National Institute of Technology Calicut
Department of Computer Science and Engineering

CS3301 OBJECT ORIENTED PROGRAMMING
Winter Semester 2018-2019 (MCA)
Assignment Question Set 2

1. **Implement a student information management system**
   Requirements: The system manages information about students for particular course. It stores the rollNumber, name, dateOfBirth and attendancePercentage. It should be possible to add, modify and delete (modify and delete based on rollNumber) students information. Besides that there should be functionality for searching and sorting based on rollNumber and name. It should be possible to generate students names along with their attendance percentage whose attendance percentage are less than the cutoff percentage.

2. **Simulation of a vehicle rental management system**
   Requirements: The different vehicles available are BiCycles, Two-Wheelers and FourWheelers. For each types of vehicle, the rental rate is different. For Bi-cycles it is 10Rs/hour, for Two-Wheeler it is 300Rs/hr and for Four-Wheeler it is 500Rs/hour. The vehicle classes should be built in inheritance hierarchy and use the abstract methods appropriately. Each vehicle maintains a status information (Available/UnderMaintenance/Rented). Only available vehicles can be given for rent and upon returning the vehicle it should be again available. Up on damage, the status of the vehicle should be changed. Once a user takes a vehicle for rent, the time at which the vehicle given should be noted and up on return an automatic bill should be generated by calculating the time duration by utilizing the current time and the time at which the vehicle taken for rent. There should be facility for showing all the vehicles along with their vehicle type and status information.

3. **Implement a library catalog management System.**
   Requirements:

   The system should be able to manages the information related to the books available. Each book catalog has information regarding the book title, author, publisher, year of publication, price, the number of copies available and the status of each copies. The author attribute stores information regarding the firstName, lastName, email and the address. The address field stores the information regarding the professional institute which contains the instituteName and instituteAddress. Each book stores the information related with the different copies available for the book which the unique barcode assigned for that copy and the status of the book copy(Available/Rented). Decide the relationship between the Book, Author and the BookCopyList and implement the system accordingly. Make use of composition relationship and constructors for initialization. There should be functionality for printing out the basic information (title, author, publisher, price) and detailed information catalog related with the books.

4. **Simulation of examination management system.**
   Requirements:

   The system manages the question feeding and examination process. For the the system to work, initially feed some questions. The questions can be in three levels: easy, medium and

tough. Each question has query portion and can have four options as answers.

The Examination can be conducted in two levels: ModerateExam and DifficultExam. For the ModerateExam the half of the questions rendered are in easy level and the other half from medium level. For DifficultExam, 0.75% of the questions are from tough level and the remaining 0.25% from the medium level. The questions selected for the exam are random based on the difficulty level. For both of the exam, the marks are calculated in such a way that for the correct answer the mark scored is 1 and for the wrong answer 0.25 marks deducted. The mark calculation method can be declared inside an interface and should be implemented by the Exam class which is an abstract base class of both DifficultExam and ModerateExam. Decide the inheritance hierarchy and decide up on the functionality that should be overridden in the subclasses. At the end of the exam the user should be provided with the total mark scored during the exam.