

Farm Management System

The farmer will purchase the sensors and create an account on this subscription-based software.

In the case of crops, the sensors will be installed in the crop fields, synchronizing with the software and uploading data (temperature, pH, moisture, nutrients) to the account. The data will be analyzed by the program to determine the best crop for the land. The farmer can select the best crop or any suggested crop. The program will then propose the appropriate procedures, equipment, and other data for the selected corporation.

In the case of livestock, sensors will be placed in the rooms to gather data such as room temperature, moisture, and air quality, which will then be sent to the account. The breed of the animals and the size of the space will be determined by the farmer. The program will evaluate the data and propose the appropriate procedures, equipment, and other data for the chosen animal.

In the case of aquatic livestock, sensors will be placed in the water to gather data such as water temperature, pH, and water quality, which will then be sent to the account. The farmer will select the fish breed and the size of the pond. The program will evaluate the data and propose the appropriate methods, equipment, and other data for the chosen fish.

Features:

- Analyze environmental data automatically to recommend the best crop/livestock.
- Notifies the user when the environment lacks essential nutrients required for the growth of a specific crop/livestock.
- All sensor data is stored in the cloud and synced with the user account, allowing several fields and livestock to be tracked at the same time.
- Recommends the best and most cost-effective fertilizer/feed, equipment, and procedures for a certain crop/livestock.
- Informs the user of the signs of common illnesses and their treatment for the crop/livestock in question.
- Determines the best crop rotation for a specific field.
- Gathers real-time weather forecast data and updates required procedures to maximize crop/livestock growth.

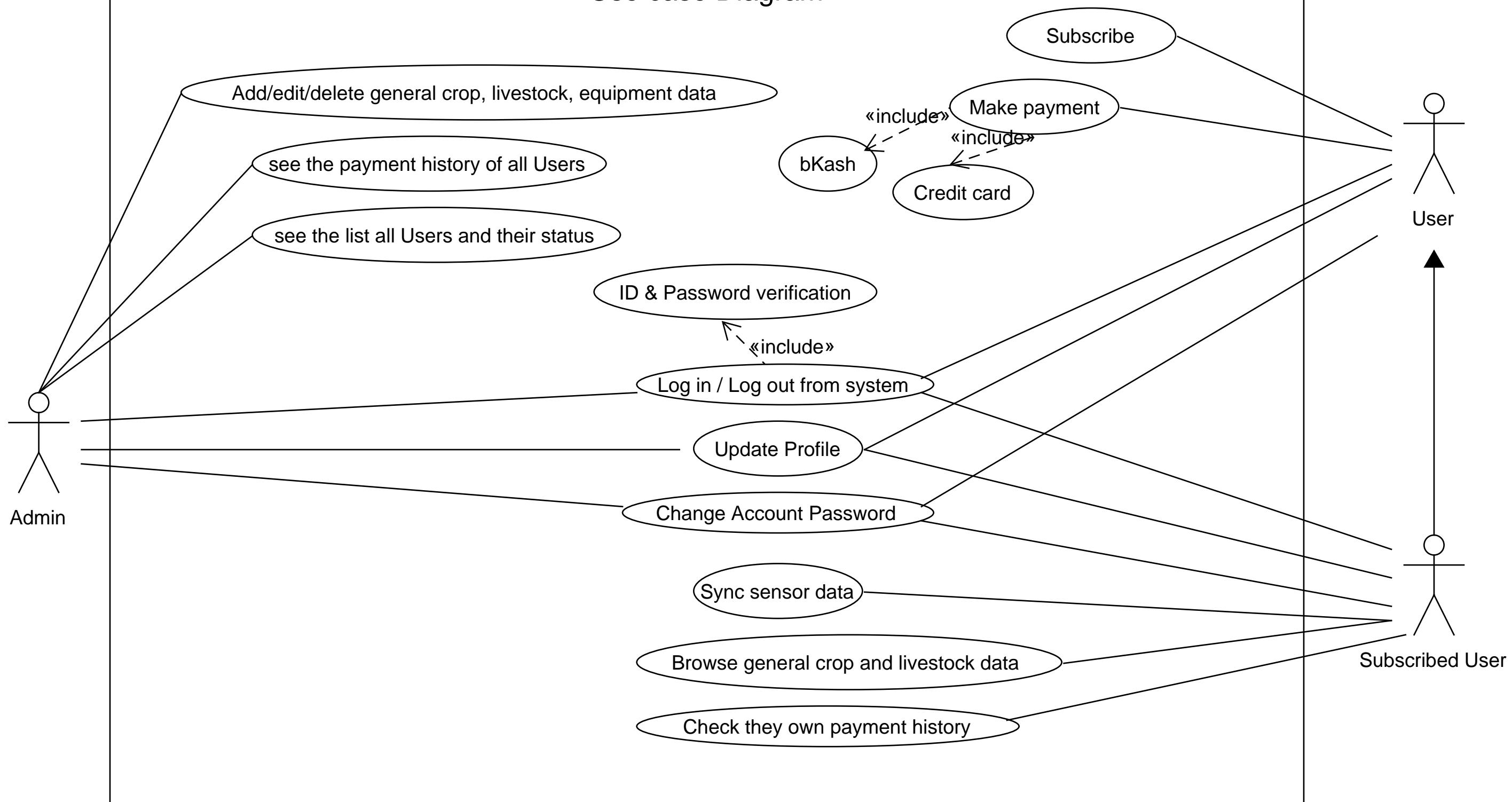
Farm Management System

Functional requirements:

- The system should have a registration process. There are 2 types of users: Admin and User
- The system should have a login process
- The system should have an online payment process for subscribing
- The system should remind the User to re-subscribe each month
- The system should automatically collect the sensor data and store it in the Users account
- The system should analyze the User data and recommend optimal crop, livestock, equipment to the User
- The system should give an estimated cost of production for the selected crop
- The system should notify the User when the environment lacks essential nutrients required for the growth of a specific crop/livestock
- The system should notify the User about the signs of common illnesses and their treatment for the selected crop/livestock
- The system should collect weather data and recommend the best crop rotation roadmap to the User
- The system should allow User to browse general crop and livestock data
- The system should notify the User when a sensor malfunction
- The system should allow the User to check they own payment history
- The system should allow the Admin to see the list all Users and their status
- The system should allow the Admin to see the payment history of all Users
- The system should allow the Admin to add/edit/delete general crop, livestock, equipment data

