National University of Computer & Emerging Sciences
School of Computing
Spring 2022

CS1004 – Object Oriented Programming

Assignment # 2

Max Points: 50 **Due Date:** Wednesday, April 6, 2022, 11:59 p.m.

Carefully read the following instructions!

- It should be clear that your assignment would not get any credit if the assignment is submitted after the due date.
- Strict actions will be taken if the submitted solution is copied from any other student.
- For any query, feel free to email at: **abeer.gauher@nu.edu.pk**
- If you find any confusion in the assignment (Question statement), please consult at least two days before the deadline. After that no queries will be entertained in this regard.
- **Submission:** Submission will only be accepted through GOOGLE CLASSROOM. Upload a .zip or .rar file containing all your source files. Before submission, rename your .zip or .rar file as your ID **"KXX-XXXX".**

Question 1:

AirCore, an airline booking system stores information about the tickets that are sold to passengers.

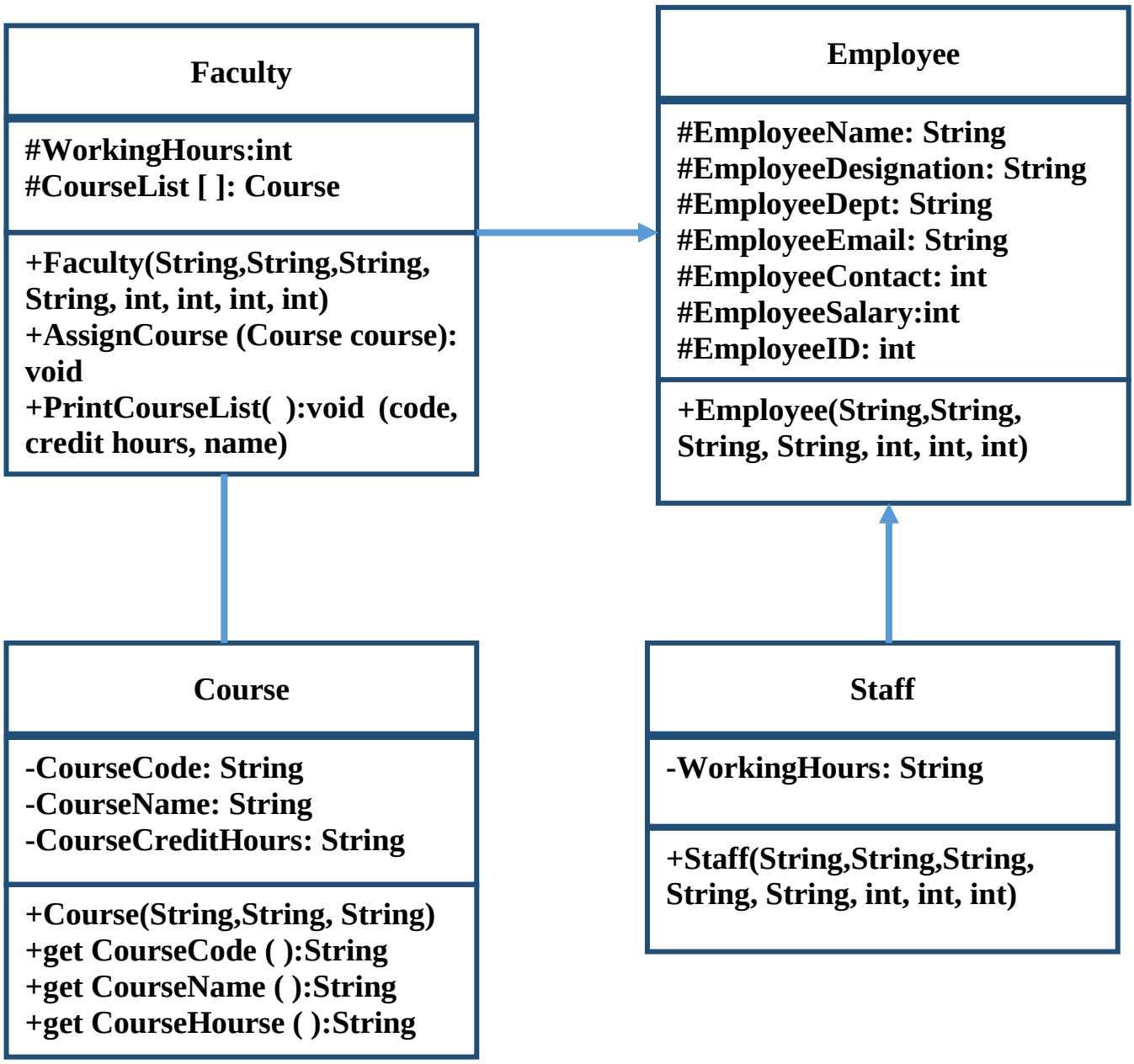
- Implement a class named "TICKET" that has the attributes passenger's name, departure city, arrival city, flight number and ticket price. The class has a constructor that sets all the mentioned attributes and a function getPrice( ) that returns the price of the ticket.
- Derive a class "PREMIUM TICKET" that inherits all the attributes from "TICKET" but also has an attribute the seat number.
- The class has a constructor that sets all the attributes of "TICKET" and the seat number.
- The price of Premium Ticket is 25% more than the price of Ticket. Redefine the function getPrice( ) to return the price of Premium Ticket by calling Ticket's getPrice( ) function and multiplying the result by 25%.
- In the main program, display the price for both Ticket and Premium Ticket by creating one object of each class.

