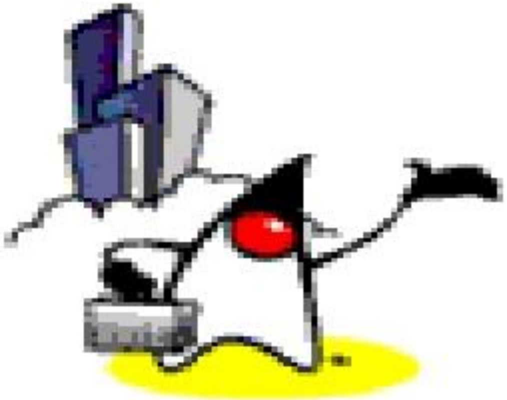


Access Modifiers

Access Modifiers

- Access modifiers specifies who can access them.
- There are four different types of access modifiers in Java:
    - public (Least restrictive)
    - protected
    - private (Most restrictive)
    - default
- The first three access modifiers are explicitly written in the code to indicate the access type, for the fourth one which is default, no keyword is used.
- Usage of these access modifiers is restricted to two levels.
    - class level access modifiers
    - member level access modifiers.

Access Modifiers

- Class level access modifiers:
  - Only two access modifiers are allowed, public and no modifier
  - If a class is ‘public’ then it can be accessed from anywhere.
  - If a class has ‘no modifier’ then it can be accessed only from the same package.
- Member level access modifiers:
  - All four access modifiers are allowed.
  - ‘public’ and ‘no modifier’ are same as above.
  - ‘private’ – accessed by only other members in the same class.
  - ‘protected’ - can be accessed from same package and sub classes in any package.

public accessibility

- public access
  - □ specifies that class members (variables or methods) are accessible to anyone, both inside and outside the class and outside of the package.
  - □ Any object that interacts with the class can have access to the public members of the class.
  - □ Keyword: public

Example: “public” Access Modifer

```
public class StudentRecord {
    //public access to instance variable
    public int name;

    //public access to method
    public String getName(){
        return name;
    }
}
```

protected accessibility

- protected access
  - Specifies that the class members are accessible only to methods in that class and the subclasses of the class.
  - The subclass can be in different packages.
  - This also has friendly(default) access
    Package access + Inherited classes
  - Keyword: protected

Example: “protected” Access Modifier

```
public class StudentRecord {
   //sub-classes can access to instance variable
   protected String name;

   //sub-classes can access to method
   protected String getName(){
     return name;
   }
}
```

default accessibility

- Default access
  - specifies that only classes in the same package can have access to the class' variables and methods
  - no actual keyword for the default modifier; it is applied in the absence of an access modifier.

Example

```
public class StudentRecord {
   //default access to instance variable
   int  name;

   //default access to method
   String getName(){
      return name;
   }
}
```

private accessibility

- private accessibility
    - specifies that the instance members are only accessible by the class they are defined in.
    - Keyword: private

Example: “private” Access Modifier

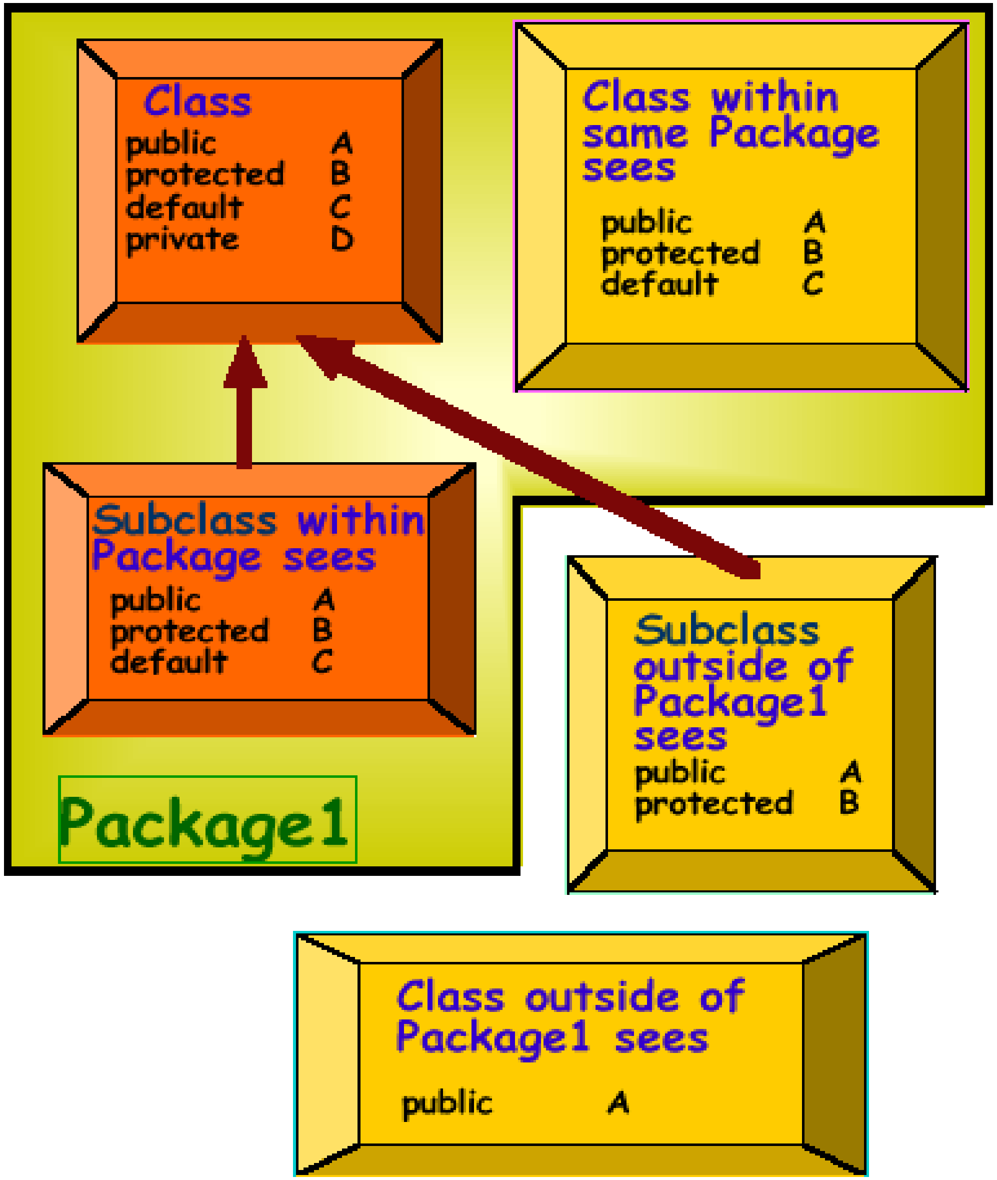
```
public class StudentRecord {
    //private access to instance variable
    private int  name;

    //private access to method
    private String getName(){
        return name;
    }
}
```

Java Program Structure: The Access Modifiers

	Private	No Modifier/ default	Protected	Public
Same Class	Yes	Yes	Yes	Yes
Same package subclass	No	Yes	Yes	Yes
Same package non-subclass	No	Yes	Yes	Yes
Different package subclass	No	No	Yes	Yes
Different package non-subclass	No	No	No	Yes

Access Modifiers



A summary of Java scoping visibility

Coding Guidelines

- The instance variables of a class should normally be declared private, and the class will just provide accessor and mutator methods to these variables.

Labs on the topic

- Prove the accessibility of private, and public
  access modifiers.
  Since we did not complete inheritance and packages
  topic, we will not do practicals on those access specifiers.