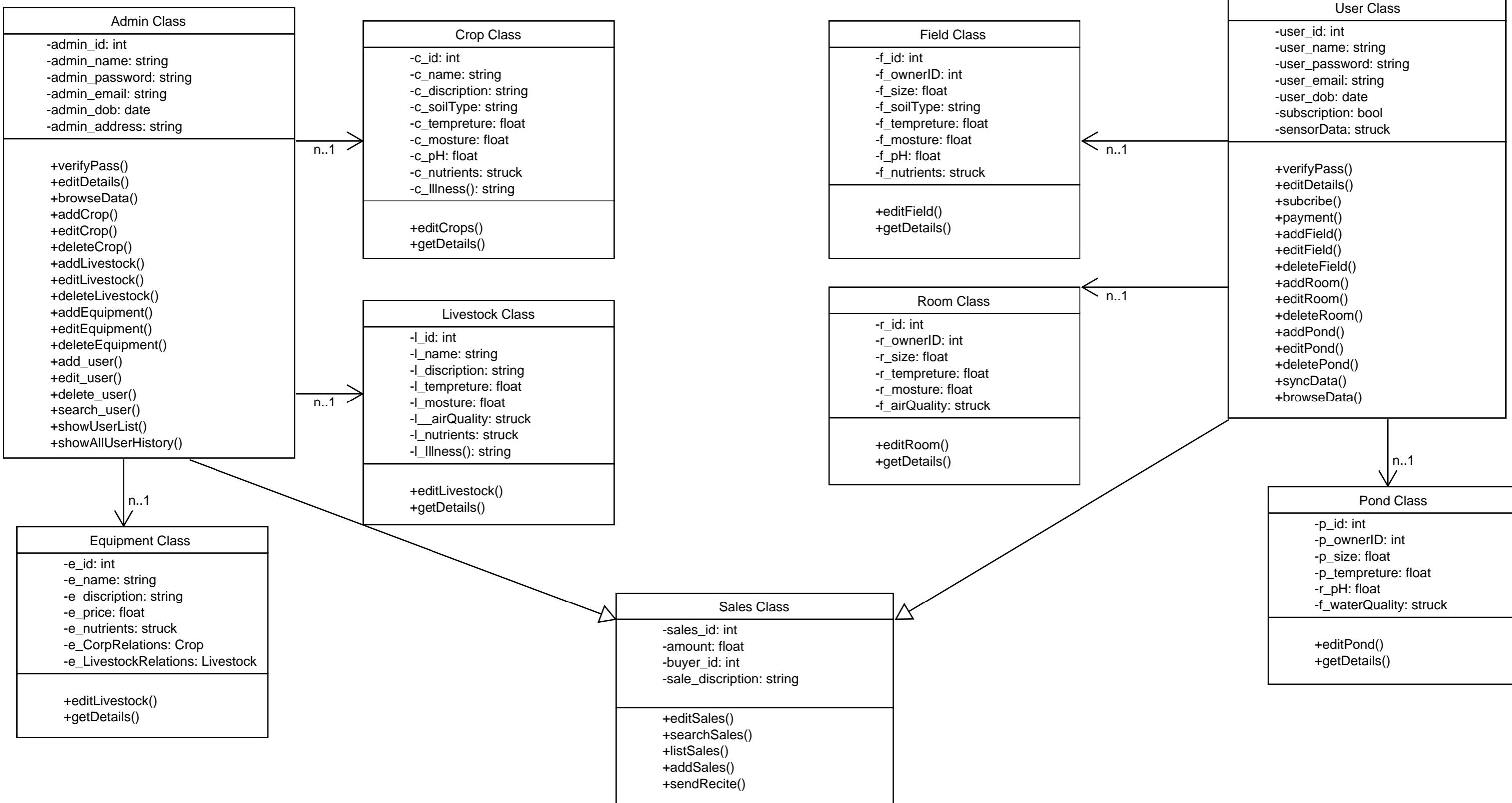
Farm Management System

Use case Diagram

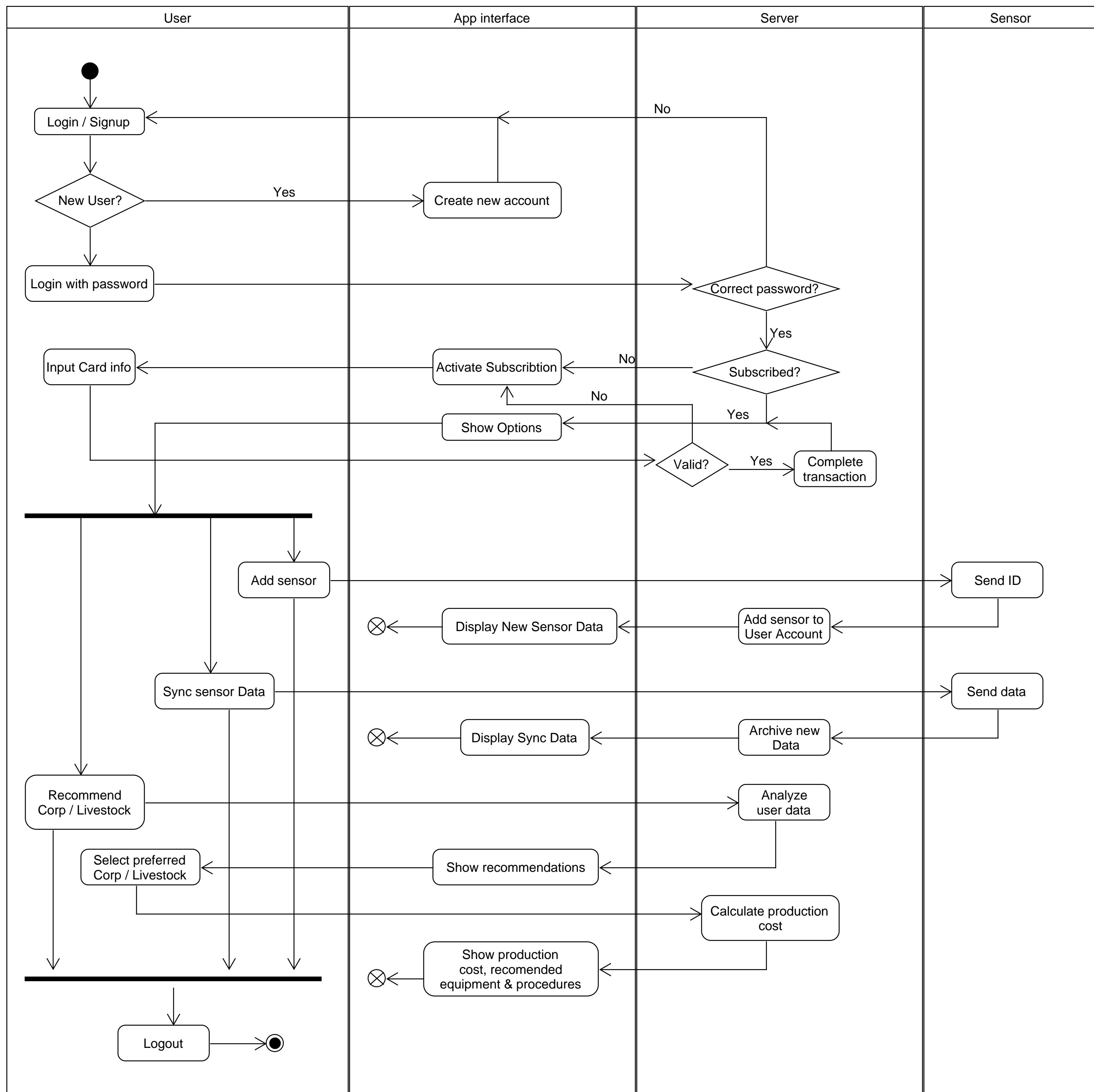


Farm Management System

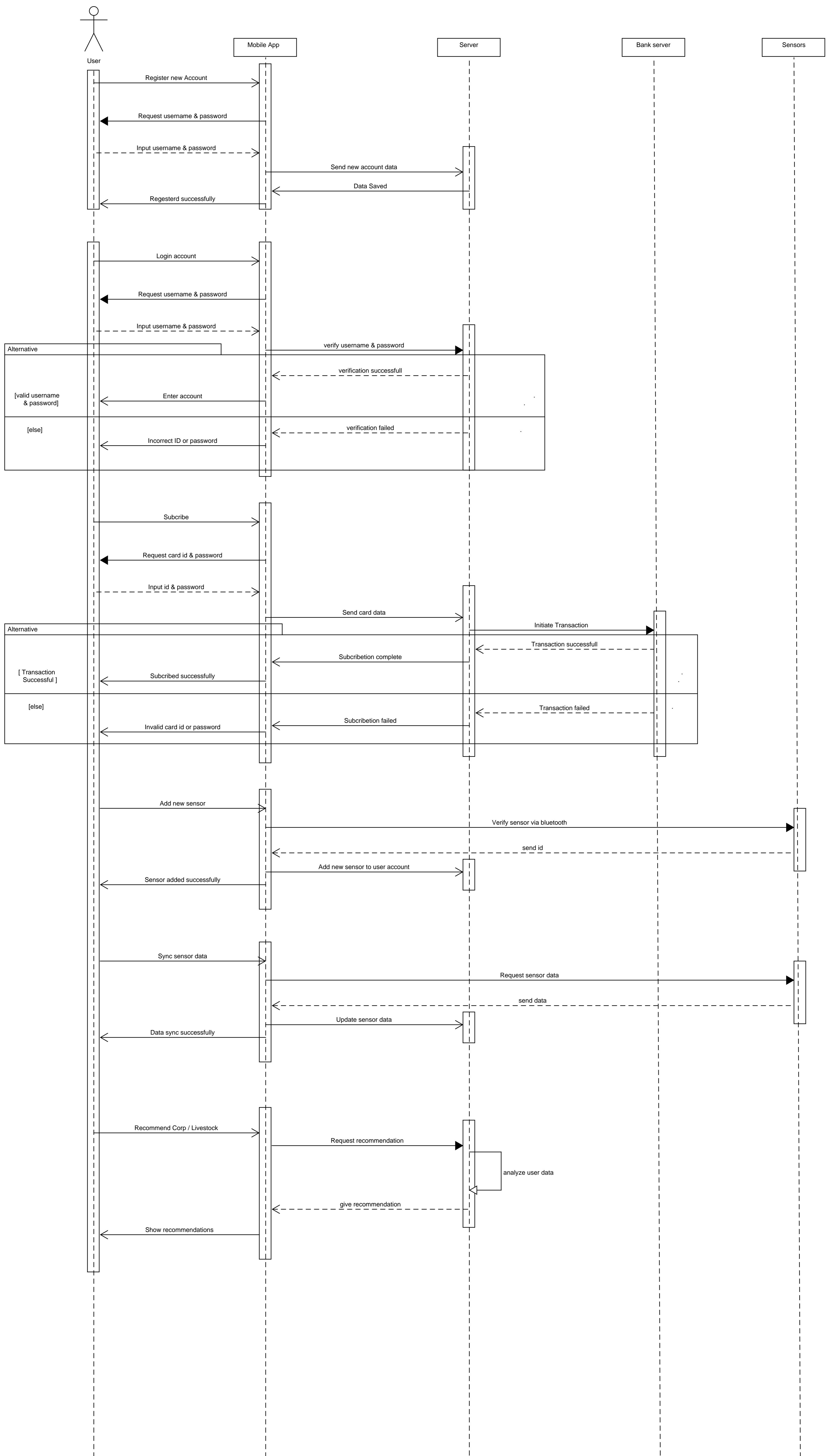
Class Diagram



Farm Management System
Activity Diagram



Farm Management System Sequence Diagram



1.

To develop our Farm Management system solution the appropriate process model would be **DSDM**

2.

DSDM (formally known as Dynamic System Development Method) is an Agile method that focuses on delivering what the business needs when it needs it.

The eight Principles of DSDM:

1. Focus on the business need
2. Deliver on time
3. Collaborate
4. Never compromise quality
5. Build incrementally from firm foundations
6. Develop iteratively
7. Communicate continuously and clearly
