# KING SAUD UNIVERSITY

## COLLEGE OF COMPUTER AND INFORMATION SCIENCES

## DEPARTMENT OF SOFTWARE ENGINEERING

كلية علوم الحاسب والمعلومات
قسم هندسة البرمجيات

## SWE312: Software Requirements Engineering

**1st Semester 1442-1443 H**

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# Project

**Course Code / Title**: SWE 312
**Assessment**: Project **Deliverable 1**
**Semester / Year**: Fall 2020 **Submission Date**: 29/10/2020 **Duration**: 4 weeks

**STUDENT OUTCOMES:**

This phase covers/targets the following students outcomes.

| Project Tasks | Relevant SOs/Clos | Marks |
|---|---|---|
| Functional, non-functional requirements, and design constraints | SO(2) | |
| Use cases, Use case description | SO(2) | |
| Use of SWE case tool | SO(2) | |
| Report organization, ethical and professional issues | | |
| Teamwork and work distribution, Introduction | | |

**STUDENT IDENTIFICATION**:

**Section: 50066** **Group Number:** 5

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**Name**: Rawan AlDosari **ID**: 439200371 **Signature:**……

*By signing this form, the student recognizes that he understands and accepts the exam policy and ethics. He/she recognizes also that if he/she does not respect these ethical rules, the professor will take the appropriate measures including exclusion from the exam.*

# Software Requirements Specification Template Instructions

Software Engineering

The following annotated template shall be used to complete the Software Requirements Specification (SRS) project of SWE 312. The instructor must approve any modifications to the overall structure of this document.

**Template Usage:**
Text contained within angle brackets ('<', '>') shall be replaced by your project-specific information and/or details. For example, <Project Name> will be replaced with 'Payroll Management System'.

Italicized text is included to briefly annotate the purpose of each section within this template. This text should not appear in the final version of your submitted SRS.

This cover page is not a part of the final template and should be removed before your SRS is submitted.

**Acknowledgements:**
Sections of this document are based upon the IEEE Guide to Software Requirements Specification (ANSI/IEEE Std. 830-1984). The SRS templates of Dr. Orest Pilskalns (WSU, Vancouver) and Jack Hagemeister (WSU, Pullman) have also been used as guides in developing this template for SWE 312 course.

# Payroll Management System

## Software Requirements Specification

## Version#2

## 18 Nov, 2020

Modhi AlDughaim
Nouf AlShalhoub
Rawan AlDosari
Raneem AlRashoud
Lead Software Engineer

Prepared for
SWE 312 - Software Requirements Engineering
Fall 2020

Work Distribution:
**Phase 1:**

| **Student Name** | **Role and Responsibilities** |
|---|---|
| Modhi AlDughaim | Use case #3 |
| Nouf AlShalhoub | Use case #4 |
| Raneem AlRashoud | Use case #1 |
| Rawan AlDosari | Use case #2 |
| Group Work | SRS document<br>Use case diagram<br>Use case #5<br>Functional Requirements<br>Non Functional requirements<br>design constraints<br>System Boundary |

**Phase 2:**

| **Student Name** | **Role and Responsibilities** |
|---|---|
| Modhi AlDughaim | Add employee sequence diagarm,<br>Add employee activity diagram |
| Nouf AlShalhoub | Select payment method sequence diagram, select payment method activity diagram |
| Raneem AlRashoud | Edit timecard sequence diagram, class diagram |
| Rawan AlDosari | Add purchase order sequence diagram, mock ups |

# Revision History

| Date | Description | Author | Comments |
|---|---|---|---|
| <date> | <Version 1> | <Your Name> | <First Revision> |
| | | | |
| | | | |
| | | | |

# Document Approval

The following Software Requirements Specification has been accepted and approved by the following:

| Signature | Printed Name | Title | Date |
|---|---|---|---|
| | <Your Name> | Lead Software Eng. | |
| | | | |
| | | | |

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# 1. Introduction

The purpose of this Software Requirements Specification (SRS) document is to provide a comprehensive description of the intended software product, “Mena payroll Management System”, the new payroll management system to replace Mena’s existing out-of-date system. This document will cover the purpose of the system, its scope, the system’s general description and users, and all requirements. It also presents the systems use case diagram and analysis models, in addition to the use case description for some of the most important use cases. All the previously mentioned information will provide software engineers with all needed data to design and implement the system.

## 1.1. Purpose

The purpose of this SRS document is to avail as a guide to designers, developers, and testers who are involved in building the payroll system. It lays the framework that engineers should follow in designing, developing, and testing the system.

## 1.2. Scope

The Mena payroll management system will permit processes to impact the potential users of the system who are the employees of the company worldwide.

**The key functionalities of the system are:**

- Providing access to employees to submit their timecards information, enter purchase orders, change some employee preferences and create various reports through the Windows-based desktop interface.
- Allowing employees to record timecard information electronically and automatically generate paychecks.
- Enabling employees to choose their method of payment which controls how the Employee will be paid.
- Enhancing data security and integrity of each employee.
- Providing employee reports which is one of the most requested features of the Mena Payroll Management System.
- Enabling the Payroll Administrator to run administrative reports.

## 1.3. Definitions, Acronyms, and Abbreviations

### 1.3.1. Bank System

Any bank(s) to which direct deposit transactions are sent.

### 1.3.2. Employee

A person who works for the company that owns and operates the payroll system (Mena, Inc.)

### 1.3.3. Payroll administrator

The person responsible for maintaining employees and employee information in the system.

### 1.3.4. Project management database

The legacy database that contains all information regarding projects and charge numbers.

### 1.3.5. System Clock

The internal system clock that keeps track of time. The internal clock will automatically run the payroll at the appropriate times.

### 1.3.6. Pay Period

The amount of time over which an employee is paid.

### 1.3.7. Paycheck

A record of how much an employee was paid during a specified Pay Period.

### 1.3.8. Payment Method

How the employee is paid, either pick-up, mail, or direct deposit.

### 1.3.9. Timecard

A record of hours worked by the employee during a specified pay period.

### 1.3.10. Purchase Order

A record of a sale made by an employee.

### 1.3.11. Salaried Employee

An employee that receives a salary.

### 1.3.12. Commissioned Employee

An employee that receives a salary plus commissions.

### 1.3.13. Hourly Employee

An employee that is paid by the hour.

## 1.4. References


- Peter Zielczynski, Requirements Management Using IBM Rational RequisitePro. IBM Press, 2008
- Managing Software Requirements. Dean Leffingwell. Don Widrig.

Publisher: Addison Wesley.
- Antonia Prahm, *draw.io*,[online],Wiesbaden, November 14th | 2016,October 15th 2020 , drawio-app.com/author/aprahm/
- Lucichart

### 1.5. Overview

The remaining sections of the SRS will discuss the general description and specific requirements specifically external Interface requirements, functional requirements, use cases diagram, use cases description, non-functional requirements, and design constraints. Then, the document will present the system's analysis models, which include a sequence diagram and activity diagram.
The SRS document is organized into two phases. the first phase starting with the external Interface requirements, functional requirements, use cases diagram, use cases description, Non-Functional Requirements, and Design Constraints.
Then the second phase concerns analysis models, the sequence diagram and activity diagram.

## 2. General Description

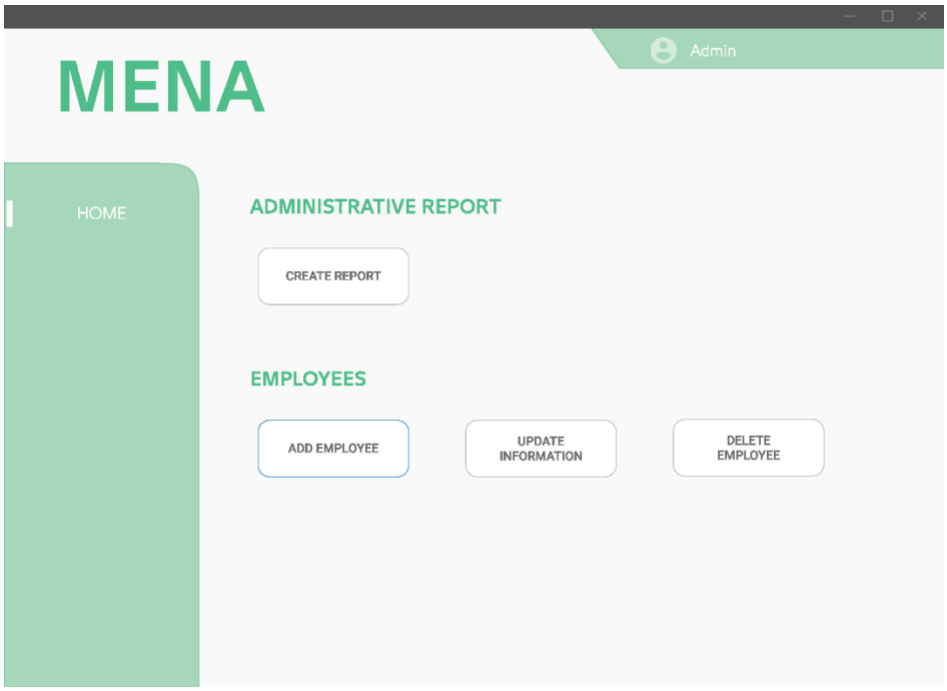
The Mena Payroll management system will collaborate with banks to reduce the obligations that can create immense burden and undesired stress for entrepreneurs and can be overwhelming for large organizations. Several parties are involved in the process: employees, administrator, bank staff.

