Object Oriented Programming

Kookmin University

Department of Computer Science

Announcements

- Homework 5
  - https://classroom.github.com/a/53MdECIG
  - Due: Nov. 29th

Abstract Class/Method Exercise

Interface Class and Polymorphism

- Abstract class lets a child class to override a function when it has to
  - Using abstract method
- Interface class
  - A class that defines how to use an object (class instance)
  - It has only method declaration – name and arguments (no method body implementation)
  - Decides what to implement (not how to implement)
  - The methods that are in the interface should be implemented in child classes
  - Enhances polymorphism

Composition of Interface

- Syntax
  - CLASS_ACCESS_MODIFIER interface NAME
  - EX: public interface Walkable{}
- It is for contract – no concrete implementation
- It generally contains only method declaration that has to be implemented
  - ACCESS_MODIFIER METHOD
  - EX: public void walk();
- Constant field and static method - recent addition
- When a child class inherits, it uses "implements" instead of "extends"
- Code – PhoneCallable, CellPhone, Telephone

Benefit of Using Interface

- A child class can implement (inherit) multiple parent interface classes
  - Note that a child class can inherit only one parent class by default
- Use the multiple inheritance feature to have an object more degree of Polymorphism
- Code : SmartPhone, MusicPlayable, PhotoTakable
- Imagine how to implement a digital camera, MP3 player
  - Code: DigitalCamera, Mp3Player

Interface Seems Similar to Abstract

- Differences between Interface and Abstract Class
  - Interface contains only method declaration
  - Abstract class can contain both method declaration and implementation

  - A class can implement multiple interfaces – more polymorphism
  - A class can extend only one abstract class

  - All methods declared in interface should be implemented
  - All methods declared in abstract class do not have to implemented

Use Interface or Abstract Class

- Multiple inheritance is necessary
  - Interface: multiple inheritance possible
- Need some default implementations with method declaration only
  - Abstract can have both concrete implementation and declaration
- Type declaration
  - Interface is preferable as it generally contains distinct concrete implementation in child classes and multiple inheritance
- Is-a VS. Can-do
  - General suggestion: use abstract class for Is-a hierarchy and use interface for Can-do (Circle, Square – Shape and Fly - Flyable)

Interface VS. Abstract Class

- Interface generally defines capability - note multiple implementation of Interface
  - Flyable, Runnable, Eatable, …
- Define horizontal capability (feature) using Interface. In vertical relationships, use abstract method
  - Abstract: Animal – Cat, Dog, Tiger
  - Interface: Eatable, Walkable, …
- Combination of abstract and interface class
  - Abstract class implements multiple interface while providing some common methods implementation

Mixture of Abstract and Interface

- Abstract class inheritance and interface implementation can happen together

References

- 이것이자바다 – 한빛미디어 2015
- http://javarevisited.blogspot.kr/2013/05/difference-between-abstract-class-vs-interface-java-when-prefer-over-design-oops.html