

## Programming Assignment #5

CSE 1342 - Programming Concepts - May 2022

**Due Date:** Tuesday (5/31) at 5 p.m Pushed to GitHub

# The Shipping Station

## Scenario

The Shipping Station is a small outfit on campus that ships packages in-state. They offer three different options:

1. Overnight
2. Two-day
3. Ground

The price for an overnight package is  $\$0.35/\text{ounce} + \$0.08/\text{in}^3$  (based on length x width x height of a bounding box if the package is oddly shaped) + \$12.00 flat fee.

The price for a two-day package is  $\$0.30/\text{ounce} + \$10.00$  flat fee.

The price for a ground package is  $\$0.20/\text{ounce} + \$3.25$  flat fee.

The user will need to enter package info throughout the day and print a report at the end of the day.

## What you need to do

Implement an inheritance hierarchy based on the type of packages above. Think about what is common to all packages and what is unique to each type. That will help you determine what should go in the different classes. You should assign each package a randomly generated 12-digit tracking number (check out the random number generators in c++, but also keep in mind the max size for an integer).

Then implement a UI that will gather information from the user (desk clerk) based upon packages that customers bring to the window. It should first ask the clerk to enter which shipping method the customer wants, and then get the information required for that particular shipping method. Store the package info entered by the clerk in an appropriate data structure. You can explore the **vector** class of the C++ std library if you'd like to use it. Additionally, you may consider having a container of base class object pointers and making use of polymorphism (so that you don't have to have three separate containers of objects).

When the clerk is ready, he or she should be able to choose an option that has the software print an end-of-day report that lists each package tracking number along with the total shipping cost for that package and the shipping method. List the individual packages in the order the customers

came to the window. At the end of the report, print the total amount collected for each shipping method and then the grand total collected for all packages shipped that day.

## **Coding Requirements and Assumptions**

- Your solution should be object oriented, including an inheritance hierarchy.
- You can use any part of the C++ STL that you'd like, including string objects.
- Your program should be properly functionally decomposed. Remember that a function should do one thing and do it well. Try to minimize the actual amount of code in main; use it for a controller that just calls other functions.
- The software doesn't need to handle more than 500 packages in any one day. However, there's no good idea of the breakdown between the different package types.
- You must implement an inheritance hierarchy for this program
- Use good code formatting standards and have a nice UI.

## **Grading Rubric:**

- 15 points for User Interface
- 30 points for properly implemented inheritance hierarchy
- 30 points for complete functionality
- 25 for code formatting