

**Requirements Specifications**

**P04 : Dairy Farm Management System**

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**CS 491 (A) - S1**

**Submitted to**

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# Introduction

In attempts to modernize the dairy industry in Pakistan, which is one of the greatest producers and consumers of milk and other dairy products in the region, our proposed and developed system will present a solution to better manage the dairy farms and optimize sales and help in better record keeping.

Furthermore, multiple dairy farm owners will have the opportunity to set up their accounts on our management system, as we aim to develop a multi-tenant software, which will aid them in getting more customers and for the better management and record keeping of their farms. The system will allow the customer to keep track of daily milk production, sales, expenses and maintenance. Moreover, the system will also provide an interface for the customers of the dairy farm to check their delivery and monthly invoice.

Potential users of our management system include dairy farm owners (who wish to digitize their records and keep an updated track of their farms) and the customers who wish to order dairy products, be it for domestic or commercial use.

The main purpose of this product will be to provide multiple tenants a way to see various trends in their milk production, expenses and income streams and to make better decisions for the future.

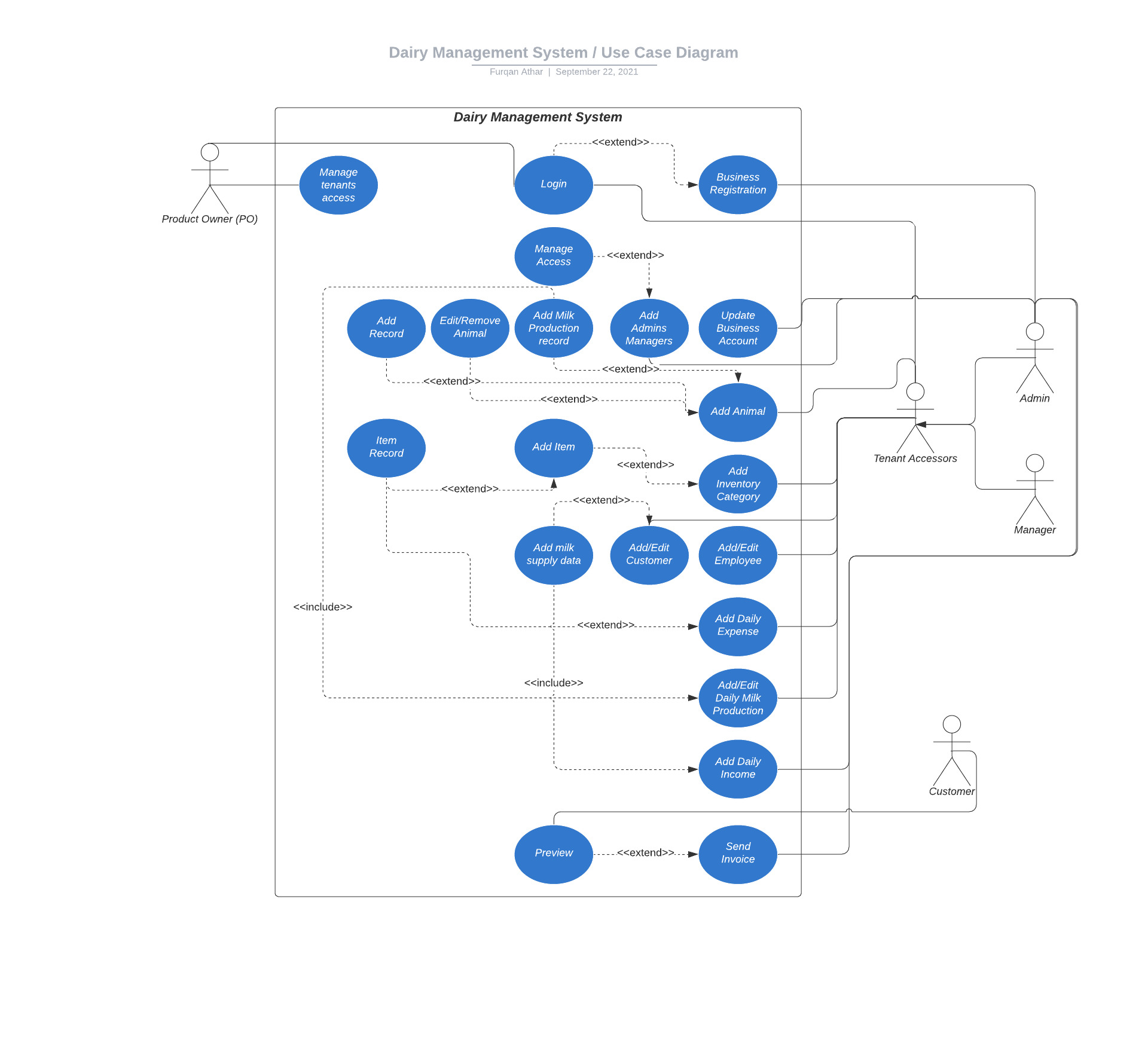
# System Actors

| **Actor Name** | **Description** |
| --- | --- |
| Product Owner | The product owner will be present at the top of the hierarchical structure. The product Owner will ultimately decide which dairy farm owners can set up their accounts on their product. |
| Admin | Admins are the dairy farm owners/Companies themselves. A dairy farm owner will be able to set up their account/dashboard on the main product interface and is also known as the tenant admin. |
| Manager | The tenant manager will be the personnel that would be next in authority after the farm owner. The manager will be the one overlooking the logistics of the farm and is also known as the tenant manager. |
| Customer | The customer will be the actor that will be present at the lowest level of this hierarchical structure. Customer is the one who will get the milk supply and will be able to check his portal on daily basis |

# Use Cases

## Use Case Diagrams

<Use standard UML notation>



## Description of Use Cases

<Write description of each use case separately using the template below.>

### Login for Super Admin (Product Owner)

| **Identifier** | | UC-001 | |
| --- | --- | --- | --- |
| **Purpose** | | The Product Owner wants to login to his website. | |
| **Pre-conditions** | |  | |
| **Post-conditions** | | Product Owner will be logged in to see the dashboard. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
|  | The PO visits the login page. | |
|  | The PO enters the login details (email, password) | |
|  | If the details are correct, he will be logged into the PO Dashboard. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
|  |  | |
| **Step #** | **Exception Paths** | |
|  | In step 3, if the details are incorrect, an error message will be displayed to the PO. | |

