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Sri Indu

College of Engineering & Technology

UGC Autonomous Institution

Recognized under 2(f) & 12(B) of UGC Act 1956,
NAAC, Approved by AICTE &
Permanently Affiliated to JNTUH

Estd.2001

NAAC

NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

SOFTWARE ENGINEERING LAB
(R22INF3126)

LAB MANUAL

III Year I Semester

DEPARTMENT OF INFORMATION TECHNOLOGY

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH –INFORMATION TECHNOLOGY

INSTITUTION VISION

To be a premier Institution in Engineering & Technology and Management with competency, values and social consciousness.

INSTITUTION MISSION

IM1 Provide high quality academic programs, training activities and research facilities.

IM2 Promote Continuous Industry-Institute Interaction for Employability, Entrepreneurship, Leadership and Research aptitude among stakeholders.

IM3 Contribute to the Economical and technological development of the region, state and nation.

DEPARTMENT VISION

To be a recognized knowledge centre in the field of Information Technology with self - motivated, employable engineers to society.

DEPARTMENT MISSION

The Department has following Missions:

DM1 To offer high quality student centric education in Information Technology.

DM2 To provide a conducive environment towards innovation and skills.

DM3 To involve in activities that provide social and professional solutions.

DM4 To impart training on emerging technologies namely cloud computing and IOT with involvement of stake holders.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: **Higher Studies:** Graduates with an ability to apply knowledge of Basic sciences and programming skills in their career and higher education.

PEO2: **Lifelong Learning:** Graduates with an ability to adopt new technologies for ever changing IT industry needs through Self-Study, Critical thinking and Problem solving skills.

PEO3: **Professional skills:** Graduates will be ready to work in projects related to complex problems involving multi-disciplinary projects with effective analytical skills.

PEO4: **Engineering Citizenship:** Graduates with an ability to communicate well and exhibitsocial, technical and ethical responsibility in process or product.

PROGRAM OUTCOMES (POs) & PROGRAM SPECIFIC OUTCOMES (PSOs)

PO	Description
PO 1	**Engineering Knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
PO 2	**Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
PO 3	**Design/Development of Solutions:** Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
PO 4	**Conduct Investigations of Complex Problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).
PO 5	**Engineering Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
PO 6	**The Engineer and The World:** Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
PO 7	**Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
PO 8	**Individual and Collaborative Team work:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
PO 10	**Project Management and Finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
PO 11	**Life-Long Learning:** Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)
Program Specific Outcomes	
PSO 1	**Software Development:** To apply the knowledge of Software Engineering, Data Communication, Web Technology and Operating Systems for building IOT and Cloud Computing applications.
PSO 2	**Industrial Skills Ability:** Design, develop and test software systems for world-wide network of computers toprovide solutions to real world problems.
PSO 3	**Project implementation:** Analyze and recommend the appropriate IT Infrastructure required for the implementationof a project.

GENERAL LABORATORY INSTRUCTIONS

1. Students are advised to come to the laboratory at least 5 minutes before (to the starting time),those who come after 5 minutes will not be allowed into the lab.
2. Plan your task properly much before to the commencement, come prepared to the lab with thesynopsis / program / experiment details.
3. Student should enter into the laboratory with:
    a) Laboratory observation notes with all the details (Problem statement, Aim, Algorithm,Procedure, Program, Expected Output, etc.,) filled in for the lab session.
    b) Laboratory Record updated up to the last session experiments and other utensils (if any)needed in the lab.
    c) Proper Dress code and Identity card.
4. Sign in the laboratory login register, write the TIME-IN, and occupy the computer system allotted to you by the faculty.
5. Execute your task in the laboratory, and record the results / output in the lab observation notebook, and get certified by the concerned faculty.
6. All the students should be polite and cooperative with the laboratory staff, must maintain thediscipline and decency in the laboratory.
7. Computer labs are established with sophisticated and high end branded systems, which should be utilized properly.
8. Students / Faculty must keep their mobile phones in SWITCHED OFF mode during the lab sessions. Misuse of the equipment, misbehaviors with the staff and systems etc., will attract severe punishment.
9. Students must take the permission of the faculty in case of any urgency to go out ; if anybody found loitering outside the lab / class without permission during working hours will be treated seriously and punished appropriately.
10. Students should LOG OFF/ SHUT DOWN the computer system before he/she leaves the labafter completing the task (experiment) in all aspects. He/she must ensure the system / seat is kept properly.

Head of the Department **Principal**

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE OUTCOMES (CO's)

COURSE NAME: SOFTWARE ENGINEERING LAB (C31L1)

Course Outcomes (COs)	
C31L1.1	To understand the software engineering methodologies involved in the phases for project development. (understanding)
C31L1.2	To gain knowledge about open source tools used for implementing software engineering methods (understanding)
C31L1.3	To develop product-prototypes implementing software engineering methods. (Creating)

Course Articulation Matrix

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PS O2	PS O3
C31L 1.1	2	2	1	-	1	-	-	-	2	2	1	-	2	3
C31L 1.2	2	2	3	-	2	-	-	-	2	2	1	-	2	2
C31L 1.3	2	2	3	-	1	-	-	-	2	-	1	-	2	3
	2	2	2.3	-	1.3	-	-	-	2	-	1	-	2	2.67

TABLE OF CONTENTS

1. DIMENSIONS OF THE LAB

Area of the lab in Sqmts	: 66 Sqm
2. CAPACITY OF THE LAB	: 60 Students

3. EQUIPMENTS

Computer Systems (Clients)	: 60
CPU	: 60
Monitors	: 60
Key Board	: 60
Mouse	: 60
4. SYSTEM CONFIGURATION	**: Intel ®Core™ I3**
Speed	: 3.10 GHz, 2GB RAM
Hard Disk	: 500 GB
HCL LED Monitor Size	: 18.5
5. SOFTWARE	**: Star UML**

6. AMBIENCE

Printers	: 01
Projector	: 01
Computer Tables	: 60
Student Chairs	: 60
Charts	: 02
Photo Frames	: 03
Switch/Hub	: 03
White Boards	: 01
A/C s	: 02
Power Backup	: UPS

Contents of Lab Manual

Contents of Lab manual (Teacher):

1. Index
2. List of experiments as per the university.
3. List of experiments to be conducted for this semester. Add the additional experiments list separately.
4. Cycle to indicate schedule and the batch size.
5. Content of the experiment. (for IT/Computer labs flow charts/ algorithm should be given with input and output. Program should also include. For other than computer labs master reading to be taken and noted).

LAB OBJECTIVE

- To understand the software engineering methodologies involved in the phases for project development.
- To gain knowledge about open source tools used for implementing software engineering methods.
- To exercise developing product-startups implementing software engineering methods.
- Open source Tools: Star UML / UML Graph / To phased

List of Experiments

S. No.	List of Experiments
1	Course Management System
2	Easy Leave
3	E-Bidding
4	Electronic Cash Counter
5	Library Management System
S. No.	**List of Additional Experiments**
1	Course Management System
2	Sequence Diagram for Airline Reservation System

SYLLABUS

Prepare the following documents and develop the software project startup, prototype model, using software engineering methodology for at least two real time scenarios or for the sample experiments.

- Problem Analysis and Project Planning -Thorough study of the problem–Identify Project scope, Objectives and Infrastructure.
- Software Requirement Analysis –Describe the individual Phases/modules of the project and Identify deliverables. Identify functional and non-functional requirements.
- Data Modeling –Use work products –data dictionary.
- Software Designing -Develop use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.
- Prototype model –Develop the prototype of the product.

The SRS and prototype model should be submitted for end semester examination.

List of Sample Experiments:

1. **Course management system (CMS)**A course management system (CMS) is a collection of software tools providing an online environment for course interactions. A CMS typically includes a variety of online tools and environments, such as:
   - An area for faculty posting of class materials such as course syllabus and handouts
   - An area for student posting of papers and other assignments
   - A grade book where faculty can record grades and each student can view his or her grades
   - An integrated email tool allowing participants to send announcement email messages to the entire class or to a subset of the entire class
   - A chat tool allowing synchronous communication among class participants
   - A threaded discussion board allowing asynchronous communication among participants.

   In addition, a CMS is typically integrated with other databases in the university so that students enrolled in a particular course are automatically registered in the CMS as

The Course Management System (CMS) is a web application for department personnel, Academic Senate, and Registrar staff to view, enter, and manage course information formerly Submitted via paper. Departments can use CMS to create new course proposals, submit changes for existing courses, and track the progress of proposals as they move through the stages of online approval.

2. Easy Leave

This project is aimed at developing a web based Leave Management Tool, which is of importance to either an organization or a college. The Easy Leave is an Intranet based application that can be accessed throughout the Organization or a specified group/Dept. This system can be used to automate the workflow of leave applications and their approvals. The periodic crediting of leave is also automated. There are features like notifications, cancellation of leave, automatic approval of leave, report generators etc in this Tool.

Functional components of the project:

There are registered people in the system. Some are approvers. An approver can also be a Requestor. In an organization, the hierarchy could be Engineers/Managers/Business Managers/Managing Director etc. In a college, it could be Lecturer/Professor/Head of the Department/Dean/Principal etc.

Following is a list of functionalities of the system: A person should be able to

- login to the system through the first page of the application
- change the password after logging into the system
- see his/her eligibility details (like how many days of leave he/she is eligible for etc)
- query the leave balance
- see his/her leave history since the time he/she joined the company/college
- apply for leave, specifying the from and to dates, reason for taking leave, address for communication while on leave and his/her superior's email id
- see his/her current leave applications and the leave applications that are submitted to him/her for approval or cancellation

- approve/reject the leave applications that are submitted to him/her
- withdraw his/her leave application (which has not been approved yet)
- Cancel his/her leave (which has been already approved). This will need to be approved by his/her Superior
- get help about the leave system on how to use the different features of the system
- As soon as a leave application /cancellation request /withdrawal /approval /rejection /password-change is made by the person, an automatic email should be sent to the person and his superior giving details about the action
- The number of days of leave (as per the assumed leave policy) should be automatically credited to everybody and a notification regarding the same be sent to them automatically
- An automatic leave-approval facility for leave applications which are older than 2 weeks should be there. Notification about the automatic leave approval should be sent to the person as well as his superior

3. E-Bidding

Auctions are among the latest economic institutions in place. They have been used since Antiquity to sell a wide variety of goods, and their basic form has remained unchanged. In this dissertation, we explore the efficiency of common auctions when values are interdependent-the value to a particular bidder may depend on information available only to others-and asymmetric. In this setting, it is well known that sealed-bid auctions do not achieve efficient allocations in general since they do not allow the information held by different bidders to be shared.

Typically, in an auction, say of the kind used to sell art, the auctioneer sets a relatively low initial price. This price is then increased until only one bidder is willing to buy the object, and the exact manner in which this is done varies. In my model a bidder who drops out at some price can "reenter" at a higher price.

With the invention of E-commerce technologies over the Internet the opportunity to bid from the comfort of one's own home has seen a change like never seen before. Within the span of a few short years, what may have began as an experimental idea has grown to an immensely popular hobby, and in some cases, a means of livelihood, the Auction Patrol gathers tremendous response every day, all day. With the point and click of the mouse, one may bid

on an item they may need or just want, and in moments they find that either they are the top bidder or someone else wants it more, and you're outbid! The excitement of an auction all from the comfort of home is a completely different experience. Society cannot seem to escape the criminal element in the physical world, and so it is the same with Auction Patrols.This is one area where in a question can be raised as to how safe Auction Patrols.

Proposed system

To generate the quick reports

To make accuracy and efficient calculations

To provide proper information briefly

To provide data security

To provide huge maintenance of records

Flexibility of transactions can be completed in time

4. Electronic Cash counter

This project is mainly developed for the Account Division of a Banking sector to provide better interface of the entire banking transactions. This system is aimed to give a better out look to the user interfaces and to implement all the banking transactions like:

- Supply of Account Information
- New Account Creations
- Deposits
- Withdraws
- Cheque book issues
- Stop payments
- Transfer of accounts
- Report Generations.

Proposed System:

The development of the new system contains the following activities, which try to automate the entire process keeping in view of the database integration approach.

- User friendliness is provided in the application with various controls.
- The system makes the overall project management much easier and flexible.
- Readily upload the latest updates, allows user to download the alerts by clicking the URL.
- There is no risk of data mismanagement at any level while the project development is under process.
- It provides high level of security with different level of authentication

REFERENCE BOOKS:

1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Edition, 6th edition, 2001.
2. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000
3. Unified modeling language- Grady booch

Experiment - 1
COURSE MANAGEMENT SYSTEM

OBJECTIVE:

A **course management system (CMS)** is a collection of software tools providing an online environment for course interactions. A CMS typically includes a variety of online tools and environments, such as:

- An area for faculty posting of class materials such as course syllabus and handouts
- An area for student posting of papers and other assignments
- A grade book where faculty can record grades and each student can view his or her grades
- An integrated email tool allowing participants to send announcement email messages to the entire class or to a subset of the entire class
- A chat tool allowing synchronous communication among class participants
- A threaded discussion board allowing asynchronous communication among participants.

In addition, a CMS is typically integrated with other databases in the university so that students enrolled in a particular course are automatically registered in the CMS as participants in that course.

The Course Management System (CMS) is a web application for department personnel, Academic Senate, and Registrar staff to view, enter, and manage course information formerly Submitted via paper. Departments can use CMS to create new course proposals, submit changes for existing courses, and track the progress of proposals as they move through the stages of online approval.

Problem Analysis and Project Planning

A course management system is a set of tools that enables an online environment for course interaction i.e. to create online course content and post it on the Web without having to handle HTML or other programming languages.

Course management system become an integral a part of the upper education system. They create teaching and course management easier by providing a framework and set of tools for faculties and for students.

RESOURCE:

Software Requirement Analysis

(1) Module Summary:

(1.1) Administrator Module:

Admin can produce accounts for college students and faculties and make course programmed list and add faculties and students to it course list.

Admin can produce course details exploitation course creation kind that consists in fact name, course id, and choose student. Using Student creator kind student details are entered to information. User name, adapt username, password, given name and name, ID. After accounts are produced supported every students and instructors are divided and accessorial to list exploitation create missing student kind.

(1.2) Faculty Module:

It can check student's papers, their assignments and assign grades for work. This module accommodates preparation menu, choose student for grades.

(1.3) Students Module: Student can register with application or the proposed system and login with user name and password. He will check and submit assignment and his/her grade. Every student can have id.

1.2 PROCEDURE:

(2)Functional and Non-Functional Requirements

(2.1)Functional Requirements:

(2.1.1) Creating Courses

(2.1.2) Grade Management

a. Allow grades to be entered online: The system shall allow instructors to enter and modify grades online.
b. Allow students to access their grades online: The system shall allow student to log in their account and check their grades at any time.
c. The system shall provide statistical information such as averages, standard deviation, and median about student's grades.
d. Track and Handle Regrade Requests: The system shall be able to track and handle requests for re- grades, and all information about re-grades shall be available to the student, and the course instructor.

(2.1.3) Paper and Assignment Submission

a. Accept submissions in multiple formats: The system shall accept submissions in multiple formats, including .zip, .cpp, .txt, .doc,etc.
b. Support for late submissions: The system shall provide information about late submissions, and also disallow submissions after a certain period of time.
c. Integration with grade management: The homework submission system shall be integrated with the grade management by using online grading templates that can be filled out, and automatically annotating code with line numbers.

1. Assignment grades can be automatically posted to student account.
2. Grader comments can be sent along with the grades.

(2.1.4)Create Accounts

a. The system shall automatically create accounts for each class.

1. Create one account for course instructor regardless to the number of classes that he/she teaches.
2. The account username is course name and its number.
3. The account password is the same password that in Academic Information System (AIS).
4. Any change in the password in AIS the system shall reflect it on the instructor account password in CMS.

5. Create one account for each student that registered in this class.
6. The account username is course name and its number.
7. The account password is the same password that in Student Information System (SIS).
8. Any change in the password in SIS the system shall reflect it on the student account password in CMS.

b. Instructor account contain the classes that he/she teach, each class contain list of student that ordered based on student serial number.

c. Instructor can modify student grades from his/her account.

(2.2) Non-Functional Requirements:

(2.2.1) Response Time

a. Average response time shall be less than 2 second.

(2.2.2) Throughput

a. The system shall accommodate 1000 booked per minute.

(2.2.3) Recovery Time

a. In case of a system failure, redundant system shall resume operations within 30 sec.

b. Average repair time shall be less than 1 hour.

(2.2.4) Start-up/Shutdown Time

a. The system shall be operational within 1 minute of starting-up.

(2.2.5) Capacity

a. The system accommodates 4000 concurrent users.

(2.2.6) Utilization of Resources

a. The system shall store in the database no more than one million transactions.
b. If the database grows over this limit, old transaction shall be backed up and deleted from the operational database.

(2.2.7) Security

a. Firewall Protection: The course management software system shall run inside a firewall.
b. Support different roles: The system shall support different roles for users, such as Instructors, Students, and administrative staff, the user logged in with given role should only be allowed access consistent with that role. For example a student shall only be allowed to see he/she grades not to modify it.

(2.2.8) Reliability

a. The system shall not be down more 2 times in year.

