

CodeStories

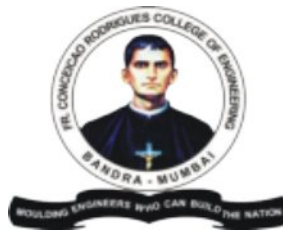
Employee Expense Management System

Version 1.0

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1. INTRODUCTION

Expense management refers to the systems deployed by a business to process, pay, and audit employee-initiated expenses. These costs include, but are not limited to, expenses incurred for travel and entertainment. Expense management includes the policies and procedures which govern such spending, as well as the technologies and services utilized to process and analyze the data associated with it.

Expense management automation has two equally important aspects - the process an employee follows in order to complete an expense claim (for example logging a hotel receipt or submitting mobile phone records) and the activity accounts or finance staffs undertake to process the claim within the finance system.

Expenses management can be expected to deliver cost savings by reducing travel and entertainment expenses through policy rules and reminders and by dramatically reducing the costs of processing expense claims for your business.

1.1 PURPOSE

The basic purpose of the employee expense management software is to help the employee's of an organization claim their expenses associated with various aspects like travel, food, stay and other aspects.

It will promote users in an organization to contribute in maintaining decorum in the organization by working hand in hand with the finance department either directly or indirectly. Letting employees see details of their own expenditure, analyzed by Expense Type, Client, Project etc can have a significant impact on spending behavior and oftentimes reduces frivolous or excessive spending. In many instances, it is entirely appropriate for expenditure to take place in pursuit of a new client or the management of an existing one. However, giving employees and managers real time visibility of the monies involved ensures that everyone can see the true cost of client acquisition or retention.

1.2 SCOPE

1.2.1 Basic Features:

- **Create different system users:** Profiles for different users like Employee, Manager, Administrator, Backup Administrator, Finance department (Accountant) of this system will be created and managed.
- **Authenticating different users on the system:** Authentication of each and every user on the system using login id and password technique to keep the system safe from breach. These will be initially provided by the organization itself.

- **Managing different user profiles:** Users can manage their respective profile. They can update or change or remove basic details from their profile but the major initial details will be managed by the Administrator.
- **Voucher Entry:** Forms for entering expense vouchers for any reimbursable expenses borne by the employee. A voucher should have one header and multiple lines providing detailed information of expenses incurred along with amounts.
- **Ease of Use:** Interface is designed so as to allow ease of use, even for inexperienced user. Help menu and user guides ensure that no formal training is required.
- **Draft Vouchers:** System is providing the ability to save incomplete vouchers and submit them for approval later after completion. A user can save many vouchers and altogether give them for approval.
- **Delegate authority:** The employee has the right to assign authority to his/her colleague in case he/she may not be present to submit the voucher on time and avail the amount claimed.
- **Multi-level workflow approval hierarchy:** Based on the Employees department and designation, the vouchers flow to his supervisors for their approvals. The number of approvals required will vary according to total amount of the voucher and approval limits set for supervisors.
- **Elimination of fraud:** The users will not be able to deceive the system software by claiming for vouchers once held in abeyance.
- **Maintain proper hierarchical organization with Real Time Updates:** The administrator of the organization will have full fledged control of maintaining the hierarchical structure of the organization right from the grass root level. Also real time updating will be provided as per the promotions/demotions and changes in the working environment of the organization.
- **Specifying business purpose in the description section:** The employee can specify the business purpose in the description section of the voucher to help the organization to accept it as a report header and classify their records.
- **Categorized Monetary limits:** Each genre of predefined voucher will have a specified limit up to which the employee can claim a maximum amount. For claimable amount exceeding maximum amount the voucher claimed would be forwarded by manager to higher executive in the organizational hierarchy.
- **Case Management:** Every voucher starts a new process instance (case). Managers are able to view vouchers waiting for their approval in their Inbox by logging in to the application. Employee is also able to track progress of his vouchers through the unique voucher id.
- **Rejection Flow:** At any point in the workflow, managers have the option of rejecting any voucher stating appropriate reasons. Rejected vouchers come back to the Employee, who is then allowed to change details on the vouchers or provide additional information required for the approval.
- **Accounts View:** Accounts department users are able to view approved vouchers of all employees and mark vouchers as paid. This step completes the lifecycle of the voucher and the associated process instance.

- **Email alerts:** Automated email alerts will reach the users at specific stages of the process. E.g.: When a voucher is sent, the manager will get an email notification about the review of the voucher sent by the employee. Similarly, when a voucher is approved an e-mail will be sent to the user to alert him about the same.
- **Keep the Employee's satisfied:** One of the most important aspects of any software system is to keep the users happy. Through the employee self-service portal, employees will be able to file for reimbursements. They will also be able to access compensation, whenever they're updated. Enhanced transparency lets employees understand what's going on and keeps everyone about. They can focus on what they do best instead of chasing and filing for claims.
- **Report Generation :** Following reports are included in the system:
 - MIS Reports – MIS reports stating status of the vouchers
 - Exception Reports – Reports providing the in depth details of the exception.
 - Master data management – Creation of masters for Employee Hierarchy, setting approval limits etc.
 - Employee Hierarchy View - View of Employee Hierarchy.
 - Rejected vouchers report – Report listing vouchers rejected by Managers.
 - Reports customizing the stored data in a platform independent format and displaying it using style sheets.
 - Administrator is able to print data in reports in excel sheets and PDF formats.
 - Administrator is able to make pictorial depiction of data in excel sheets for better understanding.

1.2.2 Additional Features

- **Uploading Files:** Uploading various files (pdf, doc, excel, txt) which may include scanned reports, receipts is allowed in the vouchers. This helps in speedy verification of expenses made by employee.
- **ROI (Return on investment) Calculator:** The ROI calculator is designed to help the organization make an informed decision on the benefits of using an expenses management solution. The cost savings calculated using the ROI calculator are only those related to process efficiency gains and lower travel and entertainment spend. Cost savings resulting from improved compliance, more efficient client/project recharging.
- **Mileage Verification:** To avoid claim of false expenses in terms of valuable fuel, mileage verification feature calculates the mileage between two points A and B by taking the postal code or location from map and calculating average distance.
- **Map my Path:** Providing the map view to track the path between two points A and B as entered in the corresponding forms while claiming travel related expense.

1.3 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

- **Employee:** The basic fundamental user of the system for whom the system has been designed. The entire process of creating a voucher right up to submitting a voucher to claim the expenses is an integral part of the employee's job. The employee can also track the progress of his voucher.
- **Manager(Hierarchically above employee) :** Any user having the hierarchical placement above an employee will be considered as a manager and has the right to claim a voucher as well as review vouchers sent by employees for approval.
- **Executive:** The user who is logged in as the Executive has the privilege of approving/rejecting those vouchers forwarded by the manager under certain circumstances as stated in the policy made by the organization. Although he cannot claim a voucher through the system interface.
- **Administrator:** The job of defining the hierarchical structure of the organization and also stating the expense limits on all genre of vouchers rests with the administrator. The administrator also has the rights for managing the departments, updating policy and other expense related.
- **Backup Administrator:** The backup administrator does the entire job associated with database administration and recovery.
- **HTML:** Hyper Text Mark-up Language to create static web pages.
- **JSP:** Java Server Pages, serve dynamically generated web pages based on HTML, XML, or other document types.
- **Servlet:** A Servlet is a Java class in Java EE that conforms to the Java Servlet API, a protocol by which a Java class may respond to HTTP Requests. A Servlet is an object that receives a request and generates a Response based on that request. It also acts as a controller in MVC Architecture.
- **RAD:** Rational application developer is a toolkit which is designed for the creation of more complex projects, providing fully dynamic web application utilizing EJB's. This consist of EJB tools, CMP, data mapping tools & a universal test client that is designed to aid testing of EJB's.
- **Struts 2.0:** Struts is an open-source web application framework for developing Java EE web applications. It uses and extends the Java Servlet API to encourage developers to adopt a model-view-controller (MVC) architecture.
- **XML:** Extensive Mark-up Language used for data transfer.
- **JASPER Reports:** Java reporting tool used to display reports in various formats like PDF, XLS, etc.
- **DB2:** DB2 is the database management system that provides flexible and efficient database platform to erect strong on demand business applications.
- **HTTP:** Hypertext transfer protocol is a transaction oriented client/server protocol between web browser and a web server.
- **HTTPS:** Secure hypertext transfer protocol is a hypertext transfer protocol over secure socket layer.
- **TCP/IP:** Transmission control protocol/internet protocol is the communication protocol used to connect hosts on the internet.

- JMF: The Java Media Framework (JMF) is a Java library that enables audio, video and other time-based media to be added to Java Applications and applets. This optional package, which can capture, play, Stream, and Trans code multiple media formats, extends the Java Platform, Standard Edition (Java SE) and allows development of cross platform multimedia applications.
- WASCE (Web Sphere Application Community Edition): It is an application server that runs and supports the J2EE and the web service applications.
- AJAX (Asynchronous Java and XML): It is a technique used in java script to create dynamic web pages.
- WEB 2.0: It is commonly associated with web applications which facilitate interactive information sharing, interoperability, user-centered design and collaboration on the World Wide Web.

1.4 REFERENCES

- Project Scenario document provided by IBM
- Object Oriented Systems Development using Unified Modeling Language by Ali Bahrami 2008.
- Struts 2.0 Black Book- Kogent Solutions
- IBM Red Books
- IBM – www.ibm.in/developerworks
- Database Management Concepts by Silberchatz, Korth & Sudarshan.

