INTERNET CAFÉ MONITORING SYSTEM

Minor Project

Submitted towards partial fulfillment of the

Degree of **Bachelor of Engineering**

Year 2010

Department Of Information Technology

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Certificate

This is to Certify that **Mr. Apoorv Shrivastava, Ms.Minakshi Gupta, Mr.Pulkit Verma** and **Mr. Udayan Gupta** working in a Group have satisfactorily completed the minor project titled "Internet Café Monitoring System" towards the partial fulfillment of the degree in Bachelor of Engineering (Information Technology) Awarded by Rajiv Gandhi Technical University,Bhopal for the academic year 2010.

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ACKNOWLEDGEMENT

"We follow your foot-steps, we move on the path shown by you, we acknowledge you, and we are proud to have guides like you."

We feel it our proud privilege to express our deep sense of gratitude and indebtedness to **Prof. Ashish Bansal** (Head of Department), **Prof. Jigyasu Dubey** (Project Incharge) **Prof. Anand Rajavat, Lect. Ankit Dongre** and **Lect. Rajesh Chakravarty** (Project Guide) for providing their painstaking and untiring supervision. We own our deep sense of gratitude and thanks for their constructive criticism, valuable suggestions and constant encouragement at all stages of development of this project.

We wish to express our sincere thanks to all the faculty of Information Technology Department, for providing a conductive environment for proper development of project and the necessary facilities for completion of project.

We also express our sincere thanks and gratitude to all of them without whose constant support and guidance, this project would not have been a success.

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Chapter 1

INTRODUCTION

1. Introduction

1.1 Problem Statement

The Internet Cafe Monitoring System mainly deals with the problems faced by the internet cafe owners or organizers and the Users. The main problem in present times the café owner faces is that he has to manage the whole café work manually, i.e. user's registration, login time, logout time, billing amount etc. Moreover he has to maintain bills regarding internet usage and other charges also. Whenever a User goes to any internet café, every time he has to show his identity.

1.2 Objectives

The Internet Café Monitoring System is a software solution for operating a computer rental system that can help you with cyber cafe management, accounting and billing. The software program comes as a client and server version. The server version needs to be installed on the administrator's computer system while the client version needs to be deployed on all computer systems that are to be monitored. The system administrator can monitor and record activity on all client computer systems. New user accounts with distinct rights can be created in the software program easily. After account creation, the user is given an id and password with which he can access internet at any of the cyber café which are linked through this software.

1.3 Scope

- Permanent view of all computers and their states will be available for the cyber café administrator.
- Cyber Café Administrator can log on/log off Users remotely.
- Cyber Café Administrator can enable/disable workstation remotely.
- Cyber Café Administrator send message to Users.
- Cyber Café Administrator can set time intervals for timeout messages.
- Cyber Café Administrator can handle the stocks of various items used in cyber café.
- Cyber Café Administrator can maintain the logs of users using their café.
- Billing system for additional services like scanning, CD/DVD's, printing, etc. will be incorporated.

- The Users can have the freedom to register only once at an internet café on the network.
- The User can use the same registration details for using some other internet café on the network.

1.4 Platform Specification

1.4.1. Hardware

MINIMUM REQUIREMENTS:

	TECHNOLOGY	PROCESSOR	RAM	DISK SPACE
CLIENT SIDE (INTERNET)	Firefox 2.0	Pentium II at 500MHz	64 MB	20 MB
CLIENT SIDE (INTRANET)	Firefox 2.0	Pentium II at 500MHz	64 MB	20 MB
	Java SDK 1.5	Pentium III at 1GHz	512 MB	132 MB
SERVER SIDE	Apache Tomcat Application Server V6.0	Pentium III at 1GHz	512 MB	1 GB
	DB2 V9.0	Pentium III at 1 GHz	512 MB	1GB (Excluding data size)

OTHER REQUIREMENTS:

- 17” Colored Monitor.
- 101 keys Keyboard.
- A Optical Scroll Mouse
- NIC (Network Interface Card)
- Modem

1.4.2. Software

- **Client on Internet** : Web Browser (Java Enabled), Operating System (any Linux Flavor or Windows Series OS).

- **Client on Intranet** : Web Browser (Java Enabled), Operating System (Windows Series OS), Java SDK 1.5 or higher (with RMI support).

- **Server on Intranet** : Web Browser (Java Enabled), Operating System (Windows Series OS), Java SDK 1.5 or higher (with RMI support).

- **Web Server** : Apache Tomcat, Operating System (Windows Series OS).

- **Data Base Server** : DB2, Operating System (Windows Series OS).

- **Development End** : Netbeans IDE (J2EE, Java, Servlets, HTML, RMI), DB2, Operating System (any Linux Flavor or Windows Series OS), Apache Tomcat Web Server.

1.4.3 Implementation Language : JAVA

We have chosen JAVA as the language for implementing the project. The primary motivation for the use of JAVA in our project is its feature of platform independence.

The various features of JAVA are summarized below:

a) **Simple**: JAVA was designed to be easy for the professional programmer to learn and use effectively.

b) **Security**: JAVA achieves protection by confining a JAVA program to the JAVA execution environment and not allowing its access to other parts of the computer

c) **Portability**: For programs to be downloaded to all the various types of platforms connected to the Internet, some means of generating portable executable create portability.

d) **Multithreaded**: JAVA was designed to meet the real-world requirement of creating interactive, networked programs. To accomplish this, JAVA supports multithreaded programming which allows you to write programs that do man things simultaneously.

Chapter 2

SYSTEM ANALYSIS

2. System Analysis

2.1 Identification Of Need

Currently user authentication for a customer at a internet cafe is a manual job. It requires the manual filling of form and authentication of user by the internet cafe administrators. The same tedious procedure is followed every time the customer uses an internet cafe.

The Cyber cafe administrators has to manually handle and manage all the workstations.

In short manual system has following drawbacks:

- Manual process is very lengthy process that is wastage of time.
- Manual system is also a burden for doing or recording the paper work and then storing them safely.
- Level of automation for database maintenance is not that advance
- Requires large utilization of the human resources.

2.2 Preliminary Investigation

In Internet Cafe Monitoring System, information is gathered regarding the needs of the internet cafe administrators and the customers using the cafes. Information regarding functionality and concerns of the software and experience and preferences of cyber cafe administrators and users is collected.

For preliminary investigation we referred the present systems used by the internet cafe administrators. We found that the manual maintainance of the internet cafes is not easy, also for the customers it is very tedious and cumbersome to make entry at each internet cafe separately. When ever a new user arrives at an internet cafe he/she has to show his identity card to the cyber cafe administrators and the administrator makes an entry to the log register depending on the identity card shown by the user.

Sometimes maintaining the record manually may cause loss of data and inaccuracy, since a person can do mistake. In turn, redundancy rate increases in the data base. Hence there is a need of automation. Automation in any area helps people to do work more efficiently and effectively.

Chapter 3

FEASIBILITY STUDY

3. Feasibility Study

After the analysis of the requirement from the proposed system and specification of the proposed system a feasibility study of the projected system is conducted. The feasibility study is done to find whether the system is beneficial to user and organization or not. The feasibility study is carried out to select the best system that meets performance requirements.

The feasibility study includes the investigation of the information needs of the end user and objectives, constraints, basic resource requirement and cost benefits. The main and prime objective of feasibility study is not to solve the problem, but to acquire a sense of its scope. Based on this the feasibility of the proposed system can be evaluated in terms of following major categories:

3.1 Technical Feasibility

Our project uses JAVA as implementing language. We need resources that are easily available:

- Pentium IV or higher processor.
- 512 MB RAM or higher.
- Hard disk Space:10GB or more
- NetBeans IDE 6.8.

The technical requirements are available to us. Thus, our project is technically feasible.

3.2 Economical Feasibility

The project requires an efficient browser and required tools to run the project which are available very easily. Nowadays built in NIC are available on systems thus no extra amount is required to purchase them. Thus our project is economically feasible.

3.3 Operational Feasibility

It is operational feasible because it does not affect other applications running on system. Not only this, but network traffic is also not affected so badly. It requires its installation on every system on the network.

Chapter 4

LITERATURE SURVEY

4. Literature Survey

4.1 Work Done By Others

Though in this reference there has not been any previous work done in our college but all major cyber cafes have a highly automated monitoring system through which they carry out their monitoring activities.

4.2 Benefits

- Efficient & economical maintenance of information.
- One time effort of entering the user information in the system.
- Centralized control of internet cafe administrator in monitoring the cyber cafe.
- Automation of various functions like billing, stock maintenance, etc.

4.3 Proposed Solution

A proper management for information of various workstations at the internet cafe is must.

- Allows automatic billing procedure.
- Easy access method for the Users as they had to create account only once.

4.4 Technology Used

- **J2EE : Application Architecture**

  Java Platform, Enterprise Edition or J2EE is a widely used platform for server programming in the Java programming language. The Java platform (Enterprise Edition) differs from the Java Standard Edition Platform (Java SE) in that it adds libraries which provide functionality to deploy fault-tolerant, distributed, multi-tier Java software, based largely on modular components running on an application server.

- **JAVA : Front End**

  Java is a programming language originally developed by Sun Microsystems and released in 1995 as a core component of Sun's Java platform. The language derives much of its syntax from C and C++ but has a simpler object model and fewer low-level facilities. Java applications are typically compiled to bytecode which can run on any Java virtual machine (JVM) regardless of computer architecture, thus making the software platform independent.

- **RMI : For Remote Call Procedures**

The Java Remote Method Invocation Application Programming Interface, or Java RMI, is a Java application programming interface that performs the object-oriented equivalent of remote procedure calls (RPC). The original implementation depends on Java Virtual Machine (JVM) class representation mechanisms and it thus only supports making calls from one JVM to another. The protocol underlying this Java-only implementation is known as Java Remote Method Protocol (JRMP). Usage of the term RMI may denote solely the programming interface or may signify both the API and JRMP.

- **DB2 : Database Management**

DB2 is one of relational database management system (RDBMS) software products. Although there are different "editions" and "versions" of DB2 which run on devices ranging from handhelds to mainframes, most often DB2 refers to DB2 Enterprise Server Edition, which runs on Unix (AIX), Windows or Linux servers; or DB2 for z/OS.

- **NetBeans : Development Tool (GUI)**

The Netbeans IDE is a free, open-source Integrated Development Environment for software developers. The IDE runs on many platforms including Windows, Linux, and Solaris. It is easy to install and use straight out of the box. The netbeans IDE provides developers with all the tools they need to create professional cross-platform desktop, enterprise, web and mobile applications. Netbeans, along with Eclipse, is one of the most widely used Java IDE (Integrated Development Environment). Netbeans can be run on a net based system, using Linux Java Virtual Machine and Linux compatibility mode.

- **Apache Tomcat : Web Server**

Apache Tomcat is a servlet container developed by the Apache Software Foundation (ASF). Tomcat implements the Java Servlet and the JavaServer Pages (JSP) specifications from Sun Microsystems, and provides a "pure Java" HTTP web server environment for Java code to run.

Tomcat should not be confused with the Apache web server, which is a C implementation of an HTTP web server; these two web servers are not bundled together. Apache Tomcat includes tools for configuration and management, but can also be configured by editing XML configuration files.

Chapter 5

TECHNICAL PART

5. Technical Part

5.1 Project Standard

Project standard defines the kind or type of project. Our project is a combination of web based application and a desktop based application software.

5.2 Proposed Tool

We will make use of Java Server Pages (JSP) as a software tool for the development of web application.

- **Platform Independence**: This feature helps to run our software on various operating systems.
- **Safe and Secure**: This security feature helps in confining our software to the Java Environment and not allowing it to access the other parts of computer.
- **Object Oriented**: This feature allows us to design our software from any blank state. This feature of JAVA makes it simple and easy to extend our software.
- **Faster response**: As JSP engine compiles the JSP into corresponding servlet so after this compilation when any other time JSP is accessed its response is very fast.

We will make use of Remote Method Invocation (RMI) as a software tool for the development of networking application. Some of its advantages are:

- Handles threads automatically.
- Handles Sockets automatically.
- Marshalls objects automatically.
- Dynamic loading of classes are available.
- Can also make changes on the server end, that might not mean you need to change anything on the client side

5.3 Interfaces

For the user to use our application easily and efficiently, we have provided a user friendly GUI that contains text fields, buttons, boxes and hyperlinks.

The menus and buttons will provide options for the user to select a particular operation. Hyperlinks will provide a user interface to specify the option while selecting an action. The selection box and list boxes will specify other options.

- **User Interface**

    1. Login Form
    2. Registration Form
    3. Delete User Form
    4. List of Internet Cafes

- **Hardware Interface**

    1. 17" Colored Monitor
    2. 101 keys Keyboard
    3. A Optical Scroll Mouse
    4. NIC (Network Interface Card)
    5. Modem

- **Software Interface**

    - JDBC 3.0 API – This is API used for database connection.
    - DSN – We have to configure the ODBC manager by creating Data Source Names.
    - JDBC-ODBC Bridge – Open Database Connection provided by Microsoft. JDBC drivers provide a bridge between the JDBC API and the ODBC API.
    - DB2 as database.
    - Web Browsers like Internet Explorer, Firefox Mozilla, etc.
    - Compatible HTTP and TCP/IP protocol versions.
    - Compatible Operating System Linux or Windows Xp/Vista.
    - Java Supportable Environment.

- **Communication Interface**

    1. Browser – Microsoft Internet Explorer, Firefox Mozilla, etc.
    2. HTTP/HTTPS – Hyper Text Transfer Protocol.
    3. TCP/IP – Transmission Control Protocol / Internet Protocol.
    4. Data Transfer Rate is depend on internet connection.
    5. Java Synchronize mechanism is used to control security and complexity.

5.4 Coding Language

- Java
- HTML/JSP
- Javascript

Chapter 6

SOFTWARE ENGINEERING APPROACH

6. Software Engineering Approach

6.1 Software Engineering Paradigm Applied

6.1.1 Description

A software engineer must incorporate a development strategy that encompasses the process, methods and tools and generic phases. This strategy is often referred to as a Process Model or a software engineering paradigm. A process model for software engineering is chosen based on the nature of the project and application, the methods and tools to be used and the controls and delivered that are required.

The process model used for our project is Concurrent Development Model. The concurrent process model can be represented schematically as a series of major technical activities, tasks, and their associated states.

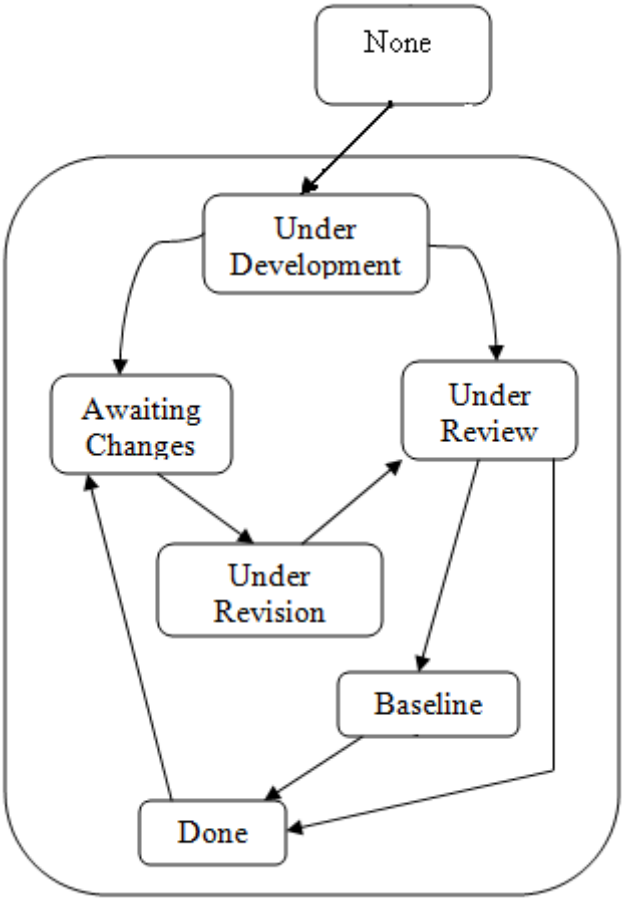


Figure 1: One element of Concurrent process model

 Represents a state of software engineering activity.

Figure provides a schematic representation of one of activity with the concurrent process model. The activity-analysis-maybe in any one of the states noted at any given time. Similarly, other activities (e.g. design or User communication) can be represented in and analogous manner. All activities exist concurrently but reside in different states. For example, early project the User communication activity has completed its first iteration and exists in the awaiting changes state. The analysis activity (which existed in none state while initial User communication was completed) now makes a transition into the under development state. If, however, the User indicates that changes in requirements must be made, the analysis activity moves from the under development state into the awaiting changes state.

The concurrent process model defines a series of events that with trigger transitions from state for each of the software engineering activities. For example during early stages of design, an inconsistency in the analysis model is uncovered. This generation the event analysis model correction which will trigger the analysis activity from the done state into the awaiting changes state. For example during early states of design, an inconsistency in the analysis model is uncovered. This generates the event analysis from the done state into the awaiting changes state.

The concurrent process model is often used as the paradigm for the development of client /server application. A clients/server system is composed of a set of functions components. When applied to client server, the concurrent process model defines activities in two dimensions.

1. **A system dimensions**
2. **A component dimension**

System level issues are addressed using three activities:

1. Design
2. Assembly and
3. Use

The component dimension is addressed with two activities:

1. Design

2. Realization

Concurrently achieved in two ways:

1. System and component activities occur simultaneously and can be modeled using the state-oriented approach describe previously.

2. A typical client/server application is implemented with many components each of which can be designed and realized concurrently.

In reality, the concurrent process model is applicable to all types of software development and provides and accurate picture of the current state of a project. Rather than confining software engineering activities to a sequence of events, it defines a network of activities. Each activity on the network exists simultaneously with other activities. Events generated within a given activity or at some other place in the activity network trigger transition among the states of an activity.

6.1.2 Advantage and Disadvantage

Advantages:

1. It provides an accurate picture f the current state of the project

2. It defines the network of the activities instead of confining software engineering activities to a sequence of events.

3. It is often used as the paradigm for the development of the client/server applications.

4. Verification at each stage helps error to surface and be detected at an early stage.

5. Ensures the system meets the user needs

6. It driven by user needs, management decisions and review results.

Disadvantages

1. It is very complex as compared to other models.

2. It requires thorough understanding of the project, so it is not really applicable to real time projects.

3. It is very difficult to understand as well as explain to an unacquainted user.

6.1.3 Reasons for Use

1. Ours is a client server application each client server application consists of a set of functional component (in our case 6 applications). Each of the components can be designed and realized concurrently.
2. All the functional components in the project are less dependent on each other. For example, functional component – the remote shutdown utility does not interact with other utilities (registry, security, process manager, folder locking etc.)
3. The degree of interoperability and reusability is low, coupling between any two components is also very low (limited to class usage and API usage only).
4. This model is more suited to our team structure (democratic decentralized). Since, the communication between the team members is horizontal the different activities of different model modules can go on simultaneously.
5. This model provides an accurate picture of the current state of the project. Because it tells us up to what state each of the functional components have been completed.

6.2 Requirement Analysis

6.2.1 Software Requirement Specification

6.2.1.1 Glossary

- **Cyber Café / Internet Cafe** : A place where a person can go and browse the internet and use other computer related facilities in exchange of money.
- **DB2** : DB2 Database is the database management system that delivers a flexible and cost effective database platform to build robust on demand business applications.
- **HTML** : Hypertext Markup Language is a markup language used to design static web pages.
- **HTTP**: Hypertext Transfer Protocol is a transaction oriented client/server protocol between web browser & a Web Server.
- **HTTPS:** Secure Hypertext Transfer Protocol is a HTTP over SSL (secure socket layer).
- **J2EE** : Java 2 Enterprise Edition is a programming platform— part of the Java Platform—for developing and running distributed multitier architecture Java applications, based largely on modular software components running on an application server.
- **RMI** : Remote Method Invocation is a Java application programming interface that performs the object-oriented equivalent of remote procedure calls (RPC).
- **Session** : Session is a semi-permanent interactive information exchange between communicating devices that is established at a certain time and torn down at a later time.
- **TCP/IP:** Transmission Control Protocol/Internet Protocol, the suite of communication protocols used to connect hosts on the Internet. TCP/IP uses several protocols, the two main ones being TCP and IP.
- **URL** : Uniform Resource Locator (URL) is a subset of the Uniform Resource Identifier (URI) that specifies where an identified resource is available and the mechanism for retrieving it.
- **Workstation** : A workstation is a high-end microcomputer designed for technical or scientific applications.