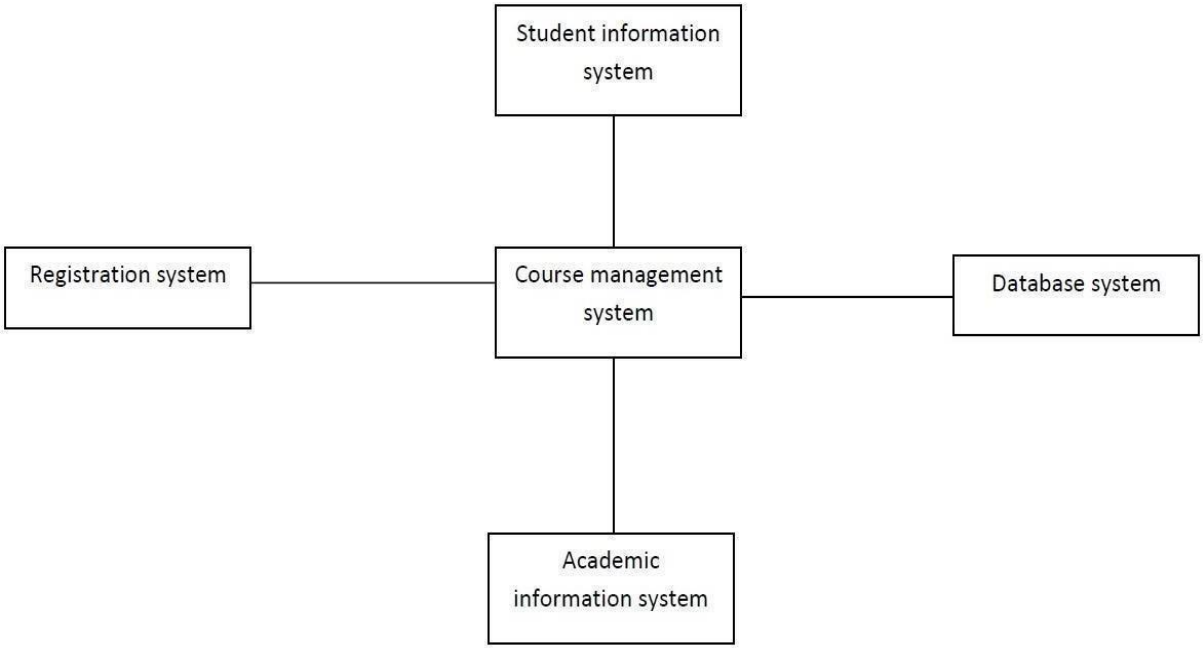
(2.2.9) Scalability

a. Scaling the system to large number of users: large courses will have hundreds of students.
b. The system shall be able to handle the load for such courses, especially near assignment deadlines when many students can be expected to access the course management system.

DATA MODELING and DESIGN

(1) Product Perspective

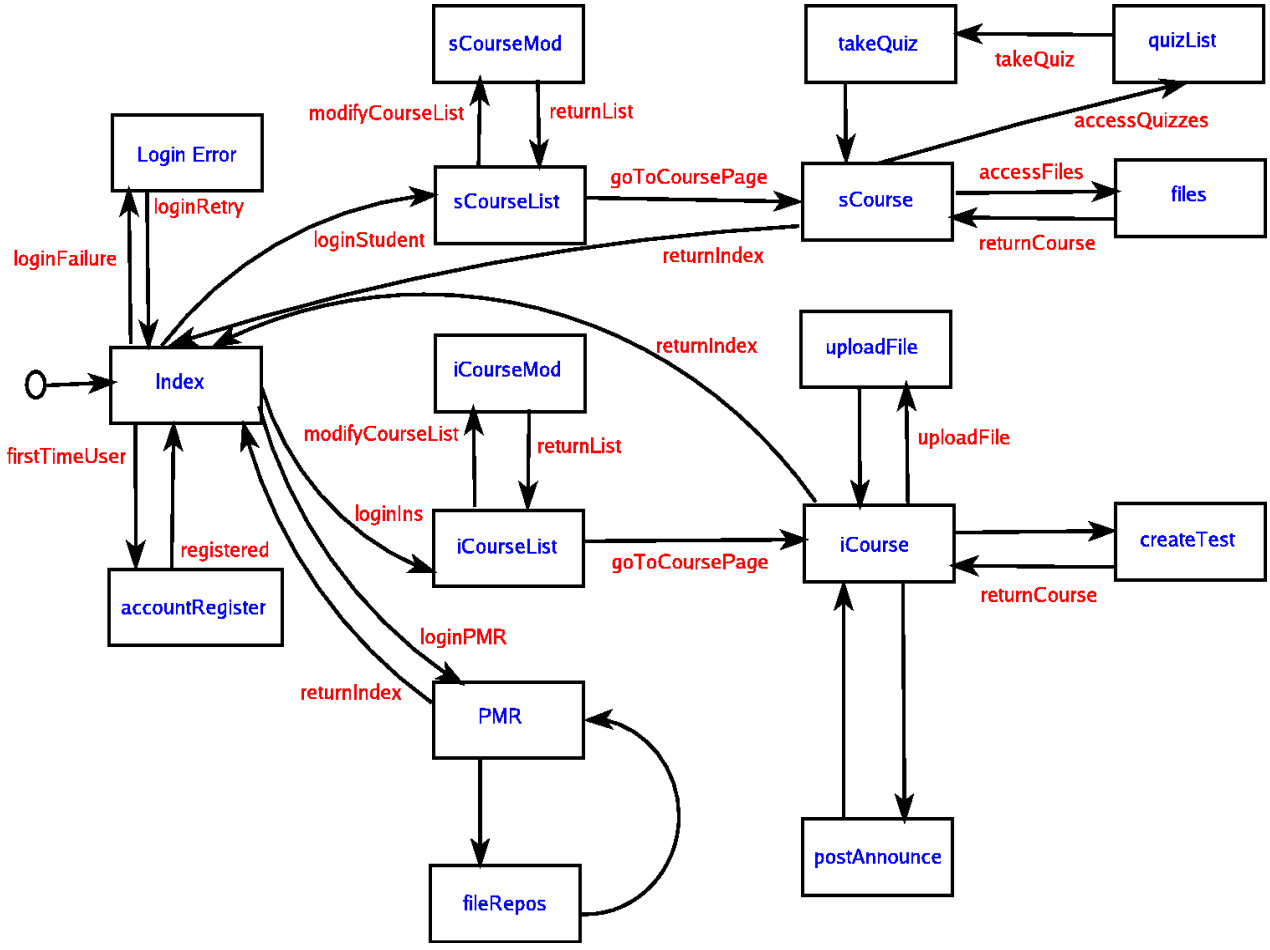
The system will be operating within university environment. This environment has another systems that will interact with this system so we need interfaces between these



system

(2) Flow Chart

The below diagram will provide the overall flow of the project.



(3) Data Dictionary

(3.1)StudentDetails

FIELD NAME	TYPE	CONSTRAINTS
Sid	Varchar2	Primary key
Name	Varchar2	
Roll_No	Varchar2	Not null
Regulation	Varchar	
Courseid	Number	Foreign key
grade	Char	
Fid	Varchar2	Foreign Key

(3.2) Course Details

FIELD NAME	TYPE	CONSTRAINTS
Courseid	Number	Primary key
CourseName	Varchar2	
Start_date	Date	
End_date	Date	

Subject	Varchar2	not null

(3.3) FacultyDetails

FIELD NAME	TYPE	CONSTRAINTS
Fid	Varchar2	Primary key
Name	Varchar2	
Courseid	Number	Foreign Key
Designation	Varchar	
Subject	Varchar	

(3.4) LoginDetails

FIELD NAME	TYPE	CONSTRAINTS
Userid	Varchar2	Unique
Password	Varchar2	Not null

Software Designing

UML

UML stands for Unified Modeling Language. This object-oriented system of notation has evolved from the work of Grady Booch, James Rum Baugh, Ivar Jacobson, and the Rational Software Corporation. These renowned computer scientists fused their respective technologies into a single, standardized model. Today, UML is accepted by the Object Management Group (OMG) as the standard for modeling object oriented programs.

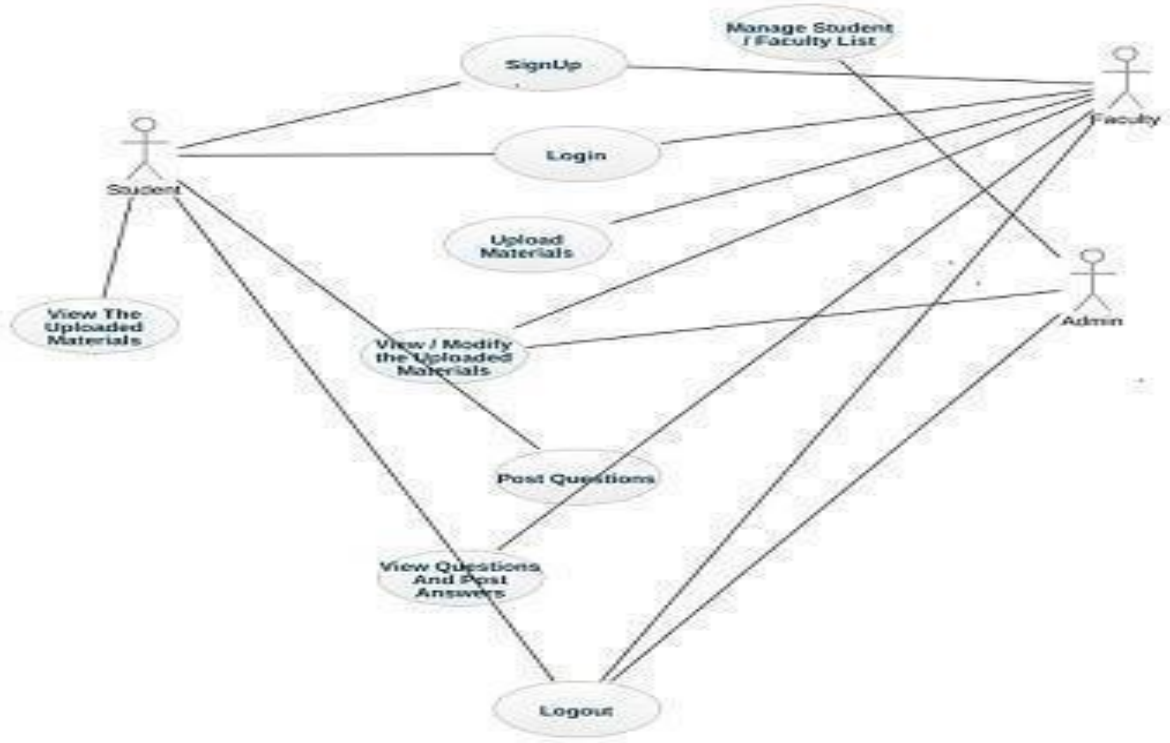
UML Diagrams

UML defines nine types of diagrams: class (package), object, use case, sequence, collaboration, state chart, activity, component, and deployment diagram.

(1) Use Case Diagram

Use case diagrams are used to gather the requirements of a system including internal and external influences. These requirements are mostly design requirements. Hence, when a system is analyzed to gather its functionalities, use cases are prepared and actors are identified. The purposes of use case diagrams can be defined as follows −

- Used to gather the requirements of a system.
- Used to get an outside view of a system.
- Identify the external and internal factors influencing the system.
- Show the interaction among the requirements is actors.

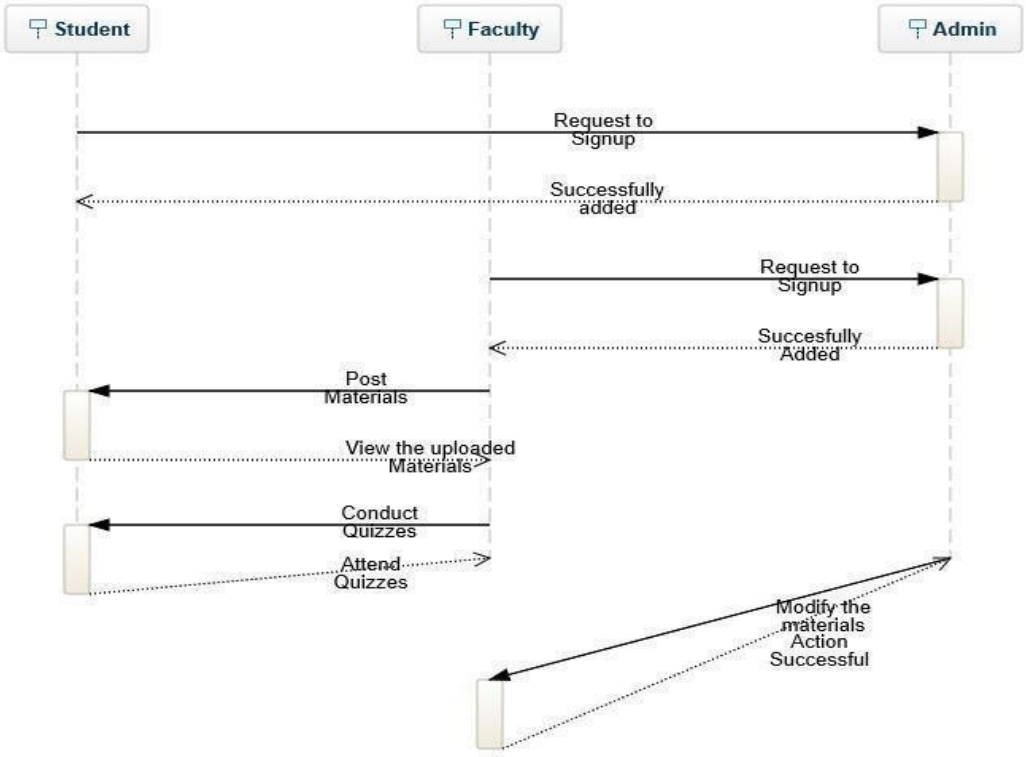


Sequence Diagram

This interactive behavior is represented in UML by Sequence **diagram**. Sequence diagram emphasizes on time sequence of messages that send and receive messages.

Following things are to be identified clearly before drawing the sequence diagram

- Objects taking part in the interaction.
- Message flows among the objects.
- The sequence in which the messages are flowing.
- Object organization.

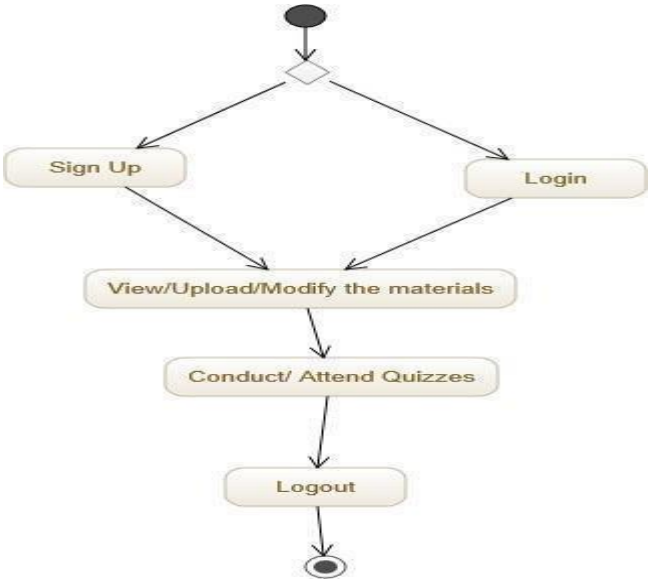


Activity Diagram

The basic purposes of activity diagrams are to captures the dynamic behavior of the system. Activity is a particular operation of the system. Activity diagrams are not only used for visualizing the dynamic nature of a system, but they are also used to construct the executable system by using forward and reverse engineering techniques. The only missing thing in the activity diagram is the message part.

The purpose of an activity diagram can be described as −

- Draw the activity flow of a system.
- Describe the sequence from one activity to another.
- Describe the parallel, branched and concurrent flow of the system.

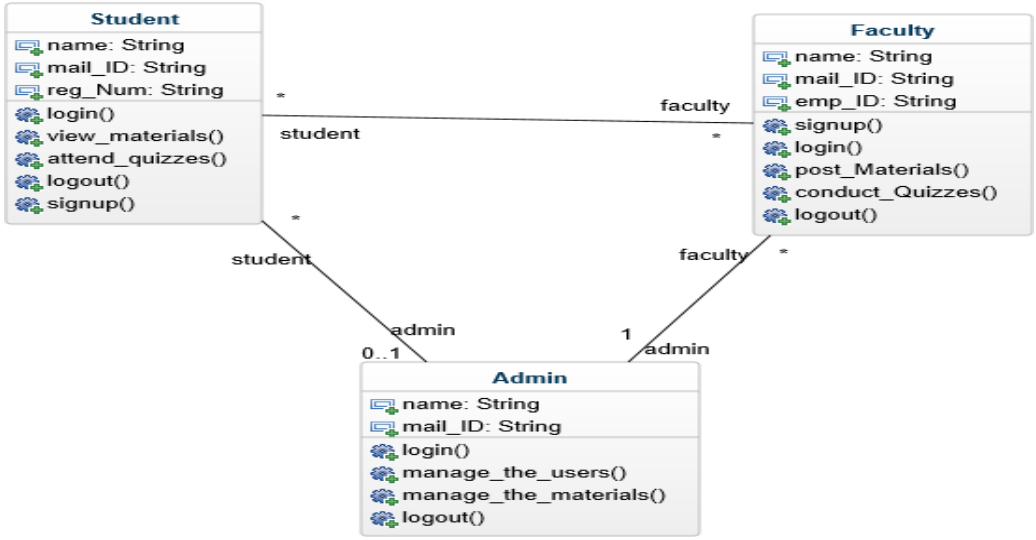


Class Diagram

The purpose of class diagram is to model the static view of an application. Class diagrams are the only diagrams which can be directly mapped with object-oriented languages and thus widely used at the time of construction.

The purpose of the class diagram can be summarized as −

- Analysis and design of the static view of an application.
- Describe responsibilities of a system.
- Base for component and deployment diagrams.
- Forward and reverse engineering.

