CLEAN CAR SCS 2202

Group CS 37

A simple reservation system + leave managing system for car service stations

Details of Project Supervisor, Co-supervisor, Advisors and Clients

Proposed Project Supervisor (Academic Staff of UCSC):

Name of the supervisor: **Ms. Sanduni Thrimahavithana**

Signature of the supervisor:

Date: **25th of May 2020**

Proposed Project Co-Supervisor (Assigned by Course Coordinator):

Name of the co-supervisor: **Mr**. **Roshan Abeyweera**

Signature of the co-supervisor:

Date: **25th of May 2020**

The client of the Project

There are no specific clients for this project. It is planned to suit the requirements of all service centers.

Confirmation by Project Supervisor and Co-supervisor

5/25/2020 Gmail - Proposal with adjustments excluding email signature

Gmail **Thenuka Ovin <thenukaovin@gmail.com>**

Proposal with adjustments excluding email signature

Sanduni Thrimavithana <sst@ucsc.cmb.ac.lk> Mon, May 25, 2020 at 3:00 PM
To: Thenuka Ovin <thenukaovin@gmail.com>
Cc: Roshan Abeyweera <rns@ucsc.cmb.ac.lk>

Dear All,
I have gone through the proposal and found that you have made up the changes I requested. Now it seems ok. You may proceed with submitting it.
Thank you.
Best Regards
[Quoted text hidden]

5/25/2020 Gmail - Proposal with adjustments excluding email signature

Gmail **Thenuka Ovin <thenukaovin@gmail.com>**

Proposal with adjustments excluding email signature

Roshan Abeyweera <rns@ucsc.cmb.ac.lk> Mon, May 25, 2020 at 3:02 PM
To: Sanduni Thrimavithana <sst@ucsc.cmb.ac.lk>
Cc: Thenuka Ovin <thenukaovin@gmail.com>

Dear team,
I have gone through the proposal and I'm satisfied with the content as well as the effort you have put on it. you may proceed with the submission now.
Thank you. Regards.
[Quoted text hidden]
--
Roshan Abeyweera | Instructor
University of Colombo School of Computing
Sri Lanka.

Table of Contents

Cover Page 0
Details of Project Supervisor, Co-supervisor, Advisors and Clients 1
Confirmation by Project Supervisor and Co-supervisor 2
List of abbreviations 4
1) Introduction 5
Problem Statement: 5
2) Project goal 6
3) Scope of the project 6
4) Objectives of the project. 7
5) Project Feasibility: 7
5.1) Technical Feasibility 7
5.2) Economic Feasibility 8
5.3) Legal and Ethical Feasibility 8
5.4) Operational Feasibility 9
5.5) Scheduling Feasibility 9
6) Deliverables of the project. 10
7) Project Constraints and Assumptions. 10
8) Requirements 11
8.1) Functional Requirements 11
8.2) Quality attributes Requirements 43
9) Technologies to be used. 44
10) Project timeline. 45
Work allocation: 46
11) Declaration 47

List of abbreviations

- CS: Computer Science
- HR: Human Resource
- HTML: Hyper Text Markup Language
- IDE: Integrated Development Environment
- IT: Information Technology
- NIC: Network Interface Card
- PC: Personal Computer
- SQL: Structured Query Language
- TP: Telephone
- UML: Unified Modelling Language

1)Introduction

Problem Statement:

After analyzing the automobile services sector, we recognized the following existing problems and their impacts:

a) The long queues and uncertain vehicles at service stations: a considerable problem for vehicle owners. Travelling all the way to the station and discovering many other vehicles are already there and having to wait several hours in the premises.
This consumes customers' precious time and ability to do another task. The efficiency of providing the vehicle service has a huge impact on retention of customers for the service center.

b) Although reservation is available for limited flagship service providers (eg: Kleen Park, Auto Miraj) it is not possible to select an available date/time that suits the customer. Most large-medium scale service stations have booking by Telephone, but the lines are often unanswered. So, customers become dissatisfied with the service. They wish for a more time-saving and convenient way such as online methods in this digital era. We discovered that if customers could view the calendar for the service station and see the reservation status for time slots and select an available/most convenient time slot (date and time) it would be the perfect solution. A central database for employees would also facilitate many of the work.

c) Currently employees in service stations are required to meet their superiors to ask for leave. For this face-to-face meeting is needed. This could be conflicting since managers are extremely busy with the customers or with other business matters.
Since there is no centralized data source, strategic decisions cannot be made as they are made in other businesses.

Based on the above identified issues we discovered that the following outcomes are of necessity:

To save customers' time as well as to distribute the work balance evenly throughout working time for employees, an online reservation system for car service stations remains a timely need. In addition, managers of service stations would be benefited by a leave applying system for employees so they could take decisions and manage the jobs for coming days according to the workforce available on that day. Accountability, individual review of each employee will be added benefits.

As Computer Science undergraduates who have experienced above issues alongside the vehicle service seekers & workers, we decided to implement a system that would help manage **car service centers** regarding the above problems with the solutions.

2)Project goal

To produce a **fully functioning, user friendly** system to operate in a car service station that helps users **solve the current problems in service stations** whilst helping to **maximize the efficiency** of the business by saving the customers time.

3)Scope of the project

- Only **a web application** will be made.
- Functionality will be limited to customer booking, Employee leave apply/manage, Report generation on leave for manager.
- Only the advance for booking will be able to be paid online.
- In case of a last-minute update/ deletion of a reservation, the system handler can manually intervene (TP call) to adjust the time slots suiting test according to the station
- For the employees, only the "leave apply" function will be done through the system.
- A Sand box will be used for the online payment method.
- User groups are:
    - Customer, Employee, Receptionist, Manager
- There will be no functions such as stock, inventory management, salary calculations included in the system (out of scope).

Following are the subsystems made:

- Login and authentication module
- Reservation – Main function of system
- Smart calendar – Used for reservation, leave applying
- Online payment module – advance payment
- Report generation module – to generate reports for manager on employee leave taking
- SMS module – sending alerts to customers
- Database – Employee and customer details

4)Objectives of the project.

- To produce the above-mentioned system with every component fully functional.
- To solve all problems related to above issues identified by car service centers and to make them satisfied in using our system.
- To make the system 'user-friendly' to the user as much as possible by creating easy to use and efficient user screens.
- To gain a learning experience on how software is made by working together and increase web developing knowledge.

5)Project Feasibility:

5.1) Technical Feasibility

We plan to use HTML, PHP, JavaScript as our implementation techniques. All IDEs used for development are free and open-source and are considered simple to handle for CS students.

Laptops and desktops that are already owned will be used for our project hardware requirements.

IDEs:

- Visual Studio Code
- Notepad++
- Sublime text

Tools & Utilities:

- XAMPP
- Version management- GitHub
- Draw.io – UMLs & diagrams
- Adobe Illustrator- for logo making
- Microsoft Office 365 (Student edition provided free for university email)
- Notepad
- Grammarly -Free edition to eliminate grammar mistakes

Hardware:

- Network equipment: (NIC), cables (e.g: RJ45) and routers.
- Personal laptops

All above mentioned resources are easily usable within our knowledge limits**. Hence the project is technically feasible**.

5.2) Economic Feasibility

- As mentioned above, free, and open source software and applications will be used. There will be no costs for software.
- No additional hardware costs
- Our own routers and internet plans will be used. Data usage might increase more than normal but it will not be a huge unbearable amount.
- In case of any hardware failure there might be costs for replacement (this is very unlikely to happen).
- For the 1st part of the project communication cost might be high because of the current Covid-19 situation as we are forced to use distance communication via mobile phones and zoom meetings.
- Paperwork cost is planned to be reduced by using electronic media (notebook, word editor) as much as possible.

Since there are no considerable expenses the project is economically feasible.

5.3) Legal and Ethical Feasibility

Access to customer data will not be allowed for any employee of the car service except for the following logins:

- Manager - Since this is the admin of the system all access will be granted
- Receptionist -no modification to records, only 'view' is allowed to facilitate issues such as password reset, change, emergency contacting etc.

- All login, credit card details will be sent through an encrypted medium when doing online payments.

The only part in which users will have to provide data to 3rd parties will be for the **online advance payment** function, it will require user consent. All transfers will be done with trusted, standardized payment providers over a secured connection.

Since there are neither legal nor ethical conflicts, the project is legally and ethically feasible.

5.4) Operational Feasibility

To use the system,

- Manager should have medium knowledge in IT and English.
- Need a system handler(receptionist) with medium knowledge in IT and English.
- A Personal Computer is required with a 24x7 internet connection
- Employees should have a basic knowledge of IT (Selecting something from screen)
- If the manager has a separate PC it will be an added advantage.

Because there will be no need of getting additional training or HR resources, **the project is operationally feasible**

5.5) Scheduling Feasibility

- A time span of 10 months is available to complete the system and the **Gantt chart is attached in section 10**.
- There are 4 members in the group so there is adequate time therefore **the project is operationally feasible.**

6)Deliverables of the project.

The following deliverable products will be available at respective times throughout the duration of the project

- Finished web application with all User-friendly interfaces – at the end of the timeline
- Test cases diagram
- User Documentation

7)Project Constraints and Assumptions.

- The product shall be finished within 10 months according to the timeline. Although due to the current Covid-19 situation the timeline may adjust varyingly.
- All 4 members of the group possess the same skills and abilities in terms of software development.
- No **frameworks** are allowed to be used. So, the project will be hard coded.

In terms of the system, we assume that,

- The manager at the premise has adequate IT and English knowledge to administer the system. Receptionist will also handle the system, but certain functionalities will need manager credentials (Modify employee data).
- In terms of hardware, we assume that there is a PC to handle the system etc. (As stated in Operational feasibility)
- When customers are unable to pay online the advance before 48 hours, they can manually contact the service center and sort out the payment method (through bank or cash)
- Online payment will be done through a secure channel.
- If an employee is unable to apply for leave online through the system, he/she can request the manager to apply the leave for them stating the reasons.

8)Requirements

8.1) Functional Requirements

There are 4 types of users that concern the system:

- Customer
- Employee
- Receptionist
- Manager

Following are the requirements that we identified:

For all users:

- Shall have Register, Login and Logout for their accounts.

Customer

- Shall be able to reserve a date/time priorly for their vehicle to have a service.
- Shall be able to view their account details and reservations they have made.
- Shall allow deletion, updating of the reservation date made by them within certain terms and conditions.
- Shall be able to change his/her account details.

Manager

- Shall be able to add employee records to the system.
- Shall be able to remove employees from system.
- Shall be able to update employee personal details.
- Shall be able to check employee leaves person-wise and date wise.
- Shall be able to cancel employees' leaves which were accepted before.
- Should be able to apply leave for employees' directly (who have technological issues).
- Should be able to view reports about the service station.

Manager and Receptionist

- Shall be able to make reservations for customers through system.
- Shall be able to view reservations made by customer.
- Shall be able to delete, update a reservation made by a customer.
- Shall be able to view details of employees.

