CS 251
Intermediate Programming
Interfaces and Enums

Brooke Chenoweth

University of New Mexico

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What is an interface?

• A contract between a class and the outside world.
• A class that implements an interface promises to provide the behavior published by that interface.
• Similar to a class, contains
  • constant definitions
  • method signatures
  • *not method bodies!*
• Interfaces cannot be instantiated.
• Can be used as a type.
public interface MyInterface {

    // Constants in an interface are
    // implicitly public static and final
    double MY_NUMBER = 17.01;

    // Method signatures (end with semicolon, no body)
    // all methods implicitly public
    void doStuff(int i, double x);
    int doOtherStuff(String s);
}
Implementing an interface

- Use `implements` in class definition.
- A class can implement more than one interface. Separate interface names with comma.
- Class must implement all the methods declared in the interface.
Implementing interface example

```java
public class MyImpl implements MyInterface {

    public void doStuff(int i, double x) {
        // I’m just going to do nothing, so there!
    }

    public int doOtherStuff(String s) {
        return s.length();
    }
}
```
Implementing multiple interfaces

```java
public interface Fruit {
    boolean hasPeel();
}

public interface Vegetable {
    boolean isRoot();
}

public class Tomato implements Fruit, Vegetable {
    public boolean hasPeel() {
        return true;
    }
    public boolean isRoot() {
        return false;
    }
}
```
public static void main(String[] args) {
    Tomato t1 = new Tomato();
    Fruit t2 = new Tomato();
    Vegetable t3 = new Tomato();

    boolean testPeel1 = t1.hasPeel();

    boolean testPeel2 = t2.hasPeel();

    // boolean badTestPeel3 = t3.hasPeel();
    boolean testPeel3 = ((Tomato)t3).hasPeel();
}
public interface Relatable {
    boolean isLargerThan(Relatable other);
}

public static Relatable findLargest(Relatable[] items) {
    Relatable largest = null;
    for(Relatable item : items) {
        if(largest == null || item.isLargerThan(largest)) {
            largest = item;
        }
    }
    return largest;
}
Interface as API

- Company makes interface public to customers.
- Implementation of interface kept secret.
- Implementation may change later. Fine as long as still implements original interface.
- Sometimes customer implements the company’s interface.
  - Java API
Review: Enum

- Fixed set of constants
- Can iterate over values
- Can use in a switch
- Use as a type
- Values are objects
public enum Day {
    SUNDAY, MONDAY, TUESDAY, WEDNESDAY,
    THURSDAY, FRIDAY, SATURDAY
}

class Main {
    public static void main(String[] args) {
        Day today = Day.FRIDAY;
        switch (today) {
            case SATURDAY:
            case SUNDAY:
                System.out.println("Yay! Weekend!");
                break;
            default:
                System.out.println("Not another weekday!");
                break;
        }
    }
}