Agri-Pro

Software Requirement Specification

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Course Code: SE505

Submission Date: 22 October, 2020

Story

Agri-Pro

Agri-pro is an android application, which is very helpful for agricultural students and farmers. This is intended to ease the students in increasing their vocabulary , farmers to seek help from a question-answer forum, get live weather forecasts, get fertilizer calculation, get disease information of some fruits and vegetables with more convenience.

1) Account Management:

1.1) Create Account:

User Perspective: A user must create an account to ask questions in the question-answer forum. He/she needs to provide the following information to create account-

- User name
- Mobile number
- Password
- District name
- Division name

After providing the information, the system will send a confirmation code to the provided mobile number. By inputting this code, an account will be created.

Admin Perspective: An account for the administrator will be given with a predefined username and password. Then , he/she will be able to add more

admin to the system giving a specific username and password. Admin will be able to remove users from the system.

1.2) Update Account:

Admin perspective: Admin will also be able to change his password after log in.

User perspective: Users can update his/her profile. He/she can change his/her following information-

- Name
- Password

1.3)Password Recovery:

A user can recover his/her password if forgotten, by using his/her mobile phone number. Users can click on the “Forget Password” Button and click on the “Recover Through Mobile Number” button.

An OTP will also be sent to the user’s mobile number , if a user clicks on the “Recover Through Mobile” button. User will have to input the OTP within a fixed time and then he/she will have to input a new password. His/her password will be updated in the Database.

1.4) Log in:

A user can log into the system by using his/her phone number and password. An administrator can login with the predefined username and password given by the system authorities

2)Agriculture Dictionary:

The features of this dictionary are given below:

- Definition, example and parts of speech of the word will be available in the dictionary.
- Users will be able to search agriculture related word meanings and definitions using search bar.
- Users will be able to add new words to the dictionary for him/her.
- Users can add words to their favourite word list.
- A user can use this dictionary feature offline.

3) Weather forecasting:

After clicking the weather feature, Users can check live weather based on their current (after providing access to their phone location) phone location.

Moreover, a user can also find weather for a given valid location. After getting the weather details ,farmers will be able to make any kind of decisions about farming easily.

4)Question-Answer forum:

To use this feature , users must log in. Every authorized user can post their problems and also can add images in the question to describe their problems . They will be able to see others' questions and answers. Experts will give answers to the questions from the admin side.

Internet connection will be needed for using this feature. Then, a user will be able to scroll down and see previous questions and answers of his/her own and others.

Except admin no one can remove/delete questions.

A user can give feedback to the question(using Like or dislike button).

5)Diseases of vegetables and fruits:

In the diseases section, initially there will be some sample fruit/vegetables list. To know about a disease of a fruit or vegetable, a user can search by fruit or vegetable name. After clicking the fruit/vegetable name, users will be able to see the diseases list related to this fruit/ vegetable.

Moreover, there will also be a default list of diseases. In that list, some fruits/vegetables names will be available. After clicking on a specific fruit/vegetable name, it will prompt the user to select a disease name of this particular fruit/vegetable from the disease list. After selection, the user will be able to see the details about this specific disease. Admin can add new diseases information in the Firebase database.

6)Fertilizer calculator:

Using this feature, a user will be able to calculate an ideal measure of fertilizer. To calculate fertilizer for a field, a user must give the total field size and select fruit/vegetable name in a specific text field. After clicking the "calculate" button, the app will show the total measure of different kinds of fertilizer with the specific details , which will help the farmers to reduce the fertilizer waste and production cost.

Admin can add new fertilizer calculation information in the database.

7) Database:

Firebase: Users and admins info will be stored in the Firebase. All the questions and answers posted by the users and the disease details info will also be stored and updated in the Firebase database. An ideal measurement of fertilizer for some fruits and vegetables will be added to the database for fertilizer calculation purposes.

Hive Database: Hive, a nosql database will be used for storing Dictionary information. It stores data locally in the user's device.

Use Case Diagram:

A Use Case diagram simply describes a story using corresponding actors who perform important roles in the story and makes the story understandable for the users.

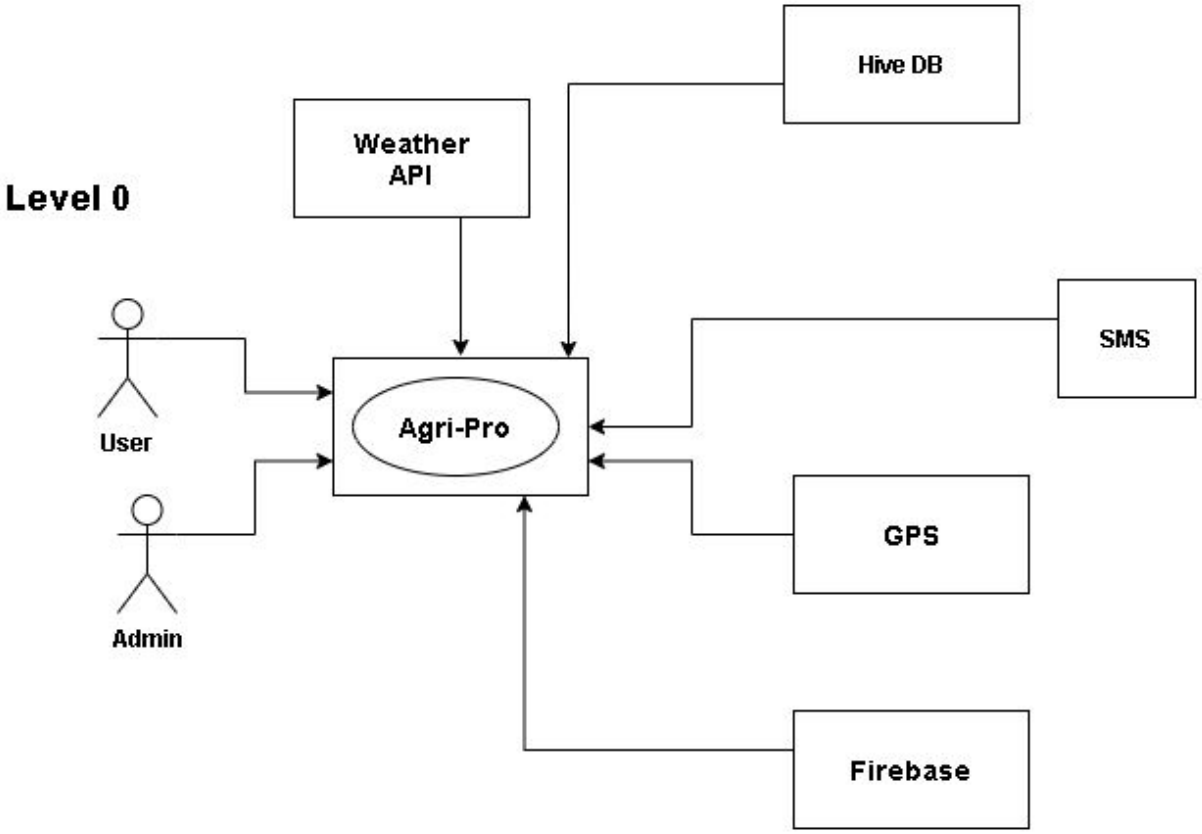
Primary Actor

Primary actors interact directly to achieve required system function and derive the intended benefit from the system. They work directly and frequently with the software.

Secondary Actor

Secondary actors support the system so that primary actors can do their work. They either produce or consume information.

Use case name: Agri-Pro
ID: 0
Primary Actor: User, Admin, Firebase, Hive database
Secondary Actor: Weather API, SMS, GPS



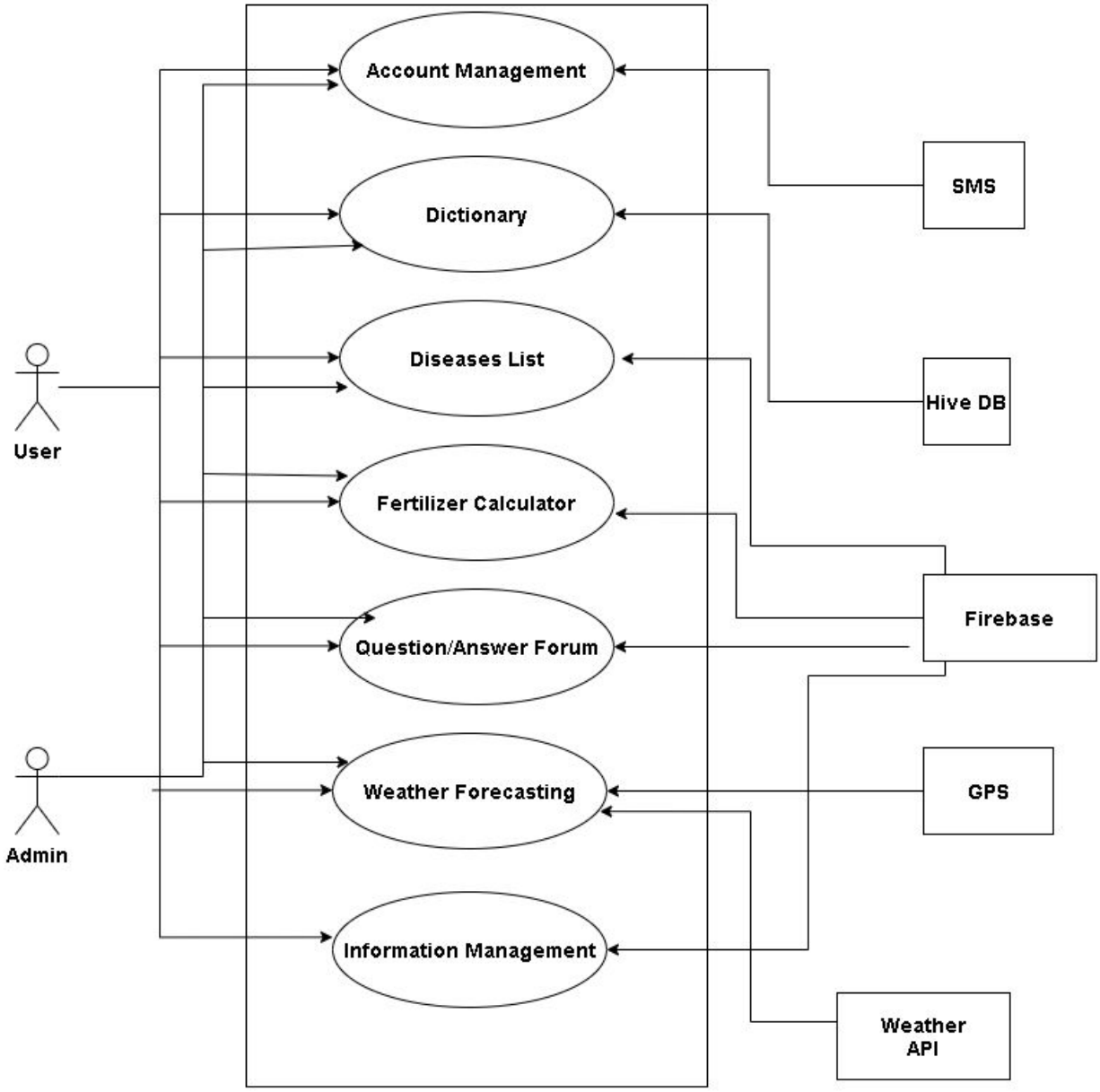
Use case name: Agri-Pro

ID:1

Primary Actor: User, Admin, Firebase, Hive database

Secondary Actor: Weather API, SMS, GPS

Level 1 : Agri-Pro



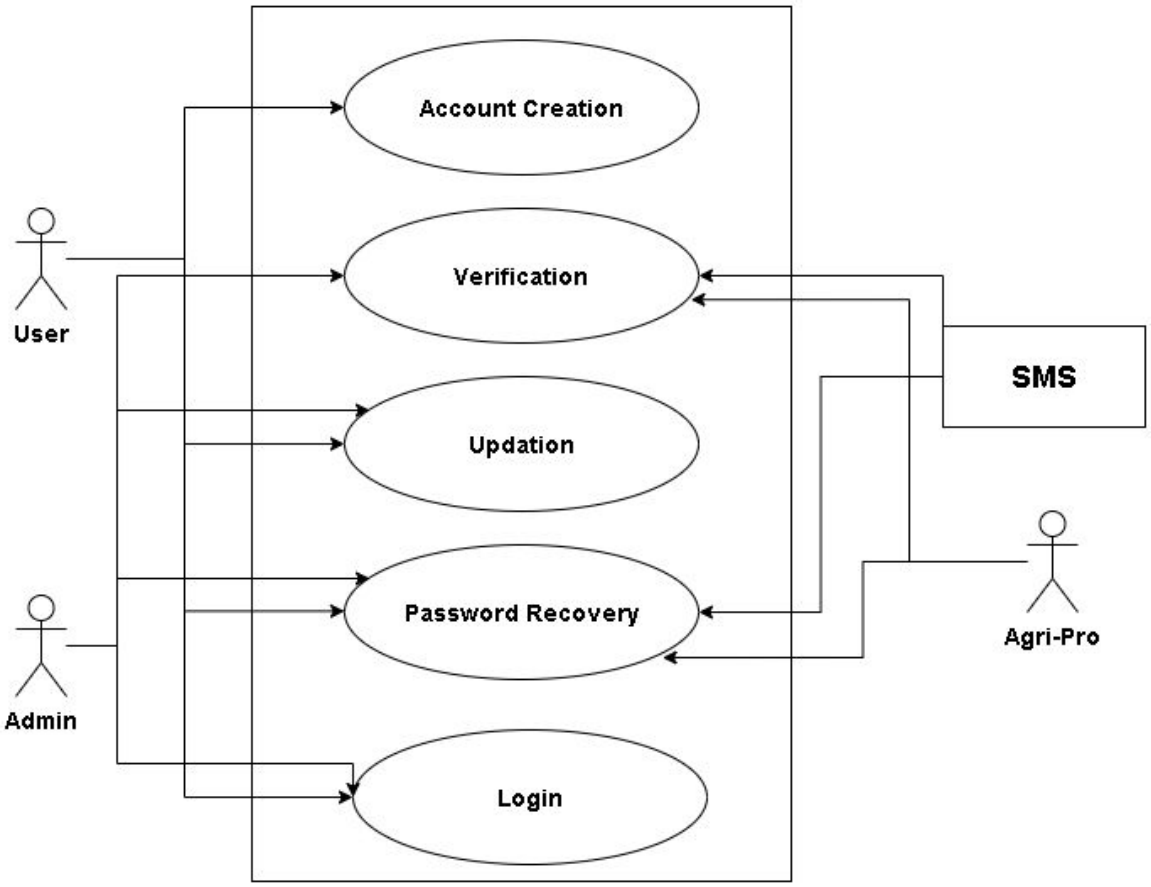
Use case name: Account Management

ID: 1.1

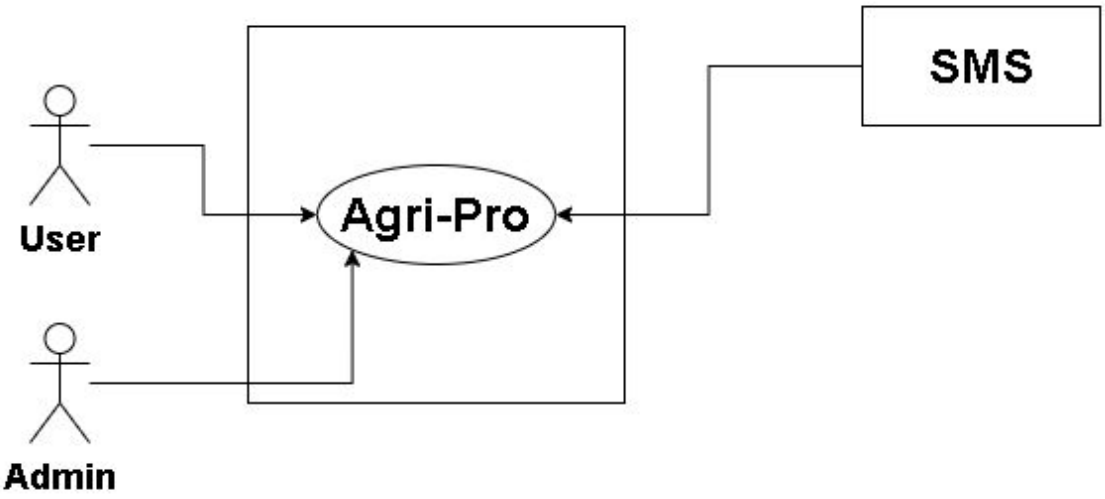
Primary Actor: User, Admin, Agri-Pro(System)