6.2.1.2 Supplementary Specifications

➢ For the website:

- **Have hours of operation that are 24 x 7 -** Because system can be an automated process, so it can stay open for 24 hours a day. If the base is now the entire world, staying open 24 hours a day becomes critical. System is required to be available 24X7 so UPS support must be on server site for at least 8 hours in case of power failure.

- **Make the Web site more dynamic in nature -** Many early Web implementations consisted of static HTML pages. This becomes very difficult to manage if the number of pages gets too large. An effective system should be largely dynamic taking advantage of technology that automates this process rather than relying on manual processes.

➢ For the monitoring system:

- **Make the System scalable as per requirements –** Generally the cyber café has a fixed number of workstations that are needed to be monitored. Now at any stage if a need arises to rescale the system and change the number of workstations then it can be done without affecting the present workstations and the overall working of the system.

- **Make the System easier to use –** The most important feature of the system is to provide a good user interface to the café administrator so that he can easily handle the network.

6.2.1.3 Use Case Model

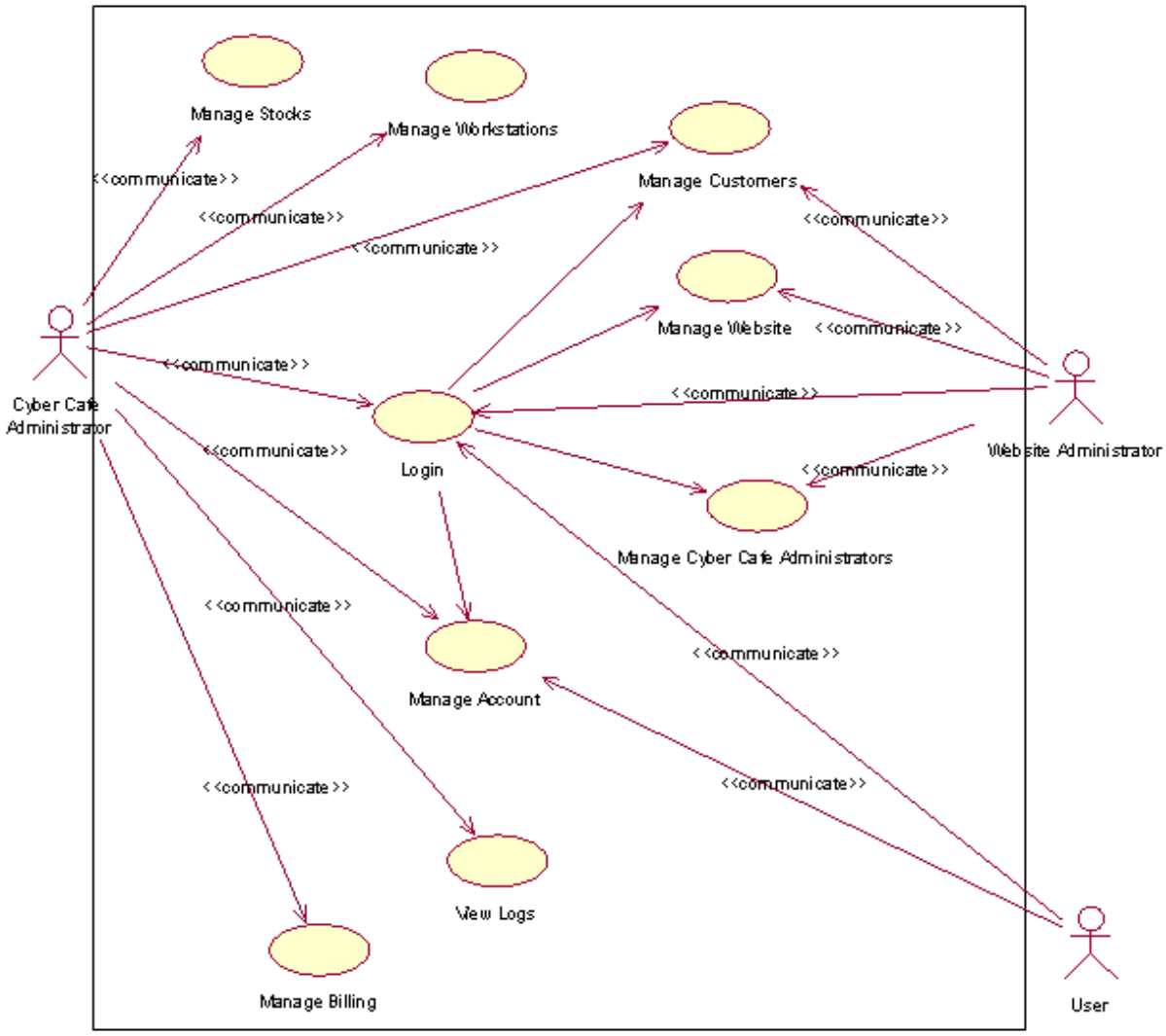


Figure 2: **USE CASE DIAGRAM**

1. **Website Administrator**: Responsible for managing the website and system users.

   - **Login:** The Website Administrator will login using user ID and password.
   - **Manage Website**: The website will be updated and enhanced as per the requirements.
   - **Manage Cyber Cafe Administrators**: The Cyber Cafe Administrators will be created and will be assigned with the different roles. More than one task and permissions can be granted or revoked from the Cyber Cafe Administrators.
   - **Manage Users**: The Users can be blacklisted/banned on reports given by the Cyber Café Administrators.

2. **Cyber Cafe administrator**: Responsible for monitoring the cyber café and verifying the Users.

   - **Login :** The Cyber Café Administrator will login using user ID and password.
   - **Manage Users** : The Users will be verified with the help of ID proof given by the User. They can also be blacklisted/banned in case of any illegal activity.
   - **Manage Workstations**: The workstations will be remotely monitored and managed.
   - **Manage Stocks** : The availability and price of various items used in printing, scanning etc. and CD/DVD's will be managed.
   - **Manage Billing** : The billing of various facilities used by the User will be done.
   - **View Logs** : The logbook will be maintained for the Users who have used the cyber café.
   - **Manage Account** : The online account of cyber café on the website will be maintained by the café administrator.

3. **Users** : Will use the cyber café to browse the internet.

   - **Login :** The User will login using user ID and password.
   - **Manage Account** : The online account of the User on the website will be maintained by him.

USE CASE : LOGIN

- **Brief Description:** This use case describes how a user logs into the System. The use case takes in the user name and password to logon and checks for its validity.

- **Flow of events:**

NORMAL FLOW:

Step	Actor	Description	Condition	Location
1.	Website Administrator/ Cyber Café Administrator/ User	System generate login page which request user enter his/her name and password.	----------	----------
2.	Website Administrator/ Cyber Café Administrator/ User	The user enters Login id and password	----------	----------
3.	Website Administrator/ Cyber Café Administrator/ User	The system validates the entered name and password and logs the actor into the system.	Invalid userid/ password	Alternate flow
4.	Website Administrator/ Cyber Café Administrator/ User	System generates required page listing all the available operations.	----------	---------- -
5.	Website Administrator/ Cyber Café Administrator/ User	Use Case Ends.	----------	---------- -

ALTERNATE FLOW:

Step	Actor	Description	Condition	Location
1.	Website Administrator/ Cyber Café Administrator/ User	The user enters an invalid Login Id and password. The System displays an error message.	---------	----------
2.	Website Administrator/ Cyber Café Administrator/ User	System request to re-enter user ID and password. The actor can choose to either return to the main flow or cancel the login, at which point the use case ends.	----------	---------- -

- **Precondition:** User needs a valid user name and password to logon to the system.
- **Post condition:** If the use case was successful, the actor is logged into the system.
- **Actor:** Website Administrator/ Cyber Café Administrator/ User
- **Special Requirements:** The ID and password should be provided to the Website Administrator/ Cyber Café Administrator/ User for login purposes.

6.2.1.3.1. Website Administrator

- Responsible for managing the website and system users.

- **Login:** The Website Administrator will login using user ID and password.
- **Manage Website**: The website will be updated and enhanced as per the requirements.
- **Manage Cyber Cafe Administrators**: The Cyber Cafe Administrators will be created and will be assigned with the different roles. More than one task and permissions can be granted or revoked from the Cyber Cafe Administrators.
- **Manage Users**: The Users can be blacklisted/ banned on reports given by the Cyber Café Administrators.

i) Manage Website :

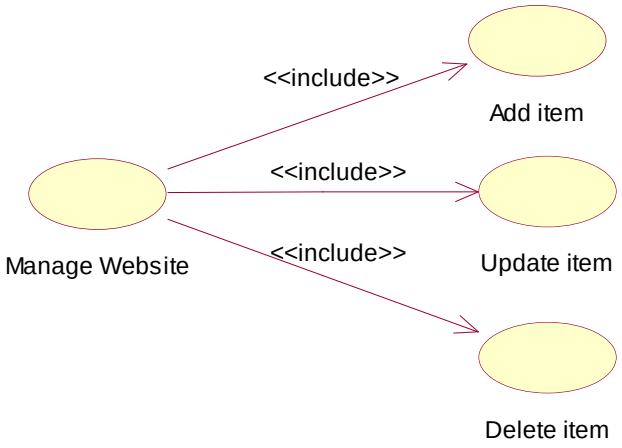


Figure 3

- **Brief Description:** This use case updates and enhances the website as per the requirements.
- **Flow of events:**

NORMAL FLOW:

Step	Actor	Description	Condition	Location
1.	Website Administrator	System prompts the Website Administrator to select the desired activity	--------	--------
2.	Website Administrator	If the activity selected is ADD, the Add Item Sub flow is performed.	Add Item	s-1
3.	Website Administrator	If the activity selected is UPDATE, the Update Item Sub flow is performed.	Update Item	s-2
4.	Website Administrator	If the activity selected is DELETE, the Delete Item Sub flow is performed.	Delete Item	s-3
5.	Website Administrator	If the activity selected is Logout Use case ends.	---------	--------

- **Precondition:** User needs a valid user name and password to logon to the system.
- **Post condition:** If the use case was successful, the Website Administrator maintains the various items on the website (i.e. add, delete, update).
- **Actor:** Website Administrator
- **Special Requirements:** The details about the items must be known.

- **Name of the Use Case :** Add Item

  Description : Add a new item on the website.

  Flow of events:

SUB FLOW S-1

Step	Actor	Description	Condition	Location
1.	Website Administrator	System generates Add Item page, which request the Website Administrator to enter the desired information.	---------	---------
2.	Website Administrator	If the Website Administrator enters information of the Item and clicks OK button then System adds the new Item to the Website.	Invalid Information	ALT-1
3.	Website Administrator	If the Website Administrator enters information of the Item and clicks OK button then System adds the new Item to the Website.	---------	----------
4.	Website Administrator	If the Website Administrator wants to Add more items then go to Step1 Or Use case ends.	----------	----------

ALTERNATE FLOW ALT-1

Step	Actor	Description	Condition	Location
1.	Website Administrator	If in the main flow , the Website Administrator enter an invalid information, the system displays an error message	---------	--------
2.	Website Administrator	System request to re-enter Correct information .The Website Administrator can choose to either return to the main flow or cancel, at which point use case ends.	----------	--------

- **Preconditions** : Website Administrator is already logged in.

- **Post condition:** If the use case was successful, the Website Administrator adds the various items on the website.

- **Name of the Use Case :** Update Item

  Description : Update an existing item on the website.

  Flow of events:

SUB FLOW S-2

Step	Actor	Description	Condition	Location
1.	Website Administrator	System generates Update Item page, which request that the Website Administrator to select the item and update it.	----------	----------
2.	Website Administrator	If the Website Administrator selects the item, updates it and clicks on update button, System updates the item.	Invalid Information	ALT-2
3.	Website Administrator	If Website Administrator Wants to update more items then go to Step1 Or Use case ends	---------	--------

ALTERNATE FLOW ALT-2

Step	Actor	Description	Condition	Location
1.	Website Administrator	If in the main flow , the Website Administrator enter an invalid information, the system display an error message	--------	-------
2.	Website Administrator	System request to re-enter Correct information The Website Administrator can choose to either return to the main flow or cancel, at which point use case ends.	--------	--------

- **Preconditions** : Website Administrator is already logged in.

- **Post condition:** If the use case was successful, the Website Administrator updates the various items on the website.

- **Name of the Use Case :** Delete Item

  Description : Delete an existing item from the website.

  Flow of events:

SUB FLOW S-3

Step	Actor	Description	Condition	Location
1.	Website Administrator	System generates Delete Item page, which request that the Website Administrator to choose the item and delete it.	---------	---------
2.	Website Administrator	If Website Administrator selects an Item & click delete.	---------	----------
3.	Website Administrator	The Website Administrator confirms the delete and the system deletes the item.	----------	----------
4.	Website Administrator	Website Administrator Wants to Delete more items then go to Step1Or Use case ends.	----------	----------

- **Preconditions** : Website Administrator is already logged in.

- **Post condition:** If the use case was successful, the Website Administrator deletes the various items on the website.

ii) Manage Cyber Café Administrators :

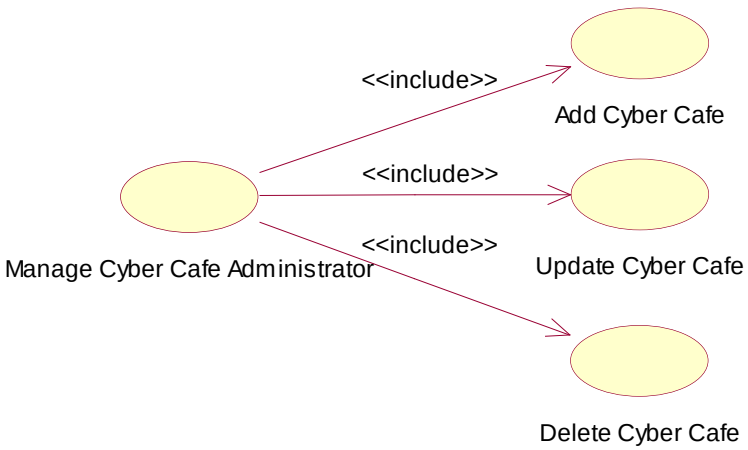


Figure 4

- **Brief Description:** This use case Manages the cyber café administrators' accounts.

- **Flow of events:**

NORMAL FLOW:

Step	Actor	Description	Condition	Location
1.	Website Administrator	System prompts the Website Administrator to select the desired activity	---------	---------
2.	Website Administrator	If the activity selected is ADD, the Add Cyber Café Sub flow is performed.	Add Cyber Cafe	S-1
3.	Website Administrator	If the activity selected is UPDATE, the Update Cyber Cafe Sub flow is performed.	Update Cyber Cafe	s-2
4.	Website Administrator	If the activity selected is DELETE, the Delete Cyber Cafe Sub flow is performed.	Delete Cyber Cafe	s-3
5.	Website Administrator	If the activity selected is Logout Use case ends.	---------	--------

- **Precondition:** The website administrator needs to be logged in on the system.

- **Post condition:** If the use case was successful, the Website Administrator maintains data of the various Cyber café administrators registered on the website.

- **Actor:** Website Administrator

- **Special Requirements:** The details about the cafe administrators must be known.

➢ **Name of the Use Case :** Add Cyber Cafe

Description : Add a new cyber cafe on the website.

Flow of events:

SUB FLOW S-1

Step	Actor	Description	Condition	Location
1.	Website Administrator	System generates Add Cyber Cafe page, which request the Website Administrator to add the desired information.	---------	---------
2.	Website Administrator	If the Website Administrator enters information of the cyber cafe and clicks OK button then System adds the new Cyber Cafe to the Website.	Invalid Information	ALT-1
3.	Website Administrator	If the Website Administrator enters information of the Cyber cafe and clicks OK button then System adds the new cafe to the Website.	---------	----------
4.	Website Administrator	If the Website Administrator wants to Add more cyber cafes then go to Step1 Or Use case ends.	----------	----------

ALTERNATE FLOW ALT-1

Step	Actor	Description	Condition	Location
1.	Website Administrator	If in the main flow , the Website Administrator enter an invalid information, the system displays an error message	---------	--------
2.	Website Administrator	System request to re-enter Correct information .The Website Administrator can choose to either return to the main flow or cancel, at which point use case ends.	----------	--------

- **Preconditions** : Website Administrator is already logged in.

- **Post condition:** If the use case was successful, the Website Administrator adds the a new cyber cafe on the website.

- **Name of the Use Case :** Update Cyber Cafe

  Description : Update a cyber café's profile on the website.

  Flow of events:

SUB FLOW S-2

Step	Actor	Description	Condition	Location
1.	Website Administrator	System generates Update cafe admin page, which request that the Website Administrator to select the cafe admin and update it.	----------	----------
2.	Website Administrator	If the Website Administrator selects the cafe admin, updates it and clicks on update button, System updates the admin.	Invalid Information	ALT-2
3.	Website Administrator	Website Administrator Wants to update more cafe admin then go to Step1 Or Use case ends	---------	--------

ALTERNATE FLOW ALT-2

Step	Actor	Description	Condition	Location
1.	Website Administrator	If in the main flow , the Website Administrator enter an invalid information, the system displays an error message	---------	--------
2.	Website Administrator	System request to re-enter Correct information .The Website Administrator can choose to either return to the main flow or cancel, at which point use case ends.	----------	--------

- **Preconditions** : Website Administrator is already logged in.

- **Post condition:** If the use case was successful, the Website Administrator updates the profile of a cyber cafe on the website.

- **Name of the Use Case :** Delete Cyber Cafe

  Description : Deletes a cyber cafe on the website.

  Flow of events:

SUB FLOW S-3

Step	Actor	Description	Condition	Location
1.	Website Administrator	System generates Update Item, which request that the Website Administrator to choose the item and delete it.	---------	---------
2.	Website Administrator	If Website Administrator selects an Item & click delete.	---------	----------
3.	Website Administrator	The Website Administrator confirms the delete and the system deletes the item.	----------	----------
4.	Website Administrator	Website Administrator Wants to Delete more items then go to Step1Or Use case ends.	----------	----------

- **Preconditions** : Website Administrator is already logged in.
- **Post condition:** If the use case was successful, the Website Administrator deletes a cyber cafe on the website.

iii) Manage Users :

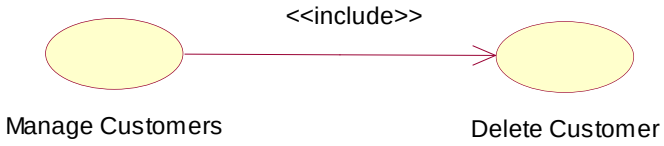


Figure 5

- **Name of the Use Case :** Delete User

  Description : Deletes a User on the website.

  Flow of Events:

NORMAL FLOW

Step	Actor	Description	Condition	Location
1.	Website Administrator	System promotes Website Administrator to select the User to be deleted.	------	------
2.	Website Administrator	System deletes the User selected by the Website Administrator and the use case ends.	------	------

- **Precondition:** The café administrator is already logged in.
- **Post condition:** None
- **Actor:** Website Administrator
- **Special Requirements:** The user ID of the User already exists.

6.2.1.3.2. Cyber Cafe Administrator

➢ Responsible for monitoring the cyber café and verifying the Users.

