B.M.S. COLLEGE OF ENGINEERING BENGALURU
Autonomous Institute, Affiliated to VTU

Lab Record

Object Oriented Analysis and Design

Submitted in partial fulfillment for the 6th Semester Laboratory

Bachelor of Technology
in
Computer Science and Engineering

Submitted by:

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B.M.S. COLLEGE OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the Object-Oriented Analysis and Design(20CS6PCOMD) laboratory has been carried out by ANVITHA GOWDA K (1BM18CS018) during the 6th Semester Apr-July-2021.

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COLLEGE INFORMATION SYSTEM

1.1 Problem statement

A centralized approach and system for managing, storing, accessing and updating all the information and details present in relevance to students, and teaching and non-teaching faculty, increasing efficiency and convenience of information management in educational institutions.

1.2 Software Requirement Specification

Functional Requirements:

- Educational institutions should be able to add, edit and view student personaL details, like name, age, gender, email, phone number, address and so on.
- Educational institutions should be able to add, edit and view student academic details, like USN, department, semester and registered courses.
- Faculty should be able to view all student personal details, and should be able to view and edit internal evaluation marks and attendance of students.
- The COE office should be able to view all student details, and view and edit internal and examination marks, and publish results.
- Placement section should be able to view all student details, and add companies coming to the campus for placements.
- Management section should be able to view, add and edit teaching and non-teaching staff details.

Non-Functional Requirements:

- Students should not be allowed to edit0 their personal or academic details.
- The system should be a reliable source of information viewing (most importantly, academic grades) for students, COE and faculty.
- The system should be convenient and easy to use by students, management and faculty.

1.3 Class Diagram

Admin can view and modify the student's records, teachers and department details. The students of the college register themselves in the department and examination and for the courses they are interested in and join the college by taking admission and following all the admission procedures. College conducts Internals and semester end examinations for students.

1.4 State Diagram

The above state diagram describes the states a teaching staff goes through in uploading assignments and books of a course. He or she can also view his profile and logout. The user can upload the assignment and view the date when the assignment was submitted. In uploading the assignment, he can set deadlines, content etc.

1.5 Use Case Diagram

1.5.1 Simple Use Case Diagram

1.5.2 Advanced Use Case Diagram

Actors:

- Admin: The person who manages everything.
- Student: A person who uses the system.
- Teacher: Teaching staff who are in college.

Use Cases:

- Manage details: The admin can update, insert or delete the data.
- Mark attendance: Takes student's attendance.
- Prepare test papers: Test papers for each course.
- Write exams: To clear a subject the exam has to be given.
- Fill registration form: A form to enroll in a course.
- Get enrolled: Submit the registration form.

1.6 Sequence Diagram

1.6.1 Simple Sequence Diagram

The above sequence diagram gives us the steps in accessing the marks and attendance of the student from the database if the login was successful.

1.6.2 Advanced Sequence Diagram

The above sequence diagram gives the interaction between objects for the payment of fees by the student which gives an appropriate message on success or failure of the payment.

1.7 Activity Diagram

1.7.1 Simple Activity Diagram

The activity diagram shows the sequence of steps involved in displaying the student details as viewed by the staff. The staff first need to login and if successful various he or she can view attendance and results of students.

1.7.2 Advanced Activity Diagram

The above activity diagram displays the payment of fees by students. On successful payment it has three swim lanes, where it validates, updates and generates the receipt.

HOSTEL MANAGEMENT SYSTEM

2.1 Problem statement

The purpose of the Hostel Management System is to carry out different operations of a hostel. This system will provide ease of use to the staff of the hostel by performing all work on computers. It helps to manage student and staff records.

2.2 Software Requirement Specification

Functional Requirement -

- Admin can login using credentials provided to him.
- Admin can allot room to students.
- Students can login using the credential provided and can give feedback about staff.
- Admin can review the feedback provided by students.
- Admin can appoint staff.
- Students can provide mess feedback.
- Mess managers can review the mess feedback.
- Mess manager can update the menu list.
- Admin can assign work to staff members.

Non Functional Requirements -

- The system should be easy to handle.
- System should give expected performance results.
- The response time should be small.