Secondary actor: SMS

Level 1.1: Account Management

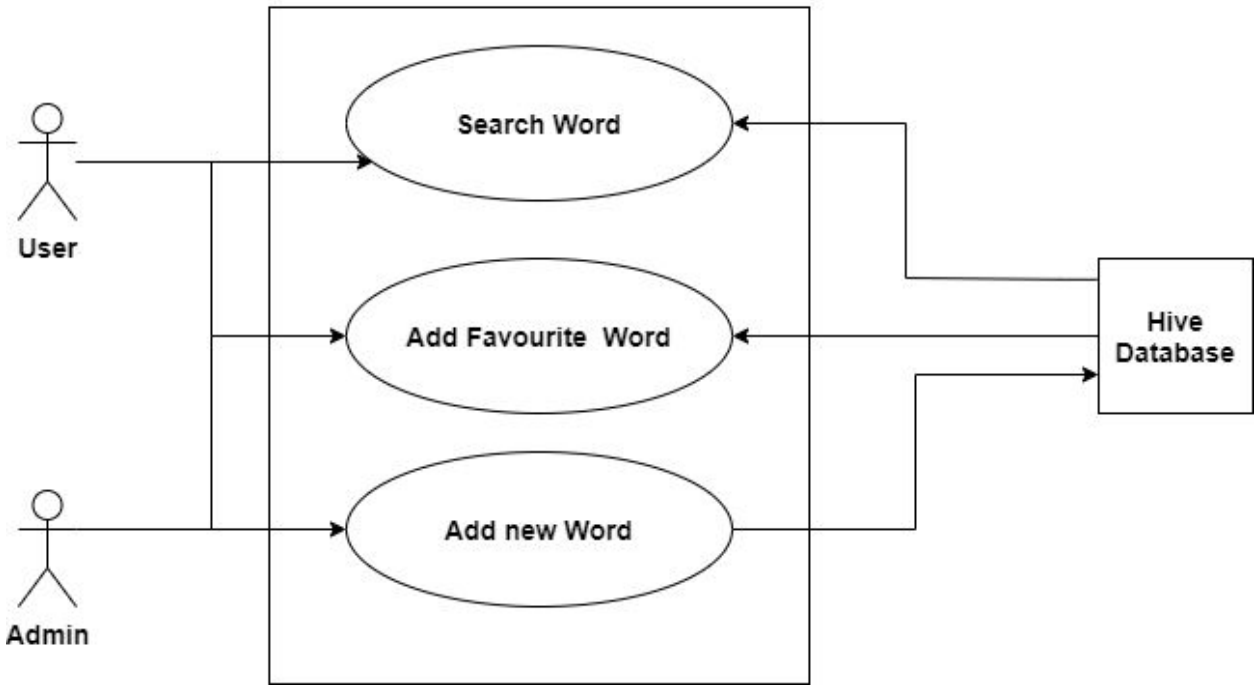


Use case name: Password Recovery
ID: 1.1.4
Primary Actor: User, Agri-Pro
Secondary actor: SMS



Use case name: Dictionary
ID: 1.2
Primary Actor: Admin, User, Hive database

Level 1.2: Dictionary

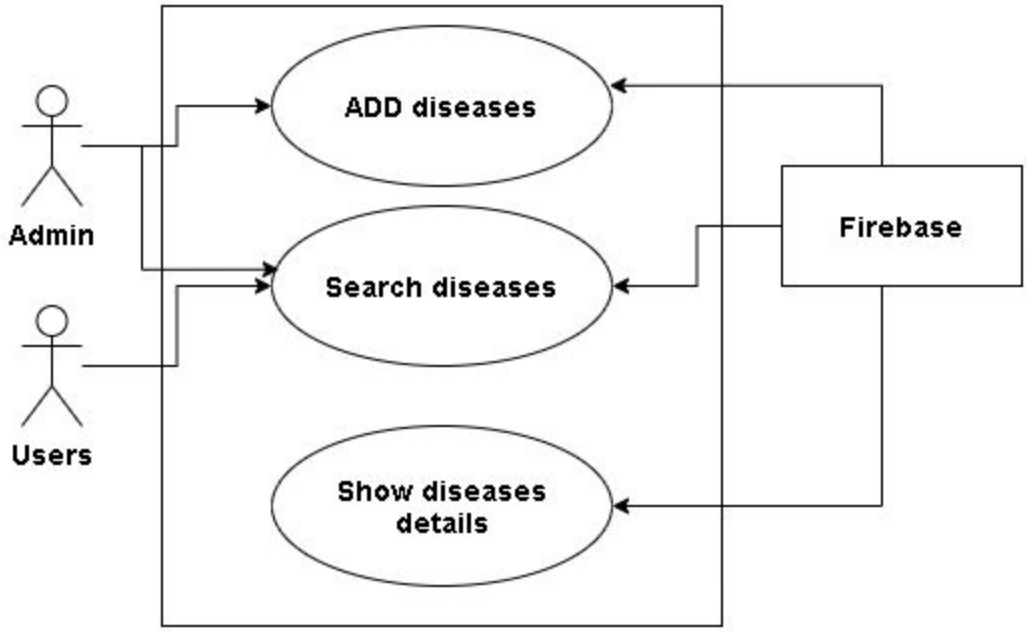


Use case name: Diseases List

ID: 1.3

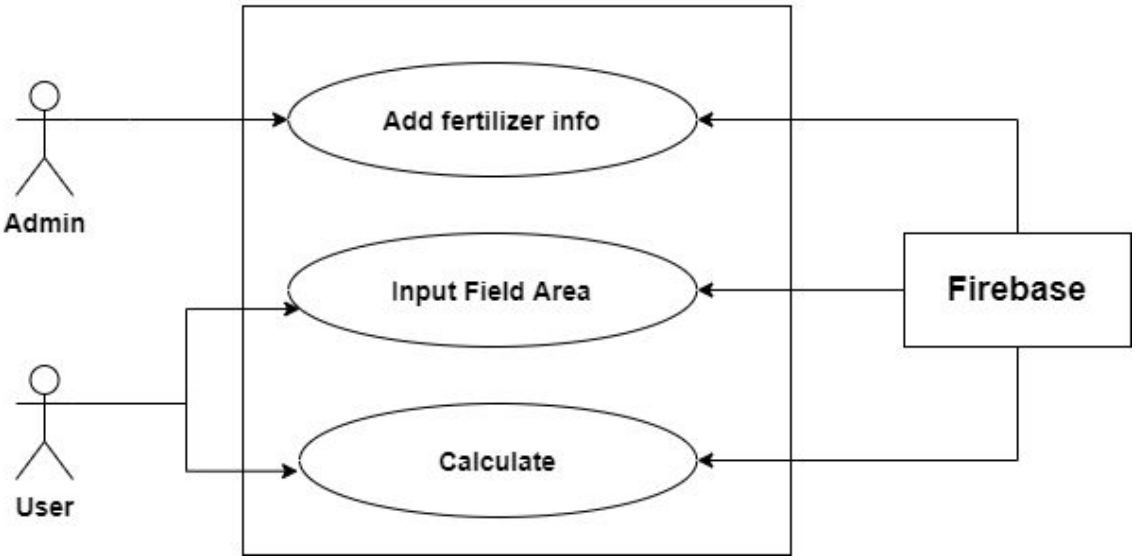
Primary Actor: Admin, User, Firebase

Level 1.3:Diseases List



Use case name: Fertilizer Calculator
ID: 1.4
Primary Actor: Admin, User, Firebase