### Change access for tenants

| **Identifier** | | UC-002 | |
| --- | --- | --- | --- |
| **Purpose** | | The Product Owner wants to change access of multiple tenants from his dashboard | |
| **Pre-conditions** | | Complete UC-001 | |
| **Post-conditions** | | Access of a tenant will be changed. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | The PO will select any of the tenants. | |
| **2.** | The PO can manage access by choosing from multiple options like Allow Access, Restrict Access and others. | |
| **3.** | The system will update the access. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. |  | |

### Register Account for Dairy Farm

| **Identifier** | | UC-003 | |
| --- | --- | --- | --- |
| **Purpose** | | The dairy farm owner wants to register his dairy farm to use our service as an admin. | |
| **Pre-conditions** | |  | |
| **Post-conditions** | | Dairy farm will be registered as a tenant to use service | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | On the registration page, the admin first provides details for his account credentials | |
| **2.** | After that,the admin will provide details regarding farm name and business domain. | |
| **3.** | The admin will click “Register”, the account details will be sent to the server for processing. | |
| **4.** | If registration is successful, the system will redirect the admin to the dashboard. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | If any of the unique dairy information conflicts with the already present dairy, the system will display the error message. | |

### Addition of Admin/Manager to Management Team

| **Identifier** | | UC-004 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin wants to add/edit admins and managers and want to manage their access | |
| **Pre-conditions** | | Complete UC-003 | |
| **Post-conditions** | | New admins and managers will be added into the management team. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | The admin will go to the admin/manager addition page. | |
| **2.** | The admin will fill out the information like name, email and other details. | |
| **3.** | The admin will select the role for that person (Admin/Manager) | |
| **4.** | The admin will select the person status as well like allow access or restrict. | |
| **5.** | If successful, a success message will be displayed. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. | If he wants to restrict someone's access immediately after adding, he can change his status to inactive/restrict. | |
| **Step #** | **Exception Paths** | |
| 1. | If any error occurs, an error message will be displayed. | |

### Update information of a Dairy Account

| **Identifier** | | UC-005 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin wants to update information of the business account. | |
| **Pre-conditions** | | Complete UC-003 | |
| **Post-conditions** | | Dairy Account Information will get updated | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | On the business account information detail page, the admin will select “Edit”. | |
| **2.** | The admin will edit the details he wants to edit. | |
| **3.** | The admin will click “Update” | |
| **4.** | If successful, a success message will be displayed. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | If the manager tries to update the account information, an error message will be displayed. | |
| 2. | If any other error occurs, an error message will be displayed. | |

### Add New Animal

| **Identifier** | | UC-006 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin/manager wants to add details of new animals into their system. The page with animal details will be called an animal card | |
| **Pre-conditions** | | Complete UC-003 | |
| **Post-conditions** | | Animal detail will be added into the tenant system. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | On the animal addition page, the admin/manager will add the animal details like tag, name, image, date of birth etc. | |
| **2.** | The admin/manager will choose animal type like Milking, Child, Heifer etc | |
| **3.** | The admin/manager will select the animal status like Active, Inactive, Dead etc | |
| **4.** | The admin/manager will click “Save” to save animal information into the database. | |
| **5.** | If successful, a success message will be displayed. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | If any of the unique details conflicts with any of the already present animals, an error message will be displayed. | |

### Adding animal record and editing any details

| **Identifier** | | UC-007 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin/manager wants to add a record of an animal in the animal card. | |
| **Pre-conditions** | | Complete UC-003 and UC-006 | |
| **Post-conditions** | | Animal records will be added into the animal card. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | On the animal card page, The admin/manager will click “Edit” | |
| **2.** | On Editing, the admin/manager can add the details of records like Vaccination details, Sickness details and other things. | |
| **3.** | The admin/Manager will have to select the date corresponding to each record he adds. | |
| **4.** | The admin/manager will click “Save” to save animal records into the database. | |
| **5.** | If successful, a success message will be displayed. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | If any error occurs, an error message will be displayed. | |

### Adding Categories to Inventory

| **Identifier** | | UC-008 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin/manager wants to maintain/add inventory using categories. | |
| **Pre-conditions** | | Complete UC-003 | |
| **Post-conditions** | | Categories will be added into the inventory | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | On the inventory’s category addition page, the admin/manager will first select the option if that category will hold items whose items’ quantities will change on a regular basis or not. | |
| **2.** | If the admin/manager selects “regular basis” regular basis option is selected, the system will then ask if the items to be included are volume based or weight based. | |
| **3.** | If the admin/manager selects “No on a regular basis” option, the system will not ask questions regarding volume/weight based items. | |
| **4.** | After that, the admin/manager will add the category name | |
| **5.** | The admin/manager will click on “Save”, a category will be added into the inventory. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. | If the admin/manager wants to remove the category, they will delete it afterwards. | |
| **Step #** | **Exception Paths** | |
| 1. | If all the information of a new category conflicts with any of the already present categories, an error message will be displayed. | |

### Add items in the inventory

| **Identifier** | | UC-009 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin/manager wants to add items into the category with their stocks | |
| **Pre-conditions** | | Complete UC-003 and UC-008 | |
| **Post-conditions** | | Items will be added into the category | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | If the item is added in the volume category, the admin/manager can enter details of the item with their name and volume in ml. | |
| **2.** | If the item is added in the weight category, the admin/manager can enter details of the item with their name and weight in kg. | |
| **3.** | If the admin/manager wants, he can add items as miscellaneous as well in which he just needs to add the quantity as discrete value. | |
| **4.** | The admin/manager will click on “Save”. | |
| **5.** | The system will display a confirmation popup which will say “Are you sure? You’ll not be able to change this item name again.” | |
| **6.** | If admin/manager selects “Yes”, the request will sent to the server and on successful completion, a success message will be displayed. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | If the admin/manager tries to add an item that is already present in that category, an error message will be displayed and he’ll move back to step 1. | |

