CISC 3115 TY2

The protected Visibility Modifier and Java Package

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Notice

- The slides are subject to change.

Outline

- Discussed in this module
  - Inheritance
    - Superclass/supertype, subclass/subtype
  - Inheritance and constructors in Java; Inheritance and instance methods in Java
  - The Object class in Java
  - Concept of Polymorphism; Polymorphism via inheritance; Dynamic binding
  - Type casting in a type hierarchy
  - *instanceof*
- Discussed previously
  - Public, (no modifier)/default, private visibility modifier. Is there more?
- The protected visibility modifier

Visibility Modifiers

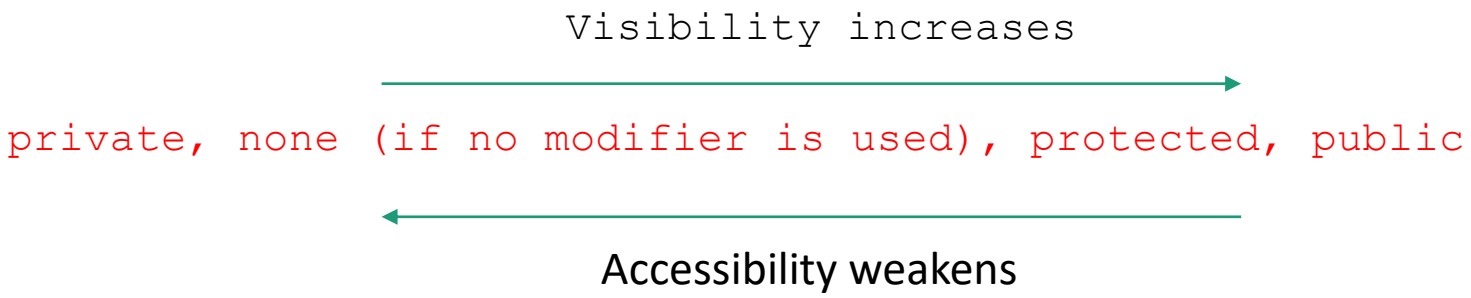
- Default (No visibility modifier)
- public
- private
- protected

The protected Visibility Modifier

- It can be applied to data fields and methods in a class.
- A protected data field or method in a public class can be accessed by
  - any class in the same package, or
  - its subclasses, even if the subclasses are in a different package

