

St. Francis Institute of Technology, Mumbai-400 103  
**Department Of Information Technology**

A.Y. 2020-2021

Class: SE-ITA/B, Semester: III

Subject: **Java Labs**

**Experiment-5: Java Program to create and use Packages .**

**1. Aim:**

- i. Create a class "Amount In Words" within a user defined package to convert the amount into words. (Consider amount not to be more than 100000).
- ii. Write a program to create user defined packages.

**2. Prerequisite:** Knowledge creating and using Packages in Java.

**3. Requirements:** Personal Computer (PC), Windows Operating System, Net beans 8.0.

**4. Pre-Experiment Exercise:**  
**Theory:**

**a. Packages:**

A package in Java is used to group related classes. Think of it as a folder in a file directory. We use packages to avoid name conflicts, and to write a better maintainable code. Packages are divided into two categories:

- Built-in Packages (packages from the Java API)
- User-defined Packages (create your own packages)

**Syntax for using built-in packages:**

```
import package.name.Class; //imports a single class from the package
import package.name.*; //imports the whole package
```

**Syntax for creating user defined packages:**

```
create packagename;
```

**5. Laboratory Exercise**

**A. Procedure**

- i. Open Notepad++.
- ii. Type the code and save it.
- iii. Open cmd and explore till the folder where the code resides..
- iv. To compile the code use: `javac -d . classname.java`
- v. To run the code use: `java package.classname`

**B. Program code with comments:**

Write and execute your program code to achieve the given aim and attach it **with your own comments with neat indentation.**

## **6. Post-Experiments Exercise**

### **A. Extended Theory:**

1. Explain some of the built-in packages used for Java.
2. Explain the benefits of using packages in Java.

### **B. Results/Observations/Program output:**

Present the program input/output results and comment on the same.

### **C. Questions/Programs:**

1. Write a Java Program using static import.

### **D. Conclusion:**

1. Write what was performed in the experiment/program.
2. What is the significance of experiment/program?
3. Mention few applications of what was studied.

### **E. References**

1. Balguruswamy, "Programming with java A primer", Fifth edition, Tata McGraw Hill Publication.
2. Let Us Java-Yashwant Kanetkar.
3. Learn to Master JAVA, from Star EDU solutions , by ScriptDemics.
4. Java 8 Programming-Black Book,by-Dreamtech Publications.
5. [www.programmingsimplified.com](http://www.programmingsimplified.com)

### Program 1:

```
/**
 * Create a class "Amount In Words" within a user defined package to convert
 * the amount into words. (Consider the amount not to be more than 100000).
 */
package amtInWords;

import java.util.Scanner;
class amountInWords{

    private static String one[] = { "", "one ", "two ", "three ", "four ", "five ", "six ", "seven ", "eight ", "nine ", "ten ", "eleven ", "twelve ", "thirteen ", "fourteen ", "fifteen ", "sixteen ", "seventeen ", "eighteen ", "nineteen " };
    private static String ten[] = { "", "", "twenty ", "thirty ", "forty ", "fifty ", "sixty ", "seventy ", "eighty ", "ninety " };

    // n is 1-digit number or 2-digit number
    public String numToWords(int n, String s)
    {
        String str = "";
        // if n is more than 19, divide it
        if (n > 19) {
            str += ten[n / 10] + one[n % 10];
        }
        else {
            str += one[n];
        }

        // if n is non-zero
        if (n != 0) {
            str += s;
        }

        return str;
    }

    // Function to return a given number in words
    public String convertToWords(int n)
    {
        //For 0
    }
```

```

        if (n == 0) {
            return "The number " + n + " in words is zero";
        }
        //if number is greater than 100000
        else if(n > 100000){
            return "Number cannot be greater than 100000";
        }
        else{
            // stores word representation of given number n
            String out = "";

            // handles digits at hundred thousands and one
            // millions places (if any)
            out += numToWords((int)((n / 100000) % 100), "lakh ");

            // handles digits at thousands and tens thousands
            // places (if any)
            out += numToWords((int)((n / 1000) % 100), "thousand ");

            // handles digit at hundreds places (if any)
            out += numToWords((int)((n / 100) % 10), "hundred ");

            if (n > 100 && n % 100 > 0) {
                out += "and ";
            }

            // handles digits at ones and tens places (if any)
            out += numToWords((int)(n % 100), "");

            return "The number " + n + " in words is " + out;
        }
    }
}

// Driver code
public class Exp5_1 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        //Taking input from user

```

```

        System.out.println("Enter the number you want to convert to words:");
        int num = scanner.nextInt();

        //Object of class amountInWords
        amountInWords amt = new amountInWords();

        //Displaying the result
        System.out.printf(amt.convertToWords(num));
        scanner.close();
    }
}