2.3 Class diagram

System has an admin who manages the hostel, allot-es and payment methods. The allot-es makes payment according to the bill generated which have the attributes bill number, type and date. The hostel is categorized into two types i.e. boys and girls hostel. A hostel is made up of mess and rooms. A mess account will also generate. This account has the mess status of the whole month.

2.4 State Diagram

The above state diagram gives the movement of states in allotting a room to a student. The admin allots rooms for students. If rooms are available then the admin allots room to the student and when successful the student makes the payment.

2.5 Use Case Diagram

2.5.1 Simple Use Case Diagram

2.5.2 Advanced Use Case Diagram

Actors:

Admin: The person who manages the whole.

Warden: The person who manages the allottes.

Student: The person who uses the hostel system.

Use Cases:

Manage Hostel: Allows actors to update, delete or add information.

Login: Allows actors to login into the system.

Add allottee: The students are allocated hostel rooms.

Book hostel: The student can select the hostel they wish to stay.

Pay fees: The fess payment is done by this use case.

2.6 Sequence Diagram

2.6.1 Simple Sequence Diagram

2.6.2 Advanced Sequence Diagram

The above sequence diagram gives the steps involved in a student logging in, booking a room, which is verified in the database and the payment for the same is made by the student.

2.7 Activity Diagram

2.7.1 Simple Activity Diagram

2.7.2 Advanced Activity Diagram

The activity diagram tells about the activities involved in payment of fees. The student first needs to login and then pay fees for both hostel and mess and finally give feedback. The activity diagram tells about the activities involved in payment of fees. The above activity diagram gives the steps involved in a student logging in, booking a room, which is verified in the database and the payment for the same is made by the student.

Stock Management System

3.1 Problem Statement -

The stock maintenance system will allow the employees to record information of the items available in the store and generate reports based on the total amount of sales.

The new system will have a windows-based desktop interface to allow employees to enter the information of sales, purchase orders, change employee preferences and create reports. The system retains information on all the items in the shop. The system retains the records of the cost, expiry date, vendor details, Discount, quantity. The employee maintains the information of the sale of items. He can add the items at the right time and update the database.

The customer can view the availability of the required items and the price of the items. The customer can just view them but cannot make any changes.

3.2 Software Requirement Specification

The process of the stock maintenance system is that the customer logs in to the particular site to place the order for the customer product. The stock maintenance system is described sequentially through steps

- The customer logs in to the particular site.
- They fill the customer details.
- They place the orders for their product.
- The vendor logs in and views the customer details and orders.

3.3 Class Diagram

Products are displayed in stores across the city or world. All the information regarding the store is used to locate any product. The stores can be of many types. Some of them are departmental stores, super markets and warehouses where the products are kept for display. The vendor deals with the information about the details of the suppliers giving products to the organization. The stock of the products is maintained separately. The stock deals with information about the details of the product that the concern handling.

3.4 State Diagram

The state diagram above gives us the states involved in purchasing a product and placing the order for the same. There is first an inventory check, where the stock of products is noted and if the stock is less than minimum an order is placed by first searching for a suitable trader. If a suitable trader is found , the order is placed and verified by the accountant. After the accountant has verified a payment is made for the products purchased.

3.5 Use Case Diagram

3.5.1 Simple Use Case Diagram

3.5.2 Advanced Use Case Diagram

Use Cases:

1) View Availability: Both inventory manager and customer have the possibility to view inventory information outside the warehouse to check if a stock is available.

2) Order Products: Customers and salespeople have the same kind of requirement. Both of them can make orders. Sales person can do the order on the behalf of the customer or by him/herself.

3) Update product quantity information: When products/parts arrive in the inventory, product quantity information will be updated immediately or when purchase is made, the inventory is updated.

4) Bills: After getting an order, goods will be gathered and then sent to the customer and a bill will be made by the accountant.

5) Maintain Account: An accountant maintains details about the stocks present in the inventory and the cost of items.

Advanced Use case Diagram:

1) Buy stock: The inventory manager/owner will buy stocks from suppliers.
2) Report Quality issues to suppliers: If there are any issues with the quality of stocks supplied by the supplier it has to be reported to the supplier.
3) Return the stock: If the stock's quality is not proper, then the stocks are returned to the supplier.
4) Payment to supplier: Once the stocks are purchased, payment has to be made to the supplier.
5) Sell stock: The stocks are sold to the customer after a request is made by the customer by the inventory manager.

