Experiment Number : 8 **Date:**

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 is a built-in package in Java that provides a collection of utility classes and interfaces used for data manipulation and general programming tasks. It includes classes for handling data structures, date and time operations, random number generation, string tokenizing, and user input through the Scanner class. One of the most important parts of the java.util package is the Java Collection Framework, which provides a standardized architecture to store and manage groups of objects. The Collection Framework includes interfaces such as List, Set, Queue, and Map, along with their implementation classes like ArrayList, LinkedList, Vector, HashSet, TreeSet, HashMap, and TreeMap. These classes help programmers efficiently store, retrieve, and manipulate data.

2. What are the two types of packages in Java?

There are two types of packages in Java: built-in packages and user-defined packages. Built-in packages are predefined packages that are provided by Java to support various functionalities such as input/output operations, networking, utilities, and data handling. Examples include java.lang, java.util, and java.io. User-defined packages are packages created by programmers to organize their own classes and interfaces. They help in structuring large programs, avoiding name conflicts, and improving code reusability and maintainability.

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: 34

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:

Hello from Helper!

```
Hello from Helper!
```

//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

[3,5,7]

```
[3, 5, 7]
```

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 into the same Java file, it will cause a compile-time error due to ambiguity. The compiler will not be able to determine which class is being referred to when the class name is used. To resolve this issue, the programmer must use the fully qualified class name (including the package name) instead of importing both classes. This removes the ambiguity and clearly specifies which class should be used.

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

The purpose of using packages in Java is to organize related classes and interfaces into a structured hierarchy. Packages help avoid name conflicts between classes, improve code readability, and make large applications easier to manage. They also provide access protection and better maintainability by grouping related functionalities together. By using packages, programmers can create modular and reusable code.

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

- java.util
- java.sql
- java.awt
- java.net

The correct answer is **java.awt**. The java.awt package contains classes for creating graphical user interface (GUI) components such as windows, buttons, labels, and text fields. It provides the basic tools needed to design and display GUI applications in Java.

ASSESSMENT

Description	Max Marks	Marks Awarded
Pre Lab Exercise	**5**	
In Lab Exercise	**10**	
Post Lab Exercise	**5**	
Viva	**10**	
Total	**30**	
Faculty Signature		