1.5 TECHNOLOGIES TO BE USED

- HTML – Hyper Text Markup Language
- JSP – Java Server Pages
- Servlets – Controller in MVC Architecture
- JavaScript – Scripting Language
- XML – Extensive Markup Language
- JAVA – Application Architecture
- J2EE - Application Architecture
- STRUTS – Framework
- AJAX – Asynchronous Java and XML
- UML – Unified modeling Language
- DB2 – Database
- WASCE – Web Sphere Application Server Community Edition
- Web 2.0 – RSS feed 2.0
- Eclipse Juno – Development tool

1.6 OVERVIEW

- **Overall Description:** This section will describe major components of the system, interconnections and external interfaces.
- **Specific Requirements:** This section will define the function of actors, the role they play in the system and the constraints faced by the system.

2. OVERALL DESCRIPTION

2.1 PRODUCT PERSPECTIVE

- The web pages will provide interface for users on client side. These web pages will be accepting the requests from users.
- Communication between client and server is provided through HTTP\HTTPS protocols.
- On the server side web server is for EJB and database server is for storing the information.
- User sends a request to the server for requesting for some resource or service. An employee may select the option to create a voucher.
- The Filter Dispatcher looks at the request and then determines the appropriate Action. Each of the requests has a subsequent action class defined based on which appropriate functionalities are provided to the users.
- Configured interceptors functionalities apply such as validation, file upload etc.
- Selected action is executed to perform the requested operation.
- Again, configured interceptors are applied to do any post-processing if required.
- Finally the result is prepared by the view and returns the result to the user.

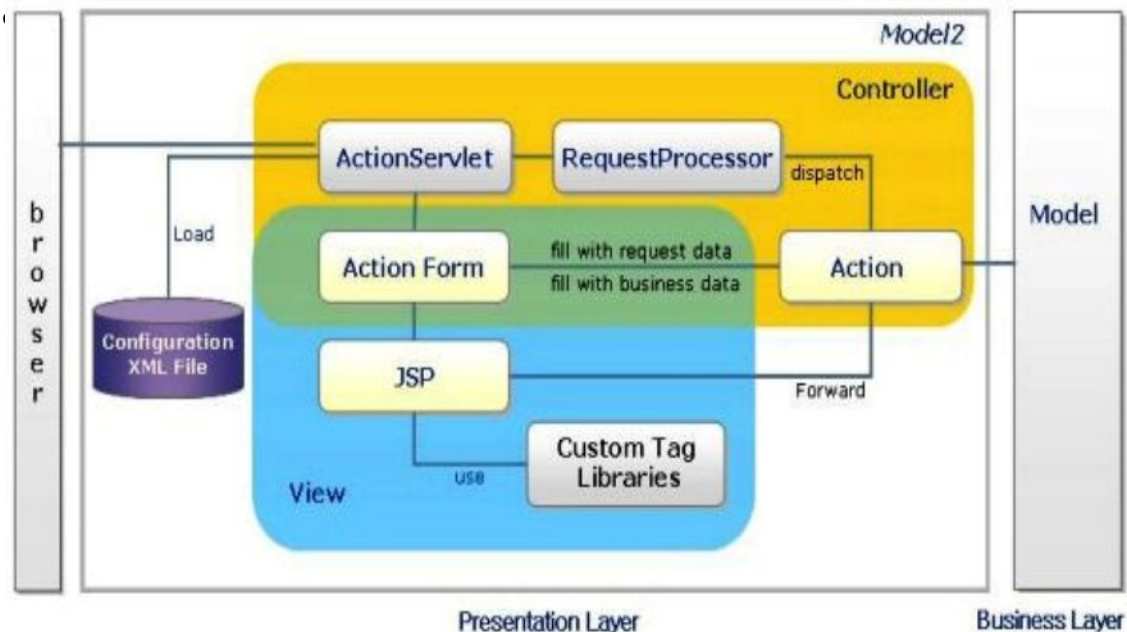


Figure 2.1 Product Perspective

2.2 SOFTWARE INTERFACE

- Front End Client:
 - Web browser(Any)
 - Operating System(Any)
- Web Server
 - Web Sphere Application Server Community edition
- Development End
 - Eclipse IDE
 - Linux Operating System
 - Struts 2.0 Framework
- Database System
 - DB2 Express C

2.3 HARDWARE INTERFACE

CLIENT SIDE			
IE 6 and above, Mozilla Firefox, Google Chrome, Opera, Epic, etc.	Processor	RAM	Disk Space
	Pentium III and above	256 MB and above	512 MB and above
SERVER SIDE			
Web Sphere Application Server	Pentium IV and above	512 MB and above	1GB and above
DB2- Express C	Pentium IV and above	512 MB and above	2GB (Excluding Data size)

2.4 PRODUCT FUNCTIONS

- The administrator has the superlative authority to define the hierarchical structure of the organization.
- The two main actors (Employee and Manager) have to go through the common process of login for authorization.
- Once logged in, they have various options from viewing/updating profiles, fill voucher details, and send a voucher, draft voucher, upload files and track progress of voucher.

- The Manager or an employee belonging to a hierarchical level above the employee can review a voucher, manually check the details and either give pass it on the higher authorities for approval or reject it with or without stating reason for disapproval.
- Throughout the entire process, the Executive can track the progress of any voucher and approve/disapprove it at any stage.
- The finance department (accountant) will finally get the voucher and the claimable amount is send to the employee with an e-mail notification stating the same message.
- Financial reports will be generated by the administrator when required by the organization to study the financial status of the organization.

2.5 USER CHARACTERISTICS

- Every user should be comfortable of working with computer and net browsing.
- He must have basic knowledge of English.

