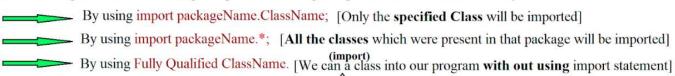
Understanding Java Packages:

- 1) A package consists of similiar types of Classes, Interfaces & Enums
- 2) In java there are '2' types of packages are there





- 3) In Java nearly there are 5000 predefined packages are present.
- 4) In every Java program one package by default it will be imported & that package is java.lang
- 5) We can access the members of one class from another class of same package with out using import statement.
- import' statement is used to connect classes in java application of different packages.
- 7) In every Java program package statement will be the first statement.
- Q) How to access package from another package?
- A) We can import a class from one package into another package in below mentioned '3' ways



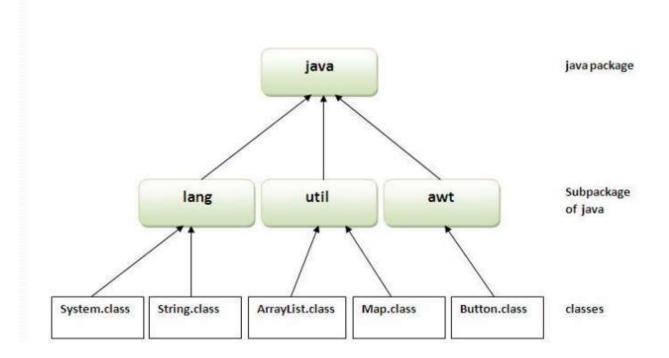
Package in Java

- A package is a group of similar types of classes, interfaces and sub-packages.
- Package can be categorized in two form, built-in package and user-defined package.
- There are many built-in packages such as java, lang, awt, javax, swing, net, io, util, sql etc.
- Java API is having nearly 5000 pre defined packages.
- Package statement will be the first statement in a java program.
- We can access the members of one class from another class of same package.
- 'import' statement is used to connect classes in java application of different packages.

Some Important Packages

Package	Description				
java.lang	Lang stands for 'language', this got primary classes and interfaces essential for developing a basic java program				
java.util	Util stands for 'utility', This package contains useful classes and interfaces like Stack, LinkedList, Hashtable, etc These classes are called collections.				
java.io	Io stands for 'input and output'. This package contains streams.				
java.awt	awt stands for 'abstract window toolkit'. This package helps to develop GUI.				
javax.swing	This package helps to develop GUI like java.awt. The 'x' in javax represents that it is an extended package.				
java.net	net stands for 'network'. Client-Server programming can be done by using this package.				
java.applet	Applets are programs which came from a server into a client and get executed on the client machine on a network.				
java.text	This package has two important classes, DateFormat and NumberFormat.				
java.sql	Sql stands for 'structured query language'. This package helps to connect to databases.				

Structure of a package



Simple example of package

The package keyword is used to create a package.

```
//save as Simple.java

package mypack;

public class Simple
{

public static void main(String args[]) {

System.out.println("Welcome to package");

}
}
```

How to access package from another package?

 There are three ways to access the package from outside the package.

```
✓ import packageName.*;
```

- ✓import packageName.classname;
- ✓ fully qualified Classname

Using packagename.*

- If you use packagename.* then all the classes and interfaces of this
 package will be accessible but not subpackages.
- The import keyword is used to make the classes and interface of another package accessible to the current package.

Using packagename.classname

 If you import packagename.classname then only declared class of this package will be accessible.

```
//save by A.java
package pack;
public class A {
    public void msg() { System.out.println("Hello"); }
}
//save by B.java
package mypack;
import pack.A;

class B {
    public static void main(String args[]) {
        A obj = new A();
        obj.msg();
    }
}
Output:Hello
```

Using fully qualified name

- If you use fully qualified name then only declared class of this package will be accessible.
- Now there is no need to import.

```
//save by A.java
package pack;
public class A {
    public void msg() { System.out.println("Hello"); }
}
//save by B.java
package mypack;
class B {
    public static void main(String args[]) {
        pack.A obj = new pack.A(); //using fully qualified name
        obj.msg();
    }
}
Output:Hello
```

Understanding Access Modifiers

- Access modifiers determine whether other classes can use a particular field or invoke a particular method.
- There are '2' levels of access modifiers.
- 1. At Class level: public & default
- 2. At member level: public, private, protected and default

At Class level:

- If a class is declared as public then that is visible to all the classes everywhere.
- If a class is declared as default (package-private)then that is visible to only within its own package.

At Member level:

 At the member level, we can also use the public or default (package-private) just as with class level, and with the same meaning.