### Edit/Delete Inventory Item

| **Identifier** | | UC-010 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin/manager wants to edit/delete the item in inventory having some exceptions. | |
| **Pre-conditions** | | Complete UC-003, UC-008 and UC-009 | |
| **Post-conditions** | | Items will be edited/removed from the inventory. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | On the inventory’s category page, the admin/manager will click “Edit” corresponding to an item. | |
| **2.** | Admin/Manager will update the stock manually. | |
| **3.** | The admin/manager will click on “save” **OR** | |
| **4.** | If the admin/manager clicks on “Delete” corresponding to an item. | |
| **5.** | If successful, a success message will be displayed. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | If the item has some record, the system will not allow the delete event to happen and an error message will be displayed. | |

### Add/edit/remove employees

| **Identifier** | | UC-011 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin/manager wants to add/edit/remove employees data from the management system. | |
| **Pre-conditions** | | Complete UC-003 | |
| **Post-conditions** | | The employee will be added to the system’s database. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | On the employee addition page, the admin/manager will add all the required fields. | |
| **2.** | The admin/manager will add the employee’s salary. | |
| **3.** | The admin/manager will click “Save”. | |
| **4.** | **OR** if edit is clicked for an employee, admin/manager can edit all the details they want. | |
| **5.** | **OR** if delete is clicked, the employee will be deleted. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | If the employee has some record present, and if the delete event occurs, the system will display an error message because an employee having some history must not be deleted. | |

### Add/Edit/Remove Customer Data

| **Identifier** | | UC-012 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin/manager wants to add/edit/remove customers data from the management system. | |
| **Pre-conditions** | | Complete UC-003 | |
| **Post-conditions** | | The customer, to whom milk is being supplied, will be added to the system’s database. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | On the customer addition page, The admin/manager will add all the required fields. | |
| **2.** | The admin/manager will select the customer status like active/inactive | |
| **3.** | The admin/manager will click “Save”. | |
| **4.** | **OR** if edit is clicked for a customer, admin/manager can edit all the details they want. | |
| **5.** | **OR** if delete is clicked, the customer will be deleted. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | If the customer has some record present like milk supplied history, and if the delete event occurs, an error will be displayed by the system because a customer having some history must not be deleted. | |

### Add daily expenses

| **Identifier** | | UC-013 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin/manager wants to add the daily expenses. | |
| **Pre-conditions** | | Complete UC-003 | |
| **Post-conditions** | | The record of daily expenses will be added into the database with the specific date selected. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | The admin/manager will first select the date. | |
| **2.** | They will add the expense and quantity of food consumed on that specific date. The food option (Green Charah, Wanda etc) will be provided from the inventory items. | |
| **3.** | They will add the expense of medications applied, if any. The medicines options will be provided from the inventory items. | |
| **4.** | They will add the miscellaneous expenses, if any. | |
| **5.** | The admin/manager will click “Save” | |
| **6.** | The system will display a confirmation popup which will say “Are you sure?You’ll not be able to edit this daily expense again”. | |
| **7.** | If the admin/manager selects “No”, the popup closes. If they selects “Yes”, a request will be sent to the server. | |
| **8.** | If yes, quantities of food and medicine will be deducted from the inventory items and the history record will be maintained under those items by the system. | |
| **9.** | If successful, a success message will be displayed. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | If the selected date is already in the database, an error message will be displayed. | |
| 2. | If the quantity of the medicine/food selected is greater than the quantity present in inventory, an error message will be displayed. | |

### Filter Daily Expense

| **Identifier** | | UC-014 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin/manager wants to filter the daily expenses. | |
| **Pre-conditions** | | Complete UC-003 and UC-013 | |
| **Post-conditions** | | The filtered daily expenses list will be displayed. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | When the list of all daily expenses will be displayed, the admin/manager can select a specific date or a range of dates from the input form. | |
| **2.** | The system will display the results on runtime after filtration. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | On date selection, if the record is not present, a message will be displayed by the system that says “No Record Found”. | |

### Add/Edit Daily Milk Production

| **Identifier** | | UC-015 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin/manager wants to add/edit daily milk production of each cow. | |
| **Pre-conditions** | | Complete UC-003 and UC-006 | |
| **Post-conditions** | | Daily milk production of each cow will be recorded into the database. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | On the milk production page, a list of all milking animals will be displayed and the admin/manager will add the milk production in morning/evening corresponding to each animal. | |
| **2.** | Or, admin/manager can add a total sum and that will be divided on each animal equally. | |
| **3.** | **OR** if “Edit” is clicked, the admin/manager will be able to edit the daily milk production of each animal. | |
| **4.** | The admin/manager will click “Save” | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | On date selection, if the record is already present, an error message will be displayed. | |

### Filter Daily Milk Production and display Trends

| **Identifier** | | UC-016 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin/manager wants to filter the daily milk production. | |
| **Pre-conditions** | | Complete UC-003 and UC-015 | |
| **Post-conditions** | | The filtered daily milk production list will be displayed. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | When the list of all daily milk production will be displayed, the admin/manager can select a specific date or a range of dates from the input form. | |
| **2.** | The system will display the graph that will show the trend of total milk production in the range of dates selected. And, | |
| **3.** | The system will display the results on runtime after filtration. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | On date selection, if the record is not present, a message will be displayed that says “No Record Found”. | |

### Add/Edit daily income

| **Identifier** | | UC-017 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin wants to add/edit the daily income. | |
| **Pre-conditions** | | Complete UC-003 and UC-012 | |
| **Post-conditions** | | The daily income will be added to the database. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | The list of all active customers will be displayed and the admin will add the quantity of milk delivered to each customer with their corresponding rates. | |
| **2.** | The admin will select the “Paid/Unpaid” status for each milk supply to a customer. | |
| **3.** | If other sources of income, admin will add those in miscellaneous types. | |
| **4.** | The admin will click “Save”. | |
| **5.** | If the admin will click “Edit”, the same option will be provided. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. | If an admin wants to add a customer, that is inactive, in the list, then the status of that customer will need to be changed to active first. | |
| **Step #** | **Exception Paths** | |
| 1. | If the selected date is already in the database, an error message will be displayed. | |