2.6 CONSTRAINTS

- GUI is only English.
- Limited to HTTP\HTTPS

2.7 ARCHITECTURE DESIGN

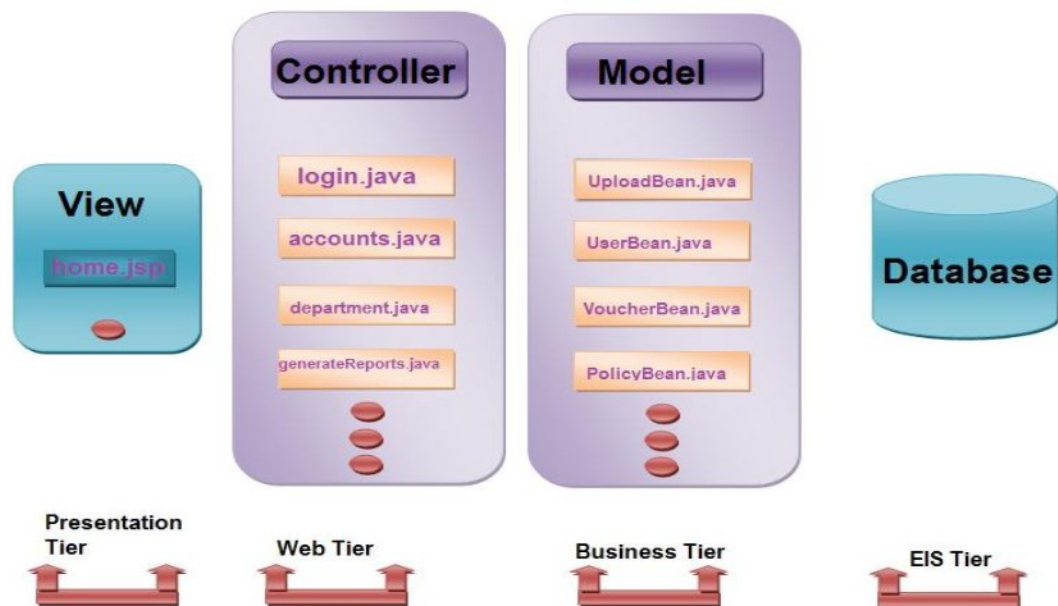


Figure 2. 2 Architecture Design

2.8 USE CASE MODEL

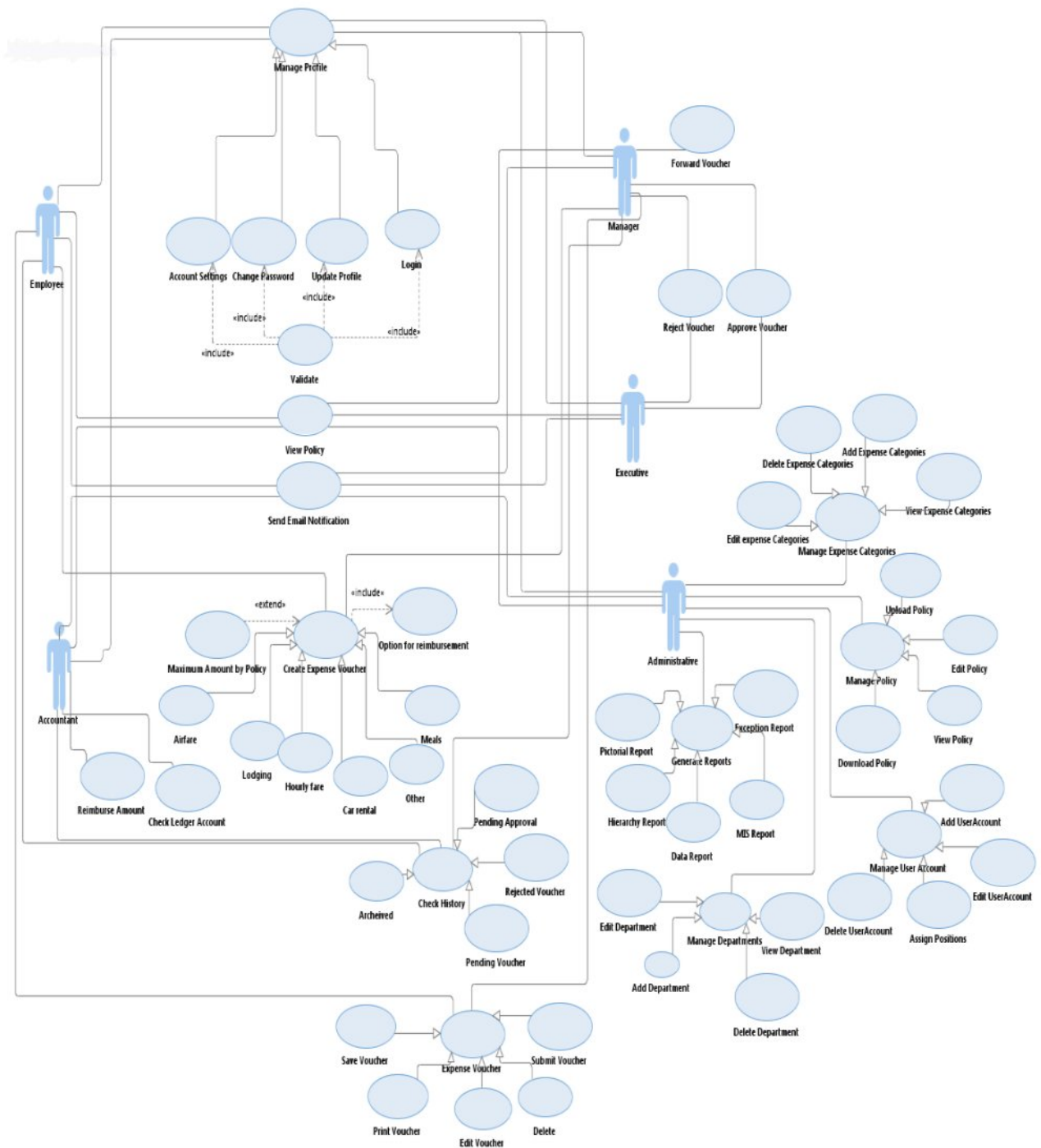


Figure 2. 3 Use Case Diagram

2.9 CLASS DIAGRAM

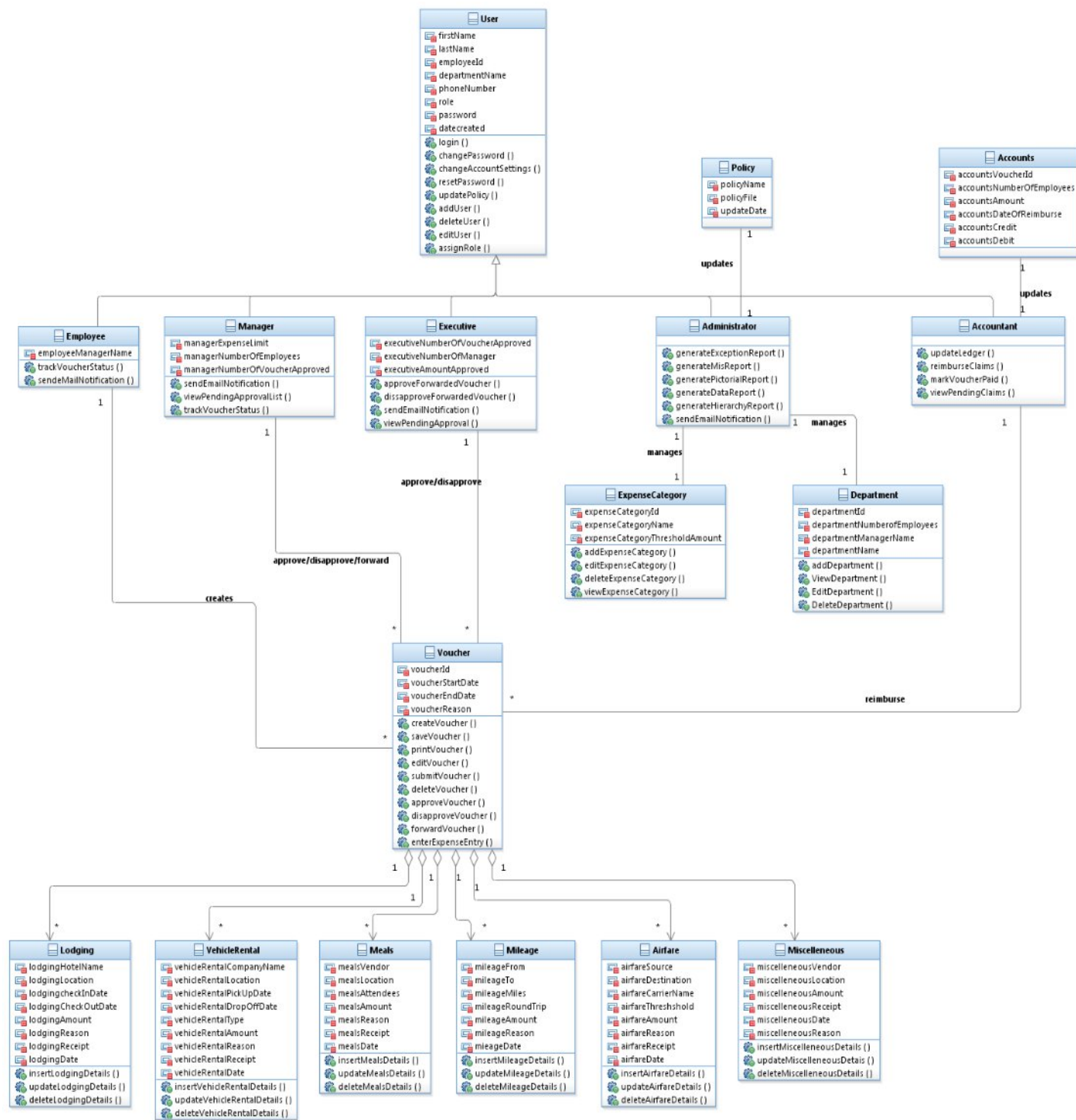


Figure 2. 4 Class Diagram

2.10 BEHAVIOURAL DIAGRAM

2.10.1 ACTIVITY DIAGRAM

- **Create Expense Report:** The user when logged in to system can create new voucher report. Inside the voucher report he can add the details of the individual expense type such as Airfare, Meals, etc. He can either draft the report or submit the report for approval. The changes are then reflected in the user account by updating the database.

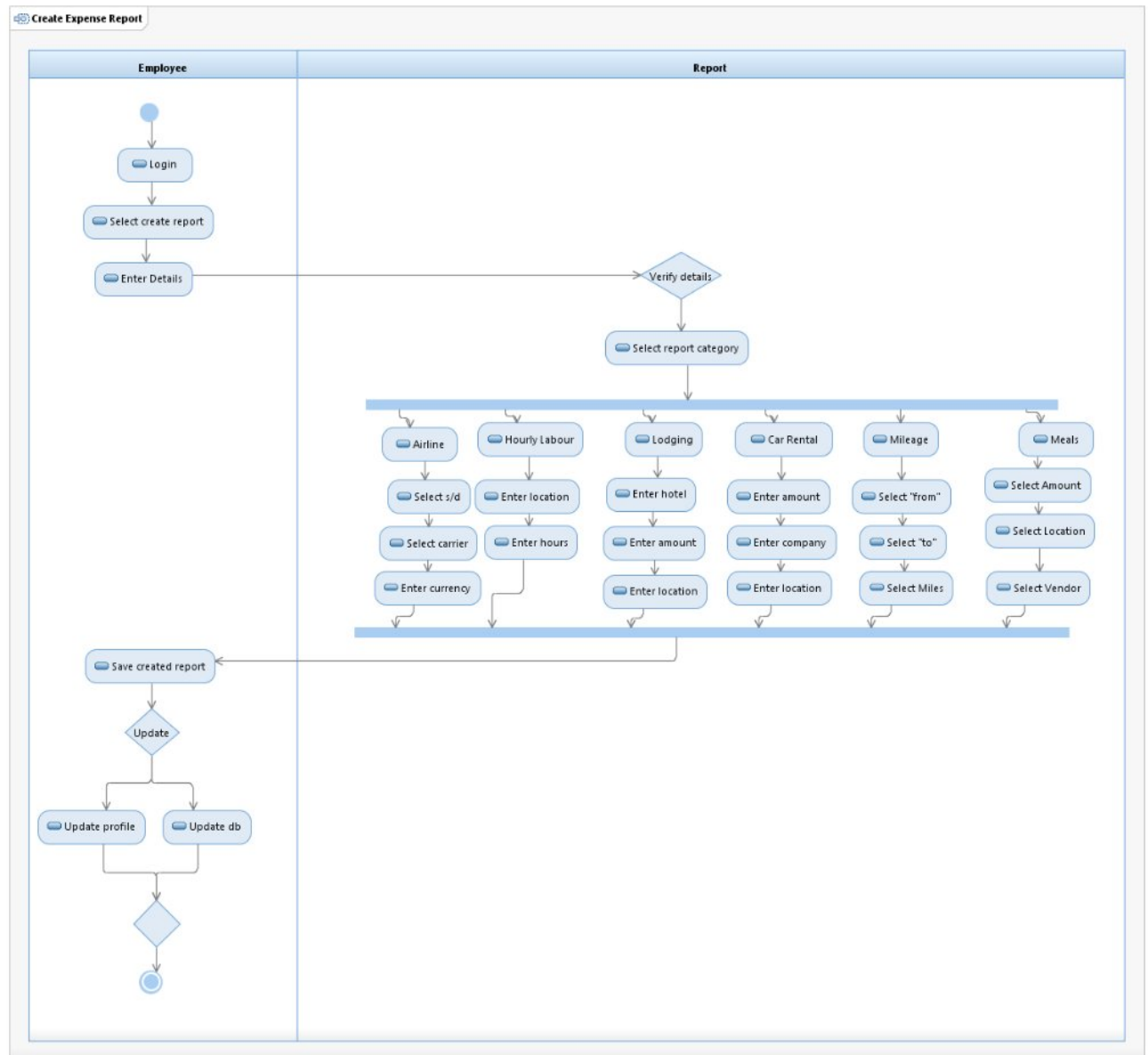


Figure 2. 5 Activity Diagram Representing Create New Expense Report Process

- **Voucher Workflow Activity:** Once the voucher is submitted, it is sent to the respective manager. The expense policy is checked by the manager for threshold amount. If the claimable amount is less than the threshold amount, the manager reviews the voucher else he forwards to the Executive. They can now approve or reject voucher. Approved voucher is sent to the accountant for claim process. Rejected voucher is sent back to the employee along with the reason for the rejection.

