INTERNATIONAL CENTRE FOR APPLIED SCIENCES
MAHE, MANIPAL

B.Sc. (Applied Sciences) in Engg.

End – Semester Theory Examinations – Nov./ Dec. 2020

III SEMESTER - SOFTWARE DESIGN USING OBJECT ORIENTED PARADIGM (ICS 233)

(Branch: CS)

Time: 3 Hours **Date: 25 November 2020** **Max. Marks: 100**

- ✓ **Answer any FIVE full questions.**
- ✓ **Missing data, if any, may be suitably assumed**

1. Write the geometrical notations for Aggregation, Composition, Dependency, Generalization and interface realization with a relevant example for each one. **[20]**

2A. What are GRASP principles? What problem does it try to solve? Write 4 basic principles with example for each one of them. **[15]**

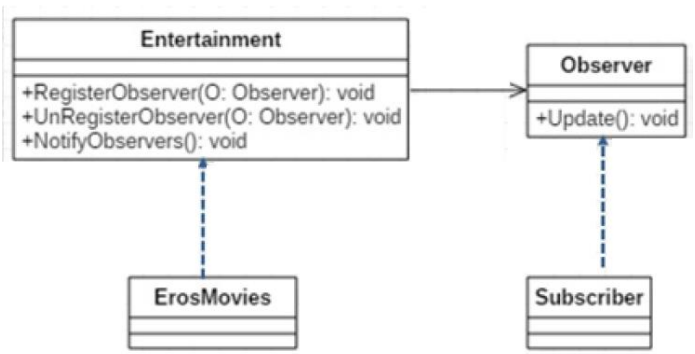
2B. Explain the concept of responsibility and methods in designing objects with responsibilities with the help of an example. **[5]**

3A. Study the below scenario:

A hotel has 20 rooms. Five rooms are of a double type, and 15 are of a single type and may be AC or Non-AC type. The rooms have different rates depending on whether they are of single or double, AC or Non-AC types. Guests can reserve rooms in advance or can reserve rooms on the spot depending upon availability of rooms. The receptionist would enter data about guests such as their arrival time, advance paid, approximate duration of stay, and the type of the room required. Depending on this data and subject to the available of a suitable room, the computer would allot a room number to the guest and assign a unique token number to each guest. If the guest cannot be accommodated, the computer generates an apology message. The hotel catering services manager would input the quantity and type of food items as and when consumed by the guest, the token number of the guest, and the corresponding date and time. When a customer prepares to check-out, the hotel automation software should generate the entire bill for the customer and also print the balance amount payable by him. Frequent guests should be issued an identity number which helps them to get special discounts on their bills.

Write the complete domain model diagram with multiplicity for the above case study. **[10]**

3B. You have been given the following domain class diagram. Identify which design pattern it is and write the complete program by considering ErosNow as the case to demonstrate the working of the design pattern. **[10]**



4. Draw a State Chart Diagram for a simple cellphone for the below mentioned scenarios.
   (a) Receiving a call **[10]**
   (b) Making a call **[10]**

   Assume the cellphone is in switched on mode and the user is moving in a car. State all your reasonable assumptions for this scenario.

5. Explain Coupling and Cohesion between Classes with a complete example with source code. Demonstrate how a bad design could be changed with the example identified. **[20]**

6. Write a sequence diagram for the below scenario. **[20]**

- The bank client must be able to deposit an amount and withdraw an amount from his or accounts. Each transaction must be recorded.
- The Via Net bank client can have two type of accounts: Checking and Savings
- For each checking account one savings account can exists.
- PIN code consisting of integer digits between 0 to 9
- PIN code allows access to all the accounts.
- No receipts will be provided for any account transaction.
- The Bank application operates for a single banking institution only.
- Neither a saving nor checking account have a negative balance.
- The system should automatically withdraw money from a related savings account if the requested withdrawal amount on the checking account is more than its current balance.
- If the balance on a savings account is less than the withdrawal amount requested, the transaction will stop and the bank client will be notified

7A. Explain the different components in a Collaboration diagram with an example. **[10]**

7B. What are the differences between the sequence diagram and Collaboration diagram? Demonstrate with the help of the example written for part (a) **[10]**

8. Write a Use case diagram and fully dressed Use-Case specification for an elevation in a 40 storied building. The required safety precautions to be taken care. **[10 + 10]**

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