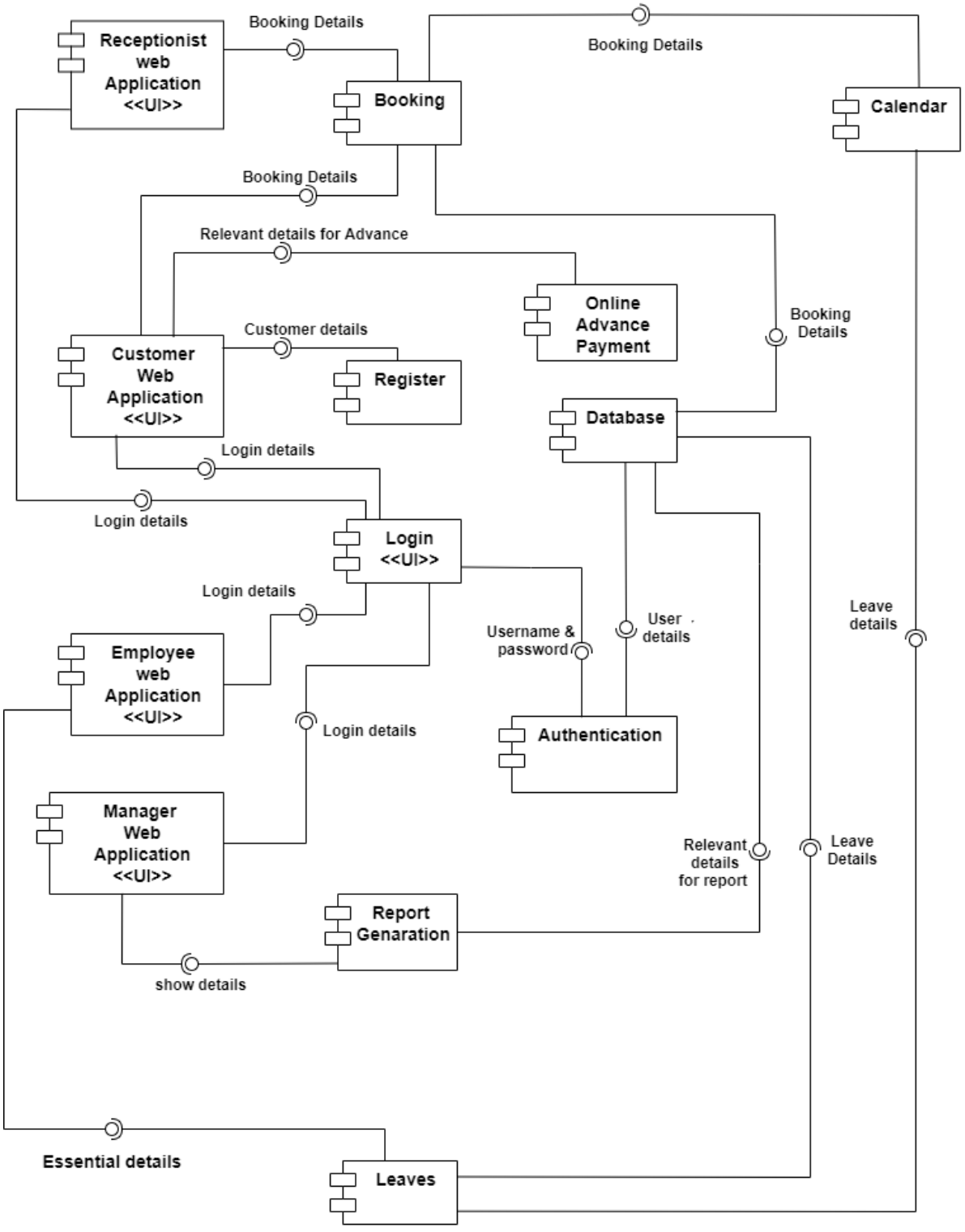
Employee

- Should be able to check the number of leaves which they applied for in the current year.
- Shall be able to view their account details and leaves they have applied for from the calendar.
- Should be able to cancel leave which they applied for priorly.
- Shall be able to request for leave through the system which shall be accepted/rejected by the manager.

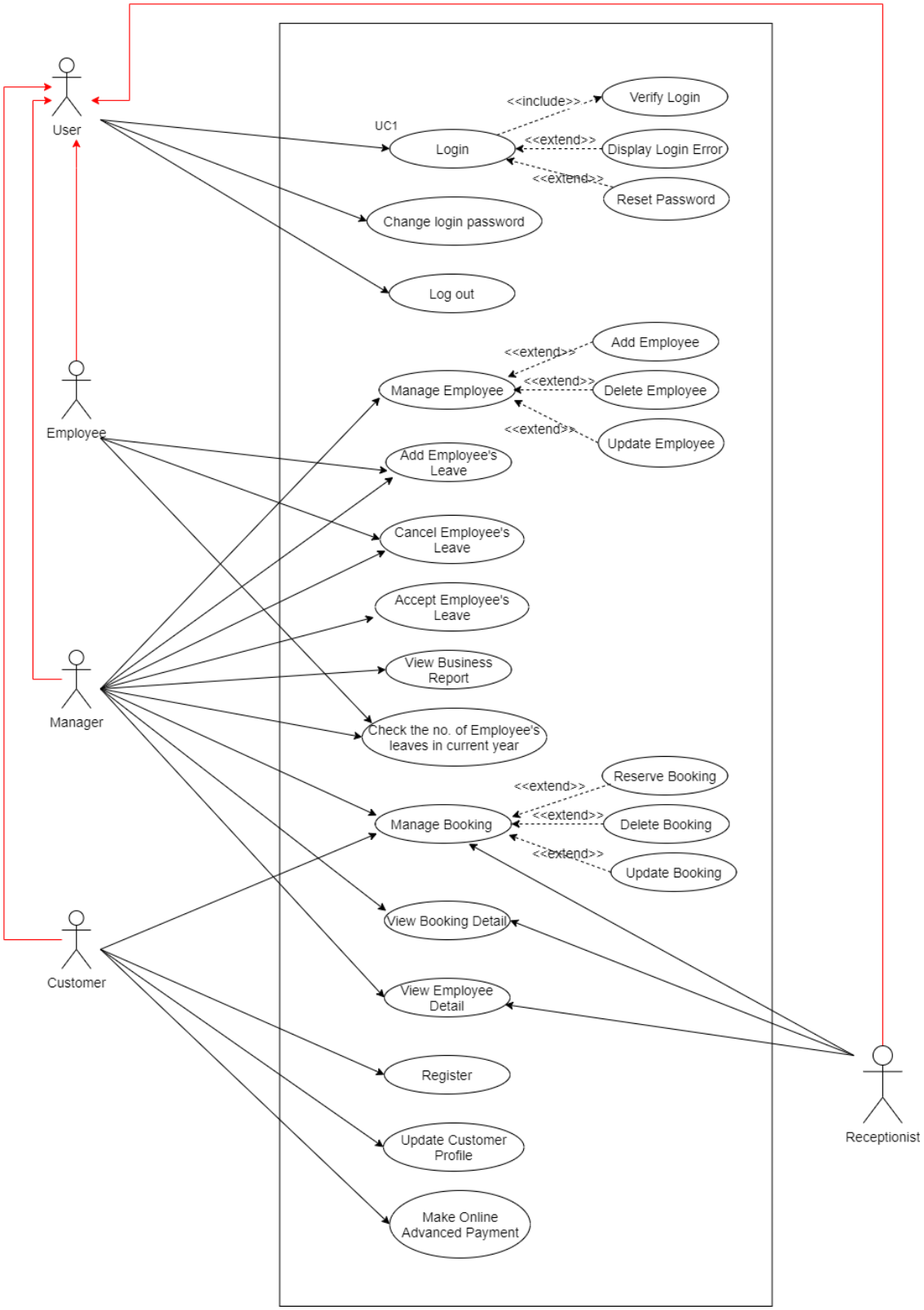
System

- Shall be able to cancel reservations that have not been paid for if it is less than 48 hours of current time.
- Should generate reports based on leave data of employees.
- Should facilitate online method for advance payment

Component Diagram



Use Case Diagram



Use case narratives:

Use Case	Login	**Summary** Need username and password to login (security). User can reset password when he or she forget password (security).
Use Case ID	01	
Actors	Employee, manager, receptionist, customer account.	
Preconditions	Registered as Employee, manager, receptionist, or customer.	
Description	All users can login giving username and password. User can reset password when he or she forget password.	
Exceptions	User has not been registered.	
Post conditions	Display you have logged in successfully.	

Use Case	Change Login password	**Summary** User can change own password(security).
Use Case ID	02	
Actors	Employee, manager, receptionist, customer account.	
Preconditions	Login done through Employee, manager, receptionist, or customer account.	
Description	User can change their password	
Exceptions	Forgot previous password	
Post Conditions	If not any other matters to attend to, can logout.	

Use Case	Logout	**Summary** User can logout of profile after using the system(security).
Use Case ID	03	
Actors	Employee, manager, receptionist, customer account.	
Preconditions	Login done through Employee, manager, receptionist or customer account.	
Description	User can logout own profile after this use web system.	
Exceptions	-	
Post Conditions	Login before reuse the system	

Use Case	Add Employee	**Summary** Manager can add employees who are joining newly to the database.
Use Case ID	04	
Actors	Manager	
Preconditions	Login to the system	
Description	When a new employee joins the company, Manager can add the employee to the database by adding his details.	
Exception	-	
Post Conditions	Issue Employee Id & password to Employee via SMS and update database.	

Use Case	Delete Employee	**Summary** Manager can remove employees from system.
Use Case ID	05	
Actors	Manager	
Preconditions	Login through manager account	
Description	Manager able to get decision whether employee is necessary or not	
Exception	-	
Post Conditions	Send an information message to the employee and if there's no other matters to attend to, can logout	

Use Case	Update Employee	**Summary** Manager can update employee personal details.
Use Case ID	06	
Actors	Manager	
Preconditions	Login through manager account	
Description	Only Manager able to update employee personal details. It will ensure the confidentiality of the employee details.	
Exception	-	
Post Conditions	Send an information message to the employee and if not any other matters to attend to, can logout	

Use Case	Add Employee Leave	**Summary** Employee can request for leave through the system which will be accepted/rejected by the manager. Manager can apply leave to Employees' directly (who have technological issues).
Use Case ID	07	
Actors	Employee, Manager	
Preconditions	Login done through Employee or manager account	
Description	Employee can request leaves from manager. Employee can request from leaves from manager from without the system. Then manager can update the calendar and database from manager login	
Exception	Employee leave limit exceeded	
Post Conditions	Display Leave date & update calendar	

Use Case	Cancel Leave	**Summary** Employee can cancel leave which they applied for priorly. Manager can cancel employees' leaves which were accepted before.
Use Case ID	08	
Actors	Employee, Manager	
Preconditions	Login done through Employee or manager account	
Description	Employee can cancel their pre requested leaves. If Employee does not have technology facilities, they can cancel their leave through manager. As well as manager can cancel leaves from Employees for an urgent reason.	
Exception	Day/Time of leave date is illogical.	
Post Conditions	Update calendar & if not any other matters to attend to, can logout.	

Use Case	Accept Employee leaves	**Summary** Manager can check employee leaves person-wise date wise.
Use Case ID	09	
Actors	Manager	
Preconditions	Login through manager account	
Description	Manager able to get decision whether leave reason and date are acceptable or not.	
Exception	Employee leave limit exceeded	
Post Conditions	Send an information message to the employee and if not any other matters to attend to, can logout	

Use Case	View Business Report	**Summary** Manager can view reports about the service station.
Use Case ID	10	
Actors	Manager	
Preconditions	Login through manager account	
Description	Only manager can view the business reports. Then manager able to get some feedback By using this business reports	
Exception	-	
Post Conditions	If not any other matters to attend to, can logout.	

Use Case	Check the Number of employees' leaves in current year	**Summary** Employee can check the number of leaves which they applied for in the current year. Manager can check employee leaves person-wise and date wise.
Use Case ID	11	
Actors	Employee, manager	
Preconditions	Login done through Employee or manager account	
Description	Employee can check the number of leaves which get before in current year & they can plan how can get their leaves in current year. Manager can check the Employee leaves, search some categories. From it he can calculate Additional allowances of End the year.	
Exception	-	
Post Conditions	If not other matters to attend to, can log out	

Use Case	Reserve booking	**Summary** Customer can reserve a date/time priorly for their vehicle to have a service. Manager and receptionist can also make reservations for customers through system.
Use Case ID	12	
Actors	Customer, manager, receptionist	
Pre-Conditions	Should be logged in as customer or by receptionist	
Description	User can reserve the date/time for their car service priorly for an available timeslot. Online payment for an advance is possible and conditions (advance should be paid 48 hours before time of booking online or otherwise method), details, other ways of payment will be displayed. Main functionality of system. Receptionist and manager can also book for TP calls received from customers and for inquiries.	
Exception	Invalid date/time	
Post Conditions	If not other matters to attend to, can log out	

Use Case	Delete, update booking	**Summary** •Customer can delete, update the date a reservation made by them. •Manager, Receptionist can also delete, update a reservation made by a customer.
Use Case ID	13,14	
Actors	Customer, Manager, Receptionist	
Pre-Conditions	Should be logged in as customer	
Description	User can delete reserve the date/time for their car service priorly for an available timeslot. Customer can readily change the time to another available time slot if there's more than 48 hours from current time. If not he/she is given a single chance to change/delete. If not, it cannot be changed. Deletion is possible here, but no refunds will be settled.	
Exception	Invalid date/time	
Post Conditions	Log out **If successful:** Update Calendar	

Use Case	View booking Detail	**Summary** Both Manager and Receptionist can view relevant booking details which are reserved by customers.
Use Case ID	15	
Actors	Manager, Receptionist	
Preconditions	Login as Manager or Receptionist	
Description	If there is a need to view details of booking which are reserved by customers, Manager or Receptionist can log to system and view detail about booking by searching relevant booking detail	
Exception	-	
Post Conditions	If not any other matters to attend to, can logout.	

Use Case	View Employee Detail	**Summary** Both Manager and Receptionist can view relevant details of employees which are included in database.
Use Case ID	16	
Actors	Manager, Receptionist	
Preconditions	Login as Manager or Receptionist	
Description	If there is a need to view details of employees who works in the company, Manager and Receptionist can search the employee detail and then view the relevant detail.	
Exception	-	
Post Conditions	If not any other matters to attend to, can logout.	

