

GUJARAT TECHNOLOGICAL UNIVERSITY

MASTERS IN COMPUTER APPLICATION (Integrated MCA)

Year – II (Semester – IV) (W.E.F. January 2015)

Subject Name: Unified Modeling Language

Subject Code: 4440604

Objectives of the Laboratory:

1. To learn how to understand the requirements of a system, its scope.
2. To learn good design, good modeling practices, document them and be able to discuss the pros and cons of your designs and models.
3. To learn issues in modeling large, complex systems with example hypothetical systems
4. To learn concepts, best practices in software, firmware development today
5. To model an entire system.
6. To learn effective use of any CASE TOOL for UML.

Outcomes:

1. Students will be able to document SRS.
2. Students will be able to develop structural models.
3. Students will be able to develop behavioral models.
4. Students will be able to create Architectural models.
5. Students will be able to select the set of appropriate diagrams to develop a system model.
6. Students will be skilled in a CASE Tool.

To meet above objectives teachers will help students choose a hypothetical system preferably either a commercial, web based or embedded system for modeling. The students will try and identify scope of such a system as realistically as possible. Students will learn to draw, discuss different UML diagrams, their concepts, notation, advanced notation, forward and reverse engineering aspects. As far as possible draw as many diagrams for one single system, unless they are not applicable for the chosen system in which case other systems may be chosen for specific diagrams. Any 8 diagrams can be drawn using tool, the other diagrams can be drawn on paper. Optionally one may draw Interaction overview diagrams, timing diagrams, and composite structure diagrams, object diagrams for your system as study assignments, paper based assignment or in cases relevant even in CASE TOOL.

The faculties are advised to use Project Based Learning [PBL] to conduct this lab.

List of Practicals:

1. Consider a book store in a shopping mall. The customer selects the books from racks to purchase. **Prepare a sequence diagram** for bookstore checkout system. The customer brings

selected books to cashier. The cashier scans each item with checkout system to prepare an order. Also prepare a **class diagram** and **collaboration diagram** for it.

The cashier requests to customer for payment. The customer gives credit card to cashier. The verifier and checkout system scans the card. The verifier accepts the card and payment is accepted. Customer signs the credit card slip. The purchased books are handed over to customer.

2. Consider the air transportation system. Many flights land and depart from city's airport. Some of the big cities may have more than one airports. Every flight belongs to specific airline. The planes may have many flights to different airports. Each plane is identified with serial number and model. E.g. hypersonic. There are specific pilots for each airline and they fly many flights. Each flight is identified by flight number and date on which flight is scheduled. The passenger reserves a seat for a flight. The seat is identified by a location. Prepare a **class diagram** and **Object diagram** for above description.
3. **Prepare a class diagram** for UML concepts like class, attribute, association, association end, multiplicity, class name, attribute name.
4. A customer decides to upgrade her PC and purchase a DVD player. She begins by calling the sales department of PC vendor and they tell her to contact customer support. She then calls customer support and they put her on hold while talking to engineering. Finally, customer support tells the customer about several supported DVD options. The customer chooses a DVD and it is shipped by the mail department. The customer receives the DVD, installs it satisfactorily and then mails her payment to accounts department. **Prepare a Class diagram, Sequence Diagram, Collaboration diagram and Activity diagram.**
5. **Prepare an activity diagram** for computing a restaurant bill. There should be a charge for each delivered item. The total amount should be subject to tax and service charge of 18% for groups of six or more. Any coupons charge submitted by the customer is subtracted from bill.
6. The University runs various diploma, graduation and post-graduation courses such as DE, Dpharm, BE, MBA, MCA, ME, Mpharm etc. The courses follow semester patterns and under each course various subjects are taught. Students seek admissions to these courses and if found eligible, the student is enrolled for the requested course. There are several faculty members in the university who teach the various subjects of these courses. The subject teacher conducts semester examinations for the concerned subject at the end of the semester and the student's performance is recorded. Even if a student is unable to pass a subject, he is promoted to the next semester but has to reappear for the subject examination again and clear his backlog. **Draw Use Case diagram** for it.
7. The telephone agent uses an order registry and customer catalog to obtain access to an order & a customer respectively. The order registry uses an order number as a qualifier to select particular order instance. A customer catalog uses customer name and phone number as a qualifier to select particular customer. The attributes of an order are the order numbers and time when it is placed. The order consists of many items. An item has item_number, a quantity, unit price. It also has reference to catalog item which represents listing. When an order is cancelled or committed, it cancels or commits each of its items first. When an order's total price method is invoked, the order calls the total price method of each of its items and returns the sum. **Prepare Use Case diagram** for Online Shopping under this situation.
8. Prepare **Activity diagram, Collaboration diagram and Sequence diagram** for book tickets and cancel tickets, **Deployment and Component Diagram** for Railway Reservation System. Its detail is following:

Railway Reservation System is a system used for booking tickets over internet. Any Customer Can book tickets for different trains. Customer can book a ticket only if the tickets are available. Customer searches for the availability of tickets then if the tickets are available he books the tickets by initially filling details in a form. Tickets can be booked in two ways by i-ticket or by e-ticket booking. In case of i-ticket booking customer can book the tickets online and the tickets are couriered to Particular customer at their address. But in case of e-ticket booking and cancelling tickets are booked and cancelled online sitting at the home and customer himself has to take print of the ticket but in both the cases amount for tickets are deducted from customers account. For cancellation of ticket the customer has to go at reservation office than fill cancellation form and ask the clerk to cancel the ticket than the refund is transferred to customer account. After booking ticket the customer has to checkout by paying fare amount to clerk.

9. As a start of a call, the telephone line is idle. When the phone receiver is picked from hook, it gives a dial tone and can accept the dialing of digits. If after getting dial tone, if the user doesn't dial number within time interval then time out occurs and phone line gets idle. After dialing a number, if the number is invalid then some recorded message is played. Upon entry of a valid number, the phone system tries to connect a call & routes it to proper destination. If the called person answers the phone, the conversation can occur.

When called person hangs up, the phone disconnects and goes to idle state.

Draw the state transition diagram for above description of telephone line.

10. In tour management system, System will check whether the customer is existing or new. New user will enter his personal and tour details for reservation. This login information could be used for further transactions. When customer is satisfied with tour package he/she would request for reservation of tour. Personal details of new customer is stored in cust_info while the details regarding the tour selected by particular customer is stored in tour_info and the details regarding it would be restructured in Tour Information System. Existing customer can update his/her personal details in cust_info and cancel reservation for tour from tour_info and changes regarding it are also reflected in Tour Information System. After confirming the tour package the customer will make payment either online or through staff by personally going at the office. Customer can make payment by cash, credit card or by cheque. System checks for the validity of staff. Once the payment is done by customer, valid staff will make Ticket Reservation System. Reserved customer will be able to view details about reservation by providing login information from cust_info and tour_info system. Administrator can add, delete or modify tour schemes from Tour Information System. **Prepare all the diagrams for tour management system.**
11. The case study 'Online Mobile Recharge' gives us the information about all the mobile service providers. This application provides us the complete information regarding any mobile service provider in terms of their plans, options, benefits, etc. Suppose, any Airtel customer wants to have the information of all the schemes and services provided by the company, he/she can have the information and according to his convenience he can recharge the mobile from the same application. The major advantage of this proposed system is to have the recharging facility of any service provider under same roof. **Prepare Usecase, Class, Activity, Collaboration, Sequence and Deployment Diagram.**