

Object Oriented Programming

Homework 07

Marks 10

Instructions

Work on this homework individually. **Absolutely NO collaboration is allowed. Any traces of plagiarism would result in ZERO marks in this homework and possible disciplinary action.** Task should be coded in **C++**. You are strictly **NOT ALLOWED** to include any additional data-members/functions/constructors in your class. **Write the *main* function first and keep testing the functionality of each function once created.**

Due Date

Upload the solution (*source code .cpp file only*) labeled with your complete **roll number** in **capital letters** e.g., **BITF21M000** till **05:00PM Friday, May 05, 2023**, in course's **Google classroom**.

Case Study: Package Inheritance Hierarchy

Package-delivery services, such as OCS®, TCS® and JCS®, offer several different shipping options, each with specific costs associated.

Create an inheritance hierarchy to represent various types of packages. Use **Package** as the base class of the hierarchy, and then include classes **TwoDayPackage** and **OvernightPackage** that derive from **Package**.

1. ADT: Package

- The class should have following **private data members**
 - Two **strings** to represent the **name** of the **sender** and **receiver**.
 - Two **strings** to hold the **address** of the **sender** and **receiver**.
 - Two **strings** to contain the **city** of the **sender** and **receiver**.
 - A **float** named **weight** to store the **weight** of the package in **ounce**.
 - A **float** named **costPerOunce** to store the **cost per ounce** of the package.
- A **constructor** who accepts the **names, addresses, cities** of the **sender** and **receiver** and the **weight** and its **cost per ounce** as arguments and assigns them to the **appropriate member variables**. Ensure that the **weight** and **cost per ounce** contain **positive values** only.
- calculateCost** member function that **returns** the **cost** associated with shipping the package, i.e., $\text{weight} \times \text{costPerOunce}$.

2. ADT: TwoDayPackage

- The class should have **private data member** of type **float** named **flatFee** to represent the company charges for **two-day-delivery** service.
- A **constructor** who accepts all the required information for the two-day-delivery package including the **flatFee** as arguments and assigns them to the **appropriate member variables**. Ensure that the **flatFee** contains **positive value** only.
- calculateCost** member function that **computes and return** the **shipping cost** by adding the **flat fee** to the weight-based cost calculated by base class **Package's calculateCost** function.

3. ADT: OvernightPackage

- The class should have **private data member** of type **float** named **feePerOunce** to represent the additional cost charged for overnight-delivery service.
- A **constructor** who accepts all the required information for the overnight package including the **additional fee per ounce** as arguments and assigns them to the **appropriate member variables**. Ensure that the **fee per ounce** contains **positive value** only.
- calculateCost** member function that **adds** the additional **fee per ounce** to the standard **cost per ounce** before calculating the shipping cost and then **computes and return** the **shipping cost**.

Failure to abide by the submission instructions will cause a penalty of two marks.

No submission will be accepted after the due date and time.

B E S T O F L U C K