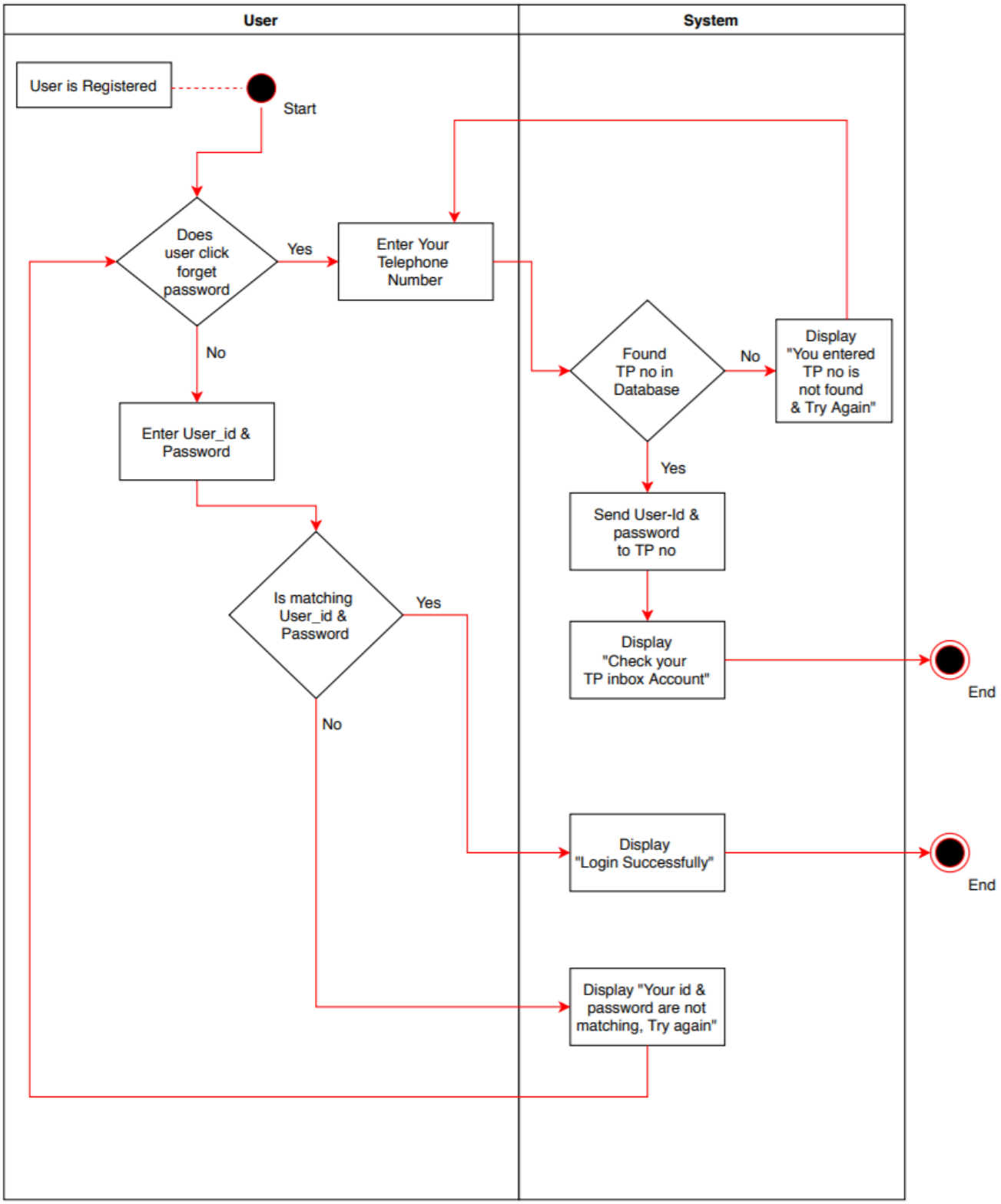
Use Case	Register	**Summary** Can create accounts for user groups.
Use Case ID	17	
Actors	Customer	
Preconditions	-	
Description	Customer can create an account with his details (TP no, email address, vehicles) which would facilitate in future orders.	
Exception	Invalid data for fields	
Post Conditions	**If success:** account created in database.	

Use Case	Update Customer profile	**Summary** Customer can change his account details.
Use Case ID	18	
Actors	Customer, Manager	
Preconditions	Login through customer account	
Description	Customers can change their TP no, email, vehicles etc. this does not affect already booked reservations. Manager can even update the profiles for customers when said through telephone.	
Exception	-	
Post Conditions	Update database	

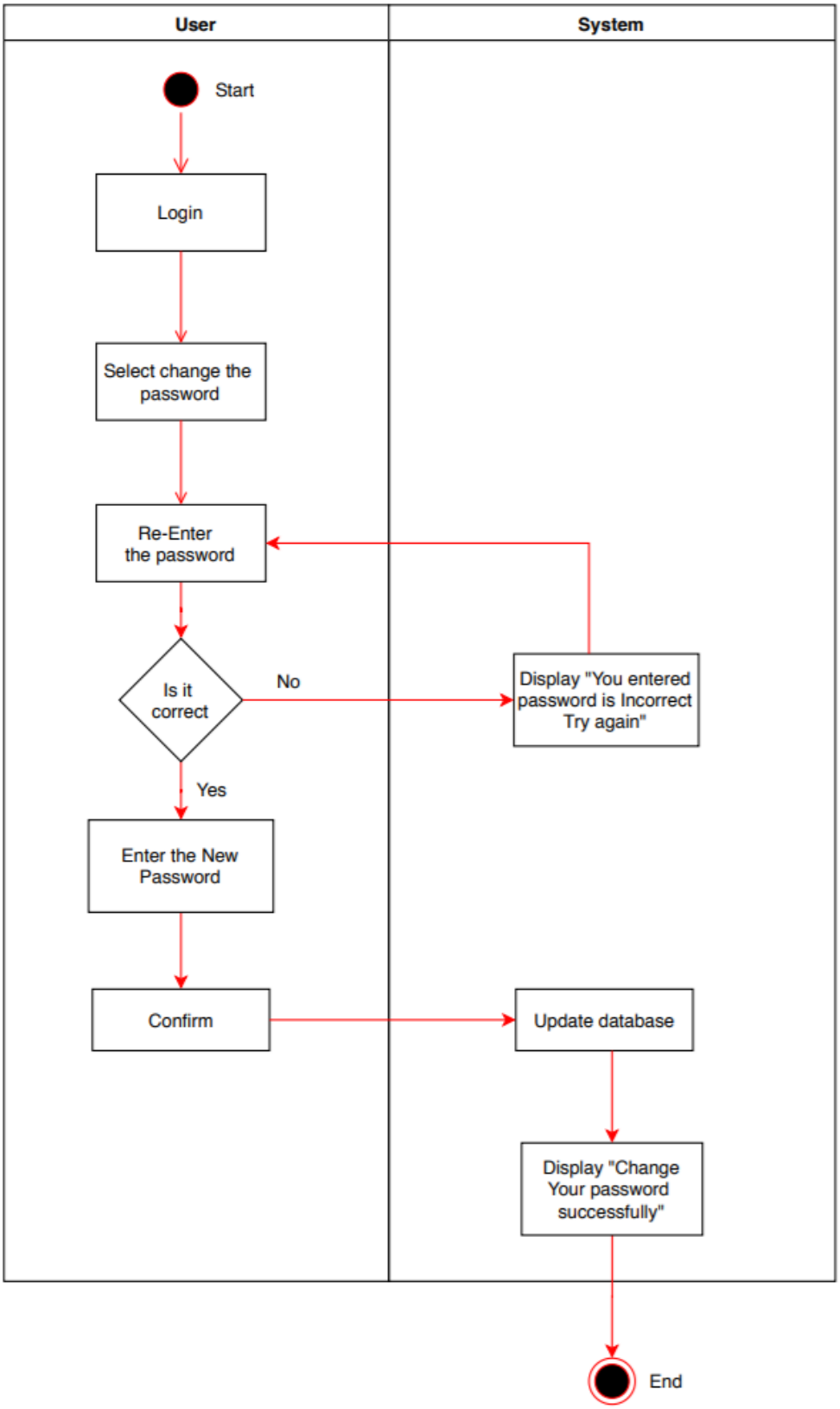
Use Case	Make Online advance payment	**Summary** Can pay advance even online (quality)
Use Case ID	19	
Actors	Customer	
Pre-Conditions	Should be in ‘reserve booking’	
Description	User can select a payment method and pay the advance. All authentication will be handled by the online payment module.	
Exception	• Payment method error • Insufficient balance error etc.	
Post Conditions	**If success:** Perform transaction	

Activity Diagrams:

