JAVA Packages and User Inputs

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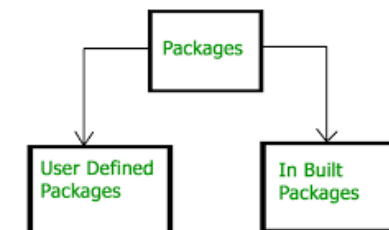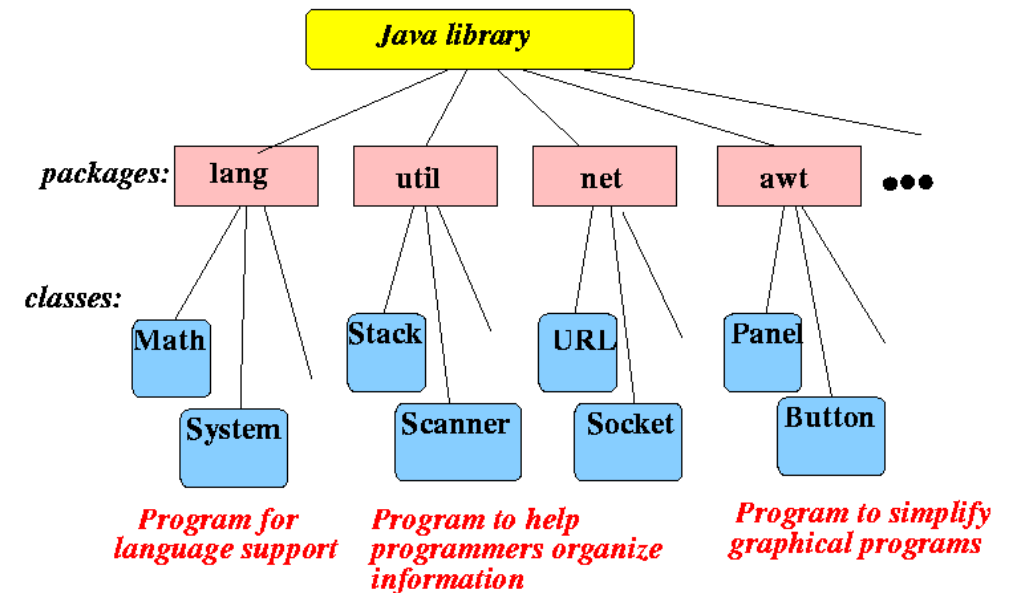
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Java Packages & Application Programming Interface (API)

▶ 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 (we can create your own packages)

Built-in Packages

▶ The **Java API is a library of prewritten classes**, that are **free to use**, included in the Java Development Environment (JDE).

▶ The **library contains components** for
  ▶ managing input, database programming, and much much more.

▶ The complete list can be found at Oracles website: https://docs.oracle.com/javase/8/docs/api/.

▶ The library is divided into **packages** and **classes**.

▶ Meaning you can **either import a single class** (along with its methods and attributes), or a **whole package that contain all the classes that belong to the specified package.**

▶ To use a class or a package from the library, you need to use the import keyword:

Syntax

import *package*.*name*.*Class*; // Import a single class
import *package*.*name*.*; // Import the whole package

Import a Class

If you find a class you want to use, for example, the Scanner class, **which is used to get user input**, you need to write the following code:

Example

```
import java.util.Scanner;

class MyClass
{
        public static void main(String[] args)
        {
                Scanner myObj = new Scanner(System.in);
                System.out.println("Enter username");
                String userName = myObj.nextLine();
                System.out.println("Username is: " + userName);

        }
}
```

In the above, **java.util is a package**,
             while **Scanner is a class of the java.util** package.

To use the Scanner class, we need to **create an object of the class** and **use any of the available methods found in the Scanner class** documentation.

In this example, we use the nextLine() method, which is used to read a complete line

```
Enter username
Spidey
Username is: Spidey
```

Import a package

There are many packages to choose from.
In the previous example, we used the Scanner class from the java.util package.
This package also contains date and time facilities, random-number generator and other utility classes.

To import a whole package, end the sentence with an asterisk sign (*).
The following example will import ALL the classes in the java.util package:

Example
import java.util.*;

This will only import the Scanner Class
import java.util.Scanner;

User Defined Packages

To create own package, you must understand that Java uses a file system directory to store them.
Just like folders on our computer:
Example

```
└── root
        └── mypack
                └── MyPackageClass.java
```

To create a package, we use the package keyword:

MyPackageClass.java

```java
package mypack;
class MyPackageClass
{
            public static void main(String[] args)
            {
                        System.out.println("This is my package!");
            }
}
```

Save the file as **MyPackageClass.java**, and compile it:

C:\Users*Your Name*>javac MyPackageClass.java

Then compile the package:

C:\Users*Your Name*>javac -d . MyPackageClass.java

This forces the compiler to create the "mypack" package.

The -d keyword specifies the destination for where to save the class file.

You can use any directory name, like c:/user (windows), or, if you want to keep the package within the same directory, you can use the dot sign ".".

Note 1: The package name should be written in lower case to avoid conflict with class names.

