new Dog();  
        dog.setName("Buddy");  
        dog.bark();  
    }  
}
```

#### 4)Default:

Default access modifier is also known as package-private access modifier. It restricts access to the class, method, or field within the same package only. A field, method, or inner class with no access modifier specified can be accessed by other classes in the same package. It cannot be accessed by classes in other packages. If no access modifier is specified, the default access modifier is used.

#### Example:

```
class MyClass {  
    void myMethod() {  
    }  
}  
  
public class Main {  
    public static void main(String[] args) {  
        MyClass myObject = new MyClass();  
        myObject.myMethod();  
    }  
}
```

#### Differences:

Here are some differences between Public, Private and Protected Access Modifiers.

Public	Private	Protected
Public members are accessible from anywhere, they can be accessed from within the class, outside the class, and even from other packages or modules.	Private members are accessible only from within the same class in which they are declared. They are not visible to other classes or packages.	Protected members are accessible within the same class and its subclasses. They are also visible to other classes within the same package.
If a class has a public method, it can be called from any other class in the program.	If a class has a private variable, it can only be accessed from within the same class.	If a class has a protected method, it can be accessed from any subclass of that class.