### Filter Daily Income and see Trends

| **Identifier** | | UC-018 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin wants to filter the daily income. | |
| **Pre-conditions** | | Complete UC-003 and UC-013 | |
| **Post-conditions** | | The filtered daily income list will be displayed. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | When the list of all daily incomes will be displayed, the admin can select a specific date or a range of dates from the input form. | |
| **2.** | The graph, displayed by the system, will show the trend of total daily incomes in the range of dates selected. And, | |
| **3.** | The system will display results on runtime after filtration. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | On date selection, if the record is not present, the system will display the message that says “No Record Found”. | |

### Filters on customers based on area

| **Identifier** | | UC-019 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin wants to filter the customers based on area | |
| **Pre-conditions** | | Complete UC-003 and UC-012 | |
| **Post-conditions** | | The filtered customers will be displayed | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | On the list of customers page, admin can search for the customer from the search box based on his name or address. | |
| **2.** | Also, he can select the area from the list of areas present in the dropdown. | |
| **3.** | The system will display the filtered results. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | If no customer is present using the search field, “No Record Present” message will be displayed. | |

### Comparison of multiple cows’ milk production

| **Identifier** | | UC-020 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin wants different options like the trend of milk production of an animal or want to compare milk production of each animal on the basis of selected date or the range of dates | |
| **Pre-conditions** | | Complete UC-003 | |
| **Post-conditions** | | The graph trends will be displayed. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | The admin selects an animal | |
| **2.** | The admin selects a date or a range of dates | |
| **3.** | A graph will be displayed that shows the milk production trend over the selected range | |
| **4.** | If the admin selects a comparison option, all milking animals will be selected by default and the trend will be displayed on the basis of total production in a day. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | If the admin selects a date that has no record, no data will be shown. | |

### Customer login to his portal

| **Identifier** | | UC-021 | |
| --- | --- | --- | --- |
| **Purpose** | | The customer wants to login to his portal | |
| **Pre-conditions** | |  | |
| **Post-conditions** | | Customer will be logged in to his portal | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | Customer enters his login credentials | |
| **2.** | Customer clicks on login | |
| **3.** | If successful, will be redirected to his portal. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | If wrong credentials are used, an error message will be displayed. | |

### Filtration on customer’s milk supplied data

| **Identifier** | | UC-022 | |
| --- | --- | --- | --- |
| **Purpose** | | The customer wants to filter the milk supplied data on his portal on the basis of date selected | |
| **Pre-conditions** | | Complete UC-021 | |
| **Post-conditions** | | Filtered data will be displayed. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | The customer selects a date or range of dates. | |
| **2.** | The system will display the filtered results. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | If not data on the date selected, it’ll show the “No Record Found” message. | |

### Invoice release to customers

| **Identifier** | | UC-023 | |
| --- | --- | --- | --- |
| **Purpose** | | The admin wants to release the invoice for the selected customers for all unpaid dues. | |
| **Pre-conditions** | | Complete UC-003 | |
| **Post-conditions** | | Invoice release will be sent to the customers on their portal. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | The admin selects the customers from the list. | |
| **2.** | The admin selects the date range for which all dues are pending for each customer. | |
| **3.** | The admin clicks on “Send Invoice” | |
| **4.** | If successful, invoices will be visible on each customer’s portal. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | If any error occurs, an error message will be displayed. | |

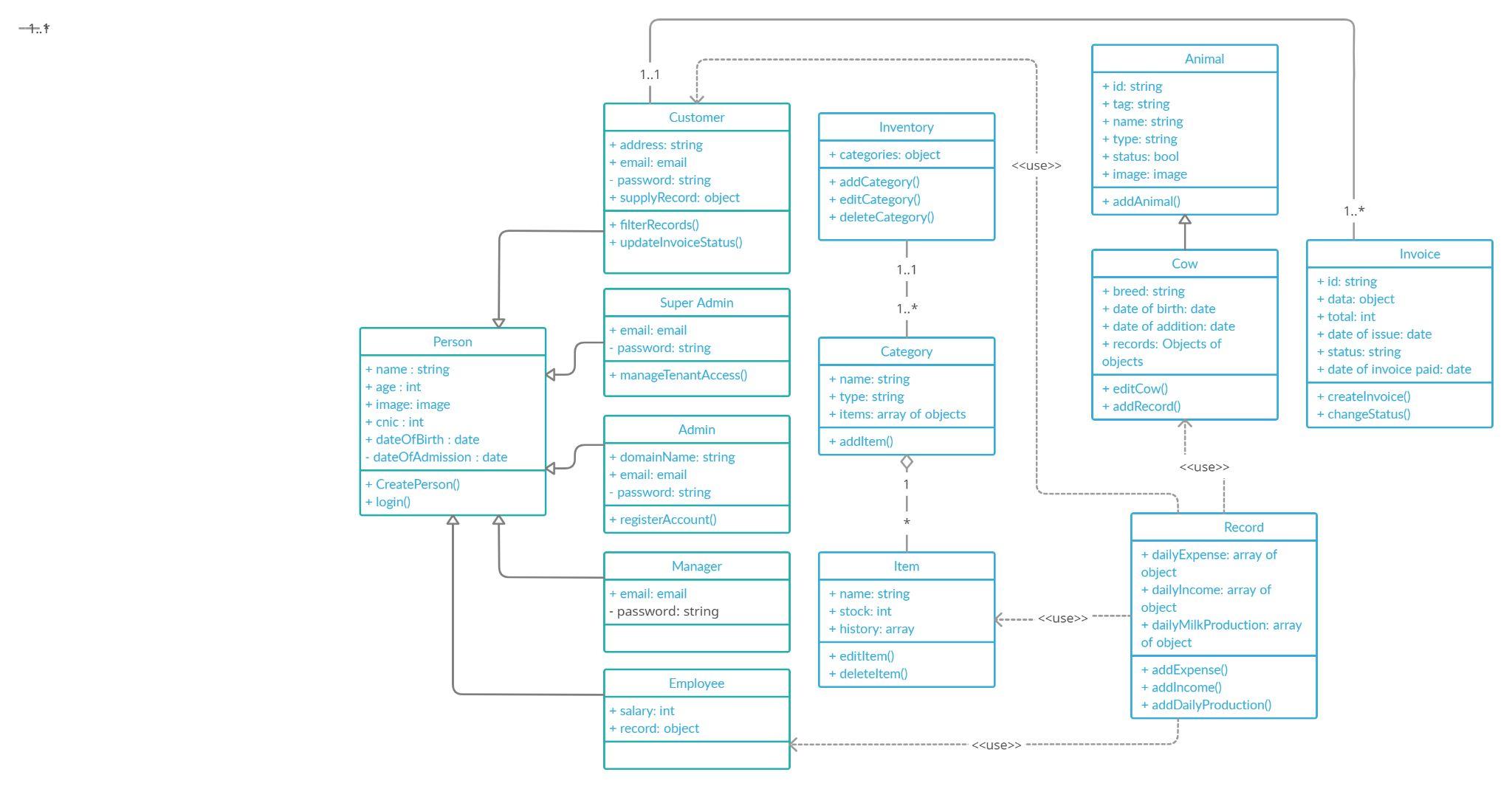
### Update status of Invoice from Customer’s portal