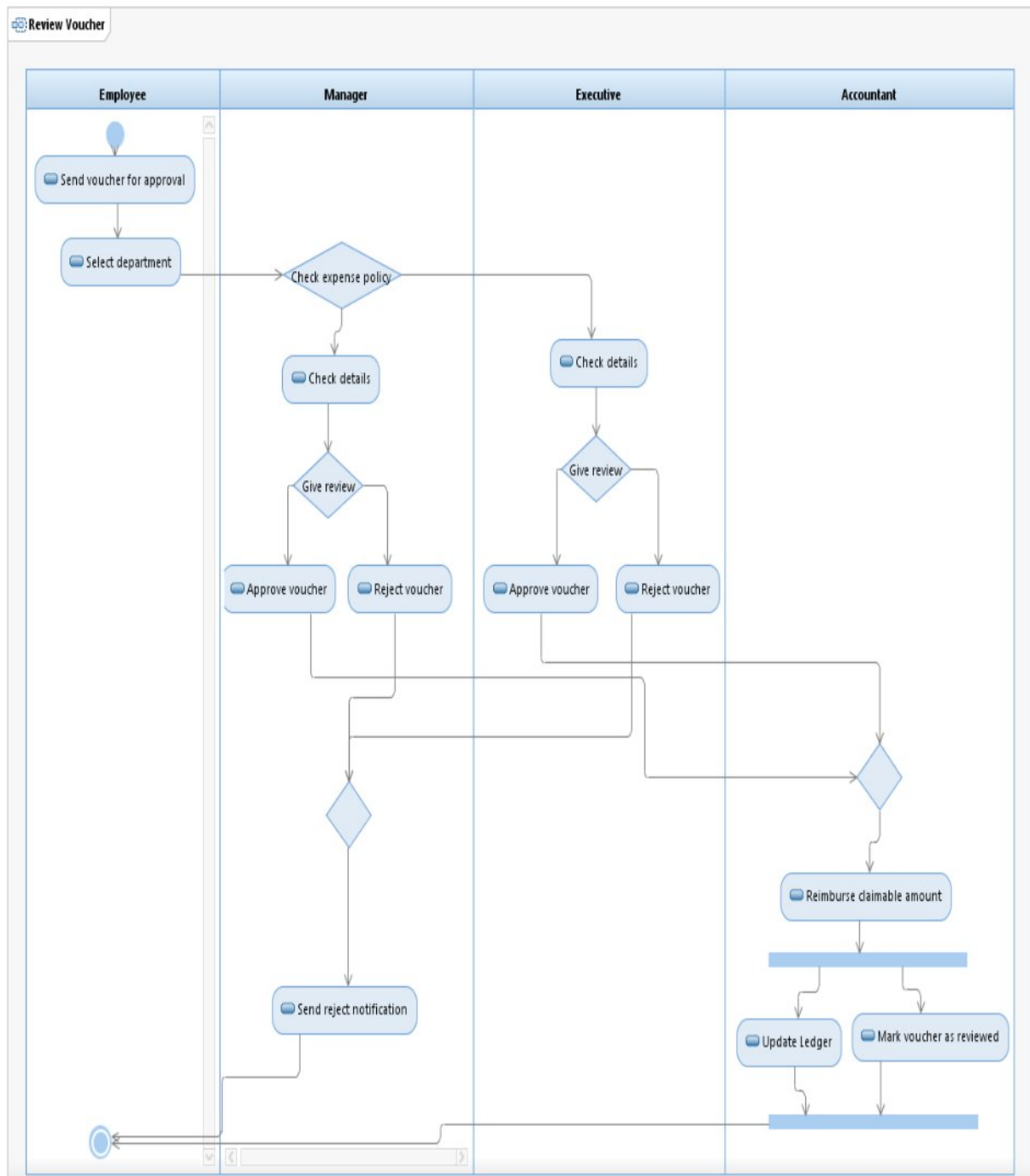


Figure 2. 6 Activity Diagram Representing Voucher Workflow

- **Manage Policy Activity:** The administrator has the privilege to manage the policy. Once logged in, he can select the option for managing the policy. He can select the option such as downloading policy, editing the policy, viewing the policy, uploading the policy.

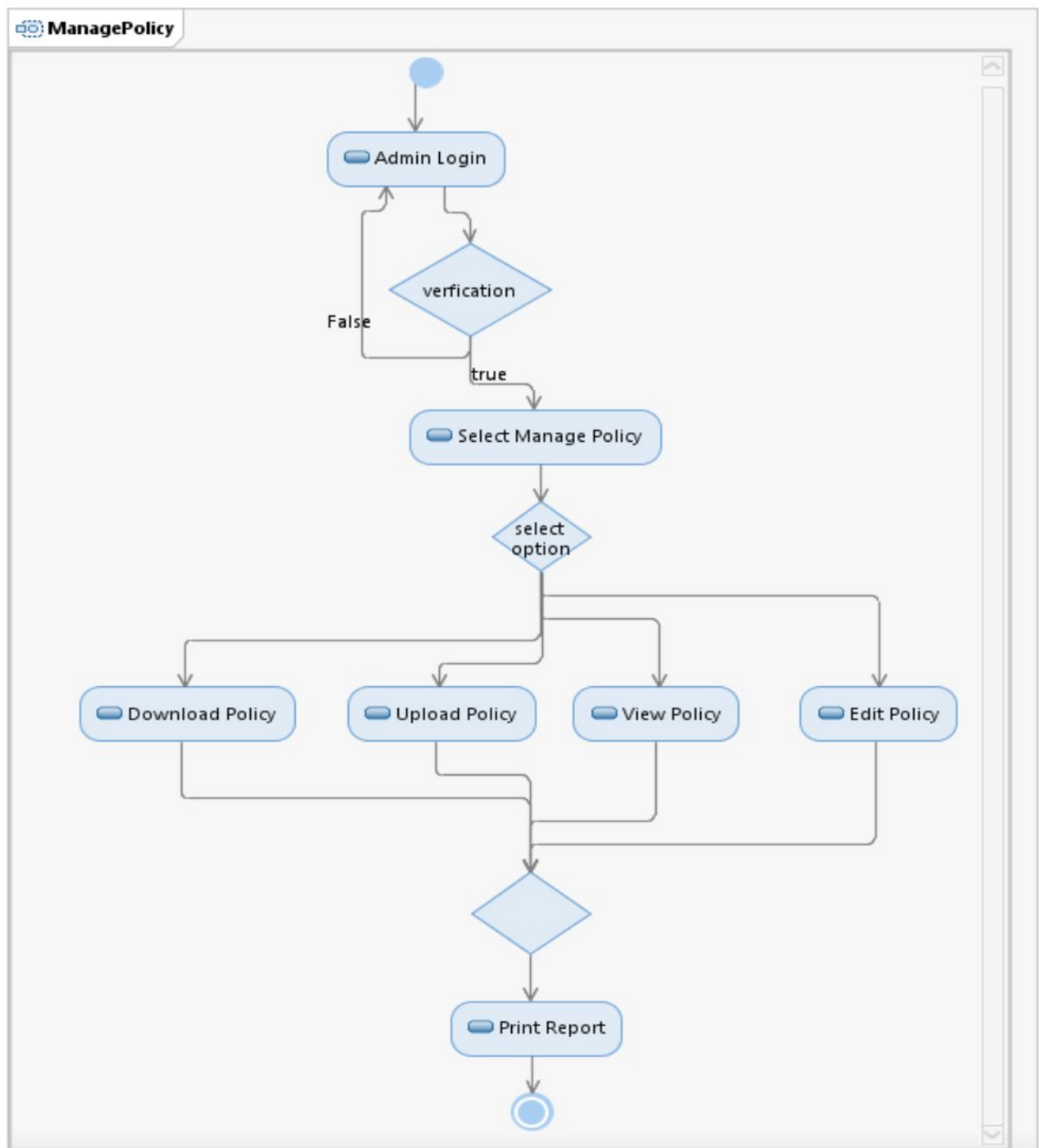


Figure 2. 7 Activity Diagram Representing Manage Policy Process

- **Generate Report Activity** : Administrator of the system can generate the reports as required by the organization for collecting data and analyzing the monetary related aspects. Administrator generates the reports such as Exception reports, Hierarchical report, pictorials report, data reports, MIS report.

