National University of Computer & Emerging Sciences, Karachi
Spring-2020 (CS-Department)

CS217 - Object-oriented Programming (OOP)

Assignment # 3

Max Points: 30 **Due Date:** Monday, May 04, 2020, 11 a.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. No assignment will be accepted after the due date.
- Strict action will be taken if submitted solution is copied from any other student.
- If you people find any mistake or confusion in assignment (Question statement), please consult before the deadline. After the deadline no queries will be entertained in this regard.
- For any query, feel free to email at: **basit.jasani@nu.edu.pk**
- **Submission:** Submission will only be accepted through SLATE. Submit all your codes in a single folder name it as your Student ID **"KXX-XXXX"**. The folder will contain three C++ program file as Q1.cpp, Q2.cpp & Q3.cpp with proper commenting of the code.

Question # 1

Write a template-based class that implements a set of items. A set is a collection of items in which no item occurs more than one. Internally, you may represent the set using the data structure of your choice (for example, list, arrays, vectors, etc.). However, the class should externally support following functions:

A) Add a new item to the set. If the item is already in the set then nothing happens.
B) Remove an item from the set.
C) Return the number of items in the set.
D) Determine if an item is a member of the set.

Question # 2

In this task, you have to calculate the percentage of marks obtained in three subjects (each out of 100) by student A and in four subjects (each out of 100) by student B. Create an abstract class 'Marks' with an abstract method 'getPercentage'. It is inherited by two other classes 'A' and 'B' each having a method with the same name which returns the percentage of the students. The constructor of student A takes the marks in three subjects as its parameters and the marks in four subjects as its parameters for student B. Create an object for each of the two classes and print the percentage of marks for both the students.

Question # 3

The murder of a young boy Danny in a small coastal town brings a media frenzy, which threatens to tear the community apart. As the mystery around Danny's death deepens, DI Hardy and DS Miller must work fast to identify the key suspects. DI Hardy wants you to make a system that keeps the track of all the suspects' travel logs. The system operates both individual taxis and shuttles. The taxis are used to transport an individual (or small group) from one location to another. The shuttles are used to pick up individuals from different locations and transport them to their several destinations. When the system receives a call from an individual, hotel, entertainment venue, or tourist organization, it tries to schedule a vehicle to pick up the fare. If it has no free vehicles, it does not operate any form of a queuing system. When a vehicle arrives at a pick-up location, the driver notifies the system. Similarly, when a suspect is dropped off at their destination, the driver notifies the system.

********** **Good Luck** **********