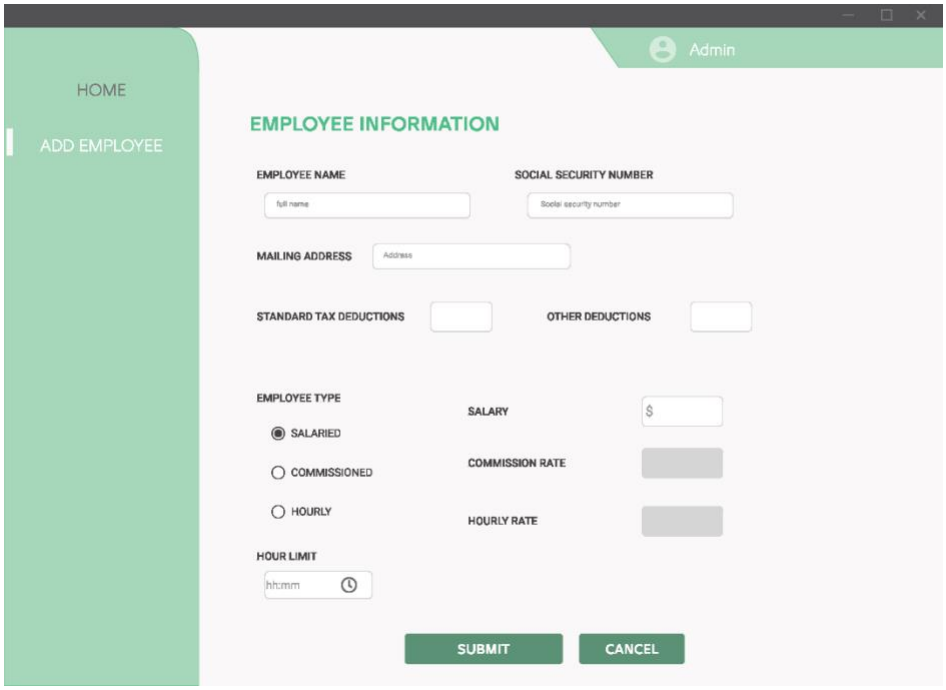
## 3. Specific Requirements

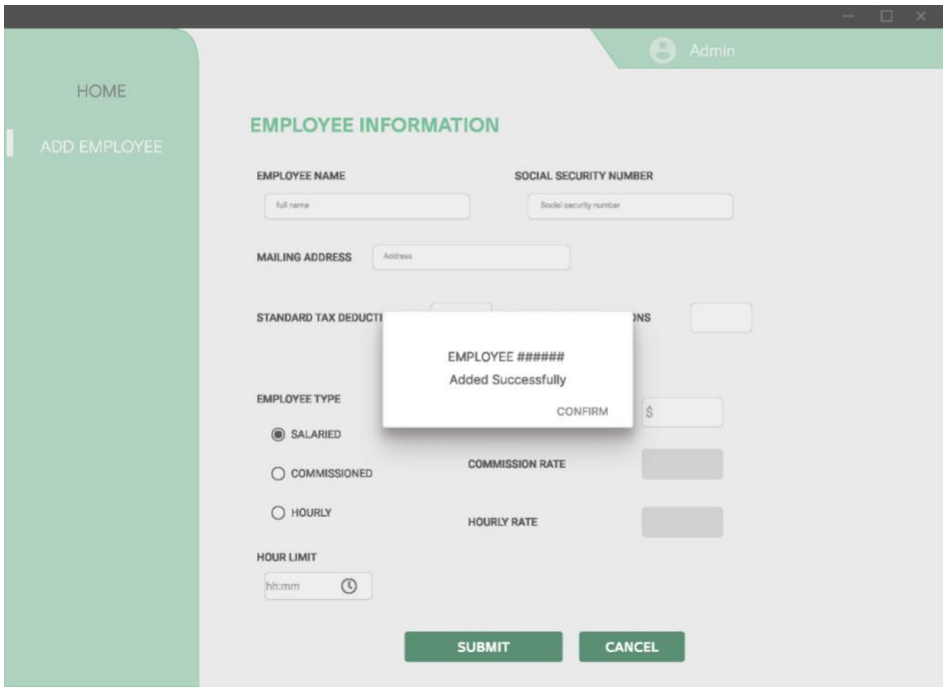
### 3.1. External Interface Requirements

