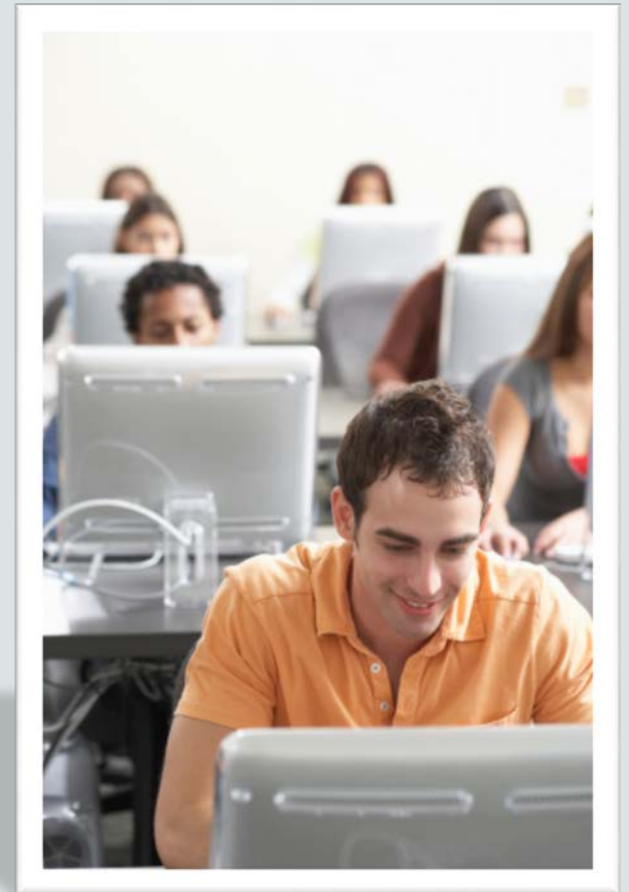




# Java Foundations

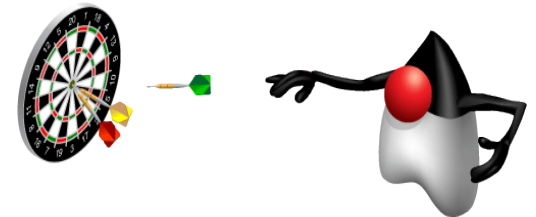
4-2

The import Declaration and Packages



# Objectives

- This lesson covers the following objectives:
- Access a class by using its fully qualified name
- Describe the function of the `import` statement
- Use the `import` statement to access a class in a package
- Understand the purpose of an asterisk in an `import` statement
- Identify packages that are automatically imported



# Topics

- Accessing classes by using a fully qualified name
- Using the `import` statement

What is a Method?

The `import` Declaration and Packages

The `String` Class

The `Random` Class

The `Math` Class



Section 4

# Why Should You Reinvent the Wheel?

- Frequently, you may rewrite the same Java code for different programs.
- As an alternative to rewriting the same code, you can use the Java-provided library, which organizes frequently used code.
- This library is called as Java class library.
- The Java class library documentation is available here:
  - <https://docs.oracle.com/javase/8/docs/api/>