- **Login :** The Cyber Café Administrator will login using user ID and password.
- **Manage Users** : The Users will be verified with the help of ID proof given by the User. They can also be blacklisted/banned in case of any illegal activity.
- **Manage Workstations**: The workstations will be remotely monitored and managed.
- **Manage Stocks** : The availability and price of various items used in printing, scanning etc. and CD/DVD's will be managed.
- **Manage Billing** : The billing of various facilities used by the User will be done.
- **View Logs** : The logbook will be maintained for the Users who have used the cyber café.
- **Manage Account** : The online account of cyber café on the website will be maintained by the café administrator.

i) Manage Users :

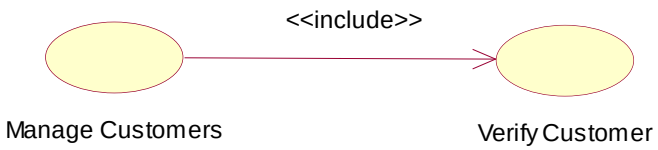


Figure 6

- **Name of the Use Case** : Verify User

  Description : Verifies the User.

  Flow of Events :

NORMAL FLOW

Step	Actor	Description	Condition	Location
1.	Cyber Café Administrator	System promotes cyber café administrator to select desired activity.	------	------
2.	Cyber Café Administrator	If the activity selected is VERIFY USER, given user ID is searched in the system.	INVALID INFORMATION	ALT-1
3.	Cyber Café Administrator	If the activity selected is VERIFY USER, given user ID is searched in the system.	------	------
3.	Cyber Café Administrator	If given user ID is found in the system, User is verified.	------	------
4.	Cyber Café Administrator	If given user ID is not found in the system, the User is not allowed and promoted to register.	------	------

ALTERNATE FLOW ALT-1

Step	Actor	Description	Condition	Location
1.	Cyber Café Administrator	If in the main flow , the Cyber Café Administrator enter an invalid information, the system display an error message	------	------
2.	Cyber Café Administrator	System request to re-enter Correct information The Cyber Café Administrator can choose to either return to the main flow or cancel, at which point use case ends.	------	------

- **Precondition**: The café administrator is already logged in.
- **Post condition**: None
- **Actor**: Cyber Café Administrator
- **Special Requirements**: The user ID of the User already exists.

ii) Manage Workstations :

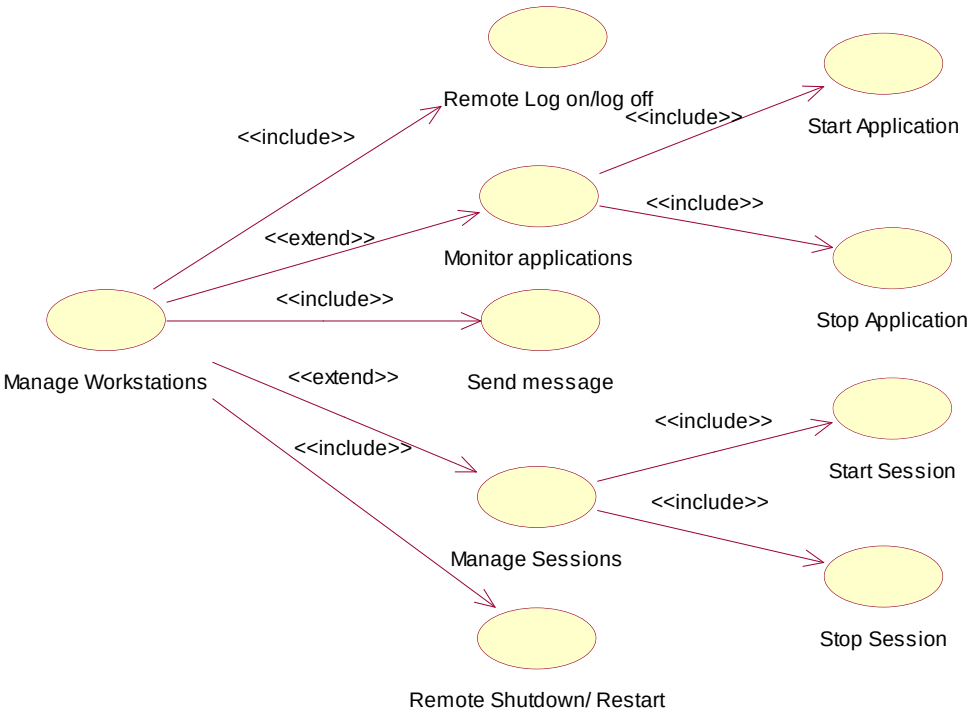


Figure 7

- **Brief Description:** The workstations will be remotely monitored and managed.
- **Flow of events:**

NORMAL FLOW:

step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System prompts the Cyber Cafe Administrator to select the desired activity	--------	--------
2.	Cyber Cafe Administrator	If the activity selected is REMOTE LOGON/LOGOFF, the Remote Logon/Logoff Sub flow is performed.	Remote logon/logoff	S-1
3.	Cyber Cafe Administrator	If the activity selected is MONITOR APPLICATIONS, the Monitor Applications Sub flow is performed.	Monitor Applications	S-2
4.	Cyber Cafe Administrator	If the activity selected is SEND MESSAGE, the Send Message Sub flow is performed.	Send Message	S-3
5.	Cyber Cafe Administrator	If the activity selected is MANAGE SESSIONS, the Manage Sessions Sub flow is performed.	Manage Sessions	S-4
6.	Cyber Cafe Administrator	If the activity selected is REMOTE SHUTDOWN/ RESTART, the Remote Shutdown/ Restart Sub flow is performed.	Remote Shutdown/ Restart	S-5

7.	Cyber Cafe Administrator	If the activity selected is Logout Use case ends.	---------	--------

- **Precondition:** The system should be on the network.
- **Post condition:** If the use case was successful, the Cyber Cafe Administrator maintains the various workstations on its network.
- **Actor:** Cyber Cafe Administrator
- **Special Requirements:** Cyber Café Administrator must be using the system running the Proxy server.

➢ **Name of the Use Case :** Remote Logon / Logoff.

Description : The cafe administrator can remotely logon / logoff the systems through network.

Flow of events:

SUB FLOW S-1

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System generates Remote Logon/ Logoff page, which request the Cyber Cafe Administrator to enter the desired option.	---------	---------
2.	Cyber Cafe Administrator	If the Cyber Cafe Administrator selects the workstation and clicks OK button then System adds checks if system is Logged in.	Workstation Logged Off	ALT-1
3.	Cyber Cafe Administrator	The system Logs off the workstation.	---------	----------
4.	Cyber Cafe Administrator	If the Cyber Cafe Administrator wants to change the operation performed step-1 is repeated Or Use case ends.	----------	----------

ALTERNATE FLOW ALT-1

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	If in the main flow, the workstation chosen by Cyber Cafe Administrator is already logged off, the System asks to send the login signal.	---------	--------
2.	Cyber Cafe Administrator	If Cyber Café Administrator clicks on Login, the system is logged in.	----------	--------

- **Preconditions** : The system should be on the network.
- **Post Condition** : None

- **Name of the Use Case :** Monitor Workstations.

  Description : The cafe administrator can remotely monitor a workstation allotted to User through network.

  Flow of events:

SUB FLOW S-2

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System generates Monitor Applications page, which request that the Cyber Cafe Administrator to choose the desired activity so as to monitor the various applications.	----------	----------
2.	Cyber Cafe Administrator	If the activity selected is START APPLICATION, the Start Application Sub flow is performed.	Start Application	S-2.1
3.	Cyber Cafe Administrator	If the activity selected is STOP APPLICATION, the Stop Application Sub flow is performed.	Stop Application	S-2.2
4.	Cyber Cafe Administrator	If Cyber Cafe Administrator Wants to monitor more applications then go to Step1 Or Use case ends	---------	--------

- **Precondition:** The system should be on the network.
- **Post condition:** If the use case was successful, the Cyber Cafe Administrator monitors the various workstations on its network.

- **Name of the Use Case :** Start Application.

  Description : The cafe administrator can remotely start an application on the system allotted to User through network.

  Flow of events:

SUB FLOW S-2.1

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System generates List of workstations, which request that the Cyber Cafe Administrator to choose the workstation.	--------	-------
2.	Cyber Cafe Administrator	System generates List of applications on the selected workstation, which request that the Cyber Cafe Administrator to choose the application.	--------	--------
3.	Cyber Cafe Administrator	If the Cyber Café Administrator clicks on Start button, the application is started.	--------	--------
4.	Cyber Cafe Administrator	If Cyber Cafe Administrator Wants to start more applications then go to Step1 Or Use case ends	--------	--------

- **Precondition:** The system should be on the network.
- **Post condition:** If the use case was successful, the Cyber Cafe Administrator starts an application remotely.

➢ **Name of the Use Case :** Start Application.

Description : The cafe administrator can remotely start an application on the system allotted to User through network.

Flow of events:

SUB FLOW S-2.2

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System generates List of workstations, which request that the Cyber Cafe Administrator to choose the workstation.	--------	-------
2.	Cyber Cafe Administrator	System generates List of applications on the selected workstation, which request that the Cyber Cafe Administrator to choose the application.	--------	--------
3.	Cyber Cafe Administrator	If the Cyber Café Administrator clicks on Stop button, the application is started.	--------	--------
4.	Cyber Cafe Administrator	If Cyber Cafe Administrator Wants to stop more applications then go to Step1 Or Use case ends	--------	--------

- **Precondition:** The system should be on the network.
- **Post condition:** If the use case was successful, the Cyber Cafe Administrator stops an application remotely.

➢ **Name of the Use Case :** Send Message.

Description : The cafe administrator can send a message on the system allotted to User through network.

Flow of events:

SUB FLOW S-3

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System generates Send Message page, which request that the Cyber Cafe Administrator to write the message and send it to a workstation.	---------	---------
2.	Cyber Cafe Administrator	If Cyber Cafe Administrator writes a message & click select a workstation.	---------	----------
3.	Cyber Cafe Administrator	The System sends the message to the desired workstation.	----------	----------
4.	Cyber Cafe Administrator	Cyber Cafe Administrator Wants to Send more messages then go to Step1Or Use case ends.	----------	----------

- **Precondition:** The system should be on the network.
- **Post condition:** If the use case was successful, the Cyber Cafe Administrator stops an application remotely.

➢ **Name of the Use Case :** Manage Sessions.

Description : The cafe administrator can remotely manage a session on a workstation allotted to User through network.

Flow of events:

SUB FLOW S-4

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System generates Manage Sessions page, which request that the Cyber Cafe Administrator to choose the desired activity so as to monitor the various applications.	----------	----------
2.	Cyber Cafe Administrator	If the activity selected is START SESSION, the Start Session Application Sub flow is performed.	Start Session	S-4.1
3.	Cyber Cafe Administrator	If the activity selected is STOP SESSION, the Stop Session Sub flow is performed.	Stop Session	S-4.2
4.	Cyber Cafe Administrator	If Cyber Cafe Administrator Wants to manage more sessions then go to Step1 Or Use case ends	---------	--------

- **Precondition:** The system should be on the network.
- **Post condition:** If the use case was successful, the Cyber Cafe Administrator manages a session.

- **Name of the Use Case :** Start Session.

  Description : The cafe administrator can remotely start a session on a workstation allotted to User through network.

  Flow of events:

SUB FLOW S-4.1

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System generates List of workstations, which request that the Cyber Cafe Administrator to choose the workstation.	--------	-------
2.	Cyber Cafe Administrator	System asks the Cyber Café Administrator to enter the time period for which session is valid.	--------	--------
3.	Cyber Cafe Administrator	If the Cyber Café Administrator clicks on Start button, the session is started.	--------	--------
4.	Cyber Cafe Administrator	System sends a message to the workstation specifying the time of session.		
5.	Cyber Cafe Administrator	If Cyber Cafe Administrator Wants to start more sessions then go to Step1 Or Use case ends	--------	--------

- **Precondition:** The system should be on the network.

- **Post condition:** If the use case was successful, the Cyber Cafe Administrator starts a session.

- **Name of the Use Case :** Stop Session.

  Description : The cafe administrator can remotely stop a session on a workstation allotted to User through network.

  Flow of events:

SUB FLOW S-4.2

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System generates List of workstations, which request that the Cyber Cafe Administrator to choose the workstation.	--------	-------
2.	Cyber Cafe Administrator	System sends a message to the workstation specifying the stopping of session.	--------	-------
3.	Cyber Cafe Administrator	If the Cyber Café Administrator clicks on Stop button, the session is stopped.	--------	--------
5.	Cyber Cafe Administrator	If Cyber Cafe Administrator Wants to stop more sessions then go to Step1 Or Use case ends	--------	--------

- **Precondition:** The system should be on the network.

- **Post condition:** If the use case was successful, the Cyber Cafe Administrator starts a session.

➢ **Name of the Use Case :** Remote Restart / Shutdown.

Description : The cafe administrator can remotely restart / shutdown the systems through network.

Flow of events:

SUB FLOW S-5

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System generates Remote Restart/ Shutdown page, which request the Cyber Cafe Administrator to select the workstation.	---------	---------
2.	Cyber Cafe Administrator	If the activity selected is RESTART, the Restart Sub flow is performed.	Restart	S-5.1
3.	Cyber Cafe Administrator	If the activity selected is SHUTDOWN, the Shutdown Sub flow is performed.	Shutdown	S-5.2
4.	Cyber Cafe Administrator	If the Cyber Cafe Administrator wants to change the operation performed step-1 is repeated Or Use case ends.	----------	----------

SUB FLOW S-5.1

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	If the Cyber Café Administrator clicks on Restart button, the workstation is restarted and use case ends.	---------	--------

SUB FLOW S-5.2

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	If the Cyber Café Administrator clicks on Shutdown button, the workstation is shut down and use case ends.	---------	--------

- **Preconditions** : The system should be on the network.

- **Post Condition** : None

iii) Manage Stocks :

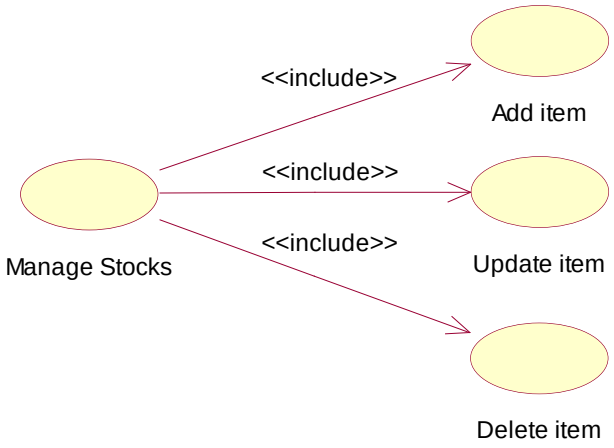


Figure 8

- **Brief Description:** The stocks will be managed.
- **Flow of events:**

NORMAL FLOW:

Step	Actor	Description	Condition	Location
1.	Cyber Café Administrator	System prompts the Cyber Café Administrator to select the desired activity	--------	--------
2.	Cyber Café Administrator	If the activity selected is ADD, the Add Item Sub flow is performed.	Add Item	s-1
3.	Cyber Café Administrator	If the activity selected is UPDATE, the Update Item Sub flow is performed.	Update Item	s-2
4.	Cyber Café Administrator	If the activity selected is DELETE, the Delete Item Sub flow is performed.	Delete Item	s-3
5.	Cyber Café Administrator	If the activity selected is Logout Use case ends.	---------	--------

- **Precondition**: Cyber café administrator must be using the system running proxy server.
- **Post condition**: If the use case was successful, the Cyber Cafe Administrator maintains the various items on the stock (i.e. add, delete, update).
- **Actor**: Cyber Cafe Administrator
- **Special Requirements**: The details about the items must be known.

- **Name of the Use Case :** Add Item

  Description : Add a new item on the stock list.

  Flow of events :

SUB FLOW S-1

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System generates Add Item page, which request the Cyber Cafe Administrator to enter the desired information.	---------	---------
2.	Cyber Cafe Administrator	If the Cyber Cafe Administrator enters information of the Item and clicks OK button then System adds the new Item to the Stock.	Invalid Information	ALT-1
3.	Cyber Cafe Administrator	If the Cyber Cafe Administrator enters information of the Item and clicks OK button then System adds the new Item to the Stock.	---------	----------
4.	Cyber Cafe Administrator	If the Cyber Cafe Administrator wants to Add more items then go to Step1 Or Use case ends.	----------	----------

ALTERNATE FLOW ALT-1

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	If in the main flow , the Cyber Cafe Administrator enter an invalid information, the system displays an error message	---------	--------
2.	Cyber Cafe Administrator	System request to re-enter Correct information .The Cyber Cafe Administrator can choose to either return to the main flow or cancel, at which point use case ends.	----------	--------

- **Precondition**: Cyber café administrator must be using the system running proxy server.

- **Post condition**: If the use case was successful, the Cyber Cafe Administrator adds an item on the stock.

- **Name of the Use Case :** Update Item

  Description : Update an item on the stock list.

  Flow of events :

SUB FLOW S-2

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System generates Update Item page, which request that the Cyber Cafe Administrator to select the item and update it.	----------	----------
2.	Cyber Cafe Administrator	If the Cyber Cafe Administrator selects the item, updates it and clicks on update button, System updates the item.	Invalid Information	ALT-2
3.	Cyber Cafe Administrator	Cyber Cafe Administrator Wants to update more items then go to Step1 Or Use case ends	---------	--------

ALTERNATE FLOW ALT 2

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	If in the main flow , the Cyber Cafe Administrator enter an invalid information, the system display an error message	--------	-------
2.	Cyber Cafe Administrator	System request to re-enter Correct information The Cyber Cafe Administrator can choose to either return to the main flow or cancel, at which point use case ends.	--------	--------

- **Precondition**: Cyber café administrator must be using the system running proxy server.

- **Post condition**: If the use case was successful, the Cyber Cafe Administrator updates an item on the stock.

- **Name of the Use Case :** Delete Item

  Description : Delete an item from the stock list.

  Flow of events :

SUB FLOW S-3

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System generates Delete Item Page, which request that the Cyber Cafe Administrator to choose the item and delete it.	---------	---------
2.	Cyber Cafe Administrator	If Cyber Cafe Administrator selects an Item & click delete.	---------	----------
3.	Cyber Cafe Administrator	The Cyber Cafe Administrator confirms the delete and the system deletes the item.	----------	----------
4.	Cyber Cafe Administrator	Cyber Cafe Administrator Wants to Delete more items then go to Step1Or Use case ends.	----------	----------

- **Precondition**: Cyber café administrator must be using the system running proxy server.
- **Post condition**: If the use case was successful, the Cyber Cafe Administrator deletes an item from the stock.

iv) Manage Billing :

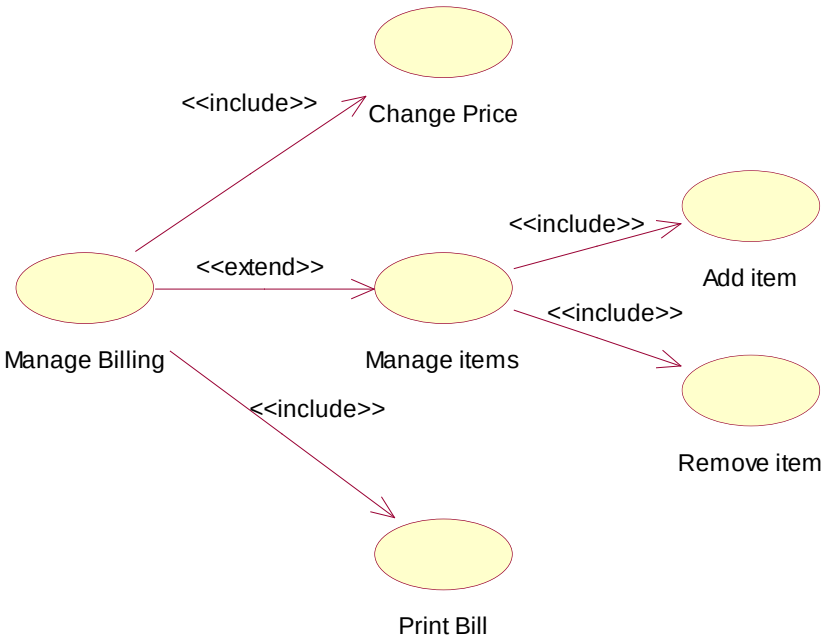


Figure 9

- **Brief Description :** The billing of various facilities used by the User will be done.
- **Flow of Events:**

NORMAL FLOW:

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System prompts the Cyber Cafe Administrator to select the desired activity	--------	--------
2.	Cyber Cafe Administrator	If the activity selected is CHANGE PRICE, the Change Price Sub flow is performed.	Change Price	S-1
3.	Cyber Cafe Administrator	If the activity selected is MANAGE ITEMS, the Manage Item s Sub flow is performed.	Update Item	S-2
4.	Cyber Cafe Administrator	If the activity selected is PRINT BILL, the Print Bill Sub flow is performed.	Print Bill	S-3
5.	Cyber Cafe Administrator	If the activity selected is Logout. Use case ends.	--------	--------

- **Precondition:** The system should be on the network.