		Dackage			
Modifier	Class	Package	Sub-Class	World	
public	YES	YES	YES	YES	
protected	YES	YES	YES		
default	YES	YES			
private	YES				

PUBLIC:

- If a method, variable or constructor is declared as public then we can access them from anywhere.
- When we are accessing the public member its class also should be public otherwise will be getting compile time error.

DEFAULT:

 If a method, variable or constructor is declared as default then we can access them from current package only. So it is also called "PACKAGE -PRIVATE"

PRIVATE:

- If a method, variable or constructor is declared as private then we can access them in the current class only.
- Private is the most restricted access modifier.
- If a constructor is declared as private we can't create a object for that class in other classes.

PROTECTED:

- If a method, variable or constructor is declared as protected then we can access them with in the current package.
- We can use PROTECTED members outside the package only in child class, and we can access them by using child class reference only not from parent class reference.

```
1 package com.pack1;
                                                             1 package com.pack2;
2
3 public class ClassA
                                                             3 public class ClassX extends ClassA
4 { 5 }
                                                                    new ClassA();
                                                             6
7
                                                             8
"ClassB.java X
🔐 Training ▶ 🚜 src ▶ 🚻 com.pack1 ▶ 🗣 ClassB ▶ 💣 main(String[]) : void
1 package com.pack1;
3 public class ClassB extends ClassA
 4 {
       public static void main(String[] args)
59
6
7 8
            new ClassA();
 9 }
```

```
1 package com.pack1;
                                                          1 package com.pack2;
2
3 public class ClassA
                                                          3 import com.pack1.ClassA;
4 {
                                                          4 public class ClassX extends ClassA
5 6 }
                                                          5 {
                                                                 new ClassA();
                                                          6
7
                                                          7
B Training → B src → H com.pack1 → Q ClassB → M main(String[]): void
1 package com.pack1;
3 public class ClassB extends ClassA
       public static void main(String[] args)
50
7
            new ClassA();
8
9 }
```

```
1 package com.pack1;
                                                         1 package com.pack2;
3 public class ClassA
                                                         3 import com.pack1.ClassA;
4 {
                                                         4 public class ClassX extends ClassA
5
                                                         6
                                                                ClassA aobj=new ClassA();
6 }
                                                         7 }
                                                         8
🔛 Training → 🤔 src → 🏭 com.pack1 → 🧣 ClassB → 💣 main(String()) : void
1 package com.pack1;
3 public class ClassB extends ClassA
                                                                                         1
       public static void main(String[] args)
5e
6
7
           new ClassA();
8
9 }
```

```
1 package com.pack1;
                                                          1 package com.pack2;
 3 public class ClassA
                                                          3 import com.pack1.ClassA;
 4 {
 5
                                                          5 public class ClassX extends ClassA
 6 }
 7
                                                          7
                                                                 ClassA aobj=new ClassA();
                                                          9
ClassB.java X
                                                         10
🔂 Training ▶ 🥵 src ▶ 🏨 com.pack1 ▶ 🧣 ClassB ▶ 💣 main(String[]) : void
 1 package com.pack1;
 3 public class ClassB extends ClassA
        public static void main(String[] args)
 58
 6
 7
            System.out.println("Hi");
 8
 9 }
```

```
1 package com.pack1;
                                                       1 package com.pack2;
                                                       2
3 public class ClassA
                                                       3 import com.pack1.ClassA;
4 {
5
                                                       5 public class ClassX extends ClassA
                                                       6 {
6 }
                                                       7
                                                              ClassA aobj=new ClassA();
                                                       8 }
                                                       9
ClassB.java System.class X
                                                      10
🔂 Training 🕨 🛅 C:\Program Files\Java\jdk-17\lib\jrt-fs.jar 🕨 🖶 java.lang 🕨 🌀 System 🕨
 98 *
 99 * @since 1.0
                                                  Ш
100 */
101 public final class System {
102⊕ /* Register the natives via the static
103
         * The VM will invoke the initPhase1 m
104
          * of this class separate from <clinit
105
106
107
         private static native void registerNat
         static {
108
             registerNatives();
109
 1 package com.pack1;
                                                       1 package com.pack2;
                                                       2
 2
3 public class ClassA
                                                       3 import com.pack1.ClassA;
4 {
                                                      4
 5
                                                        5 public class ClassX extends ClassA
6 }
                                                        6 {
                                                      7
 7
                                                              ClassA aobj=new ClassA();
                                                        8 }
                                                        9
ClassB.java
        System.class X
                                                       10
🔂 Training ▶ 📶 C:\Program Files\Java\jdk-17\lib\jrt-fs.jar ▶ 🌐 java.lang ▶ 🌀 System ▶
  2* * Copyright (c) 1994, 2021, Oracle and/or^
  25 package java.lang;
 26
 27 import java.io.BufferedInputStream;
  28 import java.io.BufferedOutputStream;
 29 import java.io.Console;
  30 import java.io.FileDescriptor;
 31 import java.io.FileInputStream;
  32 import java.io.FileOutputStream;
  33 import java.io.IOException;
  34 import java.io.InputStream;
  35 import java.io.PrintStream;
```

```
1 package com.pack1;
                                                                         package com.pack2;
 3 public class ClassA
                                                                       3
                                                                         public class ClassX
 5⊕
        public void meth1()
                                                                       5
                                                                       6
 6
                                                                         }
 7
            System.out.println("meth1() called");
