National University of Computer & Emerging Sciences, Karachi
School of Computing
Spring - 2022

CS1004 – Object Oriented Programming

Assignment # 1

Max Points: 100 **Due Date:** Wednesday, Mar 02, 2022, 11:55 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: **basit.jasani@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. Submit all your codes in a single folder name it as your Student ID "KXX-XXXX". Keep all the questions inside that folder with proper commenting of the code.

Problem # 1

Create a class named StudentSociety with the following:

- **Data Members**: Society Name (string), Faculty Head(string), President(string), General Secretary (string), Budget(int), Events(string[ ])
- **Constructor(s)**:
    - To create objects and initializing all fields by taking user input in constructor scope.
    - To create objects and initializing all fields by taking values as parameters.
    - To create objects that initialize all fields except President and General Secretary, this constructor should call function Poll( ) to get these values
- **Functions**:
    - Poll( ): This function takes no parameters and returns a string array of size 2. When called, it takes user inputs to initialize the array and returns it.
    - Accessors and Mutators for all fields

Problem # 2

Create a class named "counterType" which contains the following data members:

- counterCurrent
- counterPrevious
- counterNext

It should have accessor and mutator functions for each of its data members. Furthermore, it has the following two methods:

- incrementCounter – increments the value of counterCurrent and updates the other two members accordingly
- decrementCounter – decrements the value of counterCurrent and updates the other two members accordingly
- A destructor that resets all of the values of the counters to zero. It must also print that it has done so after changing the values.

Create a default constructor and a parametrized constructor, which takes only one value as a parameter. It then updates the data members accordingly. A few constraints to keep in mind: counterPrevious should always be equal to counterCurrent – 1; similarly, counterNext should always be equal to counterCurrent + 1. The counter values should never be less than 0.

Problem # 3

A Movie CD rental shop maintains records of all the CDs it owns. A CD record normally stores information about the name of the Movie, the producers, the studio information. Normally a rental shop has more than one copy of a movie. Therefore, there is a need to store how many copies are currently available for rent at a given time. Similarly, there needs to be a record for how many CDs have been rented out for a particular movie.

Create a menu-driven program that allows the rental shop owners to:

- Check the number of CDs available for rent for a particular movie
- Check the number of CDs currently on rent for a particular movie
- Rent a movie CD to a customer
- Receive a movie CD from a customer

Note: The methods should increment or decrement the CDs rented/available accordingly.

Problem # 4

Imagine you are a hired by the Standard Charted Bank to develop a class that models the basic workings of a bank account. The class should perform the following tasks:

- Save the account balance.
- Save the number of transactions performed on the account.
- Allow deposits to be made to the account.
- Allow with drawls to be taken from the account.
- Calculate interest for the period.
- Report the current account balance at any time.
- Report the current number of transactions at any time.

Menu

- Display the account balance
- Display the number of transactions
- Display interest earned for this period
- Make a deposit
- Make a withdrawal
- Add interest for this period
- Exit the program

Problem # 5

Read and try to understand the following scenario and implement it using any object-oriented concepts learned so far:

Smart Limited is a company that makes washing machines and clocks. The quality of their products makes them one of the leading companies around. To oversee their operations, the company has set up offices in numerous cities of Pakistan. However, all of their offices have the same management structure i.e., each of these offices have a manager, an office code (3-letter code).

The company usually allocates an amount of PKR 50 million per year and all of the offices pay their employees from this budget. In other words, it is a shared pool of money.

Although the manager is himself an employee of the company, his job is to manage other employees of his office. The company normally requires that the record of each employee is maintained e.g., their first name, last name, employee code (4-letter code), currently monthly salary and full address.

The employee code of each manager must start with "m" followed by three arbitrary letters. The employee code of others in that particular office can start with any other letter than "m".

Moreover, it has to be ensured that the total per month salaries of all employees in each office don't exceed PKR 100,000. In addition, the owner of the company has a pet cat named Tom.

Hint: *You can assume that the company controls and "creates" all employees and offices from the main( ) function.*

XXXXX Happy Coding XXXXX