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Department of Computer Science & Engineering
IIT Kharagpur

Software Engineering Lab (CS29006)
End-Semester Test

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Time: 2 hours 30 minutes   From: 14:00 – 16:30 hours

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Total Marks: 100

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Silver Spring Club Information System

The board of directors (BoD) of the Silver Spring Club (SSC) wants to administer all the current activities of the club through online and fully automatized. SSC is a very famous club in the city, and currently has 173 members in addition to a BoD with 16 members with different portfolios. The board's current activities with a brief specification of each include the following.

1. All members' data as well as BoD details should be entered into the system.

2. All users of the system should have their valid account. Mobile numbers of the members should serve as their user ID; the default password should be the member's date of birth in the `DD/MM/YYYY` format. No member should have more than one account.

3. A new member can be inducted in the club only if he/she is introduced by an existing member. In that case, an existing member should add the new member's profile against which a reference number would be generated. The member should forward the reference number to the prospective member. Moreover, during registration, the applicant also needs to enter the 4-digit OTP that would be sent to his/her mobile.

4. A new member can be registered in any one of the following categories: Privileged, Honorary, and General.

5. There is a registration fee, which should be paid online. Four different payment alternatives are currently allowed – net banking, debit card, credit card, and Paytm. The fees structure (in INR) is shown in Table 1.

6. A member can avail one or more facilities provided by the club. These include:

    (a) Community hall
    (b) Indoor sports stadium
    (c) Outdoor sports stadium

Table 1: Fees structure for the members

Member	Men	Women
Privileged	1, 00, 000	60, 000
Honorary	25, 000	20, 000
General	60, 000	50, 000

    (d) Theater hall

    (e) Transportation service

    (f) Catering/canteen service

7. In order to book for and avail any facility, the following rules apply.

    (a) A Privileged, Honorary, and General member, respectively, can avail at most 4, 3, and 2 facilities in a year free of cost.

    (b) For any booking beyond the above mentioned threshold, a member has to pay an appropriate amount as decided by the administrator.

    (c) A member, if wishes, can cancel a booking up to seven days before the date booked for, which would attract a penalty of 25% of the booking amount. For cancellation beyond this deadline, only 50% of the booking amount shall be refunded.

8. At the end of the year, the board provides incentives to the members who have booked at least 10 facilities worth Rs 10, 00, 000 or more. In that case, a Privileged member would get top priority to book any facility in the following year. On the other hand, General (Honorary) member would be promoted to an Honorary (Privileged) member.

9. All memberships are valid for up to two years from the date of registration. To remain a member of the SSC, one should renew his/her membership again. Renewal fees would be 50% of what mentioned in Table 1. However, if a member has made at least 10 bookings in the past two years, he/she shall receive an additional 15% discount. Moreover, if someone has been a Privileged member for 10 consecutive years, he/she shall receive a free-membership for two years. Booking charges still apply.

10. A member can upgrade his/her membership at any time if so desired. In that case, the balance amount proportional to the remaining membership duration must be paid. Once successfully upgraded, the member would subjected to the facilities and incentives available for the concerned membership plan.

Questions

Based on the problem statement given above, do the following.

A. Identify any one important functional requirement (FR). Clearly state the input and output required for the FR. [20]

B. Draw a use case diagram for the FR that you have chosen. Your use case diagram should include 3–10 sub-use cases. Clearly specify all the use case relationships and actors in your diagram. [25]

C. Design an appropriate user interface for the previously chosen FR. You can use any tool or platform for this purpose. [25]

D. Implement the FR that can be fitted to the user interface that you have designed. You are free to choose any programming language for your implementation. [30]

Instructions

(i) Do not leave your terminal until you are asked to do so.

(ii) Submit all the codes and relevant documents in a zipped format to the Moodle system.

(iii) The submission window shall remain open till 16:30 hours.

(iv) Submissions are mandatory.

(v) For design and implementation, you may consult the resources available in the Web, if required.