8. Demonstrate control

DSDM is a method that focuses on business need and delivery on time. As our system is a very End user heavy, we need to understand and deliver user requirements as fast as possible.

We must continually collaborate with others in order to update the current market price of equipment and incorporate the most up-to-date crop/livestock processes.

Iterative development allows us to deploy new features as they become available and to resolve issues in a timely and dependable manner.

Clear and consistent communication between users and developers will assist to improve user experience and provide developers a better understanding of current user demands.

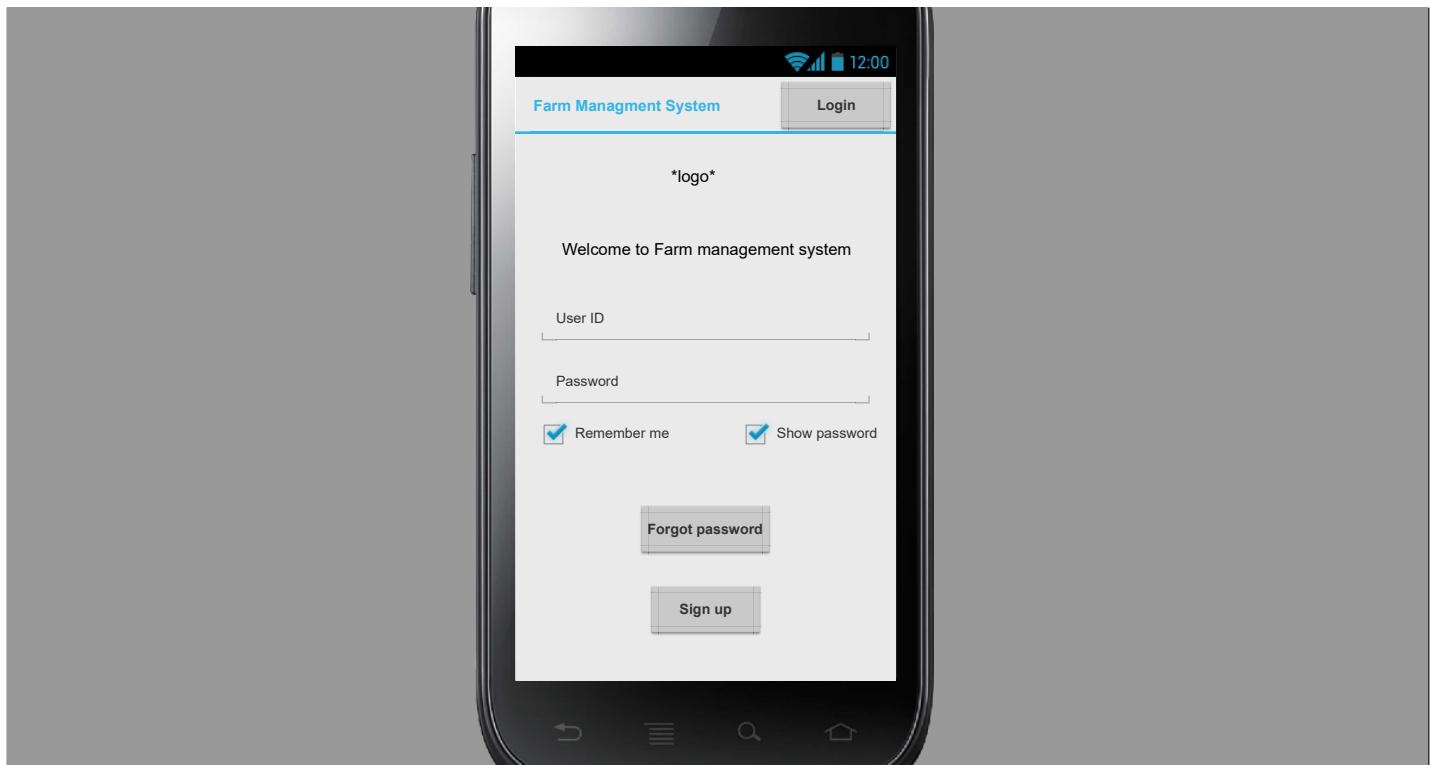
3.

Necessary Rolls:

