## CS206 Lab#4: Interface

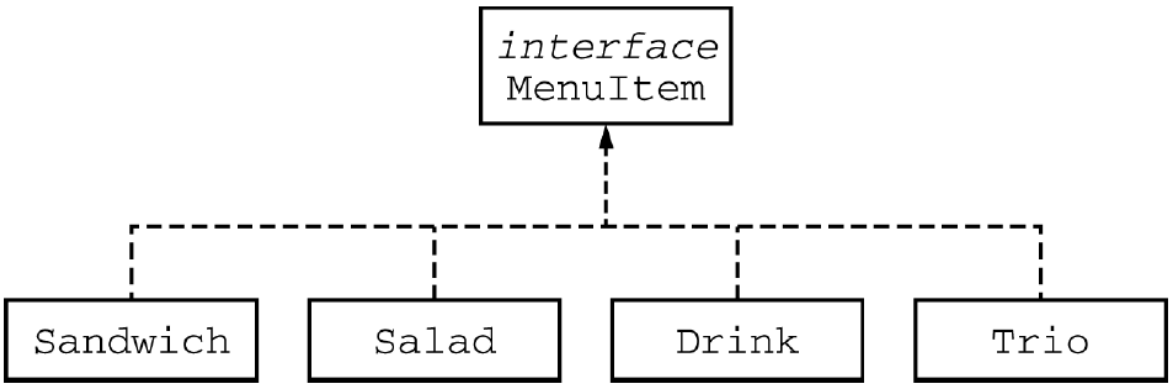
In this lab, we will learn about Java interfaces.

The menu at a lunch counter includes a variety of sandwiches, salads, and drinks. The menu also allows a customer to create a "trio," which consists of three menu items, one of each catetory: a sandwich, a salad, and a drink. The price of the trio is the sum of the two highest-priced menu items in the trio; one item with the lowest price is free. Each menu item has a name and a price. The four types of menu items are represented by the four classes `Sandwich`, `Salad`, `Drink`, and `Trio`. All four classes implement the following `MenuItem` interface.

```
public interface MenuItem {
  /**
   * @returns the name of the menu item
   */
  String getName();

  /**
   * @return the price of the menu item
   */
  double getPrice();
}
```

The following diagram shows the relationship between the `MenuItem` interface and the `Sandwich`, `Salad`, `Drink`, and `Trio` classes.




For example, assume that the menu includes the following items. The objects listed under each heading are instances of the class indicated by the heading.

| Sandwich | Salad | Drink |
|---|---|---|
| "Cheeseburger" 2.75 | "Spinach Salad" 1.25 | "Orange Soda" 1.25 |
| "Club Sandwich" 2.75 | "Coleslaw" 1.25 | "Cappuccino" 3.50 |

The menu allows customers to create `Trio` menu items, each of which includes a sandwich, a salad, and a drink. The name of the Trio consists of the names of the sandwich, salad, and drink, in that order, each separated by "/" and followed by a space and then "Trio". The price of the Trio is the sum of the two highest-priced items in the Trio; one item with the lowest price is free. A trio consisting of a cheeseburger, spinach salad, and an orange soda would have the name "`Cheeseburger/Spinach Salad/Orange Soda Trio`" and a price of $4.00 (the two highest prices are $2.75 and $1.25). Similarly, a trio consisting of a club sandwich, coleslaw, and a cappuccino would have the name "`Club Sandwich/Coleslaw/Cappuccino Trio`" and a price of $6.25 (the two highest prices are $2.75 and $3.50).

**Exercise 1:** Implement the `Sandwich`, `Salad` and `Drink` classes as specified. Test with the following driver program:

```
public static void main(String[] args) {
  Sandwich burger = new Sandwich("Cheeseburger",2.75);
  Sandwich club = new Sandwich("Club Sandwich", 2.75);
  Salad spinachSalad = new Salad("Spinach Salad",1.25);
  Salad coleslaw = new Salad("Coleslaw", 1.25);
  Drink orange = new Drink("Orange Soda", 1.25);
  Drink cap = new Drink("Cappuccino", 3.50);
  System.out.println(burger.getName()+ " " + burger.getPrice());
  System.out.println(club.getName()+ " " + club.getPrice());
  System.out.println(spinachSalad.getName()+ " " +
                     spinachSalad.getPrice());
  System.out.println(coleslaw.getName()+ " " +
                     coleslaw.getPrice());
  System.out.println(orange.getName()+ " " + orange.getPrice());
  System.out.println(cap.getName()+ " " + cap.getPrice());
}
```

**Exercise 2:** Implement the `Trio` class as specified. Test with the following driver program:

```
public static void main(String[] args) {
  Sandwich burger = new Sandwich("Cheeseburger",2.75);
  Sandwich club = new Sandwich("Club Sandwich", 2.75);
  Salad spinachSalad = new Salad("Spinach Salad",1.25);
  Salad coleslaw = new Salad("Coleslaw", 1.25);
  Drink orange = new Drink("Orange Soda", 1.25);
  Drink cap = new Drink("Cappuccino", 3.50);
  Trio trio1 = new Trio(burger,spinachSalad, orange);
  System.out.println(trio1.getName());
  System.out.println(trio1.getPrice());
  Trio trio2 = new Trio(club,coleslaw,cap);
  System.out.println(trio2.getName());
  System.out.println(trio2.getPrice());
}
```

**Exercise 3:** Modify the `Trio` class so that it throws a `IllegalTrioException` when anyone attempts to create a `Trio` combining three items of the same price (I don't know why,

because giving away a third that's not "cheaper" isn't allowed?). Provide code in your driver to test it.

**Exercise 4:** Modify the Trio class to also implement `Comparable`. The ordering of the `Trio`s depends on their prices – the more expensive `Trio` is "larger". Provide code in your driver to test it.