```

Output:

```

D:\College\JAVA\Experiments\Exp5\amtInWords>javac -d . Exp5_1.java

D:\College\JAVA\Experiments\Exp5\amtInWords>java amtInWords.Exp5_1
Enter the number you want to convert to words:
1234
The number 1234 in words is one thousand two hundred and thirty four
D:\College\JAVA\Experiments\Exp5\amtInWords>java amtInWords.Exp5_1
Enter the number you want to convert to words:
100000
The number 100000 in words is one lakh
D:\College\JAVA\Experiments\Exp5\amtInWords>java amtInWords.Exp5_1
Enter the number you want to convert to words:
0
The number 0 in words is zero
D:\College\JAVA\Experiments\Exp5\amtInWords>java amtInWords.Exp5_1
Enter the number you want to convert to words:
12
The number 12 in words is twelve
D:\College\JAVA\Experiments\Exp5\amtInWords>java amtInWords.Exp5_1
Enter the number you want to convert to words:
10000000
Number cannot be greater than 100000
D:\College\JAVA\Experiments\Exp5\amtInWords>java amtInWords.Exp5_1
Enter the number you want to convert to words:
13970
The number 13970 in words is thirteen thousand nine hundred and seventy
D:\College\JAVA\Experiments\Exp5\amtInWords>

```

## Program 2:

```
//Write a program to create user defined packages.
```

```
package figures;
public class squarePerimeter
{
    public int side;
    public void calc()
    {
        int peri=4*side;
        System.out.println("Perimeter is: "+peri);
    }
}
```

```
package geometry;
public class squareArea {
    public int side;
    public void calc()
    {
        int area=side*side;
        System.out.println("Area is: "+area);
    }
}
```

```
package calculate;
import geometry.squareArea;
import figures.squarePerimeter;
public class calSqDetails {
    public static void main(String[] args)
    {
        figures.squarePerimeter p = new figures.squarePerimeter();
        geometry.squareArea a1 = new geometry.squareArea();
        a1.side=5;
        a1.calc();
        p.side=5;
        p.calc();
    }
}
```

Output:

```
D:\College\JAVA\Experiments\Exp5>javac -d . squarePerimeter.java
D:\College\JAVA\Experiments\Exp5>javac -d . squareArea.java
D:\College\JAVA\Experiments\Exp5>javac -d . calSqDetails.java
D:\College\JAVA\Experiments\Exp5>javac -d .. calSqDetails.java
D:\College\JAVA\Experiments\Exp5>java calculate.calSqDetails
Area is: 25
Perimeter is: 20
D:\College\JAVA\Experiments\Exp5>
```

Question:

Question 1:

```
/**
 * 1. Write a Java Program using static import.
 */

import static java.lang.Math.*;
import static java.lang.System.*;

public class Question {
    public static void main(String[] args)
    {
        // We are calling static member of System class
        // directly without System class name
        out.println(sqrt(4));
        out.println(pow(2, 2));
        out.println(abs(6.3));
    }
}
```

Output:

```
D:\College\JAVA\Experiments\Exp5>javac Question.java

D:\College\JAVA\Experiments\Exp5>java Question
2.0
4.0
6.3

D:\College\JAVA\Experiments\Exp5>
```



## 6] Post Experiment Exercise

### A) Extended Theory

1) Explain some of the built in packages in Java.  
Package in Java is a mechanism to encapsulate a group of classes, sub-classes & interfaces which are part of Java API.

(i) `java.lang` :- contains language support classes which define primitive data types, math operations. This package is automatically imported.

(ii) `java.io` :- contains classes for supporting input output operations.

(iii) `java.util` :- contains utility classes which implement data structures like linked list, dictionary.

(iv) `java.applet` :- contains classes for creating applets.

(v) `java.awt` :- contains classes for implementing the components for graphical user interface.

(vi) `java.net` :- contains classes for supporting networking operations.

2) Explain the benefits of using packages in Java.  
The benefits of using packages in Java are as :-  
(i) Programmers can define their own packages i.e. a group of classes/interfaces etc.



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- (ii) It is a good practice to group related classes implemented by you so that a programmer can easily determine that the classes, interfaces, enumerations & annotations are related.
- (iii) Since the package creates a new namespace there won't be any name conflict with names in other packages.
- (iv) Using package it is easier to provide access control.

### Q3 Conclusion :-

In this we have studied how packages are implemented in Java by ~~with~~ writing programs that implement the concept of packages.

Packages allow programmers to bundle a group of classes. \* This is a good practice as it makes our code more manageable and readable.

While creating a Java package we should keep in mind that the package statement should be the first line in the source file. There can be only one package statement in each source file. Packages provide access protection & it removes naming collision.