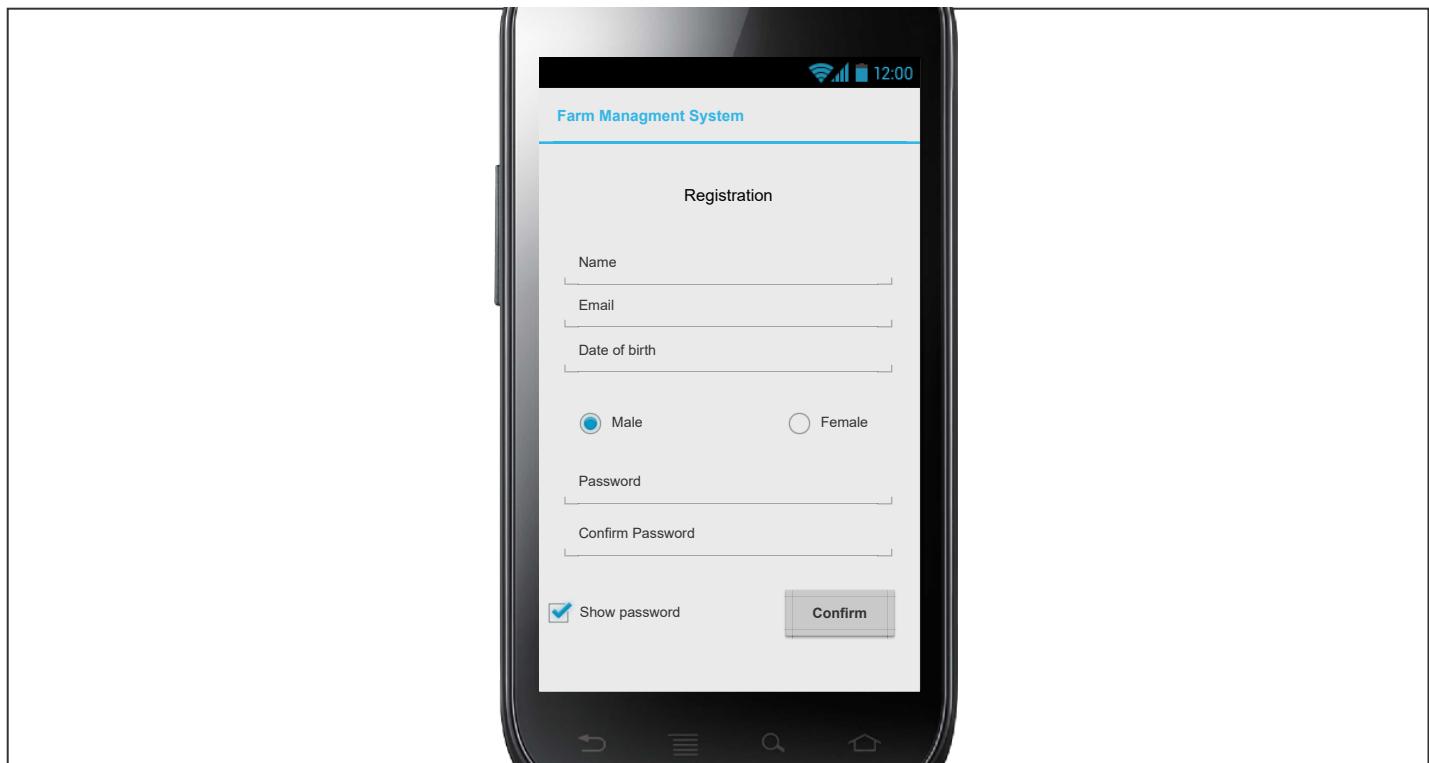
1. **Project Manager:** Responsible for the high-level coordination of the project
2. **Technical Coordinator:** Ensures technical consistency and coherent (especially when there are multiple teams).
3. **Business Analyst:** Facilitates the relationship between technical and business people, and between project level and team level.

4. **Technical Advisor:** Gives teams advice on technical aspects.
5. **Business Advisor:** Gives teams advice on business aspects.
6. **Business Ambassador:** Brings business knowledge to the teams.
7. **Team Leader:** Responsible for coordination inside a team
8. **Solution Developer:** Develop the product.
9. **Solution Tester:** Test the product.