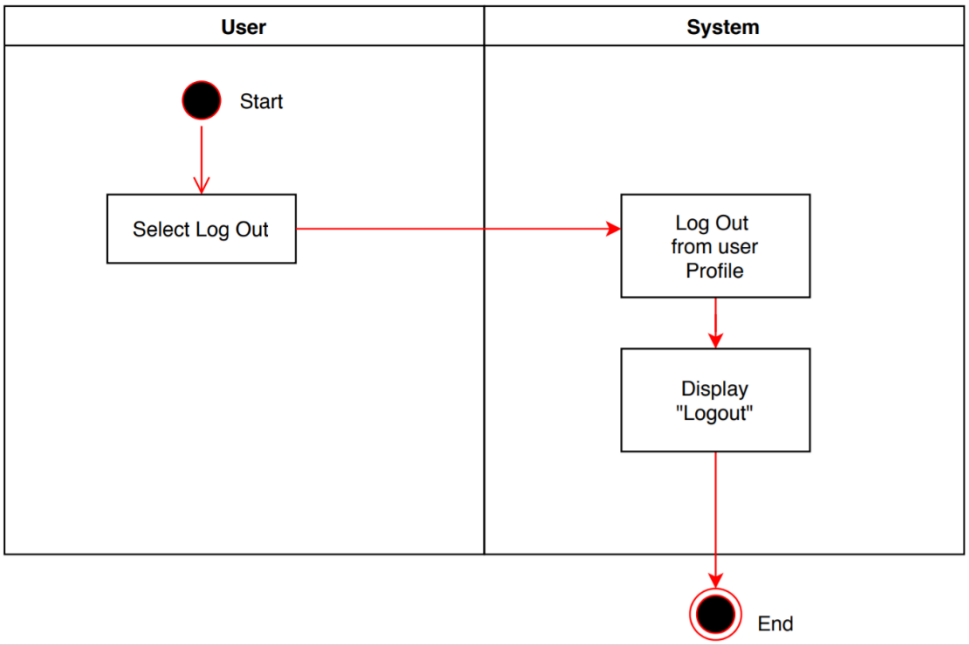
Login – All users



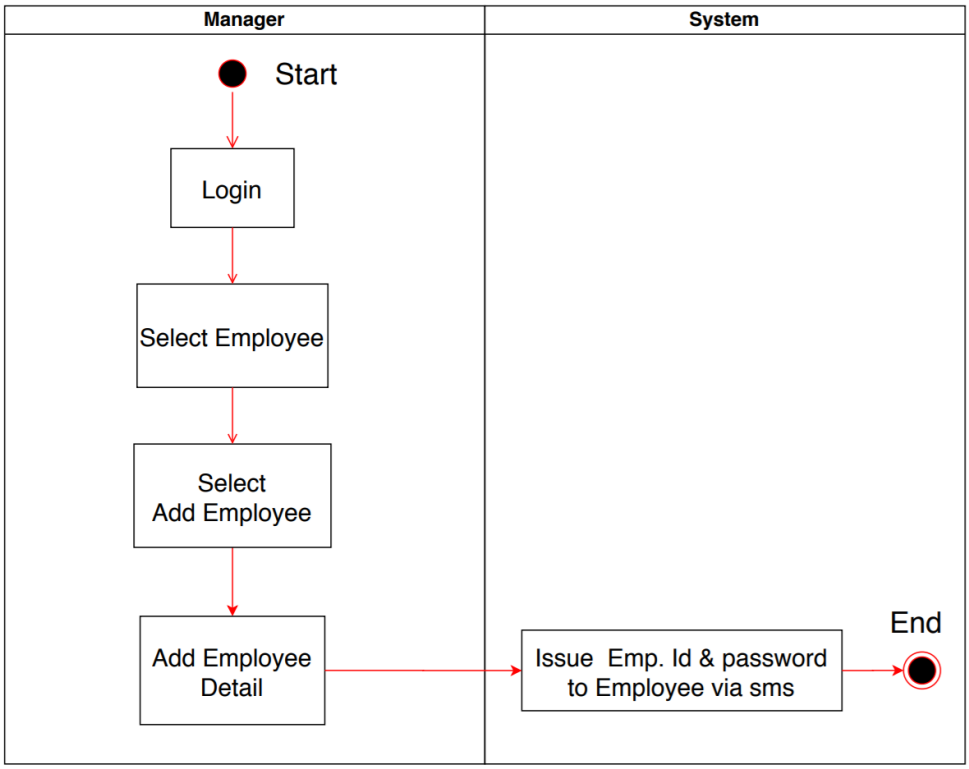
Change Login password - User



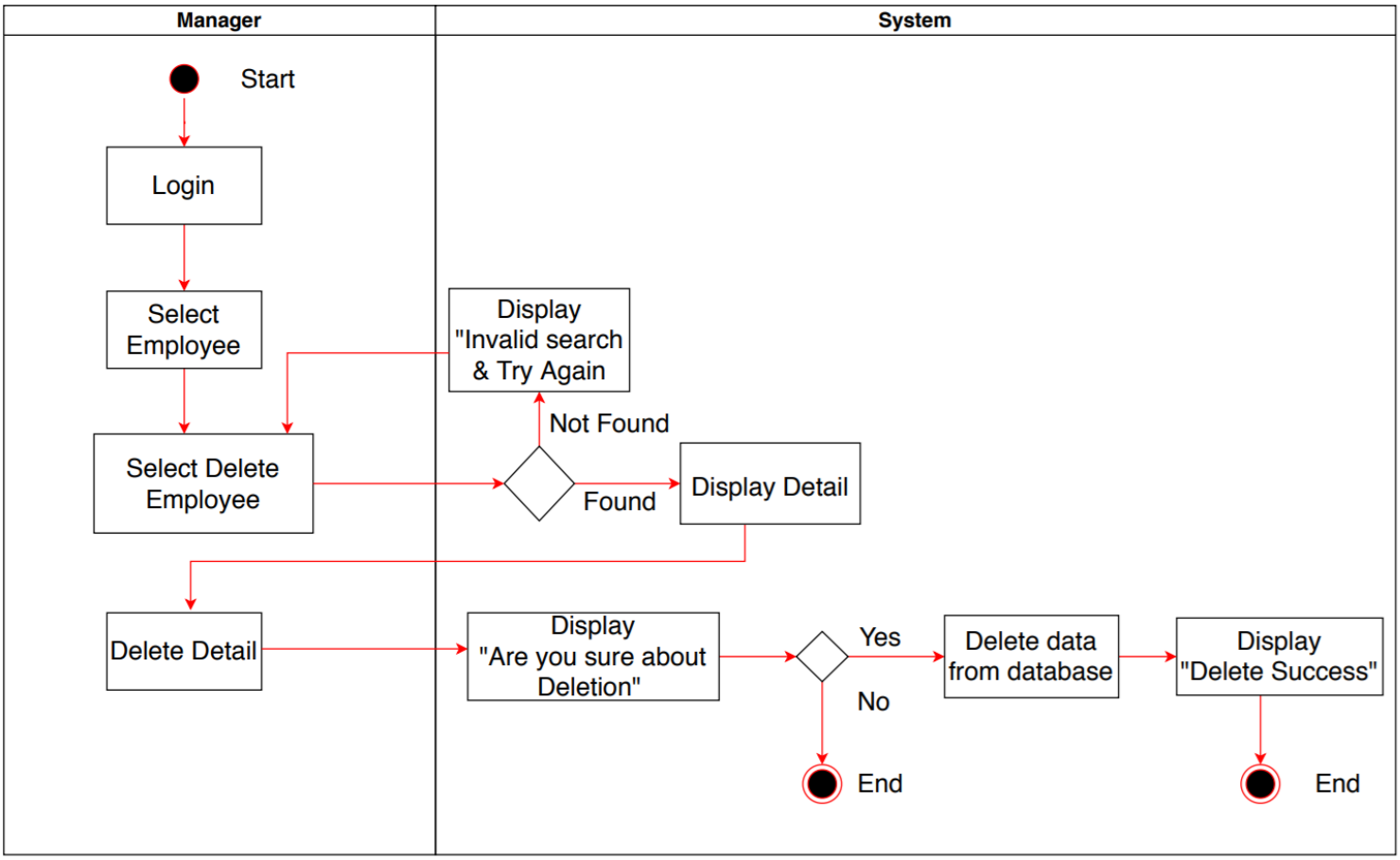
Logout - User



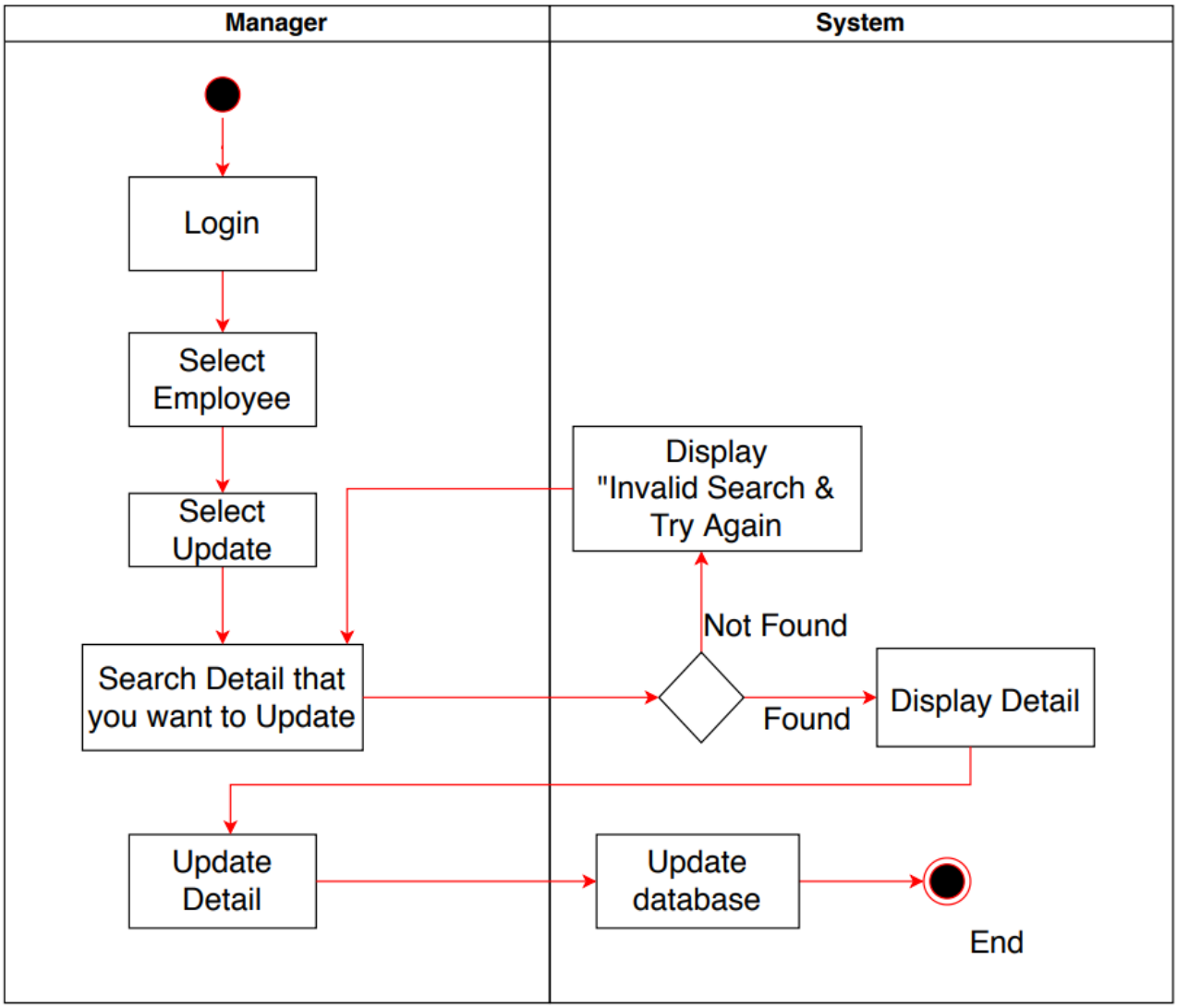
Add Employee - Manager



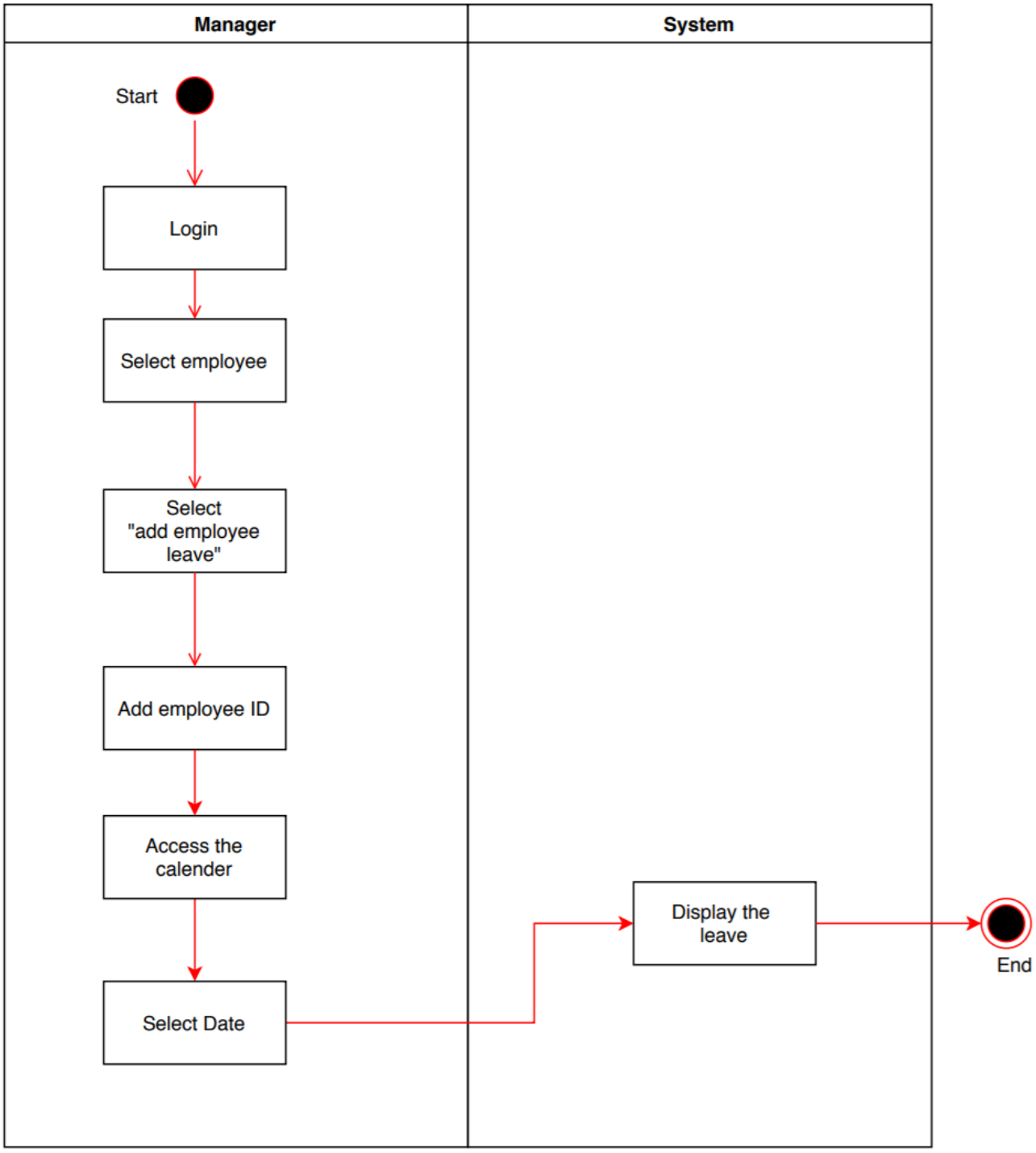
