

## Lab 7

**Due Date: March 14, 2019**

**Total Points: 15 points**

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**The purpose of this lab is to create an inheritance hierarchy.**

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In this lab, you need to create a parent class, `Package`, and a derived class, `OvernightPackage`.

The base class `Package` includes the following attributes:

- Sender information: *senderName* (string), *senderAddress* (string), *senderCity* (string), *senderState* (string) and *senderZIPcode* (long).
- Recipient information: *recipName* (string), *recipAddress* (string), *recipCity* (string), *recipState* (string) and *recipZIPcode* (long).
- Other package details: *label* (string), *date* (string), *weight* (double), *costPerOunce* (double), and *insuranceType* (string). The attributes *label*, *date*, *weight*, *costPerOunce* represent the package label, the date the package is shipped, the package weight, and the standard shipping fee per ounce, respectively. The *insuranceType* attribute describes the extra package insurance option. A sender can purchase insurance coverage for mailpieces for up to \$5,000 to protect against loss or damage. If the sender does not purchase insurance, then *insuranceType* is set to “none” and no extra charge is incurred. If the sender prefers to insure the package, then there are two options based on the package’s declared value or desired coverage: up to \$1,000, or up to \$5,000. *insuranceType* can thus have the values: “none”, “upto1000”, or “upto5000”.

The specialized class `OvernightPackage` has an additional attribute:

- *overnightFee* (double). The attribute *overnightFee* represents an additional fee per ounce charged for overnight-delivery service.

Each class must have the following member functions:

- a constructor to initialize and validate all the corresponding attributes. For example, you need to ensure that weight, cost, fees all have positive values.
- its own `calculateCost` function that calculates and returns the cost associated with shipping a certain package as described below.
- set and get functions to assign values and retrieve attribute values (**as needed**) as well as print function to print the package’s attributes on the screen (specialized and inherited), and its shipping cost.

The base class `Package`’s `calculateCost` function should determine the cost by multiplying the *weight* by the *costPerOunce* and adding the insurance fees if applicable.

Insurance fees are based on the item's declared value or *insuranceType* as shown in the table below:

Insurance Type	Insurance Fee (\$)
Upto1000	5.25
Upto5000	5.50

OvernightPackage should redefine calculateCost function so it adds the additional fee per ounce to the standard cost per ounce before calculating the shipping cost.

After designing the base and derived class, write a main program that does the following:

- 1) Create a Package object and
  - a. Set the data to:  
AmyJohnson 3465RegentsRd SanDiego CA 92130 EdwardJohnes  
439NWGreens Fayetteville NY 13066 HG9983 06/03/2016 10 0.7  
upto1000
  - b. Call the *calculateCost ()* method to calculate the object's shipping cost
  - c. Print the derived object's information on the screen.
- 2) Create an OvernightPackage object and
  - a. Set the data to:  
MaryPalmer 6534SpringburstDr PalmSprings CA 92240  
DennisGarcia 8FifthSt Denver CO 66665 UI0900 10/11/2016 20.1  
0.8 upto5000 7
  - b. Call the *calculateCost ()* method to calculate the object's shipping cost
  - c. Print the derived object's information on the screen.