Note 2: When we compiled the package in the example above, a new folder was created, called "mypack".

User Input

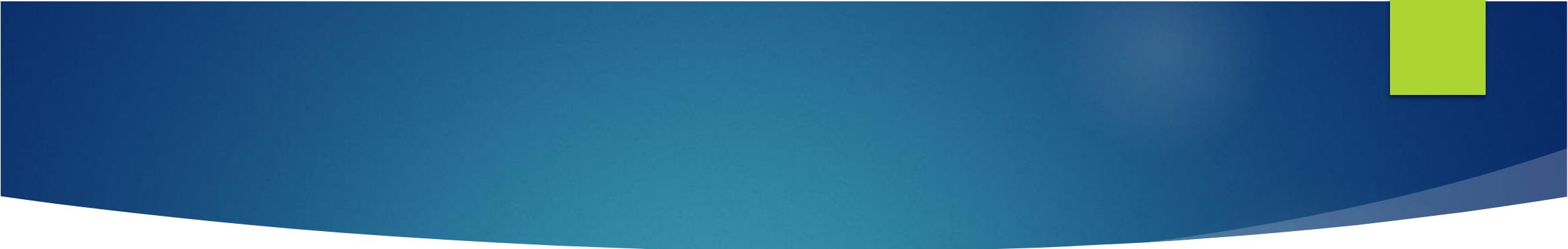The Scanner class is used to get user input, and it is found in the java.util package.
To use the Scanner class, we have to create an object of the class and use any of the available methods found in the Scanner class documentation.

```java
import java.util.Scanner; // Import the Scanner class

class Main {
        public static void main(String[] args)
        {
                Scanner myObj = new Scanner(System.in); // Create a Scanner object
                System.out.println("Enter username");

                String userName = myObj.nextLine(); // Read user input
                System.out.println("Username is: " + userName); // Output user input
        }
}
```

```
Enter username
Spidey
Username is: Spidey
```

Method	Description
nextBoolean()	Reads a boolean value from the user
nextByte()	Reads a byte value from the user
nextDouble()	Reads a double value from the user
nextFloat()	Reads a float value from the user
nextInt()	Reads a int value from the user
nextLine()	Reads a String value from the user
nextLong()	Reads a long value from the user
nextShort()	Reads a short value from the user

```java
import java.util.Scanner;

class Main
{        public static void main(String[] args)

        {        Scanner myObj = new Scanner(System.in);

                System.out.println("Enter name:");

                String name = myObj.nextLine();

                        System.out.println("Enter age:");

                        int age = myObj.nextInt();

                                System.out.println("Enter salary:");

                                double salary = myObj.nextDouble();

                // Output input by user

                System.out.println("Name: " + name);

                System.out.println("Age: " + age);

                System.out.println("Salary: " + salary);

}}
```

Program in JAVA to input the name, age and salary (separately) and print them

```
Enter name:Alice
Enter age:18
Enter salary:
2500
Name: Alice
Age: 18
Salary: 2500.0
```

Program in JAVA to input the name, age and salary (together) and print them

```java
import java.util.Scanner;

class Main
{
        public static void main(String[] args)
        {
                Scanner myObj = new Scanner(System.in);
                System.out.println("Enter name, age and salary:");
                // String input
                String name = myObj.nextLine();
                // Numerical input
                int age = myObj.nextInt();
                double salary = myObj.nextDouble();
                // Output input by user
                System.out.println("Name: " + name);
                System.out.println("Age: " + age);
                System.out.println("Salary: " + salary);
        }
}
```

```
Enter name, age and salary:Alice
18
2500
Name: Alice
Age: 18
Salary: 2500.0
```

```java
import java.util.Scanner;

public class Main {
 public static void main(String[] args)
{
   int i,n=0,s=0; //variable i acts as index, variable n is used to scan in the numbers and variable s is used to find the sum
        double avg; //variable avg is used to calculate the average
        {
          System.out.println("Input the 5 numbers : ");
        }
                for (i=0;i<5;i++)
                {
                    Scanner in = new Scanner(System.in);
                    n = in.nextInt();
                    s +=n;}
        avg=s/5;
        System.out.println("The sum of 5 no is : " +s+"\nThe Average is : " +avg);
}}
```

```
Input the 5 numbers : 1
2
3
4
5
The sum of 5 no is : 15
The Average is : 3.0
```

```java
import java.util.Scanner;
public class Main  {

        public static void main(String[] args)  {

                Scanner sc = new Scanner(System.in);

                System.out.print("Please enter the number of strings you want to enter: ");

                //takes an integer input

                String[] string = new String [sc.nextInt()];

                //consuming the <enter> from input above

                sc.nextLine();

                for (int i = 0; i < string.length; i++)   {

                        string[i] = sc.nextLine();  }

                System.out.println("\nYou have entered: ");

                //for-each loop to print the string

                for(String str: string)   {

                        System.out.println(str); }

} }
```

```
Please enter the number of strings you want to enter: 3
Alice
Bob
Chai
You have entered:
Alice
Bob
Chai
```