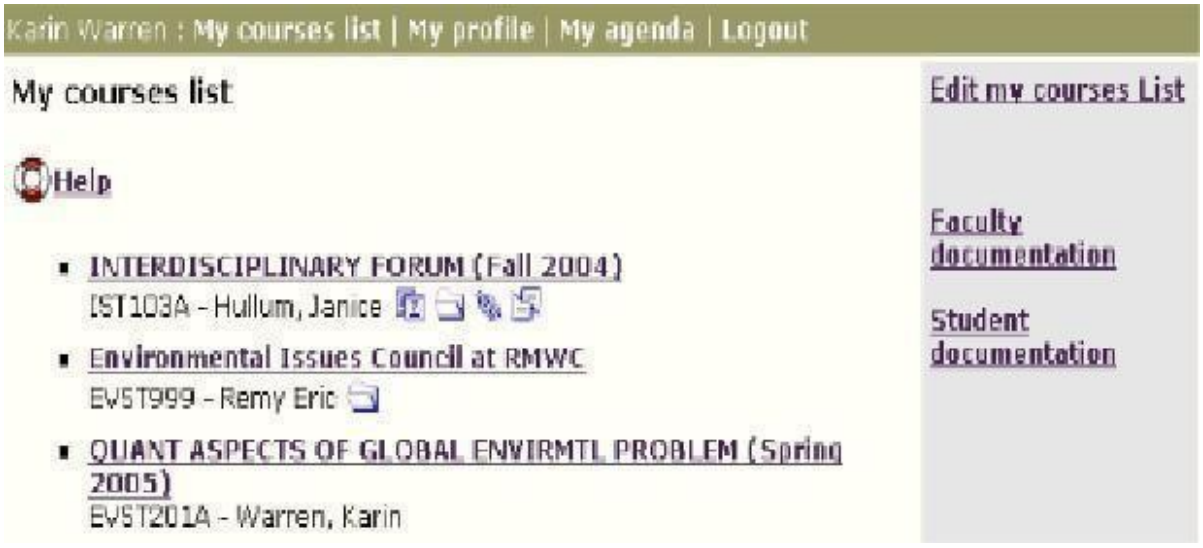


Prototype model

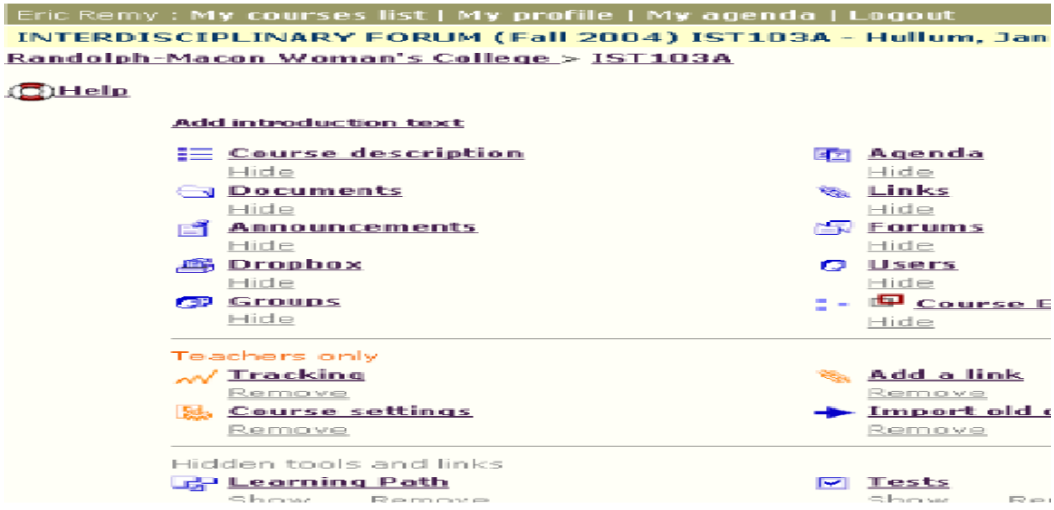
Prototype is a working model of software with some limited functionality. The prototype does not always hold the exact logic used in the actual software application and is an extra effort to be considered under effort estimation.

Prototyping is used to allow the users evaluate developer proposals and try them out before implementation. It also helps understand the requirements which are user specific and may not have been considered by the developer during product design.

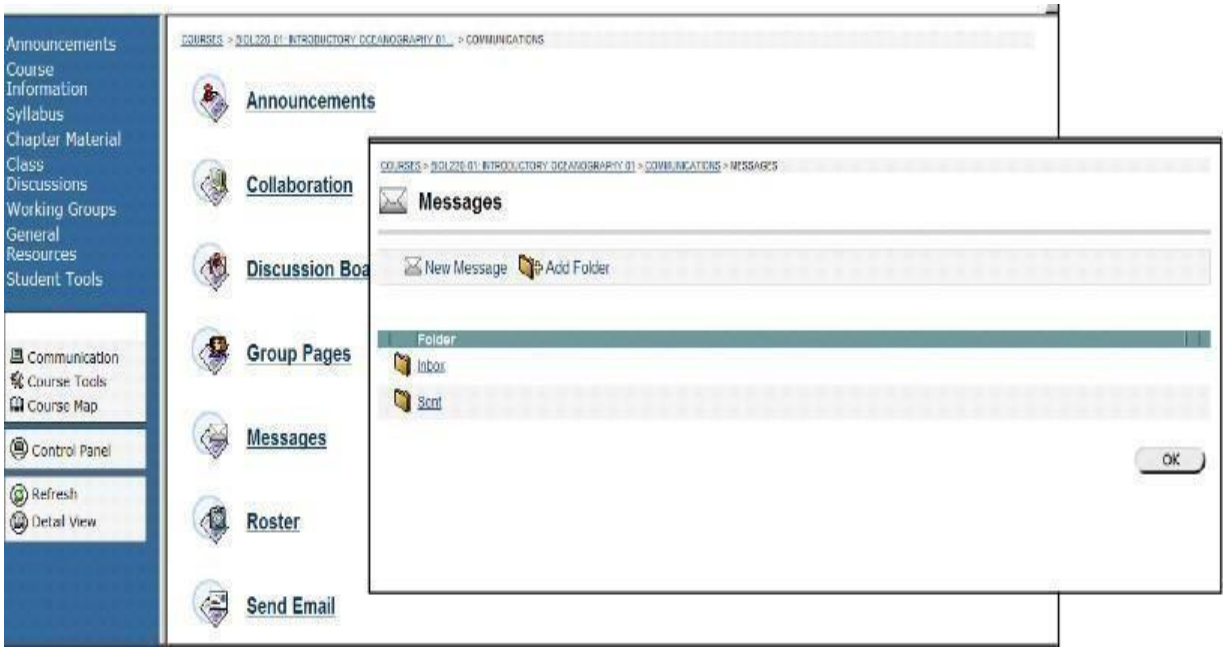
To get course List



Following fields are available in this project



Internal asynchronous messaging – mail that can be sent and read from within an online course



PRE LAB QUESTIONS

1) Describe various phases of a software project.
2) Explain about various process models.

LAB ASSIGNMENT

1) Analyze at which type of situations which process model can be used in a project.
2) Prepare Software Specification document (SRS) for the given project.

POST LAB QUESTIONS

1) Explain various phases of a software project with brief description.
2) Explain how design can be constructed from analysis.
3) Describe the coding and testing process in a software project.

Experiment - 2
EASY LEAVE

OBJECTIVE:

This project is aimed at developing a web based Leave Management Tool, which is of importance to either an organization or a college. The Easy Leave is an Intranet based application that can be accessed throughout the Organization or a specified group/Dept. This system can be used to automate the workflow of leave applications and their approvals. The periodic crediting of leave is also automated. There are features like notifications, cancellation of leave, automatic approval of leave, report generators etc in this Tool.

Functional components of the project:

There are registered people in the system. Some are approvers. An approver can also be a requestor. In an organization, the hierarchy could be Engineers/Managers/Business Managers/Managing Director etc. In a college, it could be Lecturer/Professor/Head of the Department/Dean/Principal etc.

Following is a list of functionalities of the system: A person should be able to

- login to the system through the first page of the application
- change the password after logging into the system
- see his/her eligibility details (like how many days of leave he/she is eligible for etc)
- query the leave balance
- see his/her leave history since the time he/she joined the company/college
- apply for leave, specifying the form and to dates, reason for taking leave, address for communication while on leave and his/her superior's email id
- see his/her current leave applications and the leave applications that are submitted to him/her for approval or cancellation
- approve/reject the leave applications that are submitted to him/her
- withdraw his/her leave application (which has not been approved yet)
- Cancel his/her leave (which has been already approved). This will need to be approved by his/her Superior
- get help about the leave system on how to use the different features of the system

- As soon as a leave application /cancellation request /withdrawal /approval /rejection /password-change is made by the person, an automatic email should be sent to the person and his superior giving details about the action
- The number of days of leave (as per the assumed leave policy) should be automatically credited to everybody and a notification regarding the same be sent to them automatically
- An automatic leave-approval facility for leave applications which are older than 2 weeks should be there. Notification about the automatic leave approval should be sent to the person as well as his superior

RESOURCE

Problem Analysis and Project Planning

In the existing Leave Record Management System, every College/Department follows manual procedure in which faculty enters information in a record book. At the end of each month/session, Administration Department calculates leave/s of every member which is a time taking process and there are chances of losing data or errors in the records. This module is a single leave management system that is critical for HR tasks and keeps the record of vital information regarding working hours and leaves. It intelligently adapts to HR policy of the management and allows employees and their line managers to manage leaves and replacements (if required).

In this module, Head of Department (HOD) will have permissions to look after data of every faculty member of their department. HOD can approve leave through this application and can view leave information of every individual. This application can be used in a college to reduce processing work load. This project's main idea is to develop an online centralized applicationconnected to database which will maintain faculty leaves, notices information and their replacements (if needed). Leave management application will reduce paperwork and maintainrecord in a more efficient & systematic way. This module will also help to calculate the number of leaves taken monthly/annually and help gather data with respect to number of hours' worked, thereby helping in calculating the work hours by the HR Department.

Software Requirement Analysis

In the existing paper work related to leave management, leaves are maintained using the attendance register for staff. The staff needs to submit their leaves manually to there

respective authorities. This increases the paperwork & maintaining the records becomes tedious. Maintaining notices in the records also increases the paperwork. The main objective of the proposed system is to decrease the paperwork and help in easier record maintenance by having a particular centralized Database System, where Leaves and Notices are maintained. The proposed system automates the existing system. It decreases the paperwork and enables easier record maintenance. It also reduces chances of Data loss. This module intelligently adapts to HR policy of the management &allows employees and their line managers to manage leaves and replacements for better scheduling of workload. The application basically contains the given modules:

PROCEDURE :

Module:

1) **STAFF MODULE:** It consist of two types of faculties

a) Teaching

b) Non-teaching

2) **HOD MODULE:** It consists of Head of the Department/Manager Body which takes critical decision related to HR.

3) **ADMINISTRATION MODULE:** It calculates leaves & maintains records.

Objective:

- To automate the existing leave management in educational institutes
- To decrease the paperwork and enable the process with efficient, reliable record maintenance by using centralized database, thereby reducing chances of data loss
- To provide for an automated leave management system that intelligently adapts to HR policy of the organization and allows employees and their line managers to manage leaves and replacements for better scheduling of work load & processes.

Functional Requirements:

- login to the system through the first page of the application
- change the password after logging into the system
- see his/her eligibility details (like how many days of leave he/she is eligible for etc)
- query the leave balance
- see his/her leave history since the time he/she joined the company/college
- apply for leave, specifying the form and to dates, reason for taking leave, and address for communication while on leave and his/her superior's email id

- see his/her current leave applications and the leave applications that are submitted to him/her for approval or cancellation
- approve/reject the leave applications that are submitted to him/her
- withdraw his/her leave application (which has not been approved yet)
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- get help about the leave system on how to use the different features of the system
- As soon as a leave application /cancellation request /withdrawal /approval /rejection /password-change is made by the person, an automatic email should be sent to the person and his superior giving details about the action
- The number of days of leave (as per the assumed leave policy) should be automatically credited to everybody and a notification regarding the same be sent to them automatically
- An automatic leave-approval facility for leave applications which are older than 2 weeks should be there. Notification about the automatic leave approval should be sent to the person as well as his superior

Non-Functional Requirements:

Security

a. Firewall Protection: The Easy leave software system shall run inside a firewall.
b. Support different roles: The system shall support different roles for users, such as Lecturer/Professor/Head of the Department/Dean/Principal, the user logged in with given role should only be allowed access consistent with that role.

Scalability

a. Scaling the system to large number of users: As faculties are going to use easy leave server every time to apply leaves.

b. The system should able to operate properly when the web application is accessed by many users at a single time.

Utilization of Resources

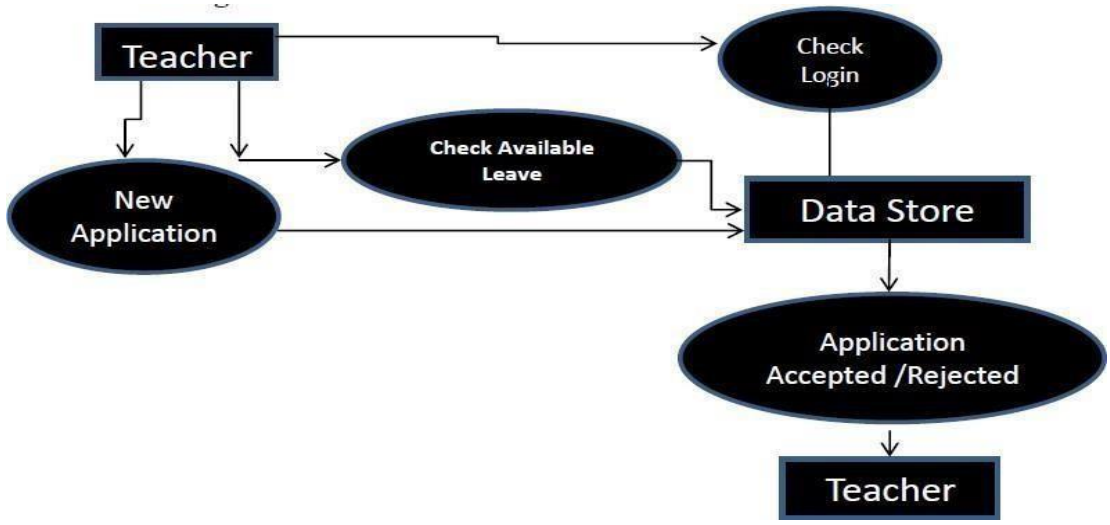
a. The system shall store in the database no more than one million transactions.

b. If the database grows over this limit, old transaction shall be backed up and deleted from the operational database.