#### 3.1.1. User Interfaces

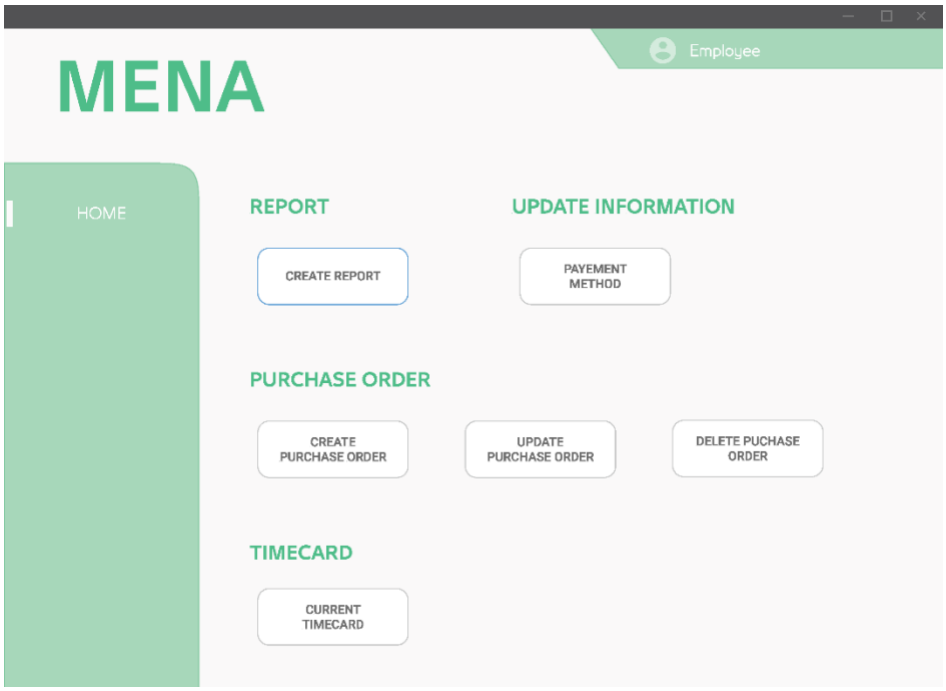
#### 3.1.1.1. Add Employee Use Case

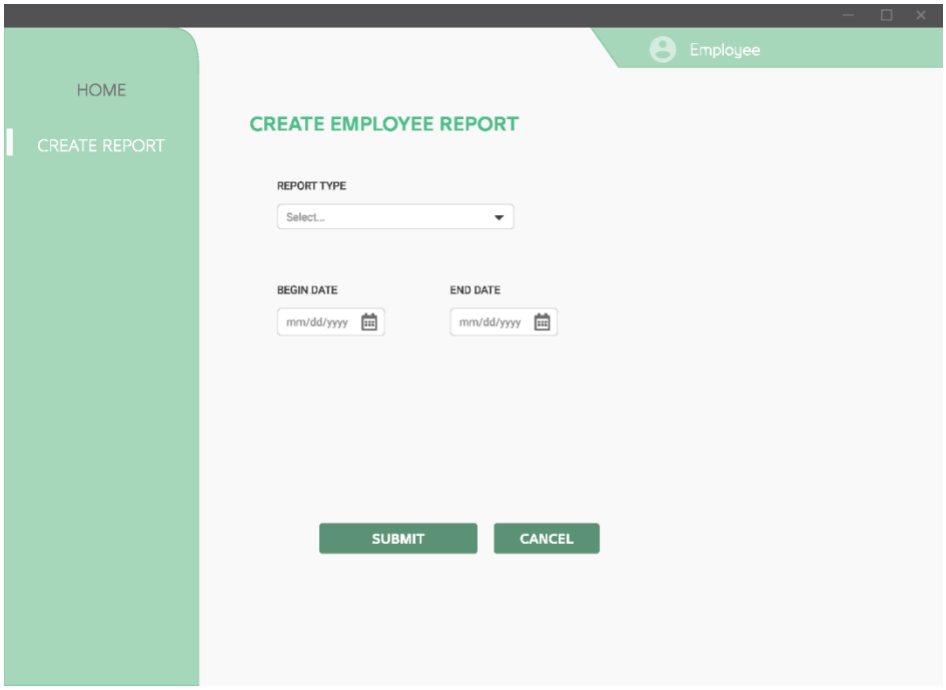


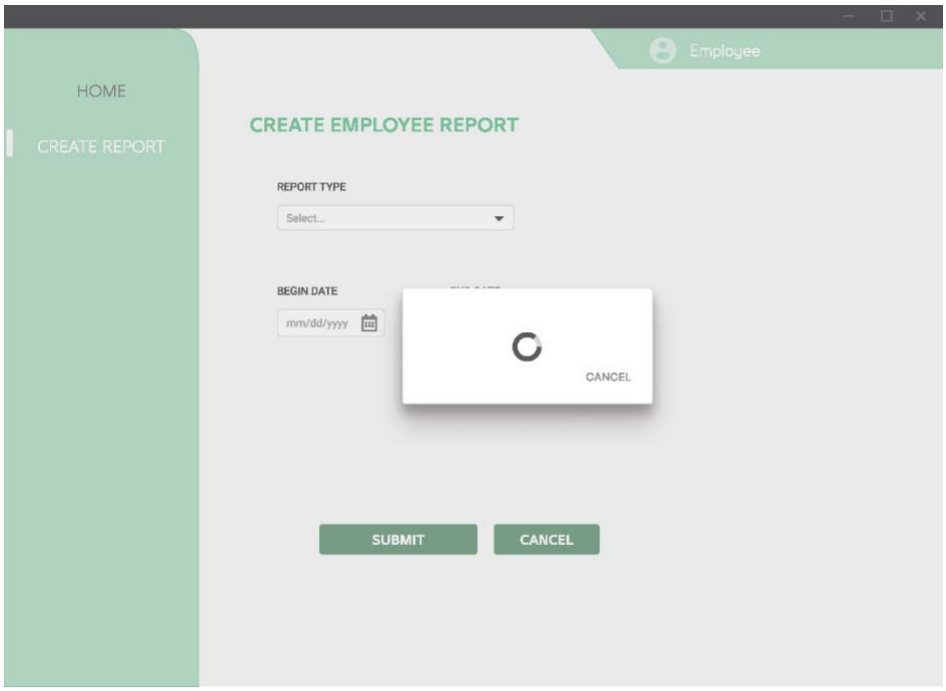



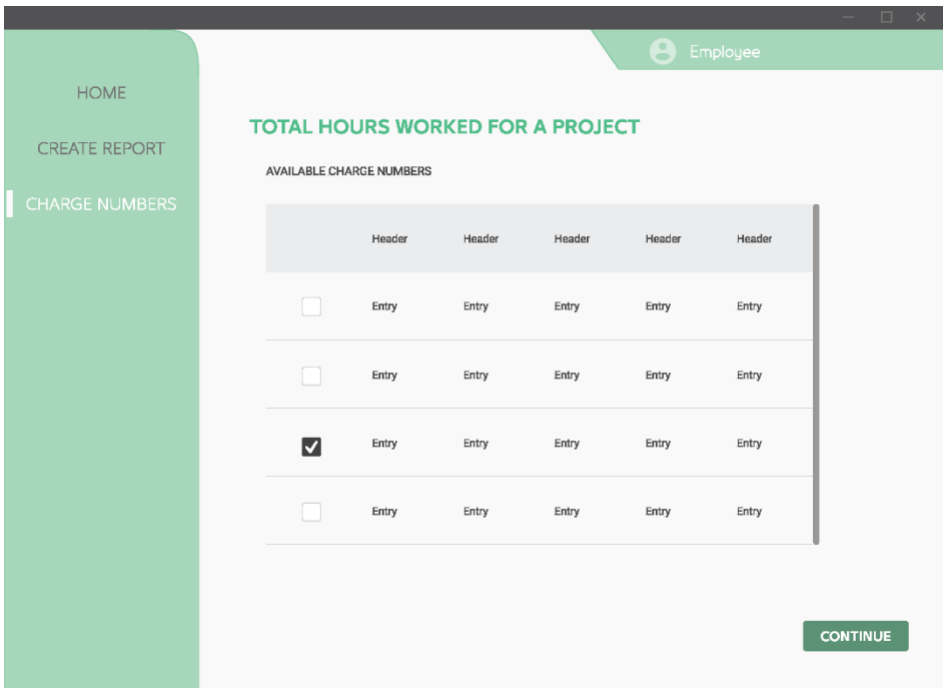


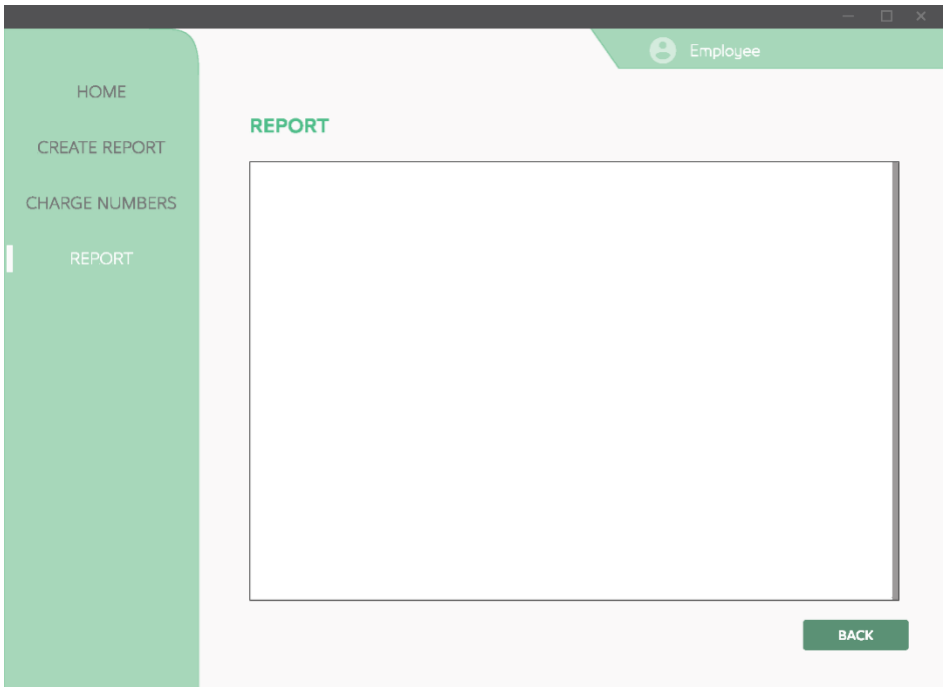

### 3.1.1.2. Create Employee Report Use Case



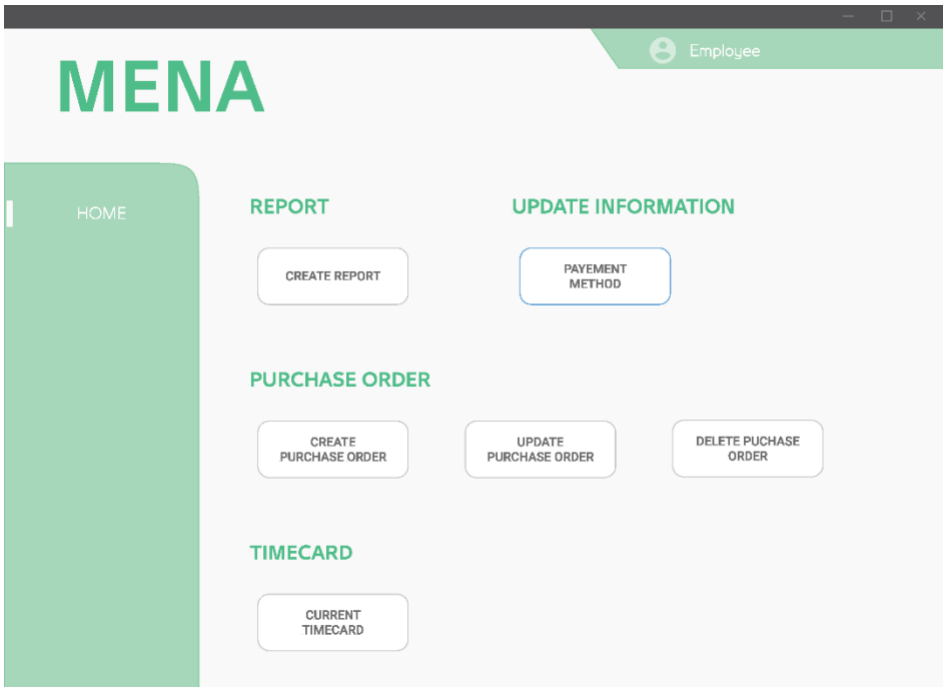

Employee
HOME
CREATE REPORT
CREATE EMPLOYEE REPORT
REPORT TYPE
Select...
BEGIN DATE
END DATE
mm/dd/yyyy
mm/dd/yyyy
SUBMIT
CANCEL

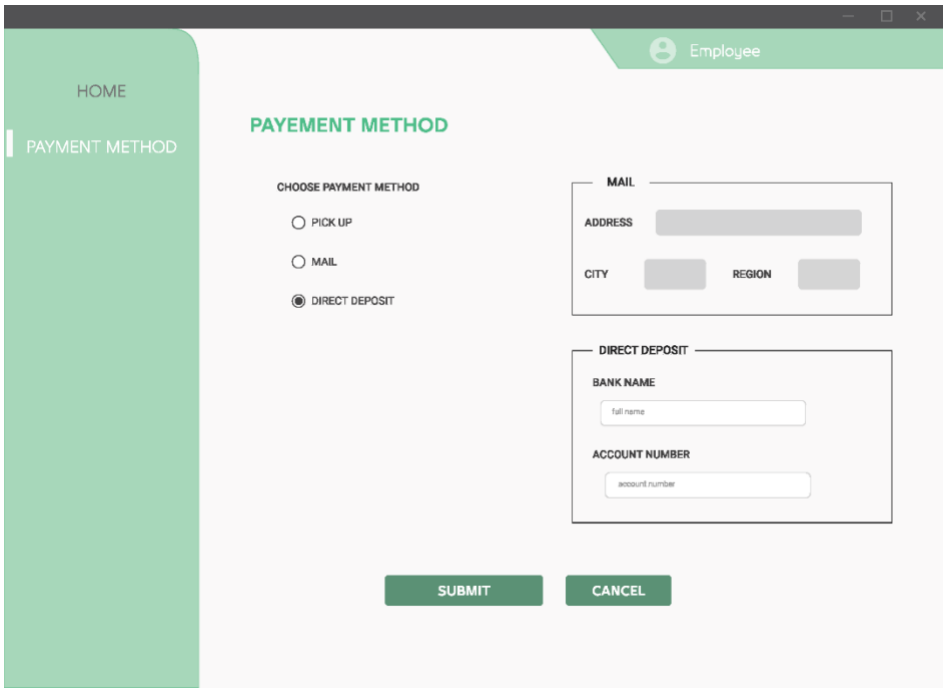

Employee
HOME
CREATE REPORT
CREATE EMPLOYEE REPORT
REPORT TYPE
Select...
BEGIN DATE
mm/dd/yyyy
CANCEL
SUBMIT
CANCEL

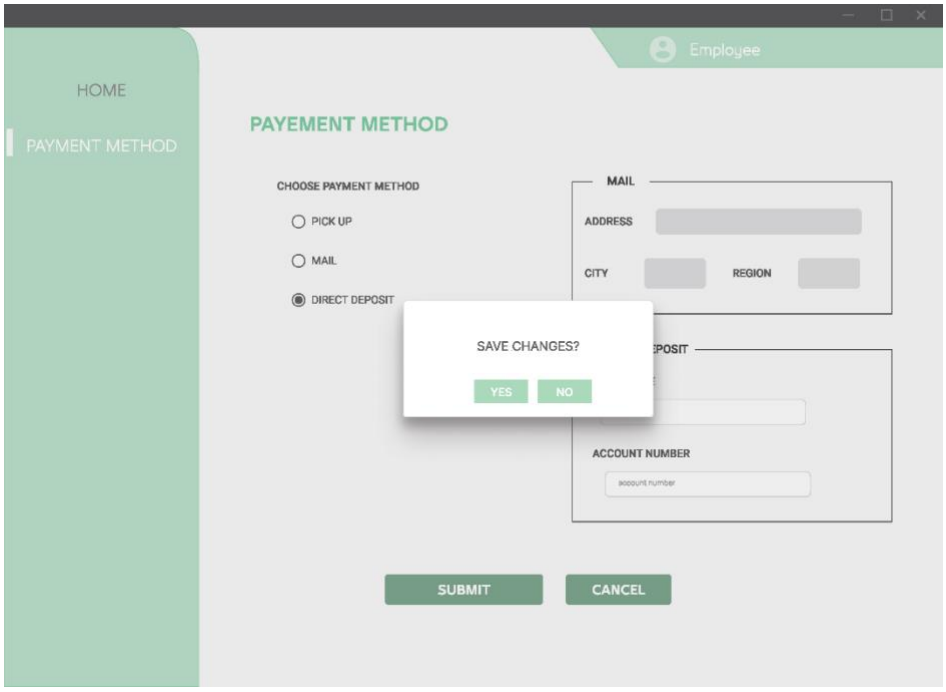

Employee
HOME
CREATE REPORT
CHARGE NUMBERS
TOTAL HOURS WORKED FOR A PROJECT
AVAILABLE CHARGE NUMBERS
Header
Header
Header
Header
Header
Entry
CONTINUE