Delete Employee - Manager



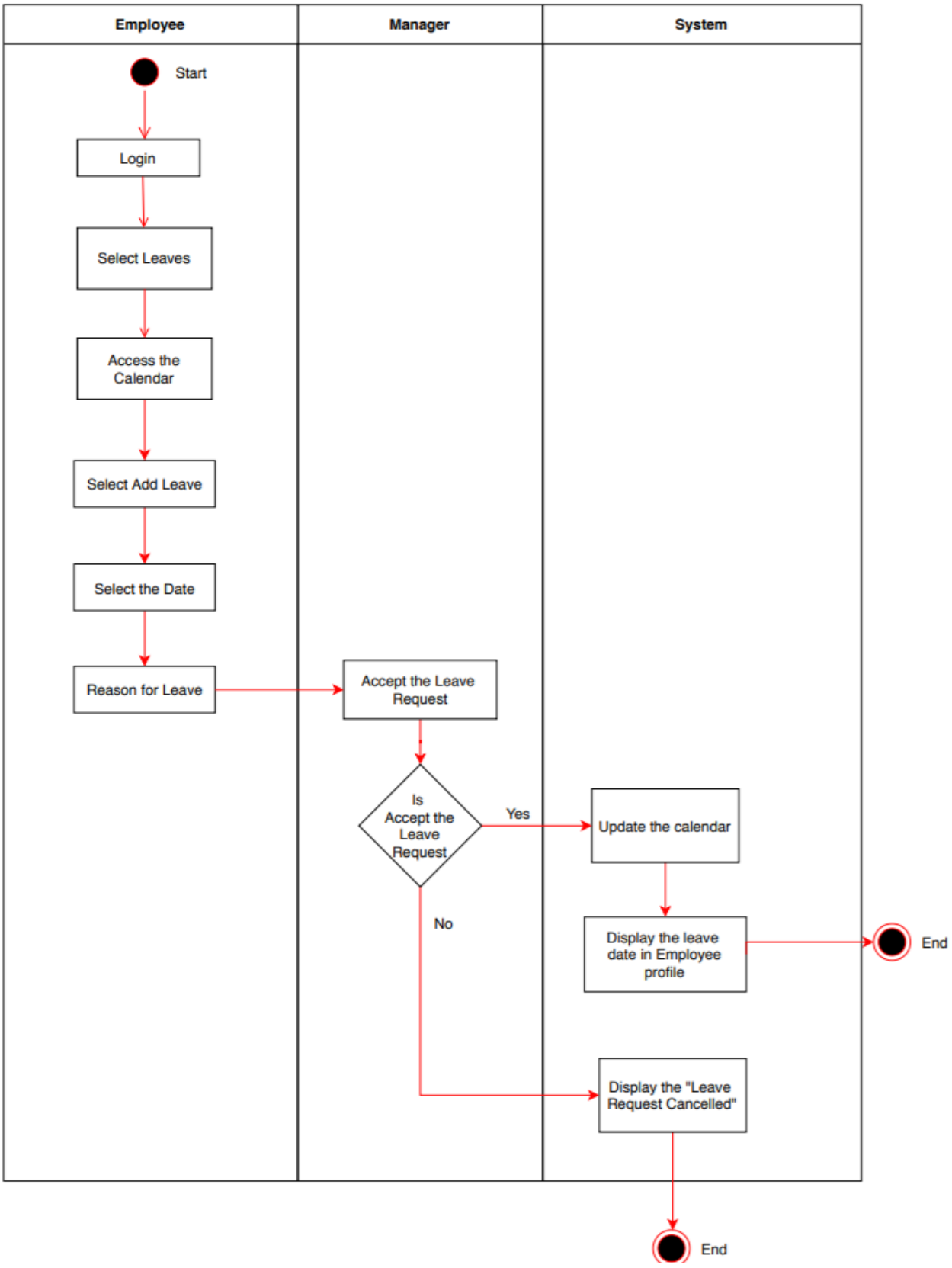
Update Employee - Manager



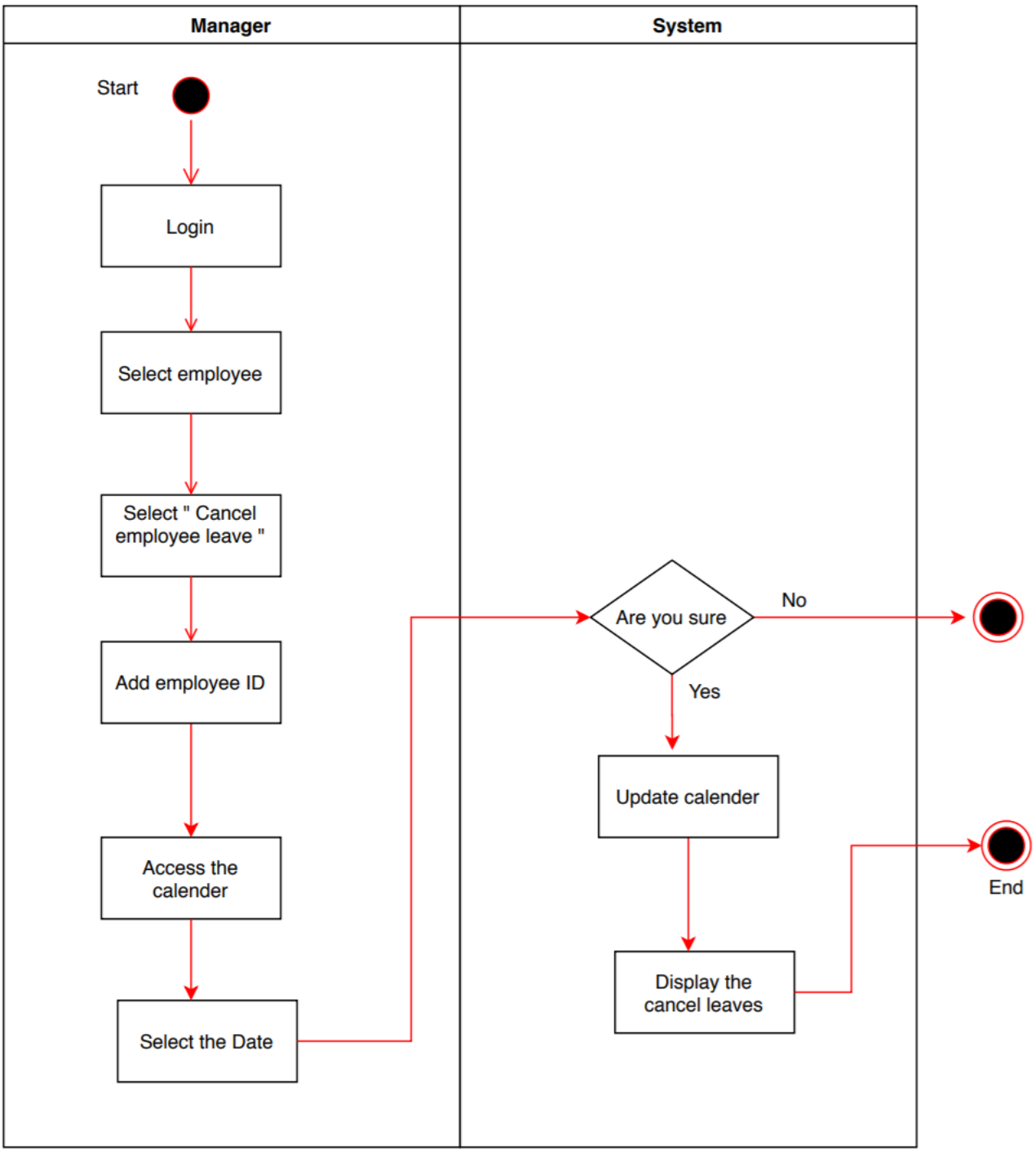
Add Employee leave – Manager



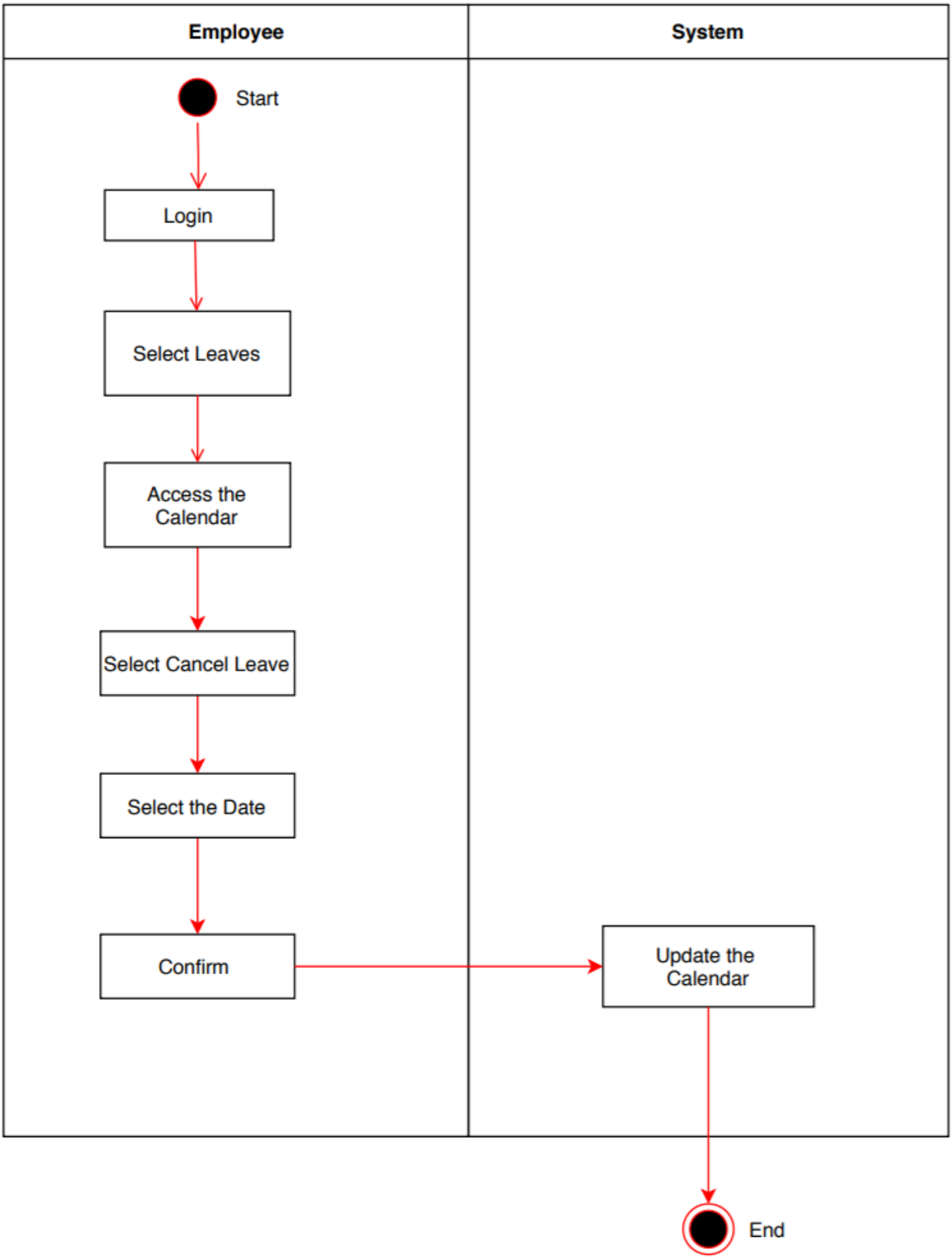
Add leave – Employee



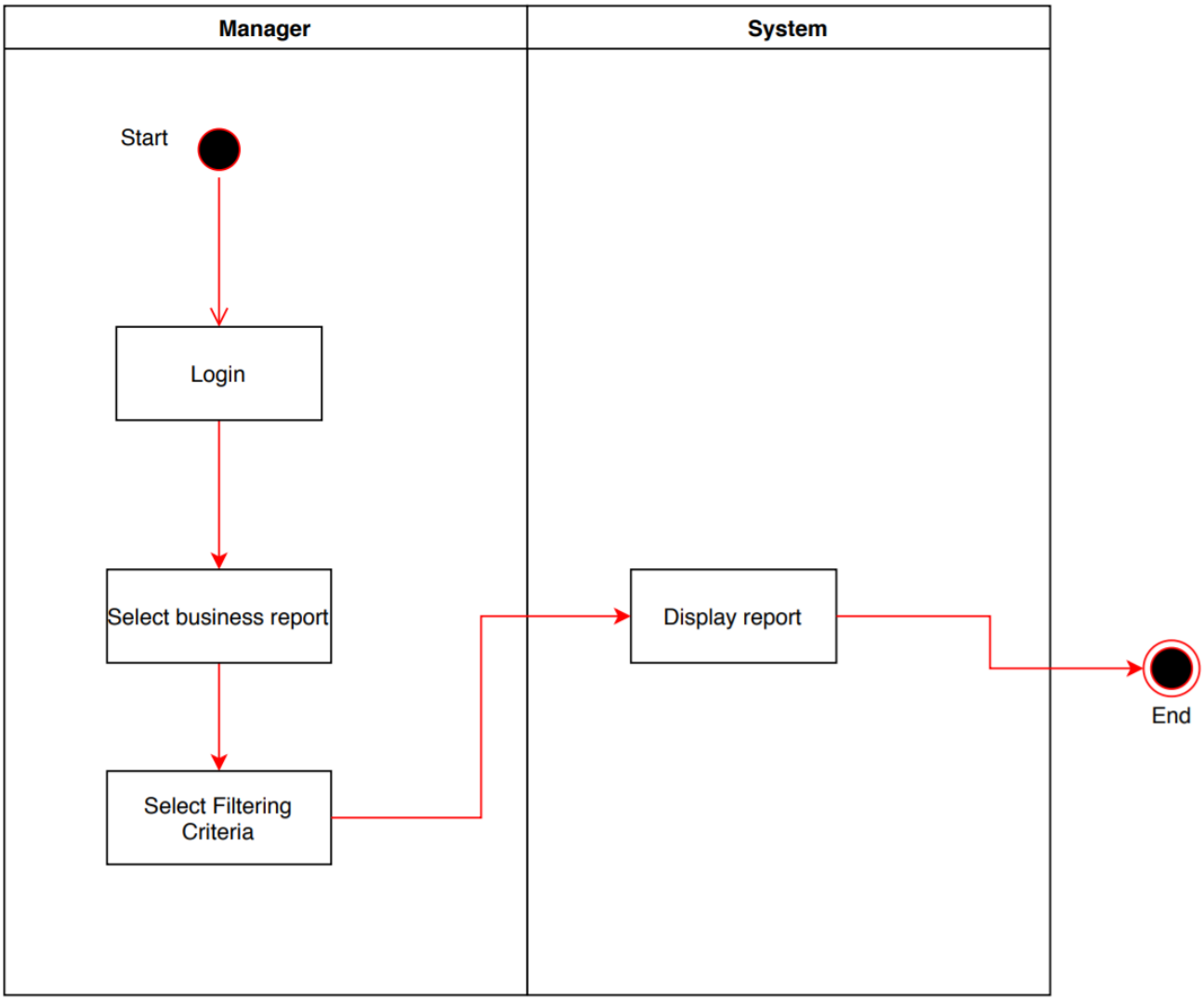