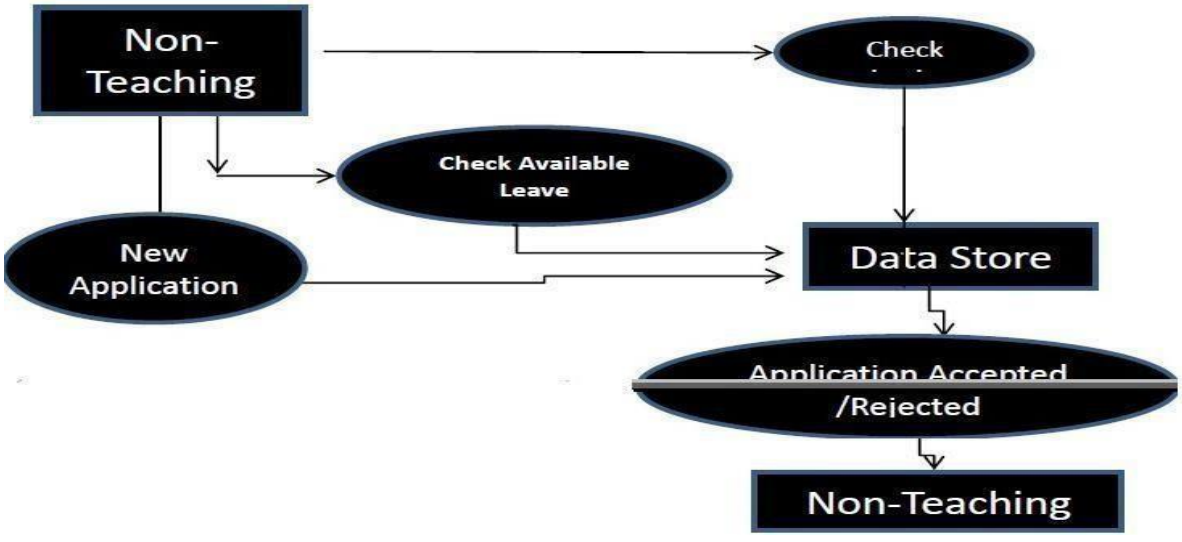
Data Modeling

1. Data Flow Diagram

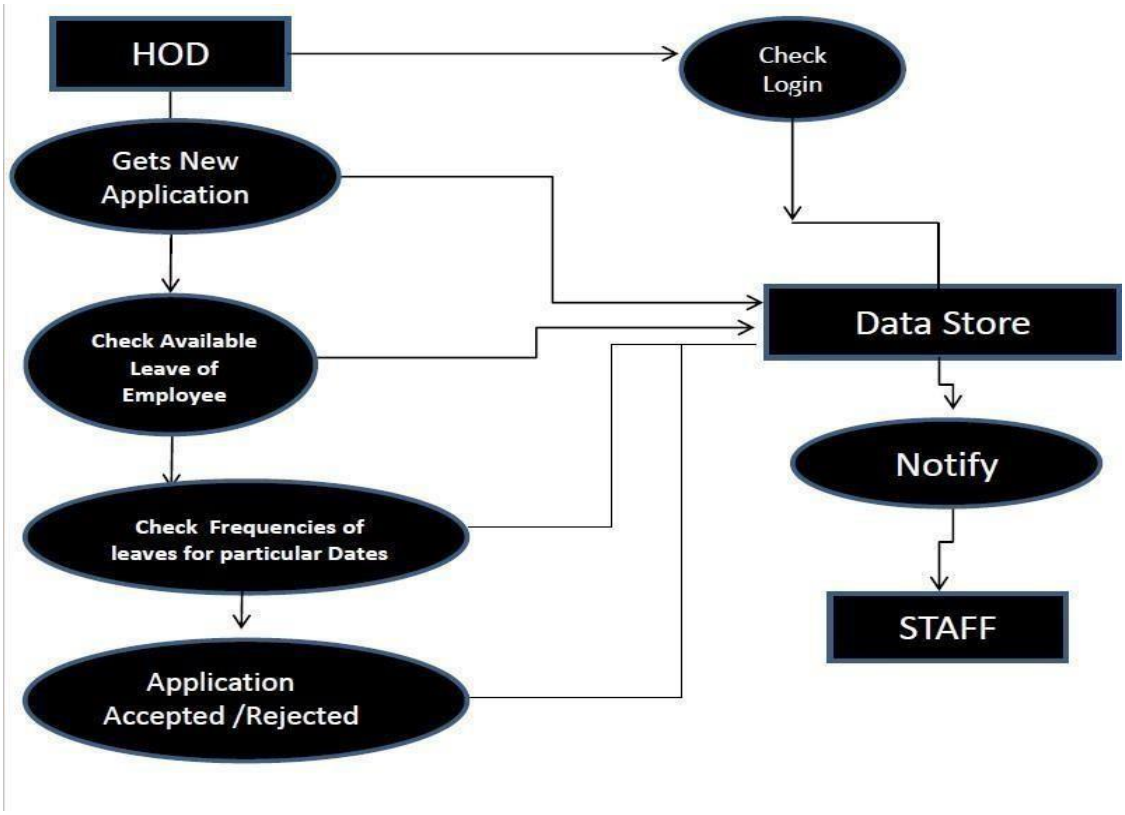
a. DFD for teaching staff



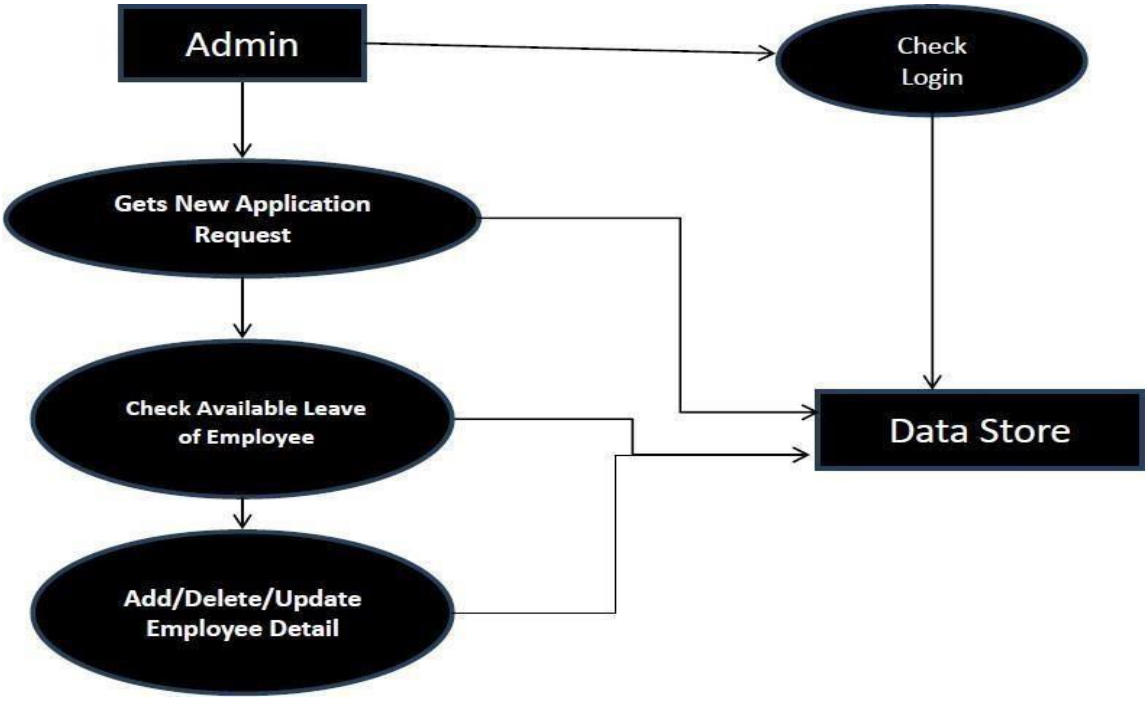
b. DFD for non-teaching staff



c. DFD for HOD



d. DFD for Admin



2. Data Dictionary

Staff Details

FIELD NAME	TYPE	CONSTRAINTS
staffID	Number	Primary key
Name	Varchar2	
DeptId	Number	Foreign key
Email	Varchar2	
phone	Number	unique
DOJ	Date	

Leaves Details

FIELD NAME	TYPE	CONSTRAINTS
Staffid	Number	Foreign key
TotalCL	Number	
usedCL	Number	
BalanceCL	Number	
TotalCCL	Number	
usedCCL	Number	
BalanceCCL	Number	

Leave Info

FIELD NAME	TYPE	CONSTRAINTS
Staffid	Number	Foreign key
NoOfDays	Number	
TypeOfLeave	Varchar2	
FromDate	Date	
ToDate	Date	
HODStatus	char	
PrincipalStatus	char	
AdminStatus	char	

Adjustments

FIELD NAME	TYPE	CONSTRAINTS
FacultyId	Number	Foreign key
ToId	Number	
Class	Varchar2	
DeptId	Number	Foreign key
Hour	Number	
Status	char	

Dept Code

FIELD NAME	TYPE	CONSTRAINTS
DeptId	Number	Primary key
DeptName	Varchar2	

Hod Details

FIELD NAME	TYPE	CONSTRAINTS
StaffId	Number	Foreign key
DeptId	Number	Foreign key

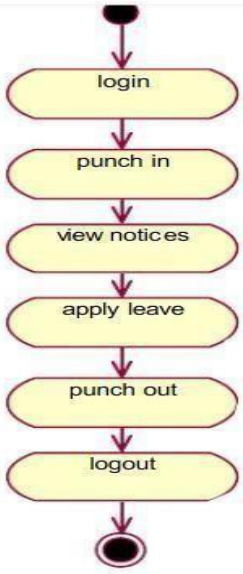
Principal Details

FIELD NAME	TYPE	CONSTRAINTS
StaffId	Number	Foreign key
DeptId	Number	Foreign key

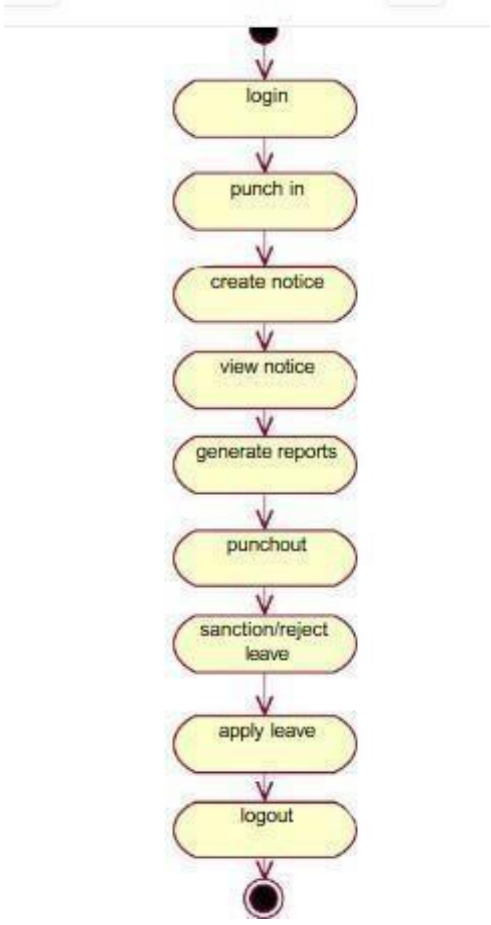
SOFTWARE DESIGNING

UML DIAGRAMS

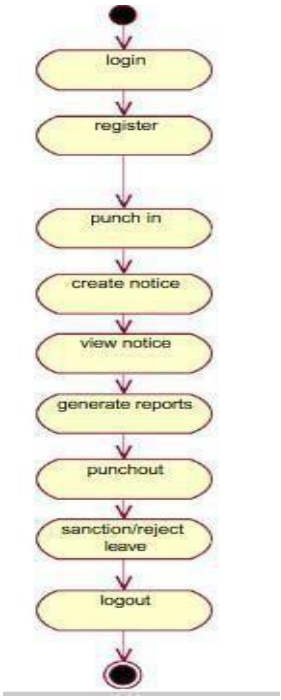
Activity diagram for employee/staff:



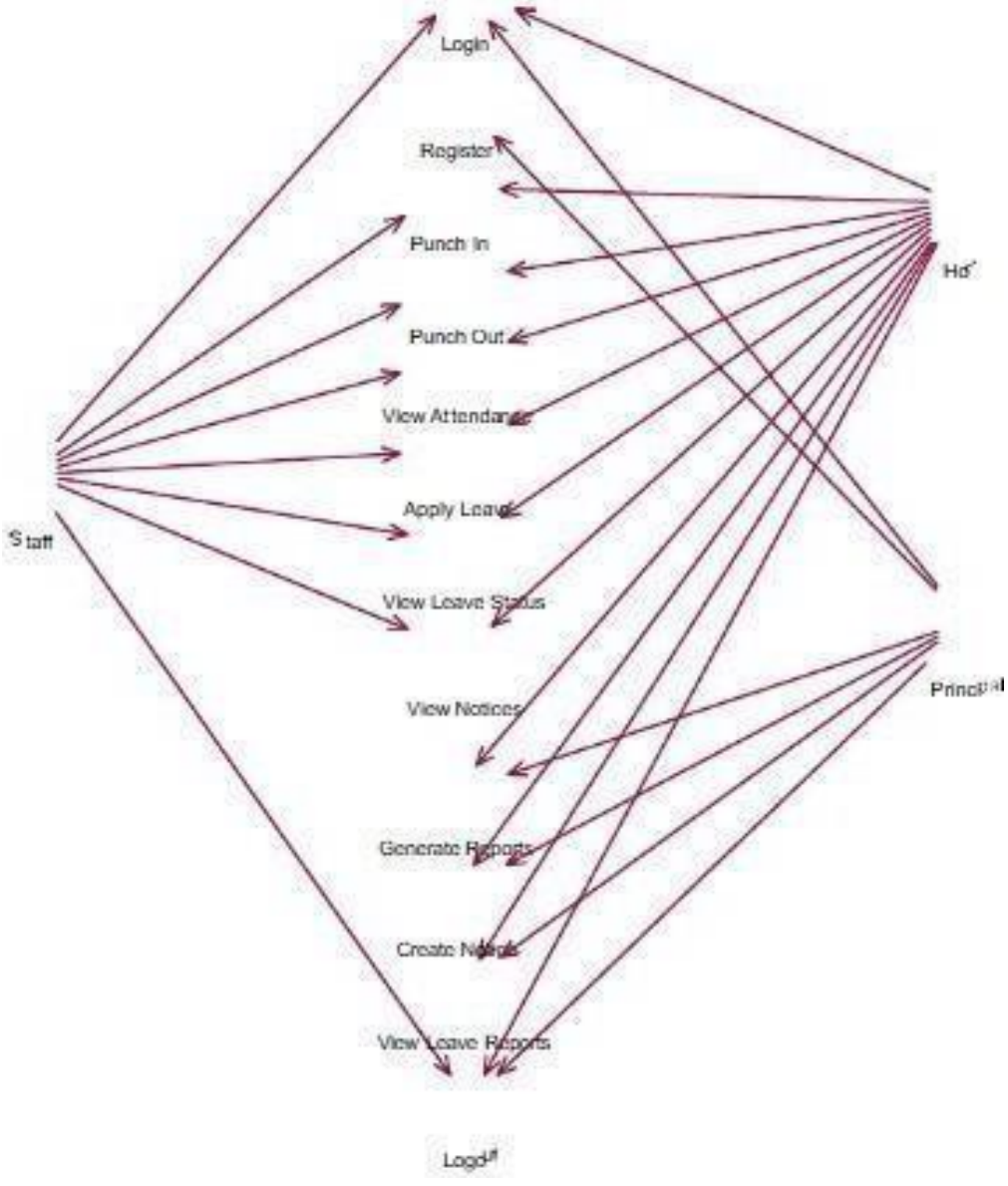
Activity diagram for hod:



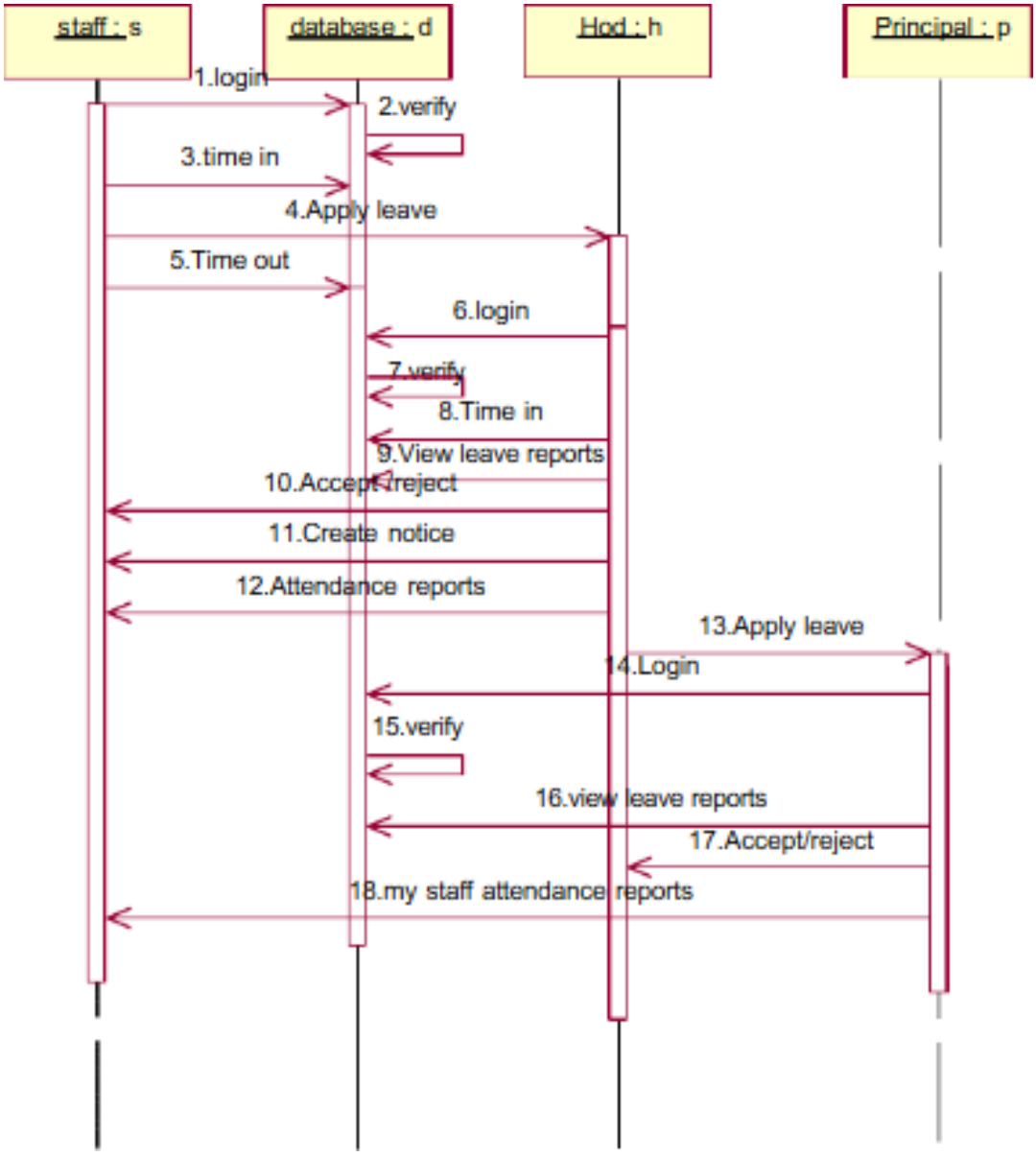
Activity diagram for accountant:


login
register
punch in
create notice
view notice
generate reports
punchout
sanction/reject leave
logout

Use case diagrams:



Sequence diagram:



Prototype :

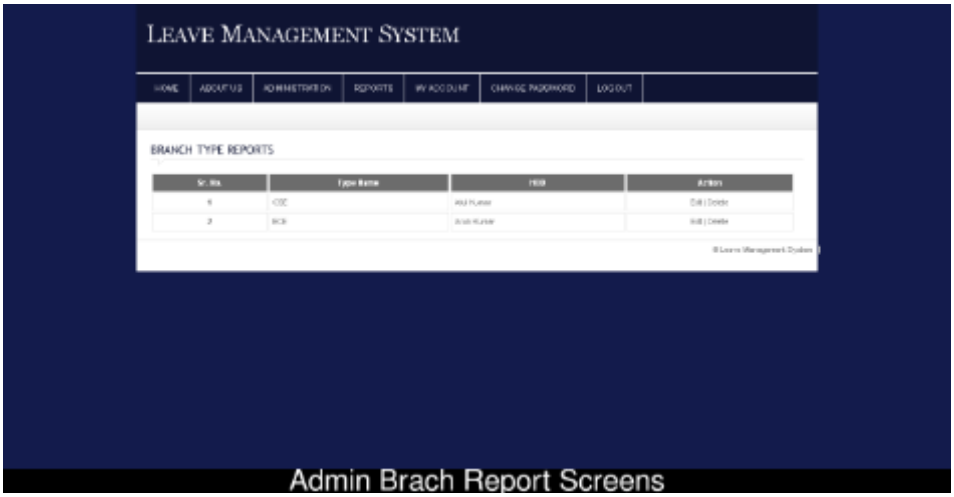

LEAVE MANAGEMENT SYSTEM
HOME
ABOUT US
REGISTER
LOGIN
CONTACT US
LEAVE MANAGEMENT
HR departments of large and medium corporations usually have to devote loads of time and resources handling employee absence and leave requests every day.
ABOUT LEAVE MANAGEMENT SYSTEM
ADVERTISEMET
VACATION AHEAD
Home Page Screens


LEAVE MANAGEMENT SYSTEM
HOME
ABOUT US
REGISTER
LOGIN
CONTACT US
ABOUT LEAVE MANAGEMENT SYSTEM
ADVERTISEMET
About Us Screens

Login Page Screens

Registration Form Screens

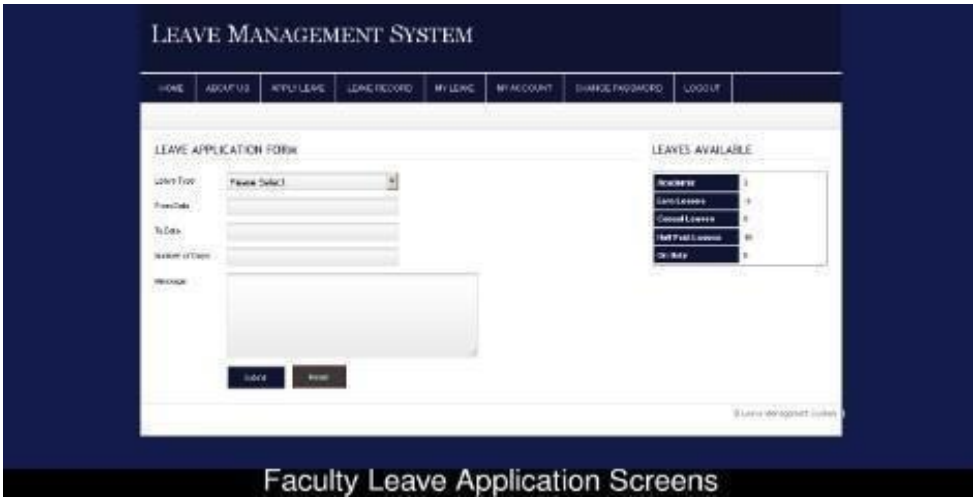
Admin Add Leave Type Screens



Admin Brach Report Screens

Admin Branch Add Screens

Admin Leave Type Report Screens



Faculty Leave Application Screens

Faculty Leave Report Screens

HOD Leave Record Screens

PRE LAB QUESTIONS

1) Describe various phases of a software project.
2) Explain about various process models.

