JAVA

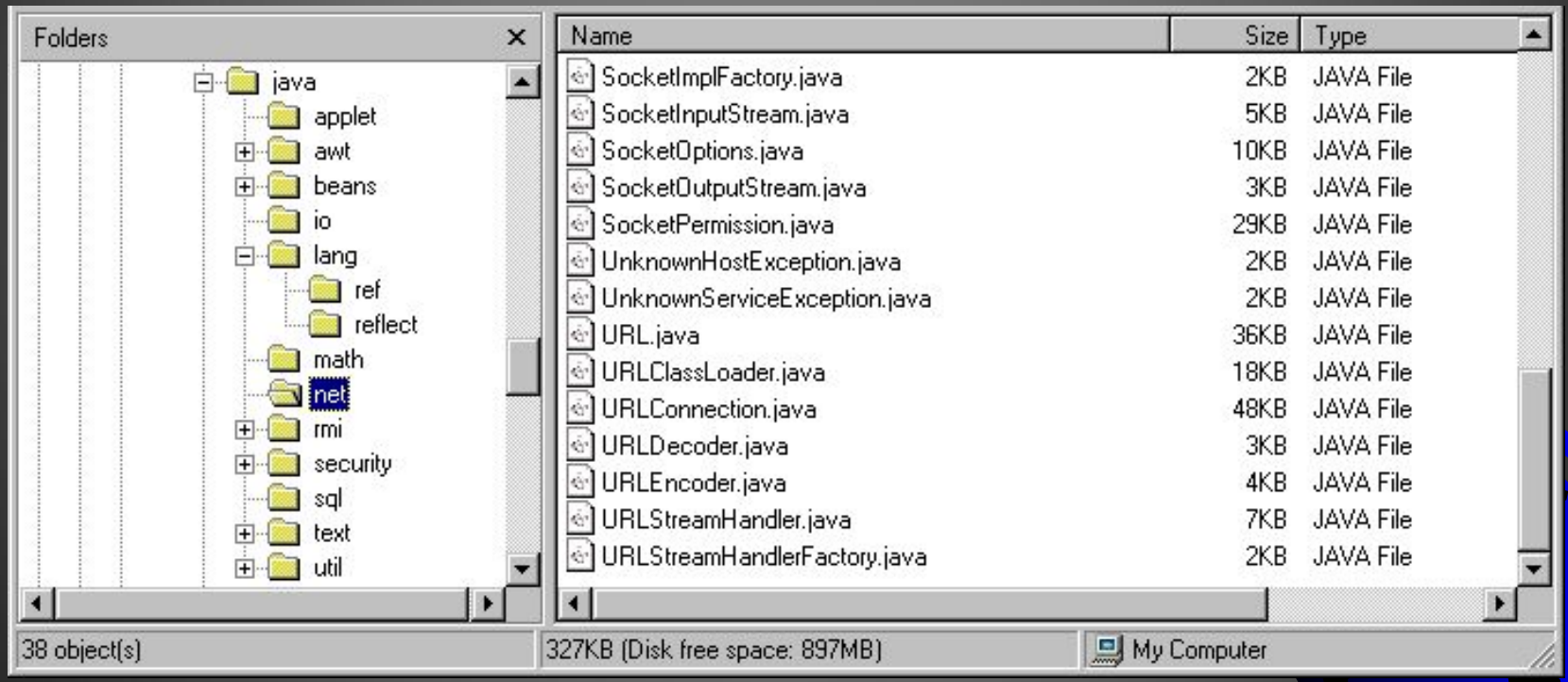
PACKAGES

Packages

- Package is a container for classes
- A package is a grouping of related types (classes and interfaces) providing *access protection* and *name space* management.
- In simple words, packages is the way we organize files into different directories according to their functionality, usability as well as category they should belong to.

Packages

The JDK package from SUN: `java.net`



Why do we need Packages?

- One can easily determine that these types are related.
- One knows where to find types that can provide task-related functions.
- The names of your types won't conflict with the type names in other packages because the package creates a new namespace.
- One can allow types within the package to have unrestricted access to one another yet still restrict access for types outside the package.