- **Post condition:** If the use case was successful, the Cyber Cafe Administrator maintains the billing system.

- **Actor:** Cyber Cafe Administrator

- **Special Requirements:** Cyber Café Administrator must be using the system running the Proxy server.

➢ **Name of the Use Case :** Change Price

Description : Change the price of an item due to some reason.

Flow of events :

SUB FLOW S-1

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System generates Change Price page, which request that the Cyber Cafe Administrator to choose the items and changed prices of those items.	---------	---------
2.	Cyber Cafe Administrator	If Cyber Cafe Administrator selects a item & click Change Price.	---------	----------
3.	Cyber Cafe Administrator	The Cyber Cafe Administrator confirms the Change and the system Changes the prices.	----------	----------

- **Precondition:** The system should be on the network.

- **Post condition:** If the use case was successful, the Cyber Cafe Administrator changes the price of an item.

➢ **Name of the Use Case :** Manage Items

Description : Manages the items on the bill

Flow of events :

SUB FLOW S-2

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System generates Manage Items page, which request that the Cyber Cafe Administrator to select the ADD and REMOVE Items.	----------	----------
2.	Cyber Cafe Administrator	If the Cyber Cafe Administrator selects the ADD ITEMS, Add Items sub flow is performed.	Add Items	s-2.1
3.	Cyber Cafe Administrator	If the Cyber Cafe Administrator selects the REMOVE ITEMS, Remove Items sub flow is performed.	Remove Items	s-2.2

- **Precondition:** The system should be on the network.
- **Post condition:** If the use case was successful, the Cyber Cafe Administrator manages the items on the bill.

- **Name of the Use Case :** Add Item

  Description : Add a new item on the bill

  Flow of events :

SUB FLOW S-2.1

Step	Actor	Description	Condition	Location
1.	Cyber cafe Administrator	System generates Add Item page, which request that the Cyber cafe Administrator to Add items.	---------	---------
2.	Cyber cafe Administrator	If Cyber cafe Administrator selects an item and its quantity and click Add.	---------	----------
3.	Cyber cafe Administrator	The Cyber cafe Administrator confirms the item and quantity, items are added to the bill.	----------	----------
4.	Cyber cafe Administrator	If Cyber cafe Administrator Wants to Add more Items then go to Step1Or Use case ends.	----------	----------

- **Precondition:** The system should be on the network.
- **Post condition:** If the use case was successful, the Cyber Cafe Administrator adds an item to the bill.

- **Name of the Use Case :** Remove Item

Description : Removes an item from the bill

Flow of events :

SUB FLOW S-2.2

Step	Actor	Description	Condition	Location
1.	Cyber cafe Administrator	System generates Remove Item page, which request that the Cyber cafe Administrator to choose the item and remove it.	---	---
2.	Cyber cafe Administrator	If Cyber cafe Administrator selects an item & click remove.	---	---
3.	Cyber cafe Administrator	The Cyber cafe Administrator confirms the remove and the system removes the item.	---	---
4.	Cyber cafe Administrator	If Cyber cafe Administrator Wants to Remove more items then go to Step1Or Use case ends.	---	---

- **Precondition:** The system should be on the network.
- **Post condition:** If the use case was successful, the Cyber Cafe Administrator removes an item from the bill.

- **Name of the Use Case :** Print Bill

  Description : Prints the bill

  Flow of events :

SUB FLOW S-3

Step	Actor	Description	Condition	Location
1.	Cyber Cafe Administrator	System generates Print Bill page, which request that the Cyber Cafe Administrator to confirm the items and give print command.	---	---
2.	Cyber Cafe Administrator	The Cyber Cafe Administrator confirms the Print and the system Prints the Bill.	---	---

- **Precondition:** The system should be on the network.
- **Post condition:** If the use case was successful, the Cyber Cafe Administrator prints the bill.

v) **View Logs:**

- The logbook will be maintained for the Users who have used the cyber café.

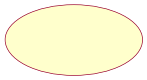


Figure 10

- **Name of the Use Case :** View Logs

  Description : View the log of Users who used the cyber cafe.

  Flow of Events :

NORMAL FLOW

Step	Actor	Description	Condition	Location
1.	Cyber Café Administrator	System promotes cyber café administrator to select desired activity	------	------
2.	Cyber Café Administrator	If the activity selected is VIEW LOGS, list of system logs is generated	------	------

- **Precondition:** The café administrator is already logged in.
- **Post condition:** None
- **Actor:** Cyber Café Administrator
- **Special Requirements**: None

vi) **Manage Account:**

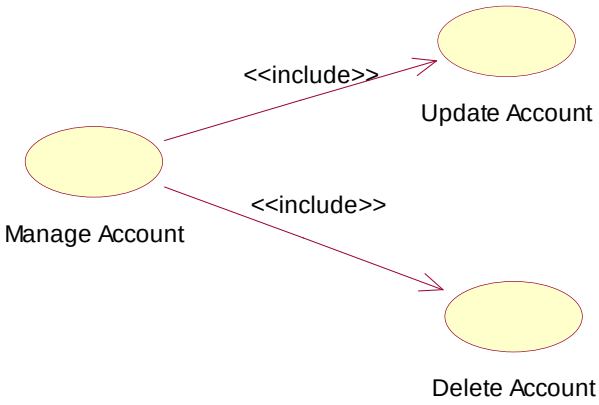


Figure 11

- **Brief Description :** The online account of cyber café on the website will be maintained by the cyber café administrator.

- **Flow of events :**

NORMAL FLOW:

Step	Actor	Description	Condition	Location
1.	Cyber cafe Administrator	System prompts the Cyber cafe Administrator to select the desired activity	--------	--------
2.	Cyber cafe Administrator	If the activity selected is UPDATE, the Update Item Sub flow is performed.	Update item	s-1
3.	Cyber Café Administrator	If the activity selected is DELETE, the Delete Item Sub flow is performed.	Delete Item	s-2
4.	Cyber Café Administrator	If the activity selected is Logout Use case ends.	--------	--------

Precondition: The café administrator is already logged in.

Post condition: If the use case was successful, the Cyber Cafe Administrator maintains the various Users on the website (i.e. delete, update).

Actor: Website Administrator

Special Requirements: The User must have already registered on the website.

- **Name of the Use Case :** Update Account

  Description : Update the profile of the cyber cafe on the website.

  Flow of events:

SUB FLOW S-1

Step	Actor	Description	Condition	Location
1.	Cyber cafe Administrator	System generates Update Item page, which request that the Cyber cafe Administrator to select the User and update it information.	----------	----------
2.	Cyber cafe Administrator	If the Cyber cafe Administrator selects the User, updates it and clicks on update button, System updates the information.	Invalid Information	ALT-1
3.	Cyber cafe Administrator	If Cyber cafe Administrator Wants to update more items then go to Step1 Or Use case ends	---------	--------

ALTERNATE FLOW ALT 1

Step	Actor	Description	Condition	Location
1.	Cyber cafe Administrator	If in the main flow , the Cyber cafe Administrator enter an invalid information, the system display an error message	--------	-------
2.	Cyber cafe Administrator	System request to re-enter Correct information The Cyber cafe Administrator can choose to either return to the main flow or cancel, at which point use case ends.	--------	--------

- **Precondition:** The café administrator is already logged in.
- **Post condition:** If the use case was successful, the Cyber Cafe Administrator updates its profile.

- **Name of the Use Case :** Delete Account

  Description : Delete the profile of the cyber cafe on the website.

  Flow of events:

SUB FLOW S-2

Step	Actor	Description	Condition	Location
1.	Cyber cafe Administrator	System generates Delete Item page, which request that the Cyber cafe Administrator to choose the User and delete it.	---------	---------
2.	Cyber cafe Administrator	If Cyber cafe Administrator selects a User & click delete.	---------	----------
3.	Cyber cafe Administrator	The Cyber cafe Administrator confirms the delete and the system deletes the item.	----------	----------
4.	Cyber cafe Administrator	If Cyber cafe Administrator Wants to Delete more Users then go to Step1Or Use case ends.	----------	----------

- **Precondition:** The café administrator is already logged in.
- **Post condition:** If the use case was successful, the Cyber Cafe Administrator deletes its profile.

6.2.1.3.3. User

- Will use the cyber café to browse the internet.

  - **Manage Account** : The online account of the User on the website will be maintained by him.

i) Manage Account:

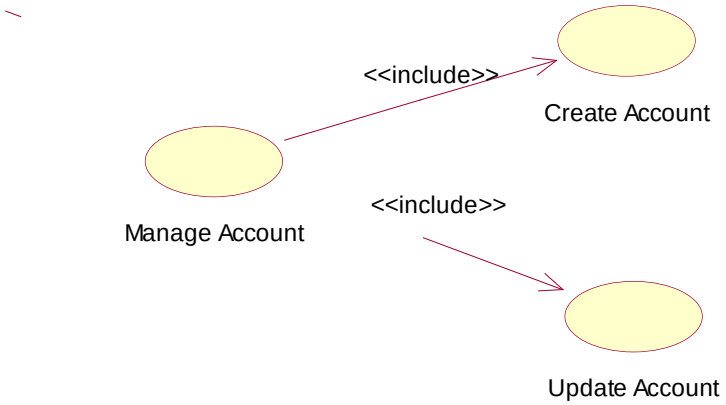


Figure 12

- **Brief Description :** The online account of User on the website will be maintained by the User.

- **Flow of events :**

NORMAL FLOW:

Step	Actor	Description	Condition	Location
1.	User	System prompts the User to select the desired activity	--------	--------
2.	User	If the activity selected is CREATE, the Create Item Sub flow is performed.	Create item	s-1
3.	User	If the activity selected is UPDATE, the Update Item Sub flow is performed.	Update Item	s-2
4.	User	If the activity selected is Logout Use case ends.	--------	--------

- **Preconditions** : The User is already logged in.

- **Post condition**: None

- **Actor**: User

- **Special Requirements**: The user ID of the User already exists.

- **Name of the Use Case :** Create Account

  Description : Create the profile of the User on the website.

  Flow of events:

SUB FLOW S-1

Step	Actor	Description	Condition	Location
1.	User	System generates Create account page, which request that the User to choose the User and Create it.	---------	---------
2.	User	If User selects a User & click Create.	---------	----------
3.	User	The User confirms the Create and the system Creates the account.	----------	----------

- **Preconditions** : The User is already logged in.
- **Post Condition** : The profile of User is created.

- **Name of the Use Case :** Create Account

  Description : Create the profile of the User on the website.

  Flow of events:

SUB FLOW S-2

Step	Actor	Description	Condition	Location
1.	User	System generates Update Item page, which request that the User to select the User and update it information.	----------	----------
2.	User	If the User selects the User, updates it and clicks on update button, System updates the information.	Invalid Information	ALT-2
3.	User	If User Wants to update more items then go to Step1 Or Use case ends	---------	--------

ALTERNATE FLOW ALT 2

Step	Actor	Description	Condition	Location
1.	User	If in the main flow , the User enter an invalid information, the system display an error message	--------	-------
2.	User	System request to re-enter Correct information The User can choose to either return to the main flow or cancel, at which point use case ends.	--------	--------

- **Preconditions** : The User is already logged in.
- **Post Condition** : The profile of User is deleted.

6.3 Planning Managerial Issues

The objective of software project planning is to provide a framework that enables the manager to make reasonable estimates of resources, cost and schedule. These estimates are made within a limited time frame at the beginning of a software project and should be updated regularly as the project progresses. In addition, estimates should attempt to define best case and worst case scenarios so that project outcomes can be bounded.

Lack of planning is the primary cause of schedule slippage, cost overruns, poor quality and high maintenance cost for the software. Careful planning is required for development process and work product, in order to avoid these problems. The planning objective is achieved through a process of information discovery that leads to reasonable estimates.

The first step in planning a project is to define the scope of the project and the resources available for its development. This should be followed by the details of the project team organization and a technical description of the project.

The first activity in software project planning is the determination of software project scope.

6.3.1 Project Scope

Software project scope describes the data and control to be processed, function, performance, constraints, interfaces and reliability. To gain the information necessary for defining the scope customer communication process is conducted.

Customer Communication

Customer communication bridges the gap between system level software allocation and software design. The following questions posed to the potential users of the system to be developed in a general meeting helped us initiate the user requirement analysis for the project.

Who is behind the request for this project?

Who will use the solution?

What will be the economic benefit of a successful solution?

How will you characterize “good” output that would be generated by a successful solution?

What problems will the solution address?

Functions

The following functions are taken into consideration

- Provide attractive appearance to the GUIs and dialogue boxes.
- The project has been developed with a view to be used in a system where there is a Local Area Network (LAN) present.

Performance

The performance of this project depends on the speed of the client computer, server computer, which determines the speed for accessing the database and the transaction of information over the network.

Constraints

Our project requires the clients working on Windows 98 or any newer version of operating system. System need to be emulated on LAN.

6.3.2 Project Resources

The second task of software planning is estimation of resources required to accomplish the software development effort. Figure below shows the development resources as pyramid:

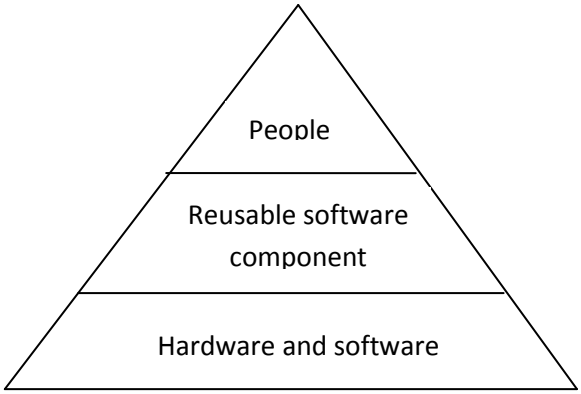


Figure 13

6.3.2.1 Human Resources

It refers to the persons who were actually involved in analysis, design, planning and implementation of the software system. This is the most important resource required for the development of the software. For this project, the human resources include the project guides and the developers of the project. All the staff members provide their full support as well. This section contains an outline of the skills required by the software developers to complete the development as well as the organizational hierarchy in terms of the organizational position of each person involved in development.

6.3.2.1.1 Specialty and Skills

The project is basically an application level based project & requires a firm understanding of the Client-Server model. In addition, the developers should have a thorough knowledge of how to use JAVA Networking utilities. The developers should also be confident in using the JAVA language and its features.

6.3.2.1.2 Organizational Position

All the members of the development team would be working in a democratic, friendly, conducive environment which would leads to free flows of ideas.

Though the software team is a combination of a budding software developer & experienced project guides but still all the members of the development team are at the same position i.e. there are no team leader or team manager.

6.3.2.2 Reusable Software Resources

Component based software engineering emphasizes reusability i.e. the creation and reuse of software building blocks.

- Off-the-shelf components

Existing software that can be acquired from a third party or that has been developed internally for past project.

- Full experience components

Existing specification, design, code or test data developed for past projects that are similar to the software to be build for current project.

- Partial experience components

Existing specifications, design, code or test data developed for a past project that are related to software to be build for the current project but will require substantial modification.

- New Components

Software components that must be build by the software team specifically for the needs of the current project.

6.3.2.3 Environmental Resources

These resources refer to the environmental situations in which the product or the software was developed. Environmental resources are comprised of hardware and software resources.

6.3.2.3.1 Hardware Resources

- 17" Colored Monitor
- 101 keys Keyboard
- A Optical Scroll Mouse
- NIC (Network Interface Card)
- Modem

6.3.2.3.2 Software Resources

- JDBC 3.0 API – This is API used for database connection.
- DSN – We have to configure the ODBC manager by creating Data Source Names.
- JDBC-ODBC Bridge – Open Database Connection provided by Microsoft. JDBC drivers provide a bridge between the JDBC API and the ODBC API.
- DB2 as database.
- Web Browsers like Internet Explorer, Firefox Mozilla, etc.
- Compatible HTTP and TCP/IP protocol versions.
- Compatible Operating System Linux or Windows Xp/Vista.
- Java Supportable Environment.

6.3.3 Team Organization

Team Structure

Our software development team is a Democratic Decentralized team with the following salient features:

1. There is no permanent team leader. Rather, task coordinators are appointed for short duration and then replaced by others who may coordinate different tasks.

2. This is ensured by the fact that the team that is working to build this system comprises of four members aided by the guidance of a project guide and a co-guide.

3. Decisions on problem and approach are made by group consensus.

4. Communication amongst the team members is horizontal.

The structure of our team can be represented by the diagram shown in figure.

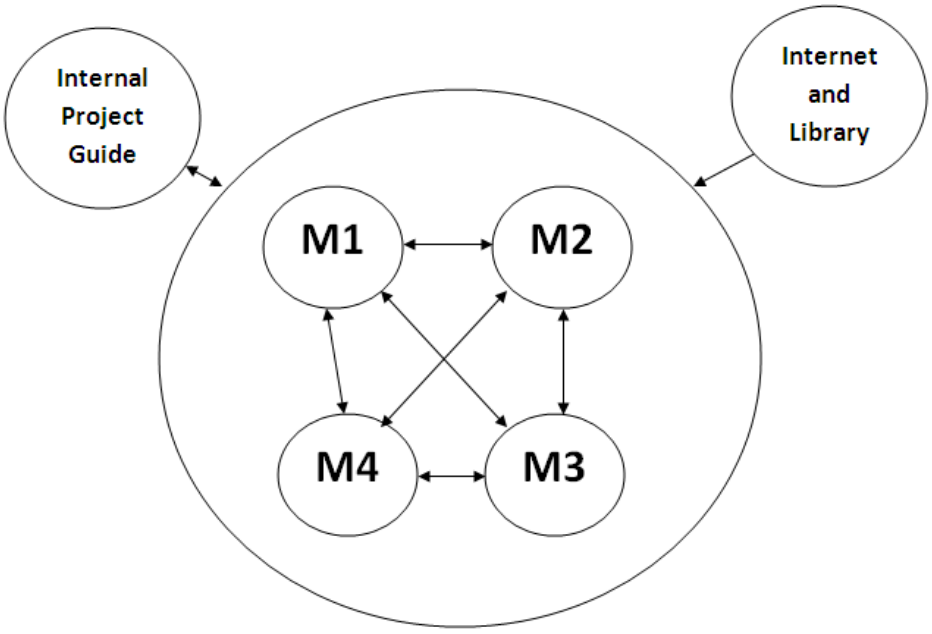


Figure 14: It shows the software team structure where

Mi (where i=1, 2, 3 or 4) stands for team member.

The team consists of four members, each of which will interact with each other in a democratic fashion. The team members will also receive information about the requirements from the customers who are clients for the system. The project guide will communicate with each of the team members and will guide them at each step of the development process.

6.3.4 Project Scheduling

Software project scheduling is an activity that distributes estimated effort across the planned project duration by allocating the effort to specific software engineering tasks. It is important to know however that the schedule evolves overtime. During early stage of project planning, a macroscopic schedule is developed. This type of schedule identifies all major software-engineering activities and the product function to which they are applied. As the project gets underway, each entry on the macroscopic schedule is refined into a detailed schedule.

A number of basic principles guide software project scheduling :

1. **Compartmentalization** - The project must be compartmentalized into a number of manageable activities and tasks. To accomplish compartmentalization, both the product and the process are decomposed.