LAB ASSIGNMENT

1) Analyze at which type of situations which process model can be used in a project.
2) Prepare Software Specification document (SRS) for the given project.

POST LAB QUESTIONS

1) Explain various phases of a software project with brief description.
2) Explain how design can be constructed from analysis.
3) Describe the coding and testing process in a software project.

Experiment - 3
E-BIDDING

OBJECTIVE:

Auctions are among the latest economic institutions in place. They have been used since antiquity to sell a wide variety of goods, and their basic form has remained unchanged. In this dissertation, we explore the efficiency of common auctions when values are interdependent-the value to a particular bidder may depend on information available only to others-and asymmetric. In this setting, it is well known that sealed-bid auctions do not achieve efficient allocations in general since they do not allow the information held by different bidders to be shared.

Typically, in an auction, say of the kind used to sell art, the auctioneer sets a relatively low initial price. This price is then increased until only one bidder is willing to buy the object, and the exact manner in which this is done varies. In my model a bidder who drops out at some price can "reenter" at a higher price.

With the invention of E-commerce technologies over the Internet the opportunity to bid from the comfort of one's own home has seen a change like never seen before. Within the span of a few short years, what may have begun as an experimental idea has grown to an immensely popular hobby, and in some cases, a means of livelihood, the Auction Patrol gathers tremendous response every day, all day. With the point and click of the mouse, one may bid on an item they may need or just want, and in moments they find that either they are the top bidder or someone else wants it more, and you're outbid! The excitement of an auction all from the comfort of home is a completely different experience. Society cannot seem to escape the criminal element in the physical world, and so it is the same with Auction Patrols. This is one area where in a question can be raised as to how safe Auction Patrols.

Proposed system

To generate the quick reports

To make accuracy and efficient calculations

To provide proper information briefly

To provide data security

To provide huge maintenance of records

Flexibility of transactions can be completed in time

RESOURCE:

Problem Analysis and Project Planning

An **Auction** is Latin work which means augment. Auction is a bid, a process of selling; buying and services offered take place. There are several different types of auctions and certain rules exist for each auction. There are variations for an auction which may include minimum price limit, maximum price limit and time limitations etc. Depending upon the auction method bidder can participate remotely or in person. Remote auction includes participating through telephone, mail, and internet. Shopping online has widely grown; online auction system is increasing rapidly. Online auction is becoming more and more popular in electronic commerce and hence it should system must increase its quality and security.

The online auction system is a model where we participate in a bid for products and service. This auction is made easier by using online software which can regulate processes involved. There are several different auction methods or types and one of the most popular methods is English auction system. This system has been designed to be highly-scalable and capable of supporting large numbers of bidders in an active auction. Online Auctioning System has several other names such as e-Auctions, electronic auction etc. The requirement for online auction or online bidding can be more accurately specified by the client. It should be healthy and will be a good practice when it is made more transparent as a matter of fact.

Online Bidding has become more wide spread in all sorts of industrial usage. It not only includes the product or goods to be sold, it also has services which can be provided. Due to their low cost this expansion made the system to grow. Online bidding has become a standard method for procurement process. Bidders can be maintained in a single database according to the preference, and they can be monitored. User's data can be maintained in a confidential way for validity and integrity of contractual documentation. Neat reporting reduces paperwork, postage, photocopying and time beneficial. Multiple bidders can be communicated with a great ease. This system allows multiple bids by single users. Online bidding is based upon lowest or the highest price which is initiated but not the best value for the product. Although there is a chance to fix the criteria against the fact expected to have desired value by the seller.

OVERVIEW

The Objective is to develop a user-friendly auctioning site where any kind of product can be auctioned and provide value-added services to the bidders and the sellers. The products will be authenticated and the site provides a safe environment for online users:

- Secure registration of all users including a personal profile Administrators would authorize the product to auction, set auction dates and Minimum auction amount for that product.
- Prior to each bid, the user's bank or credit account must be authenticated for available balance required for the bid.
- Complete Search/Site Map of the entire site for easy access.
- Discussion forums for users to interact with other users to know about the product's value and originality.
- Online Legal Documentation to avoid disputes. Guidance to the users about the same must be available.
- Rare articles may be withheld by owner on the advice of the administrator to bethrown open in special auctions held by the site so as to increase the bid-values.

Software Requirement Analysis

Modules:

1. **Login:**

   Login Module includes various utilities like User Registration, Authentication, Change Password and Forgot Password.

2. Category Management:

   This module provides all facilities to admin for managing the Category.

3. Package Management:

   This module provides all facilities to admin for managing the Package.

4. Search:

   Search Module Provides Category Wise Search of items.

5. Auction:

   In This Module Seller Can Upload their Products for Auction, Bidders can bid for theProducts Finally Admin decides the Winner based on Highest Bidding Price.

6. Report:

Report Generation Module can generate reports of past Auctions, Sellers and Bidders.

Users:

1. Admin
2. Seller
3. Bidder

1. Admin

- Admin can manage user and product.

- Admin can manage category.
- Admin can send the update to the seller and bidder.
- Admin can manage biding.
- Admin can manage package.
- Admin can generate the whole system work report.

2. Seller

- Seller can upload auction product.
- Seller can set the starting prize of the item.
- Seller can view the bid information for their items.
- Seller can bid for product.

3. Bidder

- Bidder can also search the items.
- Bidder can buy package for auction.
- Bidder can view detail of product.
- Bidder can bid on particular product.
- Bidder can also modify the bidding prize.

Functional Requirements:

➢ Each user type admin or user needs to register him or her as a user or an admin for accessing the user's necessary information. They also have email, username and password. They can login into the system from the web using their email and password.

➢ Admin needs to login to the system to operate the system. Admin has an individual or unique login email, password and a user level. Through this email and password admin can login into the system.

➢ Admin can update all product pages. An admin can insert a new product with details and can update the product information through edit option.

➢ Admin can delete user from user panel. It can have the full access of user's bid list.

➢ Admin can have access in the bid page.

➢ Users can look for a product from a selected category.

➢ User can add a product to the site with full details of that product.

➢ They can see their products and bided list through their account page.

➢ Users can edit their profiles.

Non-Functional Requirements:

1) Performance Requirements

Performance

The system must be interactive and the delays involved must be less .So in every action-response of the system, there are no immediate delays. In case of opening windows forms, of popping error messages and saving the settings or sessions there is delay much below 2 seconds, In case of opening databases, sorting questions and evaluation there are no delays and the operation is performed in less than 2 seconds for opening ,sorting, computing,

posting > 95% of the files. Also when connecting to the server the delay is based editing on the distance of the 2 systems and the configuration between them so there is high probability that there will be or not a successful connection in less than 20 seconds for sake of good communication.

Safety

Information transmission should be securely transmitted to server without any changes in information

Reliability

As the system provides the right tools for discussion, problem solving it must be made sure that the system is reliable in its operations and for securing the sensitive details.

2) Software Quality Attributes

Availability

If the internet service gets disrupted while sending information to the server, the information can be sending again for verification.

Security

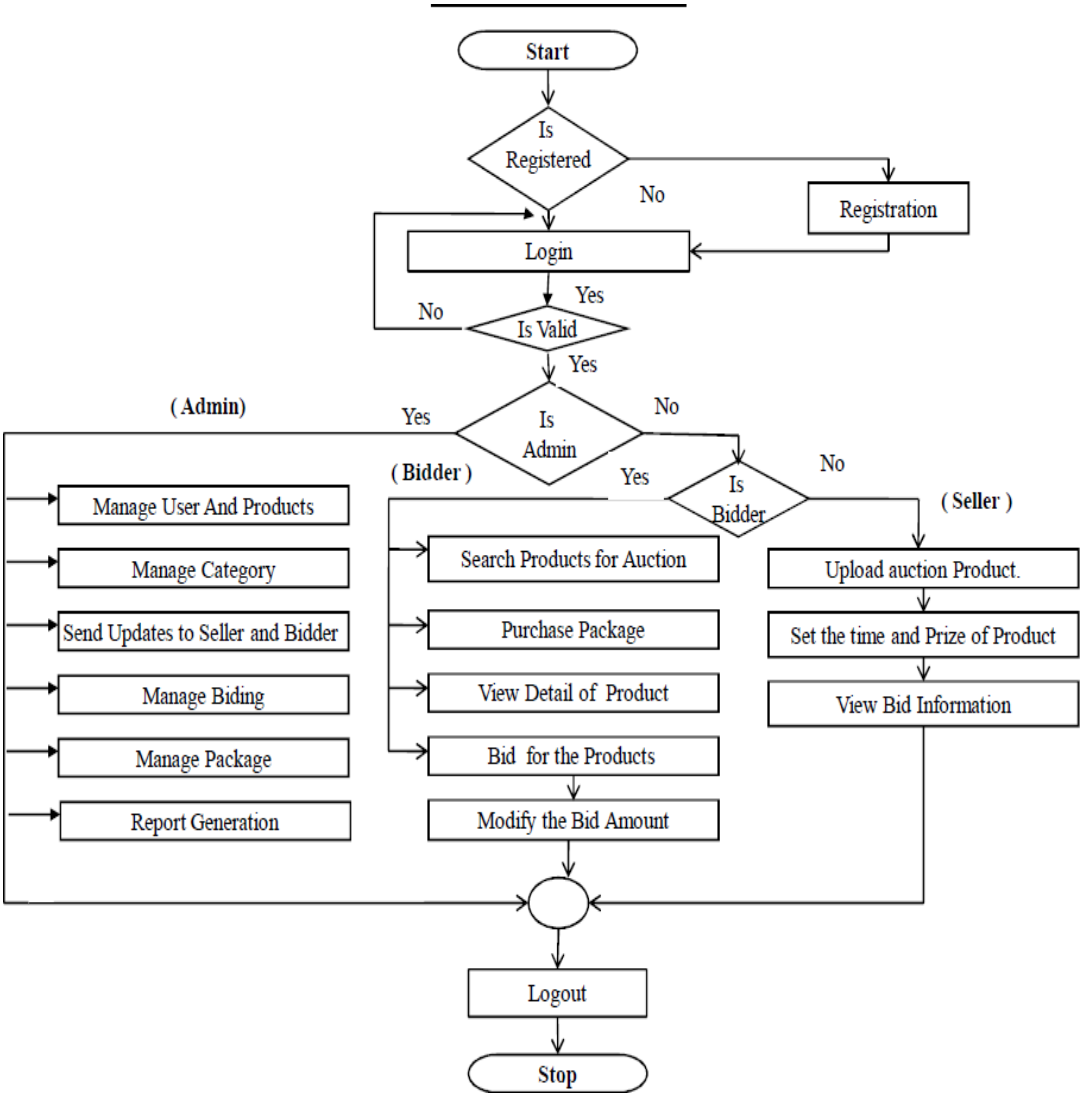
The main security concern is for users account hence proper login mechanism should be used to avoid hacking. The tablet id registration is way to spam check for increasing the security. Hence, security is provided from unwanted use of recognition software.

Usability

As the system is easy to handle and navigates in the most expected way with no delays. In that case the system program reacts accordingly and transverses quickly between its states.

Data Modeling

(1) Data Flow Diagram



(2) Data Dictionary

(2.1) UserInformation

Field Name	Type	Constraint
User_id	Int	Primary key
User_name	Varchar	Unique
First_name	Varchar	
Last_name	Varchar	
Gender	Varchar	
Email	Varchar	unique
Mobile	Varchar	
password	Varchar	
level	int	

(2.2) Product Information

Field Name	Type	Constraint
P_id	Int	Primary key
User_id	Int	Foreign key
User_name	Varchar	
Title	Varchar	
Category	Varchar	
Brand	Varchar	
Description	Text	
Inti_price	Float	
Time	Date	
status	varchar	

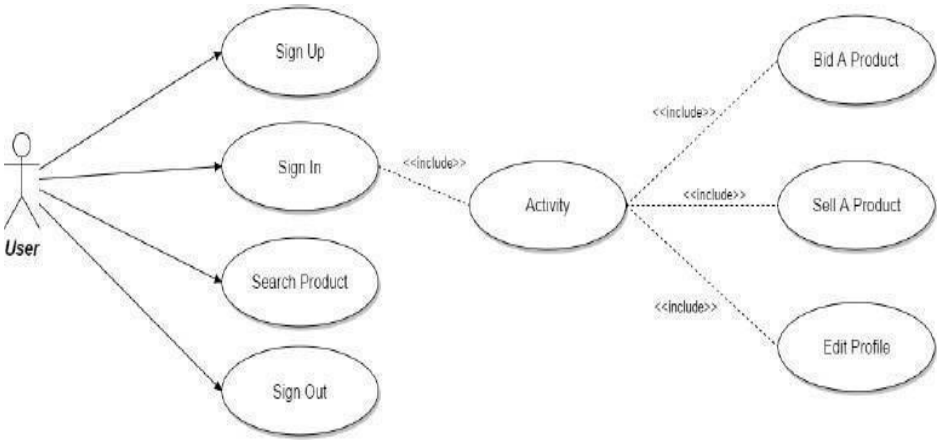
(2.3) BIddingInformation

Field Name	Type	constraint
Bid_id	Int	Primary key
User_id	Int	Foreign key
Bid_init	Float	
Bid_price	Float	
P_id	int	Foreign key