Java files for graphics

```
//in the Shape.java file
public abstract class Shape {
    . . .
}
//in the Circle.java file
public class Circle extends Shape {
    . . .
}
//in the Rectangle.java file
public class Rectangle extends Shape {
    . . .
}
```

Package `graphics`: 1st step

- Choose a name for the package (`graphics`, for example) and put a package statement with that name at the top of every source file that contains the classes that you want to include in the package.
- **In the Shape.java file:**

```
package graphics;
public abstract class Shape {
    . . .
}
```

…

- **In the Rectangle.java file:**

```
package graphics;
public class Rectangle extends Shape
{
    . . .
}
```

Package `graphics`: 2nd step

Put the source files in a directory whose name (graphics, for example) reflects the name of the package to which the type belongs:

```
...\graphics\Shape.java
...\graphics\Circle.java
...\graphics\Rectangle.java
...\graphics\Cylinder.java
```

etc.

Package Name & Package Folder

1) A company uses its reversed Internet domain name for its package names. The ABC company, whose Internet domain name is ABC.com, would precede all its package names with com.ABC

```
package com.ABC.graphics;
```

2) Each component of the package name corresponds to a subdirectory. So, if the ABC company had a **`com.ABC.graphics`** package that contained a Shape.java source file, it would be contained in a series of subdirectories like this:

```
....\com\ABC\graphics\Shape.java

....\com\ABC\graphics\Circle.java

. . .
```

How to use packages

1. Referring to a package member by its qualified name:

```
graphics.Circle myCircle = new graphics.Circle();
```

2. Importing a package member:

```
import graphics.Circle;
...
Circle myCircle = new Circle();
graphics.Rectangle myR = new graphics.Rectangle();
```

3. Importing an entire package:

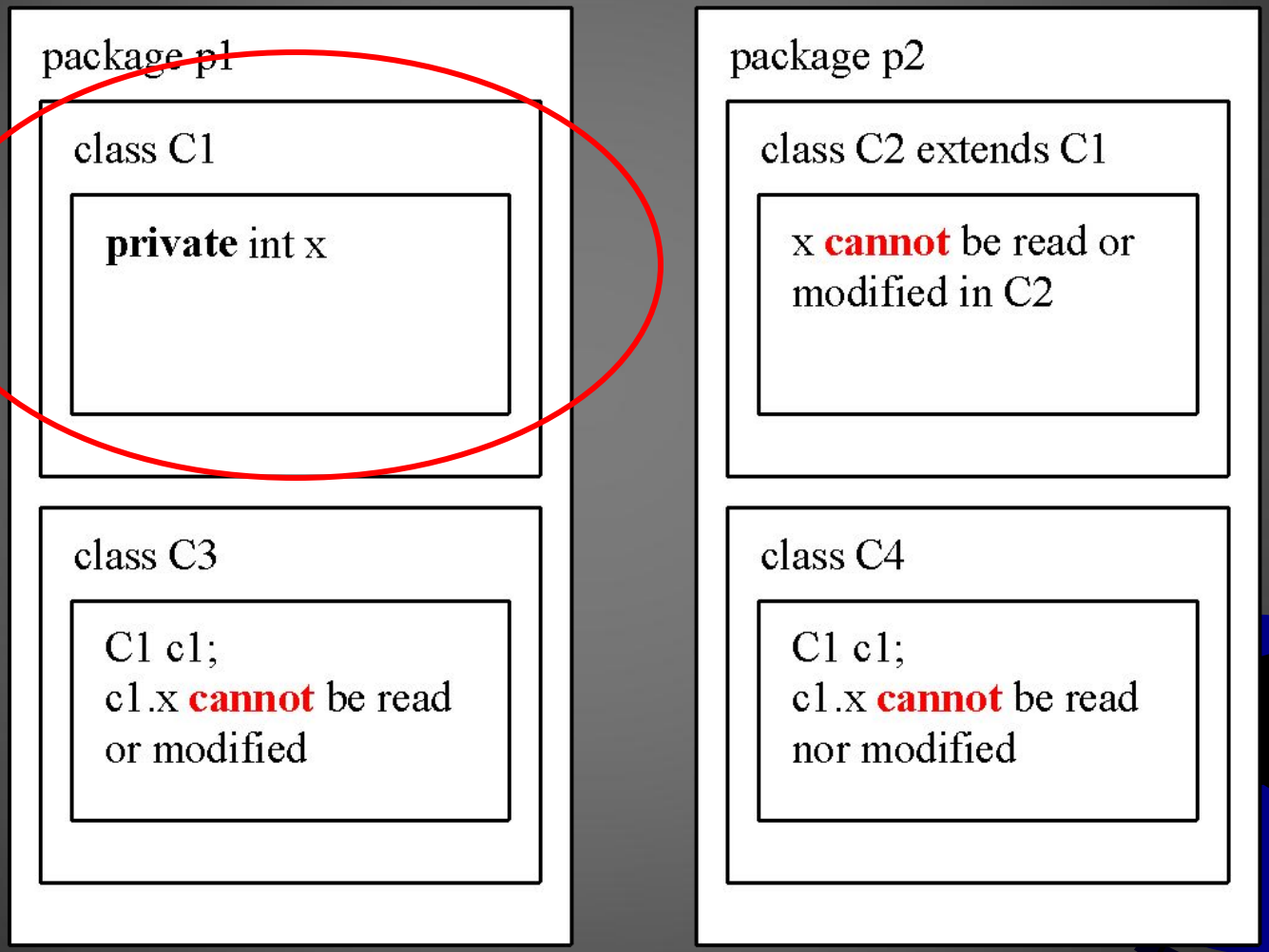
```
import graphics.*;
...
Circle myCircle = new Circle();
Rectangle myRectangle = new Rectangle();
```