Cancel Leave- Manager



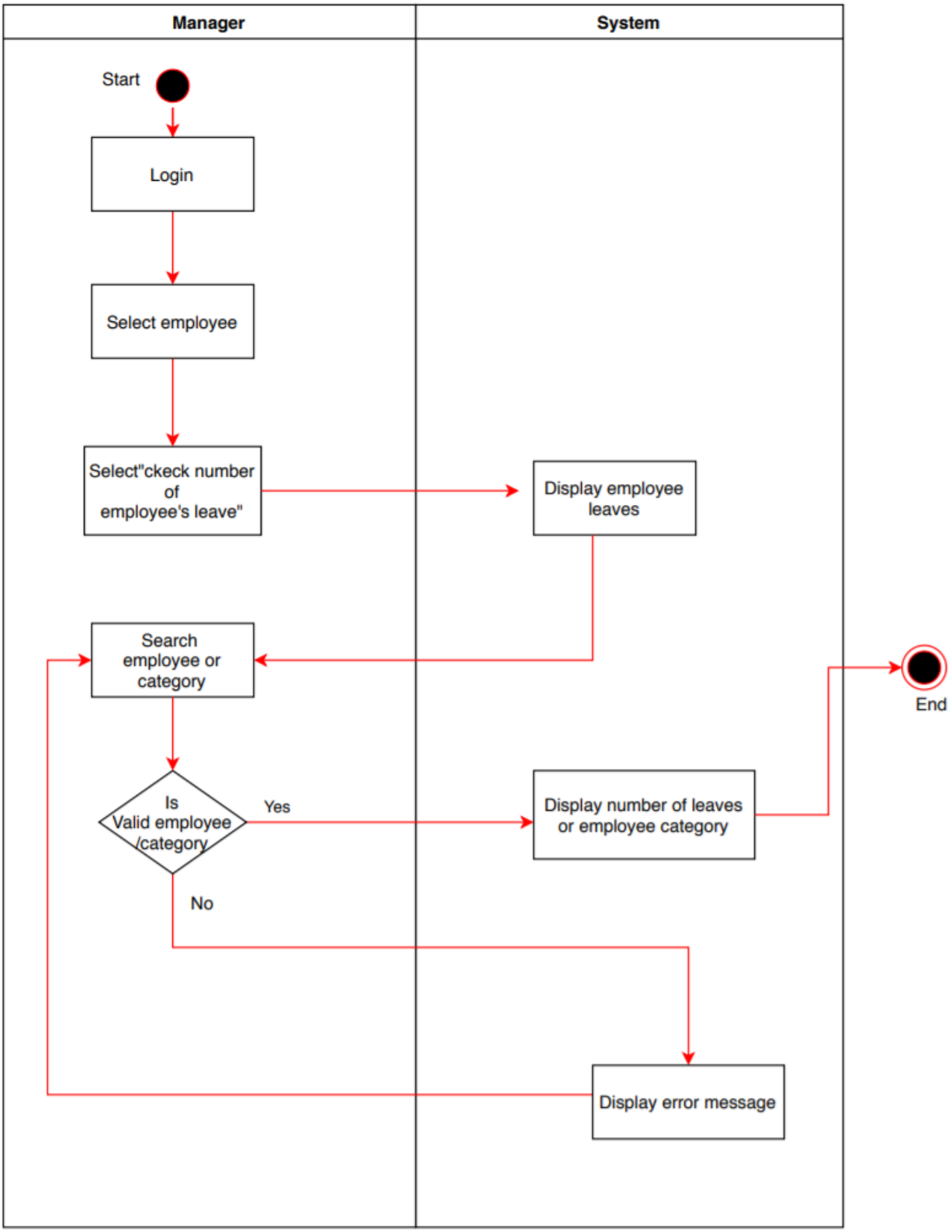
Cancel leave- Employee



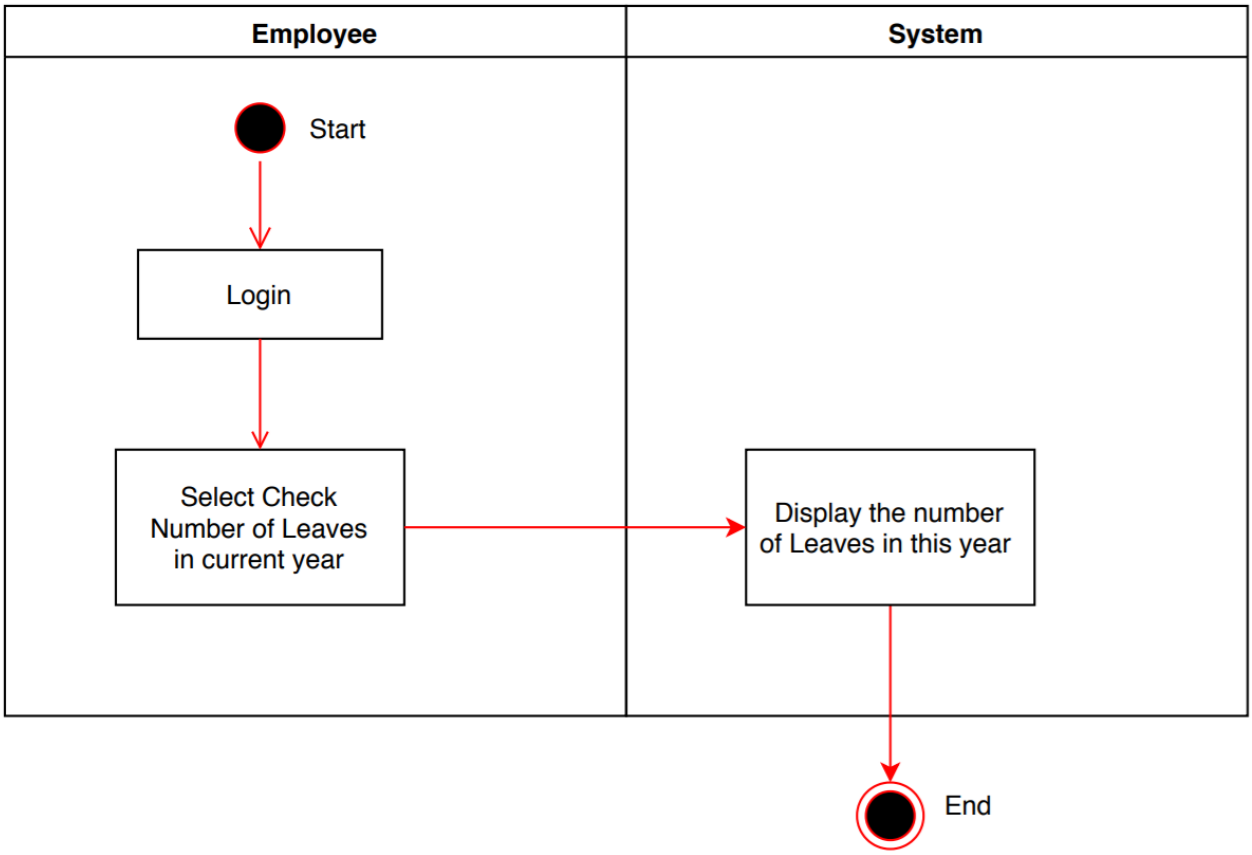
View business report- Manager



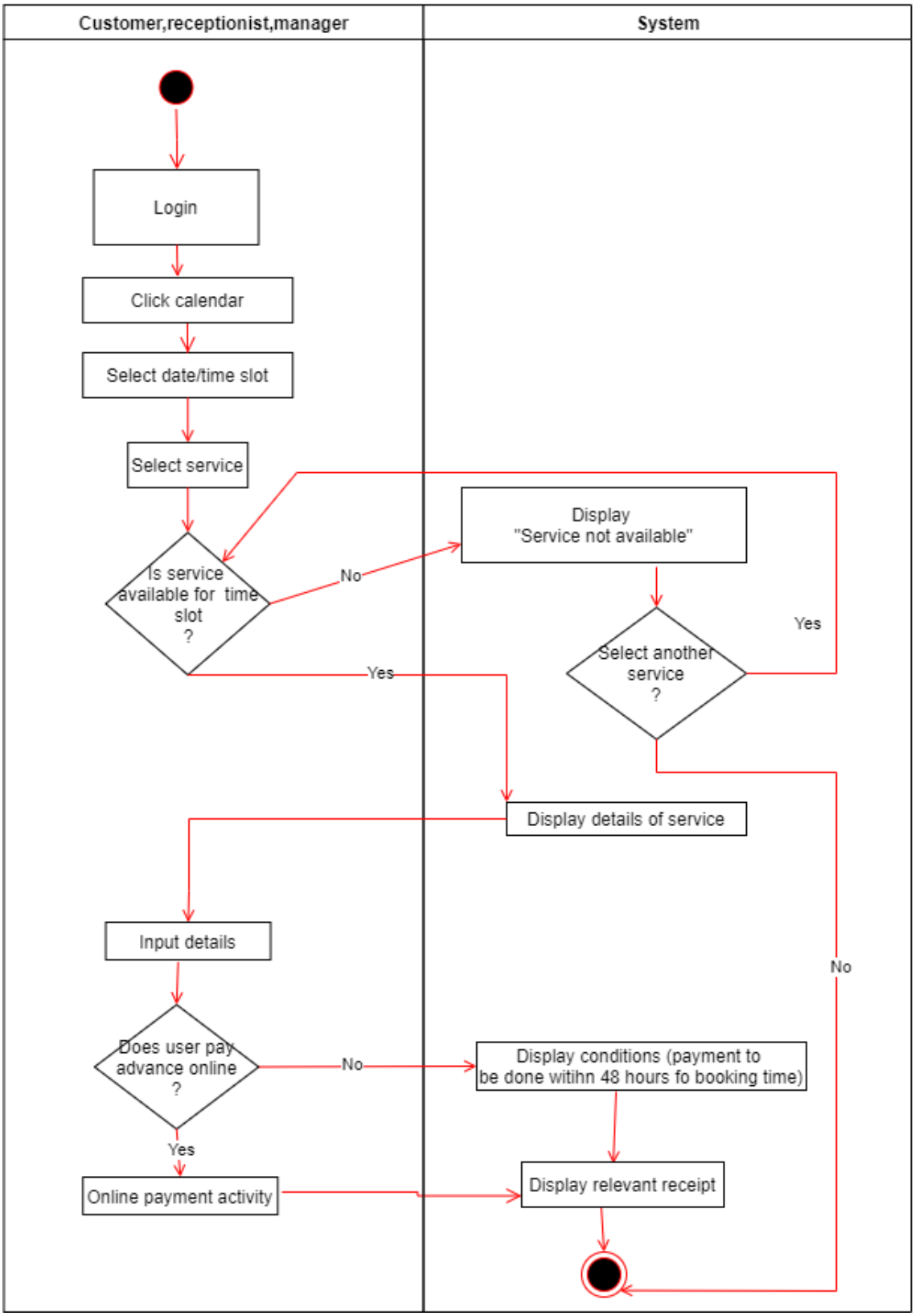
Check The Number of Employees' Leaves In Current Year - Manager



