# CS 251 Intermediate Programming
# Project 3: Inheritance

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This is a little lab to get to you more familiar with inheritance.

## Problem description

Consider a dessert shop that sells candy by the pound, cookies by the dozen, ice cream, and sundaes (ice cream with a topping). We would like to be able to calculate the price of each of these items.

## Provided Classes

I am providing you with two classes, `Dessert` and `DessertTest`. Do not change these files. Your code must work with these classes as they are provided.

- The `Dessert` class is an abstract superclass from which specific types of `Dessert`s can be derived. It contains only one field, a name. The `getPrice()` method is an abstract method that is not implemented in the `Dessert` class because the method of determining the prices varies based on the type of item.
- The `DessertTest` class tests your various dessert implementations. Your code must compile with the given code and produce the expected output.

## Derived Classes

All of the classes which are derived from the `Dessert` class must define a constructor. Please see the provided `DessertTest` class to determine the parameters for the various constructors and to see the names of the expected methods.

- The `Candy` class should be derived from the `Dessert` class. A `Candy` item has a price per pound and a weight in pounds which are used to determine its price. For example, 2.30 lbs of fudge @ \$0.89 /lb. = \$2.05

The `Candy` constructor takes a String for the name, and doubles for price per pound and weight in pounds.

In addition to the methods inherited from `Dessert`, this class provides methods to get the weight in pounds and price per pound.

- `public double getWeightInPounds()`
- `public double getPricePerPound()`

- The `Cookie` class should be derived from the `Dessert` class. A `Cookie` item has a price per dozen and a number of cookies which are used to determine its price. For example, 4 cookies @ \$3.99/dz. = \$1.33

  The `Cookie` constructor takes a String for the name, a double for the price per dozen, and an int for the number of cookies.

  In addition to the methods inherited from `Dessert`, this class provides methods to get the number of cookies and price per dozen.

  - `public int getItemCount()`
  - `public double getPricePerDozen()`

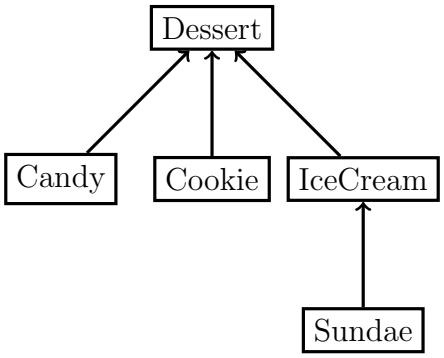
- The `IceCream` class should be derived from the `Dessert` class. An `IceCream` item simply has a price.

  The `IceCream` constructor takes a String for the name and a double for the price.

- The `Sundae` class should be derived from the `IceCream` class. A `Sundae` item is constructed with an `IceCream` item and a topping, which can be any `Dessert` item. The price of a `Sundae` is the price of the `IceCream` plus the price of the topping.

  The `Sundae` constructor takes an `IceCream` object for the base ice cream and a `Dessert` object for the topping. The name of a `Sundae` is the name of the `IceCream` concatenated with the String " topped with " and the name of the topping.

  Do note that since `Sundae` extends `IceCream`, a `Sundae` can be used as the base of another `Sundae`. Likewise, since the topping can be any `Dessert` type, a sundae can be topped with candy, cookie, ice cream, or even another sundae.



## Turning in your assignment

Once you are done with your assignment, use Canvas to turn in the java files that you have created. You should turn in a total of four files (code for `Candy`, `Cookie`, `IceCream`, and `Sundae` classes). Do *not* turn in the `Dessert` or `DessertTest` files, since you should not have changed them.