2. **Interdependency** - The interdependency of each compartmentalized activity or task must be determined. Some tasks must occur in sequence while other can occur in parallel. Some activities can't commence until the work product produced by another is available. Other activity can occur independently.

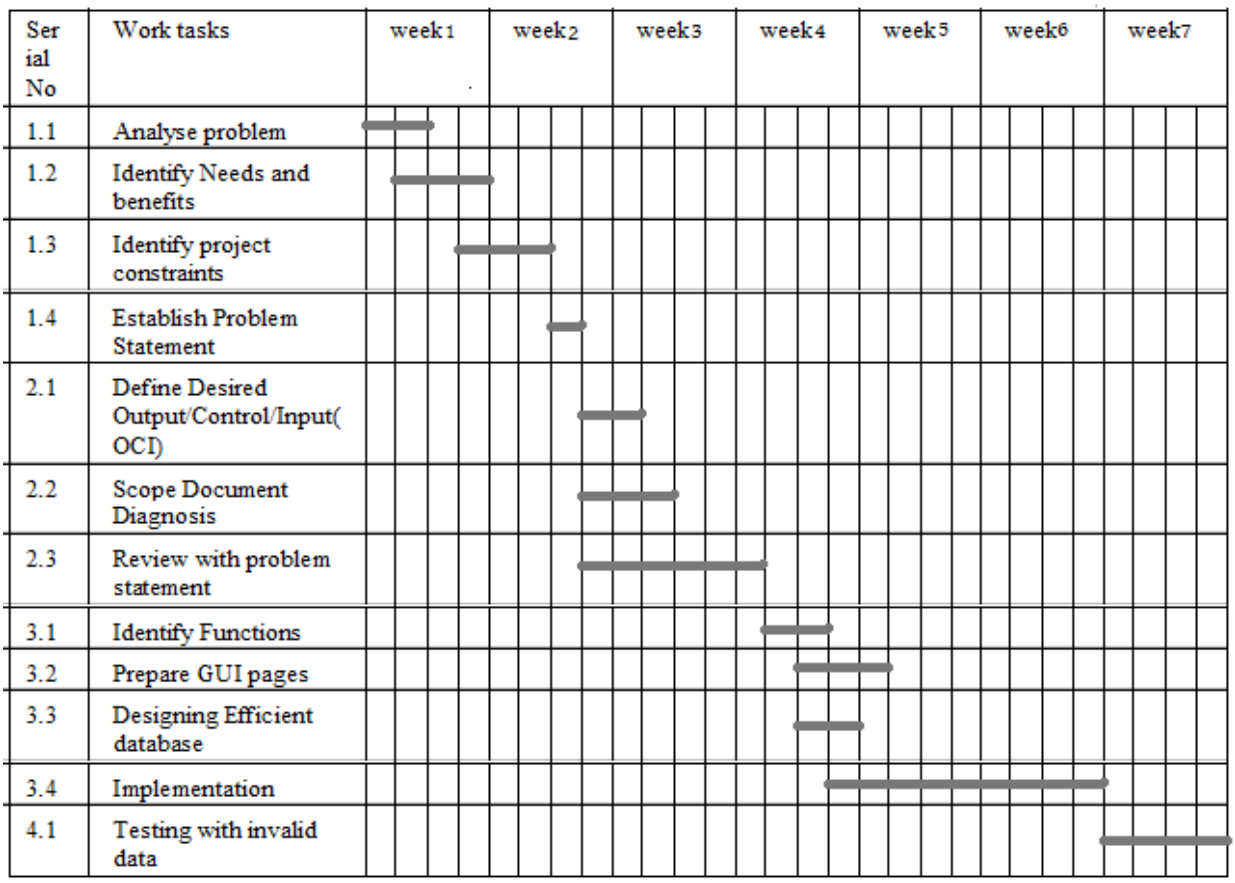
3. **Time Allocation** - Each task to be scheduled must be allocated some no. of work units. In addition, each task must be assigned a start date and a completion date that are function of interdependency and whether the work will be conduced by the full time or the part time basis.

4. **Effort validation** - Each project has a define no. of staff members. As time allocation occurs, a project manager must assure that no more than the allocated no. of people have been schedule at a given time.

5. **Defined responsibility** - Every task that is scheduled should be assigned to a specific team member.

6. **Defined outcomes** - Every task that is schedule should have defined outcomes. For software products the outcome is normally a work product or a part of a work product.

7. **Defined milestones** - Every task or group of task should be associated with a project milestone. A milestone is accomplished when one or more work product has been reviewed for quality and has been approved.



6.3.5 Estimation

Cost Estimation:

Cost estimation is part of the planning phase of any engineering activity. The cost of software can be calculated based on the following factors:

- Size
- Complexity
- Level of Reliability
- Level of Technology Utilized
- Availability, Feasibility & Stability of the system used to produce the product.

Software cost estimation has two uses in software management:

1. During the planning stage, one needs to decide how many engineers are needed for the project and develop a schedule.
2. In monitoring the project's progress, one needs to assess whether the project is progressing according to schedule and take corrective action if necessary.

COCOMO Model:

For estimating the cost of our project, we have used the COCOMO model. Constructive cost model (COCOMO model). It is a hierarchy of software estimation model. It uses empirically derived formulas to predict efforts as a function of LOC estimated. It consists of three different models of increasing complexity and levels of detail. A brief description of the three models is presented below:

Basic COCOMO or Model 1:

In this model, the cost is estimated solely on the basis of the delivered source instructions, or lines of code measured in thousands (KLOC).

The equation for the basic COCOMO model is as follows:

$E = a_0 * (KLOC)^{b}{}_0$

where,

E = Effort

KLOC = Lines of Code expressed in thousands

a_0 and b_0 are constants

Effort can be calculated in Semidetached mode for as follows:

$E = 3.0* (KLOC)^{1.12}$ P-M

$= 3.0 * (8.451)^{1.12}$ P-M

= 32.754 P-M

Duration can be calculated as:

$D = 2.5* (E)^{0.35}$ months

$= 2.5 * (32.754)^{0.35}$

= 8.477 months

Number of persons can be calculated as:

N = E/D persons

= 32.754 / 8.477

= 3.86 ~ 4 persons

The calculated value of number of persons is found to be 4 & the value of duration comes out to be approx. 8.4 months which is more than actual values

This is because the COCOMO model is used with respect to LOC based calculations which vary from one programming language to other for the same project.

6.3.6 Risk Analysis

A risk is any unwanted event that has negative consequences or a circumstances that can occur while a project is underway. If a risk becomes true, it can hamper the successful and timely completion of project. Therefore , it is necessary to anticipate and identify different risk that a project is susceptible to, so that a contingency plan may be prepared in advance to contain the effects of each risk. Risk management aims at dealing with all kinds of risks that might affect a project. We have quantified the level of uncertainty and degree of loss associated with each risk, when we analyzed the different categories of risks that are considered.

6.3.6.1 Types of Risks

6.3.6.1.1 Project Risk

Project risks threaten the project plan. That is , if project risks become real, it is likely that project schedule will slip and that cost will increase. Project risks identify potential budgetary , schedule, personnel(staffing and Organization), resource , customer and requirements problems and their impact of a software project.

In our project, these are the risks associated with schedule, i.e. timely completion of any activity. We tried our best to remain within the time constraints and deliver the product at the right time. In terms of resource these were the risk s associated with the requirement of any special libraries required in the project.

6.3.6.1.2 Technical Risks

Technical risks threaten the quality and timeliness of the software to be produced. If a technical risk becomes a reality, implementation may become difficult or impossible.

Technical risks identify potential design, implementation, interface, verification and maintenance problems.

In our project technical risks were those with potential design and implementation that one of our utility might not be supported by the higher versions of the operating systems.

6.3.6.1.3 Business Risks

- Business risks threaten the viability of the software to be built. Business risks often jeopardize the project of the product. Candidates for the top five business risk are
- Building a excellent product or system that no one really wants (market risk).
- Building a product that no longer fits into the overall business strategy for the company (strategic risk).
- Building a product that the sales force doesn't understand how to sell.
- Losing the support of senior management due to a change in focus or a change in people (management risk).
- Losing budgetary or personnel commitment (budget risk).

6.3.6.1.4 Known Risks

Known risks are those that can be under after careful evaluation of the project plan, the business and technical environment n which the project is being developed , and other reliable information sources (e.g., unrealistic delivery date, lack of documented requirements or software scope, poor development environment).

6.3.6.1.5 Unpredictable Risks

Unpredictable risks are undesirable events that occur unexpectedly. This type of risks covers such situations like the one where the user changes his requirements during the development of the project.

6.3.6.2 Risk Table

A risk table is a technique for Risk Projection. Risk Projection is an attempt to delineate the effects of risk based on two factors – the probability that the risk is real, and the consequences associated with the occurrence of the risk, should the risk occurrence of the risk, should the risk occur.

S.No.	Risk	Category	Probability	Impact
1	Size of Project becomes large	Project Risk	30%	Critical
2	Design does not meet requirements	Technical Risk	30%	Catastrophic
3	End users resist system	Business Risk	10%	Marginal
4.	Larger Number Of user than planned	Project Risk	40%	Marginal
5.	Delivery Deadline will be tightened	Business Risk	30%	Critical
6.	Customer changes the requirements	Project Risk	20%	Critical
7.	Lack of Training on Development Tools	Technical Risk	30%	Marginal
8.	Insufficient Time for Testing	Development Environment Risk	30%	Critical
9.	Technology does not meet requirements	Technical Risk	10%	Catastrophic
10.	Project Loss due to Hard Disk Failure	Predictable Risk	5%	Catastrophic

Where,

BI = Business Impact

SE = Staff Size and Experience

PS = Product Size

TE = Technology to be Built

DE = Development Environment

Risk Impact Categories are:

- Catastrophic
- Critical
- Marginal
- Negligible

Impact values:

1-Catastrophic

2-Critical

3-Marginal

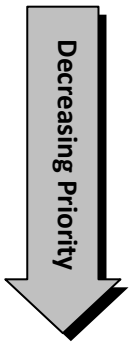
4-Negligible

6.3.6.3 Risk Prioritization

Based on the impact of the individual risks, we can prioritize them in the order of their removal as follows:

Based on the impact of the individual risks, we can prioritize them in the order of their removal as follows:

- Design does not meet requirements.
- Size of Project becomes large.
- Delivery Deadline will be tightened.
- Insufficient Time for Testing
- Larger Number Of user than Planned.
- Customer changes the requirements.
- Lack of Training on Development Tools.
- Technology does not meet requirements.
- End users resist system.
- Project Loss due to Hard Disk Failure.



6.3.7 Security Plan

Why does software need a security policy and plan? What's the point of having they, a security policy, included within a security plan, helps to ensure that everyone is in the sync with the software's needs and requirements. With a firm policy in place. Every employee knows what is expected—what the rules are – and how the requirements are to be implemented. The limits are clearly defined and consistent guidance is provided for everyone. Statements within a security plan can help to ensure that each employee knows the boundaries and what the penalties of overstepping those boundaries will be.

For example, regarding the security aspect in our project, the clear concise rules user has to easily understand and follow are:

1. Always log off your sessions before leaving the terminal.
2. Never share login id and password with anyone else.
3. Never try to end up the order in between the transaction, think before placing the order.

In order to have a truly solid and meaningful policy defined, the user needs to be committed to ensuring that the security policy will be enforceable. The security policy might state…

Members of the team might include the person or people who will be administering the system, one or more application owners, and at least one management person who is high enough in the corporate structure to ensure that the policy – as written –will be enforceable. The system administrator may have a different perspective from the database administrator on what comprises security on a system, but the goals of both should be the same—to ensure that the system cannot be compromised. If the policy is to be in effect across divisions within a company, representatives from each division might be included to ensure "buy-in" across the entire corporate structure. The goal is to include enough people to ensure that all areas of corporate need are met, but to keep the group small enough that the team will be able to create an effective, workable policy.

Project Specific Security Plan:

- This software system is prepared in JAVA which is known for its security management. Java created software has no access to the other parts of system and memory etc. It has access to only those memory areas which is allocated to the system. Thus it is one way to ensure security.
- It has no threat to the network and its resources as it is standalone application.

6.3.8 Configuration Management Plan

Software configuration management is an important element of software quality assurance. Its primary responsibility is the control of change. We are using Java in which modular mechanism can be implemented easily and modular mechanism is very helpful for the future enhancements. So if any further enhancements being happen than with the slightly change in the related module the new functions can be implemented easily. Any changes occur in the system is acceptable, our system is not limited to certain functionality only.

Each and every module contains the object which can be easily identified by their name and the type of object. The whole description of the object is given in very clear and precise way

6.4 Design

6.4.1 Design Concepts

Design concepts provide the software designer with a foundation from which more sophisticated design methods can be applied. Each design Concept helps software engineer to answer following questions:

- What criteria can be used to partition software into individual components?
- How function or data is structure detail separated from a conceptual representation of the software?
- What uniform criteria define the technical quality of software design?

The main design concepts are outlined below:

1. **Abstraction:** It permits one to concentrate on a problem at some level of generalization without regard to irrelevant low level details; use of abstraction permits one to work with concepts and terms that are familiar in the problem environment without having to transform them to as unfamiliar structure.

2. **Refinement:** It is a top level design activity which involves developing program by successively refining levels of procedural detail. In each step one or several instructions of given program are decomposed into more detailed instruction until all of them are expressed in terms of any underlying computer or programming language.

3. **Modularity:** It is a design concept in which software is divided into separately named and addressable components, often called modules that are integrated to satisfy problem requirements.

4. **Software Architecture:** It alludes to 'the overall structure of the software and the ways in which the structure provides conceptual integrity for a system '.It is the hierarchical structure of modules, the manner in which those components interact and the structure of data that are used by the components.

5. **Control Hierarchy:** Also known as the program structure, the control hierarchy represents the organization of the program components and implies a hierarchy of control.

6. **Structure Partitioning :** It is the process of partitioning the program structure both horizontally and vertically .Horizontally partitioning involves defining separate branches of the modular hierarchy for each major program function .Vertical partitioning ,on the hand suggests that control and work should be distributed top down in the program structure.

7. **Data Structure:** It is a representation of logical relationship among the individual elements if data .It dictates the organization, methods of access, degree of associatively and processing alternatives for information.

8. **Software Procedures:** It focuses on the processing details of each module individually and must provide a precise specification of processing including sequence of events, exact decision points repetitive points and even data organization and structure.

9. **Information Hiding:** The principle pf information hiding states that modules should be specified and designed so that information contained within a module is inaccessible to other modules that have no need for each information.

There are two major phases to any design process:

- Diversification
- Convergence

Diversification is acquisition of a repertoire of alternatives, the raw material of design: components, component solution and knowledge all contained in catalogues, textbooks and the mind.

During convergence the designer chooses and combines appropriate elements from this repertoire to meet design objectives as stated in the requirements documented as agreed to by the customer .The second phase is gradual elimination of all but one particular configuration of components, and thus creation of final product.

What is the design phase?

Design is a meaningful engineering representation of something that is to be built .It can be traced to a customer's requirements and at the same time assessed for quality against a set of pre defined criteria for good design. In the software engineering context, design focuses in four major areas of concern : data, architecture, interfaces and components.

Characteristics of Good Design

- The design must implement all of the explicit requirements contained as analysis model and it must accommodate all of the implicit requirements desired by the customer.
- The design must be readable, understandable guide for those who generate code and for those who test and subsequently support the software.

6.4.2 Design Technique

The design technique we have used is Top – Down. A top down design approach starts by identifying the major modules of the system, decomposing them into their lower level modules and iterating until the desired level of details is achieved. This is stepwise refinement; starting from an abstract design, in each step the design is refined to a more concrete level, until we reach a level when no more refinement is required and the design can be implemented directly. Most design methodologies are based on this approach and this is suitable if the specifications clear and development is from scratch. If coding of a part starts soon after design, nothing can be tested until all its subordinate modules are coded

6.4.3 Modeling

6.4.3.1 Detailed Class Diagram

In UML a class diagram is a type of static structure diagram that describes the structure of a system by showing the systems classes, their attributes and the relationships between the classes.

The following links can be shown between various classes:

- Generalization
- Association
- Composition
- Dependencies

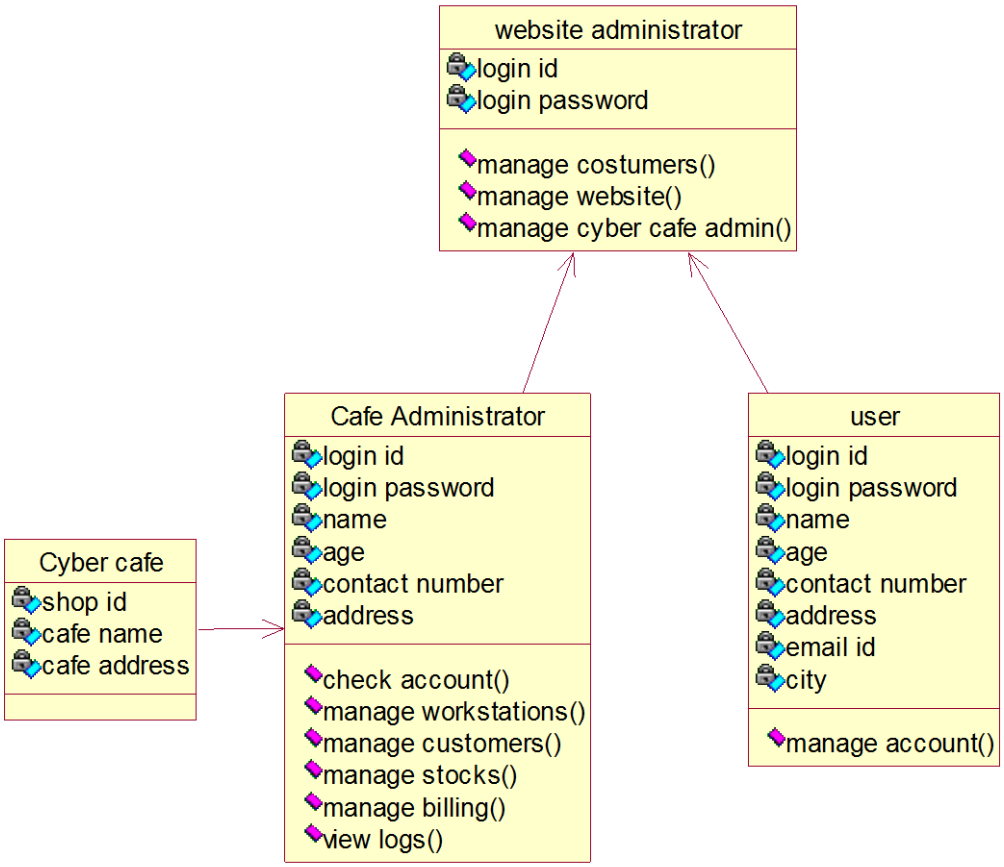


Figure 15

6.4.3.2 Interaction Diagram

6.4.3.2.1 Sequence Diagram

A sequence diagram is an interaction diagram that emphasizes the time ordering of the messages. Graphically, a sequence diagram is a table that shows objects arranged along the X-axis and messages, ordered in increasing time, along the Y axis.

A sequence diagram is a 2-dimensional in nature that depicts the sequence of actions that occur in a system .The invocation of methods in each object and the order in which the invocation occurs is ciphered in a sequence diagram .Thus it easily represents the dynamic behavior of a system .Elements of sequence diagram are:

- Object: This is the primary element involved the instance of a class. A sequence diagram consists of sequence of interaction among different objects over a period of time.
- Message: The interaction between different objects in a sequence diagram is represented as message.