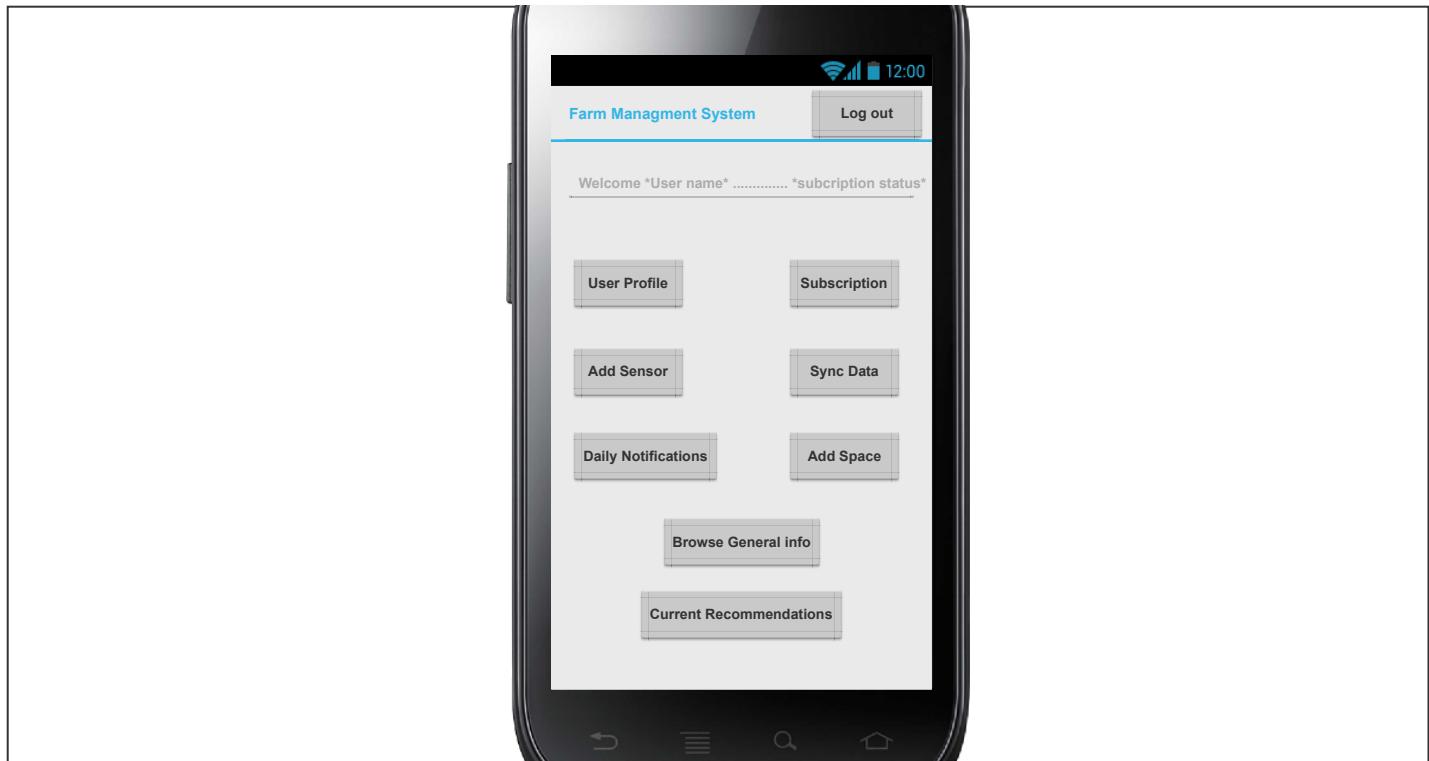
Login



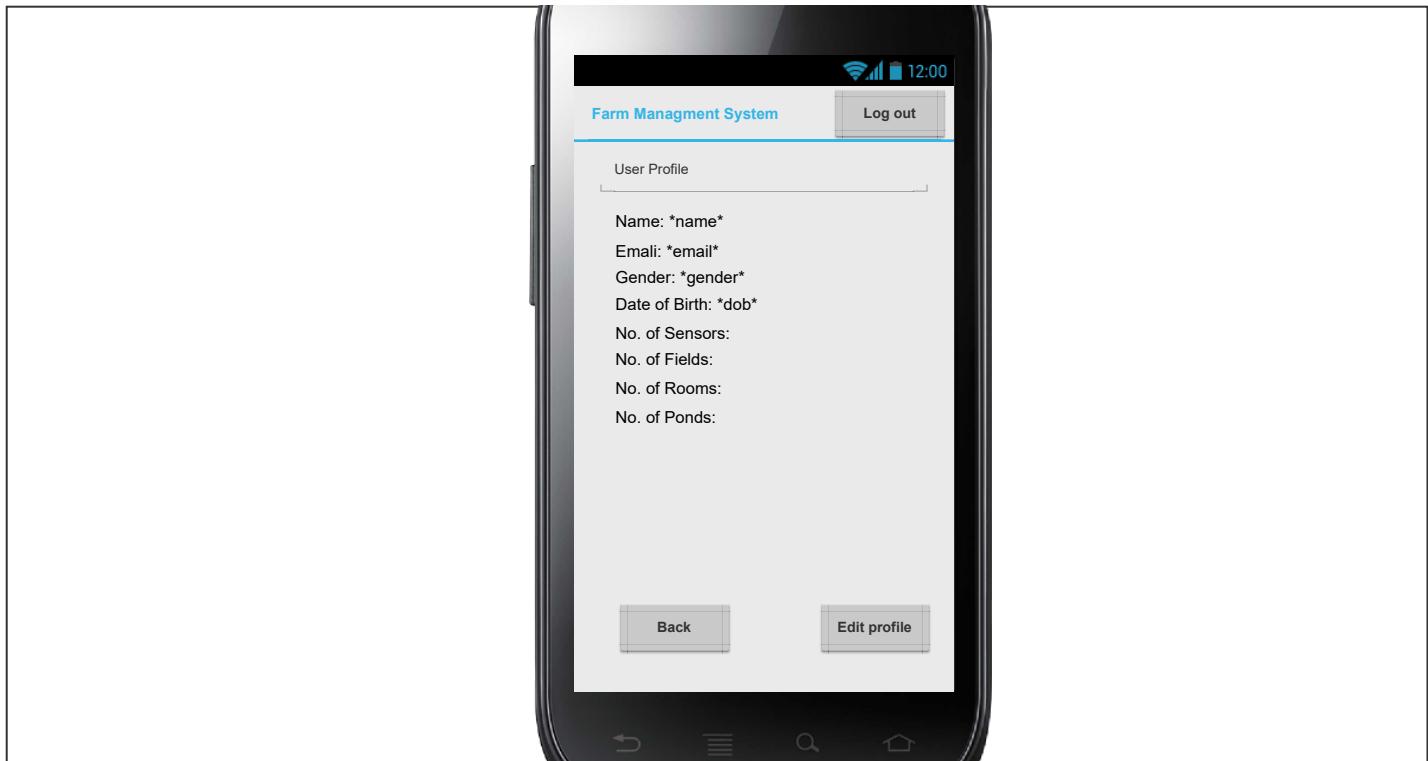
Signup



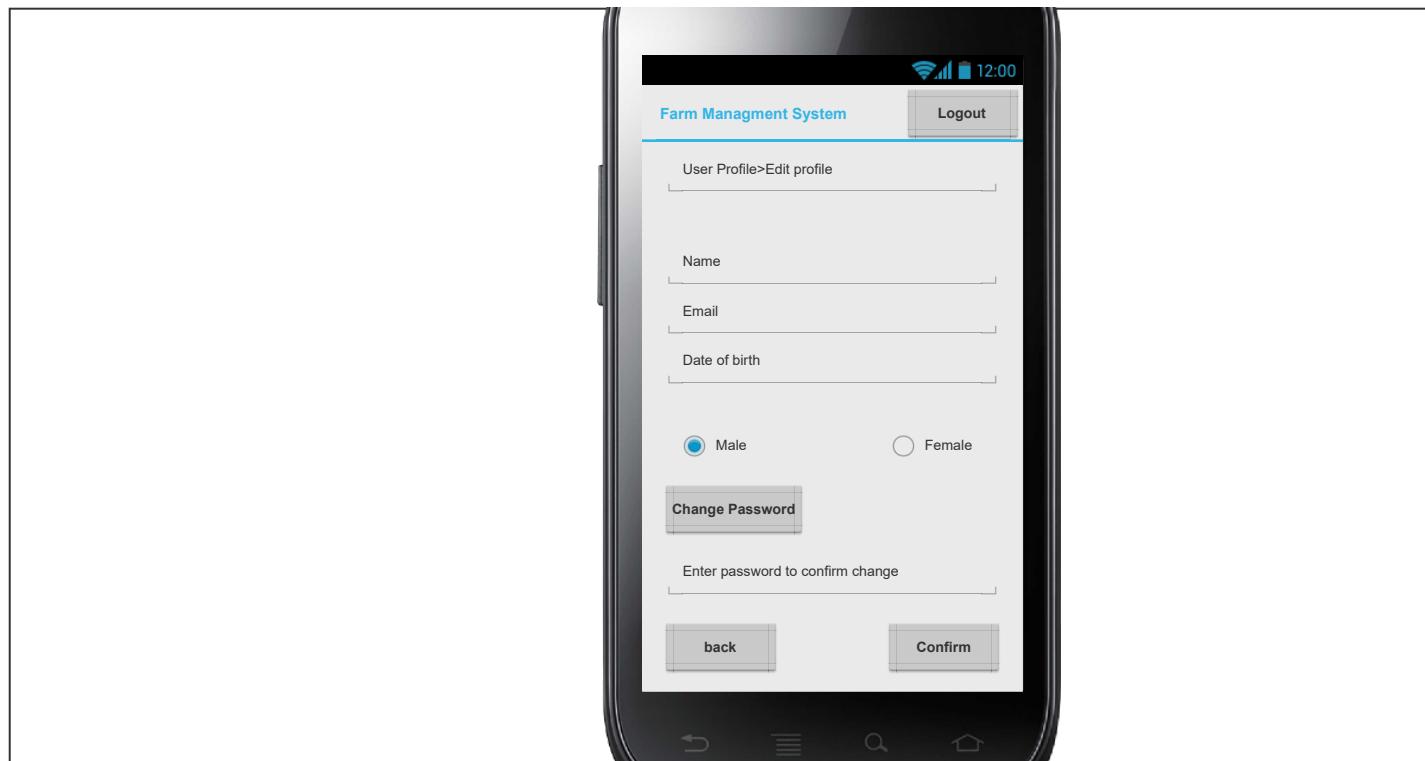
Main menu