| **Identifier** | | UC-024 | |
| --- | --- | --- | --- |
| **Purpose** | | The customer will review the invoice and change its status to paid if it is paid. | |
| **Pre-conditions** | | Complete UC-021/UC-003 | |
| **Post-conditions** | | Invoice status will be updated to paid and notification will be sent to the admins. | |
|  | | | |
| **Step #** | **Typical Course of Action** | |
| **1.** | The customer opens the invoice for review. | |
| **2.** | The customer changes its status to paid. | |
| **3.** | If successful, notification will be sent to admins. | |
|  | | | |
| **Step #** | **Alternate Courses of Action** | |
| 1. |  | |
| **Step #** | **Exception Paths** | |
| 1. | If any error occurs, an error message will be displayed. | |

# Class Diagram

## Diagram

The class diagram for our software is as follows:



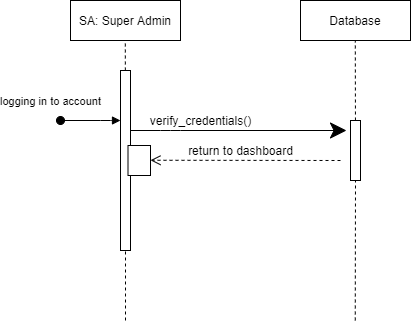
## Description

## Person It’ll be the person which contains basic attributes for a person to exist. Other persons will inherit this class for their common attributes.

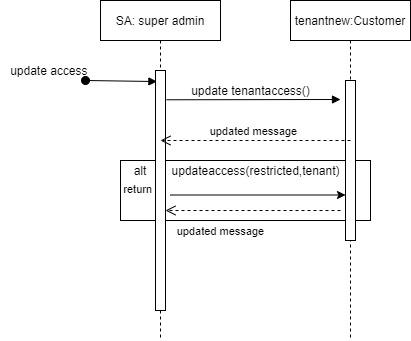
* + 1. **Super Admin**Super Admin is the owner of the product i.e. Dairy Management System. He’ll be able to manage access to multiple tenants from his dashboard and also, he can restrict them from using their business accounts.
    2. **Admin**He’ll be the tenant admin and will contain basic attributes inherited from the **Person Class**.
    3. **Manager**Manager class will inherit the person class for its existence.
    4. **Employee**  
       Employee class will inherit the person class and it also contains the salary attribute as well that is necessary for him to exist. It also has records associated with him that store how much money he has been paid and on which date.
    5. **Inventory**Inventory class will have multiple categories and it provides the function to add those new categories.
    6. **Category**  
       Category class will have the type which specifies that if it is a Volume based category or Weight based or the category whose items’ quantities cannot change with consumption.
    7. **Item**  
       This will store the details of items and provide methods like edit and delete and delete will only work if this item’s record is empty.
    8. **Animal**This class is the base class for animals and has basic attributes that are common among different animals.
    9. **Cow**  
       This class will have attributes that are for cows and inherit the Animal Class as well. This class will also have records objects as an attribute which stores different records like milk production record, medication record, vaccination record etc.
    10. **Record**  
        This is the most important class of all and it depends on various other classes for its existence. If we want to add daily expense, we have to refer to this class and that depends on the items class if we want to add the expense of the item present in the inventory i.e. Medicine.  
          
        Also, if we want to add daily income, it depends on the Customer Class because if we want to add the milk supplied to a customer then it depends on the existence of this Customer Class instance.  
          
        Likewise, for the milk production record of animals, we want the instance of Cow Class and hence dependency occurs.
    11. **Invoice**  
        Invoice class is for charging a customer on the unpaid supplies of milk and a single customer can have multiple invoices.

# Sequence Diagrams

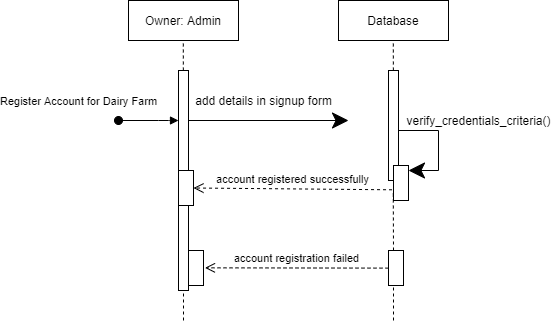
## Login for Super Admin (Product Owner)