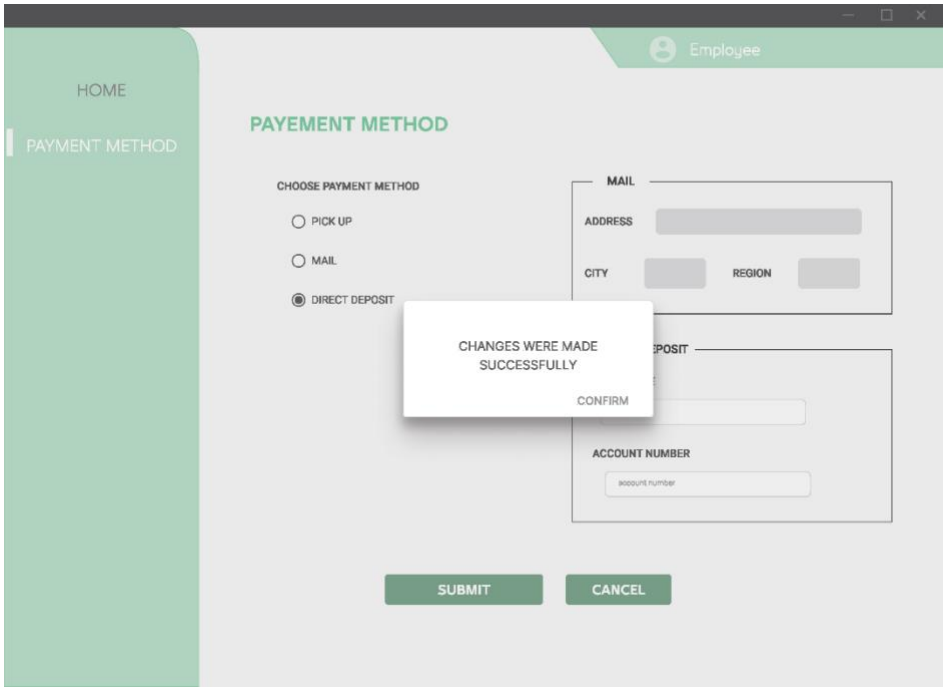

Employee
HOME
CREATE REPORT
CHARGE NUMBERS
REPORT
REPORT
BACK

### 3.1.1.3. Select Payment Method Use Case

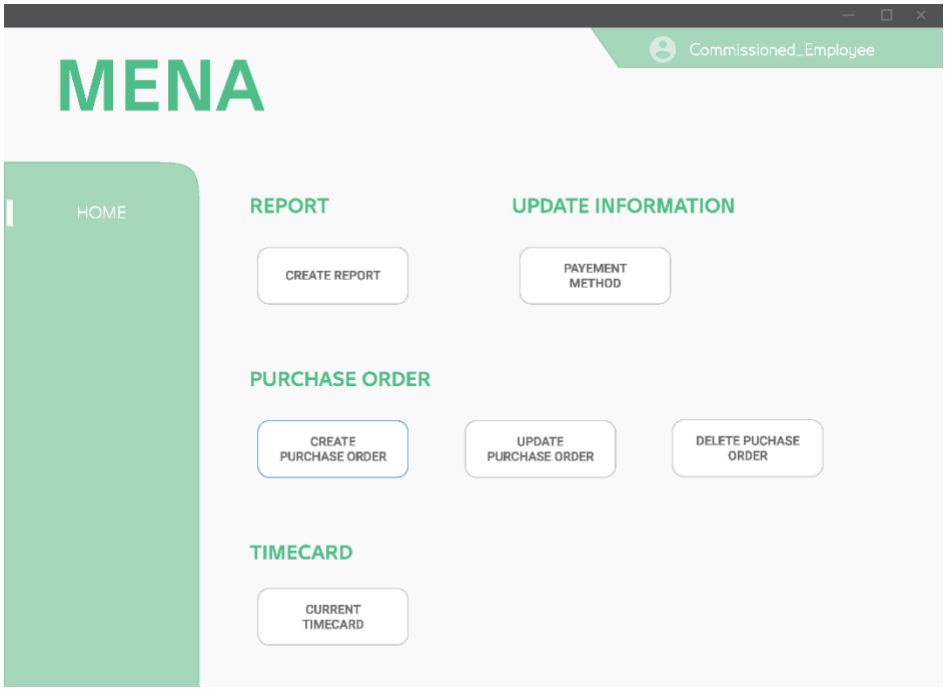


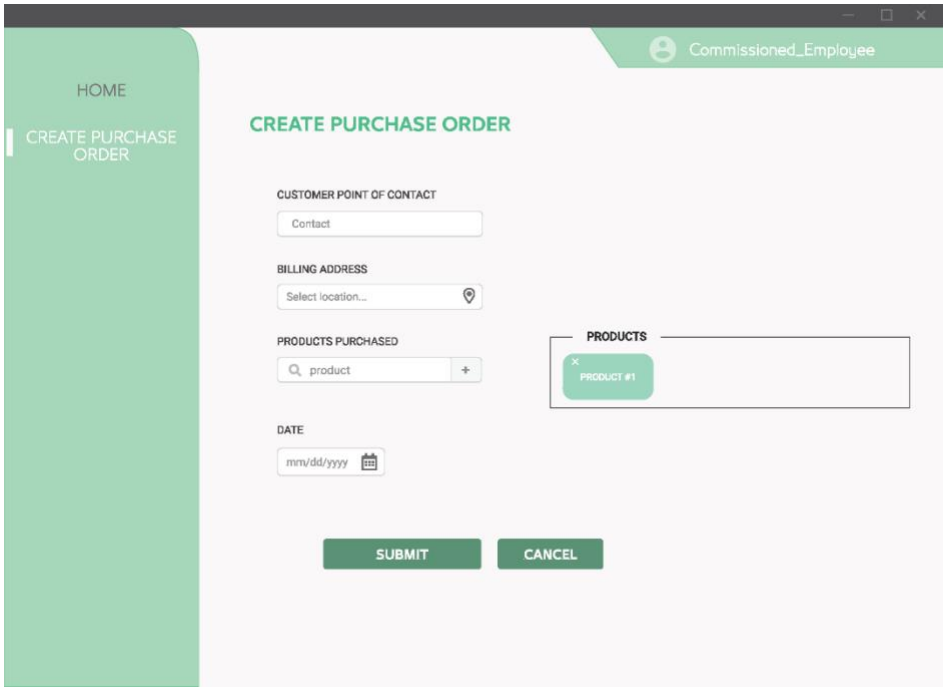



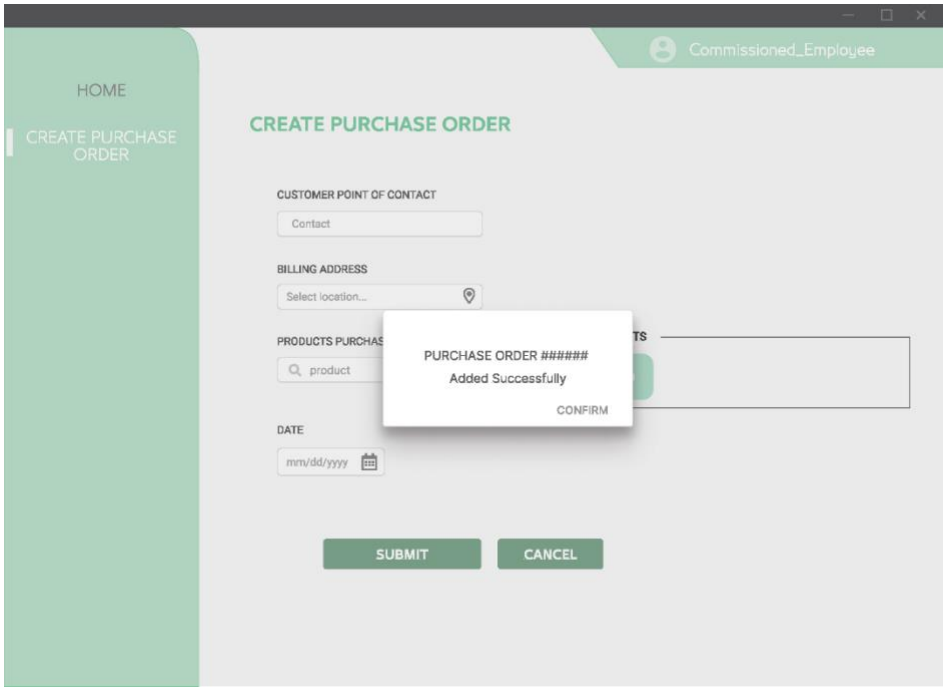

Employee
HOME
PAYMENT METHOD
PAYEMENT METHOD
CHOOSE PAYMENT METHOD
PICK UP
MAIL
DIRECT DEPOSIT
MAIL
ADDRESS
CITY
REGION
SAVE CHANGES?
YES
NO
ACCOUNT NUMBER
account number
SUBMIT
CANCEL


Employee
HOME
PAYMENT METHOD
PAYEMENT METHOD
CHOOSE PAYMENT METHOD
PICK UP
MAIL
DIRECT DEPOSIT
MAIL
ADDRESS
CITY
REGION
CHANGES WERE MADE SUCCESSFULLY
CONFIRM
ACCOUNT NUMBER
account number
SUBMIT
CANCEL

### 3.1.1.4. Create Purchase Order Use Case




Commissioned_Employee
HOME
CREATE PURCHASE ORDER
CREATE PURCHASE ORDER
CUSTOMER POINT OF CONTACT
Contact
BILLING ADDRESS
Select location...
PRODUCTS PURCHAS
product
TS
PURCHASE ORDER ######
Added Successfully
CONFIRM
DATE
mm/dd/yyyy
SUBMIT
CANCEL

## 3.2. Functional Requirements

**3.2.1.** The system shall assign a generated unique ID for every new employee.

**3.2.2.** The system shall calculate employees' payments using the employee's timecard, purchase orders, information, and all legal deductions.

**3.2.3.** The system shall assign a generated unique number for each purchase order.

**3.2.4.** The system shall determine a commission rate of 10%, 15%, 25% or 35% for commissioned employees based on their sales.

**3.2.5.** The system shall pay the hourly employees who have worked for more than 8 hours, 1.5 times the normal rate for those extra hours.

**3.2.6.** The system shall create a timecard for the employees who do not have a timecard for the current pay period.

**3.2.7.** The system shall set the start and end date of the new timecard that the system has created.

**3.2.8.** The system shall pay the salaried employee a flat salary.

**3.2.9.** The system shall pay the hourly employee every Friday.

**3.2.10.** The system shall keep track of the hours worked by the employees against charge numbers.

**3.2.11.** The system shall pay the salaried employees and commissioned employees on the last working day of the month.

**3.2.12.** The system shall generate payments for records from the last time the employee was paid to the specified date.