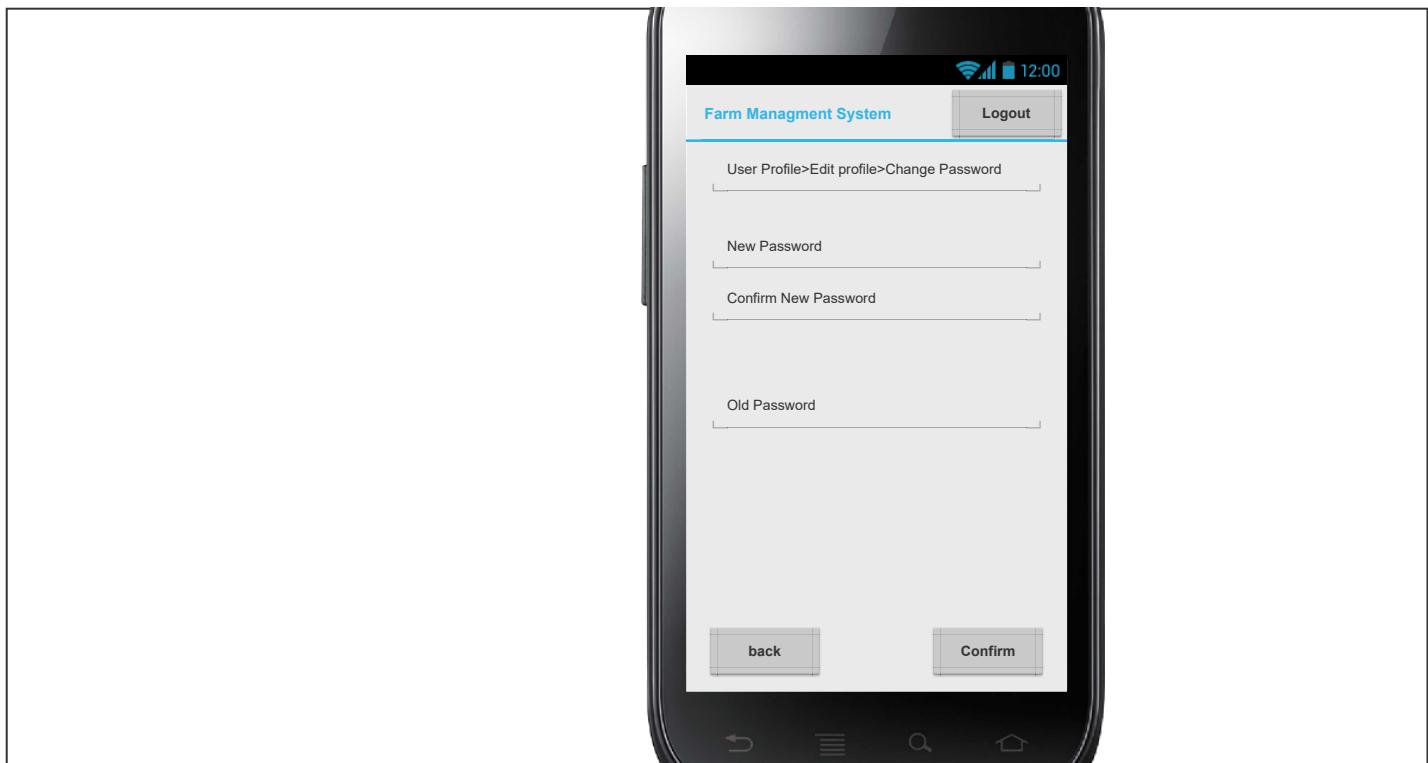
Profile



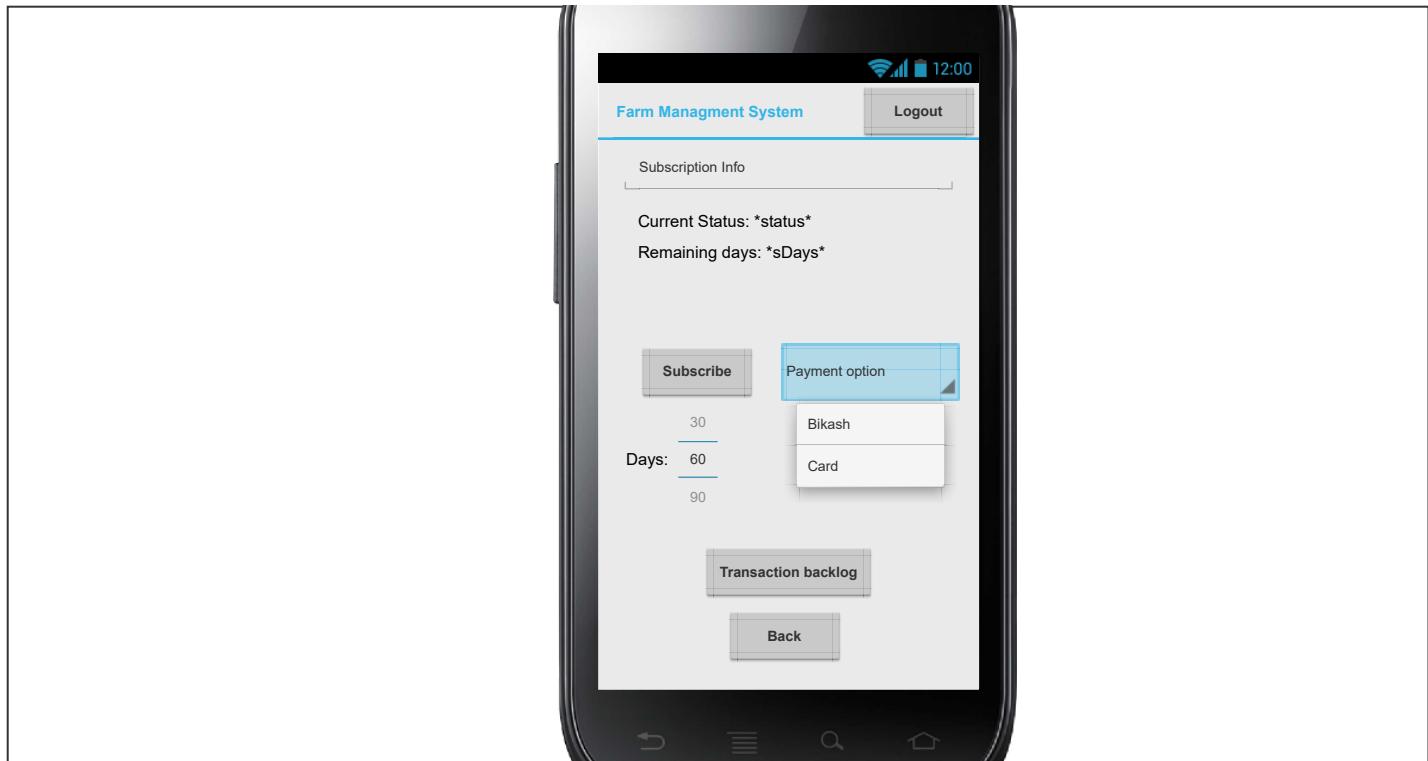
Edit profile



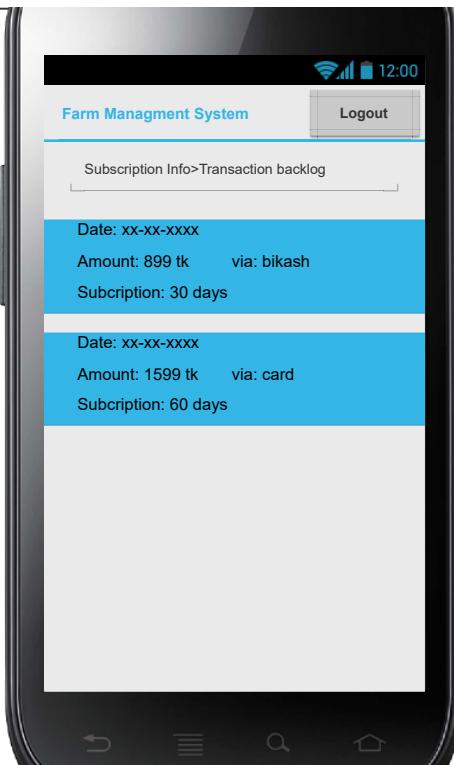