Level 1.4:Fertilizer Calculator

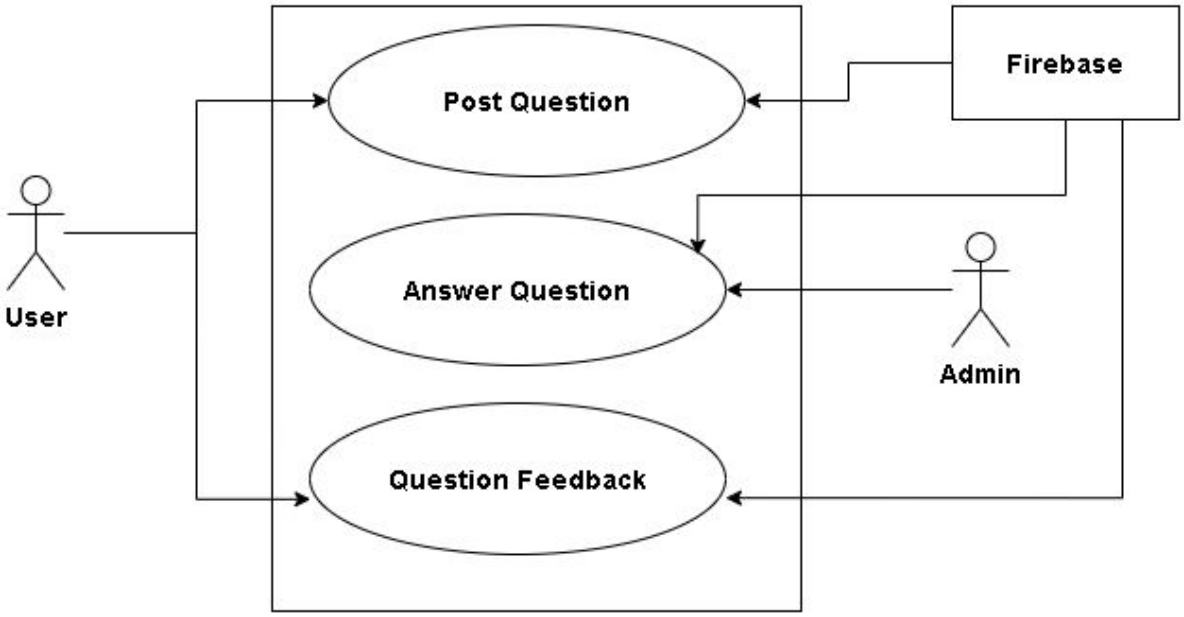


Use case name: Question-Answer Forum

ID: 1.5

Primary Actor: User, Admin, Firebase

Level 1.5: Question/Answer Forum



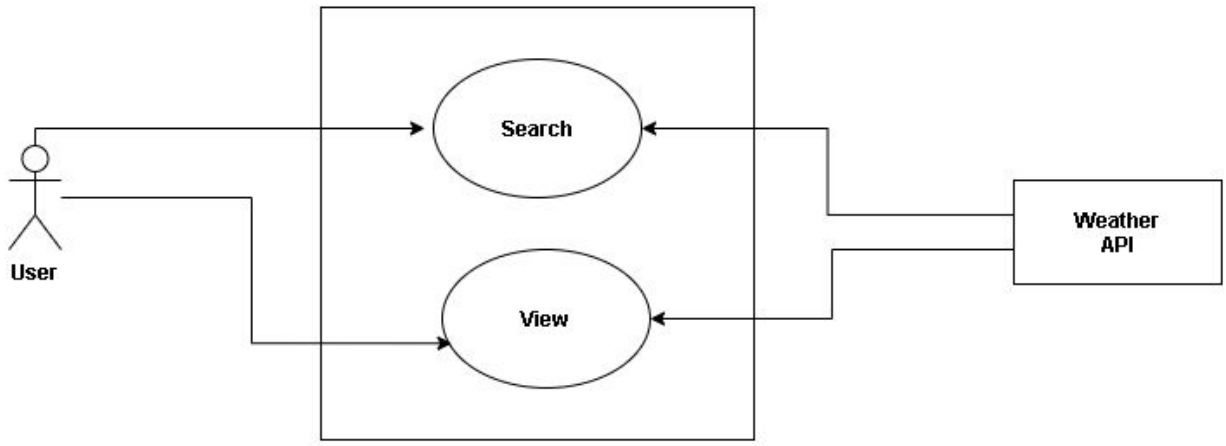
Use case name: Weather Forecasting

ID: 1.6

Primary Actor: User

Secondary actor: Weather API

Level 1.6: Weather forecasting

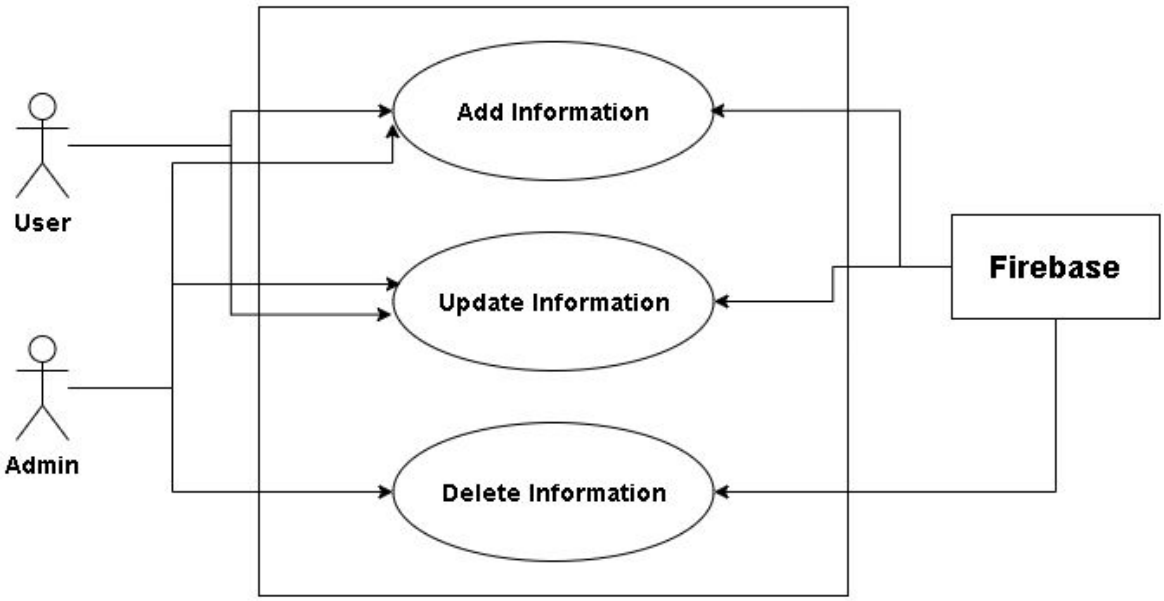


Use case name: Information Management

ID: 1.7

Primary Actor: User, Admin, Firebase

Level 1.7: Information Management

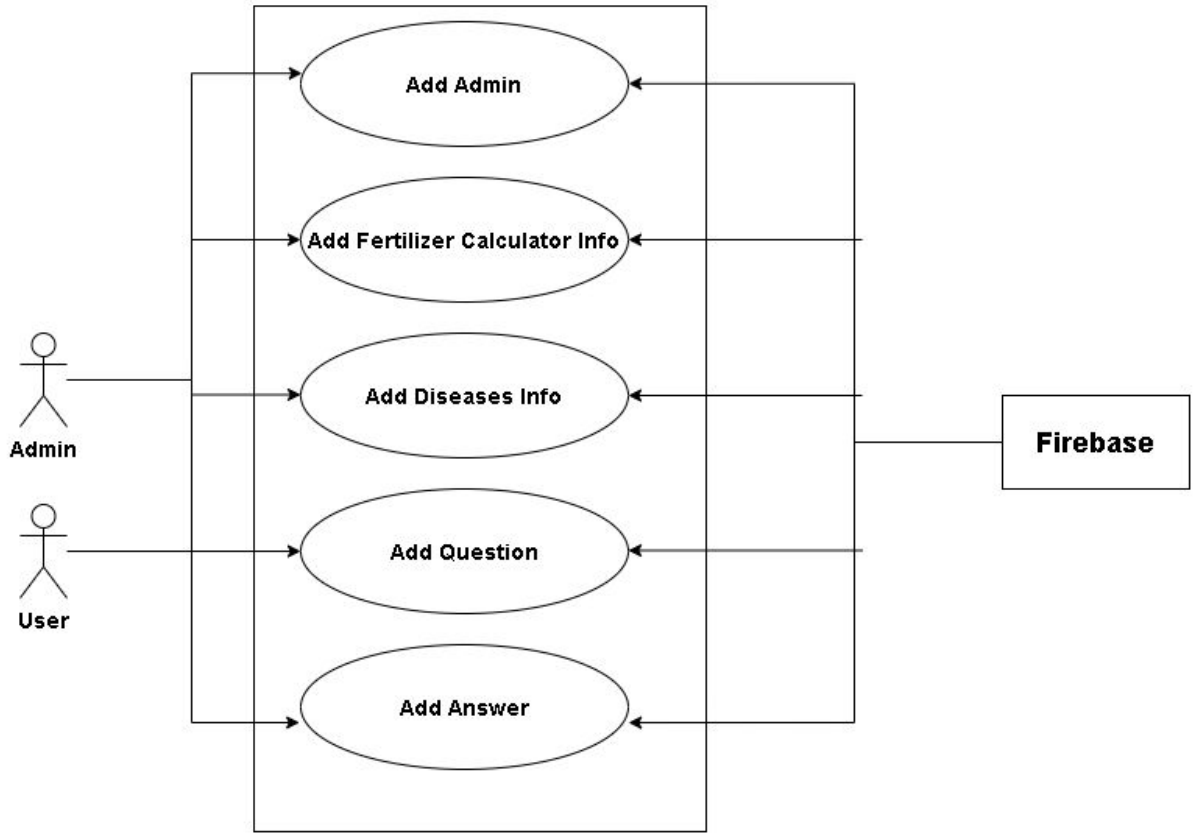


Use case name: Add Information

ID: 1.7.1

Primary Actor: User, Admin, Firebase

Level 1.7.1: Add Information

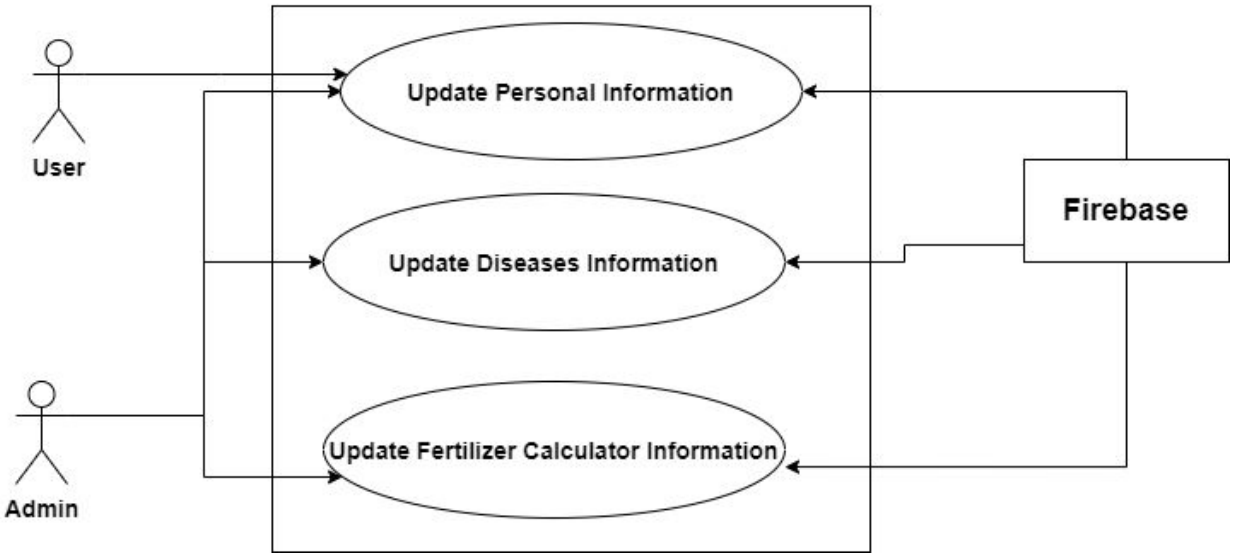


Use case name: Update Information

ID: 1.7.2

Primary Actor: User, Admin, Firebase

Level 1.7.2: Update Information

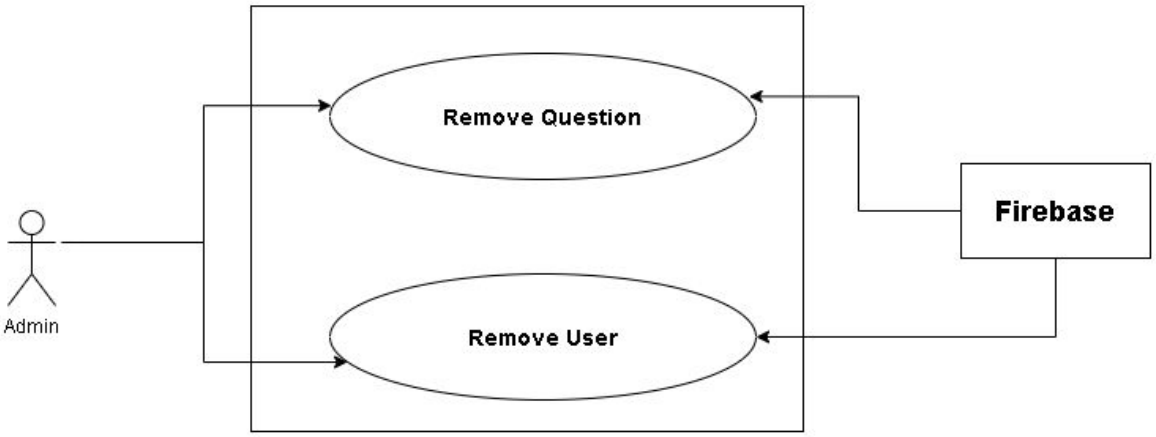


Use case name: Delete Information

ID: 1.7.3

Primary Actor: Admin, Firebase

Level 1.7.3: Delete Information

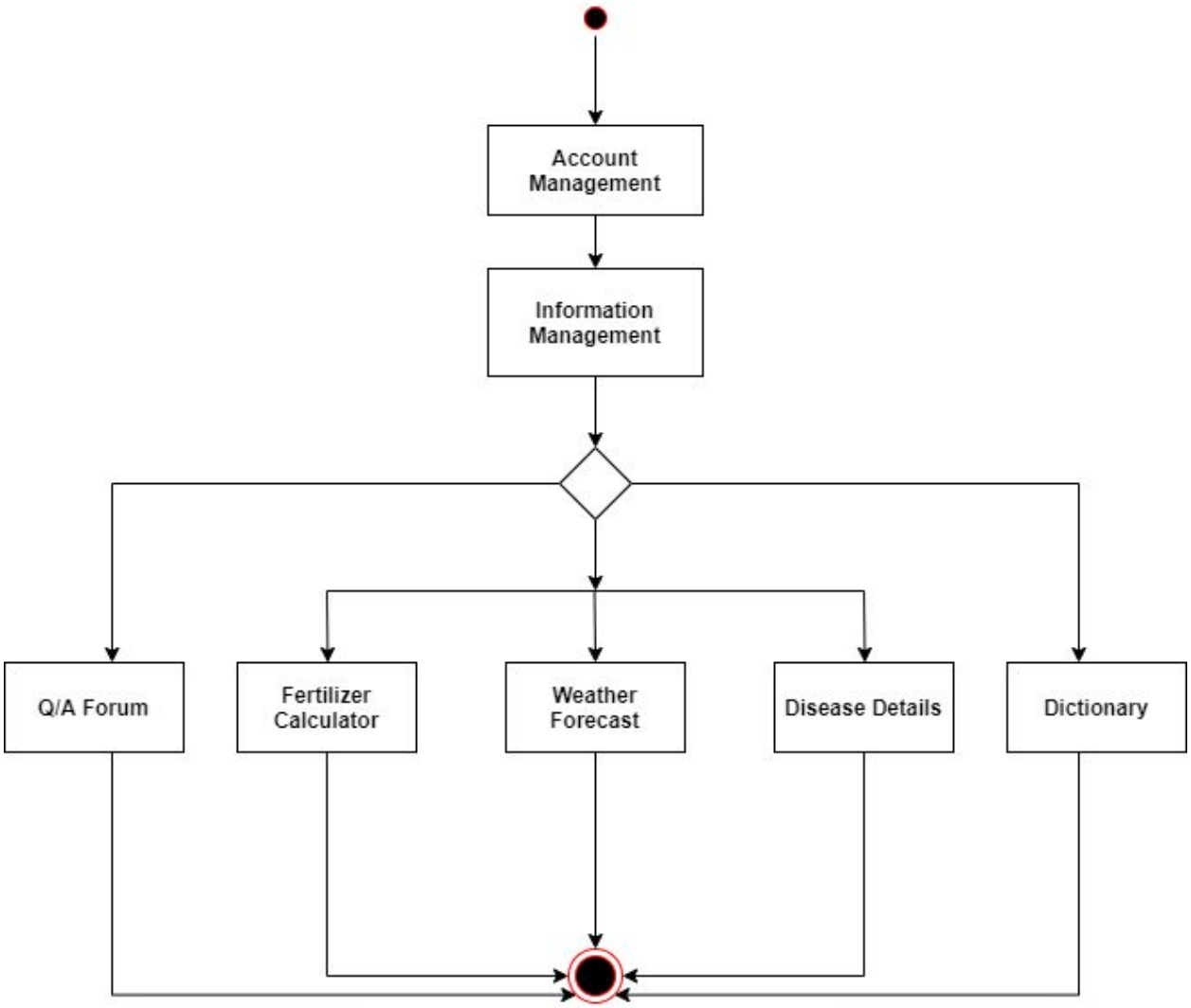


Activity Diagram:

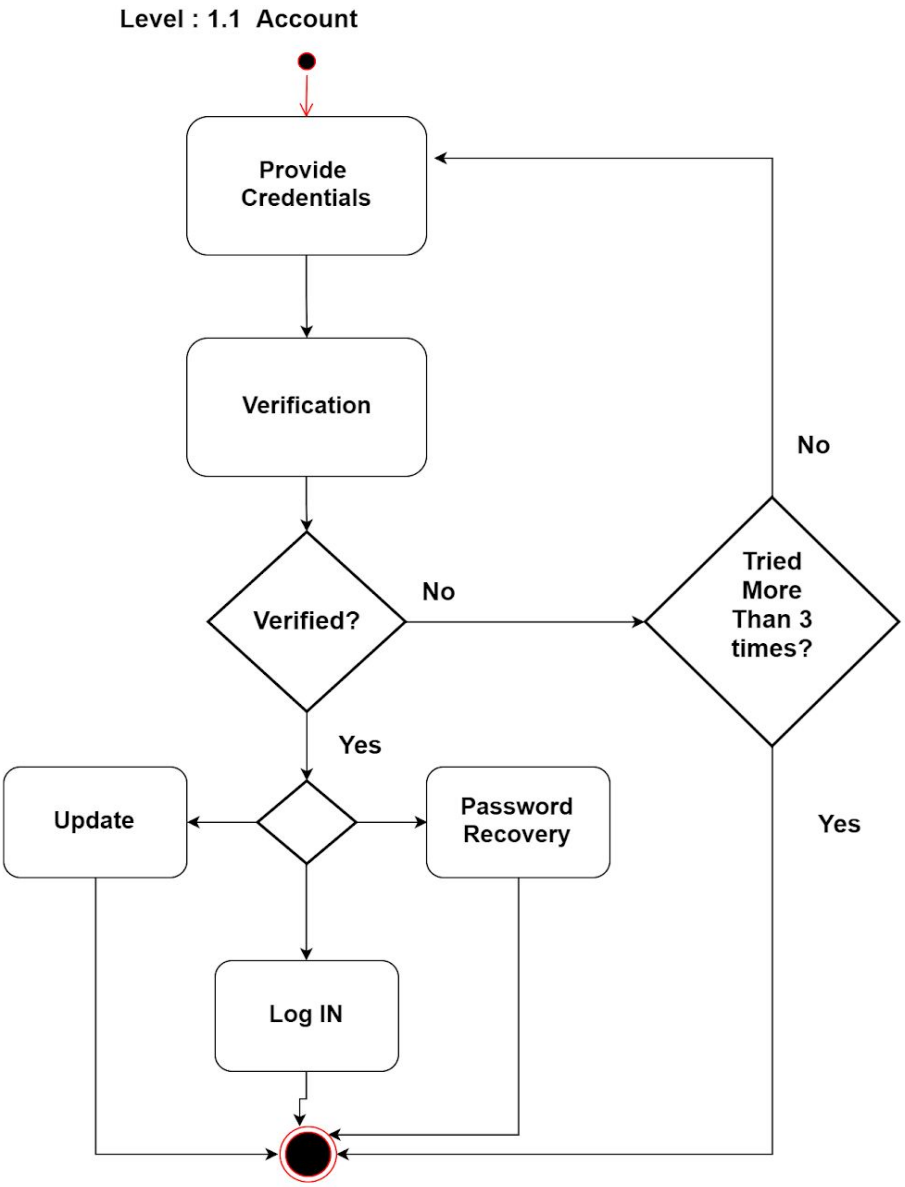
Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency.

Activity Name: Agri-Pro
Activity Level: 1
Reference: Use Case Level 1

Level 1: Agri-Pro

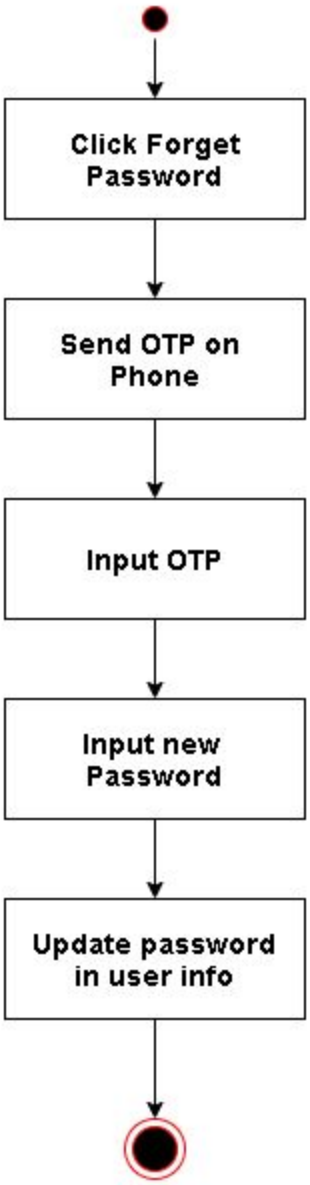


Activity Name: Account
Activity Level: 1.1
Reference: Use Case Level 1.1



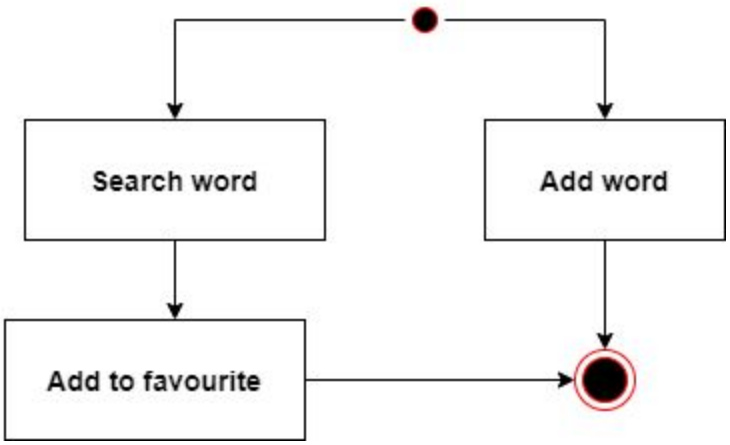
Activity Name: Verification
Activity Level: 1.1.2
Reference: Use Case Level 1.1.2

Level 1.1.2: Verification



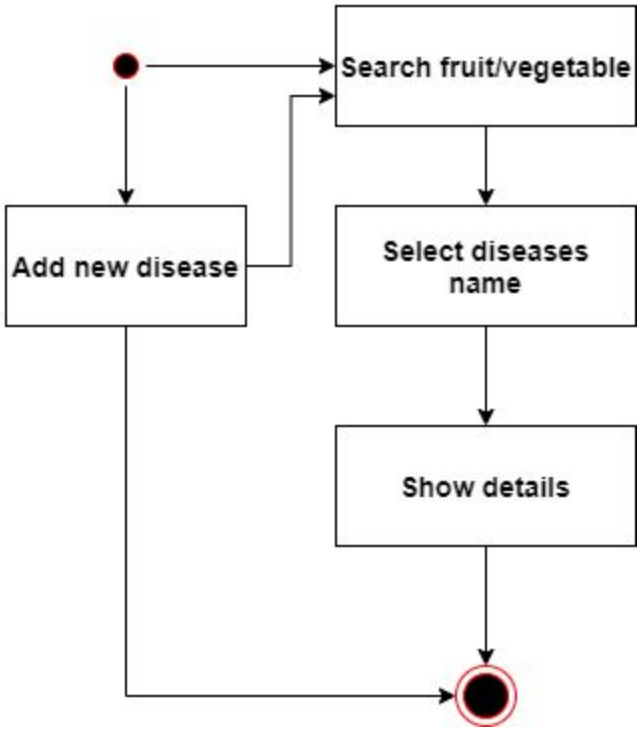
Activity Name: Dictionary
Activity Level: 1.2
Reference: Use Case Level 1.2

Level 1.2: Dictionary



Activity Name: Diseases List
Activity Level: 1.3
Reference: Use Case Level 1.3

Level 1.3: Diseases List

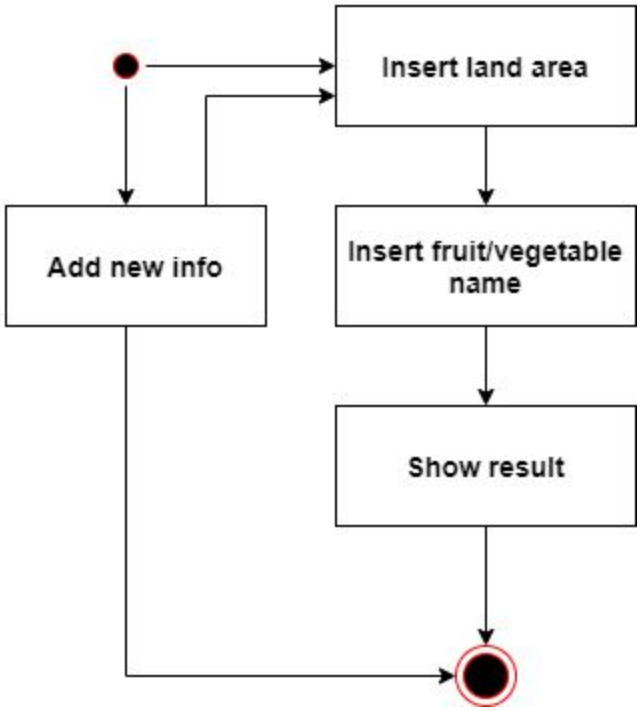


Activity Name: Fertilizer Calculator

Activity Level: 1.4

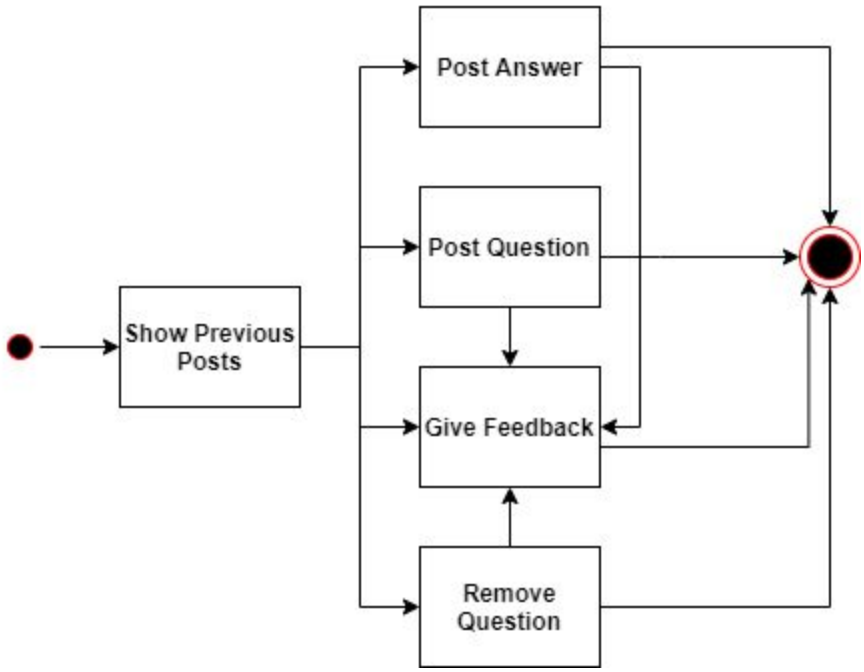
Reference: Use Case Level 1.4

Level 1.4: Fertilizer Calculator



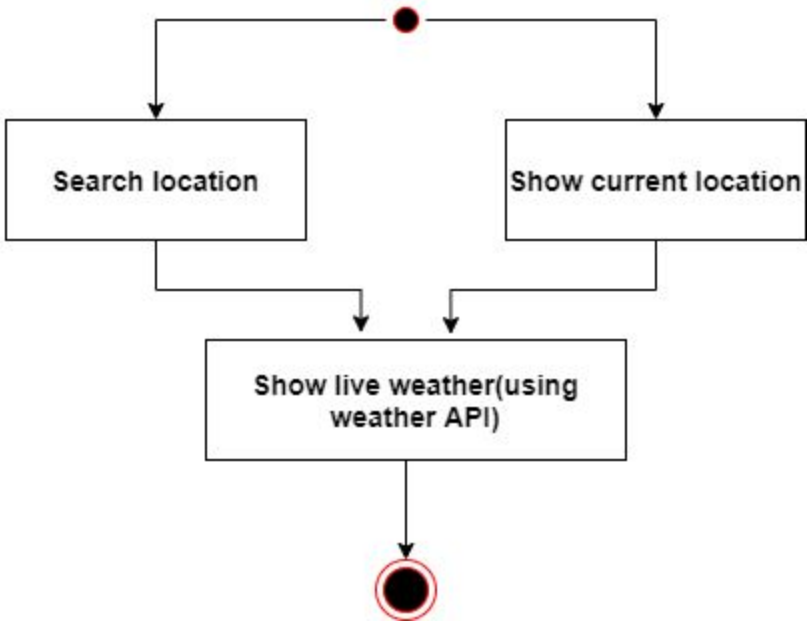
Activity Name: Question-Answer Forum
Activity Level: 1.5
Reference: Use Case Level 1.5