**3.2.13.** The system shall make the submitted timecard read-only.

**3.2.14.** The employee shall be able to log in to the system using their IDs' and passwords.

**3.2.15.** The employee shall be able to make changes to their own timecard only, prior to the submission of the timecard.

**3.2.16.** The employee shall be able to choose their payment method (paychecks mailed to a postal address, direct deposit, pick their paychecks up at the office) .

**3.2.17.** The employee shall be able to change their chosen payment method.

**3.2.18.** The employee shall be able to request the system to create reports, by providing report type, the Information related to each type, Begin and end date of the report.

**3.2.19.** The employee shall be able to print the reports the system has created.

**3.2.20.** The employees shall be able to submit their timecard information that records the date and hours worked.

**3.2.21.** The employee shall be able to view the timecard for the current time period.

**3.2.22.** The Payroll Administrator shall be able to log in to the system.

**3.2.23.** The Payroll Administrator shall be able to add new employees.

**3.2.24.** The Payroll Administrator shall be able to delete added employees.

**3.2.25.** The Payroll Administrator shall be able to change all employees' information such as name, mailing address, social security number, phone number, payment classification (hourly, salaried, commissioned), salary (for salaried and commissioned employees), hourly rate (for hourly employees), commission rate (for commissioned employees), tax deductions and other deductions.

**3.2.26.** The Payroll administrator shall be able to request to create administrative reports by specifying the report type either the total hour worked or pay year-to-date report, employee name, begin and end dates of the report.

**3.2.27.** The commissioned employees shall be able to add purchase orders by submitting the date, purchased products, amount of the sale, customer point of contact and billing address.

**3.2.28.** The commissioned employee shall be able to update purchase orders by using the purchase orders unique number.

**3.2.29.** The commissioned employee shall be able to delete purchase orders using the purchase orders unique number.

## 3.3. Use Cases Description

### 3.3.1. Use Case #1

| **Use Case Description** | |
|---|---|
| **System:** Mena Payroll Management System. | |
| **Use Case name:** Add purchase order. | |
| **Primary actor:** Commissioned Employee. | **Secondary actor(s): -** |
| **Description:** This use case describes how a commissioned employee can add their purchase order that will be counted into their sales. | |
| **Relationships**<br>▪ **Includes:** none.<br>▪ **Extends:** none. | |
| **Pre-conditions:** The Commissioned employee must be logged in the system successfully. | |

| **Steps:** | | |
|---|---|---|
| **Primary Actor (**Commissioned Employee) | **System** | **Secondary Actor(s) (if applicable)** |

| | | |
|---|---|---|
| 1. This use case begins when the Commissioned employee selects the add purchase order option.<br>3. The Commissioned employee fills the form with the following information:<br>● The date.<br>● Purchased products.<br>● Amount of the sale.<br>● Customer point of contact.<br>● Customer billing address.<br>4. The Commissioned employee submits the form.<br>6. The Commissioned employee confirms. | 2. The System displays the add purchase order form.<br>5. The System displays an option to confirm the form.<br>7. The System adds the order and displays a message that purchase order is added successfully.<br>8. The system generates a unique number and assigns it to the new added purchase order.<br>9. The System directs the Commissioned employee to the employee's main page. | |

**Alternative and exceptional flows:**

1. **Missing Field/ Incorrect Format**

If in step 3 Commissioned employee misses a required field or enters a field in incorrect format then:

1. the system displays a message indicating required fields or format.
2. The use case is resumed with step 3.

2. **Commissioned employee quits**

If at any step before step 7 the user selects cancel:

1. The use case ends with a failure condition.

**Post-conditions:**

**Successful condition:** The purchase order is successfully added.

**Failure condition:** No purchase order is added.

### 3.3.2. Use Case #2

| **Use Case Description** | | |
|---|---|---|
| **System:** Mena Payroll Management System. | | |
| **Use Case name:** Change timecard. | | |
| **Primary actor:** Employee | **Secondary actor(s): -** | |
| **Description:** This use case describes how an employee can change their timecard. | | |
| **Relationships**<br>● **Includes:** none.<br>● **Extends:** none. | | |
| **Pre-conditions:** The Employee must be logged in the system successfully. | | |
| **Steps:** | | |
| **Primary Actor (**Employee) | **System** | **Secondary Actor(s) (if applicable)** |
| **1.**This use case begins when the employee selects a "change timecard" option.<br><br>**5.**The employee makes changes to the timecard for the current pay period.<br><br>**6.**The employee submits the changes to the timecard. | **2.** The system ensures the employee has a timecard for the current pay period.<br><br>**3.** The system checks if the timecard has not been submitted yet.<br><br>**4.** The system displays the current timecard for the Employee.<br><br>**7.** The system displays a message that changes to the timecard have been done successfully.<br>employ | |

| | | |
|---|---|---|
| | | |

**Alternative and exceptional flows:**

**1.Missing Field/ Incorrect Format**

If in step 1 Employee misses a required field or enters a field in incorrect format, then:

1.1. The system displays a message indicating required fields or format.

1.2. The use case is resumed with step 1.

**2. Create a timecard:**

If in step 2 a timecard does not exist for the employee for the current pay period:

2.1. The system creates a new one.

2.2. The use case is resumed with step 4.

**3. Submit timecard:**

If in step 3 the timecard for the current pay period has already been submitted:

3.1. The system displays an error message indicating that no changes can be made.

3.2. The use case ends with a failure condition.

**4.Employee quits:**

If at any step before step 4 the Employee cancel:

4.1. The use case ends with a failure condition.

**Post-conditions:**

**Successful condition:** The system successfully submitted and made the timecard for read-only.

**Failure condition:** No timecard is submitted and not made for read-only.

### 3.3.3. Use Case #3

| Use Case Description | |
|---|---|
| **System: Mena Payroll System** | |
| **Use Case name: Add employee** | |
| **Primary actor: Administrator** | **Secondary actor(s):** |
| **Description:** This use case describes how the administrator can add an employee to the mena payroll system. | |
| **Relationships**<br>▪ **Includes:** None<br>▪ **Extends:** None | |
| **Pre-conditions:** The administrator must be logged in successfully. | |

**Steps:**

| **Primary Actor (**Administrator**)** | **System** | **Secondary Actor(s) (if applicable)** |
|---|---|---|
| 1. This use case begins when the administrator selects the "add employee" option.<br><br>3. The administrator fills the form with the following information:<br>● Name of the employee<br>● Mailing address<br>● Social security number<br>● Phone number<br>● Payment classification (hourly, salaried, commissioned)<br>● Tax deduction and other deductions<br><br>4. The administrator specifies salaried employee, the administrator specifies salary<br><br>5. Administrator submits the form.<br><br>7. The administrator confirms. | 2. The system displays the add employee form.<br><br>6. The system displays an option to conform the form.<br><br>8. The system adds the employee.<br><br>9. The system generates a unique ID number and assigns it to the new added employee.<br><br>10. The system displays an option whether the administrator wants to "add another employee" or go to the "main page".<br><br>12. The system directs the administrator to the main administrator's page. | |

| | | |
|---|---|---|
| 11. The Administrator selects "main page". | | |

**Alternative and exceptional flows:**

**1. Commissioned/Hourly employee**

1.1. If in step 4 the employee is commissioned employee
- 1.1.1. The administrator specifies the salary and commission rate.
- 1.1.2. The use case resumes with step 5.

1.2. If in step 4 the employee is hourly employee
- 1.2.1. The administrator specifies the hour rate.
- 1.2.2. The use case resumes with step 5.

**2. Add multiple employees**

If in step 10 of the basic flow the administrator decided to add another employee:

2.1. Steps 3-10 are repeated.

**3. Missing field/ incorrect format**

If in step 3 the administrator misses a required field or enters a field in incorrect format, then:

3.1. The system displays a message indicating required field or format.

3.2. Step 3 is resumed.

**4. Administrator quits**

If at any step before step 8 the administrator selects cancel

4.1. The use case ends with failure condition.

**Post-conditions:**

**Successful Condition:** The system Successfully adds the new employee account.

**Failure Condition:** No employee is added.

### 3.3.4. Use Case #4

| Use Case Description | | |
|---|---|---|
| **System: Mena Payroll System** | | |
| **Use Case name:** Choose Payment Method | | |
| **Primary actor:** Employee | **Secondary actor(s):** none | |
| **Description:** This use case describes how an employee can choose the payment method. | | |
| **Relationships**<br>▪ **Includes:** None<br>▪ **Extends:** None | | |
| **Pre-conditions:** The employee user has been logged in successfully. | | |
| **Steps:** | | |
| **Primary Actor (**Employee**)** | **System** | **Secondary Actor(s) (if applicable)** |
| 1. This use case begins when the employee selects the "choose the payment method" option.<br><br>3. The employee chooses:<br>If the Employee chooses to be mailed to the postal address, execute S-1: Mail paycheck.<br><br>If the Employee chooses direct deposit, execute S-2:<br>Direct deposit.<br><br>If the Employee chooses direct pickup, execute S-3:<br>Direct pickup. | 2. The System displays options whether the employee wants the paycheck to be mailed to the postal address, or a direct deposit of the paycheck to a bank account or to pick the paycheck up at the office.<br><br>1.The system displays a message that the payment method has been chosen successfully. | |

**Sub flows:**

1. **mail paycheck**
   If in step 3 of the basic flow the employee decides to choose a mail paycheck then:
1.1. mail paycheck use case is performed.

2. **Direct deposit**
   If in step 3 of the basic flow the employee decides to choose a direct deposit, then:
2.1. Request direct deposit use case is performed.

3. **Direct Pickup**
   If in step 3 of the basic flow the employee decides to choose a direct deposit, then:
3.1. Choose direct pickup use case is performed.

**Alternative and exceptional flows:**

1. **Employee Quits**
   If at any step before step 5 the employee selects cancel:
1.1. The use case ends with failure condition.