# Packages in the Java Class Library

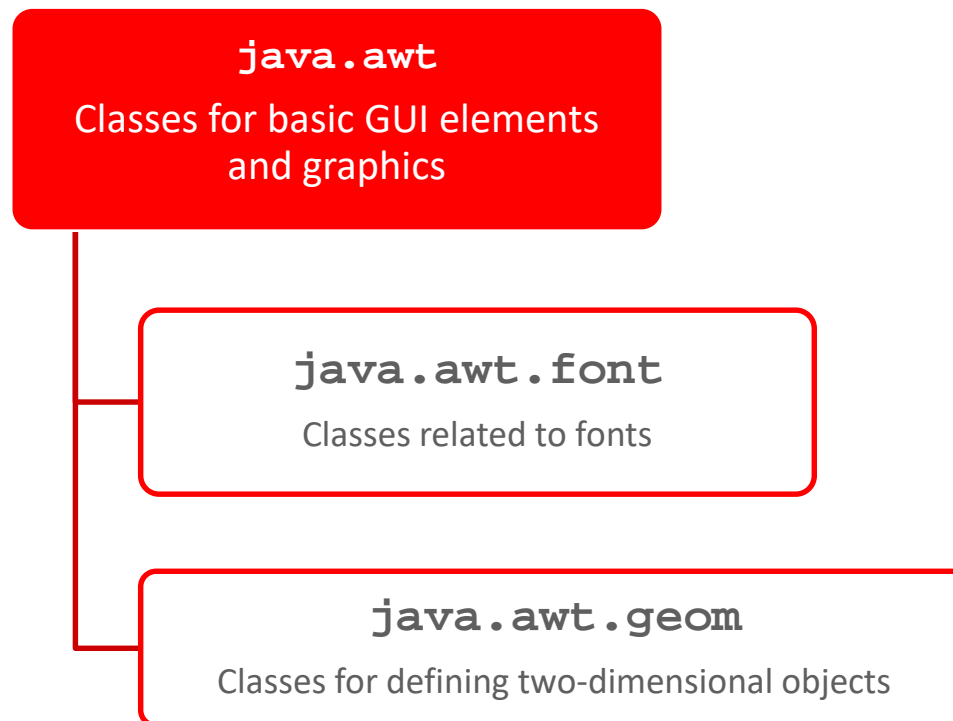
- The classes of the Java class library are organized into packages.
- A package contains a group of related classes.
- With a package, it becomes easier to locate the related classes.

# Packages in the Java Class Library

Package	Purpose
<code>java.lang</code>	Provides classes that are fundamental to the design of the Java language
<code>javax.swing</code>	Provides classes to build GUI components
<code>java.net</code>	Provides classes for networking applications
<code>java.time</code>	Provides classes for dates, times, instants, and durations

# How Are the Packages Organized?

The vast collection of classes are organized into a tree-like hierarchy, which allows packages to be divided into subpackages, like this:





# Using a Class from a Package

- To use a class from a package in your program, you need to specify its fully qualified name.
- For example, to use the `Scanner` class to read a keyboard input, the fully qualified name for the `Scanner` class, which is defined in the `java.util` package, is

`java.util.Scanner`

Package                      Class Name

# Using the Fully Qualified Class Name

```
public static void main(String[] args) {  
    int num;  
    java.util.Scanner keyboard = new java.util.Scanner(System.in);  
    System.out.print("Enter a number");  
    num = keyboard.nextInt();  
    System.out.print("The number you entered is" + num);  
}
```

Fully Qualified Class Name

- As you can see, using the fully qualified name creates very long names for classes.
- Long names reduce the readability of the code and also make coding difficult.

# Is There an Alternative to the Fully Qualified Name?

- Suppose that you have a friend whose name is Santi Inez Luis Vidal.
  - How tedious is it to call him by his full name every time?
  - If you could simply refer to him as “Santi,” it would be so much more convenient.
- Similarly, accessing Java classes by using fully qualified names is equally tedious in your programs.
- Let’s see if there’s a way to specify only the name of the class instead of its fully qualified name.

# Topics

- Accessing classes by using a fully qualified name
- Using the `import` statement

What is a  
Method?

The `import`  
Declaration  
and Packages

The `String`  
Class

The `Random`  
Class

The `Math`  
Class



Section 4

# Using the `import` Statement

- You can avoid the fully qualified class name by using the `import` statement.
- You place the `import` statement above your class definition. It looks like this:

```
import package.className
```

— Example:

```
import java.util.Scanner;  
  
public class AddNums {  
    //class code goes here  
}
```

`import`  
Statement

Class Definition

# How Do You Import a Single Class?

- You can import a single class or an entire package.
- To import a single class into your program, you write an `import` statement like this:

`import` keyword  
followed by the name of  
the package dot, the  
name of the class

```
import javax.swing.JOptionPane;
```

Package Name

Class Name

# `javax.swing` Package

- Java has an extensive library for constructing GUIs.
- This library, called `swing`, can be imported into your program to give you access to Java's GUI functionality.
- The `swing` library is in the `javax.swing` package.