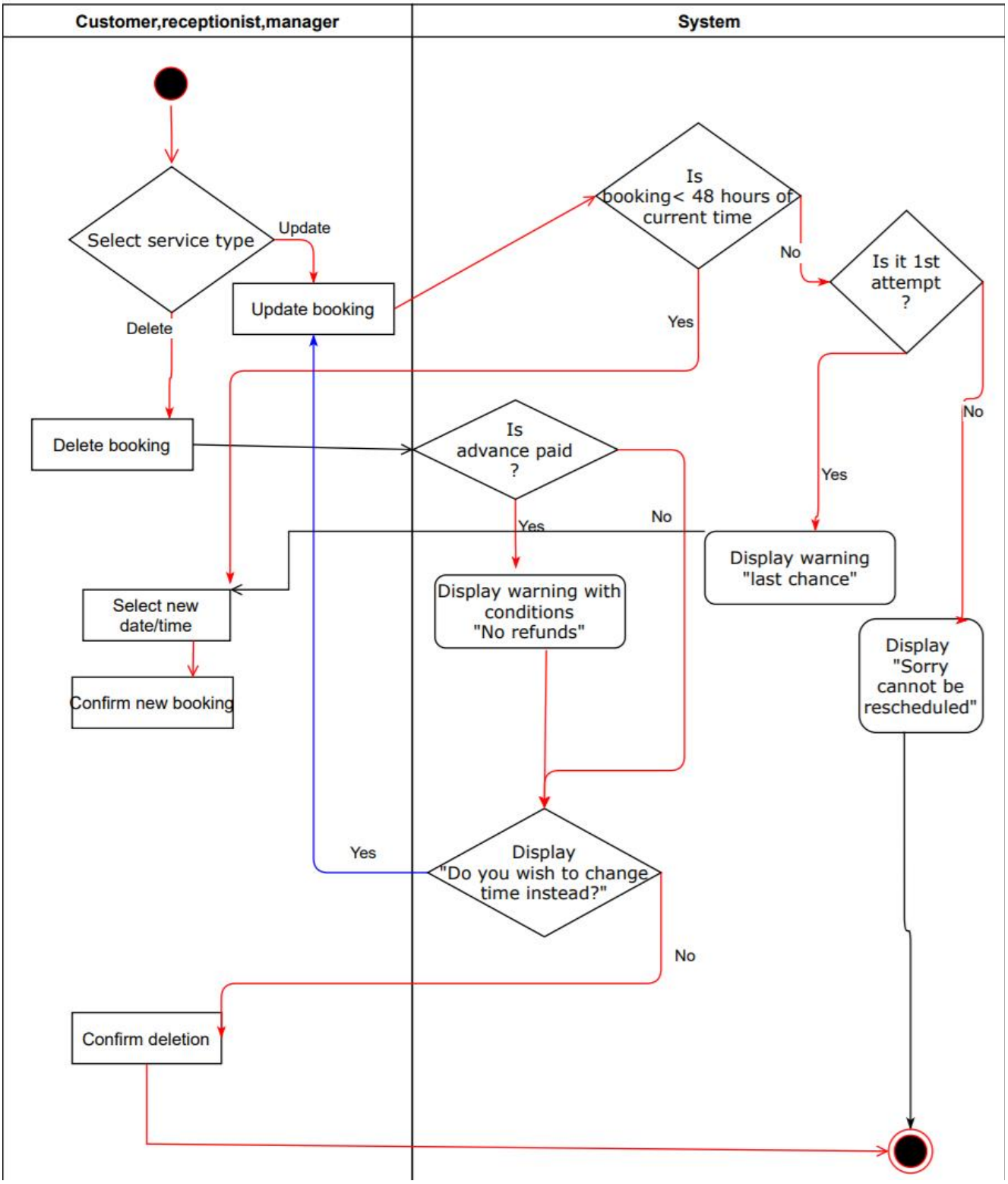
Check Leaves in Current year - Employee



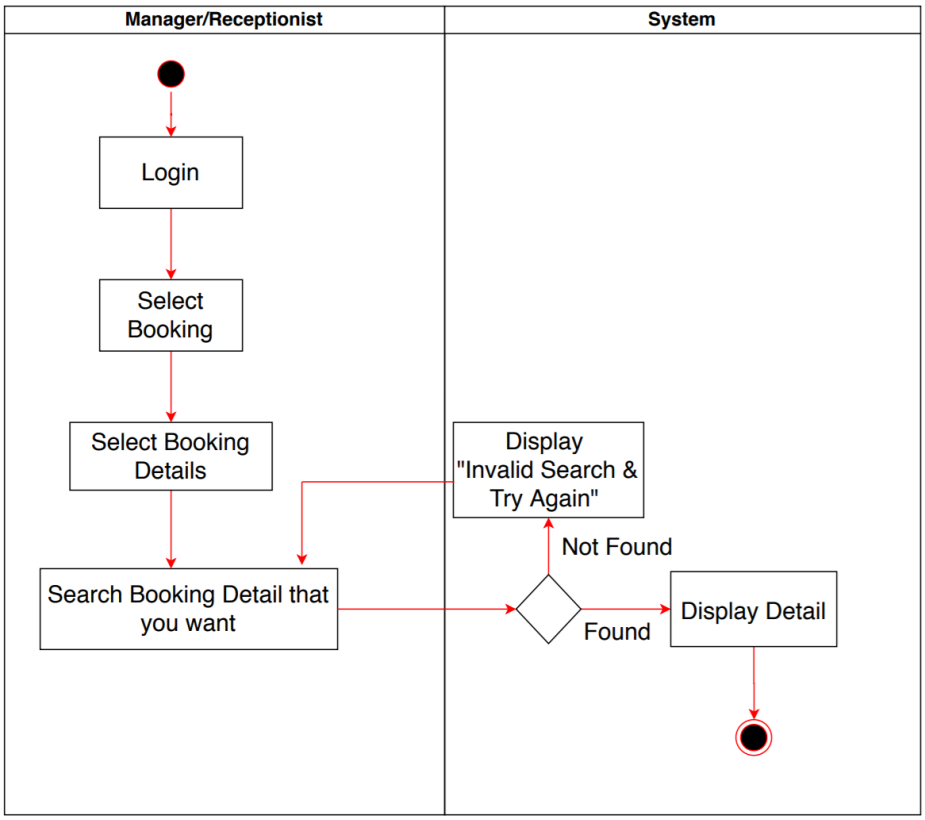
Reserve booking-Customer,receptionist,manager



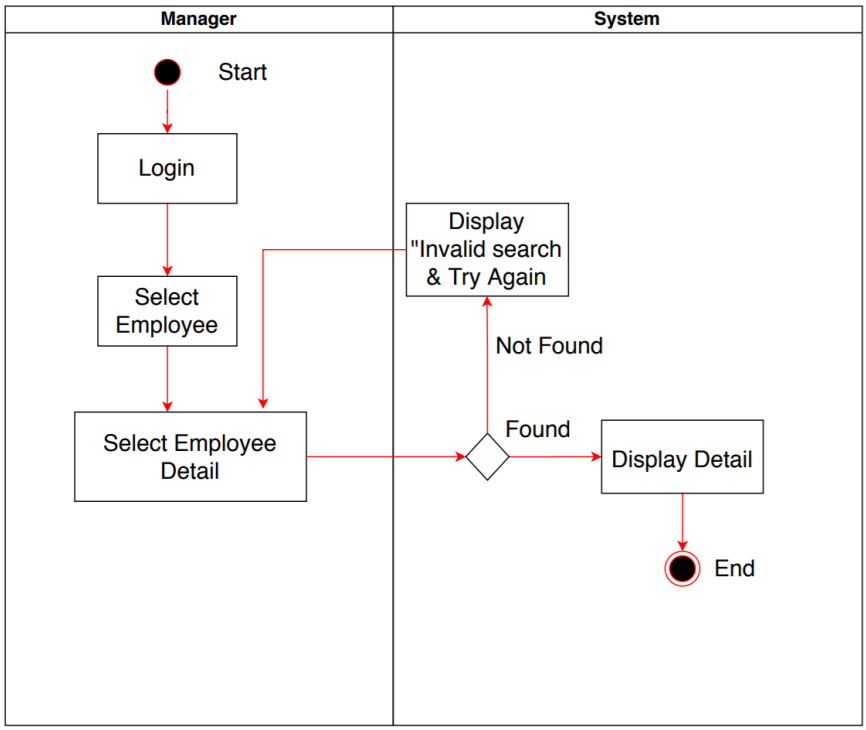
Delete/Update booking – Customer, Receptionist, Manager