Level 1.5: Q/A Forum



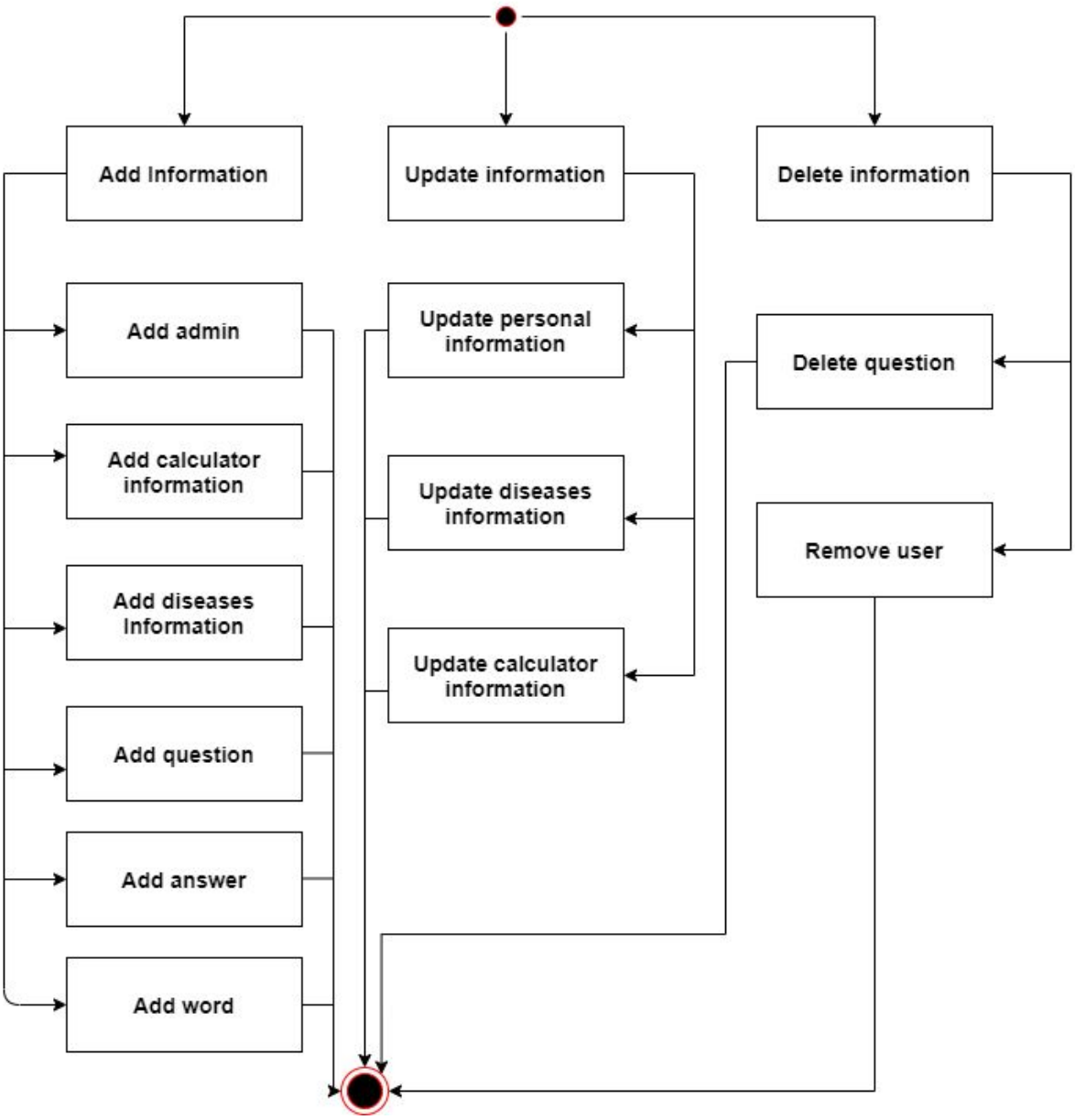
Activity Name: Weather Forecasting
Activity Level: 1.6
Reference: Use Case Level 1.6

Level 1.6: Weather Forecasting



Activity Name: Information Management
Activity Level: 1.7
Reference: Use Case Level 1.7

Level 1.7: Information Management

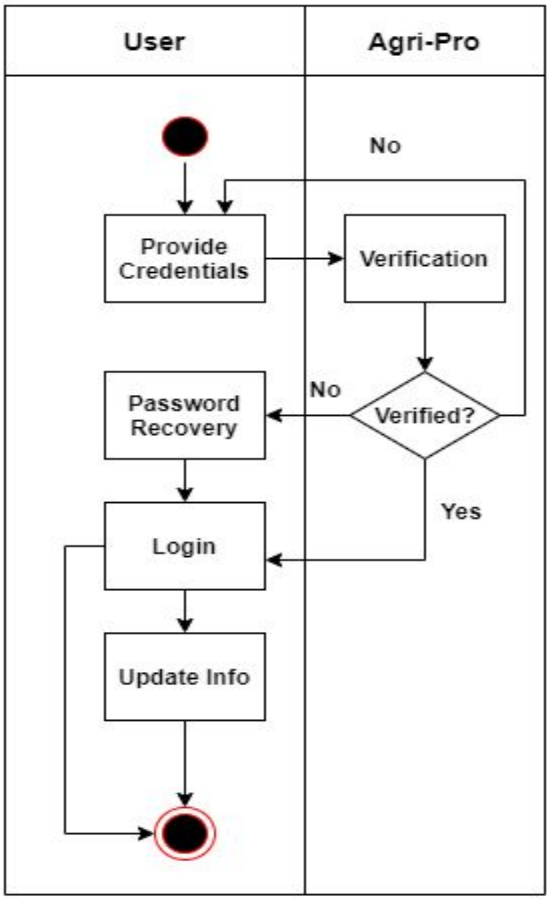


Swimlane Diagram:

A swimlane diagram is a type of flowchart that delineates who does what in a process.