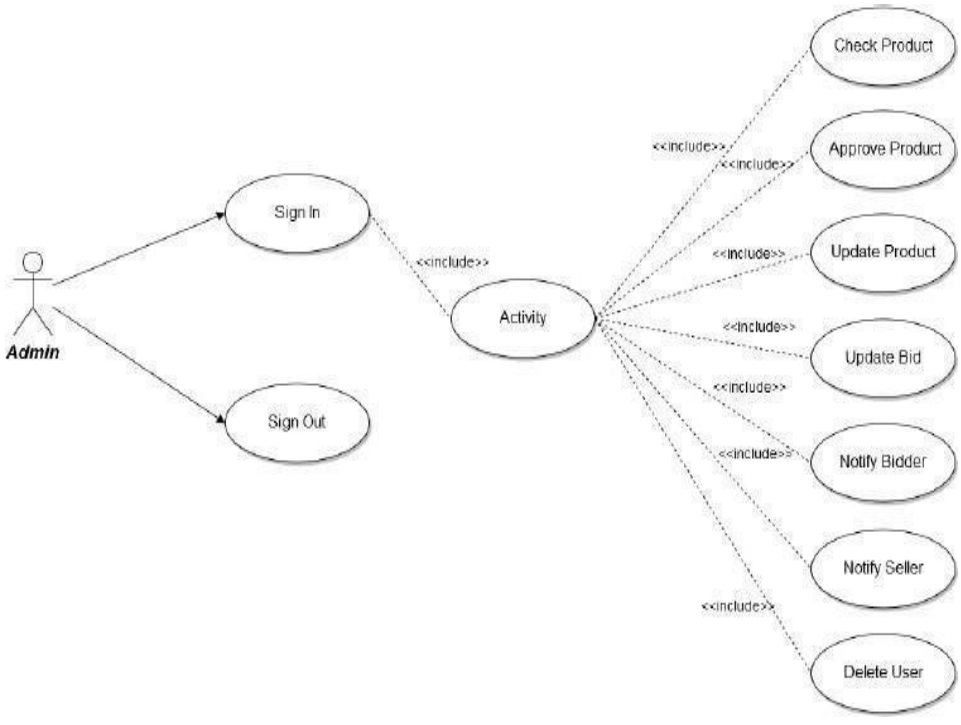
Software Designing

(1) Use case Diagram

Use Case Diagram for User panel

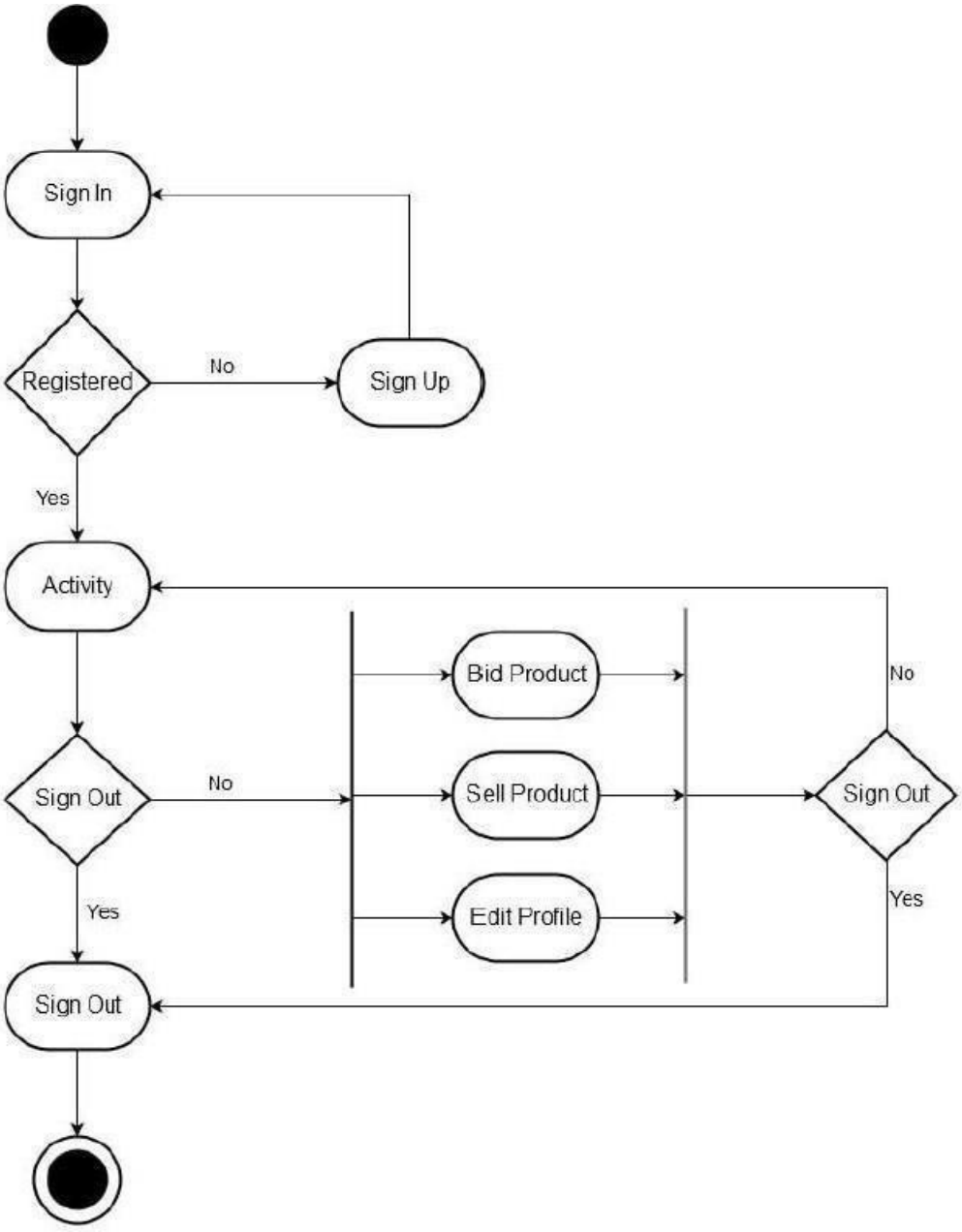


Use Case Diagram for Administrative panel

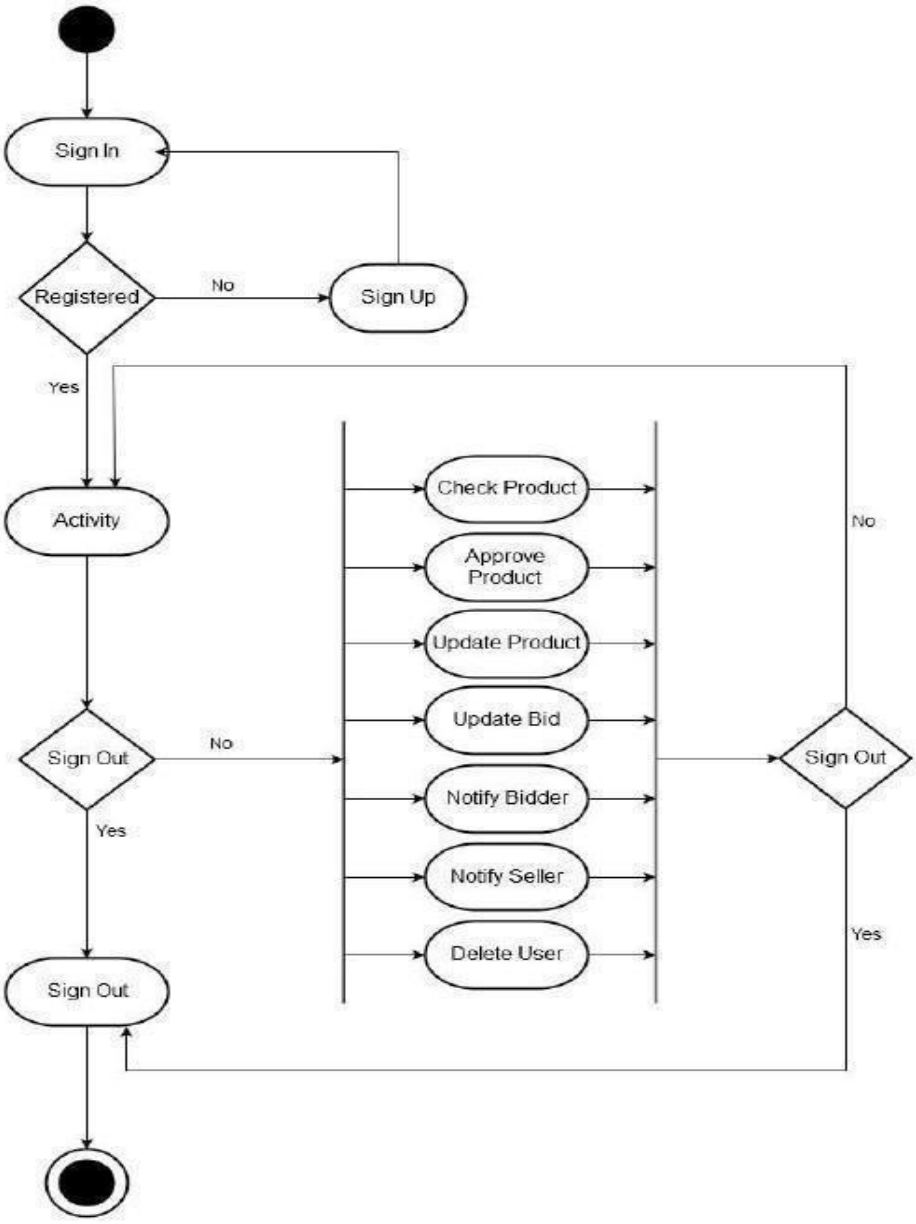


2) Activity Diagram

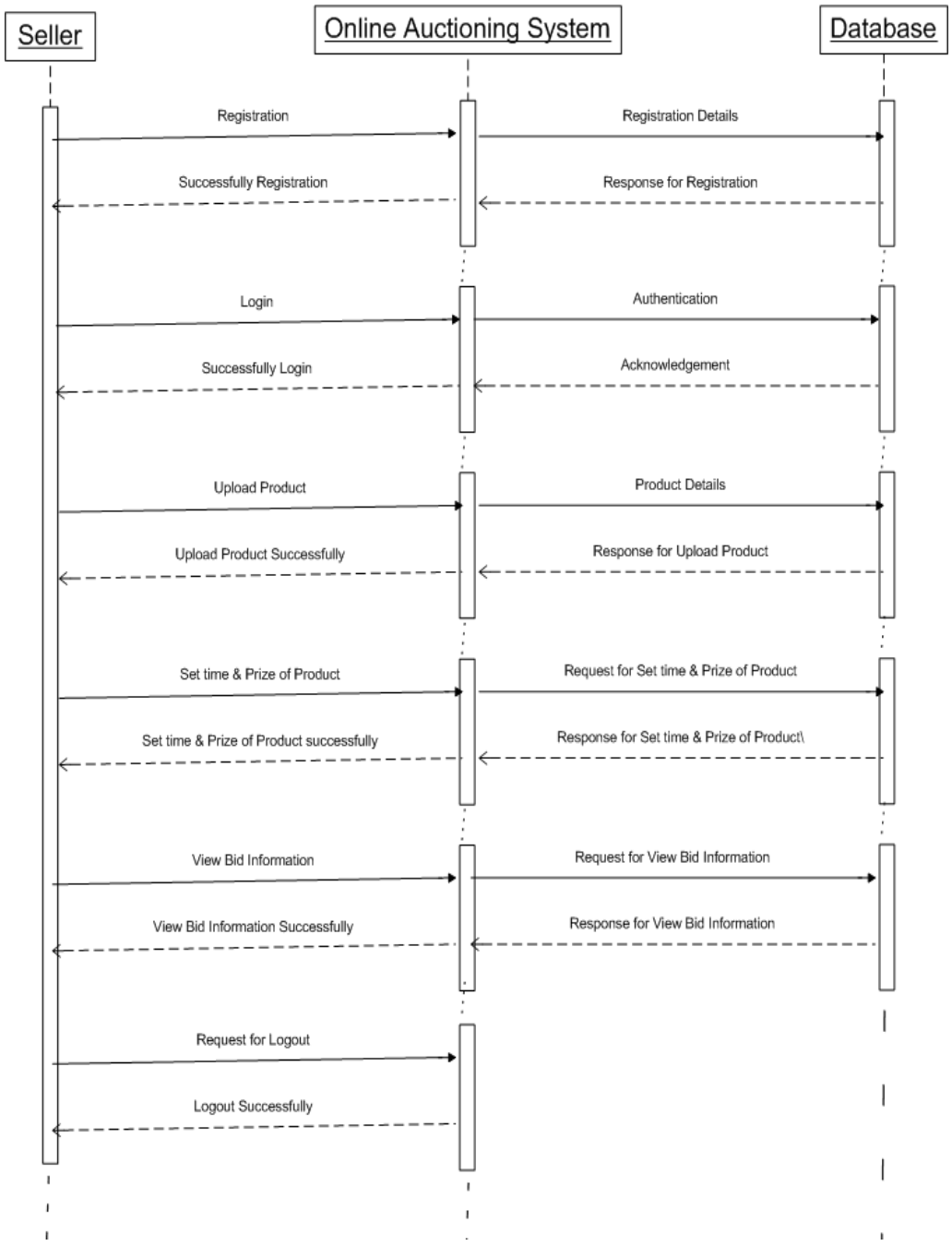
Activity Diagram for User panel



Activity Diagram for Admin panel



2)Sequence Diagram



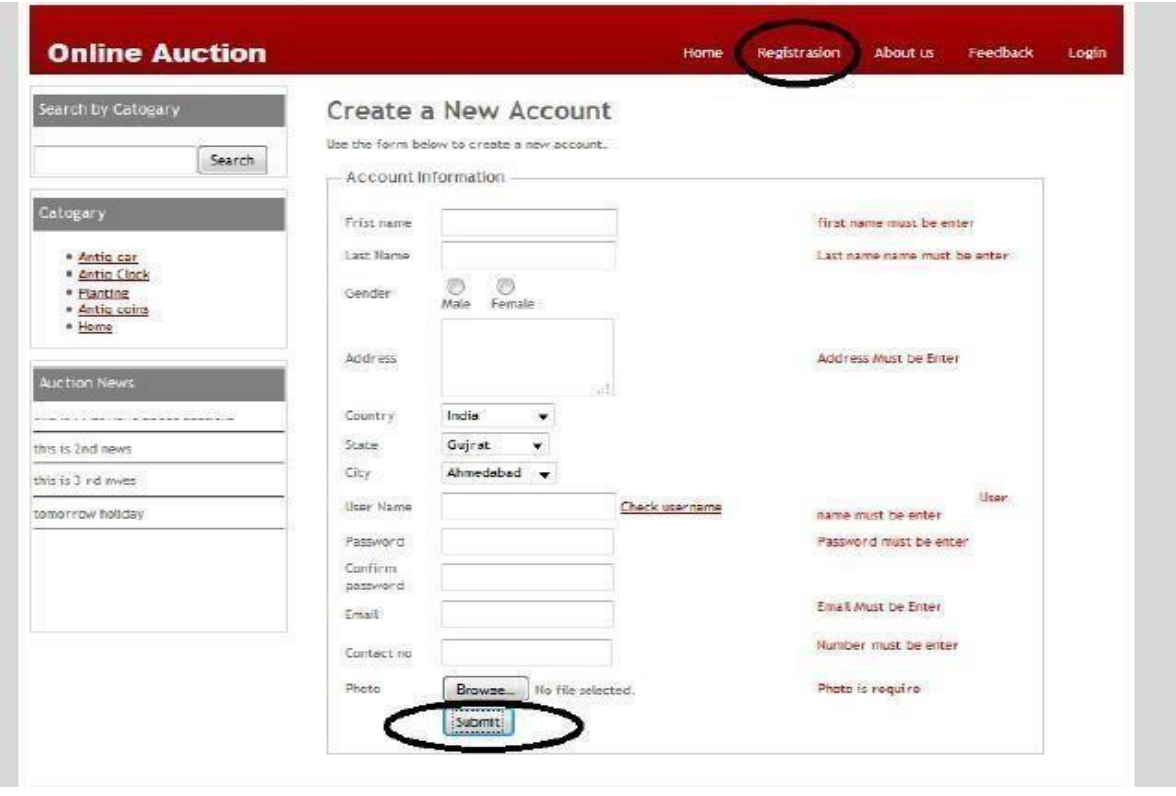
Prototype models:

1. Home Page:

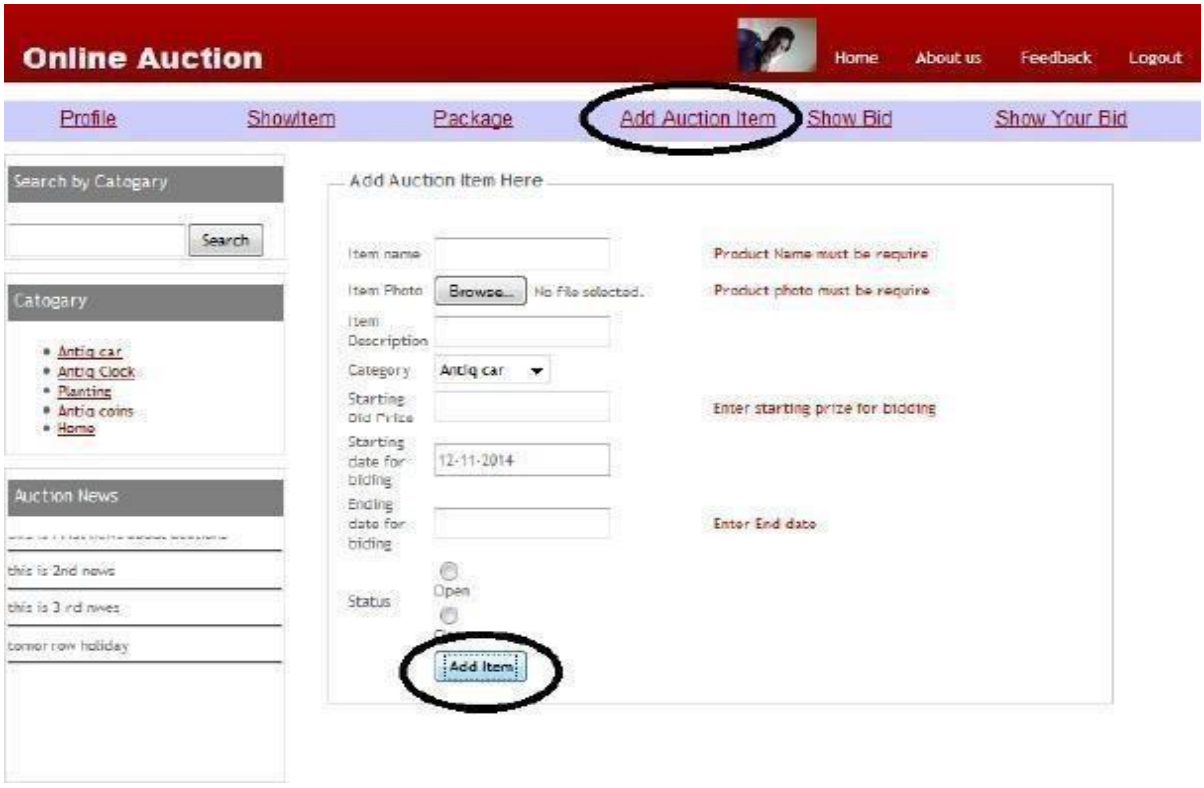
This Home Page is open When Customer can Open the Site**.**

2. Registration Form:

This page is used to customer can Registration here. But customer not enter data so error will be occur.