                                                                       8
 8
 9
   }
ClassB.java X
Training > # src > # com.pack1 > Q ClassB > w main(String()) : void
 3 public class ClassB
 4 {
 58
        public void meth2()
 6
 7
            System.out.println("meth2() called");
                                                                     Console X
 8
                                                                     <terminated> ClassB [Java Application] C:\Pr
        public static void main(String[] args)
 98
                                                                     meth1() called
10
            ClassA aobj=new ClassA();
11
12
             aobj.meth1();
13
14 }
```

```
1 package com.pack1;
                                                                        package com.pack2;
 3 public class ClassA
                                                                        import com.pack1.ClassA; // 1st way
4 {
        public void meth1()
                                                                      5 public class ClassX
 59
 6
            System.out.println("meth1() called");
                                                                      78
                                                                             public static void main(String[] args)
8
                                                                      8
                                                                                  ClassA aobj=new ClassA();
 9 }
                                                                      9
10
                                                                     10
                                                                                 aobj.meth1();
                                                                     11
                                                                     12 }
· 😸 Training ▶ 进 src ▶ 🏨 com.pack1 ▶ 🗣 ClassB ▶ 🌞 meth2() : void
                                                                     13
 3 public class ClassB
                                                                     14
 4 {
5e
        public void meth2()
 6
 7
            System.out.println("meth2() called");
                                                                    Console X
8
                                                                   <terminated> ClassX [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (21-I)
 99
        public static void main(String[] args)
                                                                   meth1() called
10
            ClassA aobj=new ClassA();
11
12
            aobj.meth1();
13
14 }
```

```
1 package com.pack1;
                                                                        package com.pack2;
3 public class ClassA
                                                                      3@import com.pack1.ClassA; // 1st way
4 {
                                                                      4 import com.pack1.ClassB;
        public void meth1()
5e
6
                                                                     6 public class ClassX
            System.out.println("meth1() called");
8
                                                                      88
                                                                            public static void main(String[] args)
9 }
                                                                     9
20
                                                                                 ClassA aobj=new ClassA();
                                                                    10
                                                                                 aobj.meth1();
                                                                    12
🔂 Training ▶ 🕾 src ▶ 🏭 com.pack1 ▶ 🥨 ClassB ▶ ● meth2() : void
                                                                     13
                                                                                 ClassB bobj=new ClassB();
3 public class ClassB
                                                                    14
                                                                                 bobj.meth2();
58
        public void meth2()
                                                                    16 }
6
                                                                    17
            System.out.println("meth2() called");
                                                                    10
8
90
       public static void main(String[] args)
                                                                   <terminated> ClassX [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (21
10
                                                                   meth1() called
            ClassA aobj=new ClassA();
11
                                                                   meth2() called
            aobj.meth1();
12
13
14 }
   package com.pack1;
                                                                       package com.pack2;
1
   public class ClassA
                                                                     3@import com.pack1.ClassA; // 1st way
3
4 {
                                                                     4 import com.pack1.ClassB;
        public void meth1()
 50
6
                                                                       {/import com.pack1.*; // 2nd way
            System.out.println("meth1() called");
8
                                                                       public class ClassX
9 }
10
                                                                            public static void main(String[] args)
                                                                    11
🗓 ClassB.java 🗙
                                                                    12
                                                                                ClassA aobj=new ClassA();
🔂 Training ▶ 📅 src ▶ 🏨 com.pack1 ▶ 😭 ClassB ▶ @ meth2(): void
                                                                    13
                                                                                aobj.meth1();
3 public class ClassB
                                                                    14
4 {
                                                                    15
                                                                                ClassB bobj=new ClassB();
50
        public void meth2()
                                                                    16
                                                                                bobj.meth2();
6
                                                                            }
                                                                    17
            System.out.println("meth2() called");
                                                                    10 1
8
                                                                   Console X
99
       public static void main(String[] args)
                                                                   <terminated> ClassX [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (21-
10
                                                                   meth1() called
11
            ClassA aobj=new ClassA();
                                                                   meth2() called
12
            aobj.meth1();
13
```

