
✅ Java Packages and Core Classes – Notes

◆ What is a Package in Java?

A **package** in Java is a namespace that organizes a set of related classes and interfaces. Think of it like a folder containing related files.

- **Built-in packages** – Provided by Java (e.g., `java.util`, `java.io`)
 - **User-defined packages** – Created by programmers.
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◆ Commonly Used Java Packages and Key Classes

1. `java.lang` – 📦 Default Package (auto-imported)

Contains fundamental classes.

| Class | Purpose |
|--------------------------------|---|
| Object | Parent class of all classes. |
| String | Immutable sequence of characters. |
| StringBuilder, StringBuffer | Mutable character sequences. |
| Math | Common math functions (<code>sqrt()</code> , <code>pow()</code> , <code>random()</code> etc). |
| System | Input/output access, system-level operations (<code>System.out</code> , <code>System.in</code>) |
| Thread, Runnable | For multithreading. |
| Exception, Throwable, Error | Base for exception handling. |

■ **Auto-imported** — You don't need to write `import java.lang.*;`

2. `java.util` – 📦 Utility Package

Supports data structures, collections, date/time, etc.

| Class | Purpose |
|---------------------------------|--|
| ArrayList, LinkedList | Dynamic arrays and linked list. |
| HashSet, TreeSet, LinkedHashSet | Set implementations. |
| HashMap, TreeMap, LinkedHashMap | Map implementations (key-value pairs). |
| Collections, Arrays | Utility classes (sorting, searching). |
| Scanner | To take user input. |
| Date, Calendar, TimeZone | Date and time manipulation. |
| Random | Generate random values. |

3. java.io – 📦 Input/Output Package

Used for file handling and stream operations.

| Class | Purpose |
|---------------------------------------|---|
| File | For file and directory path operations. |
| FileReader, FileWriter | Character stream for reading/writing files. |
| BufferedReader, BufferedWriter | Efficient reading/writing with buffer. |
| InputStream, OutputStream | Byte streams (abstract base classes). |
| ObjectInputStream, ObjectOutputStream | For serialization and deserialization. |

4. java.nio – 📦 Non-blocking I/O

Advanced I/O for performance and network/file channels.

| Class | Purpose |
|----------------------------|------------------------------------|
| Path, Files | Modern file operations (Java 7+) |
| ByteBuffer, CharBuffer | Buffer for data. |
| FileChannel, SocketChannel | Channels for NIO file/network ops. |

5. java.net – 📦 Networking Package

Used for TCP/UDP programming, HTTP, URLs, etc.

| Class | Purpose |
|--------------------------------|----------------------------------|
| Socket, ServerSocket | TCP client/server communication. |
| URL, URLConnection | Working with URLs. |
| DatagramSocket, DatagramPacket | UDP programming. |

6. java.sql – 📦 Database Connectivity (JDBC)

Used to connect Java applications with databases.

| Class / Interface | Purpose |
|------------------------------|----------------------------|
| Connection | To connect with database. |
| Statement, PreparedStatement | Execute SQL queries. |
| ResultSet | To retrieve query results. |
| DriverManager | Manages JDBC drivers. |

7. javax.swing – 📦 GUI Toolkit (Window-based Apps)

Used for building GUI (Graphical User Interfaces).

| Class | Purpose |
|----------------------------------|------------------------------|
| JFrame, JPanel, JLabel, JButton | GUI components |
| JTextField, JTextArea, JComboBox | User input fields |
| JTable, JScrollPane | Table and scrollable content |

8. java.applet – 📦 Applet Programming (Browser GUI – Old)

Class Purpose

Applet Base class for applets.

⚠ Deprecated in modern Java.

9. java.awt – 📦 Abstract Window Toolkit (Older GUI)

Class

Purpose

Frame, Button, Label Basic GUI elements

Event, ActionListener Event handling

● Replaced mostly by javax.swing in newer apps.

◆ Additional Useful Packages

- java.time – Modern date and time API (Java 8+)
 - java.security – Cryptography and access control
 - java.util.concurrent – For multithreading and concurrency tools
 - java.beans – For JavaBean components
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◆ Types of Java Packages

Type

Description

Example

Built-in

Provided by JDK

java.util.*

User-defined

Created by developers com.myapp.utility

◆ How to Use a Package in Java

```
import java.util.ArrayList;
```

```
public class Main {
```

```
    public static void main(String[] args) {
```

```
ArrayList<String> list = new ArrayList<>();  
list.add("Java");  
System.out.println(list);  
}  
}
```

✔ Summary Table of Core Packages

| Package | Description |
|----------------------|---------------------------------------|
| java.lang | Core language classes (auto-imported) |
| java.util | Collections, utilities, Scanner, etc. |
| java.io | File handling, input/output |
| java.net | Networking |
| java.sql | Database operations |
| javax.swing | GUI development |
| java.time | Date & Time API |
| java.awt | Legacy GUI components |
| java.util.concurrent | Threading utilities |