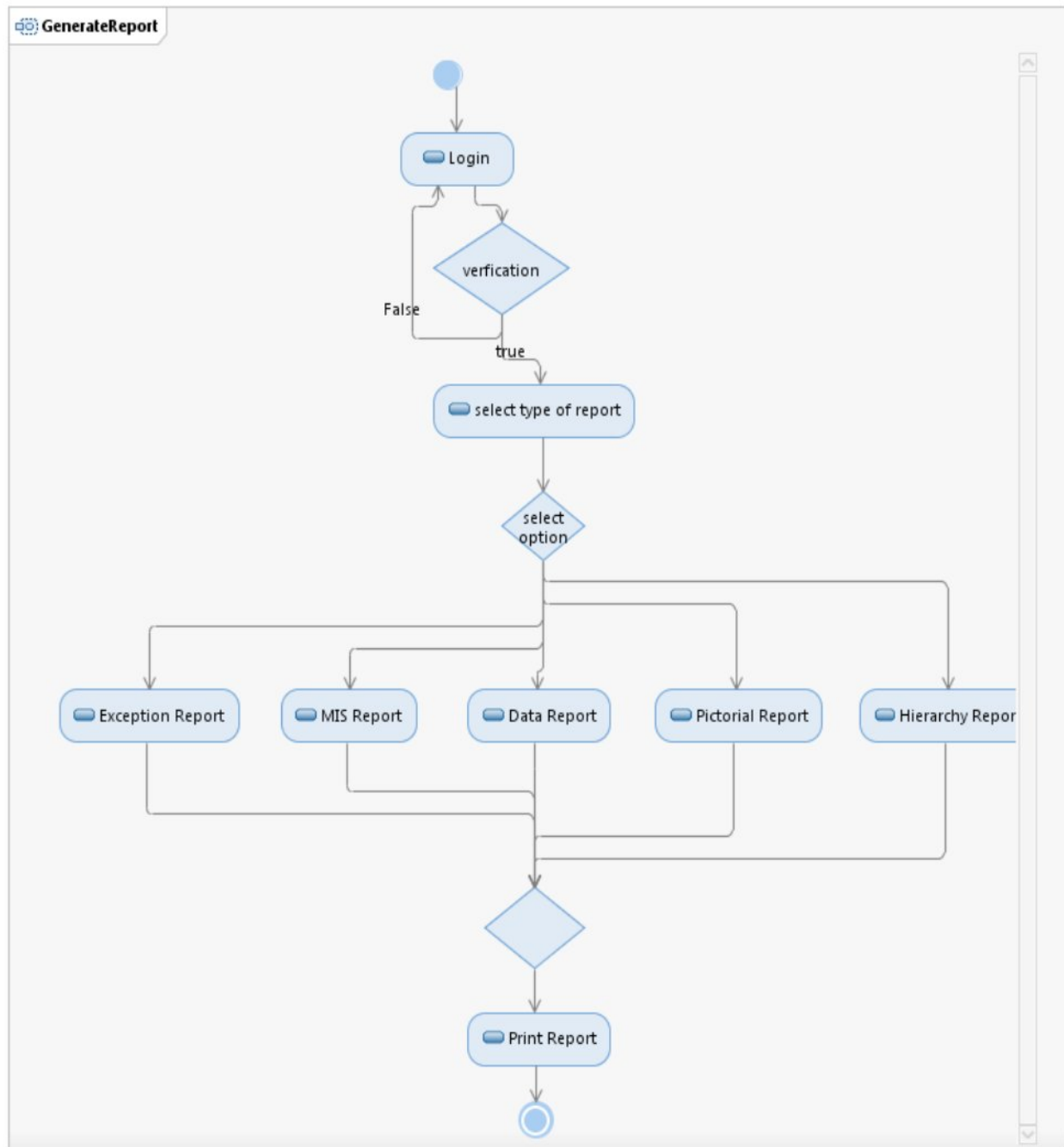


Figure 2. 8 Activity Diagram Representing Generate Reports Process

- **User Login** : User is prompted to enter the credentials for login as provided by the administrator. The system checks the credentials by verifying. If the entered credentials are correct he will be redirected to the home page. In case he forgets the password there is option for regaining access to the account by resetting the password by forgot password link.