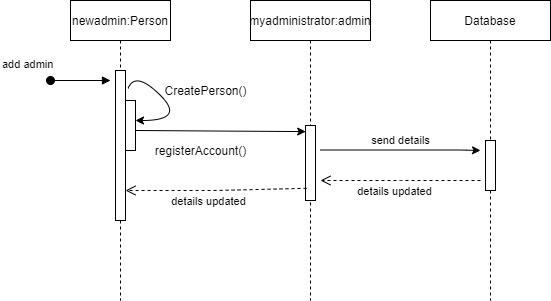
## Change access for tenants



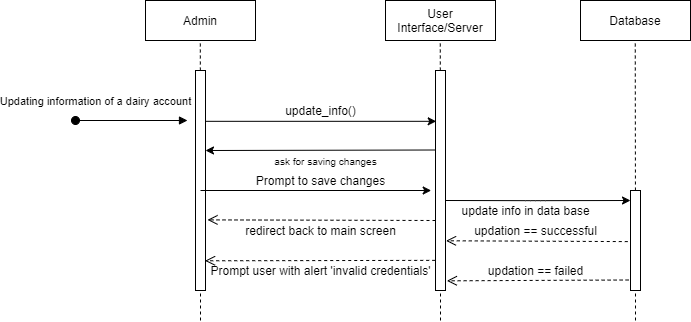
## Register Account for Dairy Farm



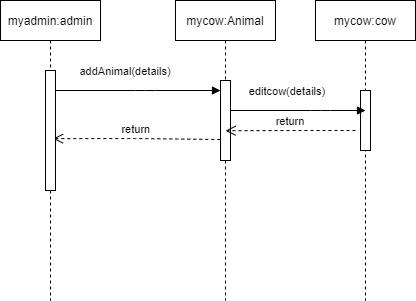
## Addition of Admin/Manager to Management Team



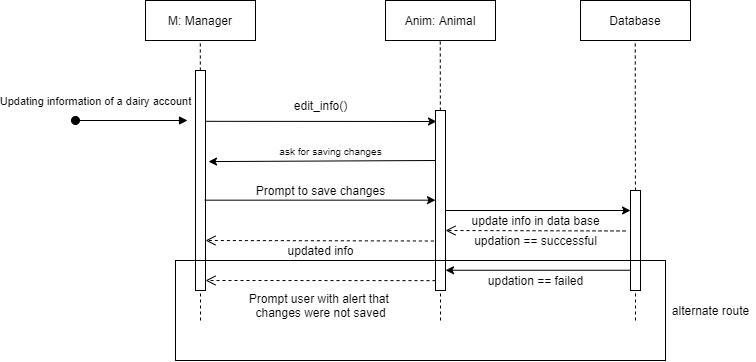
## Update Information of a Dairy Account



