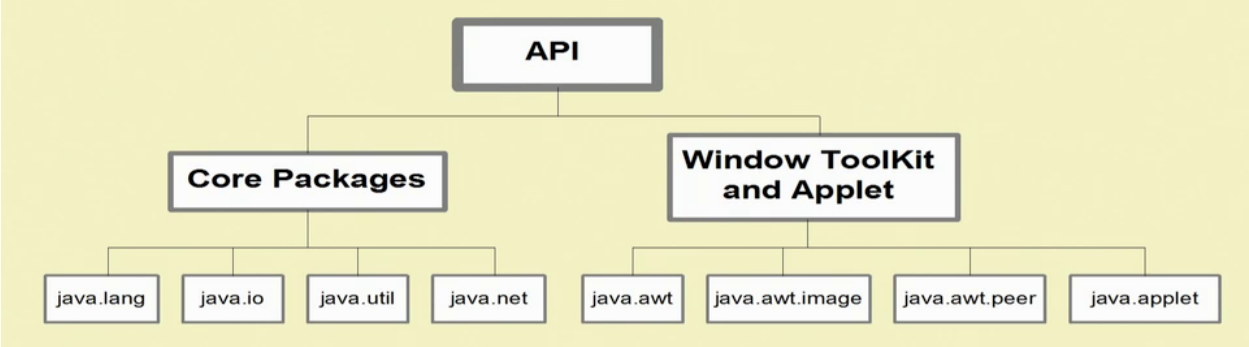
Unit II Part C

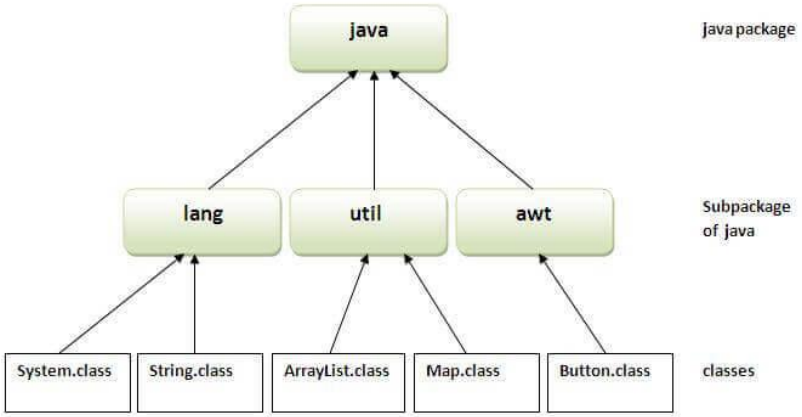
Java Package

A **java package** is a group of similar types of classes, interfaces and sub-packages.
Package in java 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.



Advantage of Java Package

1) Java package is used to categorize the classes and interfaces so that they can be easily maintained.
2) Java package provides access protection.
3) Java package removes naming collision.



Package Declaration:

Package declaration is file based

- All classes in the same source file belong to the same package.
- Each source file may contain an optional package declaration in the following form.

```
package <PackageName>;
```

Finding-Packages and classpath

Packages are mirrored directories **i.e.** the source program and the generated **.class** file are saved in the folders which have the same name similar to the package name.
There are three ways how java run-time system find a package in Java program.
First: By default the java run-time system considers the current directory which you are working as starting directory and checks for the package defined and finds it if it is present that directory.
Second: To specify the directory path by setting the **CLASSPATH** environment variable.
Third: Using -classpath option while compiling and running the java program to specify the path to your classes.

Access Protection

Java addresses four categories visibility for class member.

1. Subclass in same package.
2. Non subclass in same package
3. Subclasses in different packages
4. Classes that are neither in same package nor subclasses.

There are three access modifier private, protected and public. And one default access modifier we don't write anything for default. That provide a variety of ways to produce the many levels of access required by these categories.

	Private	No Modifier	Protected	Public
Same class	Yes	Yes	Yes	Yes
Same package subclass	No	Yes	Yes	Yes
Same package non-subclass	No	Yes	Yes	Yes
Different package subclass	No	No	Yes	Yes
Different package non-subclass	No	No	No	Yes

Simple example of java package

The **package keyword** is used to create a package in java.

Example

```
package mypackage;
public class myClass
{
        public void msg()
        {
                System.out.println("Class: Hello! ");
        }
}
```

Save this file myClass.java

```
package mypackage;
```

```
public class myClass2
{
	public void msg()
	{
		System.out.println("Class2: Hello! ");
	}
}
```

Save this file as my Class 2.java

Save both the file in a subdirectory mypackage into current directory.

```
import mypackage.myClass;
class PackageDemo
{
	public static void main(String args[])
	{
		myClass obj=new myClass();
		obj.msg();
	}
}
```

Save, Compile and run this PackageDemo.java file to access the user defined package mypackage.

```
import mypackage.*;
class PackageDemo2
{
	public static void main(String args[])
	{
		myClass obj1=new myClass();
		obj1.msg();
		myClass2 obj2=new myClass2();
		obj2.msg();
	}
}
```

Save, Compile and run this PackageDemo2.java file to access both the classes from user defined package mypackage.

Example

```
package mypack;
public class Balance
{
```

```
        String name;
        double bal;
        public Balance(String n,double b)
        {
                name=n;
                bal=b;
        }
        public void show()
        {
                if(bal<0)
                        System.out.println("Account is dead");
                else
                        System.out.println(name+" : $ "+bal);

        }
}
```

Save this file Balance.java in mypack subdirectory and compile it.

```
import mypack.Balance;
class AccountBalance
{
        public static void main(String args[])
        {
                Balance current[]=new Balance[3];
                current[0]=new Balance("Tom", -12.33);
                current[1]=new Balance("Herry", 90.33);
                current[2]=new Balance("Jery", 101.33);
                for(int i=0;i<3;i++)
                        current[i].show();
        }
}
```

Save, Compile and run this AccountBalance.java file to access the user defined package mypack.