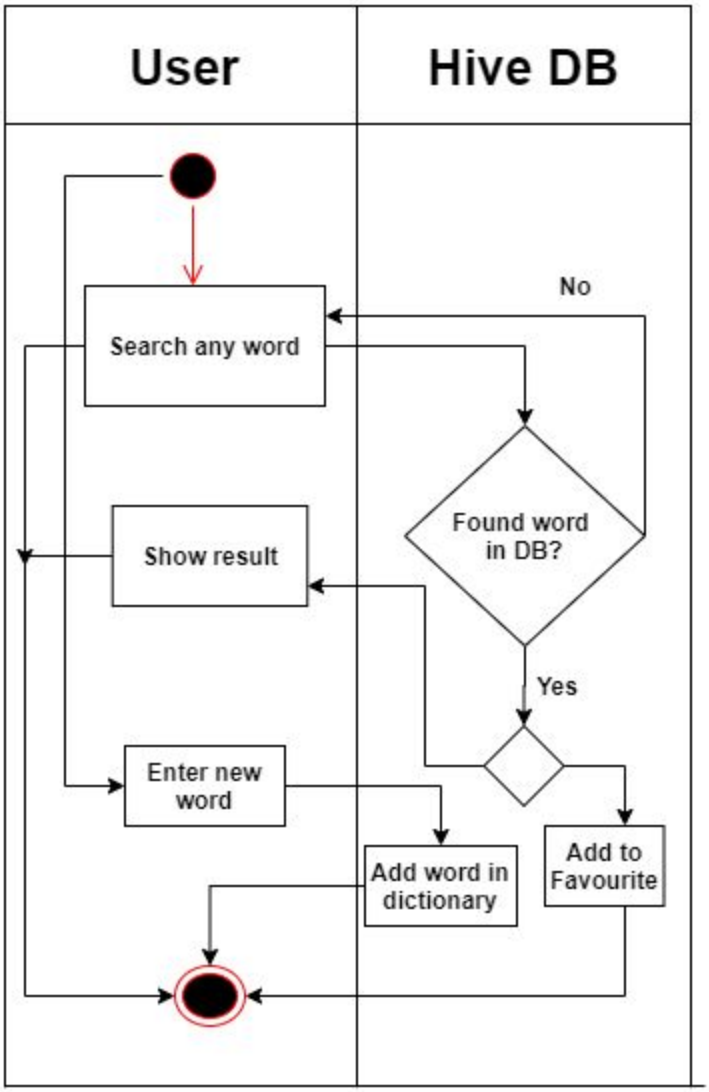
SID(Swimlane ID): 1.1

Name : Account
Reference: Use Case & Activity level 1.1



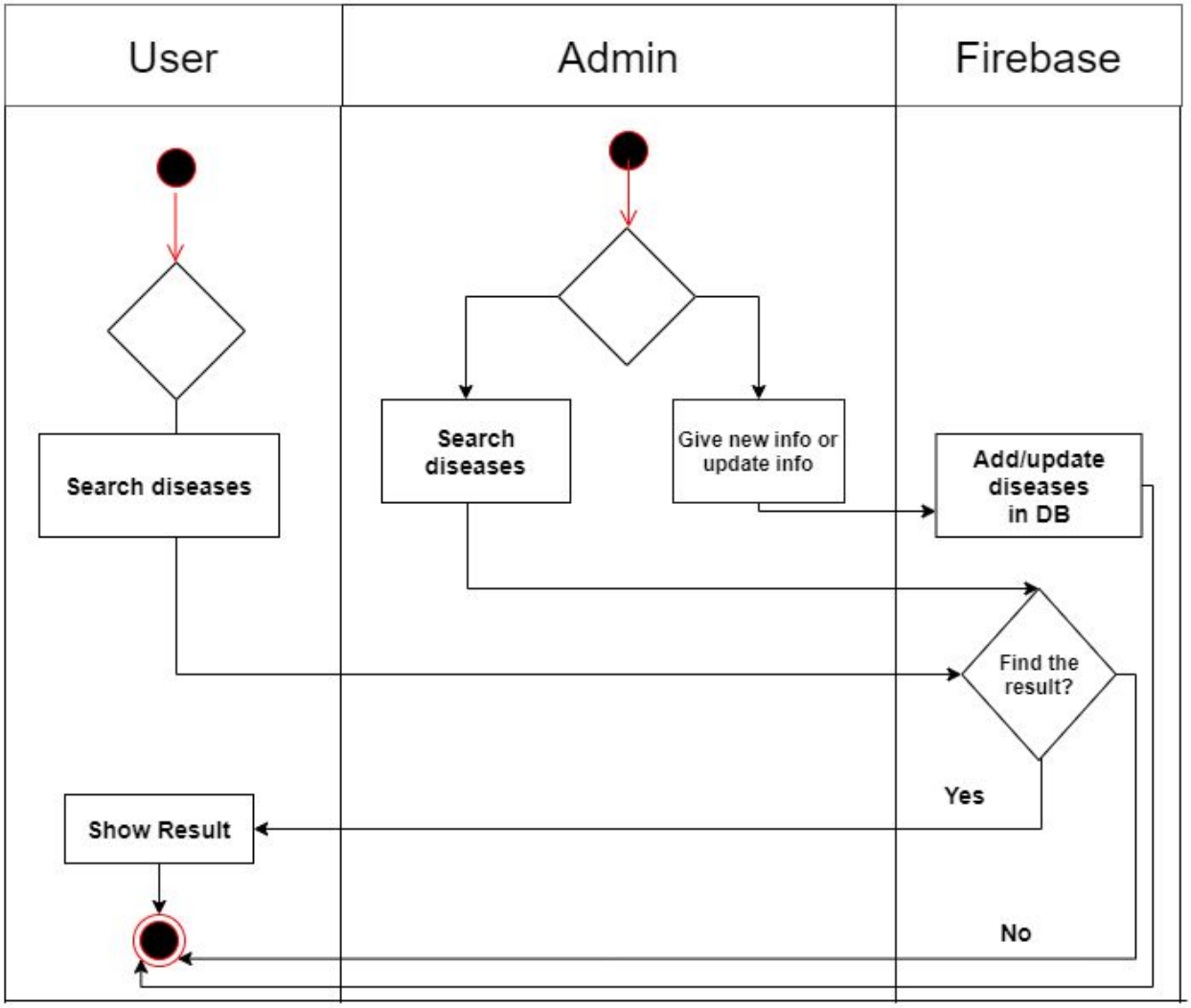
SID(Swimlane ID): 1.2

Name : Dictionary
Reference: Use Case & Activity level 1.2



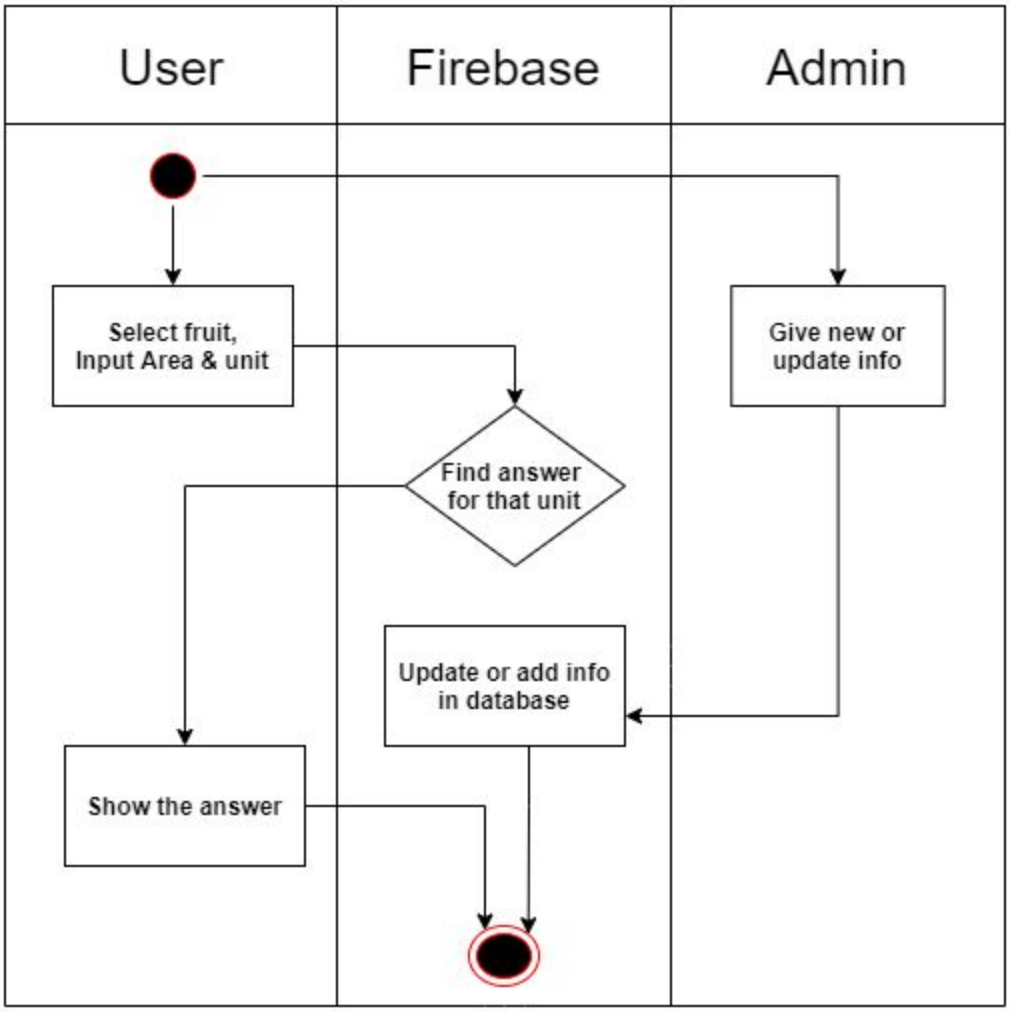
SID(Swimlane ID): 1.3

Name : Diseases List
Reference: Use Case & Activity level 1.3



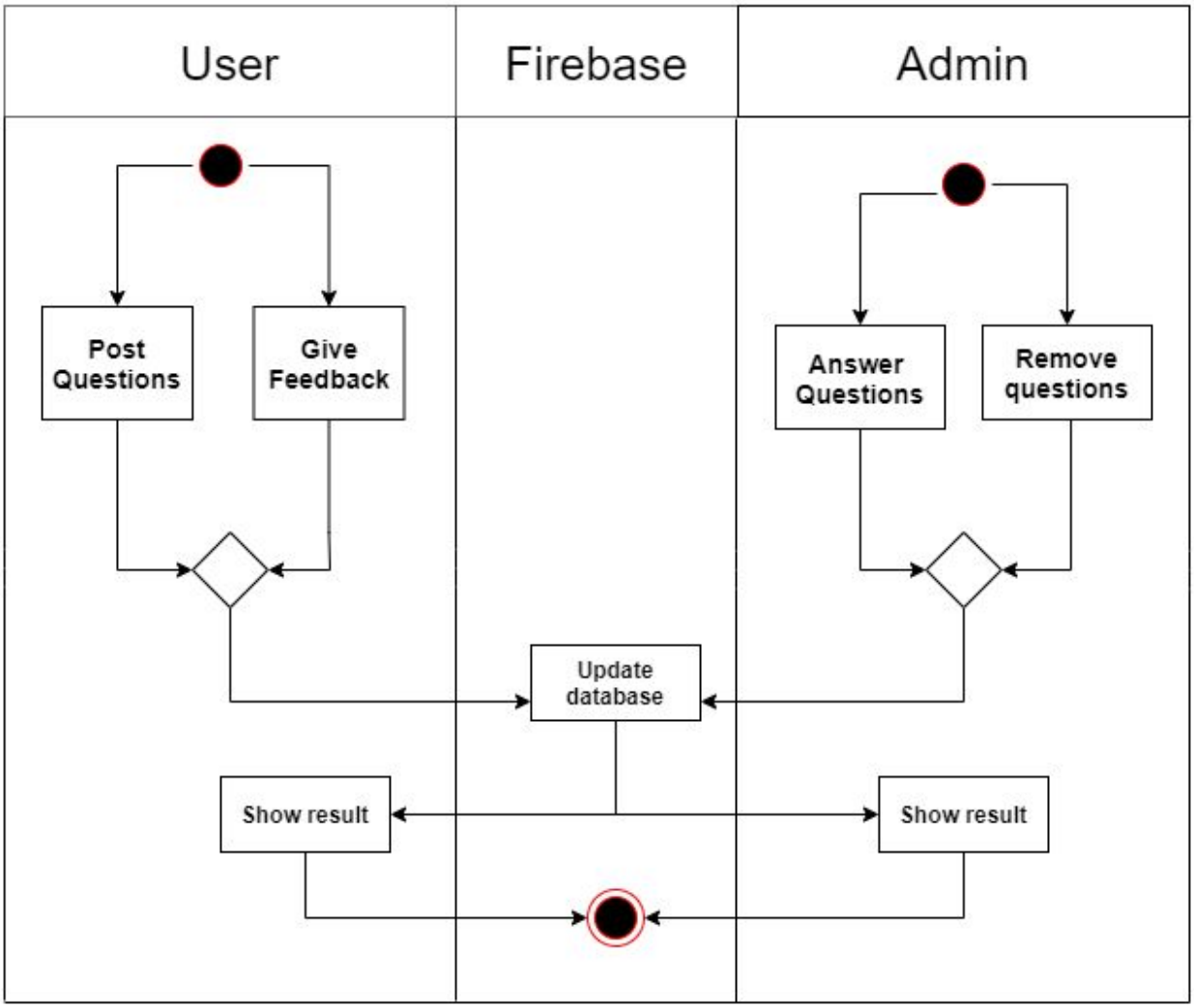
SID(Swimlane ID): 1.4

Name : Fertilizer Calculator
Reference: Use Case & Activity level 1.4



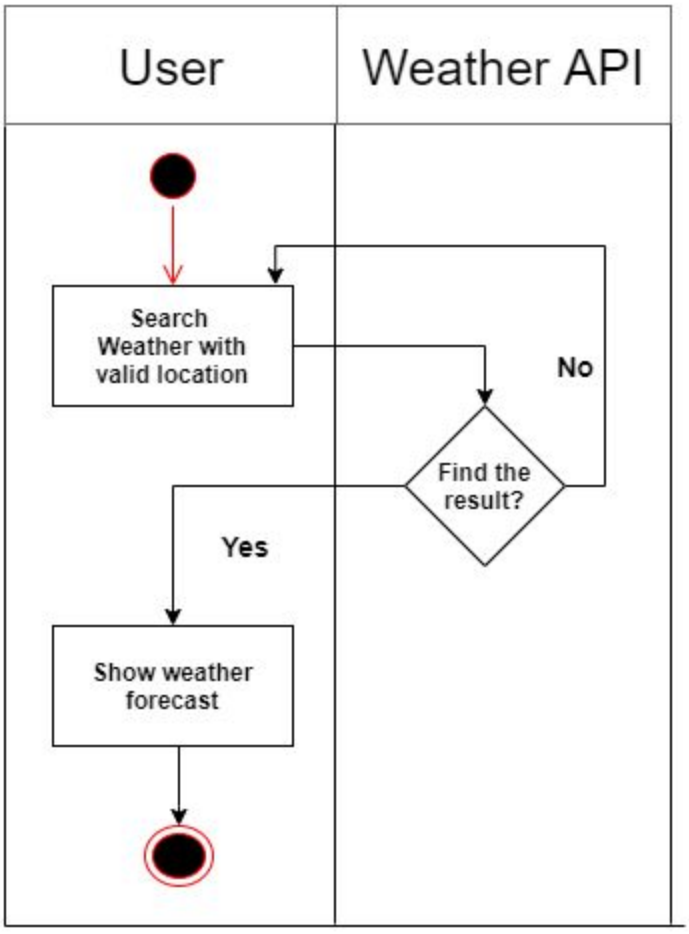
SID(Swimlane ID): 1.5

Name : Q/A Forum
Reference: Use Case & Activity level 1.5



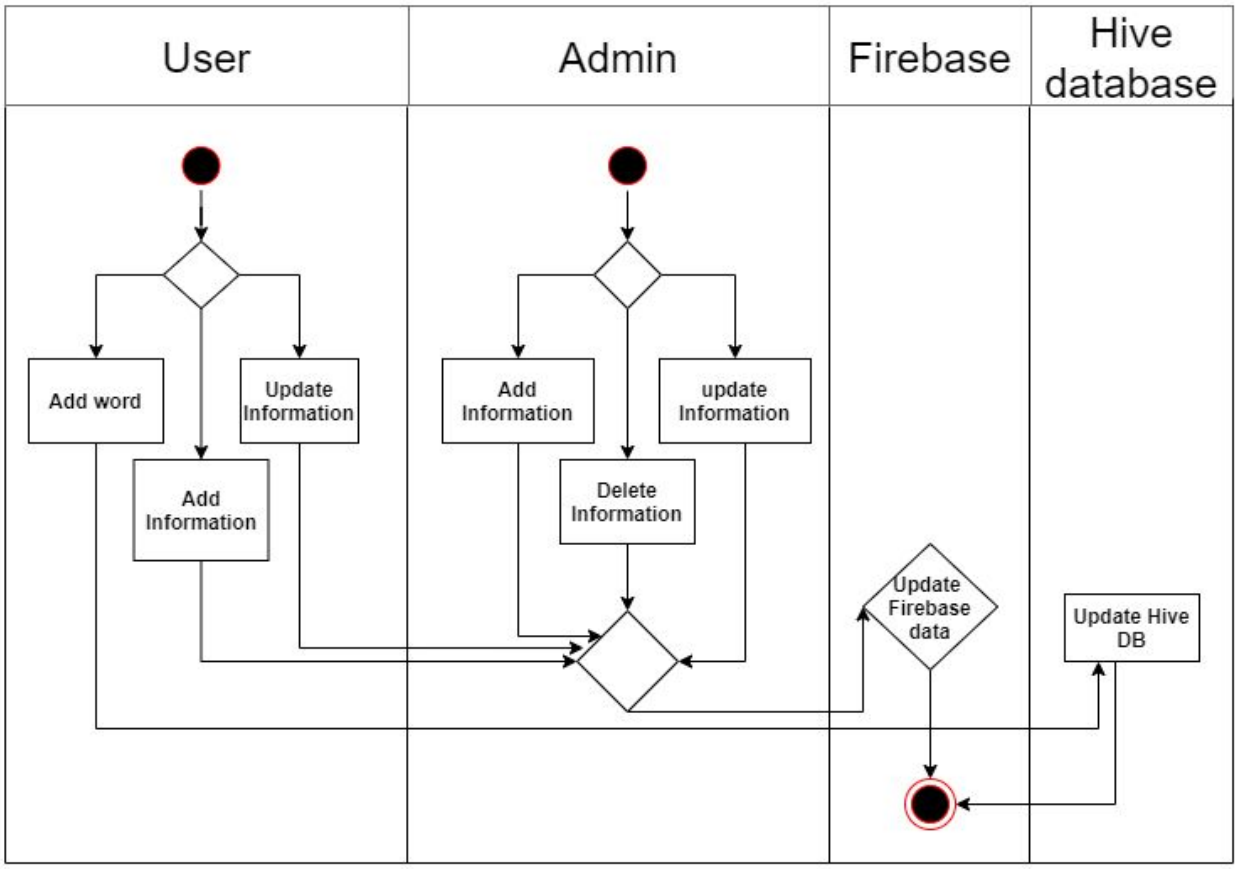
SID(Swimlane ID): 1.6

Name : Weather Forecast
Reference: Use Case & Activity level 1.6



SID(Swimlane ID): 1.7

Name : Information Management
Reference: Use Case & Activity level 1.7



Class based Modelling:

CLASS BASED MODELING CONCEPT :

Class-based modeling represents the objects that the system will manipulate, the operations that will be applied to the objects, relationships between the objects and the collaborations that occur between the classes that are defined.

Noun List:

No	Noun	No	Noun
1	Agri-pro	36	System
2	Android application	37	Confirmation code
3	Student	38	Number
4	Farmer	39	Administrator
5	Weather forecast	40	User name
6	Fertilizer Calculation	41	Admin
7	Vocabulary	42	Profile
8	Disease info	43	Button
9	Fruit	44	OTP
10	Vegetable	45	Input
11	User	46	Database
12	Account	47	System authorities
13	Question	48	Dictionary
14	Question-answer forum	49	Word
15	Information	50	Definition
16	Parts of speech	51	Agriculture
17	Mobile number	52	Search bar

18	Password	53	Features
19	District name	54	Suggestion section
20	Division name	55	Query
21	Word List	56	Dictionary feature
22	Access	57	Weather Feature
23	Phone location	58	Image
24	Decision	59	Admin side
25	Login	60	Network connection
26	Problems	61	Disease section
27	Expert	62	Default list
28	Measure	63	Sample
29	Fertilizer	64	Fertilizer waste
30	Field	65	Production cost
31	Field size	66	Synonyms
32	Text field	67	Meaning
33	App	68	Measurement
34	Firebase Database	69	Disease details
35	Example		

Verb List

1	Intended	23	Add words
2	Ease	24	Use dictionary
3	Seek	25	Check weather
4	Get (Weather forecast)	26	Access (phone location)
5	Get (Fertilizer Calculator)	27	Find weather
6	Increasing	28	Given location
7	Create (Account)	29	Make decision
8	Ask (Question)	30	Post problems
9	Providing (Information)	31	Use image
10	Send (Confirmation code/OTP)	32	Give answer
11	Input (Code)	33	Show (previous question/diseases list)
12	Give (Username and Password)	34	Need(Network Connection)
13	Add (Admin)	35	Scroll down
14	Change (Password / mobile)	36	Remove (question/user data)
15	Log in	37	Know about the diseases
16	Update (Profile/Database)	38	Search (fruit/vegetable)
17	Recover (Password)	39	Store(in database)
18	Click on (Button)	40	Help(farmar)
19	Search word	41	Select diseases
20	Show words	42	Prompt diseases name

21	Calculate(Measurement of fertilizer)	43	Write (query)
22	Give(field size)	44	Add(Word)

General Classification and Selection Criteria

General classification

Candidate classes were then characterized in seven general categories. The seven general characteristics are as follows:

1. External entities
2. Things
3. Events
4. Roles
5. Organizational units
6. Places
7. Structures

Selection Criteria

The candidate classes are then selected as classes by six Selection Criteria. A candidate class generally becomes a class when it fulfills around three characteristics.

1. Retain information
2. Needed services
3. Multiple attributes
4. Common attributes
5. Common operations
6. Essential requirements

Noun	**General Classification**	**Selection Criteria**
Student	4,7	1-6 (Selected)

Farmer	4,7	1-6 (Selected)
Weather forecast	1,2,7	1,2,3,6 (Selected)
Fertilizer Calculation	3,,7	1,2,3,6 (Selected)
Vocabulary	2	1,2,3,6
Disease info	2	1,2,3,6 (Selected)
Fruit	2,5	
Vegetable	2,5	
User	4,5,7	1-6
Account	2,7	1-6 (Selected)
Question	2	
Question-answer forum	2,7	1,2,3,6 (Selected)
Word	2	1,2,3,4,6(Selected)
Expert	4	1-6 (Selected)
Measurement	3	1,2
Fertilizer	2	3
Field size	2	1
GPS	1,2	2
SMS	1,3	2
Firebase Database	2,7	1-6 (Selected)
Hive Database	2,7	1-6(Selected)
System	4	1-6
Confirmation code	2,3	1
Admin	4,7	1-6 (Selected)
Profile	2,7	1,3,4
OTP	2,3	1,2

Database	2,7	1-6 (Selected)
System authorities	4,7	1-6
Dictionary	2,3,7	1,2,3,5,6 (Selected)
Definition	2	1
Image	2	1
Default list	2	1,2
Sample	2	1
Disease details	2	1
User Name	2	
Mobile Number	2	
Password	2	
District Name	2	
Division Name	2	
Example	2	
Parts of speech	2	

Analysis:

Here, we will use the “User” class instead of using Student and farmer, two separate classes. After identifying our final classes we have generated the following class cards.

Class Card:

User	
Attribute	**Method**

-full_name -mobile_number -password -district_name -division_name	+createAccount() +recoverPassword() +updateInfo() +login() +addWord() +addWordToFavouriteList() +searchWord() +searchWeather() +searchDisease() +calculateFertilizer() +postQuestion()
Responsibility	Collaborator
● Searching word ● Adding word ● Getting weather ● Getting diseases information ● Calculating fertilizer measurement ● Posting question ● Giving feedback of the question	● Account ● DiseasesList ● WeatherForecast ● FertilizerCalculator ● QuestionAnswerForum ● Dictionary ● Word ● SMS ● Hive database ● Firebase Database

WeatherForecast	
Attributes	**Method**
-current_location -city_name	+getOwnWeather() +getQueryWeather()
Responsibility	Collaborator
● Giving live weather info	● Weather API

FertilizerCalculator	

Attributes	**Method**
-field_size -fruit_name	+calculateFertilizer() +addFertilizerCalculatorInfo()
Responsibility	Collaborator
● Calculating fertilizer for a specific area	● Firebase Database ● Admin

DiseaseList	
Attributes	**Method**
-fruit_name	+getDiseaseList() +addDisease() +getDiseaseDetails()
Responsibility	Collaborator
● Providing diseases information	● Firebase Database ● Admin

Account	
Attributes	**Method**
-full_name -mobile_number -password -district_name -division_name	+getFullName() +setFullName() +getMobileNumber() +getPassword() +setPassword() +getDistrictName() +setDistrictName() +getDivisionName() +setDivisionName()

Responsibility	Collaborator
● Creating account ● Updating profile ● Viewing profile	● User ● Admin

QuestionAnswerForum	
Attributes	**Method**
-question_id -question -reply -feedback -image	+postQuestion() +postAnswer() +giveFeedback() +attachImage() +removeQuestion()
Responsibility	Collaborator
● Posting question ● Providing answer ● Removing question ● Giving feedback	● User ● Admin ● Firebase Database

Admin	
Attributes	**Method**
-user_name -mobile_number -password -division_name -division_name	+removeQuestion() +removeUser() +updateInfo() +addAdmin() +login() +addWord() +addWordToFavouriteList() +searchWord() +searchWeather() +searchDisease() +postAnswer() +addDisease()

	+addFertilizerCalculatorInfo()
Responsibility	Collaborator
• Removing question • Removing user • Updating info • Adding admin • Posting answer • Adding new diseases • Adding new fertilizer info	• User • DiseaseList • QuestionAnswerForum • FertilizerCalculator • Account • Firebase Database • WeatherForecast • Hive database

