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OOP Lab Exp 8: Access modifiers	Roll No	2019130015
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Aim: Implement a access modifiers

Theory

The access modifiers in Java specifies the accessibility or scope of a field, method, constructor, or class. We can change the access level of fields, constructors, methods, and class by applying the access modifier on it.

There are four types of Java access modifiers:

1. **Private:** The access level of a private modifier is only within the class. It cannot be accessed from outside the class.
2. **Default**: The access level of a default modifier is only within the package. It cannot be accessed from outside the package. If you do not specify any access level, it will be the default.
3. **Protected**: The access level of a protected modifier is within the package and outside the package through child class. If you do not make the child class, it cannot be accessed from outside the package.
4. **Public**: The access level of a public modifier is everywhere. It can be accessed from within the class, outside the class, within the package and outside the package.

	default	private	protected	public
Same Class	Yes	Yes	Yes	Yes
Same package subclass	Yes	No	Yes	Yes
Same package non-subclass	Yes	No	Yes	Yes
Different package subclass	No	No	Yes	Yes
Different package non-subclass	No	No	No	Yes

Code:

Main.java

```java
package main;

import otherpackage.ProductInOtherPackage;

public class Main {
    public static void main(String[] args) {
        // same package
        ChildClass a = new ChildClass();
        a.printAvailableData();
        a.printFromSubClass();

        // new sub-class from different package
        class SubClassOfDiffPackage extends ProductInOtherPackage {
            int price = 12000; // default
            public int rating = 2;
            protected int cost_of_making = 10;
            private int quantity = 30;

            void printSubClass() {
                System.out.println("-----------------------------------------");
                System.out.println("Access from same package, child of the Product class");
                System.out.println("-----------------------------------------");
                System.out.println("private data variable:");
                System.out.println("quantity: ERROR");
                System.out.println("");
                System.out.println("protected data variable");
                System.out.println("cost_of_making: ERROR");
                System.out.println("");
                System.out.println("public data variable");
                System.out.println("rating: " + rating);
                System.out.println("");
                System.out.println("default data variable");
                System.out.println("price: " + price);
                System.out.println("-----------------------------------------");
```

```java
            }

        }
        SubClassOfDiffPackage b = new SubClassOfDiffPackage();
        b.printSubClass();
        // different package class
        ProductInOtherPackage otherPackageObject = new
ProductInOtherPackage();
        System.out.println("---------------------------------------
--");
        System.out.println("Access from same package, child of the
Product class");
        System.out.println("---------------------------------------
--");
        System.out.println("private data variable:");
        System.out.println("quantity: ERROR");
        System.out.println("");

        System.out.println("protected data variable");
        System.out.println("cost_of_making: ERROR");

        System.out.println("");
        System.out.println("public data variable");
        System.out.println("rating: " + otherPackageObject.rating);
        System.out.println("");
        System.out.println("default data variable");
        System.out.println("---------------------------------------
--");
    }
}
```

ChildClass.java

```java
package main;

public class ChildClass extends Product {
    public void printFromSubClass() {
        System.out.println("---------------------------------------
--");
```

```java
        System.out.println("Access from same package, child of the
Product class");
        System.out.println("-------------------------------------
--");
        /*
         * int price = 12000; public int rating = 2; protected int
cost_of_making = 10;
         * private int quantity = 30;
         */
        System.out.println("private data variable:");
        System.out.println("quantity: ERROR");
        System.out.println("");

        System.out.println("protected data variable");
        System.out.println("cost_of_making: " + cost_of_making);
        System.out.println("");
        System.out.println("public data variable");
        System.out.println("rating: " + rating);
        System.out.println("");
        System.out.println("default data variable");
        System.out.println("price: " + price);
        System.out.println("-------------------------------------
--");

    }
}
```

Product.java

```java
package main;

public class Product {
    int price = 12000; // default
    public int rating = 2;
    protected int cost_of_making = 10;
    private int quantity = 30;

    void printAvailableData() {
        System.out.println("-------------------------------------
--");
        System.out.println("Access from the same class");
```

```
        System.out.println("------------------------------------------
--");

        System.out.println("private data variable:");
        System.out.println("quantity: " + quantity);
        System.out.println("");
        System.out.println("protected data variable");
        System.out.println("cost_of_making: " + cost_of_making);
        System.out.println("");
        System.out.println("public data variable");
        System.out.println("rating: " + rating);
        System.out.println("");
        System.out.println("default data variable");
        System.out.println("price: " + price);
        System.out.println("------------------------------------------
--");

    }
}
```

ProductInOtherPackage.java

```java
package otherpackage;

public class ProductInOtherPackage {
    int price = 12000; // default
    public int rating = 2;
    protected int cost_of_making = 10;
    private int quantity = 30;
}
```

Output:

```
-------------------------------------------
Access from the same class
-------------------------------------------
private data variable:
quantity: 30

protected data variable
cost_of_making: 10

public data variable
rating: 2

default data variable
price: 12000
-------------------------------------------
-------------------------------------------
Access from same package, child of the Product class
-------------------------------------------
private data variable:
quantity: ERROR

protected data variable
cost_of_making: 10

public data variable
rating: 2

default data variable
price: 12000
-------------------------------------------
```

```
------------------------------------------
Access from different package, child of the other Package class
------------------------------------------
private data variable:
quantity: ERROR

protected data variable
cost_of_making: ERROR

public data variable
rating: 2

default data variable
price: 12000
------------------------------------------
------------------------------------------
Access from different package
------------------------------------------
private data variable:
quantity: ERROR

protected data variable
cost_of_making: ERROR

public data variable
rating: ERROR

default data variable
price: 12000
------------------------------------------
```

```
----------------------------------------
Access from different package, child of the Product class
----------------------------------------
private data variable:
quantity: ERROR

protected data variable
cost_of_making: ERROR

public data variable
rating: 2

default data variable
price: 12000
----------------------------------------
----------------------------------------
Access from different package
----------------------------------------
private data variable:
quantity: ERROR

protected data variable
cost_of_making: ERROR

public data variable
rating: ERROR

default data variable
price: 12000
----------------------------------------
```

Conclusion

I have learnt and implemented access modifiers. I have also understood how the access change in different packages.

Reference:

https://www.javatpoint.com/access-modifiers