**Post-conditions:**

**Successful Condition:** The system successfully sets the payment method of an employee to the specified method.

**Failure Condition:** The employee's payment method remains unset.

### 3.3.5. Use Case #5

| Use Case Description | | |
|---|---|---|
| **System: Mena Payroll System** | | |
| **Use Case name:** Request Employee Report | | |
| **Primary actor:** Employee | **Secondary actor(s):** | |
| **Description:** This use case describes how an employee can request a report. | | |
| **Relationships**<br>▪ **Includes:** None<br>▪ **Extends:** Print Report | | |
| **Pre-conditions:** The employee user has been logged in successfully. | | |
| **Steps:** | | |
| **Primary Actor (**Employee**)** | **System** | **Secondary Actor(s) (if applicable)** |
| 1. This use case begins when the employee selects the "request employee report" option.<br><br>3.The employee fills the form with the following information:<br>● Type of the report.<br>● Information related to each type.<br>● Begin and end dates of the reports<br><br>4. The employee submits the form. | 2. The System displays request employee report form.<br><br>5. The system provides the report that satisfies the specified criteria. | |

**Alternative and exceptional flows:**

1. **Print**
   If in step 7 of the basic flow the employee decides to print the report:
   1.1. Print report use case is performed.
2. **Missing field/ Incorrect Format**
   If in step 3 the employee misses a required field or enters a field in an incorrect format, then:
   2.1. The system displays a message indicating the required fields or the specific format.
   2.2. The use case resumes with step 3.
3. **Employee Quits**
   If at any step before step 5 the employee selects cancel:
   3.1. The use case ends with failure condition.

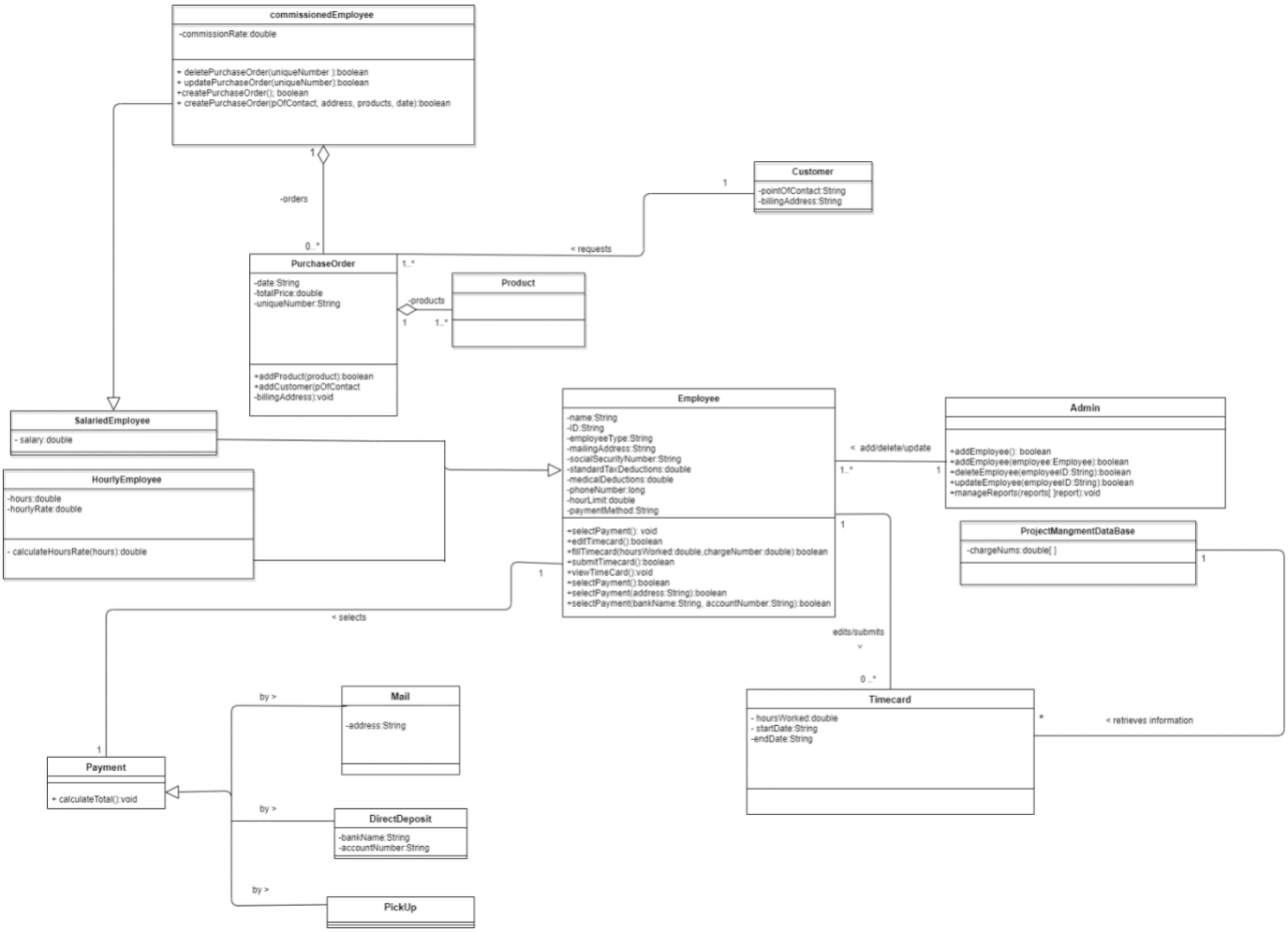
**Post-conditions:**

**Successful Condition:** The system successfully provides the employee the specified report.

**Failure Condition:** No report is provided to the employee.

## 3.4.Classes / Objects

### 3.4.5. Class Diagram



## 3.5. Non-Functional Requirements

### 3.5.5. Performance

#### 3.5.5.1. Capacity

3.5.5.1.1. The system shall be able to accommodate 7000 simultaneous users.

### 3.5.6. Reliability

#### 3.5.6.1. Accuracy

3.5.6.1.1. The system shall not produce an error of more than $1/10^5$ while calculating the employees' salaries.

#### 3.5.6.2. Availability

3.5.6.2.1. The system shall be available 98% of the time on daily bases while keeping an up time of 99.98% on the last day of the month and Fridays.

#### 3.5.6.3. Security

3.5.6.3.1. The system shall prevent employees from changing any timecards other than their own.

3.5.6.3.2. The system shall prevent the administrator from changing the employee's payment delivery method.

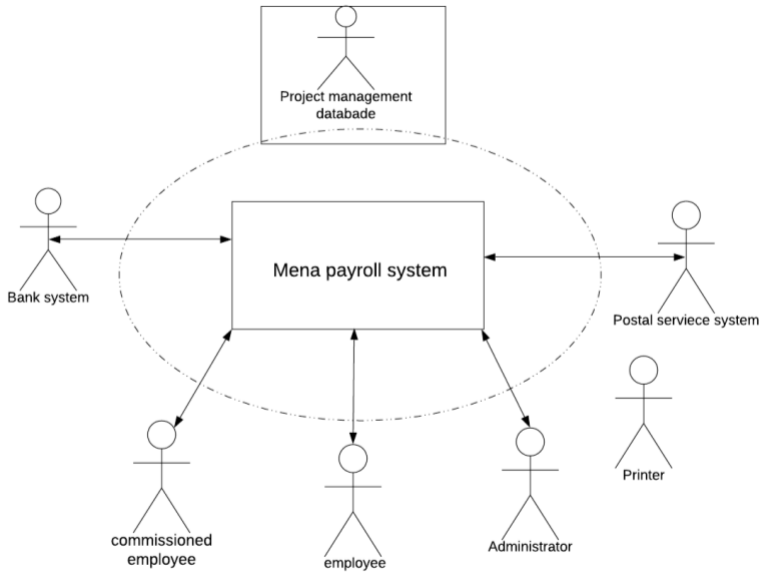
3.5.6.3.3. The system shall prevent employees from changing the start and end date of timecard after it has been set.

## 3.6. Design Constraints

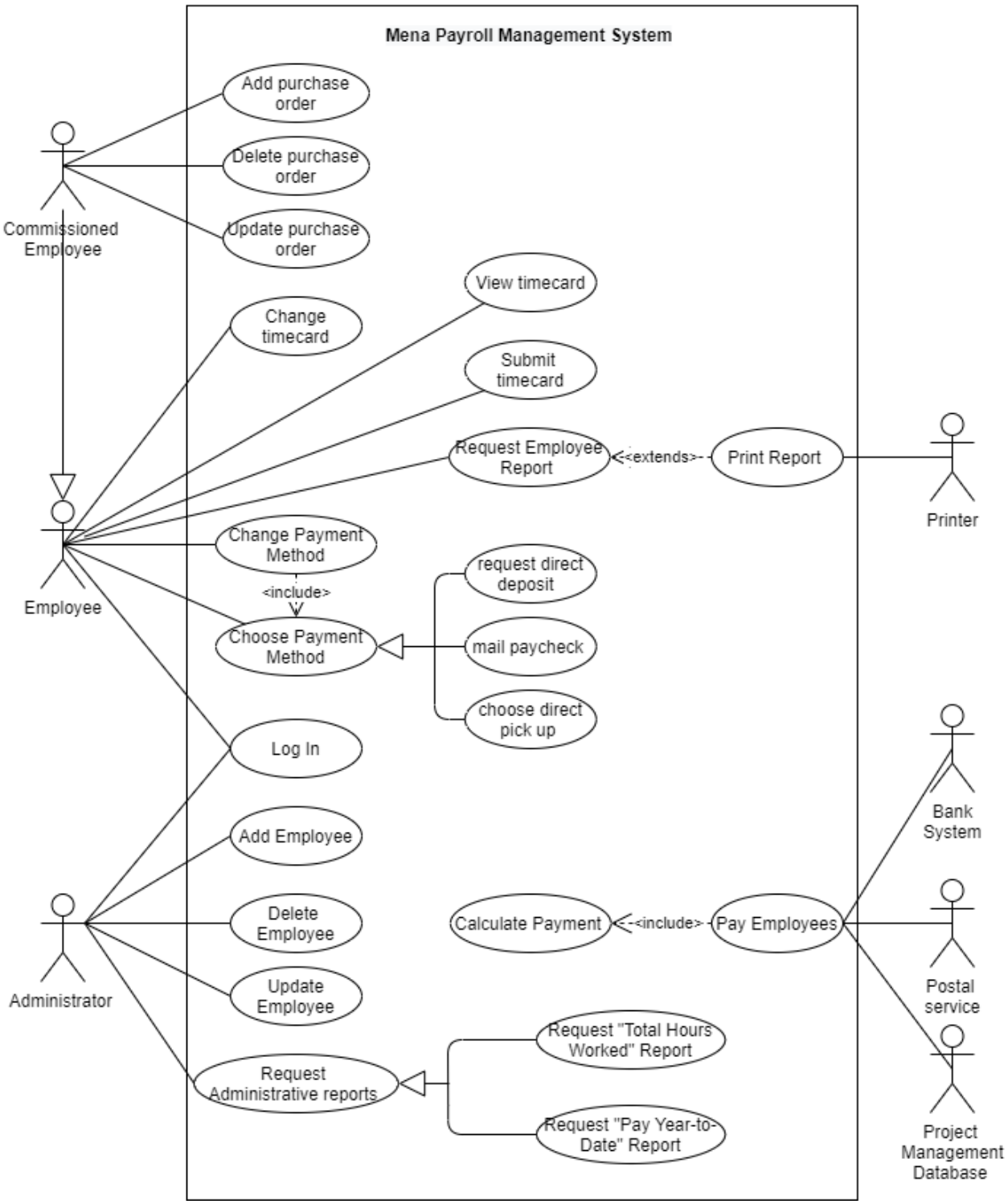
3.6.1. The system shall interface with existing bank systems via an electronic transaction.
3.6.2. The system shall have Windows-based desktop interface.
3.6.4. The system shall integrate with the existing project management database DB2 running on IBM mainframe.
3.6.5. The system shall run on individual employee desktops throughout the entire company.