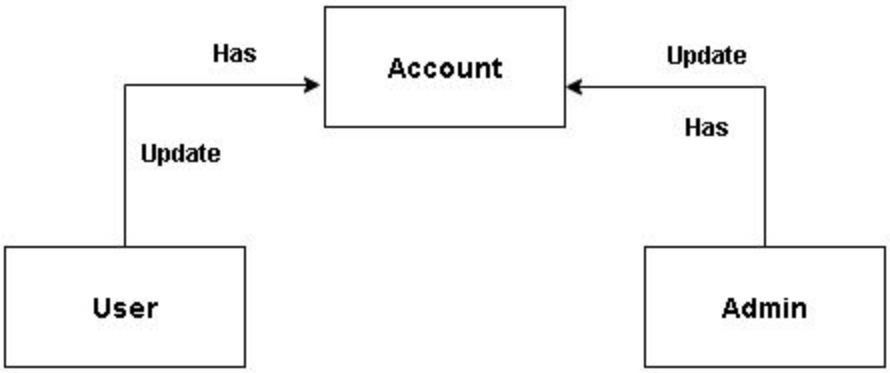
Dictionary	
Attributes	**Method**
-word -definition -example -partsOfSpeech	+getWord() +getExample() +getDefinition() +getPartsOfSpeech() +setToMap() +getFromMap() +searchWord()
Responsibility	Collaborator
• Providing Agriculture based word • Show favourite word list • Adding word to dictionary	• Hive database

SMS	
Attributes	**Method**
	+sendOTP()

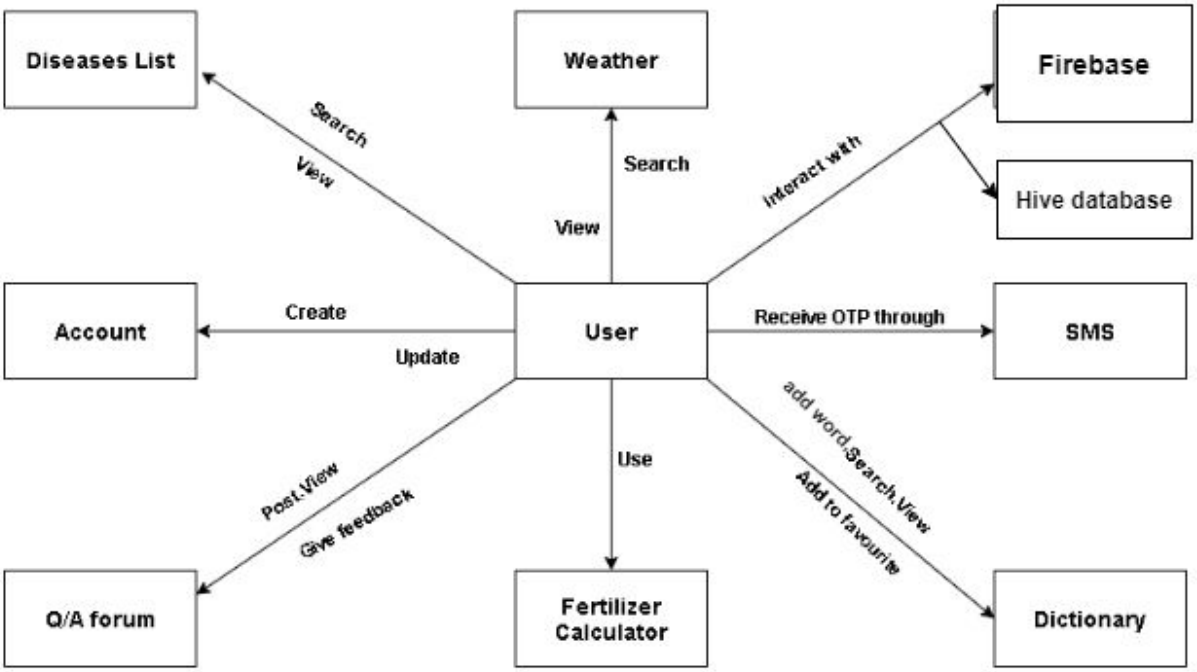
Responsibility	Collaborator
● Sending OTP	● User ● Firebase Database

CRC Diagram:

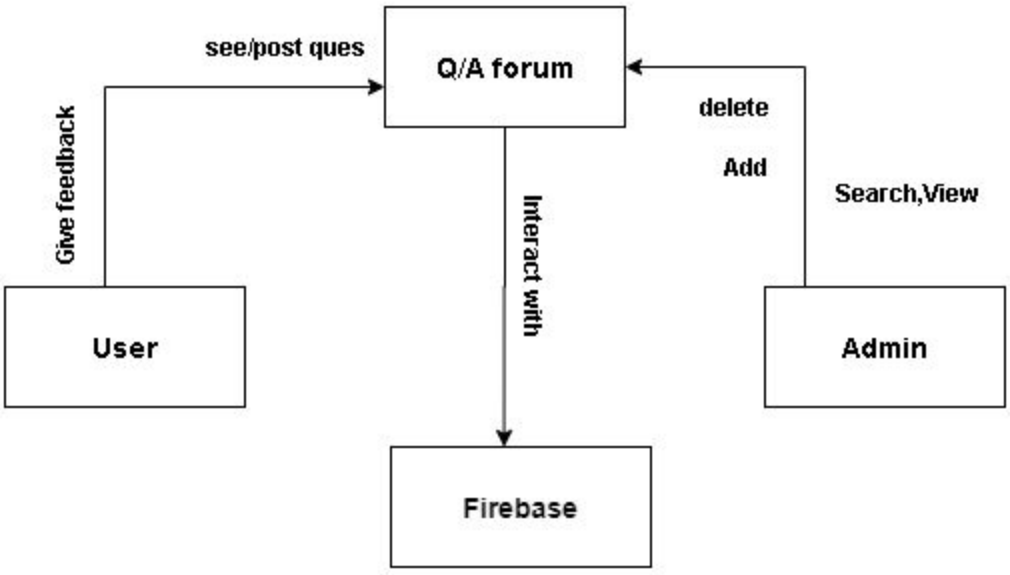
ID: Account



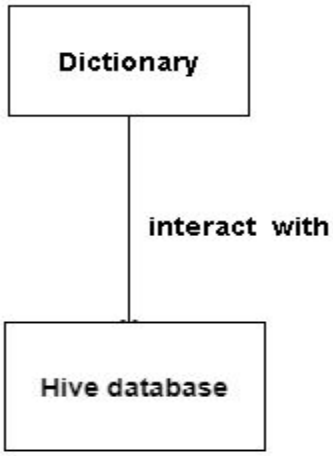
ID: User



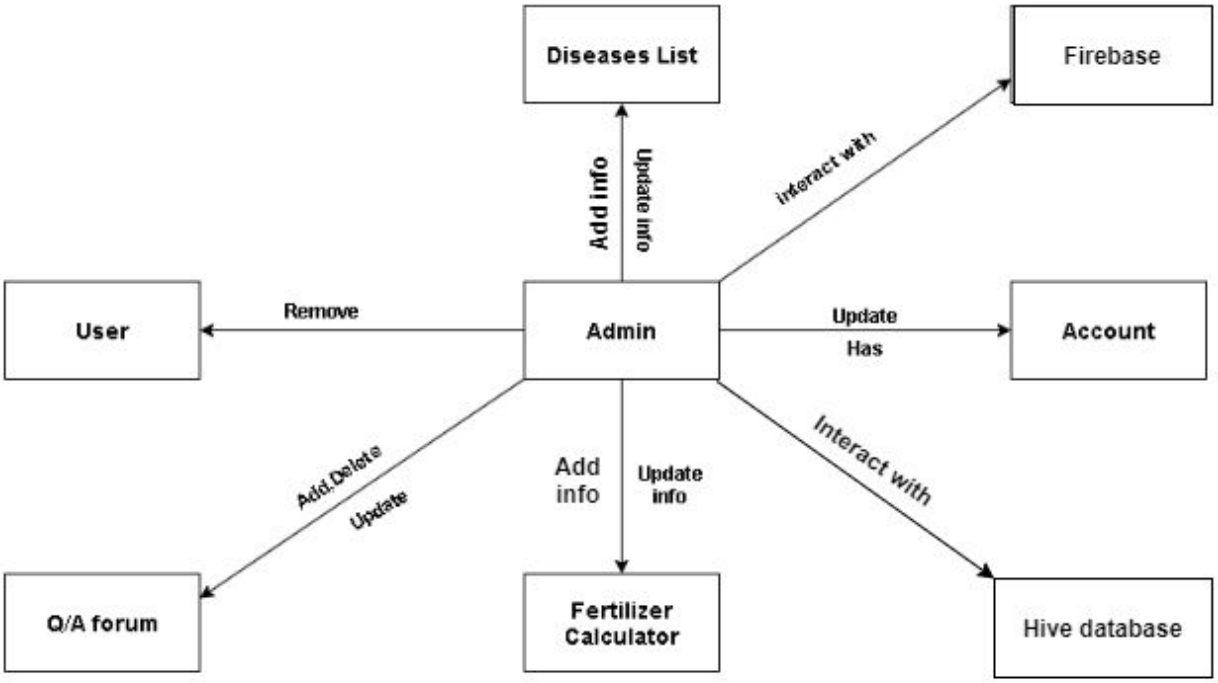
ID: Q/A forum



ID: Dictionary



ID: Admin



Data Based Modelling

DATA MODELING CONCEPT :

If software requirements include the necessity to create, extend or interact with a database or complex data structures need to be constructed and manipulated, then the software team chooses to create data models as part of overall requirements modeling. The entity-relationship diagram (ERD) defines all data objects that are processed within the system, the relationships between the data objects and the information about how the data objects are entered, stored, transformed and produced within the system.

DATA OBJECTS :

A data object is a representation of composite information that must be understood by the software. Here, composite information means information that has a number of different properties or attributes. A data object can be an external entity, a thing, an occurrence, a role, an organizational unit, a place or a structure.

Serial	Noun	Problem(p)/Soluti	Attribute

		on(s) Space	
1	Agri-pro	p	
2	Field	p	
3	Student	p	
4	Farmer	p	
5	Weather forecast	s	31,42,47,52
6	Fertilizer Calculation	s	9,10,28,29,30,31,32
7	Vocabulary	p	
8	Disease info	s	9,10,32, 53,56
9	Fruit	s	
10	Vegetable	s	
11	User	s	16,17,18,19,20
12	Account	s	
13	Question	s	
14	Question-answer forum	s	37,38,53
15	Information	p	
16	User name	s	
17	Mobile number	s	
18	Password	s	
19	District name	s	
20	Division name	s	
21	Word List	s	
22	Hive database	s	
23	Phone location	s	

24	Decision	p	
25	Login		
26	Problems	p	
27	Expert	p	
28	Measure	s	
29	Fertilizer	s	
30	Field size	s	
31	Text field	p	
32	Firebase Database	s	
33	System	p	
34	Confirmation code	s	
35	Number	s	
36	Administrator	p	
37	Comment	s	54,38
38	Admin	p	16,18
39	Profile	p	
40	OTP	s	
41	Input	s	
42	Phone location	s	
43	Dictionary	s	22,44,45,60,61,55
44	Word	s	
45	Definition	s	
46	Agriculture	p	

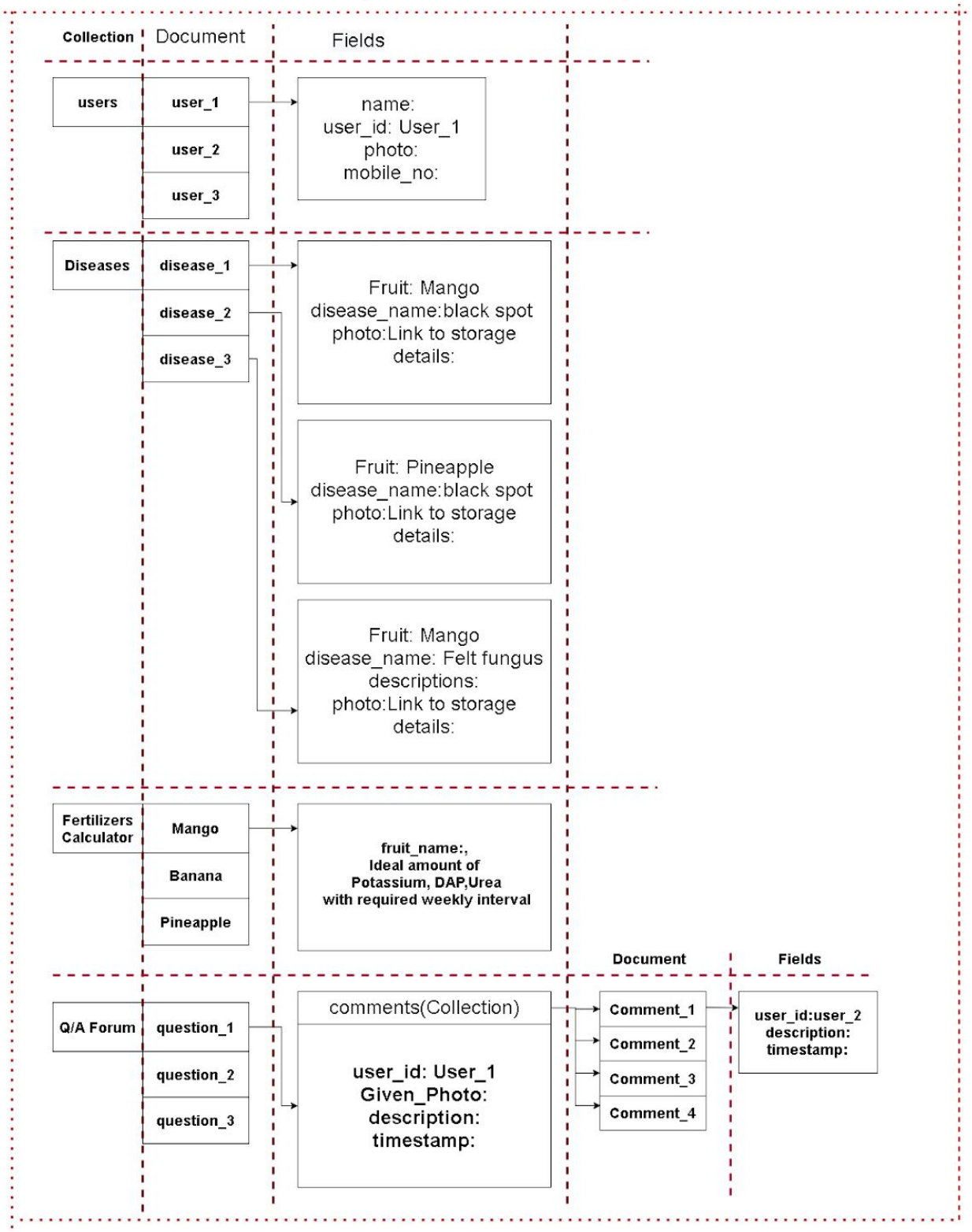
47	Search bar	s	
48	Features	s	
49	Suggestion section	s	
50	Query	s	
51	Dictionary feature	s	
52	GPS	s	
53	Image	s	
54	timestamp	s	
55	Favourite word list	s	
56	Default list	s	
57	Sample	s	
58	Meaning	s	
59	Measurement	s	
60	Example	s	
61	Parts of speech	s	

Final data object :

1.User
2.Admin
3.Dictionary
4.Weather forecast
5.Fertilizer Calculator
6.Question Answer forum
7.Disease List

8.Comment

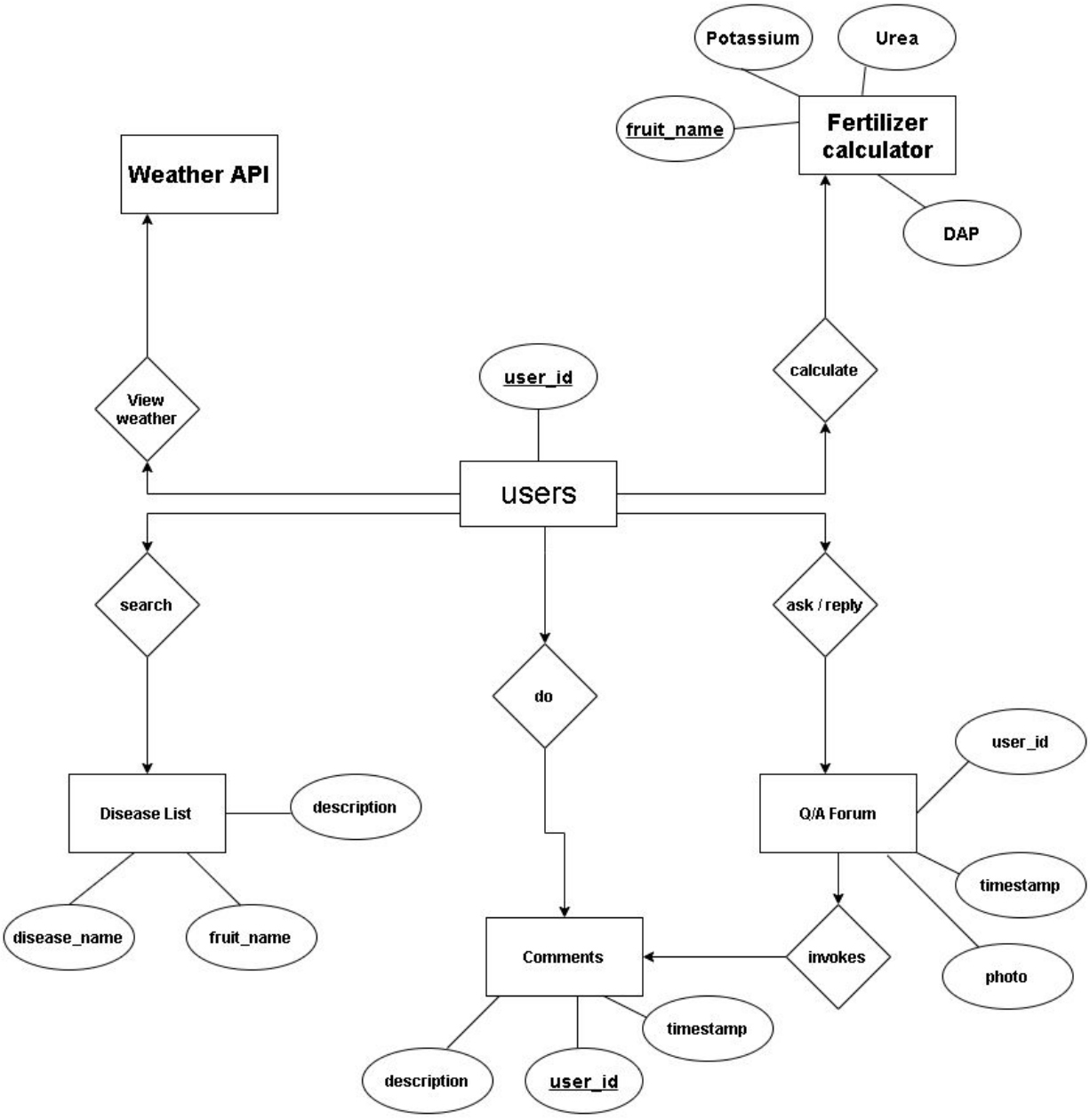
NoSql Database Structure



ER Diagram

Definition of ER Diagram

An Entity Relationship (ER) Diagram is a type of flowchart that illustrates how “entities” such as people, objects or concepts relate to each other within a system.