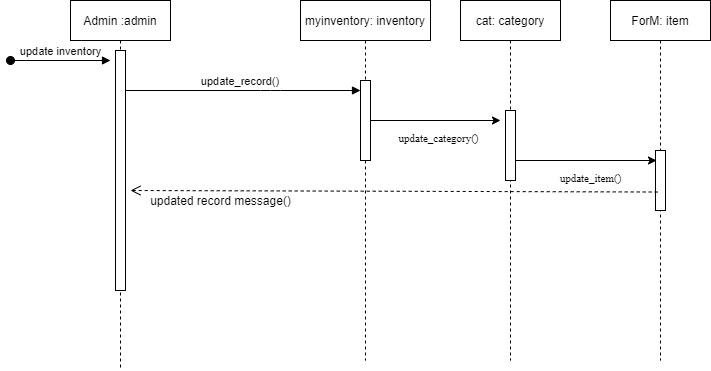
## Add new animal



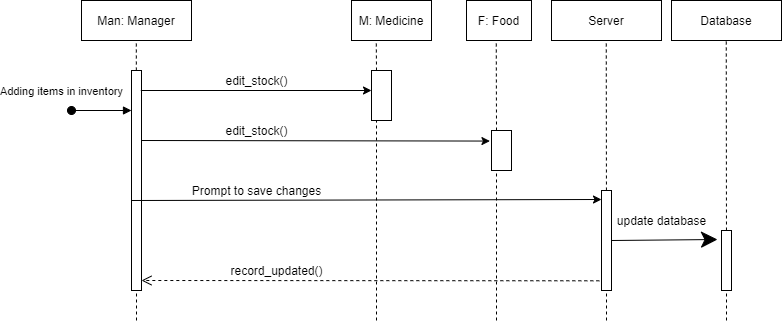
## Adding Animal Records



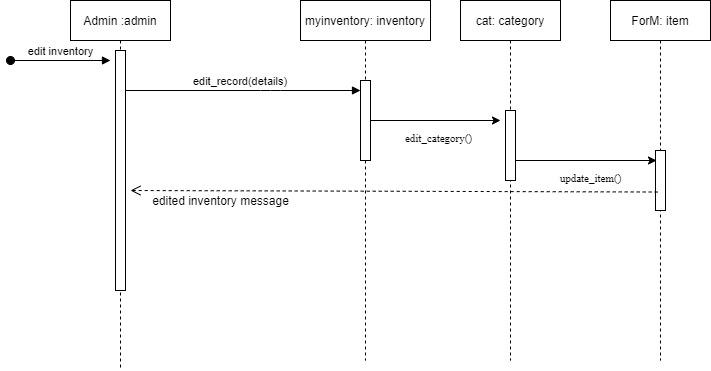
## Adding categories to the inventory



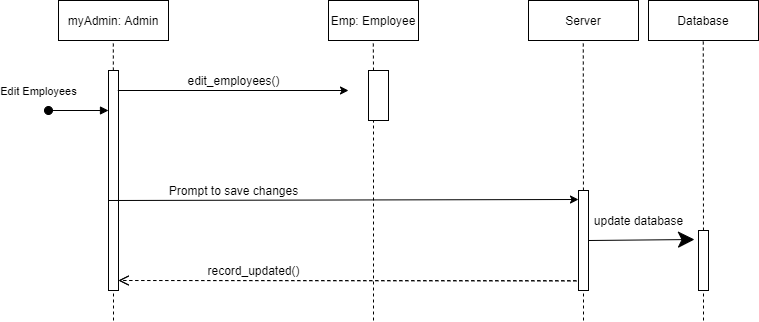
## Add items in the inventory



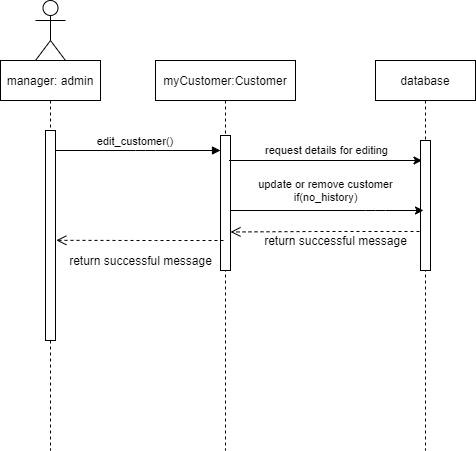
## Edit/Delete inventory item



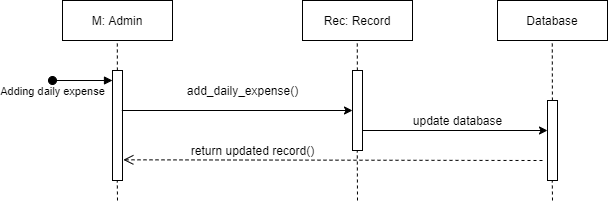
## Add/Edit Employees



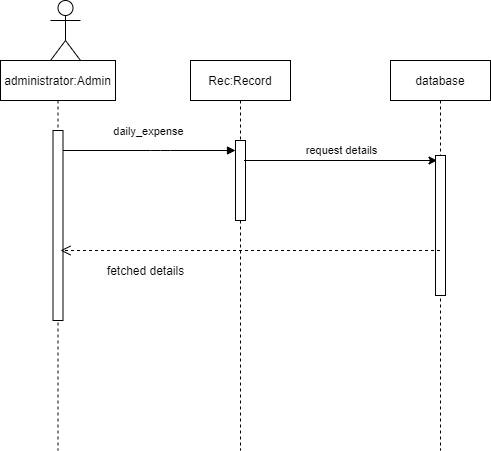
## Add/Edit/Remove Customer Data



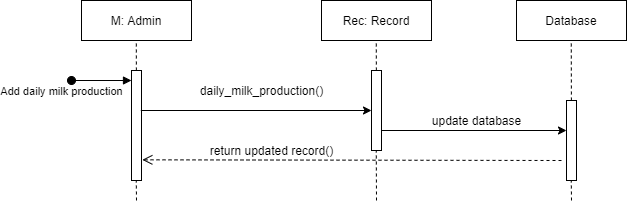
## Add Daily Expenses



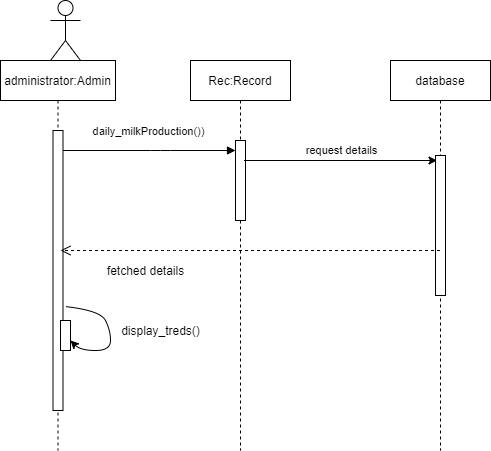
## Filter daily expense



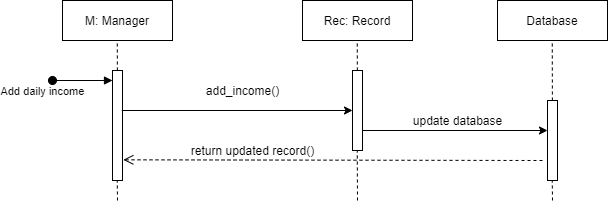
## Add/Edit Daily Milk Production



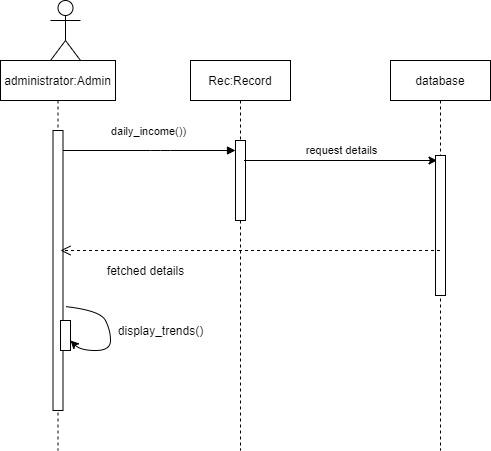
## Filter Daily milk production and display trends



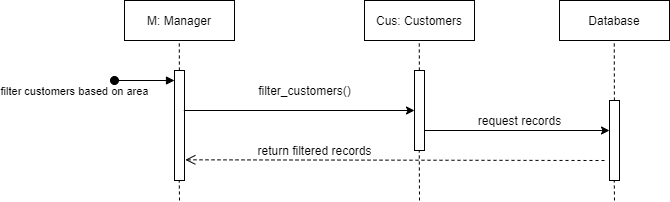
## Add/Edit Daily Income



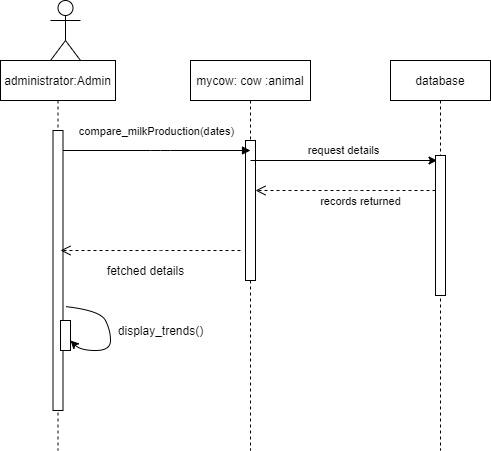
## Filter daily income and display trends



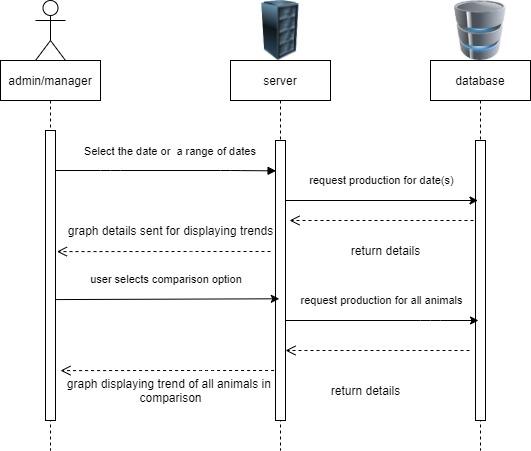
## Filters on Customer Data based on area



