

## Implementation of Packages in Java

### Aim:

Write a Java program to implement built-in, user-defined packages and accessing all classes in a package.

### PRE LAB EXERCISE

#### QUESTIONS

1. What is java.util package and what collection framework does it contain?
  - The java.util package provides utility classes for data structures and other helper functions.
  - It contains the **Java Collections Framework**, which includes interfaces like **List, Set, Queue, and Map** (e.g., ArrayList, HashSet, HashMap) to store and manage data efficiently.
2. What are the two types of packages in Java?
  - **Built-in Packages** – Provided by Java (e.g., java.lang, java.util).
  - **User-defined Packages** – Created by programmers using the package keyword.

### IN LAB EXERCISE

#### Objective

To understand and implement the concepts of built-in, user-defined packages and accessing all classes in a package in Java.

**Built-in Packages** comprise a large number of classes that are part of the Java API. Some of the commonly used built-in packages are:

- java.lang: Contains language support classes(e.g, classes that define primitive data types, math operations). This package is automatically imported.
- java.io: Contains classes for supporting input/output operations.
- java.util: Contains utility classes that implement data structures such as Linked Lists and Dictionaries, as well as support for date and time operations.
- java.applet: Contains classes for creating Applets.

- java.awt: Contains classes for implementing the components for graphical user interfaces (like buttons, menus, etc).

### Source Code

```
import java.util.Random; // built-in package

public class Sample{

    public static void main(String[] args) {

        // using Random class

        Random rand = new Random();

        // generates a number between 0–99

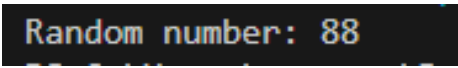
        int number = rand.nextInt(100);

        System.out.println("Random number: " + number);

    }

}
```

### Output



```
Random number: 88
```

**User-defined Packages** are the packages that are defined by the user.

### Source code

```
package com.myapp;

public class Helper {

    public static void show() {

        System.out.println("Hello from Helper!");

    }

}
```

==To use this in another class==

```
import com.myapp.Helper;

public class Test {

    public static void main(String[] args) {

        Helper.show();

    }

}
```

### Output:



**//Importing all classes from a package.**

### Source code

```
import java.util.Vector;

public class Coders {

    public Coders() {

        // java.util.Vector is imported, We are able to access it directly in our code.

        Vector v = new Vector();

        java.util.ArrayList l = new java.util.ArrayList();

        l.add(3);

        l.add(5);

        l.add(7);

        System.out.println(l);

    }

    public static void main(String[] args) {

        new Coders();

    }

}
```

### Output



### POST LAB EXERCISE

1. What will happen if two classes in different packages have the same name and are imported in a Java file?

If two classes with the same name from different packages are imported, it causes a **compile-time ambiguity error**.

To resolve this, you must use the **fully qualified class name** (package name + class name).

2. What is the purpose of using packages in Java?

Packages are used to:

- Organize related classes and interfaces
- Avoid naming conflicts
- Improve code reusability and maintainability
- Provide access protection

3. Which built-in Java package would you use if you want to create a GUI window and display a message?

- A. java.util
- B. java.sql
- C. java.awt
- D. java.net

**Answer: C. java.awt**

It contains classes for creating graphical user interface components like windows, buttons, and labels.

## ASSESSMENT

| Description              | Max Marks | Marks Awarded |
|--------------------------|-----------|---------------|
| Pre Lab Exercise         | 5         |               |
| In Lab Exercise          | 10        |               |
| Post Lab Exercise        | 5         |               |
| Viva                     | 10        |               |
| <b>Total</b>             | <b>30</b> |               |
| <b>Faculty Signature</b> |           |               |