Question 2:

Package-delivery companies, such as TCS, offer a number of different shipping options, each with a specific cost. You are required to build a system for managing the package-delivery services.

- The TCS company provides two types of options ***TwoDayPackage*** and ***OvernightPackage***.
- Each package has the following associated information of its sender and recipient, name, address, city, province and postal code. Also, each package has its associated weight (in grams) and cost per gram, this information is used to calculate the shipping cost of the package. Ensure that the weight and cost per grams contain positive values
- In ***TwoDayPackage*** service, there is additional flat fee that the shipping company charges for two-day-delivery service. The total shipping cost of TwoDayPackage should be calculated by adding the flat fee to the weight-based cost.
- In ***OvernightPackage*** the company charges an additional fee per gram for overnight-delivery service. To calculate shipping cost it adds the additional fee per gram to the standard cost per gram before calculating the shipping cost.
- Create a function that displays the address information of sender and receiver and calculates the shipping costs for different Packages.
- Keep track of the total cost and display the total cost of all the packages.

Question 3:



Create Objects of the classes as required and properly display all the information.

Question 4:

Banks have many different types of accounts with different rules for transactions such as withdrawals. Write a program with a base class for a bank account and two derived classes. Write a function that transfers funds from one account (of any type) to another. The withdraw function in the classes must be virtual. Write a main program that creates three accounts (one from each class) and test the transfer function.

- Create a base class called BankAccount that has name of the owner and the balance in the account (double) as data members.
- Include member functions deposit and withdraw (each with a double for the amount as an argument) and accessor functions getName and getBalance.
- Deposit will add the amount to the balance (assuming the amount is nonnegative) and withdraw will subtract the amount from the balance (assuming the amount is nonnegative and less than or equal to the balance).

- Create a class called MoneyMarketAccount that is derived from BankAccount.
- In a MoneyMarketAccount the user gets two free withdrawals in a given period of time.
- After the free withdrawals have been used, a withdrawal fee of Rs.50 is deducted from the balance per withdrawal.
- The class must have a data member to keep track of the number of withdrawals. It also must override the withdraw definition.

- Create a CDAccount class (Certificate of Deposit) derived from BankAccount that in addition to having the name and balance also has an interest rate.
- A withdrawal of funds has a penalty of 25% of the annual interest earned on the account. The amount withdrawn plus the penalty are deducted from the account balance. Again, the withdraw function must override the one in the base class.

For all three classes, the withdraw function should return an integer indicating the status (either ok or insufficient funds for the withdrawal to take place).

Question 5:

Metro Pharmacy reliably provides medicines to customers according to prescriptions.

- The pharmacy has three different category of medicines, tablets, capsules and syrup. Each of the medicines has a name, formula, retail price, a manufacture date and an expiration date.
- Additionally, Tablets have sucrose level which can be a value in range 0 to 1. Capsules have absorption percentage which is a value between 1 to 100. Syrups don't have any special fields.
- The pharmacy also has designated employees. A Pharmacist whose responsibility is to ensure that the medicines are sold according to prescription and a Counter Staff whose responsibility is to maintain the revenue of Metro Pharmacy.
- Overload the "= =" operator to compare two medicines and find if both are going to expire in the same year.
- Override the function Search_Medicine() in both Pharmacist and Counter Staff. The function should allow Pharmacist to search and print the details of medicine based on the formula. The function in Counter Staff should allow to search the medicine using the name.