Sequence Diagram for Login :

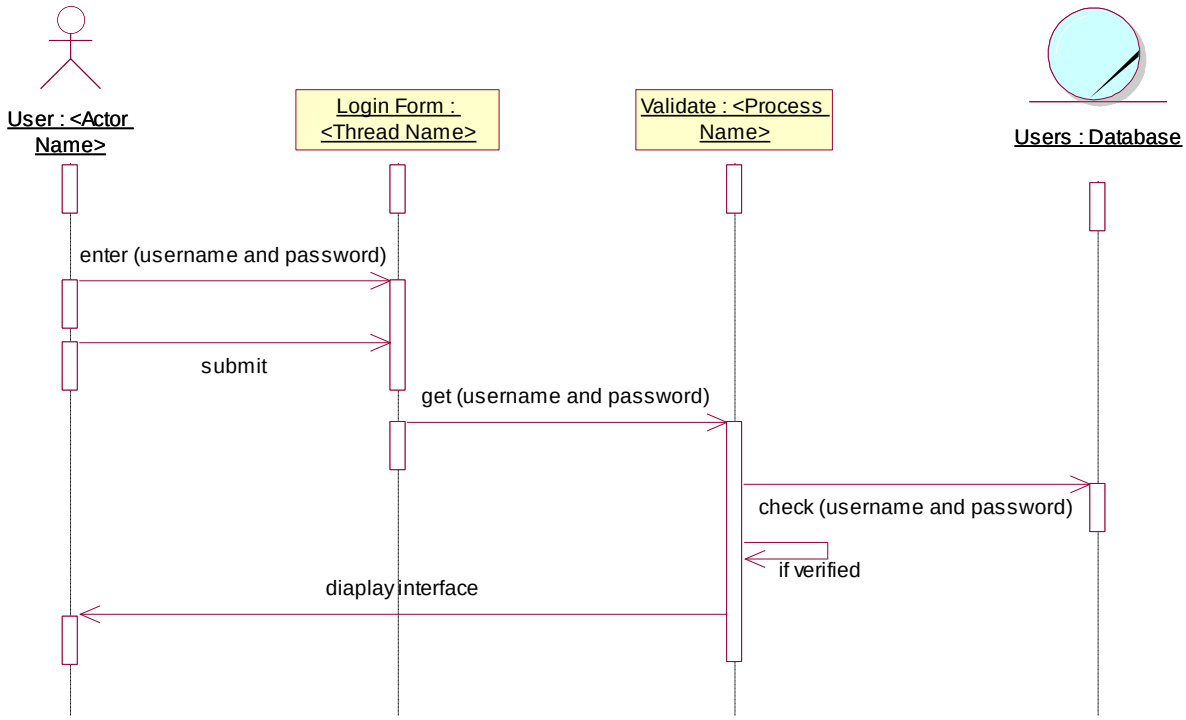


Figure 16

Sequence Diagram for registering a user :

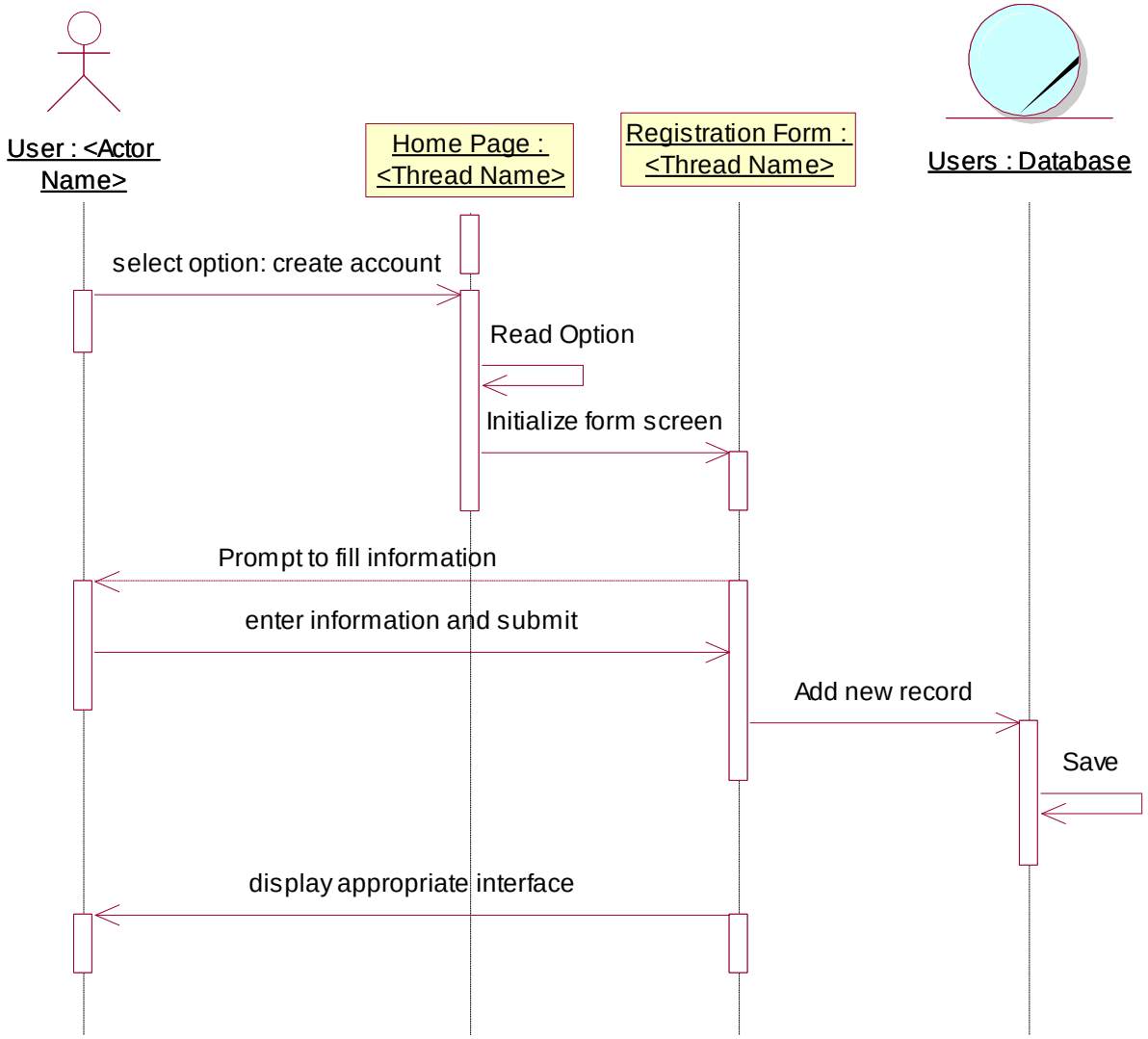


Figure 17

Sequence Diagram for allotting a system :

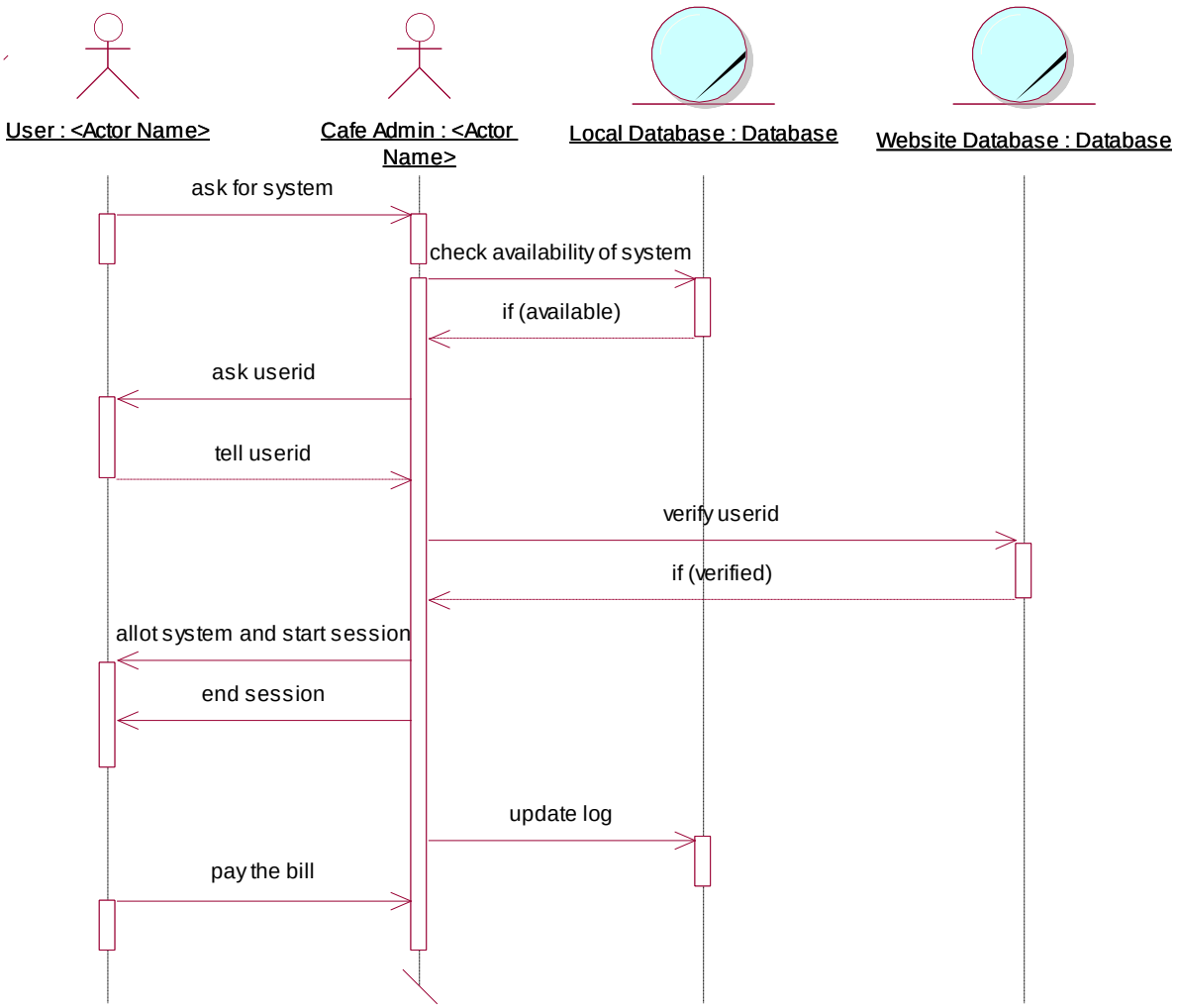


Figure 18

Sequence Diagram for managing workstation :

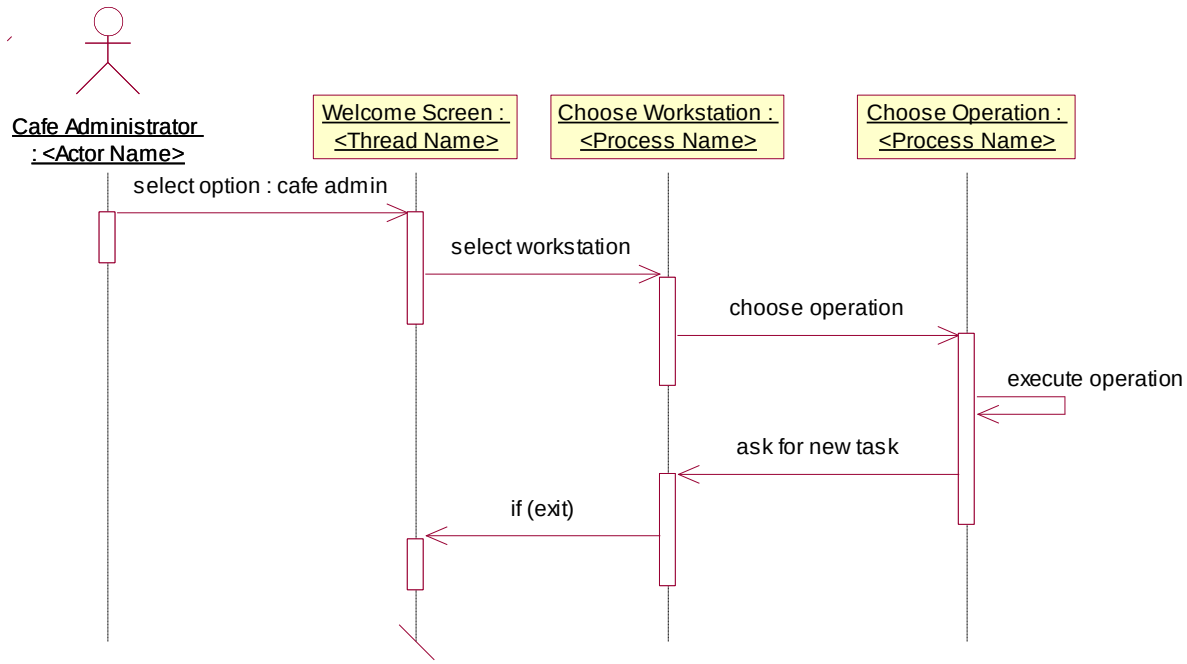


Figure 19

Sequence Diagram for managing bill :

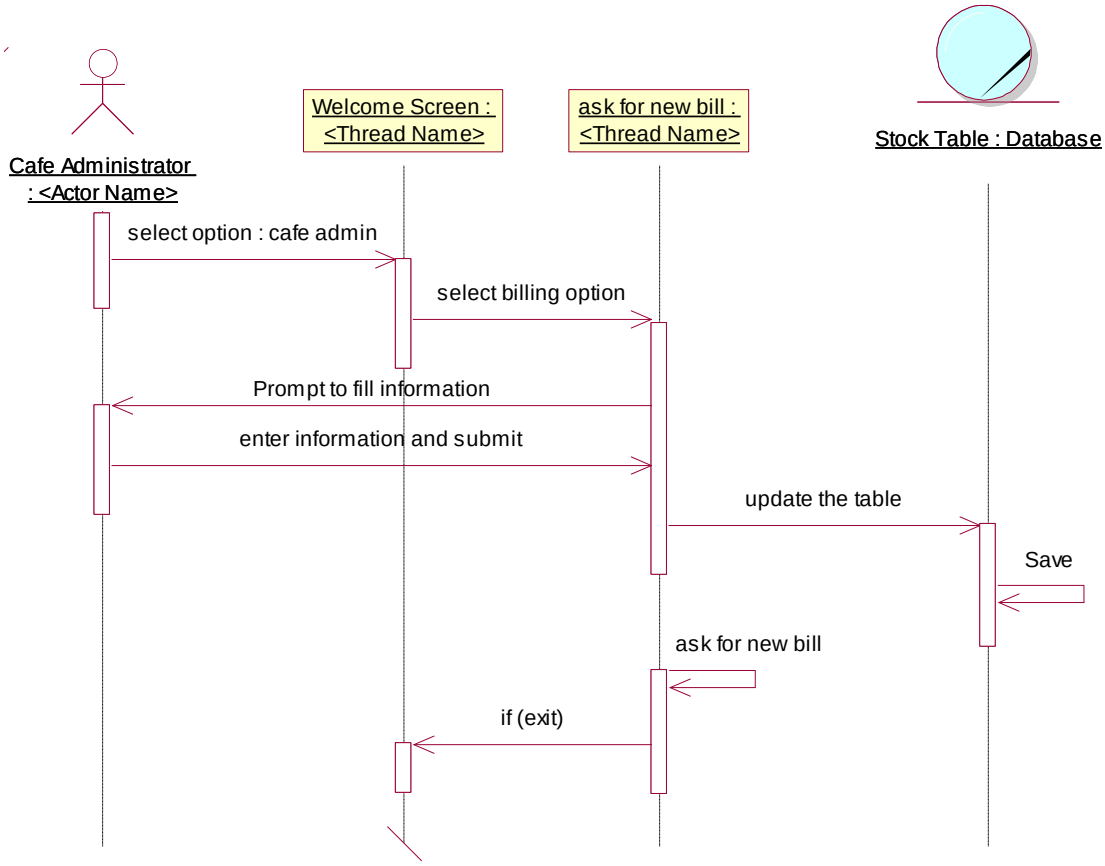


Figure 20

6.4.3.2.2 Collaboration Diagram

Collaboration Diagrams show the interactions occurring between the objects participating in a specific situation. This is more or less the same information shown by Sequence Diagrams but there the emphasis is put on how the interactions occur in time while the Collaboration Diagrams put the relationships between the objects and their topology in the foreground.

In Collaboration Diagrams messages sent from one object to another are represented by arrows, showing the message name, parameters, and the sequence of the message. Collaboration Diagrams are especially well suited to showing a specific program flow or situation and are one of the best diagram types to quickly demonstrate or explain one process in the program logic.

Collaboration Diagram for Login :

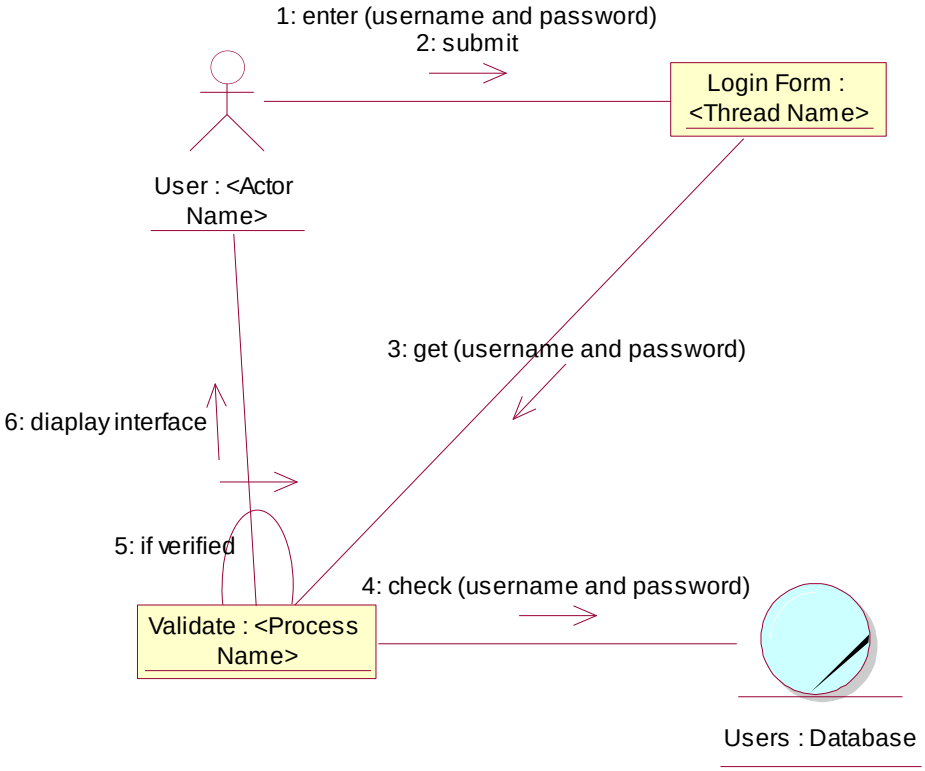


Figure 21

Collaboration Diagram for registering a user :

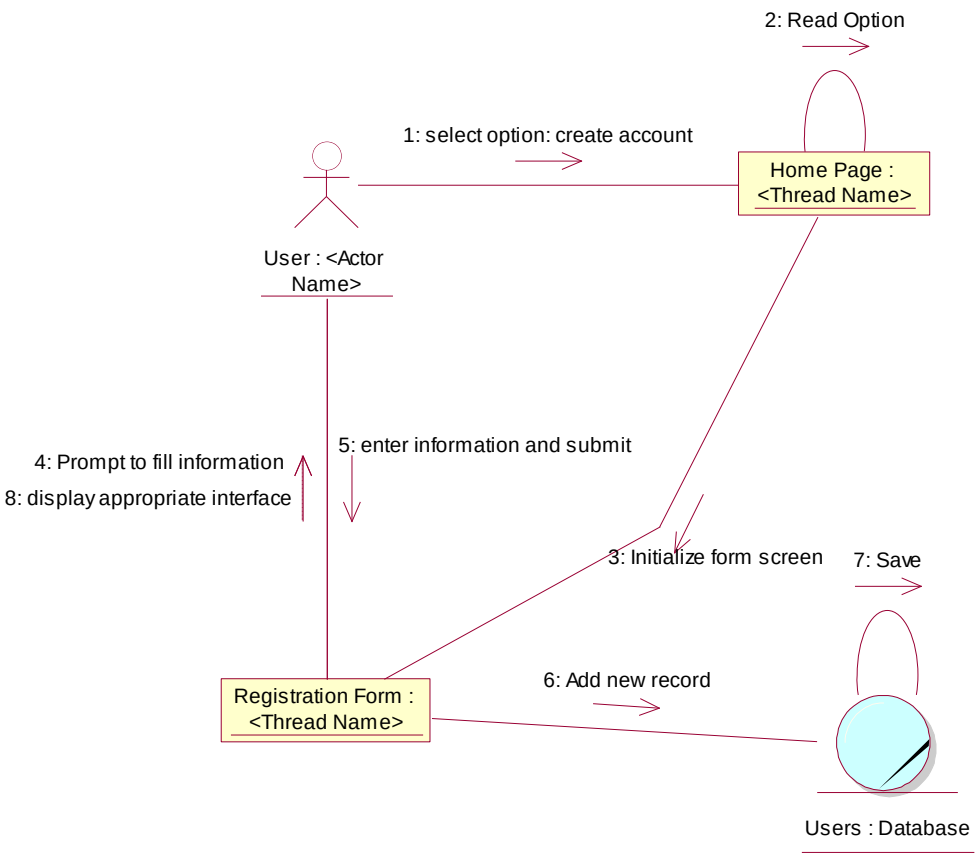


Figure 22

Collaboration Diagram for allotting a workstation :