Change Password



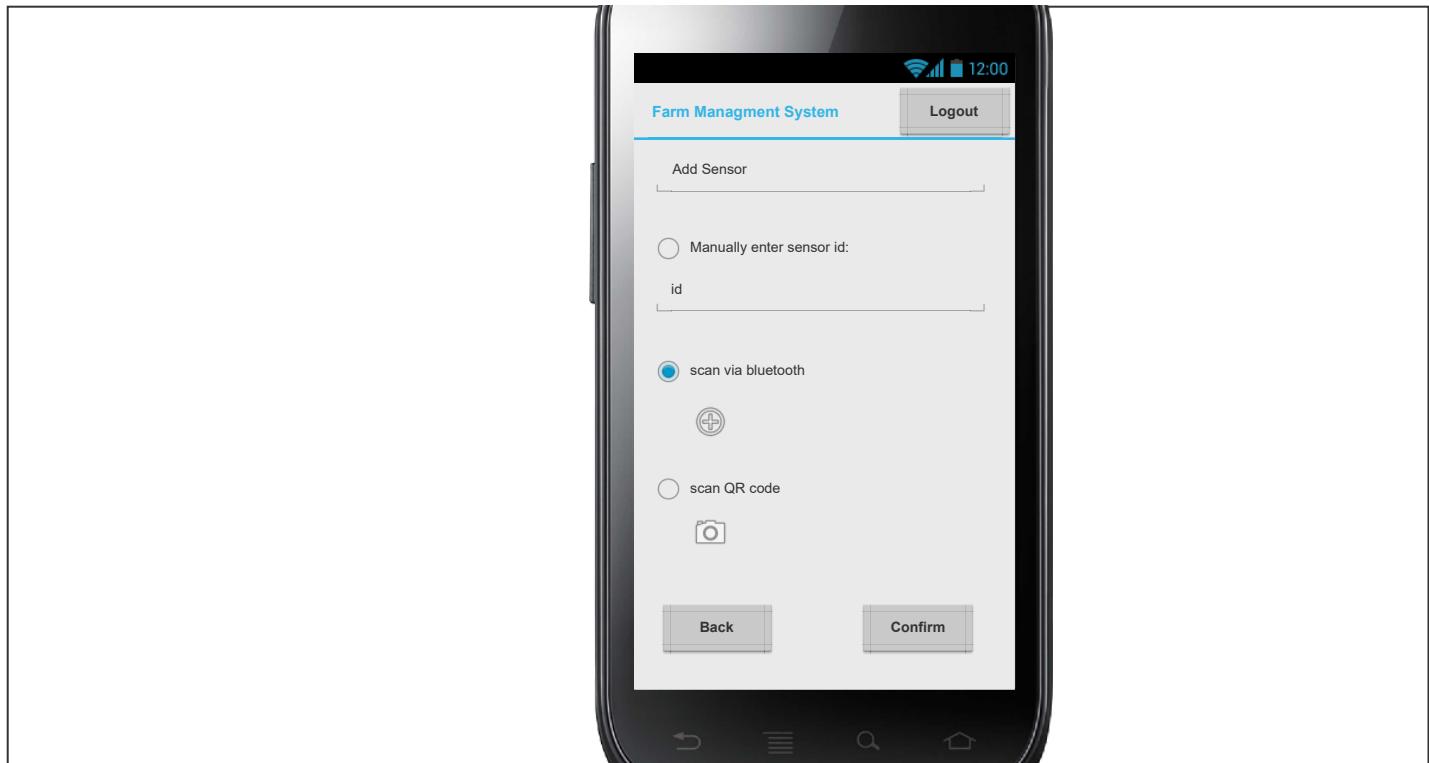
Subscription



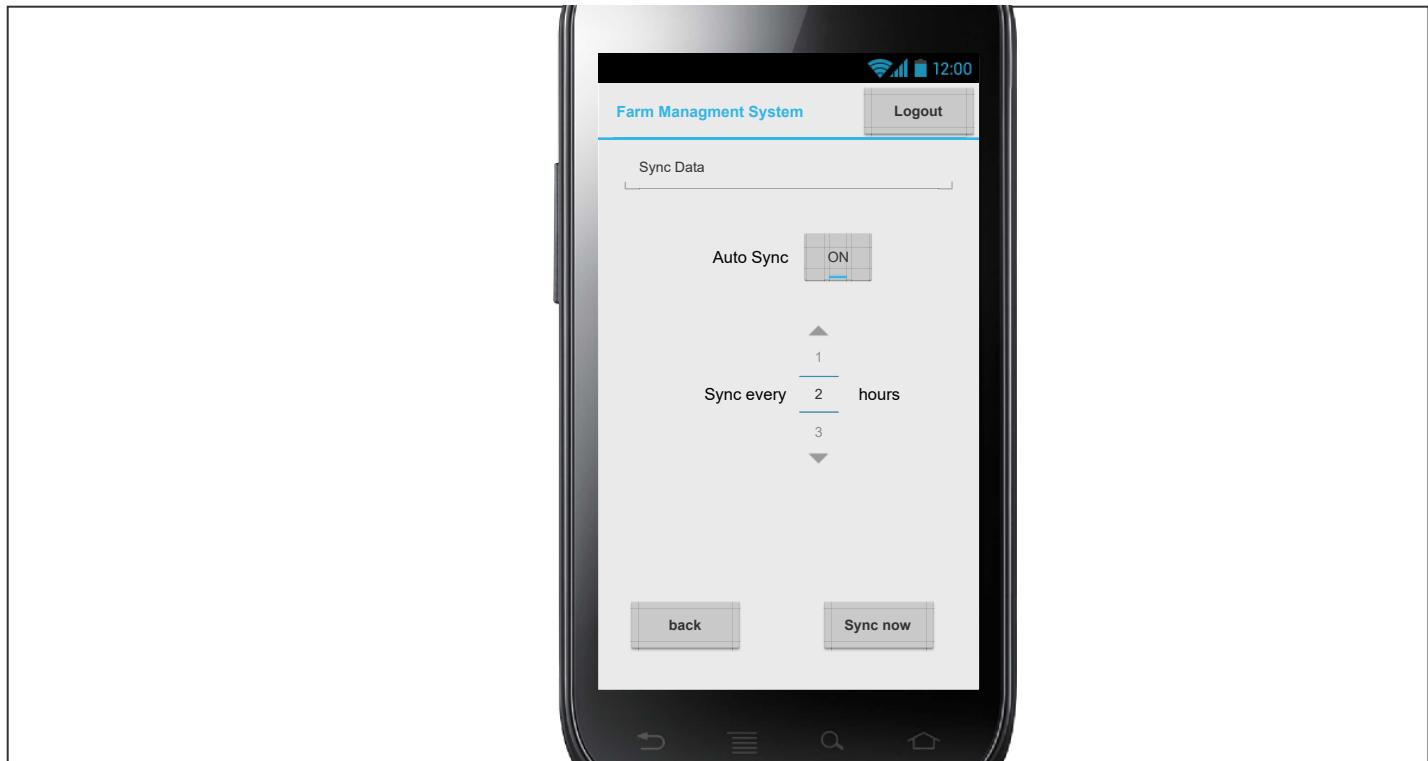
Transaction backlog