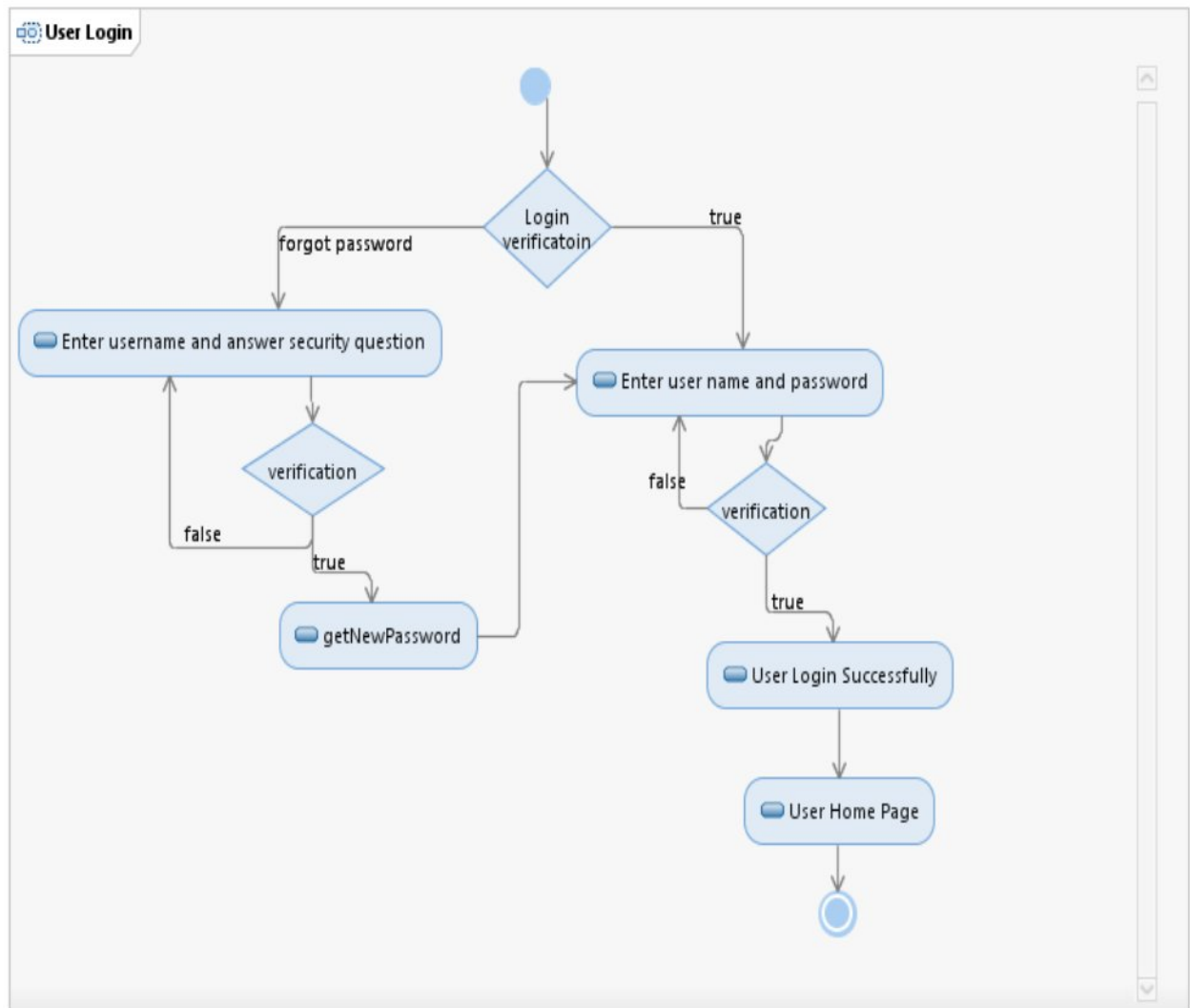


Figure 2. 9 Activity Diagram Representing User Login Process

2.10.2 SEQUENCE DIAGRAM

- Add User

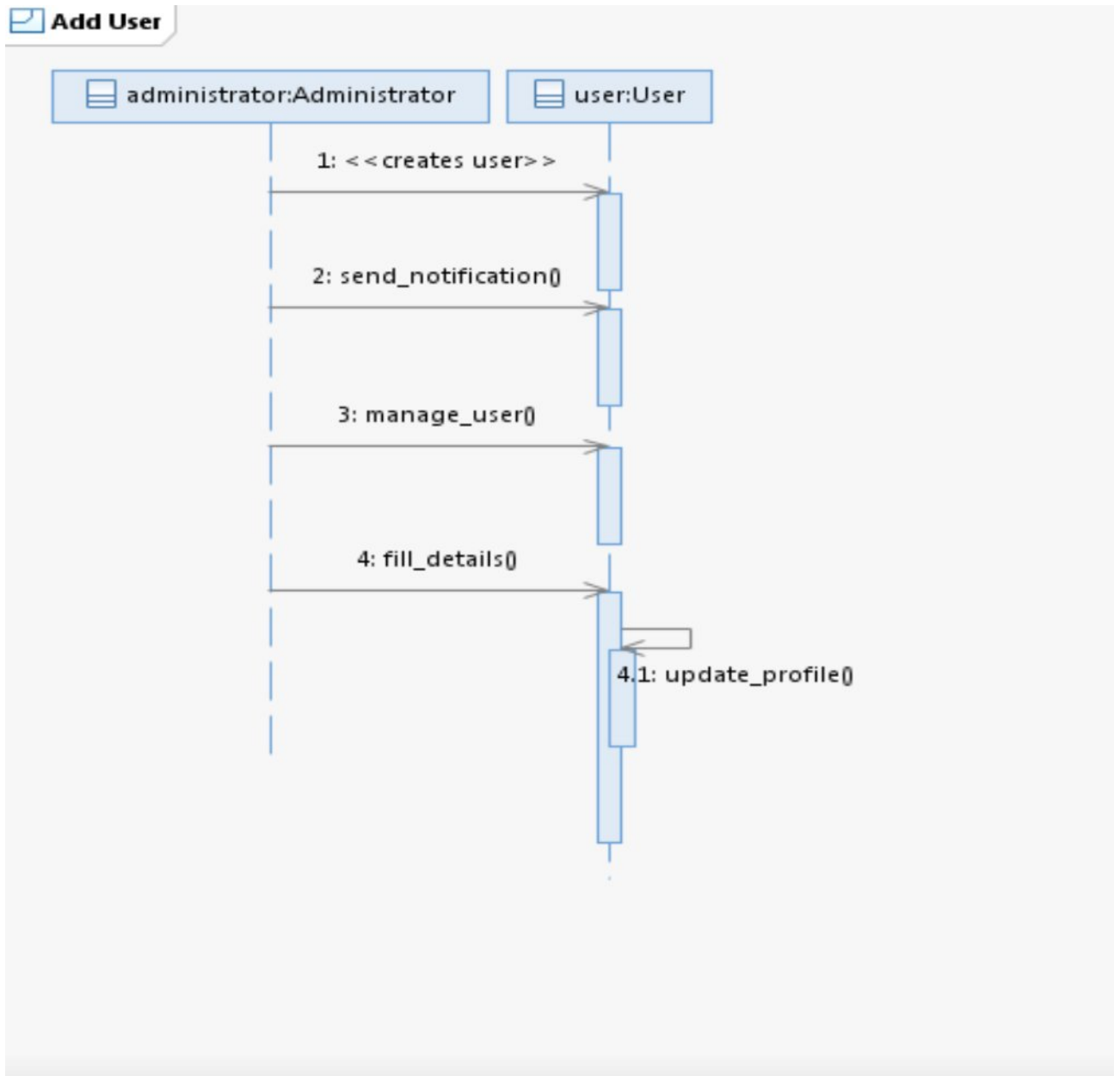


Figure 2. 10 Sequence Diagram representing Add User Functionality

- Add Voucher

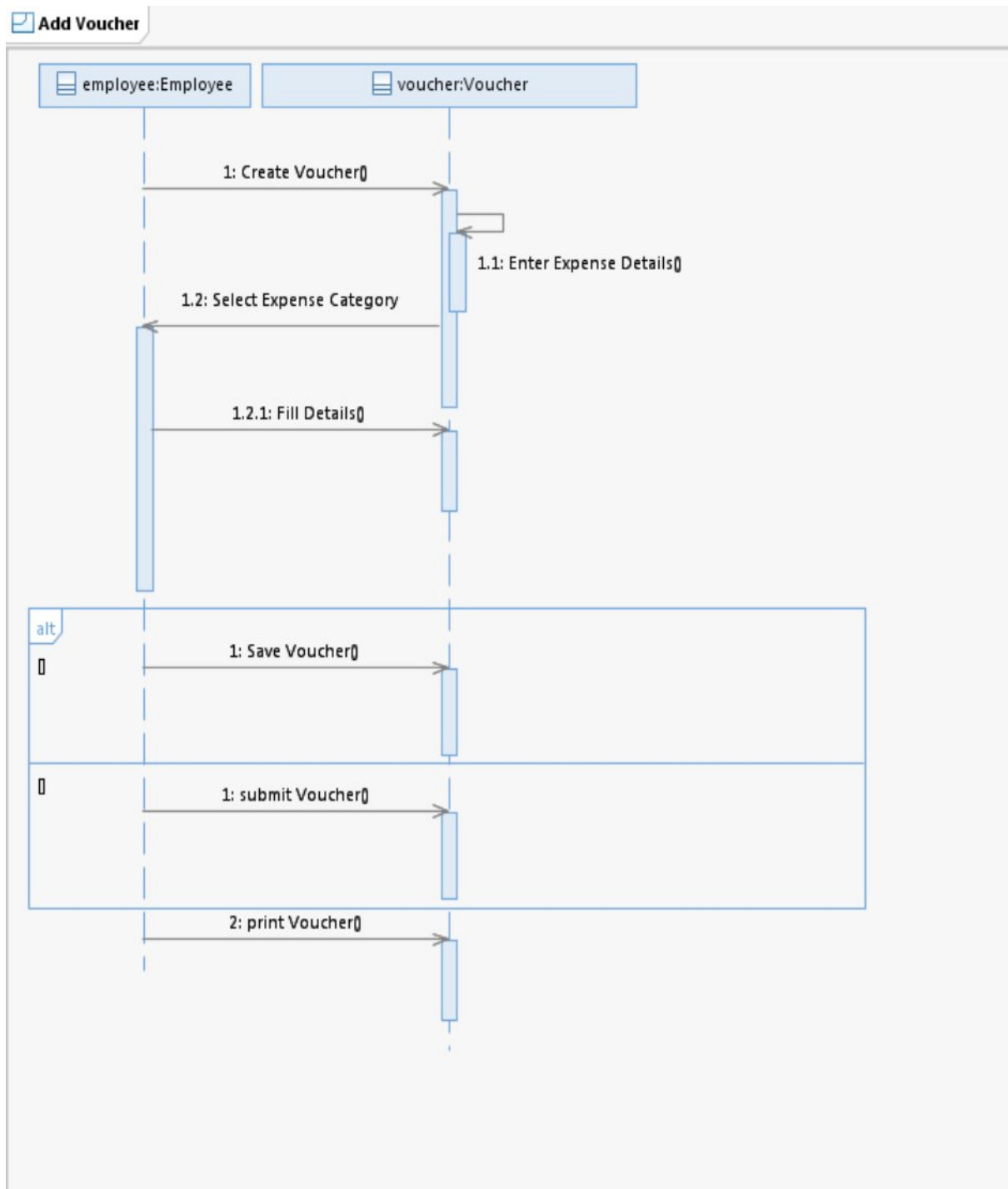


Figure 2. 11 Sequence Diagram representing Send Voucher Process

- Voucher Workflow

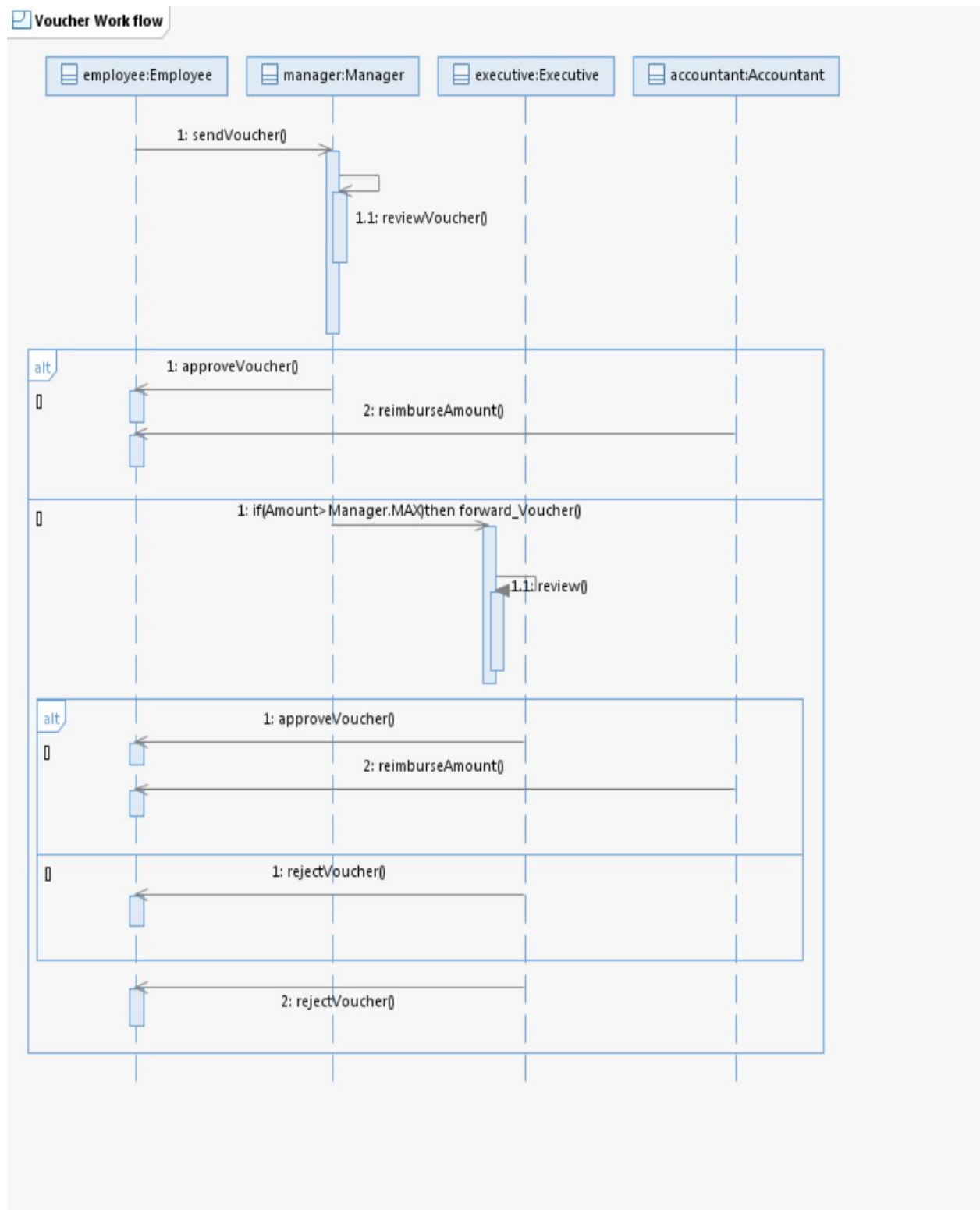


Figure 2. 12 Sequence Diagram representing Voucher Workflow

- Check Voucher Status

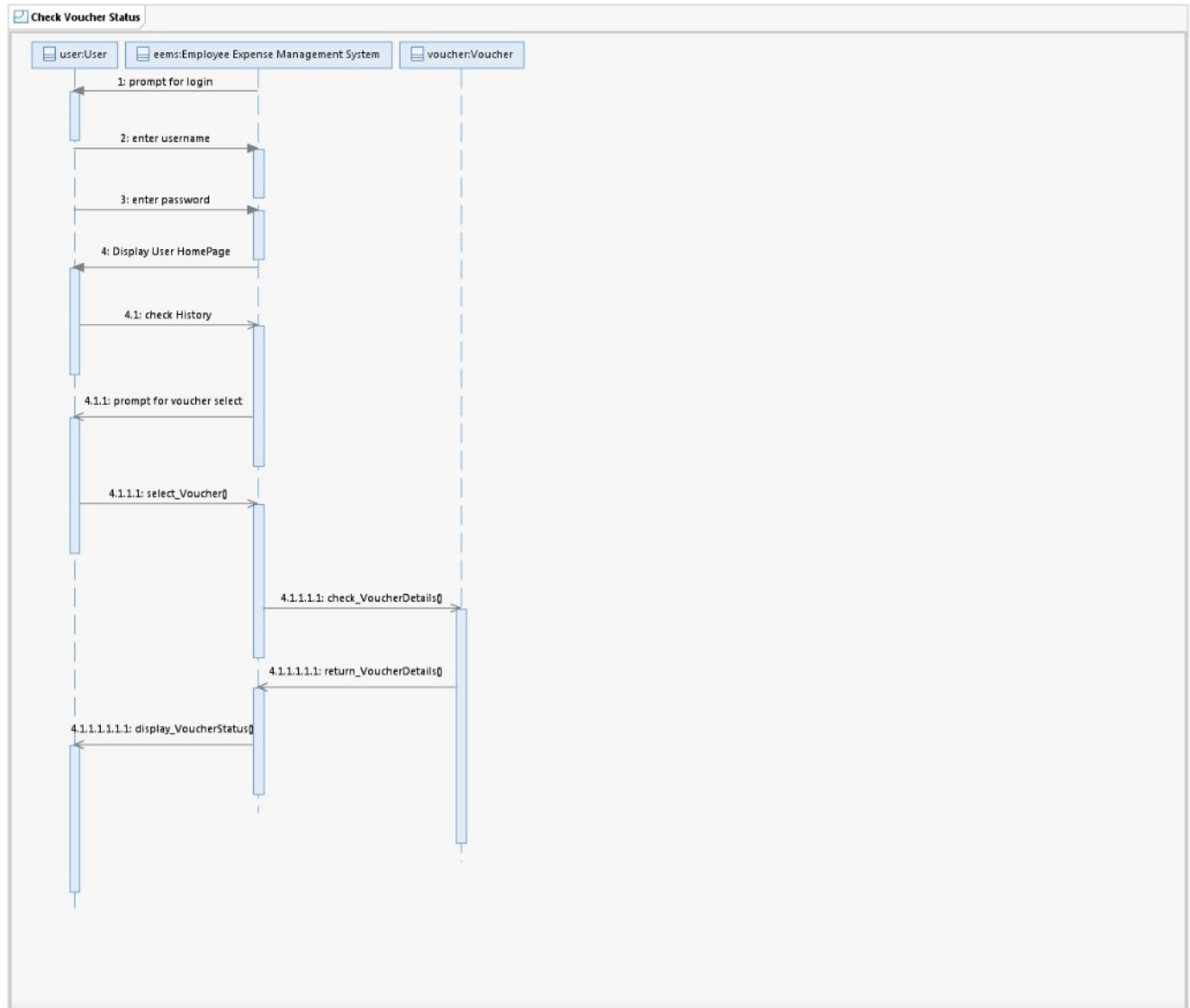


Figure 2.13 Sequence Diagram representing Check Voucher Status Process

2.11 DATABASE DESIGN

2.11.1 ER DIAGRAM

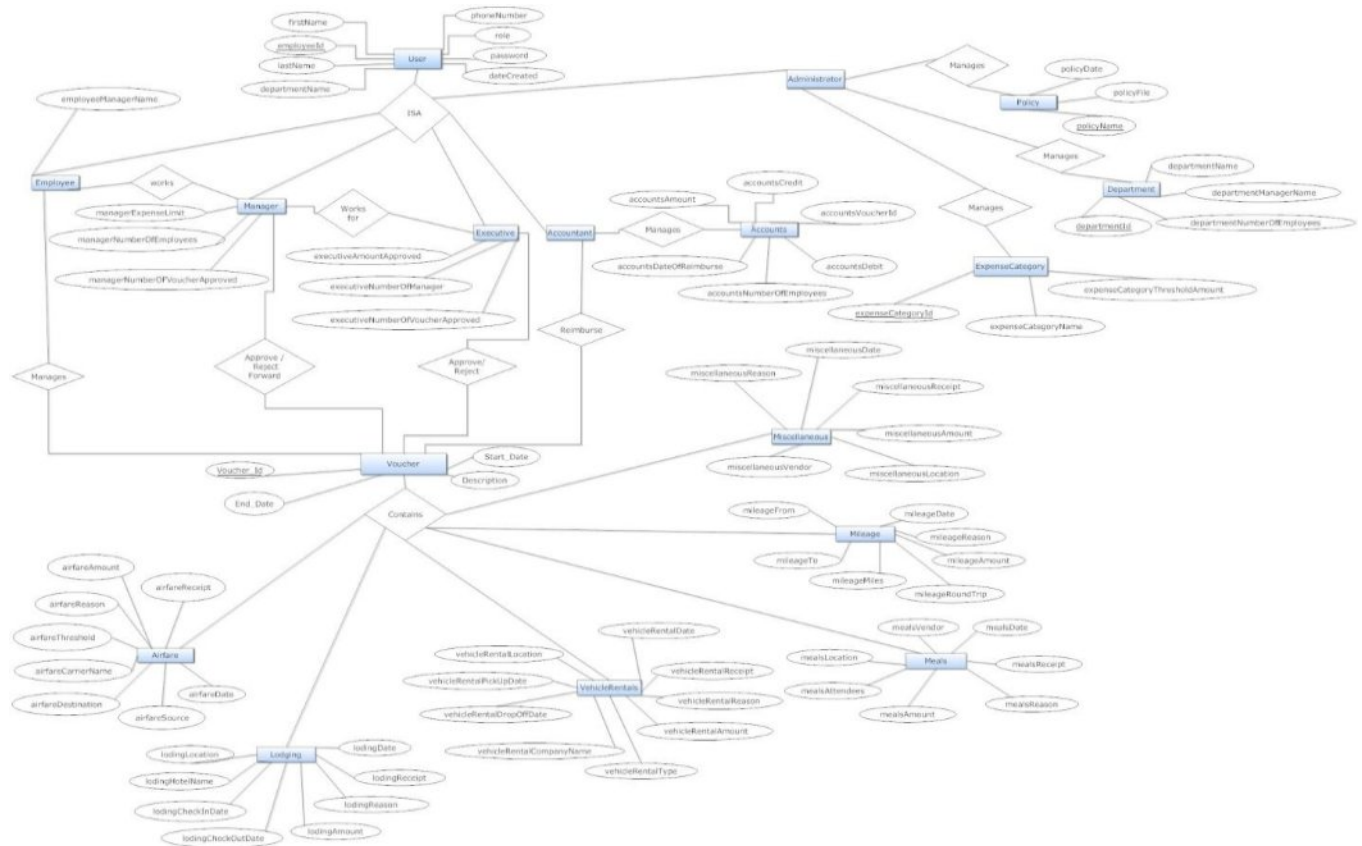


Figure 2. 14 Entity Relation Model

2.11.2 SCHEMA DIAGRAM

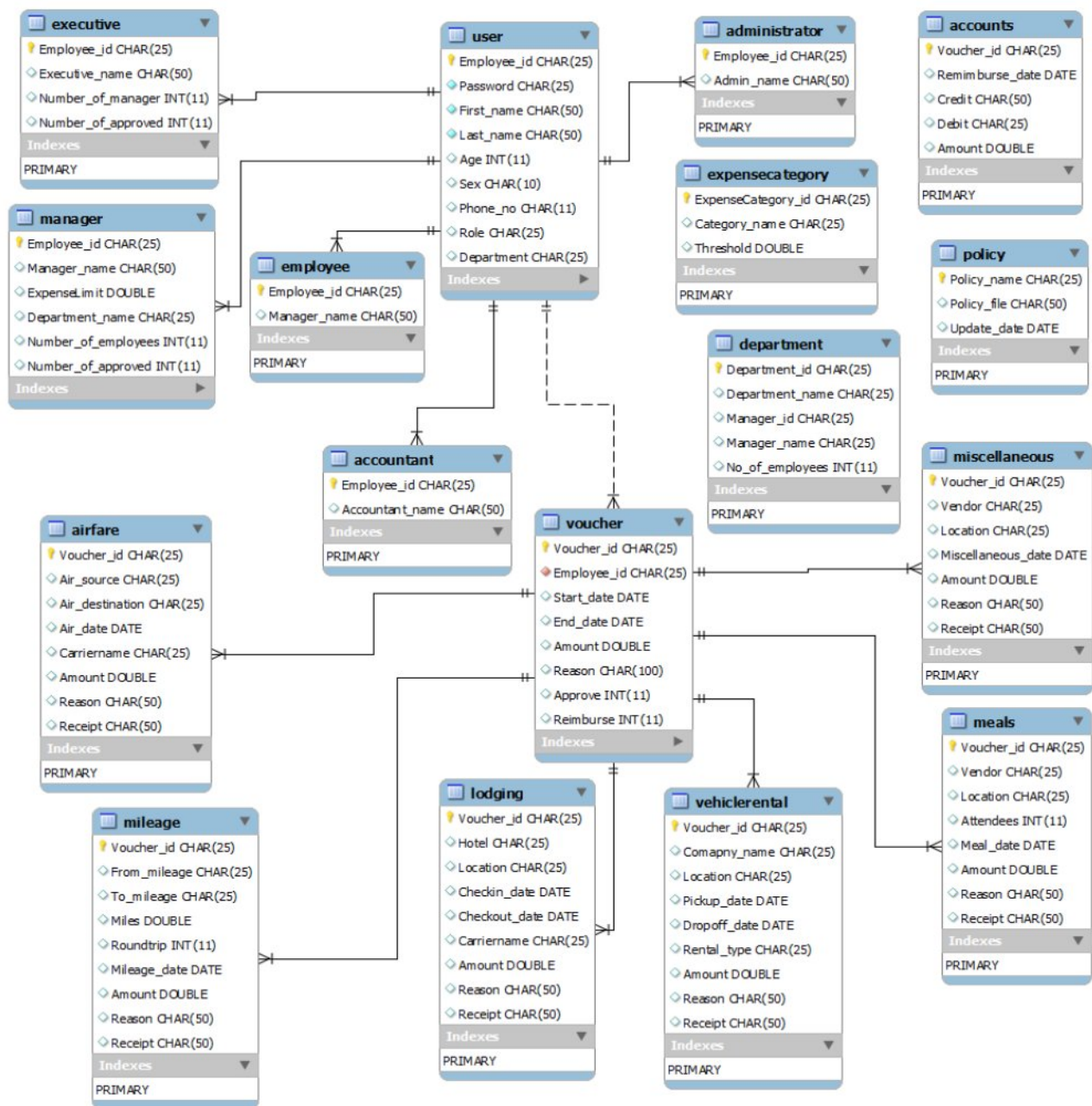


Figure 2. 15 Schema Diagram

2.12 ASSUMPTIONS AND DEPENDENCIES

- The end user should have a basic knowledge of English and computer usage.
- Administrator is created in the system already.
- Roles and tasks are predefined.
- User id and initial password are provided by the organization.

3. SPECIFIC REQUIREMENTS

3.1 USE CASE REPORTS:

Actors

The System caters to the following users

- Administrator
- Employee
- Manager
- Executive
- Finance Department(Accountant)
- Backup Administrator

3.1 .1 USER SPECIFIC REQUIREMENTS

NAME	Add Voucher				
Description	To add a Voucher Entry to claim an expense.				
Actors	Employee				
Pre Condition	1. Actor must be logged in to the System. 2. Actor must have sufficient privilege to add Entry.				
Basic Path	1. User navigates through the front End Login page. 2. User will log in successfully. 3. System displays the Voucher Entry as one of the option. 4. User selects "Add Voucher" to add an Entry. 5. System displays a form to capture following details.				
	Form Field	Type	Unique	Requirements	Maximum Size
	Expense Type	Drop down list	No	Yes	--
	Date of Expense	Date Picker	No	Yes	--
	Description	Text Area	No	Yes	60columns and 5rows
	Expense Details	Drop down List	No	Yes	--
	File Upload of Receipts	File Upload	No	No	--
	6. User will enter all the information properly 7. User selects option to save Report or Submit Report . 8. System saves data and creates new Entry in respective Employee Account 9. System refreshes the changes and reflects the changes. A-1: User selects Cancel. Does not save Entry				
	Alternate Path	N/A			
Exceptions	If employee doesn't provide any details properly then it would not proceed further until user provides correct information.				
Business Validation/Rules					
Post Condition	Actor has successfully entered the voucher. Save/submit the Voucher.				

NAME	Review a voucher
Description	To review Voucher for approval
Actors	Manager(under particular hierarchy)
Pre Condition	Hierarchical level must be above an employee and all field conditions must be satisfied under all Conditions.
Basic Path	<ol style="list-style-type: none"> 1. First Manager of a particular hierarchy head is logs into the System. 2. Here he will select a Voucher to approve 3. The Manager will check details manually. 4. Based on the Condition, Manager will approve /reject voucher because of some reason 5. Notification send to lower hierarchy user regarding status(Application accepted/rejected)