Access to members of the classes

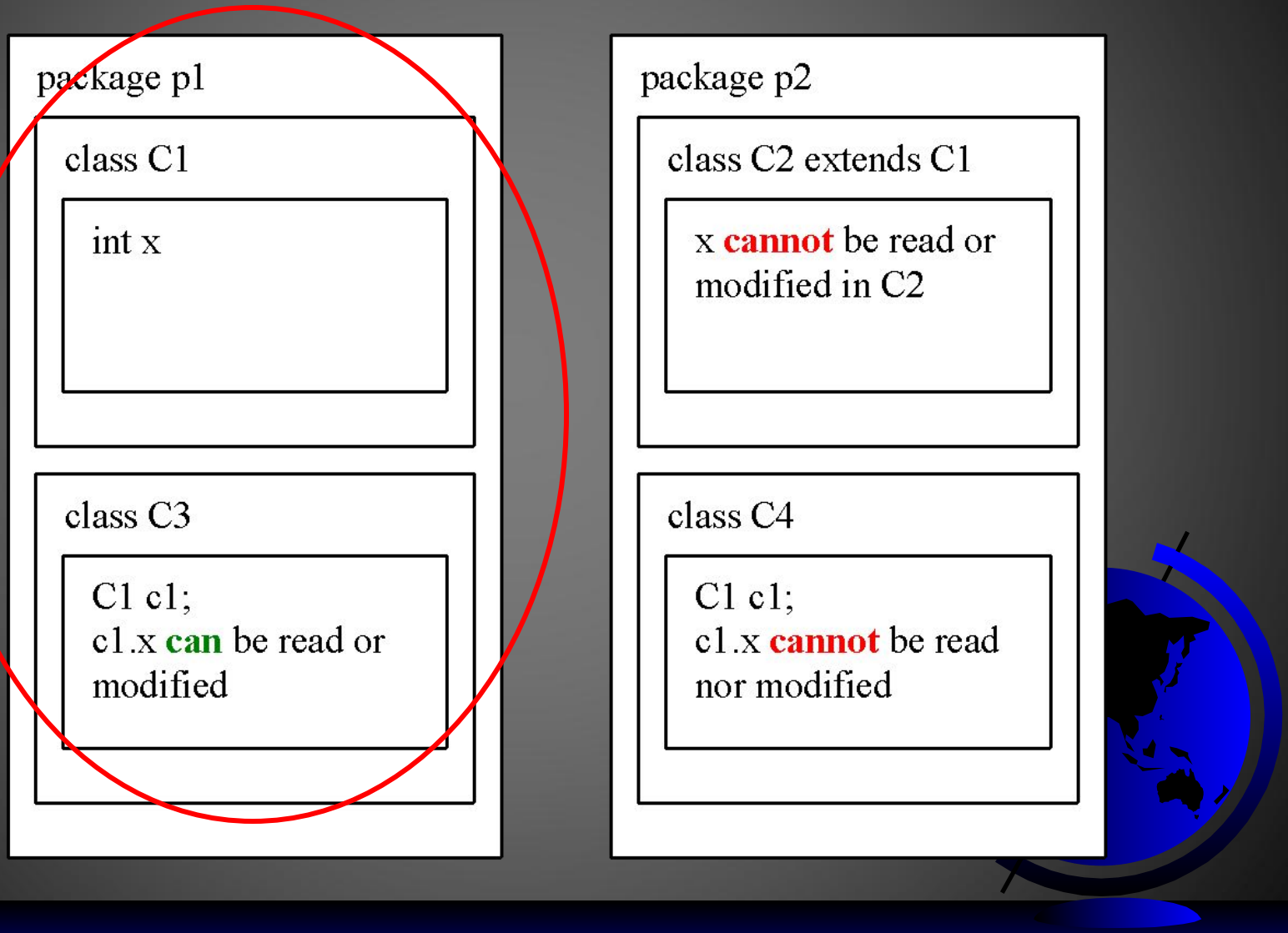
	private	(default)	protected	public
The same class	Yes	Yes	Yes	Yes
Subclass in the package	No	Yes	Yes	Yes
Non-subclass in the package	No	Yes	Yes	Yes
Subclass in another package	No	No	Yes	Yes
Non-subclass in another package	No	No	No	Yes

Java packages can be stored in compressed files called JAR files, allowing classes to download faster as a group rather than one at a time.