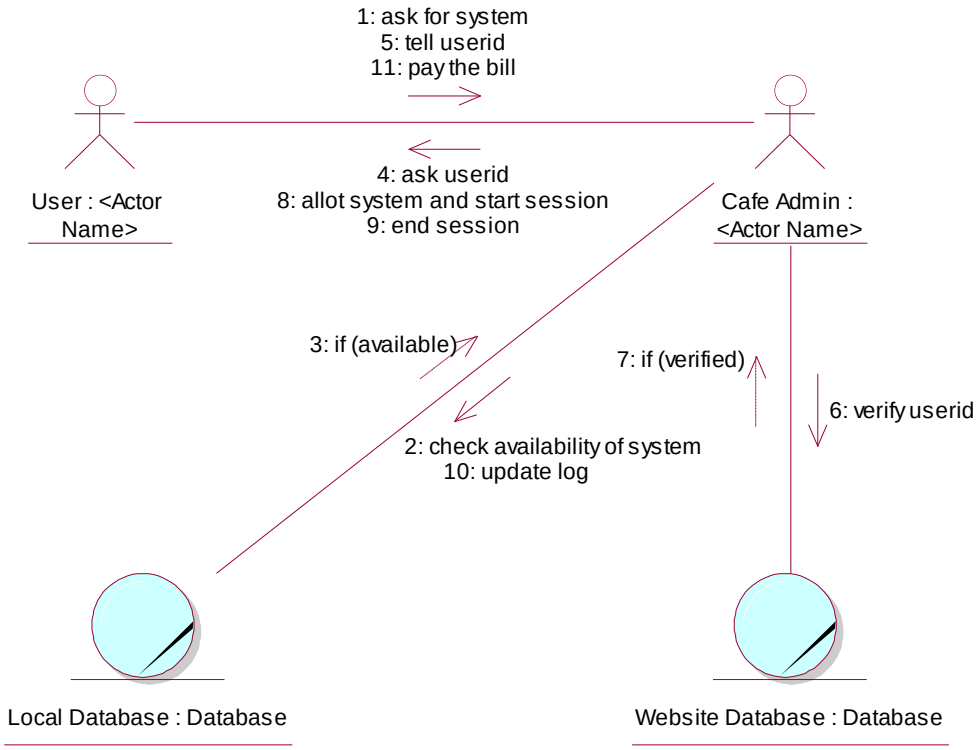


Figure 23

Collaboration Diagram for managing workstation :

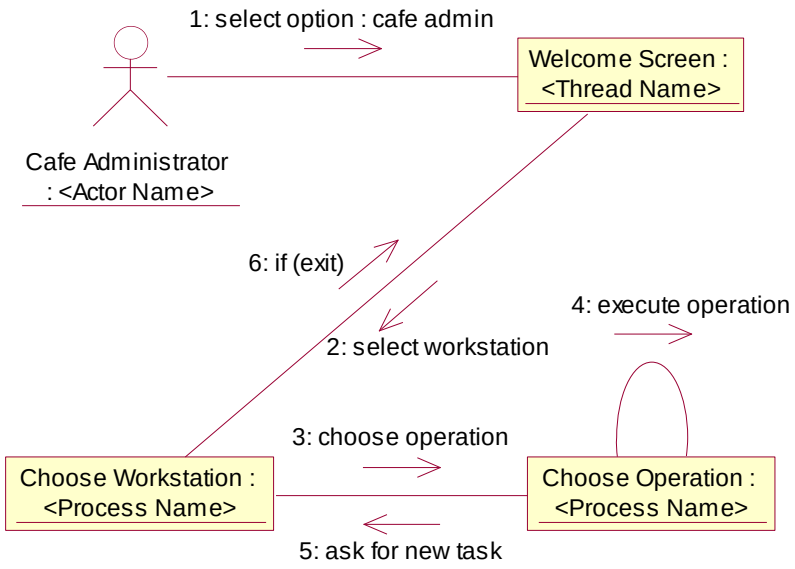


Figure 24

Collaboration Diagram for managing bill :

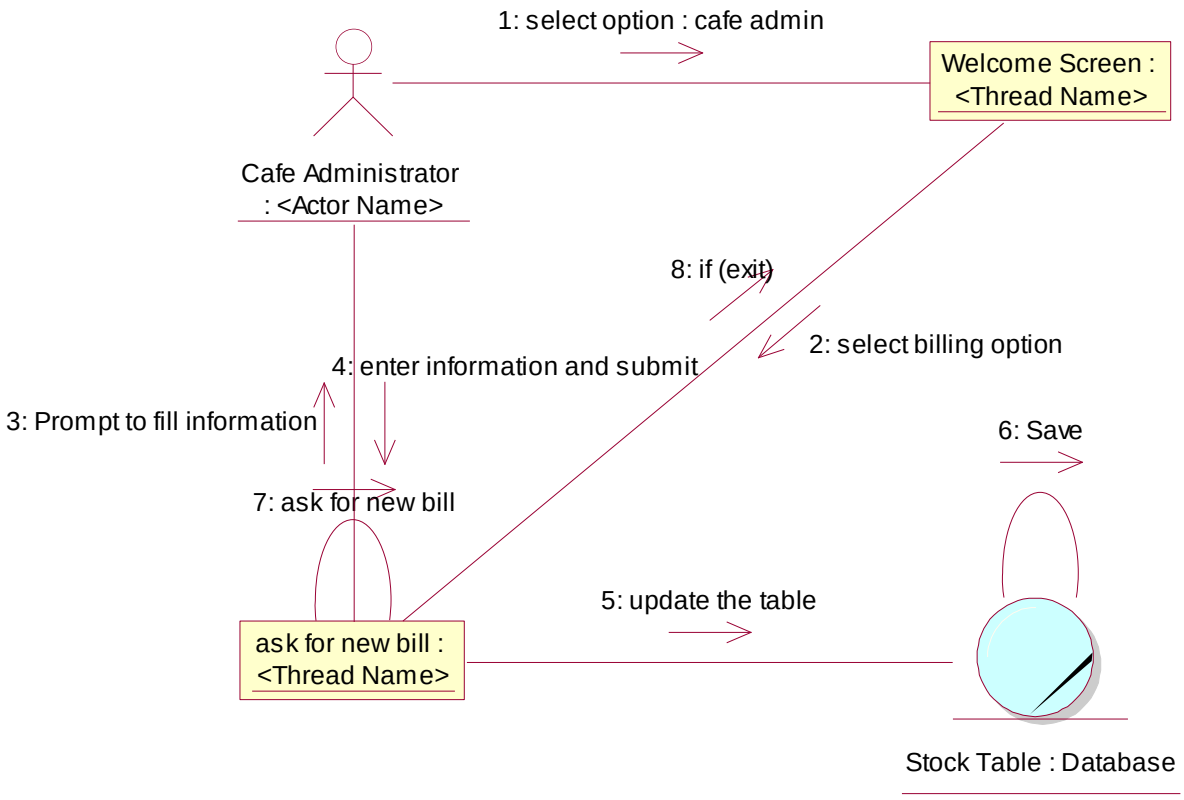


Figure 25

6.4.3.3 State Diagram

State diagrams are used to describe the behavior of a system. State diagrams show the dynamic behavior of a system. The diagram shows the various states that an object can get into and the transitions that occur between the states. Each diagram usually represents objects of a single class and tracks the different states of its objects through the system.

It shows the life of an object from birth to death. In this type of diagram, you see the behavior specifying the sequence of states that the object goes through in response to events over its lifetime, and you see the object's responses to those events.

It consists of:

State: The state object is a snapshot of an object at a particular point in its life. A state may have an activity describing the function being performed.

Initial State: The initial state is the starting state of the object with reference to the behavior that the diagram explains. Each state diagram should have only one initial state.

Final State: Each final state is the ending state of the object with reference to the behavior that the diagram explains. There may be multiple final states for an object.

Transition: The transition link represents the relationship between different states of an object. The transition guard is a condition which limits the cases in which a transition can occur. The transition action is performed during the transition and cannot be interrupted.

State Diagram for Website Administrator :

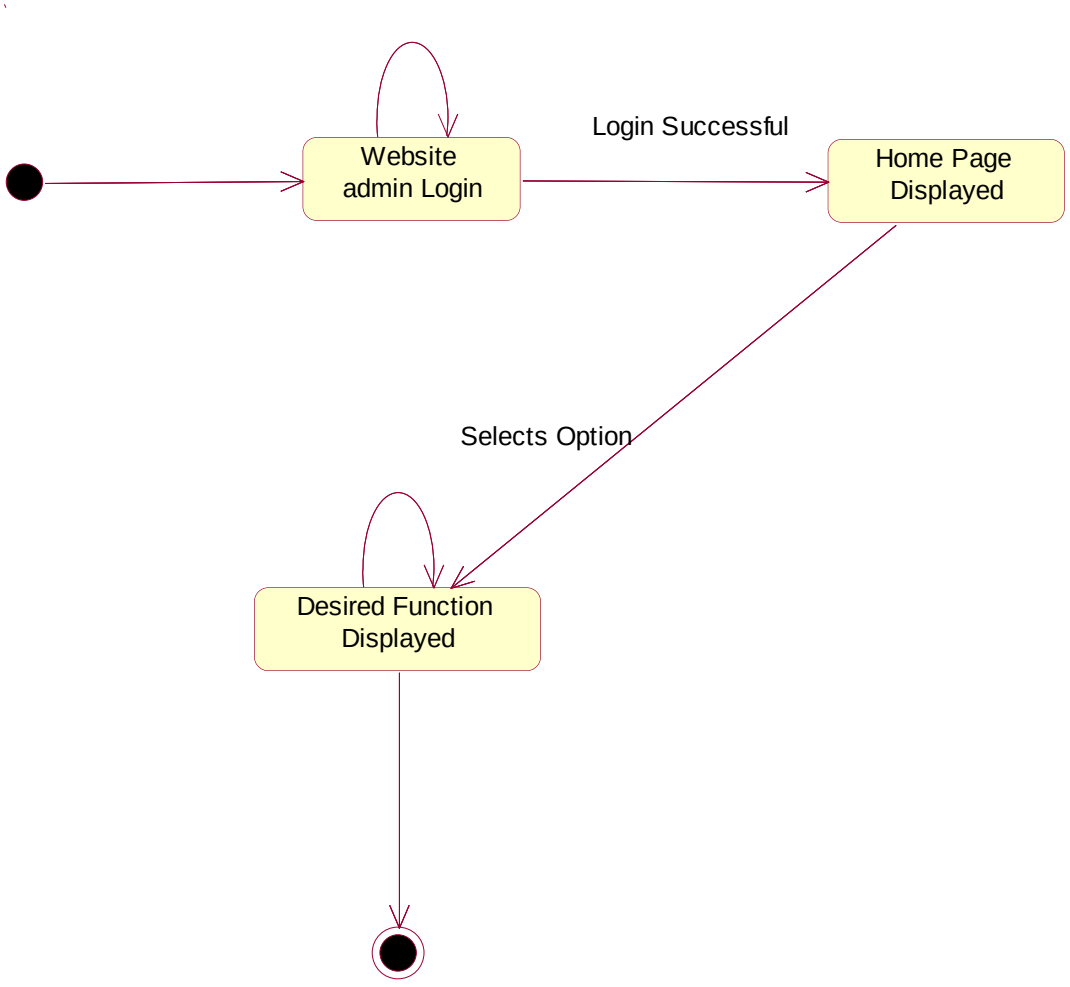


Figure 25

State Diagram for Cyber Cafe Administrator :

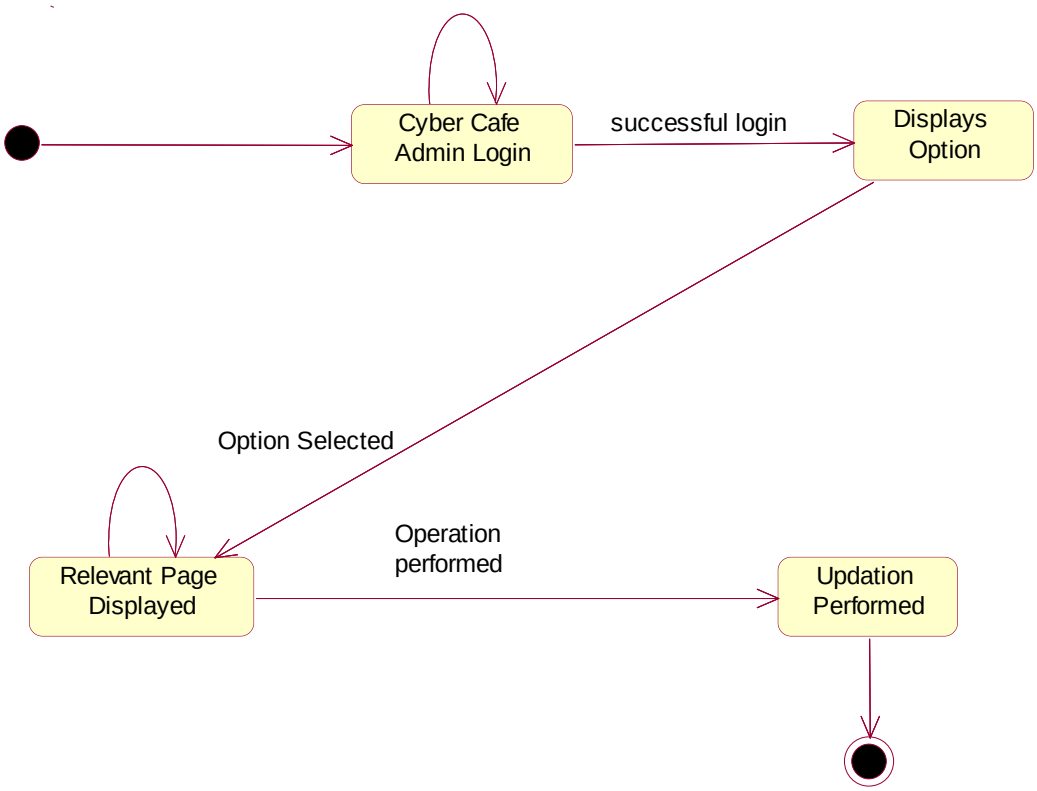


Figure 26

State Diagram for Normal User :

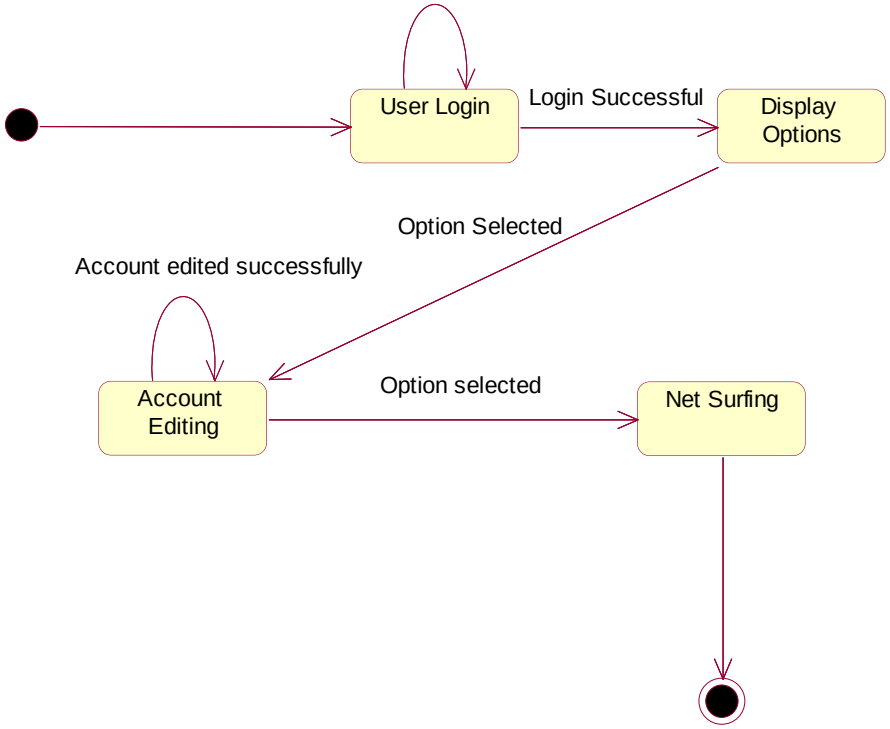


Figure 27

6.4.3.4 Activity Diagram

An Activity Diagram is essentially a flow chart showing flow of control from activity to activity. They are used to model the dynamic aspects of as system. They can also be used to model the flow of an object as it moves from state to state at different points in the flow of control.

Activity diagrams commonly contain Fork Start & End Symbol.