Alternate Path	N/A
Exceptions	-
Business Validation/Rules	The particular organization has certain Conditions. E.g. Claimable amount should not exceed 100,000.
Post Condition	Resend Voucher stating reason e.g. Incomplete details, money limit, and inappropriate receipt.

NAME	Rejection Flow
Description	It is used to send rejected voucher to the employee.
Actors	Manager(of particular hierarchy)
Pre Condition	<ol style="list-style-type: none"> 1. Manager must log in to the System. 2. Manager will assess the voucher.
Basic Path	<ol style="list-style-type: none"> 1. First Manager of a particular hierarchy in going to log in to the system. 2. Then Manager will open his/her main window where the pending approvals are present. 3. Here Manager will be getting the notifications from lower level hierarchy Members. 4. If Manager feels that data provided by lower level employees is inappropriate then he will reject that particular Voucher stating appropriate reason.
Alternate Path	N/A
Exceptions	-
Business Validation/Rules	
Post Condition	Voucher has been rejected and notification has been given to that Particular Employee.

NAME	Account View
Description	The Accounts Department will maintain a record of all financial aspects.
Actors	Accountant(Account Department)
Pre Condition	<ol style="list-style-type: none"> 1. Accountant will log in to the system. 2. Accountant will keep a track of Records from where the voucher came (from which member) and who has approved that voucher (e.g. manager of that department).
Basic Path	<ol style="list-style-type: none"> 1. Accountant will login in to the System. 2. System displays the "View Approved Vouchers" as one of the option. 3. Accountant clicks on it. 4. Here Accountant will be able to view approved vouchers from the different departments. 5. Accountant will mark the voucher which has been approved as paid and reimburse the claimable amount. 6. Then that Lifecycle of that particular Request is completed.
Alternate Path	N/A
Exceptions	
Business Validation/Rules	The voucher must be an approved voucher
Post Condition	

NAME	Send Voucher
Description	Here an Employee shall send a voucher to Manager for approval.
Actors	Employee
Pre Condition	<ol style="list-style-type: none"> 1. Employee shall login successfully. 2. Send Voucher option is selected with necessary details.
Basic Path	<ol style="list-style-type: none"> 1. Employees logs in to the System. 2. System displays the "Create voucher" as one of the option. 3. After creating the Voucher, the System displays the "Send Voucher" as one of the option. 4. Employee will click on Send Voucher. 5. Here , System will first of all will give a prompt message saying as "Are you sure to send Voucher and please check the details that you have entered" 6. Now System will show two options after

	validation a) YES (To continue the process) b) NO(to go back and makes from changes and then more further) or an option to save it as draft. 7. If employee selects "YES" then that particular voucher is forwarded to his/her Manager for approval. 8. Notification is given at both the parties(via e-mail)
Alternate Path	N/A
Exceptions	
Business Validation/Rules	At a time only one voucher is sent for approval.