Potassium
Urea
fruit_name
Fertilizer calculator
DAP
Weather API
user_id
calculate
View weather
users
search
do
ask / reply
user_id
Disease List
description
Q/A Forum
timestamp
disease_name
fruit_name
Comments
invokes
photo
timestamp
description
user_id

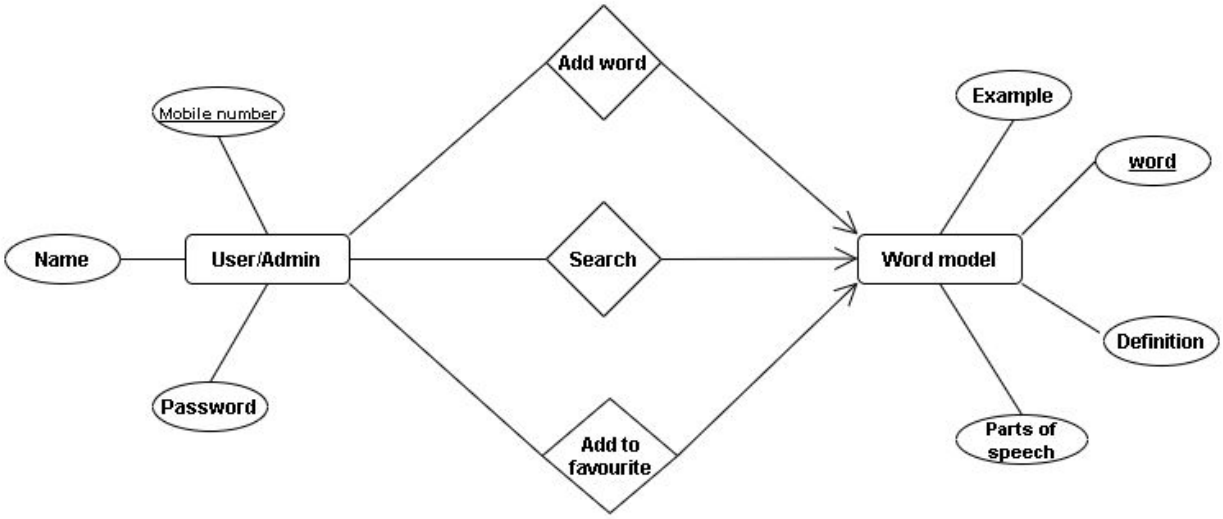


Figure: ER diagram for offline dictionary using Hive database

Schema Diagram

Data Object	Attribute	Type	Size
User	-name -user_id -mbl_num	String String String String	200 200 200 200
Admin	-isAdmin	Boolean	
Dictionary	-word -definition -example -partsOfSpeech -isFavourite	String String String String Boolean	200 200 200 200
Fertilizer Calculator	-urea -potassium -dap	float_array float_array float_array	150 150 150

	-fruit_name	String	200
Weather forecast	-location -url -weatherData	String String String	200 200 200
Disease List	-fruit_name -disease -details -photo	String String String String	200 200 200 200
Q/A Forum	-user_id -given_Photo -description -timestamp -comments	String String String String object	200 200 200 200
Comment	-user_id -description -timestamp	String String String	200 200 200

Behavioural Model:

STATE TRANSITION DIAGRAM :

State transition diagram represents active states for each class the events (triggers). For this we identified all the events, their initiators and collaborators.

Event Table

SL No	Events	State Name	Initiator	Collaborator
1	Create an account	Create_account	User	Firebase Database, Account
2	Needs to provide information	Provide_info	User	Firebase Database, Account
3	Input code	Input_code	User,admin	SMS
4	Add more admin	Add_admin	Admin	Firebase Database
5	Will be able to change info	Change_info	User,Admin	Firebase Database, Account
6	Can recover password	Recover_password	User,Admin	Firebase Database,SMS
7	OTP will be sent	Sent_OTP	SMS	User,Admin, Firebase Database
8	Will be able to search word	Search_word	User	Hive database,, Dictionary
9	Will be able to add to favourite	Add_to_favourite_List	User	Hive database, Dictionary
10	Can check live weather	Weather_forecast	User,Admin	WeatherForecast
11	Give access to GPS	Access_location	User	WeatherForecast
12	Authorized users can post problems	Post_problem	User	Firebase Database, QuestionAnswerForum
13	Experts will give answer	Give_answer	Admin	Firebase Database,User
14	See previous questions	See_previous_ques	User,Admin	Firebase Database

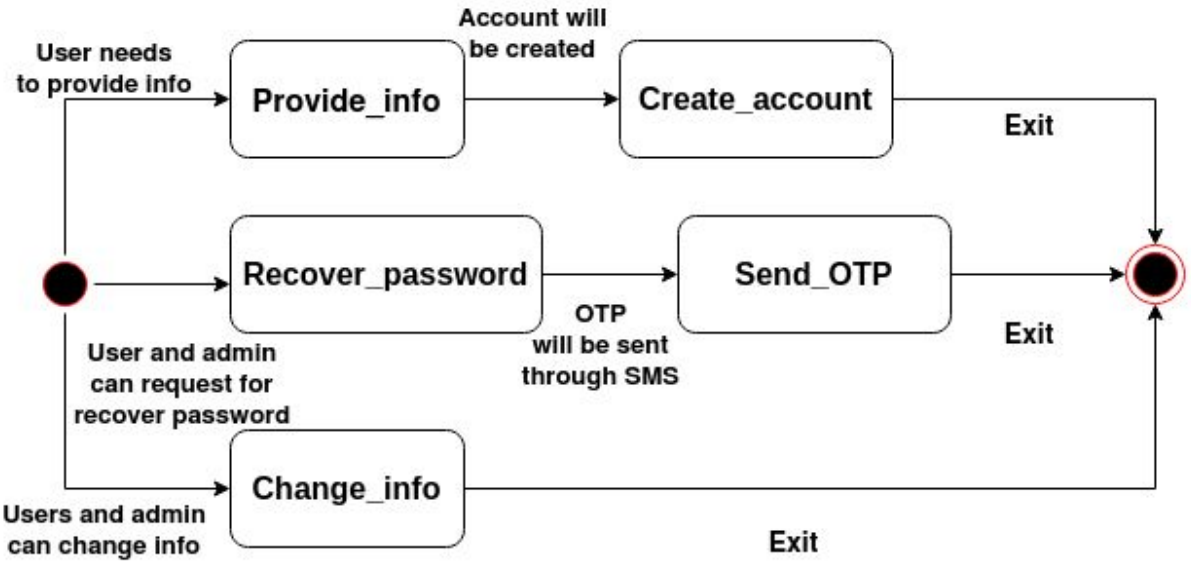
		tion		
15	Will be able to see diseases list	See_disease_list	User, admin	Firebase Database, DisasesList
16	Will be able to calculate fertilizer	Fertilizer_calculation	User,Admin	Firebase Database, FertilizerCalculator
17	User and admin info will be stored	Store_info	Firebase Database	User, admin
18	Question will be stored	Store_question	Firebase Database, QuestionAnswerForum	User
19	Answer will be stored	Store_answer	Firebase Database, QuestionAnswerForum	Admin
20	Answer will be removed	Remove_answer	Firebase Database, QuestionAnswerForum	Admin
21	Diseases info will be stored	Store_Disease_info	Admin	DiseasesList, Firebase Database
22	fertilizer info will be stored	Store_fertilizer_info	Admin	FertilizerCalculator, Firebase Database
23	Diseases info will be updated	Update_diseases_info	Admin	DiseasesList, Firebase Database
24	fertilizer info will be updated	Update_fertilizer_info	Admin	FertilizerCalculator,Firebase Database
25	To use Q/A forum	Use_forum	User , Admin	Firebase Database, QuestionAnswerForum
26	Find weather for a valid location	find_weather	User	WeatherForecast
27	log into the system	log_in	User, admin	Firebase Database

28	will be able to remove users	remove_user	Admin	User, Firebase Database
29	Will be able to add word	add_word	Admin, User	Hive database