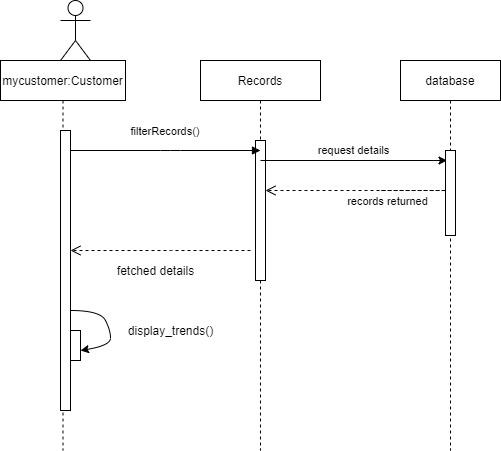
## Comparison of multiple cows’ milk production



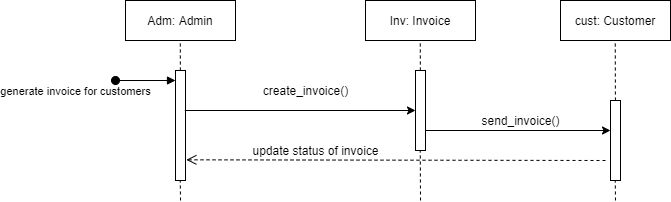
## Use case Name e.g., Transfer funds



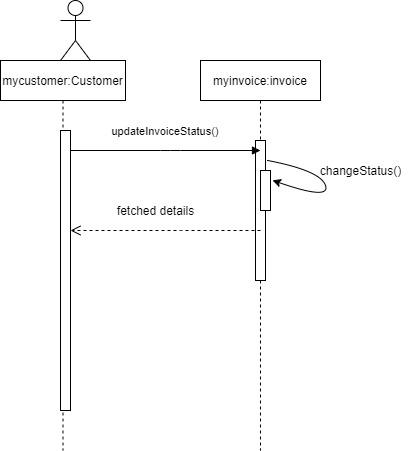
## Filtration on customer’s milk supplied data



## Invoice Release to Customers



## Update status of Invoice from Customer’s portal



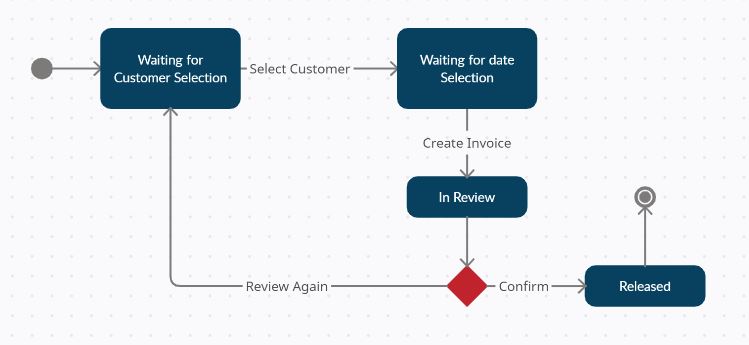
# State Diagrams

<Repeat the following if you need to draw state diagrams of multiple objects>

## State Diagram for Adding Daily Expenses

* + 1. <Name of the object whose state is being shown along with details of states and messages.>

| State | Description |
| --- | --- |
| Waiting for customer selection | The system will be waiting for the customer selection to whom the invoice will need to be released. |
| Waiting for date selection | After selecting the customer, the system will be waiting for the date selection for which invoices should be released. |
| In Review | When the invoice is created, the invoice state will be set to “In Review”. |
| Released | When reviewed, the admin will confirm the invoice and state will be changed to “Released”. |

* + 1. State Diagram  
         
       

# Non-functional Requirements / Quality Attributes

| 1 | The system should not use extensive memory, not more than 1 GB memory at its time of execution. |
| --- | --- |
| 2 | The system should not fail more than 3 times for a given week and in case of failure must be available within 5 minutes. |
| 3 | Each page must load within 2 seconds after the user has made a request. |
| 4 | System should be secure against threats essentially the OWASP security standards which include input validation such as validation of data length or range, not disclose sensitive error information such as system details; Data protection by implementing least privilege which would restrict user to only functionality, data and information that they need to perform their tasks. |
| 5 | Privacy standards according to the GDPR be followed i.e. Not withholding personal data without the user’s consent, limitation of data storage that would mean no extra data is collected from the user. |
| 6 | The system should scale and be able to handle more traffic, 500 users at peak times that would be from 10am to 5pm. |
| 7 | For the Usability of the system the user must be able to navigate easily such as not going through a series of pages to make a payment slip request not more than 4 clicks for any request in the navigation. |
| 8 | The system should be expandable from the product owners’ side so that new features may be added such as a personalized data analysis graph. |
| 9 | The help documentation for the system should be released in the commonly understood language English and Urdu. |
| 10 | The system should cater for faulty inputs and must load or prompt the user for a correct input such as a price calculator accepting numbers and not letters. |
| 11 | The system should require authentications for all resources and information except that are intended to be public, least privilege principle will be followed and access granted would allow users to fulfill their purpose. As needed, access right can be given or withdrawn and in case of failure access controls should fail securely. |

# Who Did What?

| **Name of the Team Member** | **Tasks done** |
| --- | --- |
| Use Cases | Furqan Athar |
| State Diagrams | Furqan Athar |
| Class Diagram | Abdullah Saleem + Furqan Athar |
| Sequence Diagrams | Khawaja Junaid + Saad Qadeer |
| Non-Functional Requirements | Khawaja Junaid + Saad Qadeer + Abdullah Saleem |

# Review checklist

| **Section** **Title** | **Reviewer Name(s)** |
| --- | --- |
| Use Cases | Khawaja Junaid + Abdullah Saleem + Saad Qadeer |
| State Diagrams | Saad Qadeer |
| Sequence Diagrams | Furqan Athar |
| Class Diagrams | Khawaja Junaid |
| Non-Functional Requirements | Furqan Athar + Saad Qadeer + Khawaja Junaid + Abdullah Saleem |