Comparing Visibility Modifiers

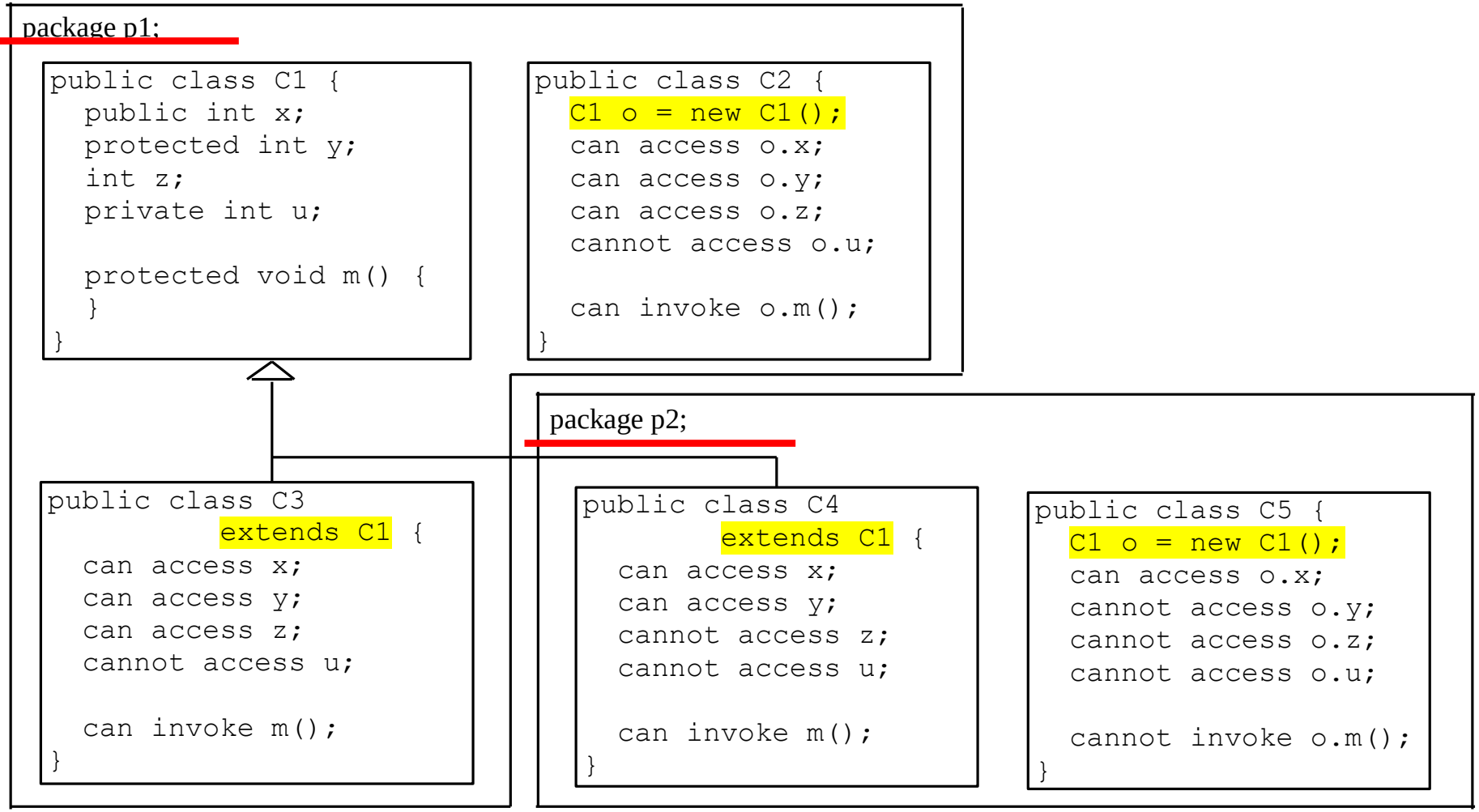
- private, default, protected, public



Visibility Summary

Modifier on members in a class	Accessed from the same class	Accessed from the same package	Accessed from a subclass	Accessed from a different package
public	✓	✓	✓	✓
protected	✓	✓	✓	–
default	✓	✓	–	–
private	✓	–	–	–

Example: Visibility Modifiers



Review: Package and Directory Structure

- Java package maps to a directory structure in a file system
- Example
  - package p1; // → directory p1
    - Classes in package p1 are in directory p1
  - package edu; // → directory edu
    - Classes in package edu are in directory edu
  - package edu.cuny; // → directory edu/cuny
    - Classes in package edu.cuny are in directory cuny that is in the edu directory

Review: Package and Directory Structure

- But where should you issue javac or java to compile or run the programs, respectively?
  - At the directory where the directories correspond to the package resides
  - package p1;
    - Directory p1's parent directory
- Use native terminal
  - Windows Command Prompt on Windows
  - Terminal from Mac OS X

A Subclass Cannot Weaken the Accessibility

- A subclass may override a protected method in its superclass and change its visibility to public.
- However, a subclass cannot weaken the accessibility of a method defined in the superclass.
- For example, if a method is defined as public in the superclass, it must be defined as public in the subclass.

Questions

- The protected visibility modifier
- Compare the accessibility /visibility of 4 different visibility modifiers
  - private, (none), protected, public

Exercise

- Create subdirectory/subfolder in today's journal
- With your own addition/design, complete the code in Slide 8 to demonstrate the visibility modifiers (public, protected, (default/package), and private)
- Submit your journal