# Accessing a Class from the swing Package

- The swing package has a `JOptionPane` class.
- This class creates a pop-up window that can be used to display strings of text to the user.
- To use the `JOptionPane` class, you must first import it into your class:

```
import javax.swing.JOptionPane;  
  
public class Welcome {  
  
    //class code to go here  
  
}
```

import statement that imports a single class, `JOptionPane`, from the swing package



# Importing the JOptionPane Class

You can then use `JOptionPane` to display text by calling the `showMessageDialog` method inside the `JOptionPane` class.

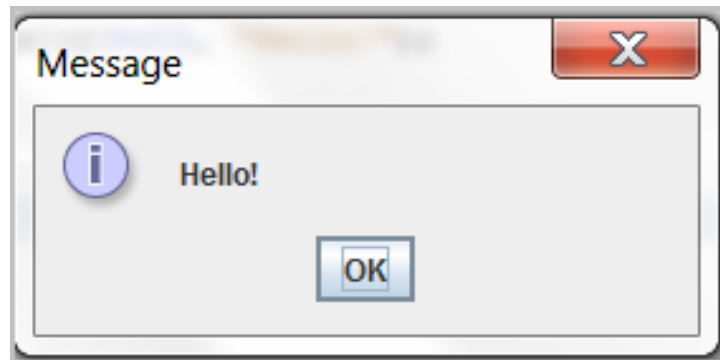
```
import javax.swing.JOptionPane;

public class Welcome {

    public static void main(String[] args) {
        JOptionPane.showMessageDialog(null, "Hello!");
    }

}
```

# Output Looks Like This!



# How Do You Import All Classes in a Package?

- You can import all classes in a particular package by using the `*` wildcard character in the `import` statement.

# How Do You Import All Classes in a Package?

- Let's say you want to extend the previous example by creating an instance of the `JFrame` class and add its reference to `JOptionPane`, like this:

```
import javax.swing.JOptionPane;
import javax.swing.JFrame;

public class Welcome {
    public static void main(String[] args) {
        JFrame frame = new JFrame();
        JOptionPane.showMessageDialog(frame, "Hello!");
    }
}
```

Importing 2 classes from  
the swing package

# Accessing All Classes from the swing Package

- As you access more classes from the swing package in your program, the number of import statements also increases.

# Accessing All Classes from the swing Package

- To avoid this, you can import all classes from the swing package by using the \* wildcard character in the import statement, like this:

```
import javax.swing.*;
```

```
public class Welcome {  
    public static void main(String[] args) {  
        JFrame frame = new JFrame();  
        JOptionPane.showMessageDialog(frame, "Hello!");  
    }  
}
```

Replace all import statements of the previous example with one import statement

# Including Multiple `import` Statements

- You can include multiple `import` statements in a Java program to access classes in the same package or in different packages.
- For example:

```
import java.util.Date;  
import java.util.Calendar; }  
import javax.swing.*;  
  
public class DisplayDate {  
  
    //class definition here  
  
}
```

Importing classes from the  
same package

Importing classes from  
different packages

# Identify Packages That Are Automatically Imported

- So far, you have used `System.out.println()` to print text to the console.

```
public class DisplayOutput {  
  
    public static void main(String[] args) {  
  
        System.out.println("Hello, how are you today?");  
    }  
}
```

- However, you didn't import a package for using this method in your program.
- So how does Java know what to do when you call it?



# java.lang Package

- If you look at the Java library, you'll see that the `System` class is organized in the `java.lang` package.
- By default, the `java.lang` package is automatically imported into all Java programs.



# Exercise 1

- Import and open the `ImportEx` project.
- Examine `AddImport.java`.
  - Perform the following:
    - Replace the fully qualified name to access the `JLabel` component with an `import` statement.
    - To import classes from the `util` package, replace multiple `import` statements with a single `import` statement.

# Summary

In this lesson, you should have learned how to:

- Access a class by using its fully qualified name
- Describe the function of the import statement
- Use the import statement to access a class in a package
- Understand the purpose of an asterisk in an import statement
- Identify packages that are automatically imported