## 3.7.Other Requirements

## 3.8. System boundary



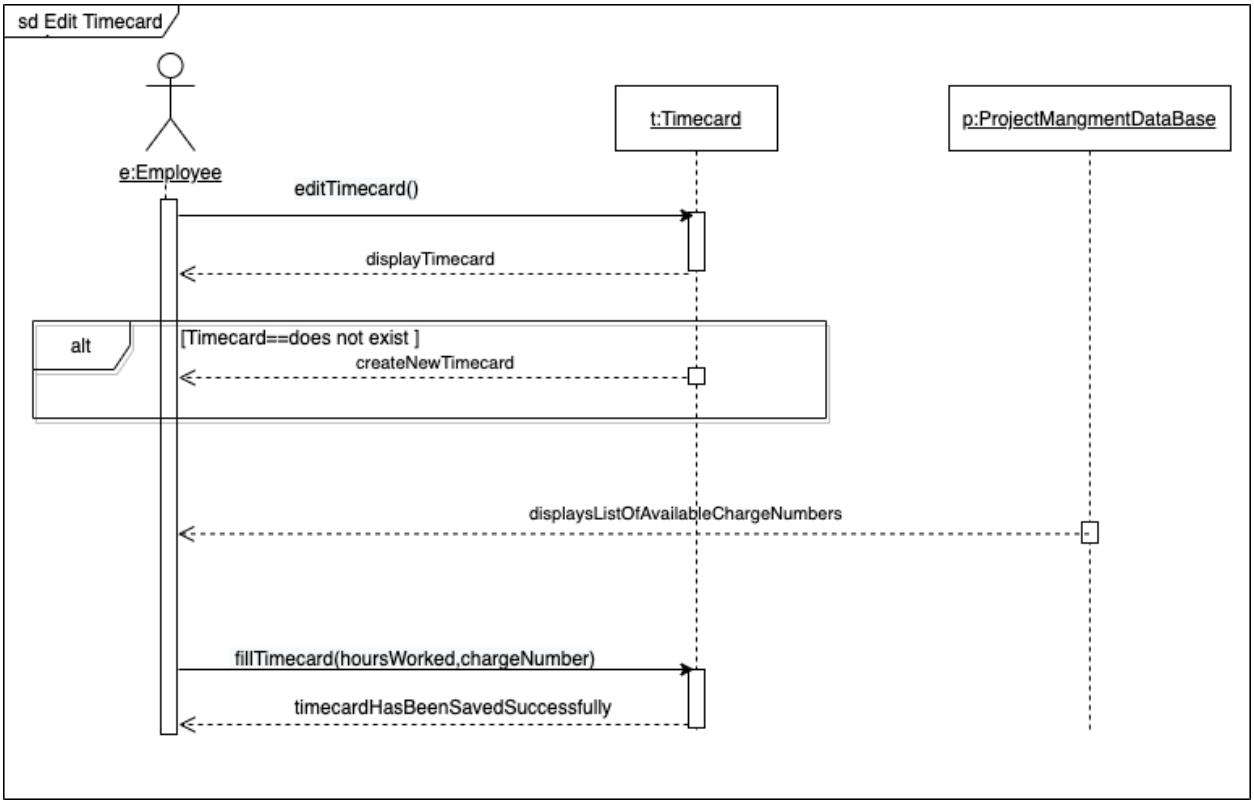
## 3.9. Use Case Diagram



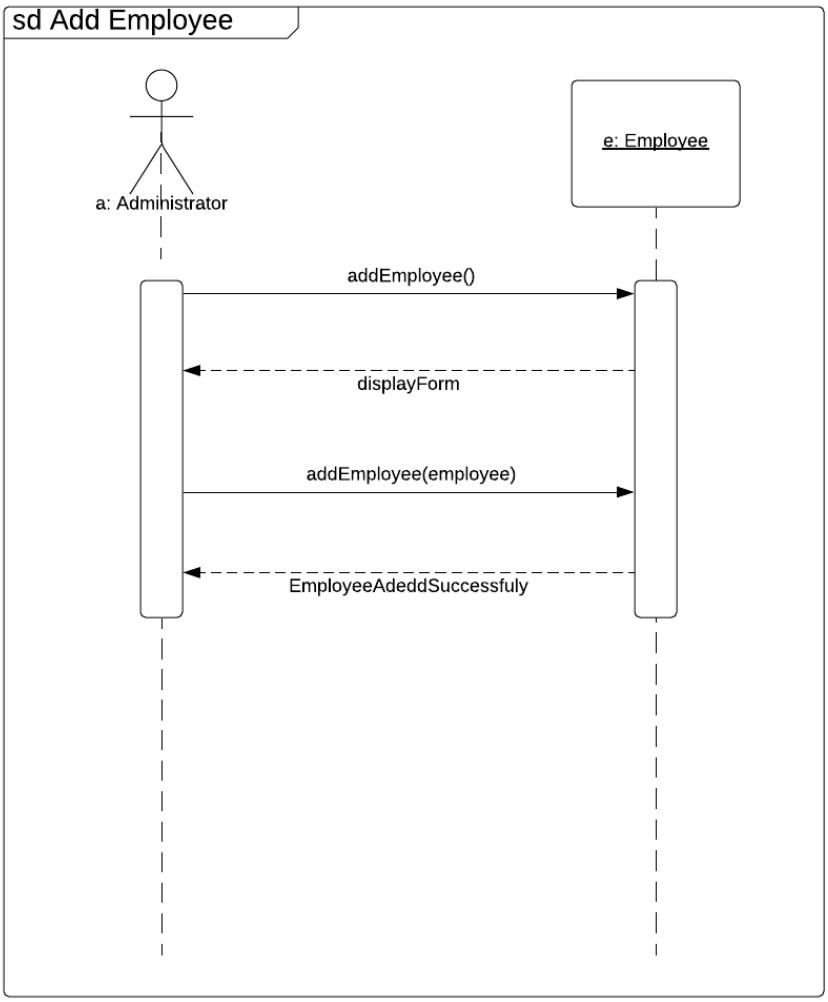
# 4. Analysis Models

## 4.1.Sequence Diagrams

### 4.1.1. Edit Timecard:

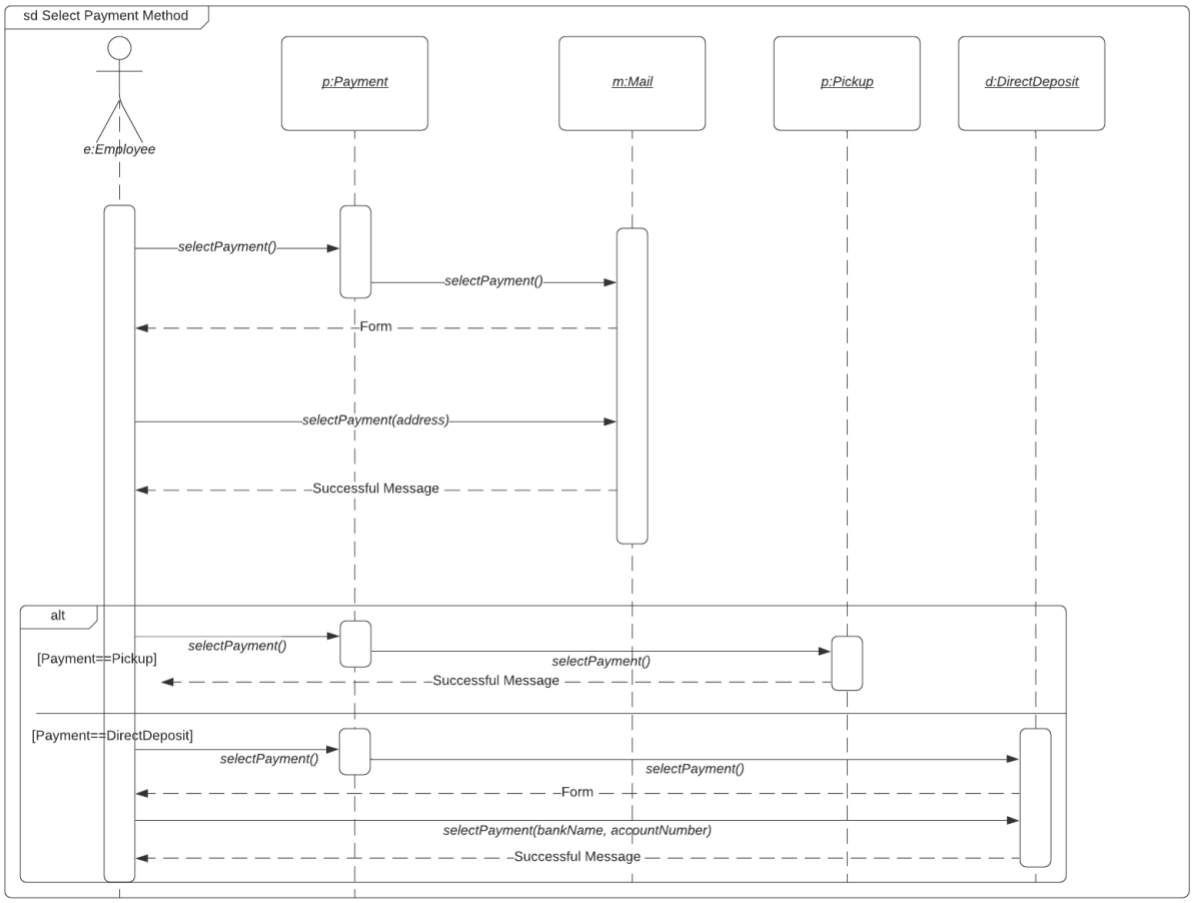


### 4.1.2. Add Employee:

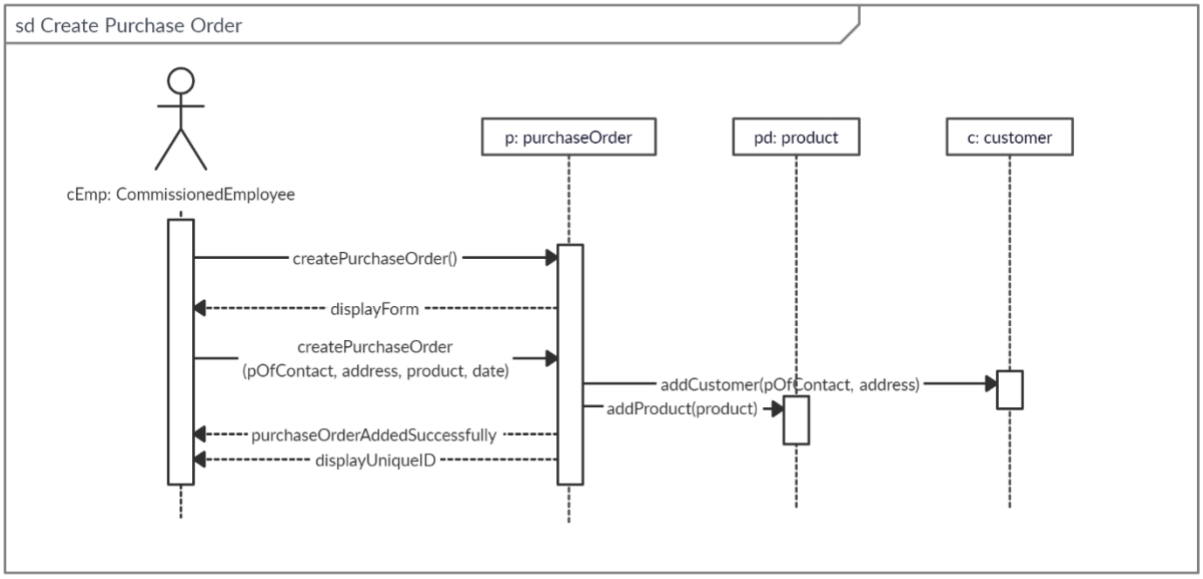



Note: we conclude add employee sequence diagram based on the concept of polymorphisim

### 4.1.3. Select Payment Method:

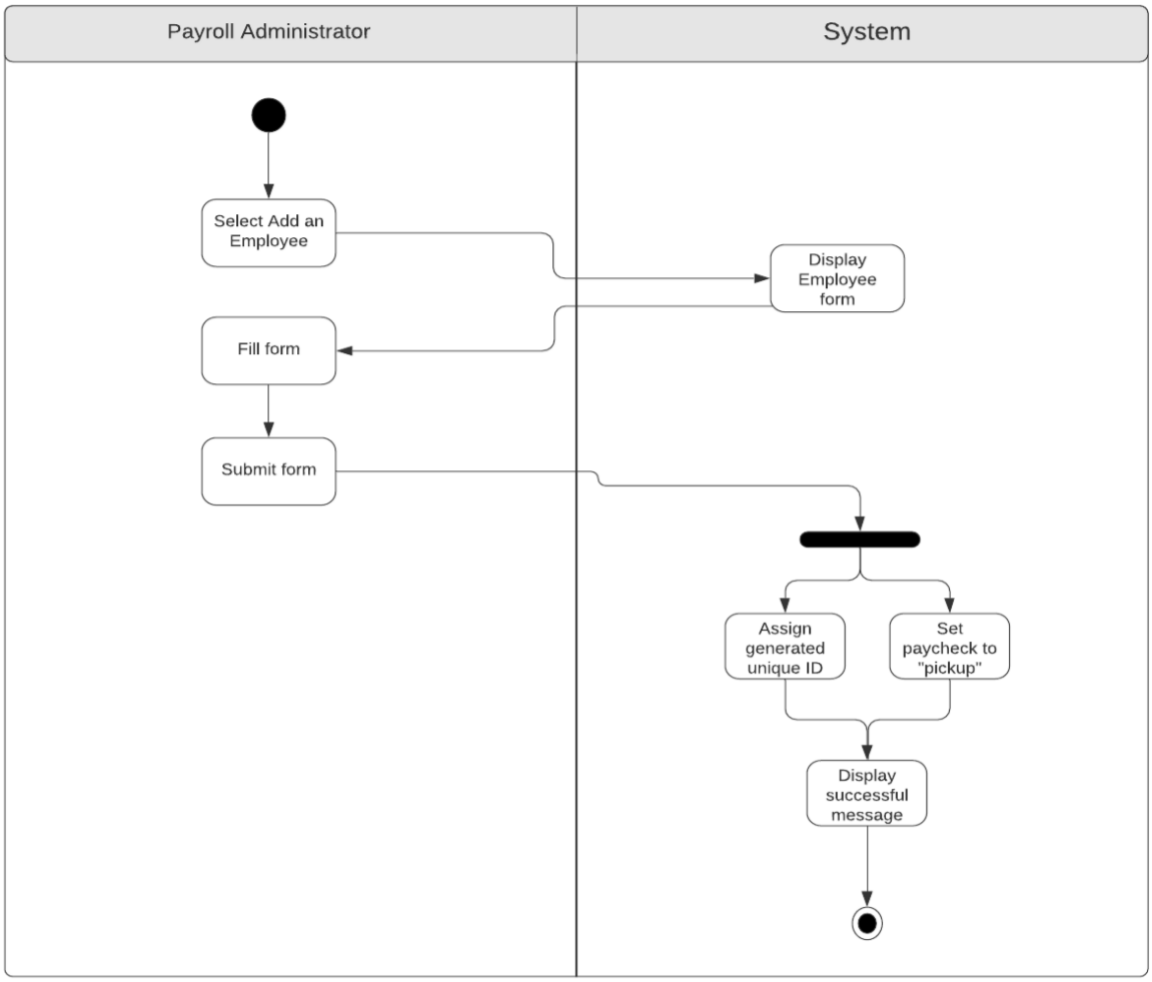


### 4.1.4. Create Purchase Order:

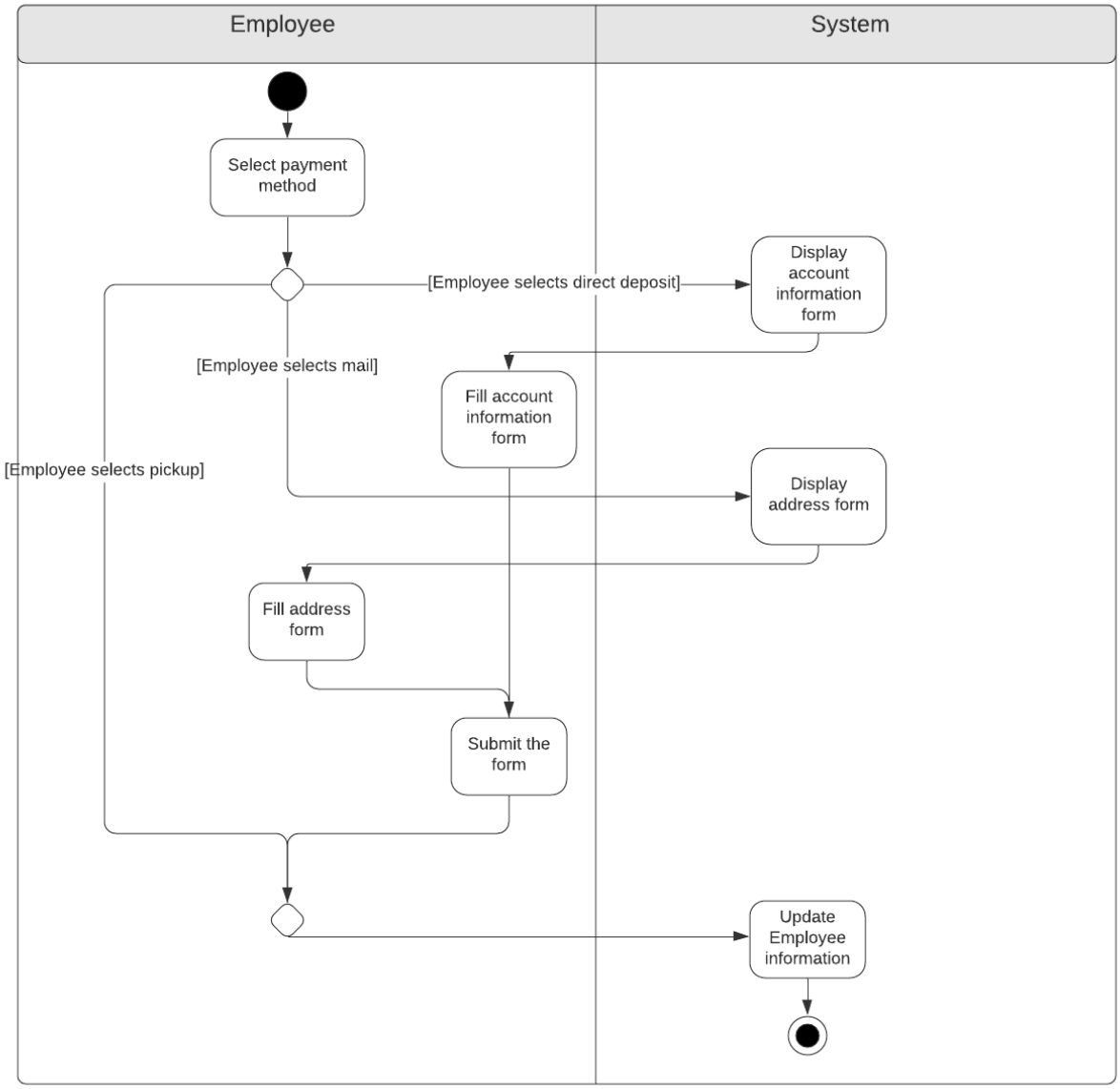


## 4.2. Activity Diagram

### 4.2.1. Add Employee:



### 4.2.2. Select Payment Method:



# A. Appendices

*Appendices may be used to provide additional (and hopefully helpful) information. If present, the SRS should explicitly state whether the information contained within an appendix is to be considered as a part of the SRS's overall set of requirements.*

*Example Appendices could include (initial) conceptual documents for the software project, marketing materials, minutes of meetings with the customer(s), etc.*

## A.1. Appendix 1

## A.2. Appendix 2