6) Product not found: The searched stock is not present in the inventory.

7) Select product: The customer selects a stock after searching it in the inventory.

8) Buy product: The customer buys the required stock from the inventory.

9) Check availability: The customer checks for availability of the product before buying it and even the warehouse worker keeps a record of availability of stocks.

10) Payment: The customer pays for the stock which he/she purchased from the inventory.

3.6 Sequence Diagram

3.6.1 Simple Sequence Diagram

3.6.2 Advanced Sequence Diagram

3.7 Activity Diagram

3.7.1 Simple Activity Diagram

The state diagram above gives us the states involved in purchasing a product and placing the order for the same. There is first an inventory check, where the stock of products is noted and if the stock is less than minimum an order is placed by first searching for a suitable trader.

3.7.2 Advanced Activity Diagram

Coffee Vending Machine

4.1 Problem statement

The Objective of the system is to prepare a coffee vending machine for commercial purposes. The system will be able to prepare coffee by processing all its required ingredients. User will be provided with sophisticated and easy to use user interface

4.2 Software Requirement Specification

There are many different types of coffee makers using a number of different brewing principles, in the most common devices, coffee grounds are placed in a paper or metal filter inside a funnel, which is set over a glass or ceramic coffee pot, a cooking pot in the kettle family. Cold water is poured into a separate chamber, which is then heated up to the boiling point, and directed into the funnel

- Cash Box:Knows amount of money put in; Give change; Knows price of coffee; Turns front panel on and off.
- Front panel:Captures selection; Knows what to mix in each; Instructs mixer when to mix.
- Mixer:Knows how to talk to the dispensers.
- Dispenser [cup-, coffee powder-, sugar-, creamer-, water-]:Knows how to dispense a fixed amount, knows when it is empty.

Features :

- Small carbon footprint
- Energy saving advanced power management system
- Comprehensive drink range
- Simple user interface
- One touch servicing

Working :

Coffee vending machines are quite simple and basic. The way they work is not too different to how a tabletop coffee machine or even a drip coffee machine operates. If you think about it, making coffee is simply adding together coffee beans or grounds to hot water and mixing with milk and sugar, that's exactly what a hot drink vending machine does.

Functions :

- Add heat:to heat the coffee we have 3 options. We could use a heating element where the water is gravity fed into a tubular heating element, external to the water reservoir, and boiled out. Secondly, we could use a submersible heating element placed inside of the water reservoir to heat all of the water at once. Thirdly, we could use an external hot plate to heat

one or multiple walls of the water reservoir and thus heat the water through surface convection.

- Direct Water:The fluids could be directed from the water reservoir to their final destination via tubing, gravity reed, and pump.
- Contain Water/Coffee:To contain the water and coffee we could use one reservoir, two reservoirs or a funnel. If one reservoir was used for both the water and coffee container, our design would be a percolating or French press coffeemaker.
- Reduce Noise:To reduce the overall noise we consider two options: noise dampening material and internal brew mechanism. To lessen the noise produced by our designs we could fill or cover the outer shell of a noise dampening material. We could also keep the brew mechanism, whether it is drip drops out.

Maintenance: When it comes to the ways in which coffee vending machines work, it's not all about the coffee, it's also about the upkeep and maintenance of the machine. With regular visits, suppliers should empty the cash drawer, reconcile the proceeds against sales, empty the waste grounds, refill ingredients and cups, and generally undertake any work to both the interior and exterior to keep everything running smoothly, such as ensuring there's no build up of dirt around the exterior buttons that could cause them to stick, and making sure nothing is blocking the internal sensors that could prevent some ingredients from being added to the mixing chamber.

4.3 Class Diagram

The vending machine has a coffee dispenser, coin collector, coin dispenser and various components to make coffee. The user has a unique id and the user can choose the kind of coffee from various flavours. Once the payment is done, a bill is generated and coffee is given.

4.4 State Diagram

Initially the vending machine is in the waiting state. The machine displays the selected item by the user. When the person inserts the coin the machine adds the amount to the cumulative balance. After adding some coins, a person can select any item. If an item is empty or the balance is insufficient, the machine waits for another selection. Otherwise the machine dispenses the item and returns the appropriate change.

4.5 Use Case Diagram

4.5.1 Simple Use Case Diagram

4.5.2 Advanced Use Case Diagram

Actor:

Customer: A person who uses the coffee vending machine.

Machine stock clerk: A person who maintains stock.

Use cases:

Display payment details: Displays the payment.

Details request coffee: Allows users to order.

Make payment: Accepts money.

Load ingredients: Clerk fills mahine with ingredients.

Dispense: Coffee is dispensed.

4.6 Sequence Diagram

4.6.1 Simple Sequence Diagram

The sequence diagram tells the steps in ordering a coffee from a coffee vending machine and informing the maintenance in charge and solving any anomalies if any.

4.6.2 Advanced Sequence Diagram

The above sequence diagram gives us the steps involved in dispensing a product from the coffee machine. First an enquiry for the product is made and if available the coins are inserted and calculated, if the correct product is dispensed.

4.7 Activity Diagram

4.7.1 Simple Activity Diagram

The activity diagram above receives the order and forks into two activities i.e make coffee and display order, on choosing an option if the user wants a receipt it gets printed otherwise no and order ends.

4.7.2 Advanced Activity Diagram

The advanced activity diagram has three swimlanes i.e customer, coffee dispenser and payment. The customer can select coffee, insert coins, get change and collect coffee. The coffee dispenser checks for payment and makes, dispenses the coffee. The payment lane accepts coins, calculates the amount and gives back the change.

Online Shopping System

5.1 Problem statement

The online shopping system allows the users and vendors to exchange products remotely and reduces the amount of cost and time substantially.

5.2 Software Requirement Specification

The software provides the following facilities to the customers:

• Facilitates easy shopping online anywhere with free shipping (conditions apply).
• Provides information about the products in categories
• Can avail the facility of purchasing second hand products
• Can reserve if the particular product is not available
• Customers are provided with up to date information on the products available
• Provides email facility for future correspondence
• Provides backup facility
• Can add nearly ten products to their shopping cart at a time

The software will not provide the following facilities to the customers:

• Cannot reserve the product for more than two days.
• Cannot reserve more than two products
• Responsibility of damages
• The product cannot be changeable once confirmed

The software provides the following facilities to the merchants:

• Facilitates easy bidding facility
• Provides complete information about the customers
• Provides complete information about their products
• Can avail the facility of email correspondence
• Can avail the brand catalog facility

5.3 Class Diagram

The online shopping system has customers who must have an account in the online website where he/she can purchase products. If a customer wants to buy the product then he/she must be registered, unregistered users can't go to the shopping cart. Customers login to the system by entering valid user id and password for the shopping. The customer has a choice to make online payment or cash on delivery. After the payment or surf the product the customer will logged out.

5.4 State Diagram

The advanced state chart diagram has states explaining the product purchase and payment. It has two sub machines i.e product selection and checkout product. Product selection allows us to select products and add them to cart. Checkout product has states explaining the payment methods and validating the methods.

5.5 Use Case Diagram

5.5.1 Simple Use Case Diagram

5.5.2 Advanced Use Case Diagram

Actors -

Customer: Uses the online shopping system

Supplier: Supplies product

Payment system: Person who handles the payment

Delivery executive: A person who manages delivery.

Use cases -

View product: Displays all product details

Place order: Order the items present in the cart

Make payment: Accepts payment

Deliver product: Delivery of product is handled

5.6 Sequence Diagram

5.6.1 Simple Sequence Diagram

5.6.2 Advanced Sequence Diagram

The customer logins into the online interface. The items are displayed. The customer adds items into the cart and a reply from the interface is sent. The customer places the order. The on;ine interface requests for payment. The customer provides details and confirmation is sent. The customer logs out.

5.7 Activity Diagram

5.7.1 Simple Activity Diagram

The simple activity diagram gives us activities in purchasing an order and paying for the order. The customer is first made to register and then login into their account. Then the items are displayed, where they can select their choice and pay for them.

5.7.2 Advanced Activity Diagram

Railway Management System

6.1 Problem statement

To develop a user-friendly Railway Reservation System to enable passengers to book tickets online and make payment online as well.

6.2 Software Requirement Specification

Railway reservation system project which provides the train timing details, reservation, billing and cancellation on various types of reservation namely,

- Confirm Reservation for Seat.
- Reservation against Cancellation.
- Waiting list Reservation.
- Online Reservation.
- Tatkal Reservation

This system enables the Advance booking in any class, against general and ladies quota, on payment of fare in full for adults and children, a maximum of six berths/seats at a time, for journey between any two stations served by a train. It also provides details about

1. Timetable
2. Train Fares
3. Current status of reservation position
4. Train available between a pair of stations
5. Accommodation available for a train/date combination Types of tickets: I-ticket, E-ticket and Tatkaal

6.3 Class Diagram

The admin manages the trains and reservations related to the railway reservation system. The passengers with a reservation go to one or the other reservation. A train consists of name and capacity. A passenger pays for the ticket booked. Tickets can be booked in two ways by i-ticket or by e- ticket booking of tatkal ticket.

6.4 State Diagram

The advanced state diagram has states for paying the ticket. From the ready state the user goes to payment initiation after which the card details are accepted and an OTP is sent to the registered mobile number. On verification the money is deducted and a ticket is sent to the customer.

6.5 Use Case Diagram

6.5.1 Simple Use Case Diagram

6.5.2 Advanced Use Case Diagram

Actors:

User: uses the railway reservation system
Admin: manages all information
Railway System: System that is used for train ticket reservation

Use Case:

Register: The first-time user has to create a account in railway system
Book Ticket: User can select the type of coach and no of seats and book the ticket
Make payment: System displays the payment details. User can make his payment.
Cancel Ticket : User can cancel the ticket
Verify login credentials : The database verifies the user details and allows access

6.6 Sequence Diagram

6.6.1 Simple Sequence Diagram

6.6.2 Advanced Sequence Diagram

6.7 Activity Diagram

6.7.1 Simple Activity Diagram

6.7.2 Advanced Activity Diagram

Graphics Editor System

7.1 Problem statement

The graphics editor provides an Application Programmer's Interface that enables a programmer to develop their own graphical model editor for a specific type of model. This API in turn, relies on extending the Eclipse Graphical Editing Framework to provide an environment in which the editor functions, and the programmer can create a graphical editor and palette of shapes in order to modify an underlying model. The graphical editor provides an interface with which the programmer implements said editor for a given underlying model. Such an instance of the graphical editor allows a user to drag objects from a specified model into a working graphical diagram.

7.2 Software RequirementSpecification

It should support following functionalities:

- It includes toolbox with tools such as: Line, Circle, Rectangle, Polygon, Parallelogram, Text, Draw, Eraser
- Color box or palette
- Standard toolbar with options for New, Open, Save, toolbox and Text Toolbox.
- One integrated view to users for toolbar, color box, menu, and graphic screen.
- Easy handling of tools for users.
- Ability to group several drawings into one i.e. complex drawing.
- Provision of zoom in and zoom out.
- Different shadings of line tools are provided.

7.3 Class Diagram

The graphics editor consists of documents with many sheets. Each sheet has a drawing object including text and groups of geometric objects.

7.4 State Diagram

Advanced state model has a composite state called saving and a sub machine called a drawing system.

7.5 Use Case Diagram

7.5.1 Simple Use Case Diagram

7.5.2 Advanced Use Case Diagram

Actor -

User : who uses the system

Graphics editor: who manages the system

Use Case -

Create document: Create new document

Edit document: Edit existing document

Display toolbox: Displays all available tools

7.6 Sequence Diagram

7.6.1 Simple Sequence Diagram

7.6.2 Advanced Sequence Diagram

The graphics editor displays options to the user. The user selects the option. The graphics editor displays shape. The user selects shape and parameters for the same. Graphics editor displays the diagram.

7.7 Activity Diagram

7.7.1 Simple Activity Diagram

7.7.2 Advanced Activity Diagram

The advanced activity diagram gives the states involved in making and saving a graphic file. The user selects a new document and draws graphics, saves the file and closes it.