It is highly recommended that we should use 1st way if need to import 90 classes too we should go with the 1st way.

```
1 package com.pack1;
                                                                package com.pack2;
                                                                import com.pack1.ClassA; // 1st way *** highly recommended
  public class ClassA
                                                              3
4 {
                                                              4 //import com.pack1.ClassB;
       public void meth1()
50
                                                                //import com.pack1.*; // 2nd way
           System.out.println("meth1() called");
8
                                                                public class ClassX
9 }
                                                              9
                                                                    public static void main(String[] args)
                                                             100
                                                             11
ClassB.java X
                                                             12
                                                                        ClassA aobj=new ClassA();
13
                                                                        aobj.meth1();
3 public class ClassB
                                                             14
4 {
                                                             15
                                                                        com.pack1.ClassB bobj=new com.pack1.ClassB();// 3rd way
       public void meth2()
                                                             16
                                                                        bobj.meth2();
6
                                                             17
           System.out.println("meth2() called");
                                                             18 }
8
       public static void main(String[] args)
90
                                                                                                       Console X
10
                                                            <terminated> ClassX [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (21-Mar-2025, 8:30:43 am – 8:30:49 am) [pid:
11
           ClassA aobj=new ClassA();
                                                            meth1() called
12
           aobj.meth1();
                                                            meth2() called
13
14 }
```

Access Modifiers

```
1 package com.pack1;
                                                                           package com.pack2;
  3 public class ClassA
                                                                           import com.pack1.ClassA;
 4 {
         public void meth1()
                                                                           public class ClassX
 6
                                                                        6
 7
             System.out.println("meth1() called");
                                                                                public static void main(String[] args)
 8
                                                                        8
 98
         public static void main(String[] args)
                                                                        9
                                                                                    ClassA aobj=new ClassA();
10
                                                                       10
                                                                                    aobj.meth1();
11
             new ClassA().meth1();
12
                                                                       12
13 1
                                                                       13
                                                                       14

    ClassB.java 

    X

                                                                       15
🕨 🔛 Training 🕨 🥵 src 🕨 🏭 com.pack1 🕨 👊 ClassB 🕨 💣 main(String[]) : void
 1 package com.pack1;
 3 public class ClassB
 4 {
 50
         public static void main(String[] args)
 6
                                                                      <terminated> ClassX [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (21-M
             ClassA aobj=new ClassA();
                                                                      meth1() called
 8
             aobj.meth1();
```

If access modifier of class is public

If the Access Modifiers of method is declared as public, we can access throughout the project

It means we can access public method in same class

We can access public methods in different classes of same package

We can access public methods in different classes of different packages.

```
1 package com.pack1;
                                                                        package com.pack2;
3 public class ClassA
                                                                        import com.pack1.ClassA;
        private void meth1()
                                                                        public class ClassX
6
                                                                      6 {
            System.out.println("meth1() called");
                                                                             public static void main(String[] args)
                                                                      8
8
98
       public static void main(String[] args)
                                                                      9
                                                                                 ClassA aobj=new ClassA();
                                                                    10
                                                                                 aobj.meth1();
11
            new ClassA().meth1();
                                                                     11
                                                                     12
12
                                                                     13
                                                                     14
🔛 Training 🕨 🕾 src 🕨 🏭 com.pack1 🕨 🚱 ClassB 🕨 🥩 main(String[]) : void
1 package com.pack1;
3 public class ClassB
4 {
       public static void main(String[] args)
                                                                    Console X
                                                                    terminated> ClassA [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (21-f
            ClassA aobj=new ClassA();
            aobj.meth1();
```

If access modifier of class is public

If the Access Modifiers of method is declared as private, we can access only in the same class.

We cannot access private methods in different classes of same package

We cannot access private methods in different classes of different packages.

```
1 package com.pack1;
                                                                    package com.pack2;
 3 public class ClassA
                                                                   import com.pack1.ClassA;
       lvoid meth1()
                                                                   public class ClassX
59
6
7
                                                                        public static void main(String[] args)
           System.out.println("meth1() called");
8
                                                                 8
90
       public static void main(String[] args)
                                                                            ClassA aobj=new ClassA();
10
                                                                            aobj.meth1();
11
           new ClassA().meth1();
                                                                 11
13 1
🔛 Training 🕨 🥵 src 🕨 🏭 com.pack1 🕨 💽 ClassB 🕨
1 package com.pack1;
  public class ClassB
4 {
       public static void main(String[] args)
                                                               Console X
6
           ClassA aobj=new ClassA();
           aobj.meth1();
```

If access modifier of class is public.