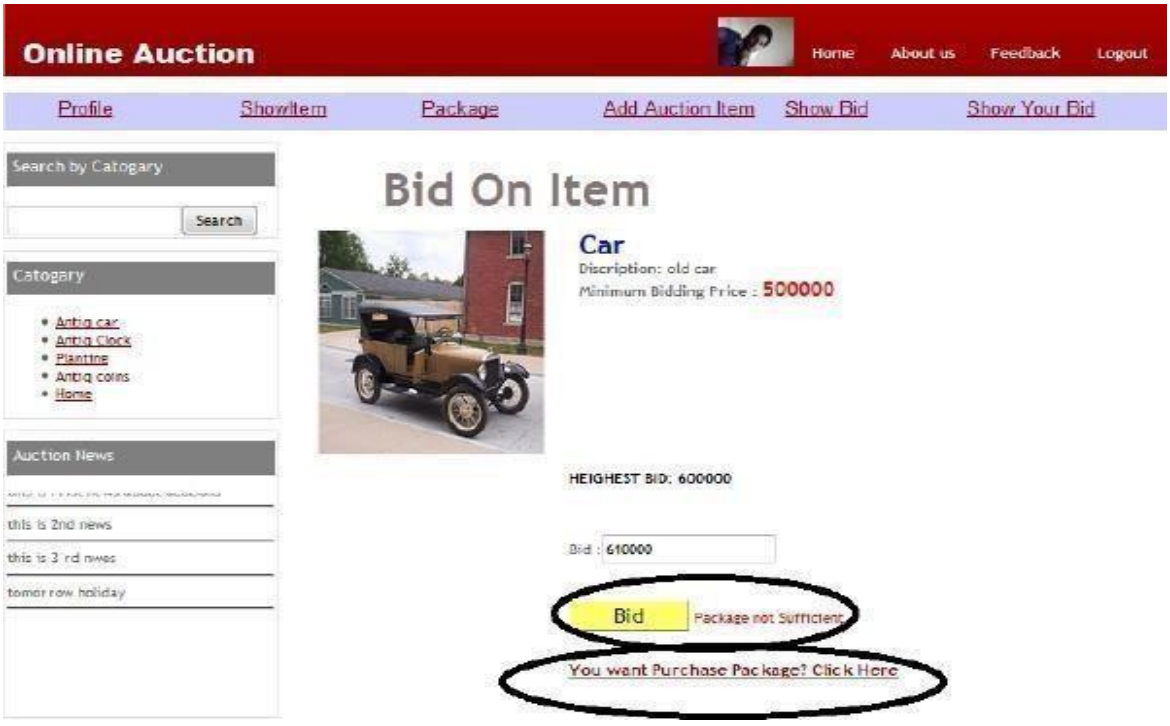
3. Add Auction Item:
This page for user can not enter some data into the fields error will be occur.



4. Search Item:
This page for user can search Items.

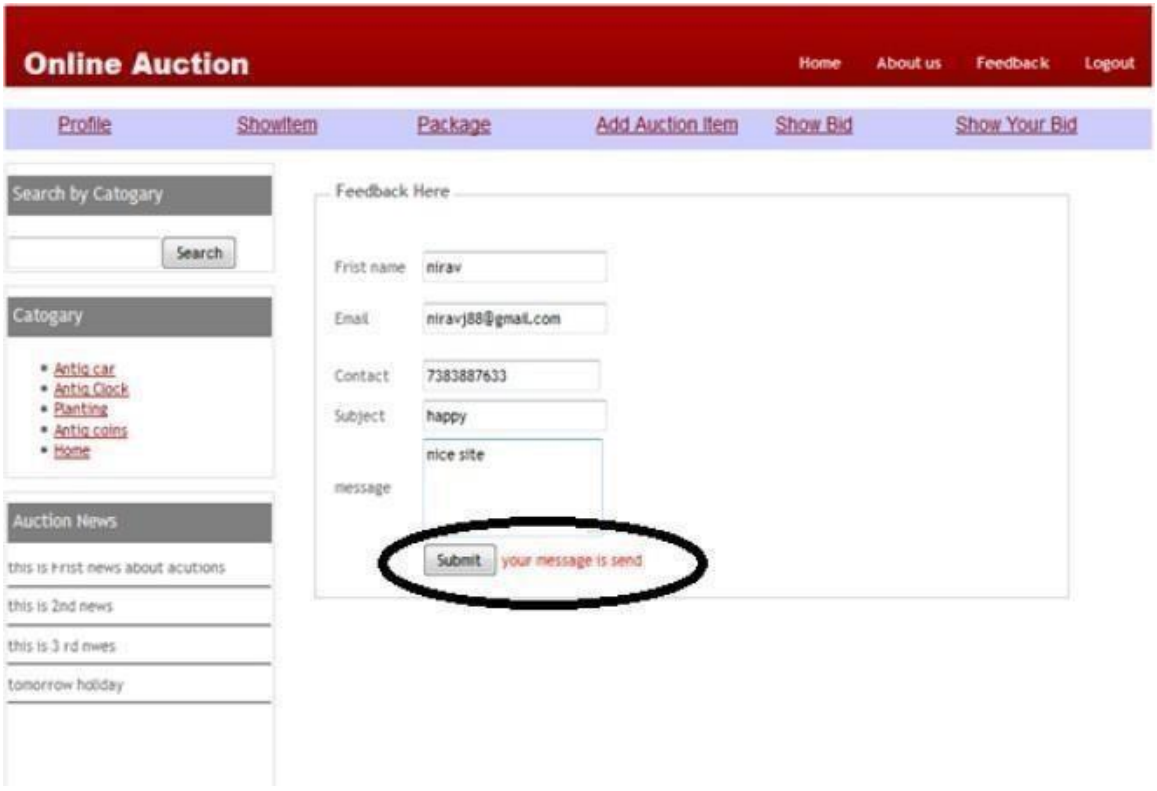
5. Bid On Item:

This page for user can Bid On the Particular Item then package not available so error will be occur.



6. Contact us :

This page for user have Any Query to Contact to the Company.



PRE LAB QUESTIONS

1) Describe various phases of a software project.
2) Explain about various process models.

LAB ASSIGNMENT

1) Analyze at which type of situations which process model can be used in a project.
2) Prepare Software Specification document (SRS) for the given project.

POST LAB QUESTIONS

1) Explain various phases of a software project with brief description.
2) Explain how design can be constructed from analysis.
3) Describe the coding and testing process in a software project.

Experiment - 4
ELECTRONIC CASH COUNTER

OBJECTIVE:

This project is mainly developed for the Account Division of a Banking sector to provide better interface of the entire banking transactions. This system is aimed to give a better out look to the user interfaces and to implement all the banking transactions like:

- Supply of Account Information
- New Account Creations
- Deposits
- Withdraws
- Cheque book issues
- Stop payments
- Transfer of accounts
- Report Generations.

Proposed System:

The development of the new system contains the following activities, which try to automate the entire process keeping in view of the database integration approach.

- User friendliness is provided in the application with various controls.
- The system makes the overall project management much easier and flexible.
- Readily upload the latest updates, allows user to download the alerts by clicking the URL.
- There is no risk of data mismanagement at any level while the project development is under process.
- It provides high level of security with different level of authentication

RESOURCE:

Problem Analysis and Project Planning

(1) Project Scope:

Internet Banking System refers to systems that enable bank customers to Access accounts and general Information on bank products and services through a personal computer or other intelligent device.

The chances and threats that the internet symbolizes is no longer news to the present day banking sector. No traditional bank would dare face investment analysts without an Internet strategy. The main intention behind the commencement of electronic banking services is to provide the customers with an alternative that is more responsive and with less expensive options. With options just a click away, customers have more control than ever. Their expectations are usability and real-time answers. They also want personal attention and highly customized products and services. Internet banking identifies a particular set of technological solutions for the development and the distribution of financial services, which rely upon the open architecture of the Internet. With the implementation of internet banking system, it maintain a direct relationship with the end users via the web and are able to provide a personal characterization to the interface, by offering additional customized services.

(2) Objectives:

The objective of this project is limited to the activities of the operations unit of the banking system which includes opening of Account, Deposit and withdraw of funds, Electronic funds transfer, Cheque balance and Monthly statement.

Software Requirement Analysis

(1) Module Description:

The Electronic cash counter Application project will be divided into 2 modules namely:

1. Bank Account
2. Bank Account Administrator

Bank Account

In this module the customer is allowed to logon to the website and can access his/her account by getting user name and password which will be verified with the server and the database. Once he/she gets verified then they are allowed to view their personal account and perform operations such as change of address, paying bills online, viewing transactions and transferring money into other accounts. Once the customer finishes the task the update information instantly gets stored into the database. The customer is then allowed to sign out from his/her account.

Bank Account Administrator

In this module the administrator is allowed to log on to the website and can access his/her administrative account by using the user name and password which will then be verified with

the database. Once he/she gets verified the administrative interface will be displayed, where the administrator can perform operations for both new customers and existing customers. Administrator will help a new customer in opening their account by taking complete information from them. Administrator provides services like withdrawal, deposit, transferand deleting customer during the time of closing the account. In this module administrator provides great customer service to the customers who want to do phone banking or teller banking. The interface for administrator will be both very users friendly and efficient. The data gets stored in the database instantly when the administrator hits the submit button.

(2)Functional Requirements:

- Customer can request details of the last 'n' number of transactions he has performed on any account.
- Customer can make a funds transfer to another account in the same bank.
- Customer can request for cheque book
- Customer can view his monthly statement. She/he can also take print out of the same.
- Customer can make Electronic Fund Transfer's to accounts at their and other banks.
- The system is providing balance enquiry facility

(3) Non-Functional Requirements:

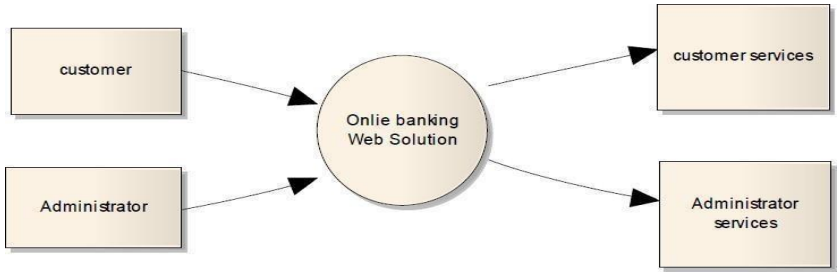
Those requirements which are not the functionalities of a system but are the characteristics of a system are called the non-functionalities.

- Secure access of confidential data. Secure socket layer can be used.
- 24X7 availability
- Better component design to get better performance at peak time
- Flexible service based architecture will be highly desirable for future extensions.

PROCEDURE:

Data Modeling

1) Context Level Diagram



Data Dictionary

Customer table

Name	Null?	Type
Customer_id (PK)	NOT NULL	INTEGER
Cust_first_name		VARCHAR2(20)
Cust_last_name		VARCHAR2(20)
DOB		VARCHAR2(20)
Gender		VARCHAR2(2)

Login table

Name	Null?	Type
Customer_id (FK)		INTEGER
Password		VARCHAR2(30)
Username		VARCHAR2(30)

Customer Detail table

Name	Null?	Type
Customer_id (FK)	NOT NULL	INTEGER
City		VARCHAR2(20)
State		VARCHAR2(20)
Zip		VARCHAR2(20)
Phone Number		NUMBER(10)
Email id		VARCHAR2(20)

Credit Card table

Name	Null?	Type
Request Number	NOT NULL	INTEGER
Name		VARCHAR2(30)
Profession		VARCHAR2(30)
Annual Income		INTEGER
Address		VARCHAR2(30)
City		VARCHAR2(30)
Telephone Number		VARCHAR2(30)
Card type		VARCHAR2(30)

Account table

Name	Null?	Type
Account Number (PK)	NOT NULL	NUMBER(8)
Customer_id (FK)	NOT NULL	INTEGER
Min_Balance		NUMBER(8)
Current_ balance		NUMBER(8)
Recommended_ by		VARCHAR2(20)
Nominee		VARCHAR2(20)
Type_of_account		VARCHAR2(20)
Date_of_opening		VARCHAR2(20)
Date_of_access		VARCHAR2(20)

Branch locator table

Name	Null?	Type
Location	NOT NULL	VARCHAR2(30)
Branch_city		VARCHAR2(20)
Address		VARCHAR2(30)

Employee table

Name	Null?	Type
Employee_id (PK)	NOT NULL	NUMBER(10)
Name		VARCHAR2(20)
Working_from		VARCHAR2(20)
Age		NUMBER(10)

Transaction(transfer-funds) table

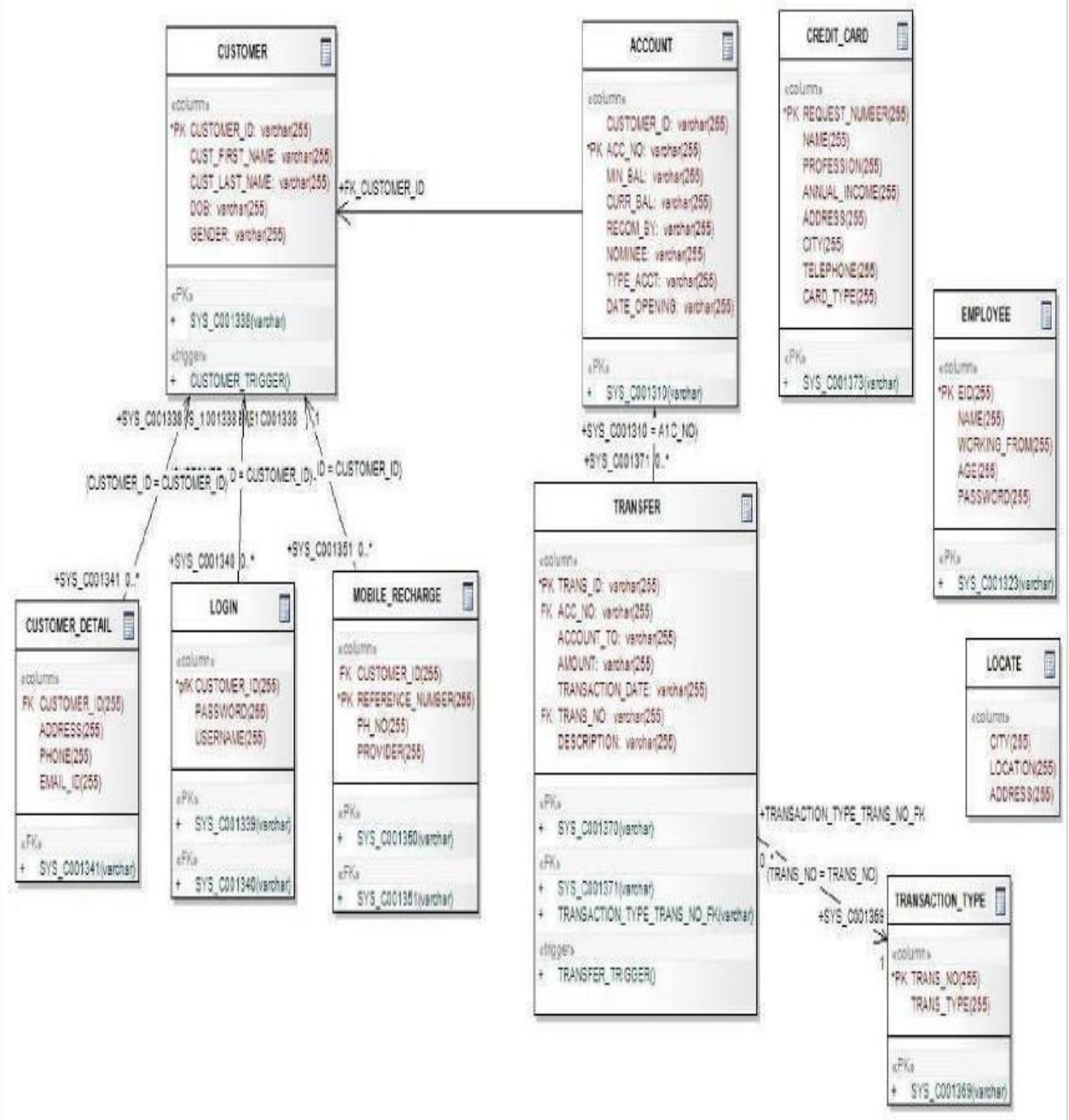
Name	Null?	Type
Trans_id	NOT NULL	NUMBER(10)
Acc_no		NUMBER(10)
Account_to		NUMBER(10)
Amount		NUMBER(10)
Transaction_date		VARCHAR2(20)
Trans_no		INTEGER
description		VARCHAR2(30)