Post Condition	Voucher has successfully been sent.

NAME	Backup Database
Description	In case of any problems associated with database systems, the backup of the database will be taken in advance to prevent data loss.
Actors	Backup Administrator
Pre Condition	1. Administrator will log in to the System 2. Will backup all the records from every employee, Manager and other aspects from the database
Basic Path	1. Administrator will log is to the system. 2. System displays the "Backup" as one of the option and Admin clicks on it. 3. Then Admin will take a backup of all data from the database. 6. And then Admin will save these log files into the database. 7. Daily an Admin will take a backup and store it into database and the updating is performed daily.
Alternate Path	N/A
Exceptions	
Business Validation/Rules	
Post Condition	Backup is taken place successfully.

NAME	Generating the Report
Description	The Manager is going to generate a report for better understanding.
Actors	Administrator, Manager
Pre Condition	1. Administrator logs in to the system successfully. 2. Administrator after assessing all the data generates reports for specific set of results
Basic Path	1. Administrator logs in to the system successfully. 2. System displays the generate reports as one of the option. 3. Administrator clicks on it for getting any kind of specific data as required. 4. This Report gives the brief description to Administrator about a Particular voucher. 5. These reports are printed if required.
Alternate Path	N/A
Exceptions	
Business Validation/Rules	
Post Condition	Generate report has taken place successfully.

3.2 SUPPLEMENTARY REQUIREMENT

- Secure access of confidential data (user's details). SSL can be used: SSL is the backbone of our secure Internet and it protects your sensitive information as it travels across the world. It keeps the Internet from being ruled by anarchists and criminals and provides many direct benefits to all the users.
- 24x7 Availability: If the base is now the entire world, staying open 24 hours a day becomes critical. Because system can be an automated Process, so it can stay open for 24 hours a day. So UPS support must be on server site for at least 8 hours in case of power failure.
- Better Component Design to get better Performance at PEAK time: This involves better understanding by the developer of the system. A properly designed system helps in elaborating and understanding refined aspects of system. System development becomes efficient. A well designed system also helps in early detection of problems in critical areas, if any. An error free system saves development time since it helps in understanding without any discussion. Better quality of reporting formats. Modifications can be made easily in the system. Little maintenance is required in the operations phase.
- Flexible service based Architecture: SOA allows creating new applications on top of existing enterprise solutions, increasing the value of the current systems and automating new processes. This results in faster implementations and more cost-effective upgrades.

With service-oriented architecture, one can take advantage of Web services to deliver core competencies to new customer segments – while reducing IT costs and increasing efficiency.