If the Access Modifiers of method is declared as default(package-private), we can access in the same class.

We can access default methods in different classes of the same package

We cannot access default methods in different classes of different packages.

```
1 package com.pack1;
                                                                     1 package com.pack2;
3 public class ClassA
                                                                       import com.pack1.ClassA;
4 {
        protected void meth1()
                                                                       public class ClassX extends ClassA
                                                                            public static void main(String[] args)
            System.out.println("meth1() called");
       public static void main(String[] args)
                                                                                ClassA aobj=new ClassA();
90
10
                                                                    10
                                                                                //aobj.meth1();
11
            new ClassA().meth1();
                                                                                new ClassX().meth1();
12
                                                                    12
                                                                    13
                                                                    14 }
ClassB.java X
                                                                    15
Fraining ▶ # src ▶ # com.pack1 ▶ Q ClassB ▶
                                                                    16
1 package com.pack1;
3 public class ClassB
        public static void main(String[] args)
                                                                   terminated> ClassX [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (21-
            ClassA aobj=new ClassA();
            aobj.meth1();
8
```

If access modifier of class is public.

If the Access Modifier of a method is declared as protected, we can access in the same class.

We can access protected methods in different classes of the same package

We can access protected methods in different classes of different packages, by using inheritance we should use extends concept.

```
1 package com.pack1;
                                                                     1 package com.pack2;
   class ClassA
                                                                     3 import com.pack1.ClassA;
 4 {
 50
        public void meth1()
                                                                   5 public class ClassX extends ClassA
 6
            System.out.println("meth1() called");
                                                                      78
                                                                             public static void main(String[] args)
 8
                                                                      8
 90
        public static void main(String[] args)
                                                                     9
                                                                                 ClassA aobj=new ClassA();
                                                                                 //aobj.meth1();
10
                                                                    10
11
            new ClassA().meth1();
                                                                    11
                                                                    12
                                                                                 //new ClassX().meth1();
10
                                                                             }
                                                                    13
                                                                    14 }
A ClassB.iava X
                                                                    15
Fraining Free src Free com.pack1 F Q ClassB F
                                                                    16
 1 package com.pack1;
3 public class ClassB
4 {
 50
        public static void main(String[] args)
                                                                    Console X
 6
                                                                    <terminated> ClassX [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (21-l
            ClassA aobj=new ClassA();
8
            aobj.meth1();
```

If access modifier of a class is default.

Access modifier of a method is public.

We cannot import the class into different packages.

```
1 package com.pack1;
                                                                      package com.pack2;
   public class ClassA
                                                                      import com.pack1.ClassA;
4
       public void meth1()
                                                                      public class ClassX extends ClassA
            System.out.println("meth1() called");
                                                                           public static void main(String[] args)
Qe.
       public static void main(String[] args)
                                                                               ClassA aobj=new ClassA();
10
                                                                   10
                                                                               //aobj.meth1();
11
           new ClassA().meth1();
                                                                               new ClassX().meth1();// Accessing Protected method from a
12.1

    Training → 
    Src → 
    com.pack1 → 
    ClassB →

                                                                   16 //private < default < protected < public
1 package com.pack1;
  public class ClassB
       public static void main(String[] args)
                                                                                                               <terminated> ClassX [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (21-Mar-2025, 8:55:21 am - 8:55:22 am) [pid: 9
           ClassA aobj=new ClassA();
            aobj.meth1();
```

```
1 package com.pack1;
                                                             package com.pack2;
  public class ClassA
                                                          3 import com.pack1.ClassA;
4 {
50
       protected void meth1()
                                                          5 public class ClassX extends ClassA
                                                          6 {
6
            System.out.println("meth1() called");
                                                                 public static void main(String[] args)
       public static void main(String[] args)
                                                          8
                                                          9
98
                                                                     ClassA aobj=new ClassA();
1.0
                                                          10
                                                                      //aobj.meth1();
                                                         11
11
            new ClassA().meth1();
                                                         12
                                                                      new ClassX().meth1();
12
                                                         13
14
13 }
                                                                     // Accessing Protected method from another package
14
15
                                                         15 }
                                                         16
16
                                                         17 //private < default < protected < public
17
18
19
20
21
                                                                                                                - × % - 1
                                                         ☐ Console ×
22
                                                         <terminated> ClassX [Java Application] C:\Program Files\Java\jdk-17\bin\javav.exe (21-Mar-2025, 8:55:21 am – 8:55:22
23
```

Private < default < protected < public