Transaction type table

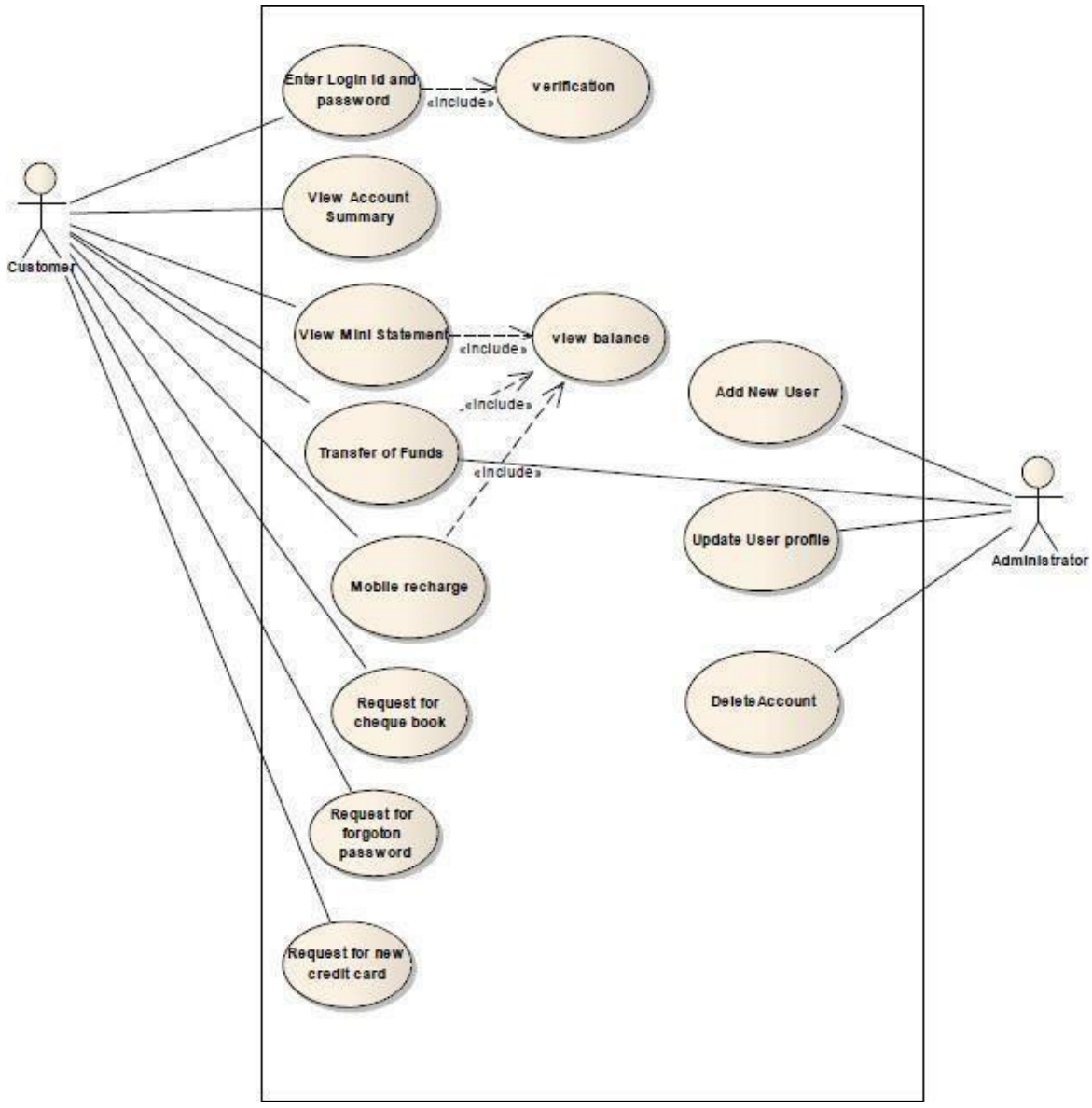
Name	Null?	Type
Transaction Number (PK)	NOT NULL	INTEGER
Account Number (FK)	NOT NULL	INTEGER

Software Designing

1) Class diagram:

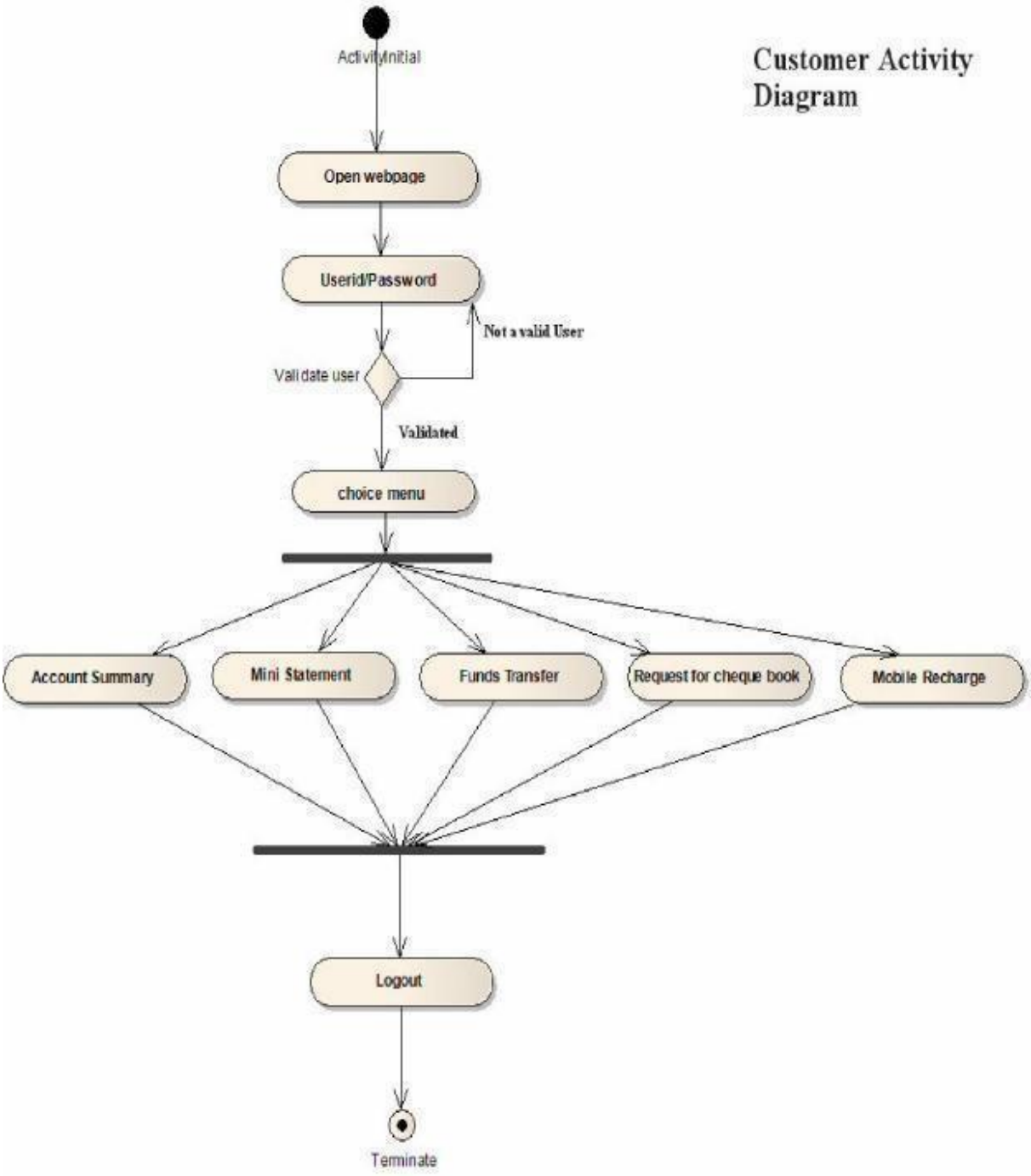


2) Use case Diagram

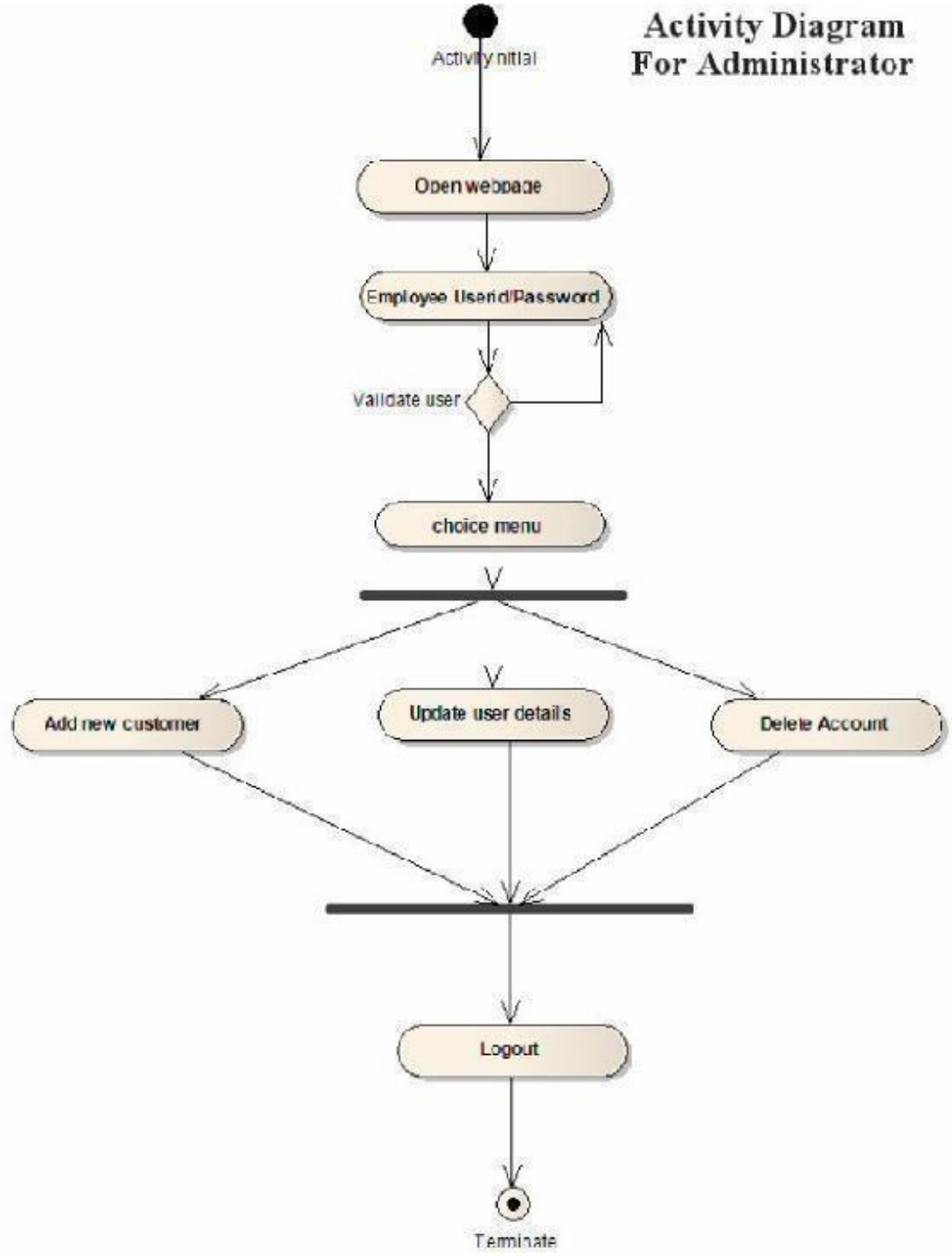


3) Activity Diagram (3.1)Customer

Activity Diagram



(3.2)Activity Diagram for Administrator



Prototype model

Prototype is a working model of software with some limited functionality. The prototype does not always hold the exact logic used in the actual software application and is an extra effort to be considered under effort estimation.

Prototyping is used to allow the users evaluate developer proposals and try them out before implementation. It also helps understand the requirements which are user specific and may not have been considered by the developer during product design.

PRE LAB QUESTIONS

1) Describe various phases of a software project.
2) Explain about various process models.

LAB ASSIGNMENT

1) Analyze at which type of situations which process model can be used in a project.
2) Prepare Software Specification document (SRS) for the given project.

POST LAB QUESTIONS

1) Explain various phases of a software project with brief description.
2) Explain how design can be constructed from analysis.
3) Describe the coding and testing process in a software project.

1.Draw a Class Diagram for Hospital Management System

Hospital management systems are complex and involve various stakeholders, processes, and data flows. UML diagrams are especially helpful for these systems to visualize and design the particular modules and interactions. They help in understanding, documenting, and communicating the structure and behavior of the system.

The class diagram depicts the classes, an association class, and enumerations that are used within the modeled hospital management system.

Classes:

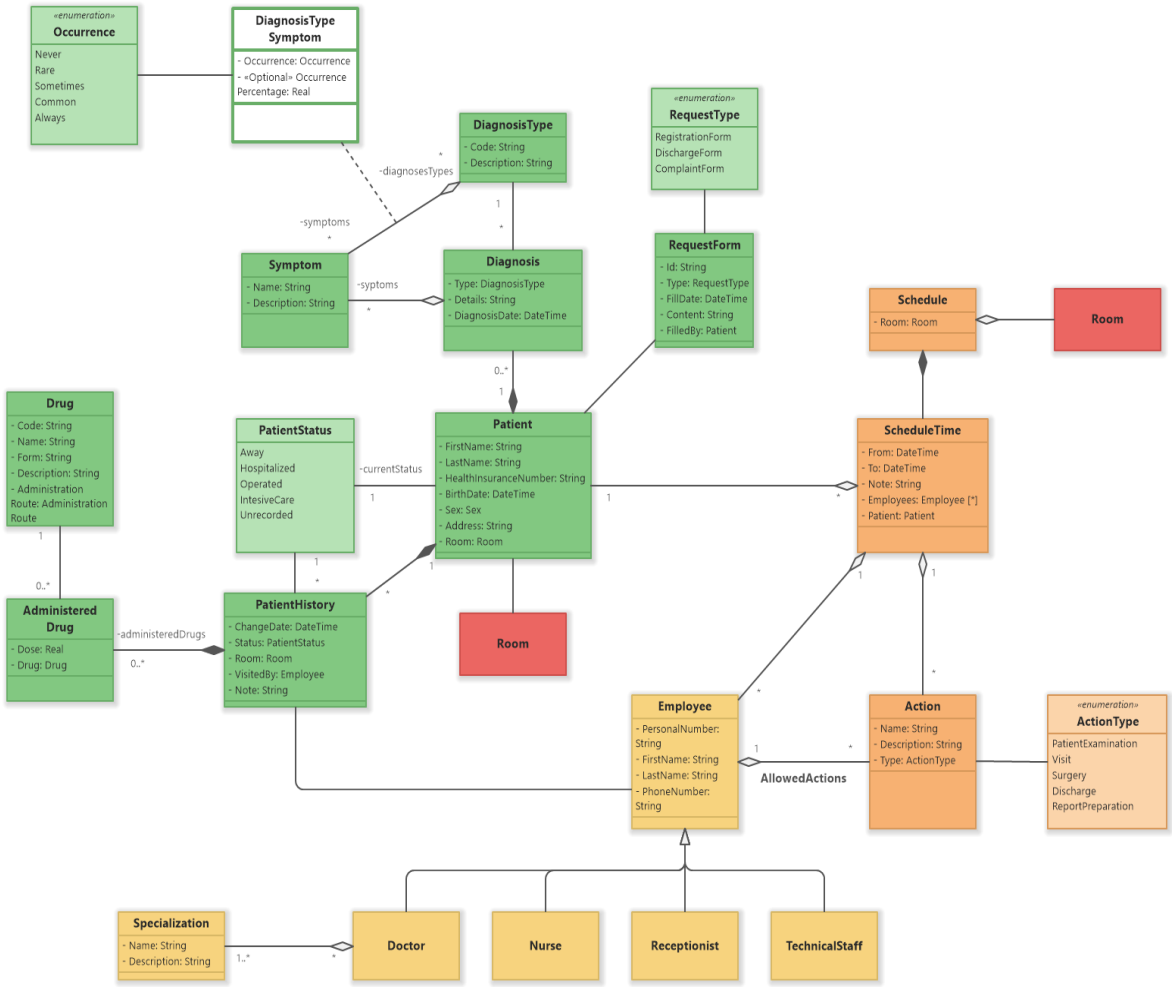
- Nurse
- Employee
- Doctor
- Patient
- Technical Staff
- Receptionist
- Diagnosis
- Diagnosis Type
- Schedule
- Schedule Time
- Action
- Allowed Actions
- Specialization
- Symptom
- Room
- Request Form
- Patient History
- Administered Drug
- Drug

An association class:

- Diagnosis Type Symptom

Enumerations:

- Occurrence
- Patient Status
- Action Type
- Request Type


«enumeration»
Occurrence
Never
Rare
Sometimes
Common
Always
DiagnosisType Symptom
- Occurrence: Occurrence
- «Optional» Occurrence Percentage: Real
-diagnosesTypes
DiagnosisType
- Code: String
- Description: String
«enumeration»
RequestType
RegistrationForm
DischargeForm
ComplaintForm
-symptoms
Symptom
- Name: String
- Description: String
-syptoms
Diagnosis
- Type: DiagnosisType
- Details: String
- DiagnosisDate: DateTime
RequestForm
- Id: String
- Type: RequestType
- FillDate: DateTime
- Content: String
- FilledBy: Patient
Schedule
- Room: Room
Room
Drug
- Code: String
- Name: String
- Form: String
- Description: String
- Administration Route: Administration Route
PatientStatus
Away
Hospitalized
Operated
IntesiveCare
Unrecorded
-currentStatus
Patient
- FirstName: String
- LastName: String
- HealthInsuranceNumber: String
- BirthDate: DateTime
- Sex: Sex
- Address: String
- Room: Room
ScheduleTime
- From: DateTime
- To: DateTime
- Note: String
- Employees: Employee [*]
- Patient: Patient
Administered Drug
- Dose: Real
- Drug: Drug
-administeredDrugs
PatientHistory
- ChangeDate: DateTime
- Status: PatientStatus
- Room: Room
- VisitedBy: Employee
- Note: String
Room
Employee
- PersonalNumber: String
- FirstName: String
- LastName: String
- PhoneNumber: String
AllowedActions
Action
- Name: String
- Description: String
- Type: ActionType
«enumeration»
ActionType
PatientExamination
Visit
Surgery
Discharge
ReportPreparation
Specialization
- Name: String
- Description: String
Doctor
Nurse
Receptionist
TechnicalStaff

2. **Draw a Sequence Diagram for Airline Reservation System.**

Sequence Diagram Description:

1. **Customer** searches for available flights by providing travel details (source, destination, date, etc.).
2. The **Reservation System** queries the **Flight Database** to fetch available flights.
3. The **Flight Database** returns the list of available flights to the **Reservation System**.
4. The **Reservation System** presents the available flight options to the **Customer**.
5. The **Customer** selects a flight and proceeds with the booking.
6. The **Reservation System** checks the availability of the selected flight by querying the **Flight Database**.
7. If the flight is available, the **Reservation System** prompts the **Customer** for payment details.
8. The **Customer** enters payment information.
9. The **Reservation System** communicates with the **Payment Gateway** to process the payment.
10. The **Payment Gateway** confirms whether the payment is successful or failed.
11. If successful, the **Reservation System** books the ticket and generates a booking confirmation.
12. The **Reservation System** updates the **Flight Database** to mark the flight as booked.
13. The **Customer** receives the booking confirmation and the ticket.

UML Sequence Diagram: