POKHARA UNIVERSITY

Level: Bachelor Semester: Fall Year : 2018
Programme: BE Full Marks: 100
Course: Object Oriented Design and Modeling Through UML Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Explain data and behavioral abstraction with suitable examples? How is the responsibilities assigned to objects different from the behavior that they exhibit? 8
   b) Explain the process of performing requirements elicitation and specifying those requirements using a visual modeling tool? 7
2. a) What are use cases and how can they be used for identifying and recording system requirements? How would you differentiate between include and extend relationship between use cases? 8
   b) What are the different relationships that may exist between Domain concept elements? Construct a domain model for a patient care system making necessary assumptions. 7
3. a) How are system events identified? 9

   Student Attendance Monitoring System:

   In case of a Student Attendance Monitoring System, the system allows students to record their daily attendance through a Biometric Finger scan device. The system records the daily attendance of students and generates a report at the end of every month that shows the late arrival details, number of absentees etc. The system allows staff members to print the reports and configure the system as per their need.

   Identify the potential use cases for scenarios and elaborate them further by coming up with individual sequence diagrams for identifying the system events belonging to the individual scenario.
   b) How can iterations and conditional messages be shown using a Collaboration diagram and a Sequence diagram? 6
4. a) **Cheque Payment:** 8

   A customer presents a cheque to the bank employee. The employee checks if the cheque and the signature are valid and that the customer has enough amount of balance in the account. The maximum amount of withdrawal allowed is 100000 per cheque unless the customer is a Privileged Customer in which case the customer can make a withdrawal of 500000 per cheque. Upon successful verification, the system records the successful completion of the transaction and the cash is handed over to the customer.

   i. Perform domain modeling of the above scenario.
   ii. Draw the sequence diagram for the events that occur in the scenario.

   b) What is the difference between coupling and cohesion? How can you make use of the Information Expert Pattern rather than the Controller pattern for delegating responsibilities to objects while designing a system? 7
5. a) In the UML, how can error generated and exceptions thrown by operations be illustrated in a Sequence diagram? Explain with the necessary figure. 7
   b) **ATM:** 8

   A customer having a Savings account in a Bank swipes a card in an ATM machine and types in the PIN number using the keyboard of the ATM. The System checks if the PIN matches the card. If the PIN does not match, the system rejects the card and display the rejection message in the ATM display. If the PIN is found to be a valid one, the customer types in the amount to be withdrawn. The system checks if the customer has enough amount of balance in that account. If he does, the system debits the account and dispatches cash thru the dispenser of the ATM and a receipt gets printed and issued to the customer.

   Come up with a design class diagram for the scenario above and then map those classes to code in any programming language that supports Object Oriented Paradigm.
6. a) What are the artefacts created during the Object Oriented Analysis phase of software development and how do those artefacts get converted into concrete design during the Object Oriented Design phase thru elaboration? 8
   b) Why should one expect and plan for change and deviation from the design even during programming? Explain. 7
7. Write short notes on: (**Any two**) 2×5
   a) Activity Diagrams
   b) Iterative Process
   c) Local and Global Visibility