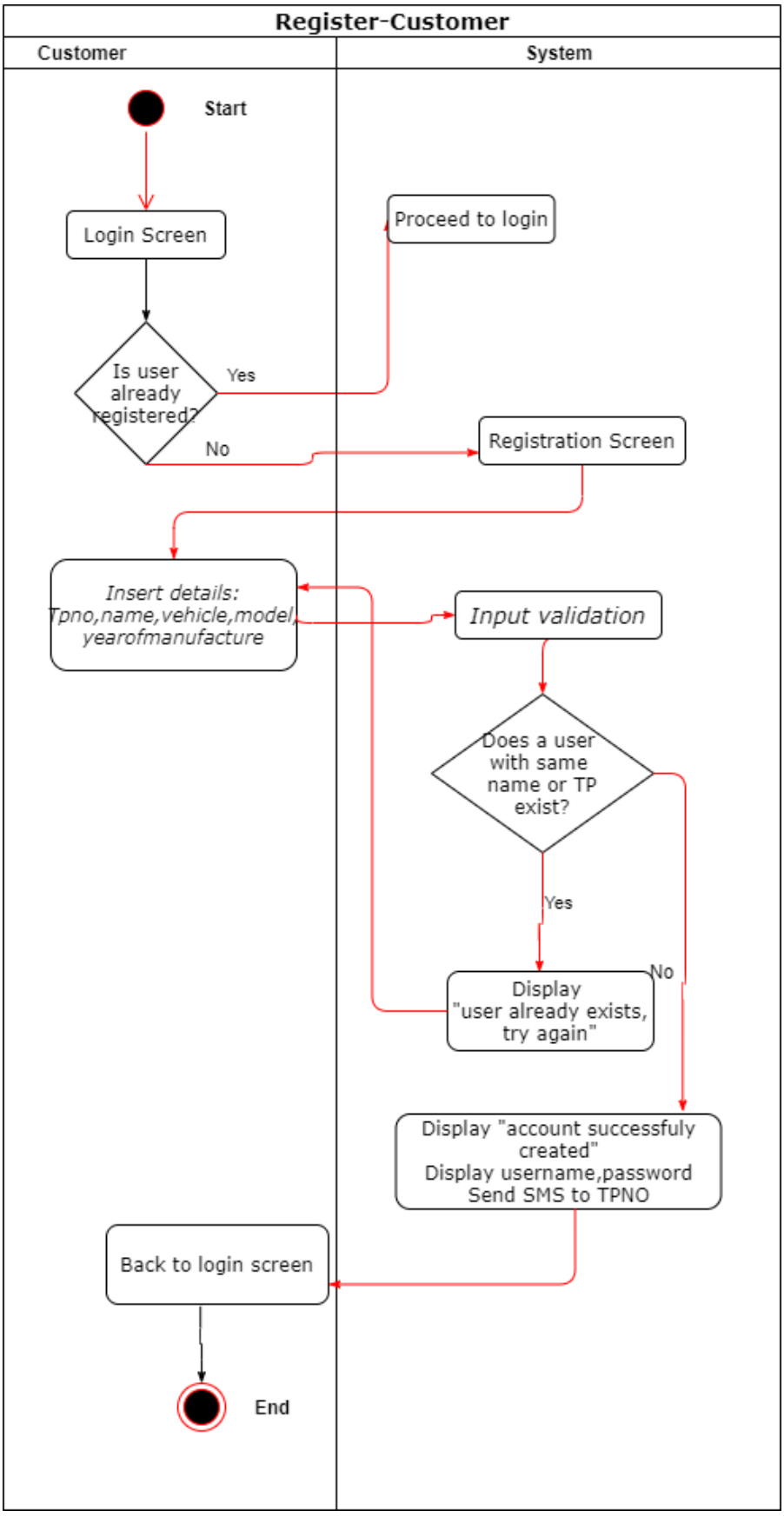


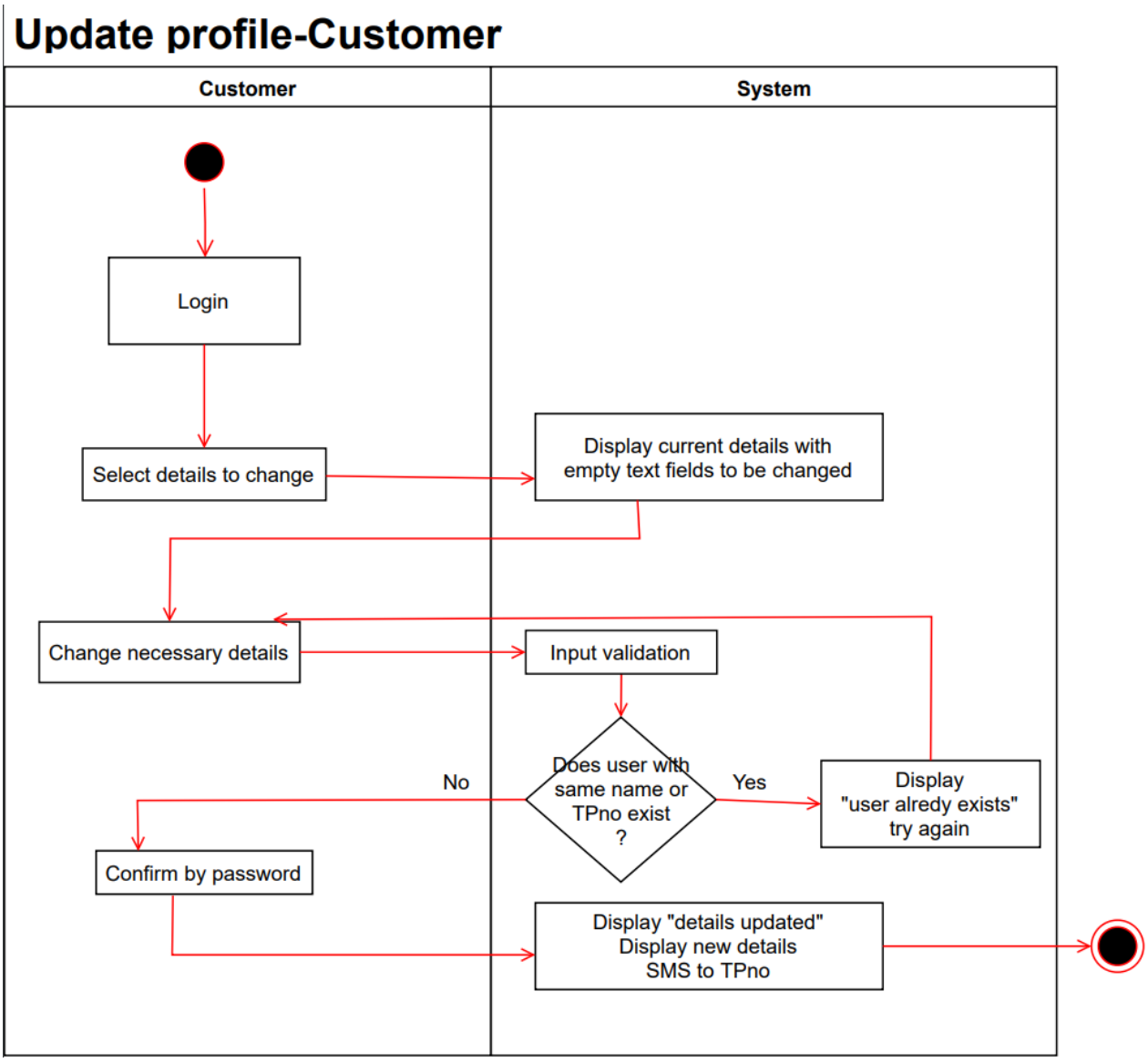
View booking – Manager, Receptionist



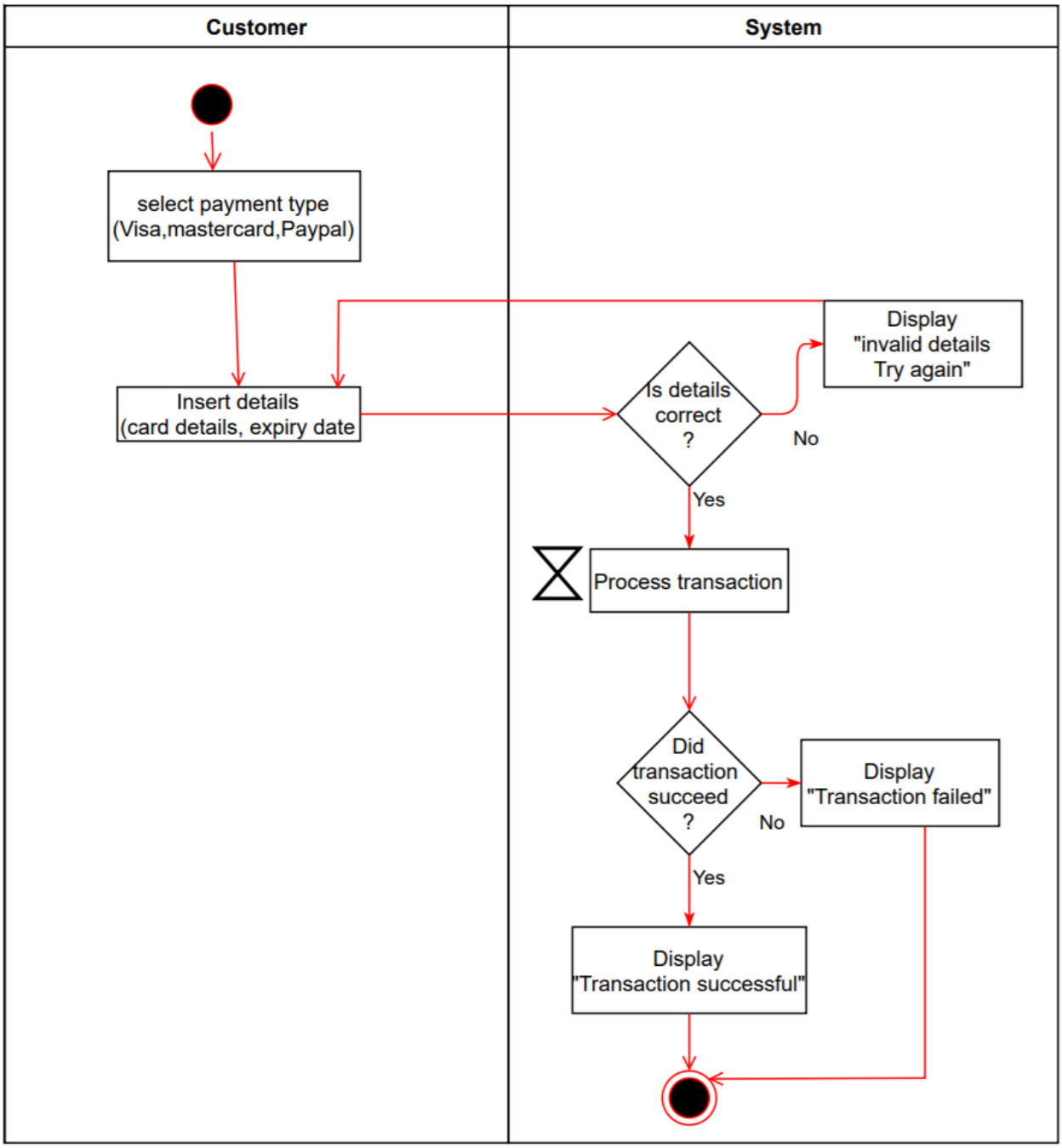
View Employee - Manager, Receptionist




Register-Customer
Customer
System
Start
Login Screen
Is user already registered?
Yes
No
Proceed to login
Registration Screen
Insert details: Tpno,name,vehicle,model yearofmanufacture
Input validation
Does a user with same name or TP exist?
Yes
No
Display "user already exists, try again"
Display "account successfuly created"
Display username,password
Send SMS to TPNO
Back to login screen
End


Update profile-Customer
Customer
System
Login
Select details to change
Display current details with empty text fields to be changed
Change necessary details
Input validation
Does user with same name or TPno exist ?
No
Yes
Display "user alredy exists" try again
Confirm by password
Display "details updated"
Display new details
SMS to TPno

Online advance payment-Customer



8.2) Quality attributes Requirements

Following are quality attribute requirements that we identified and how we plan to achieve them:

User-friendliness, reliability, usability, modifiability, Security, Testability

- **User-friendliness-**
  - The developed system can be easily accessed since it is a website.
  - Having easy to use screens for users.

- **Reliability-**
  - System will be planned to backup databases on a given basis, so data loss will not occur.
  - Online payment will be done through a secure channel

- **Usability -**
  - Since it is a website system will be optimized to give best resolution across different devices (Desktops, Laptops, Mobile devices)

- **Modifiability-**
  - System is made component by component.
  - Future enhancements such as salary calculation, inventory management modules can be attached easily.

- **Security-**
  - Authentication using user accounts.
  - All login details are sent encrypted.
  - All credentials in online payment module is encrypted and trusted vendors will be used.

- **Testability-**
  - Since system is modular each component can be tested separately.
  - Debugging is easier

9)Technologies to be used.

Languages:

- HTML5
- CSS3
- Php
- JavaScript
- MySQL

For testing -Manual testing

SMS module- Nexmo

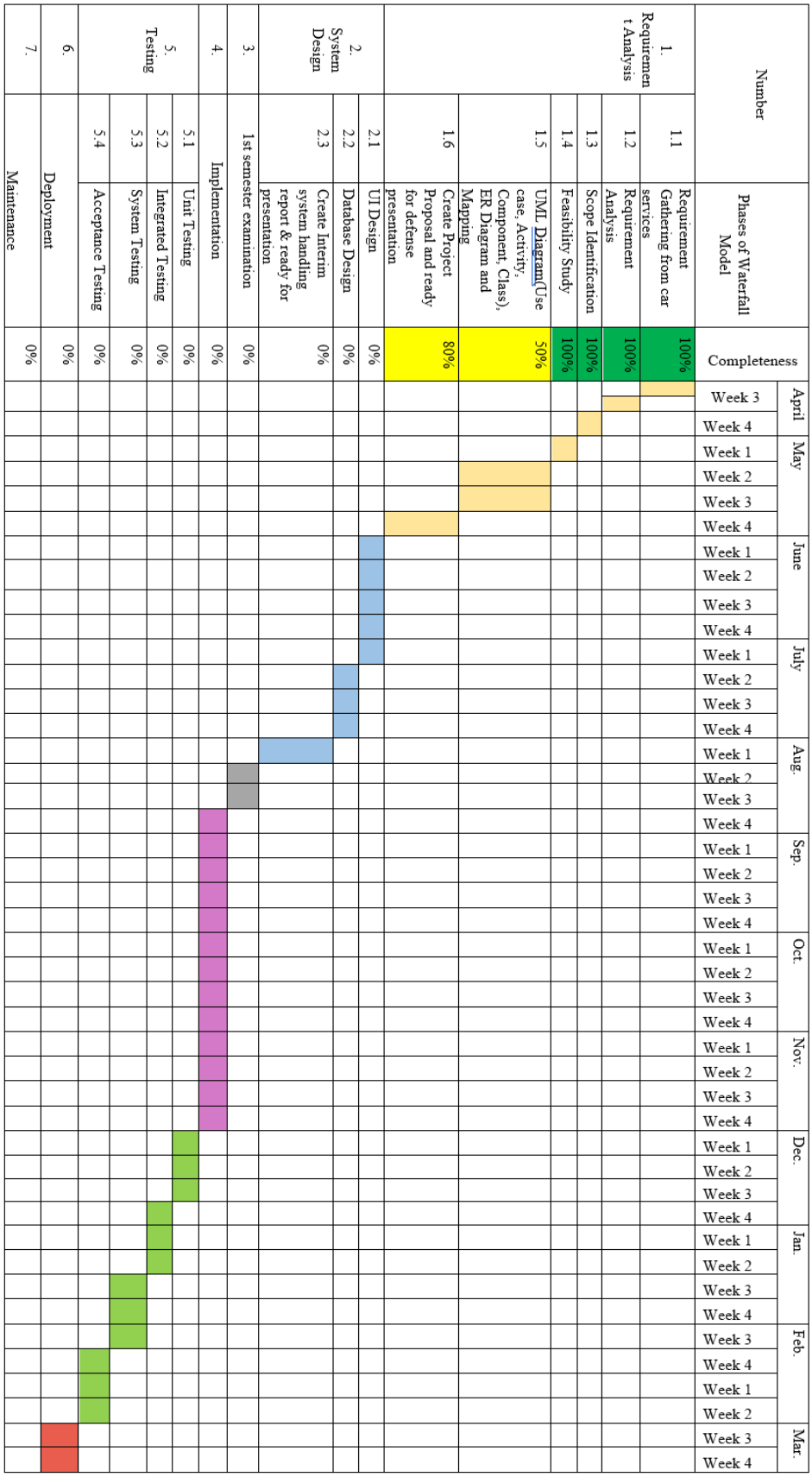
Online advance payment module-Sandbox payment method

Online collaboration tools:

- Trello
- Zoom meetings

10)Project timeline.

- Following is the Gantt Chart for the project timeline. It is only a tentative timeline since some task start dates and end dates might change with the current situation in the country.



Work allocation:

All work is to be divided according to the user roles of the system.

- U.W.T.O Weerasinghe - Customer functions
- T.W.T.Dulshan - Employee
- W.M.D.M.Y.Wickramanayaka - System handler (receptionist)
- W.K.B.K.Madhushanka - Manager

11)Declaration

We as members of the project titled <u>Clean Car</u>, Certify that we will carry out this project according to the guidelines provided by the coordinators and supervisors of the course as well as we will not incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any university. To the best of our knowledge and brief, the project work will not contain any material previously published or written by another person or ourselves except where due reference is made in the text of appropriate places

Group number: **CS 37**

Index Number	**Name of the Student**	**Signature**
18001912	U.W.T.O Weerasinghe	
18000487	T.W.T.Dulshan	
18001922	W.M.D.M.Y.Wickramanayaka	
18000967	W.K.B.K.Madhushanka