CSC 2510 C++ Programming – Lab 7 Part D

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Lab Objectives
This lab was designed to reinforce programming concepts learnt during lecture. In this lab, you will practice:
• Inheritance and virtual functions.

Description of the Problem
Please use the Package inheritance hierarchy created in LAB 06 Part D to create a program that displays the address information and calculates the shipping costs for several Packages. The program should contain a vector of Package pointers to objects of classes TwoDayPackage and OvernightPackage. Please loop through the vector to process the Packages polymorphically. For each Package, please invoke *get* functions to obtain the address information of the sender and the recipient, then print the two addresses as they would appear on mailing labels. Also, please call each Package's calculateCost member function and please print the result. Please keep track of the total shipping cost for all Packages in the vector, and please display this total when the loop terminates.

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Sample Output

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Package 1

Sender:
Lou Brown
1 Main St
Boston, MA 11111

Recipient:
Mary Smith
7 Elm St
New York, NY 22222

Cost: $4.25

Package 2

Sender:
Lisa Klein
5 Broadway
Somerville, MA 33333

Recipient:
Bob George
21 Pine Rd
Cambridge, MA 44444

Cost: $8.82

Package 3

Sender:
Ed Lewis
2 Oak St
Boston, MA 55555

Recipient:
Don Kelly
9 Main St
Denver, CO 66666

Cost: $11.64

Total shipping cost: $24.71
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Follow-Up Questions and Activities

1) Distinguish between virtual functions and pure virtual functions.

2) (Abstract Base Classes) Suggest one or more levels of abstract base classes for the Shape hierarchy discussed in this lecture. (The first level is Shape, and the second level consists of the classes TwoDimensionalShape and ThreeDimensionalShape.)

3) How does polymorphism promote extensibility?

4) You have been asked to develop a flight simulator that will have elaborate graphical outputs. Explain why polymorphic programming could be especially effective for a problem of this nature.

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Thank you!