State Transition

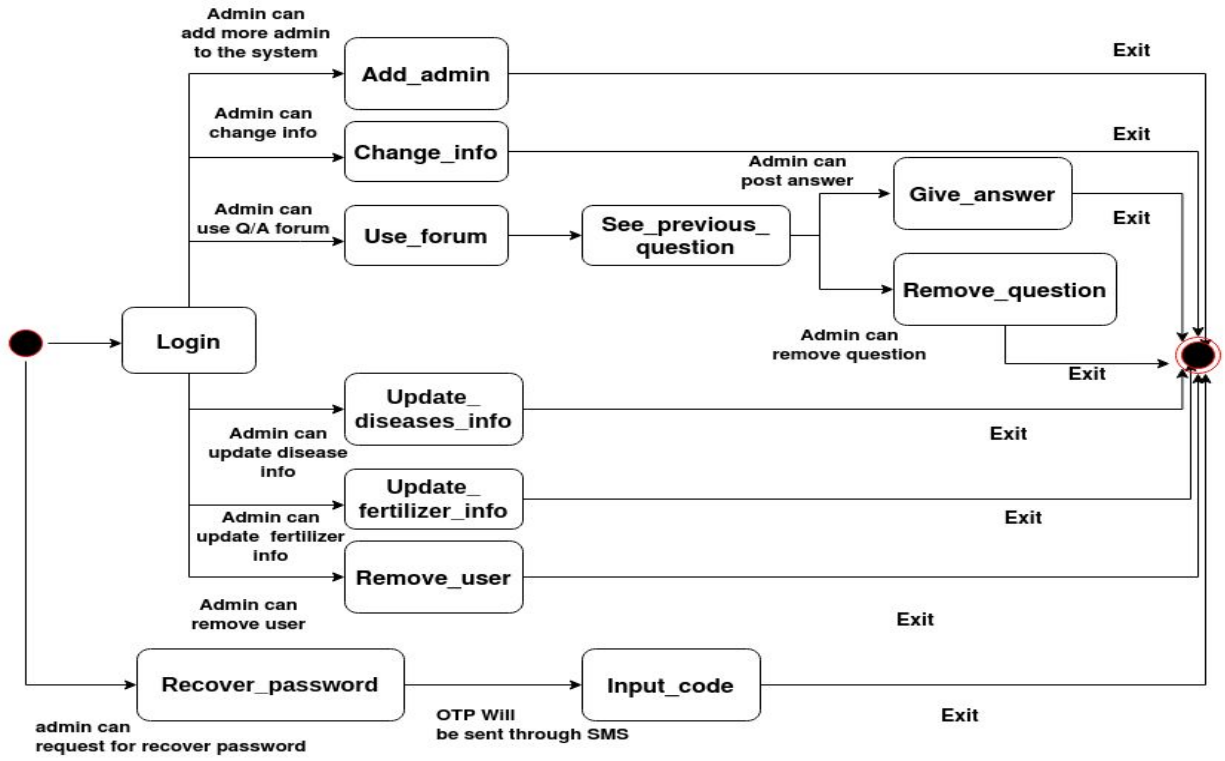
ID: Account

Account



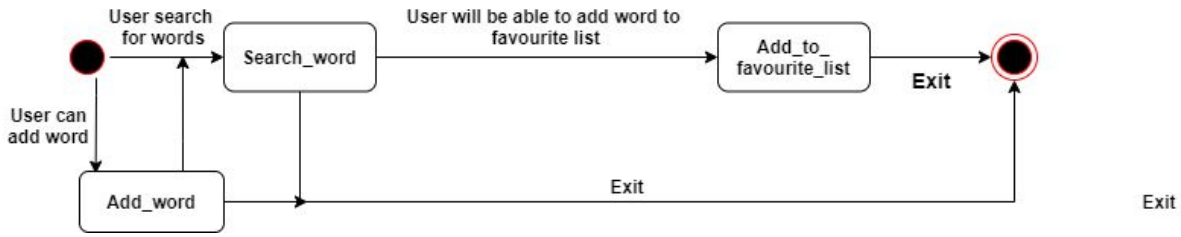
ID: Admin

Admin



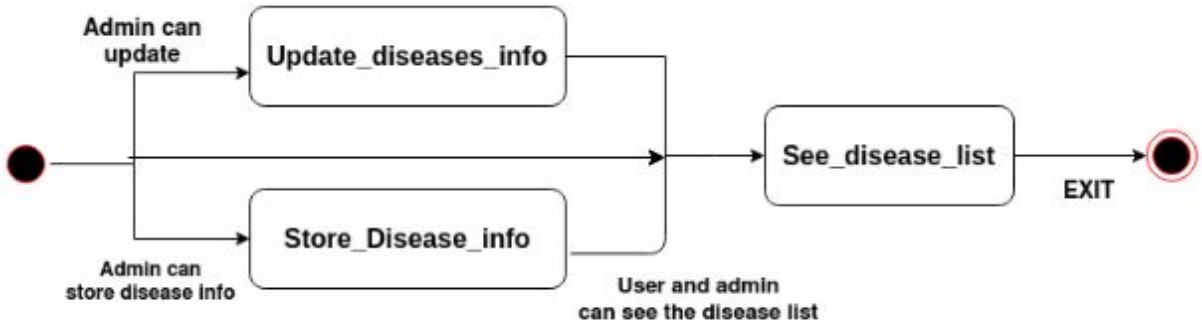
ID: Dictionary

Dictionary



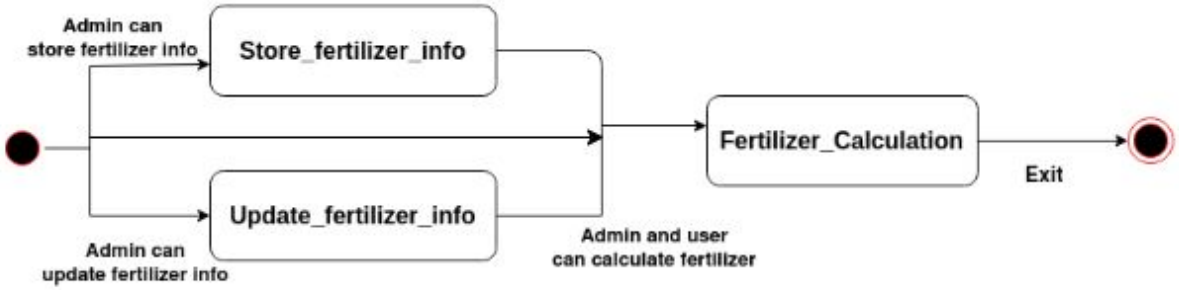
ID: DiseaseList

DiseaseList



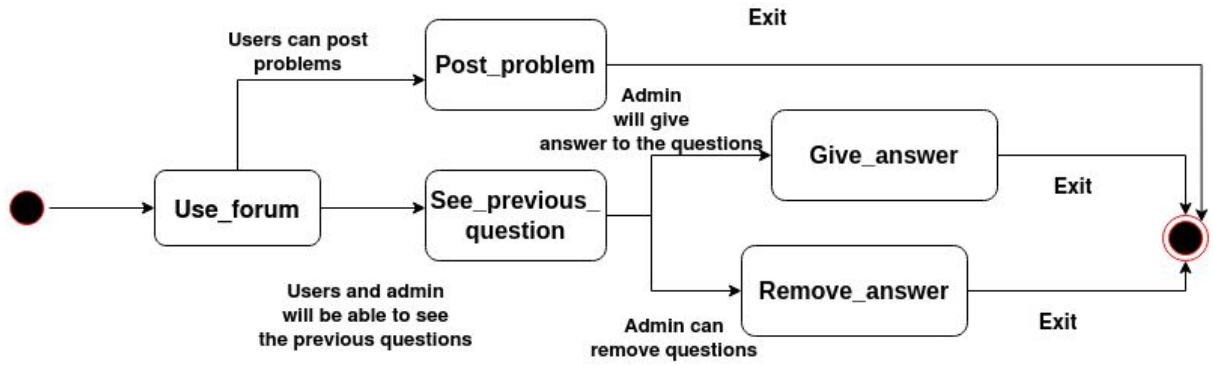
ID: FertilizerCalculator

FertilizerCalculator



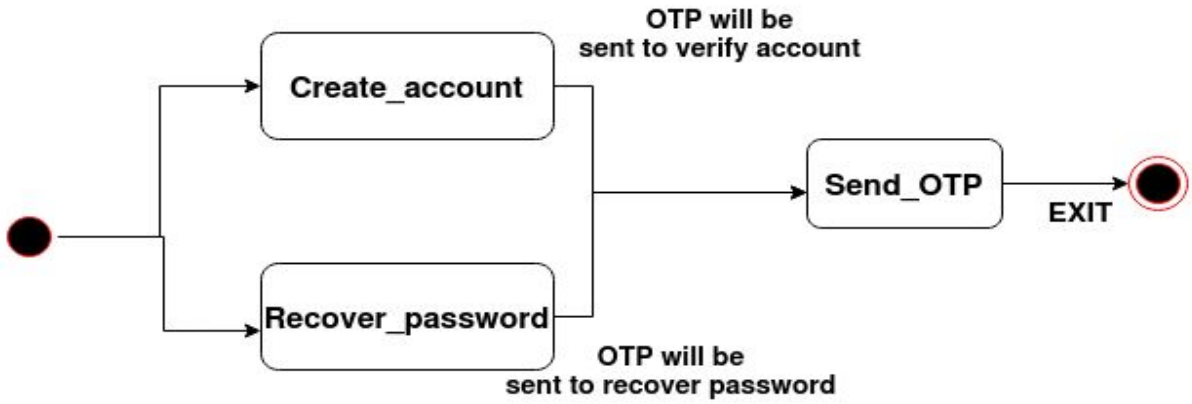
ID: QuestionAnswerForum

QuestionAnswerForum



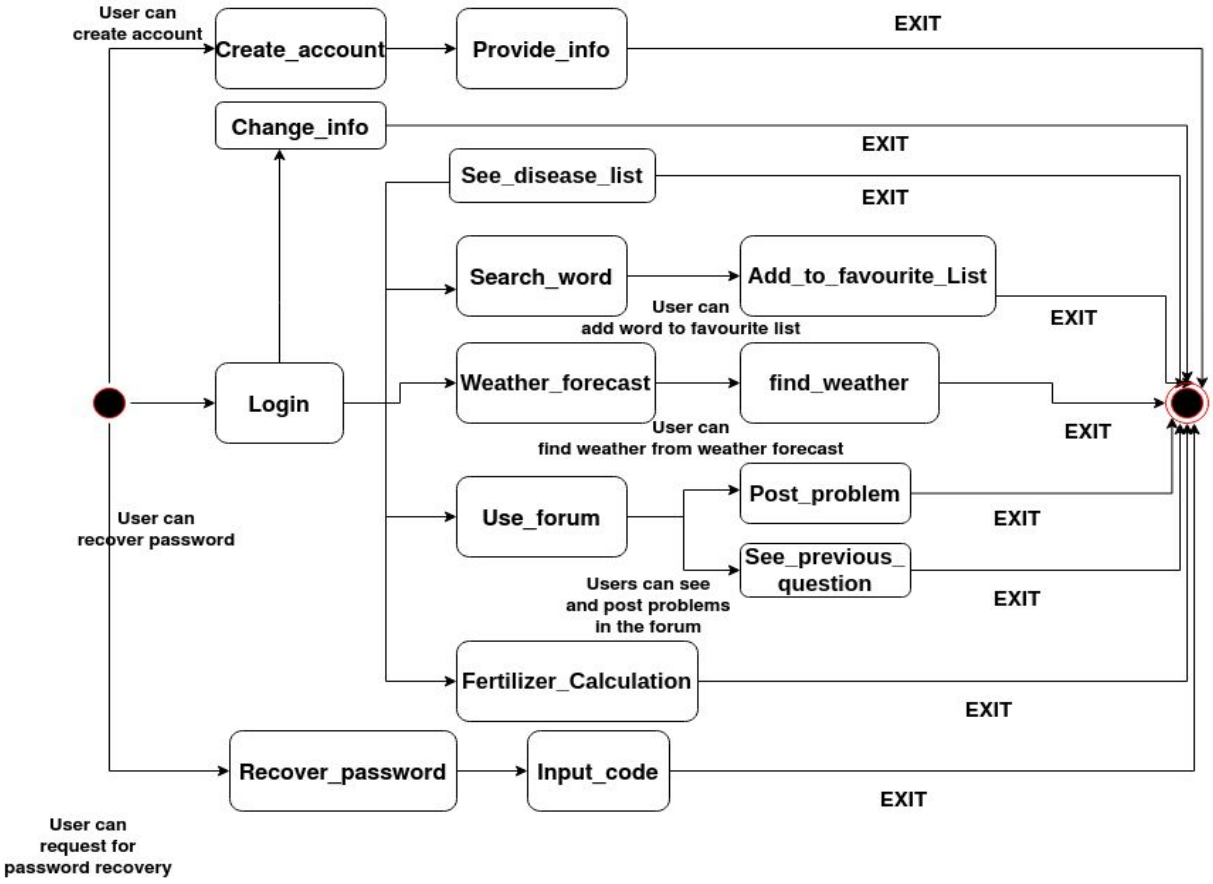
ID : SMS

SMS

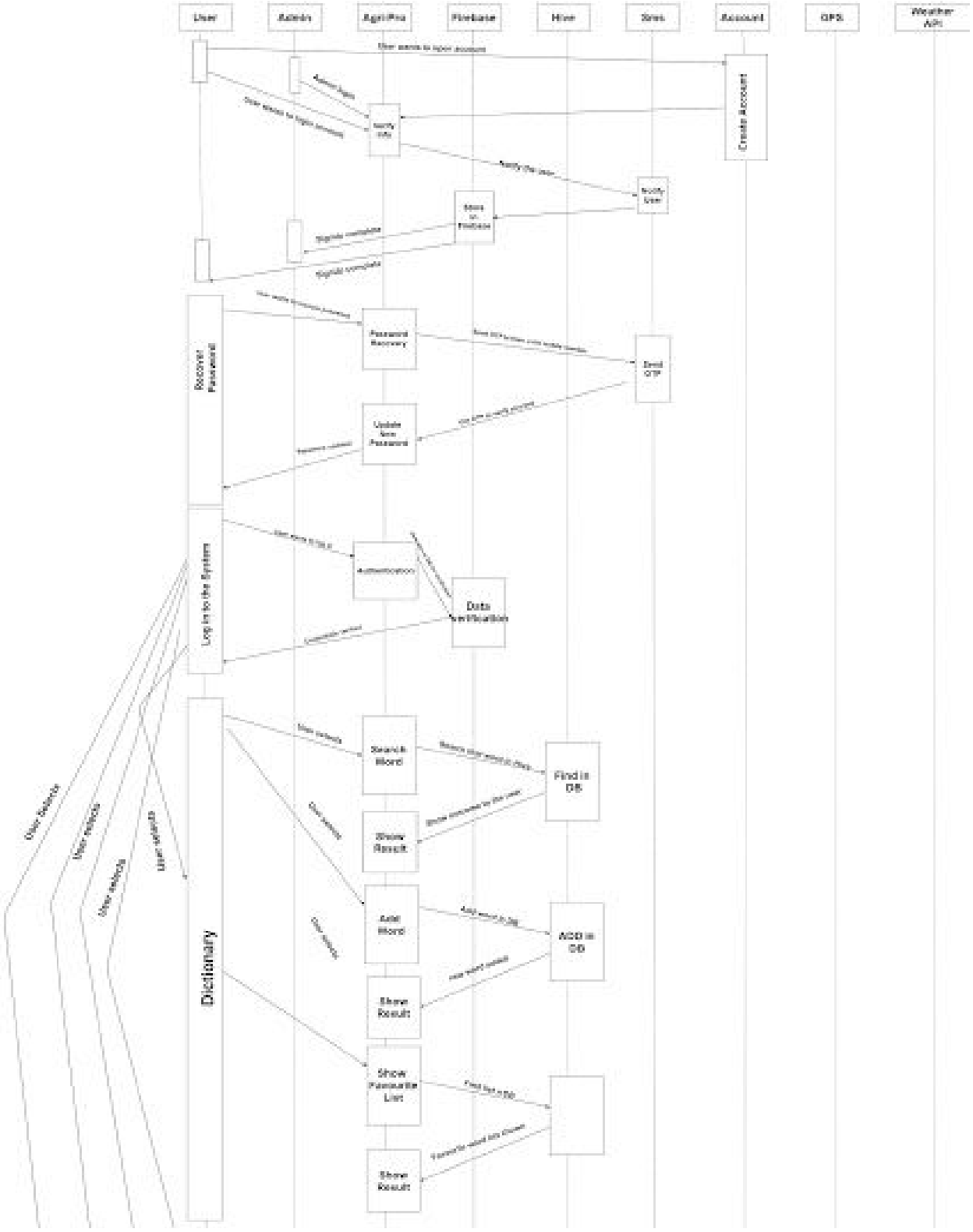


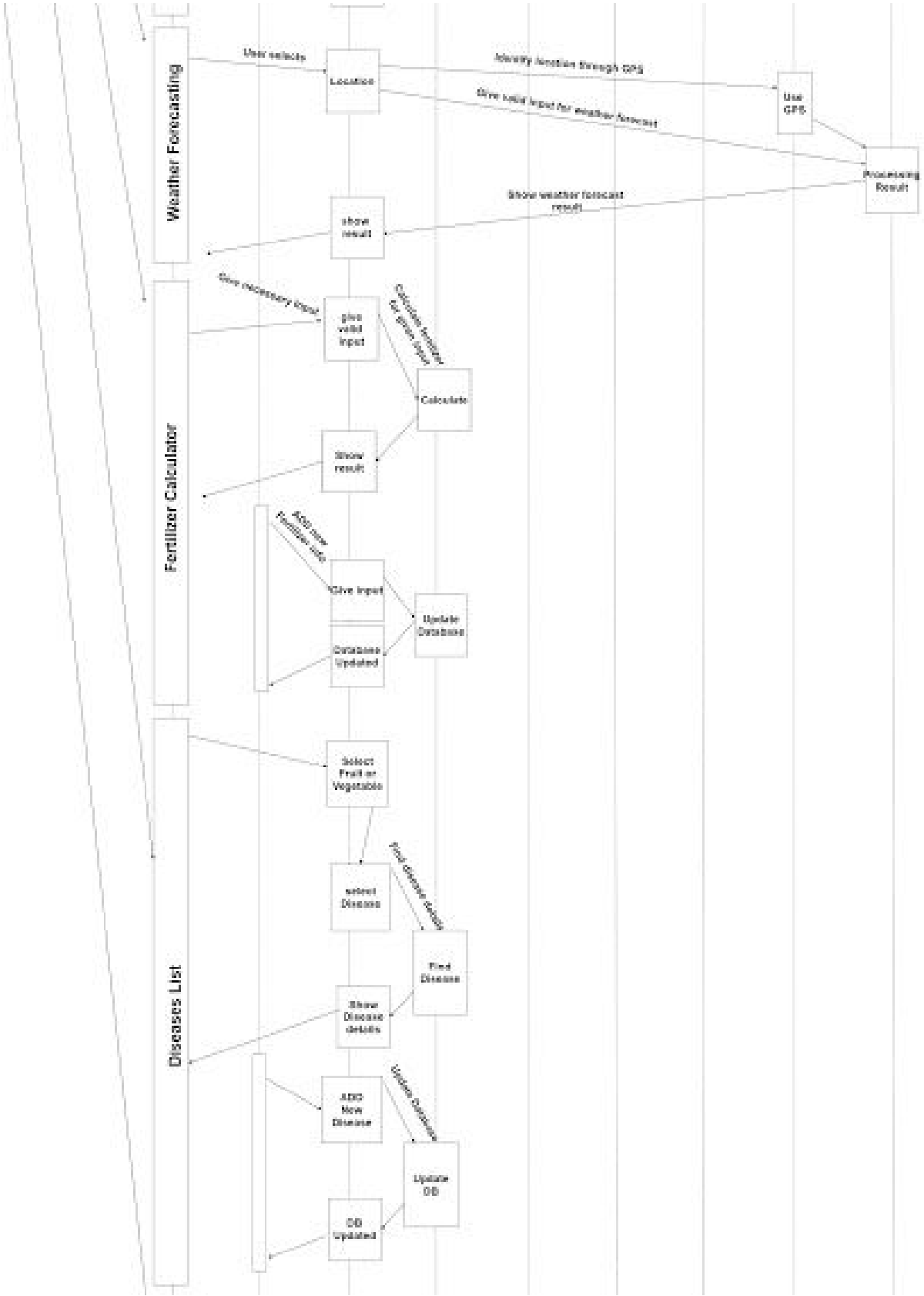
ID: User

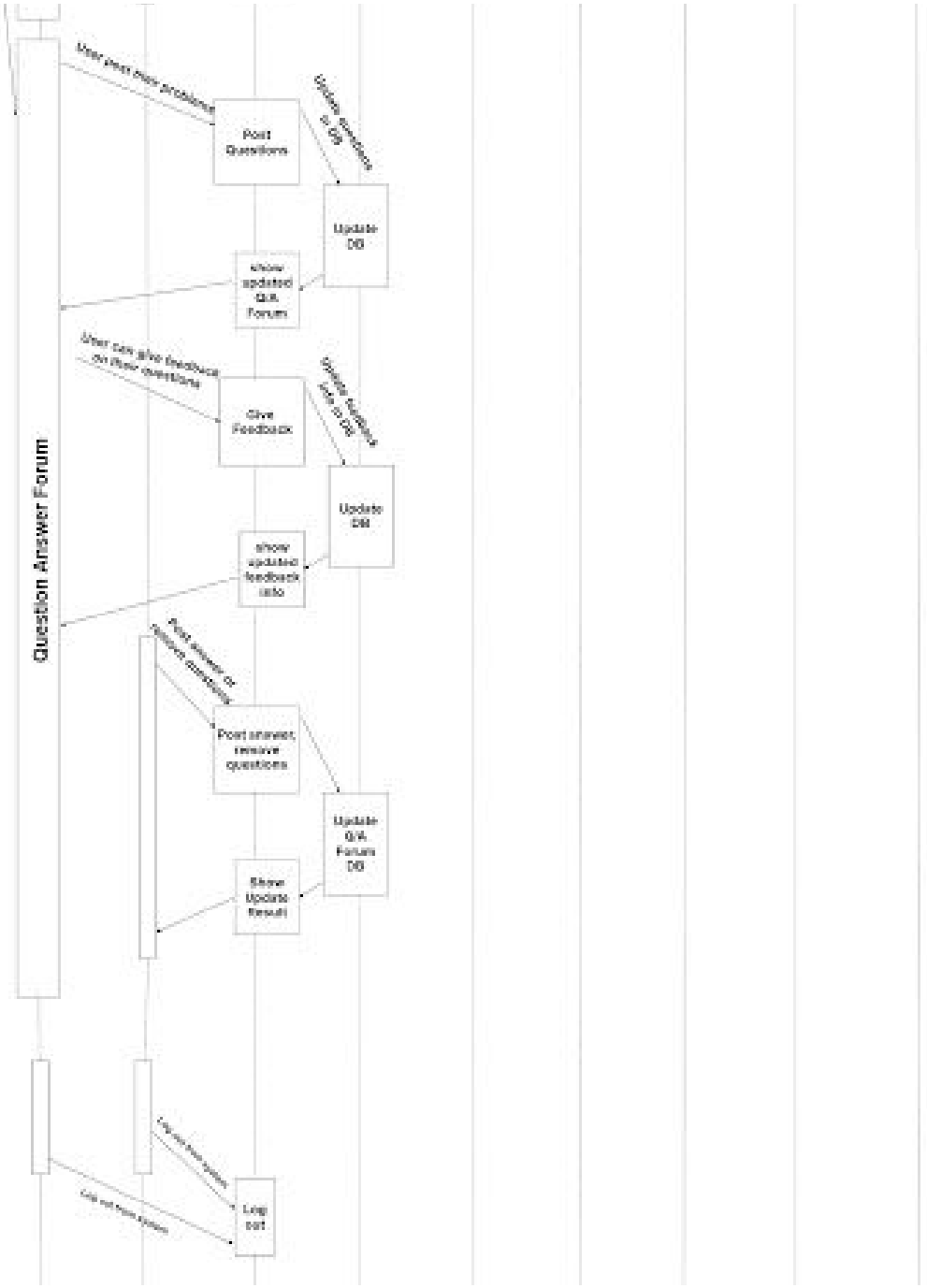
User


User can create account
Create_account
Provide_info
EXIT
Change_info
EXIT
See_disease_list
EXIT
Search_word
Add_to_favourite_List
User can add word to favourite list
EXIT
Weather_forecast
find_weather
User can find weather from weather forecast
EXIT
Login
User can recover password
Use_forum
Post_problem
EXIT
See_previous_ question
Users can see and post problems in the forum
EXIT
Fertilizer_Calculation
EXIT
Recover_password
Input_code
EXIT
User can request for password recovery

Sequence Diagram




Weather Forecasting
Fertilizer Calculator
Diseases List
User selects
Location
Already location through GPS
Use GPS
Give valid input for weather forecast
Processing Result
Show weather forecast result
show result
Give necessary input
give valid input
Calculate
Show result
Add new Fertilizer info
Give input
Update Database
Database Updated
Select Fruit or Vegetable
select Disease
Find Disease
Show Disease details
ADD New Disease
Update DB
DB Updated



For better view of Sequence Diagram:

https://drive.google.com/drive/folders/1w6nVdbGBWkdrQ_NrYY7FuHdFtg9ws5vs

Thank you