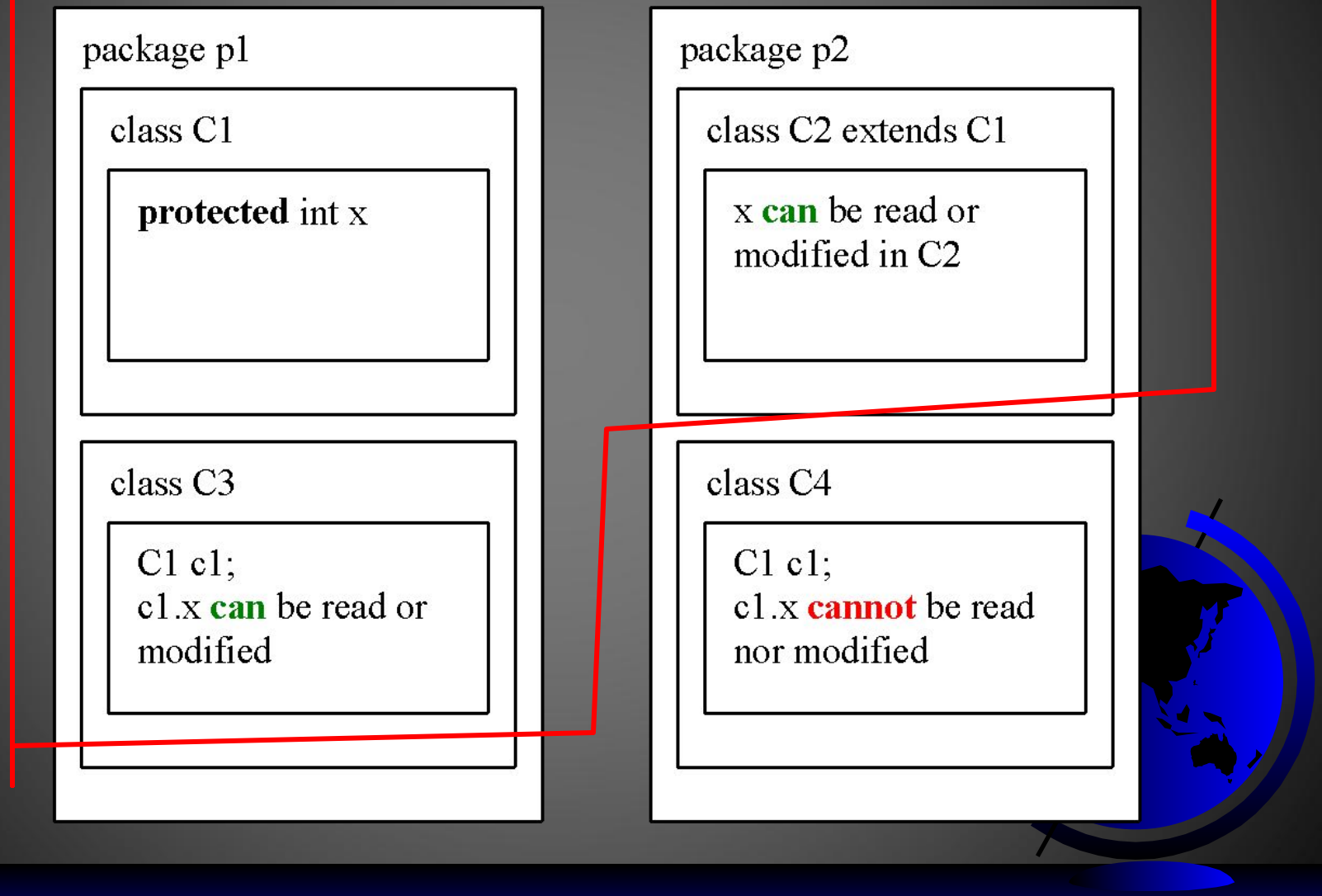
Access modifier `private`



`Default` access modifier



Access modifier `protected`



Access modifier `public`