Activity diagram for Login :

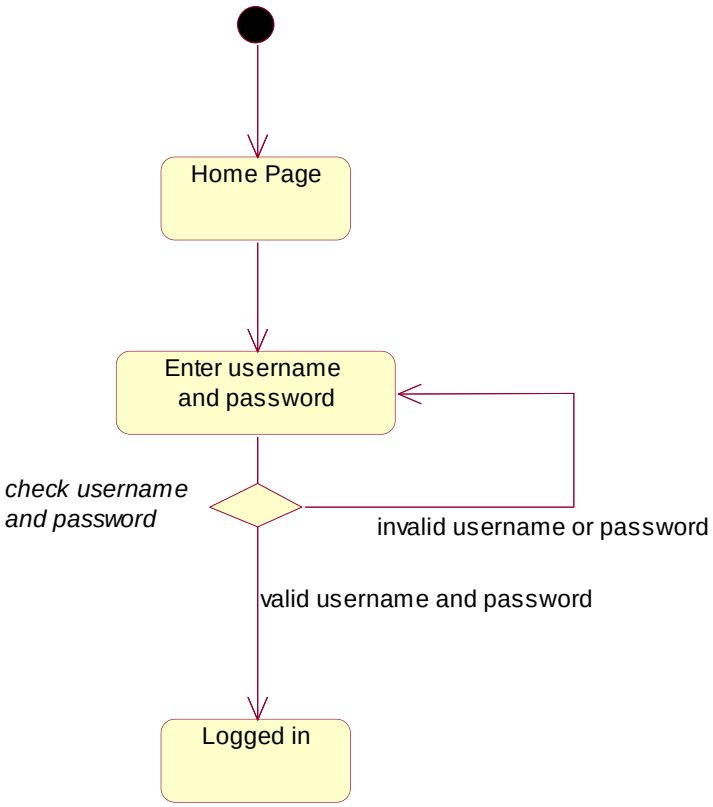


Figure 28

Activity diagram for Website Administrator :

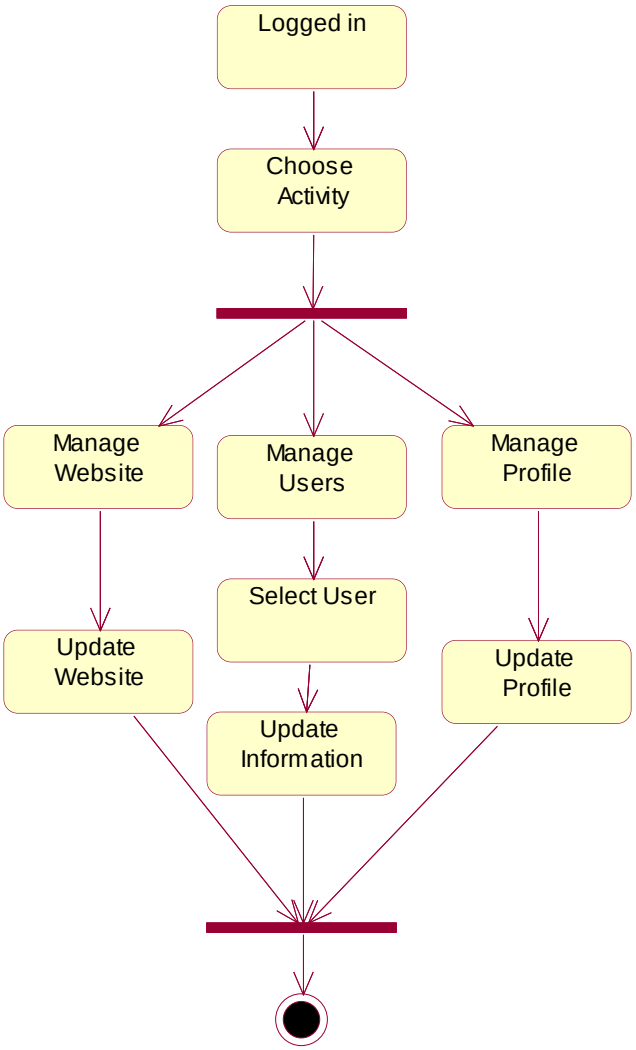


Figure 29

Activity diagram for Internet Café Administrator :

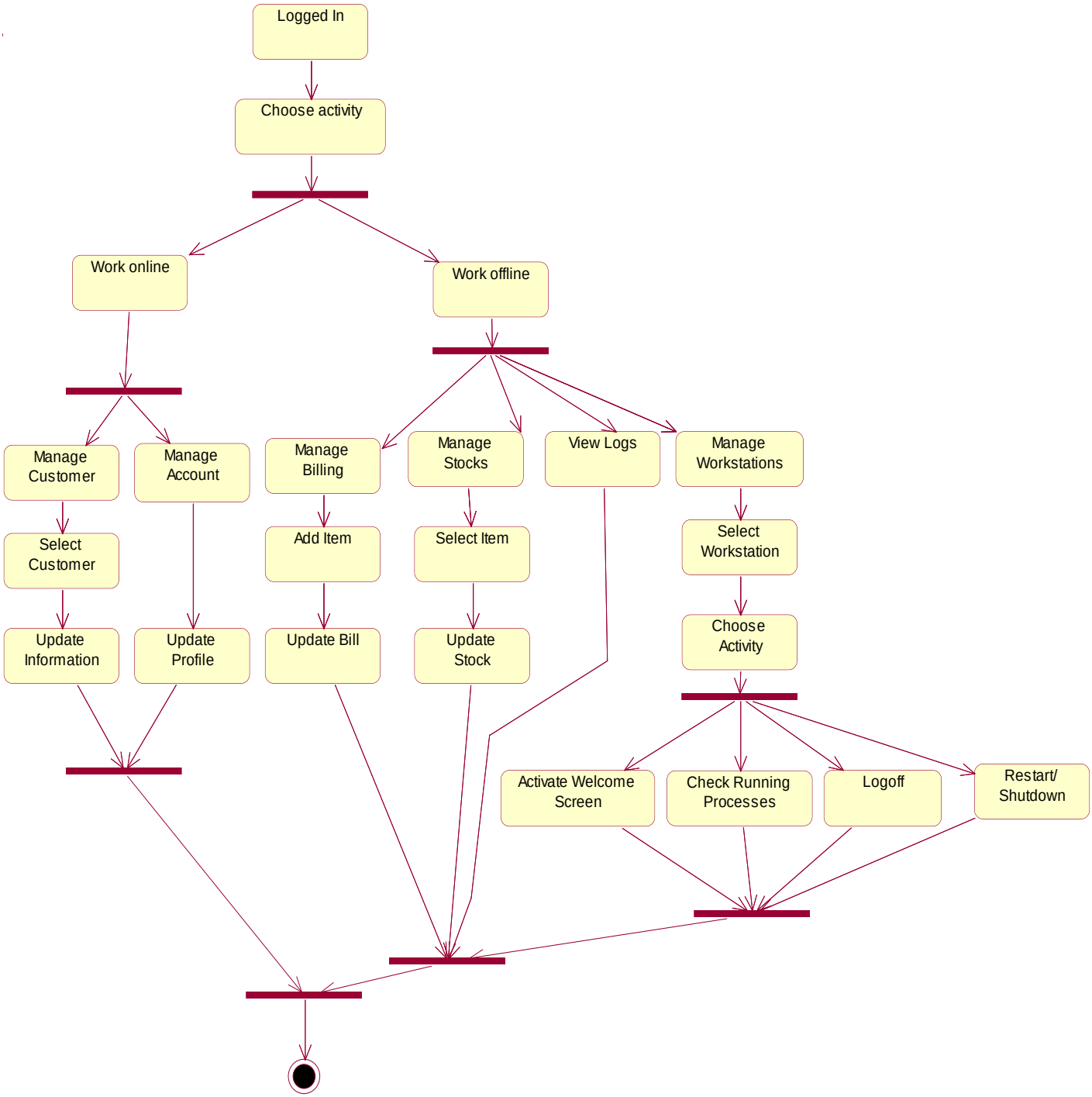


Figure 30

Activity diagram for Normal User :

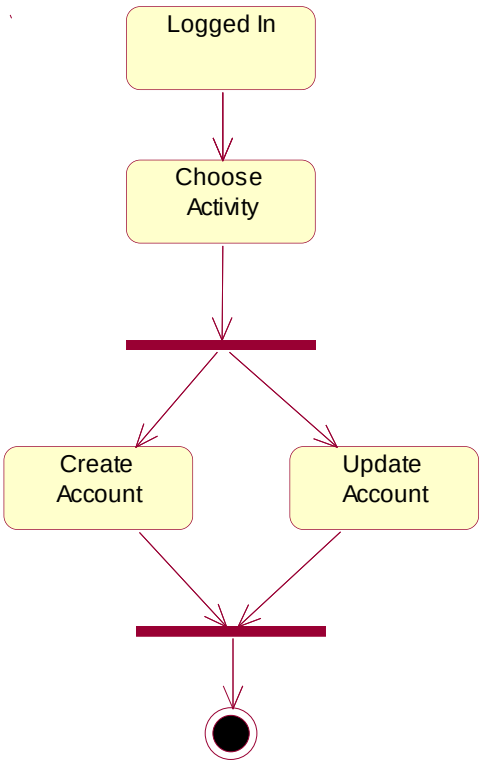


Figure 31

6.4.3.5 Deployment Diagram

This Diagram defines the typical physical network configurations, including those typically used by end users, as well as special configurations used for development and test.

Allocate processes to the various nodes. Allocation takes into account the capacity of the nodes (in terms of both memory and processing), bandwidth of the communication medium (bus, LANs, WANs), and the availability of the hardware and communication links, rerouting, and so on.

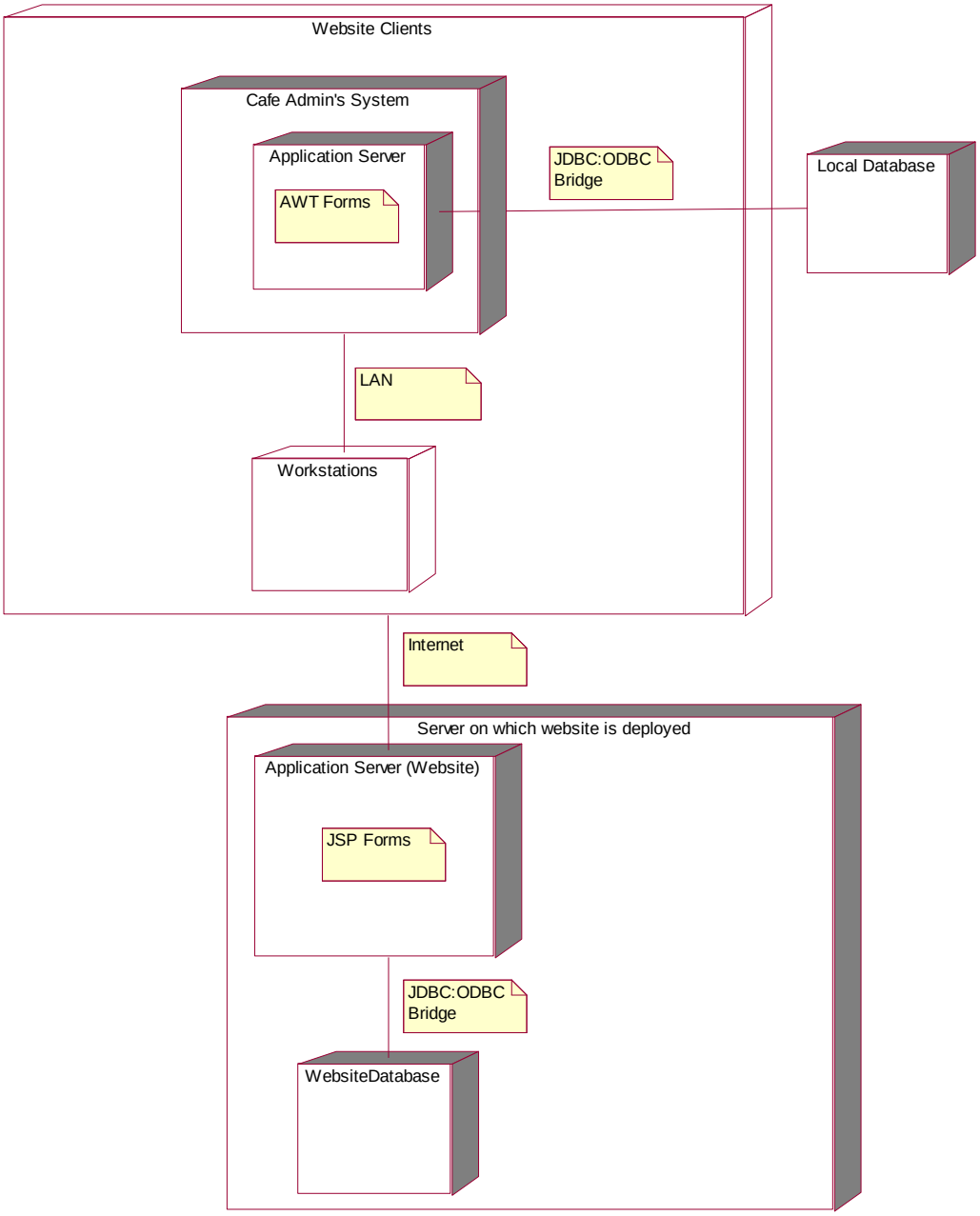


Figure 32

6.4.3.6 Component Diagram

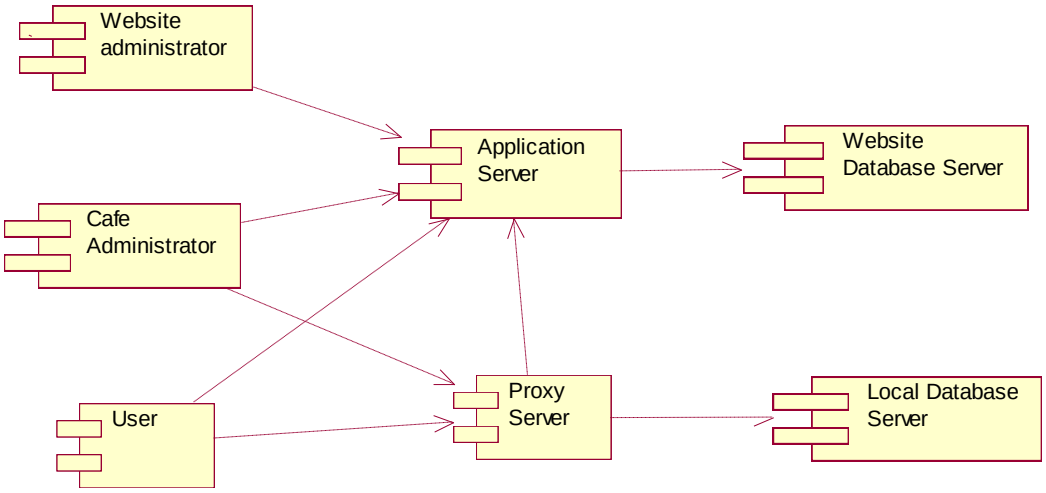


Figure 33

6.2 Implementation Phase

6.2.1 Language Used Characteristics

We have used java language for our project. General facilities which encourage to use java are:

1. It supports to Object -Oriented Paradigm.
2. It is portable language so we can extend our software to some other operating systems like Linux as well.
3. It support multithreading so it is increases efficient by parallel execution.
4. It provides sufficient components for making GUI.
5. It provides inbuilt class library for image processing and implementation of affine transformation.

We have chosen JAVA as the language for implementing the project. The primary motivation for the use of java in our project is its platform independent features. JAVA with various extra features clubbed with features of C++ makes it the more suitable language for networking which is the basic requirement of our project.

The various features of java are summarized below

- **Simple**

Java was designed to be easy for the professional programmer to learn and use effectively .it inherit the object oriented concepts of c++, which makes it easy to learn

- **Security**

While using a java compatible web browser, we can safely download java applets without fear of viral infection or malicious intent .JAVA achieves this protection by confining a java program to the java execution environment and not allow it access to other part of the computer

- **Portability**

For programs to be downloaded to all the various types of platform connected to the internet, some means of generating portable executable code is needed. The mechanism that helps to ensure security also helps to create portability

- **Object-Oriented**

JAVA is not designed to be source code compatible with any other language .java enhances and refines the object oriented paradigm used by C++. Features like encapsulation inheritance, abstraction and polymorphism are also included in java

- **Robust**

The multiplatform environment of the web places extraordinary demand on a program, because the program must execute reliably in a variety of systems.

To gain reliability, JAVA restricts you in a few key areas, to force you to find your mistakes early in programming, at the same time JAVA frees you from having to worry about many of the most common causes of programming errors.

- **Multithreaded**

Java was designed to meet the real world requirement of creating interactive, networked programs. To accomplish this JAVA supports multithreaded programming which allows you to write program that do many things simultaneously. This is the basic requirement of our project as many transactions are to be served at same time.

6.2.2 Coding

6.2.2.1 Coding Efficiency

In an effort to maintain computational efficiency and to allow the eventual adaptation of the algorithm to face tracking applications, intense optimization of the code has been performed. Although further development is in progress, the algorithm is currently fast and compact enough to run interactively on most generic platforms.

6.2.2.2 Validation Check

Validation checks that the product design satisfies or fits the intended usage (high-level Validation confirms that the product, as provided, will fulfill its intended use. Validation ensures that 'you built the right thing'. Validation Check is implemented in the project wherever necessary.

6.3 Testing

Software testing is a critical element of software quality assurance and the ultimate review of specification, design and code generation .Testing of the software leads to uncovering of errors in the software and reveal that whether software functional and performance requirement are met. Testing also provides a good indication of software reliability as software quality as a whole. The result of different phases are evaluated and then compared with the expected results. If the errors are uncovered they are debugged and corrected. A strategy approach to software testing has the generic characteristics:

- Testing begins at the module level and works outwards towards the integration of the entire computer based system

- Different testing techniques are appropriate at different point of time.

- Testing and debugging are different activities, but debugging must be accommodating in the testing strategy.

- A strategy for the software testing must be accommodate low level tests that necessary to verify that a small source code segment is performing correctly according to the customers requirement and that of developers expectations .

6.6.1. Testing Objectives

- Testing is a process of executing a program with the intent of finding an error
- A good test case is one which has a high probability of finding an as yet undiscovered error
- A successful test is one that uncovers an as yet undiscovered error
- Our objective is to design tests that systematically uncovers different classes of errors and to do so with minimum amount of time and effort

6.6.2. Testing Methods & Strategies

Any engineered product can be tested in one of two ways:

- **Black-Box Testing** – Knowing that a product has been designed to perform, tests can be conducted that demonstrate each function is fully operational, at the same time searching for errors in each function.

- **White-Box Testing** – Knowing the internal workings of a product, tests can be conducted to ensure that the internal operation performs according to specification and all internal components have been adequately exercised.

We have used white box testing for our project. White box testing sometimes called as glass-box testing, is a test case design method that uses the control structure of the procedural design to derive test cases. Following tests have been performed during testing:

1. All independent paths within a single module have been exercised at least once.
2. Exercise all logical decisions on their true and false sides.
3. Execute all the loops at their boundaries and within their operational bounds.
4. Exercise internal data structures to assure their validity.
5. Exercise coupling of various modules used in the project.
6. Integration testing of various functionality & modules of our project.
7. Server-client compatibility and connectivity testing is also exercised.

White box testing should not be dismissed as impractical. A limited number of important logical paths can be selected and exercised. Important data structures can be probed for validity.

There are many reasons as to why white box testing is preferred. The following are the few of the errors that can be neglected by the system when black box testing is used.

- Logical errors and incorrect assumptions are inversely propositional to the probability that a program path will be executed. Errors tend to creep into our system when we design and implement function, conditions or controls that are out of the mainstream.

- We often believe that a logical path is not likely to be executed on a regular basis. The logical flow of a program is sometimes counter intuitive, meaning that our unconscious assumptions about flow of control and data may lead us to make design errors that are uncovered only once path testing commences.

- Typographical errors are random. When a program is translated into programming language source code, it is likely that some typing errors will also occur. Many will be uncovered by syntax checking mechanisms, but others will go undetected until testing begins. It is likely that a typo will exist on an obscure logical path as on a mainstream path.

Each of these reasons provides an argument for conducting white-box tests. Black box testing, no matter how thorough may miss the kinds of errors noted above; white box testing is far more likely to uncover them.

The attributes of both white and black box testing can be combined to provide an approach that validates the software interface and selectively assures that the internal workings of the software are correct.

It is a test case design method that uses the control structure to derive the test cases. Using white box testing methods, following test cases were derived.

1. A guarantee that all independent paths within a module have been exercised at least once.
2. Exercise all logical decisions on their true and false sides.
3. Exercise all loops at their boundaries and within their operational bounds.
4. Exercise internal data structures to ensure their validity.

Chapter 7

CONCLUSION AND DISCUSSION

7. Conclusion and Discussion

7.1 Limitation Of Project

- The authentication of user is still manual.
- The biometric devices can be implemented to increase the automation of the system.
- The facility to extend the session is not provided.
- The workstations cannot be controlled remotely if they do not run the RMI Server.

7.2 Difficulties Encountered

During the development of the project there were certain obstacles which we faced. Prominent ones being were:

- At first, the use-cases were somehow difficult to implement as we had to deal with the RMI concept. On the other hand, lots of pieces of the architecture were then reusable as business objects in the model, act the same way in a major part.
- Finally, to implement reusable and efficient distributed application is a real difficult task.
- Interaction and patching between different modules
- Integration among different modules.

7.3 Future Enhancement Suggestions

- This is currently applied at a single café or a group of café's in a city and later on it can be extended by joining café's in various cities and across the country.
- We can also make a session time partition; by this if a person use internet for only sometime then he can use the remaining session time next time (for example, if a person has a session time of 60 min and he used only 15 min this time then his remaining 45 min he can use next time.)

Chapter 8

BIBLIOGRAPHY AND REFERENCES

8. Bibliography and References

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8.2 Other Documentation and Resources

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- http://en.wikipedia.org/wiki/Java_remote_method_invocation (RMI reference on Wikipedia)
- http://www.google.com