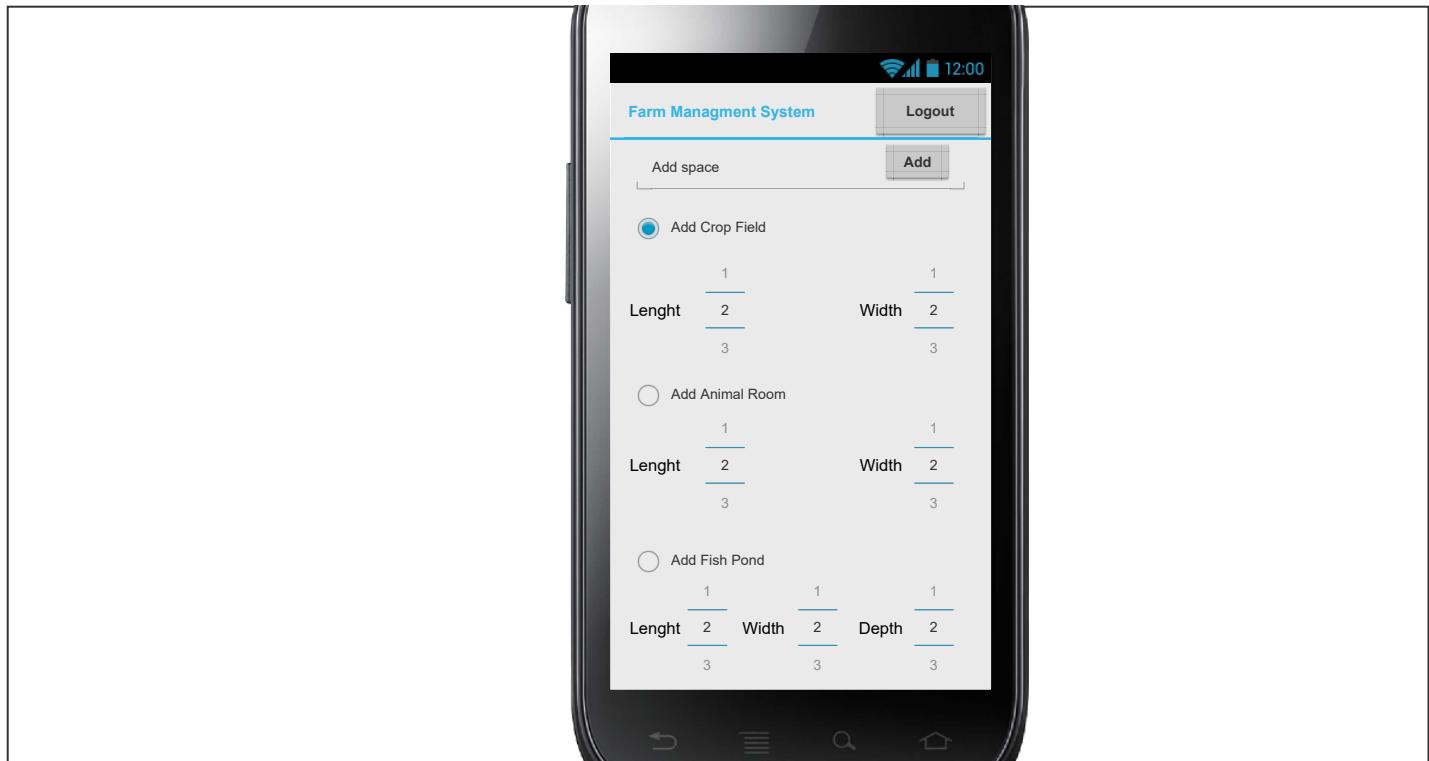
Add Sensor



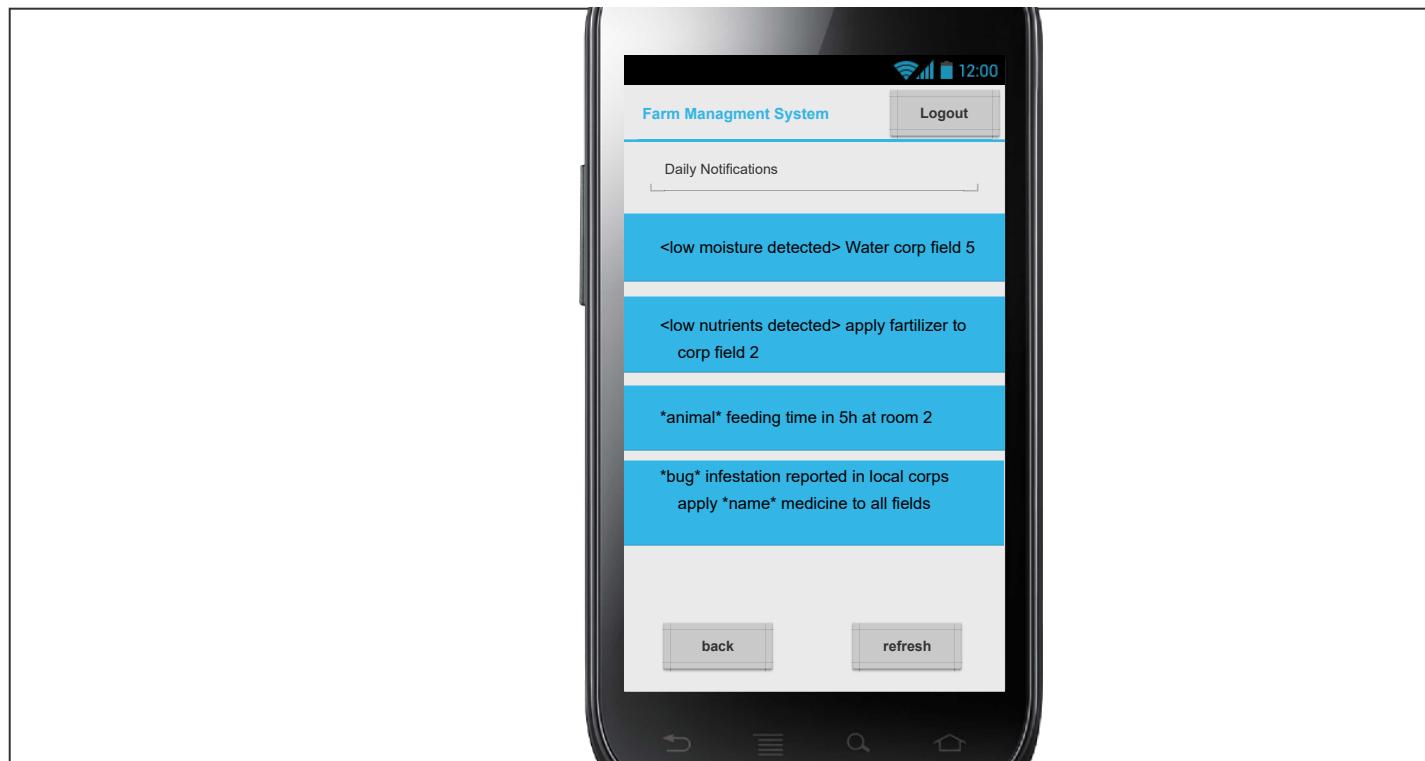
Sync Data



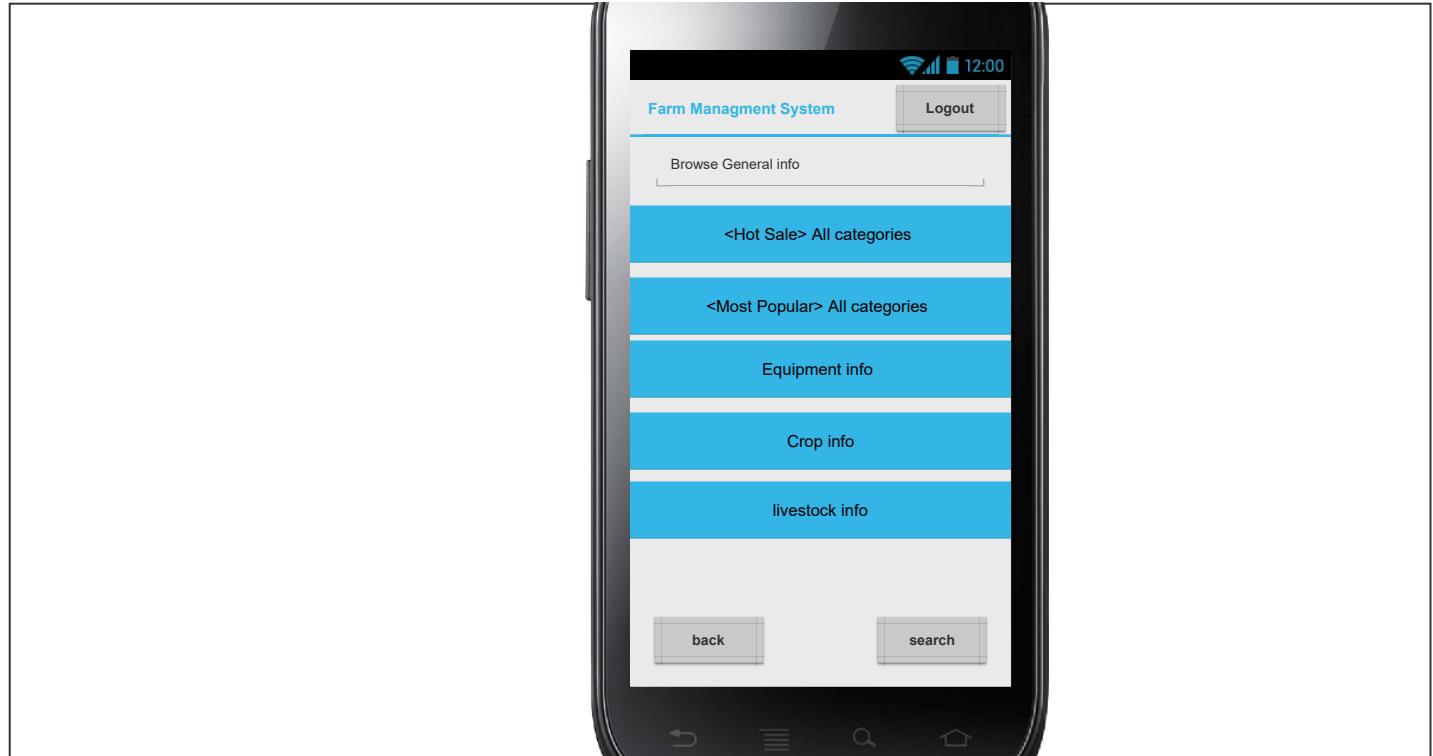
Add Space



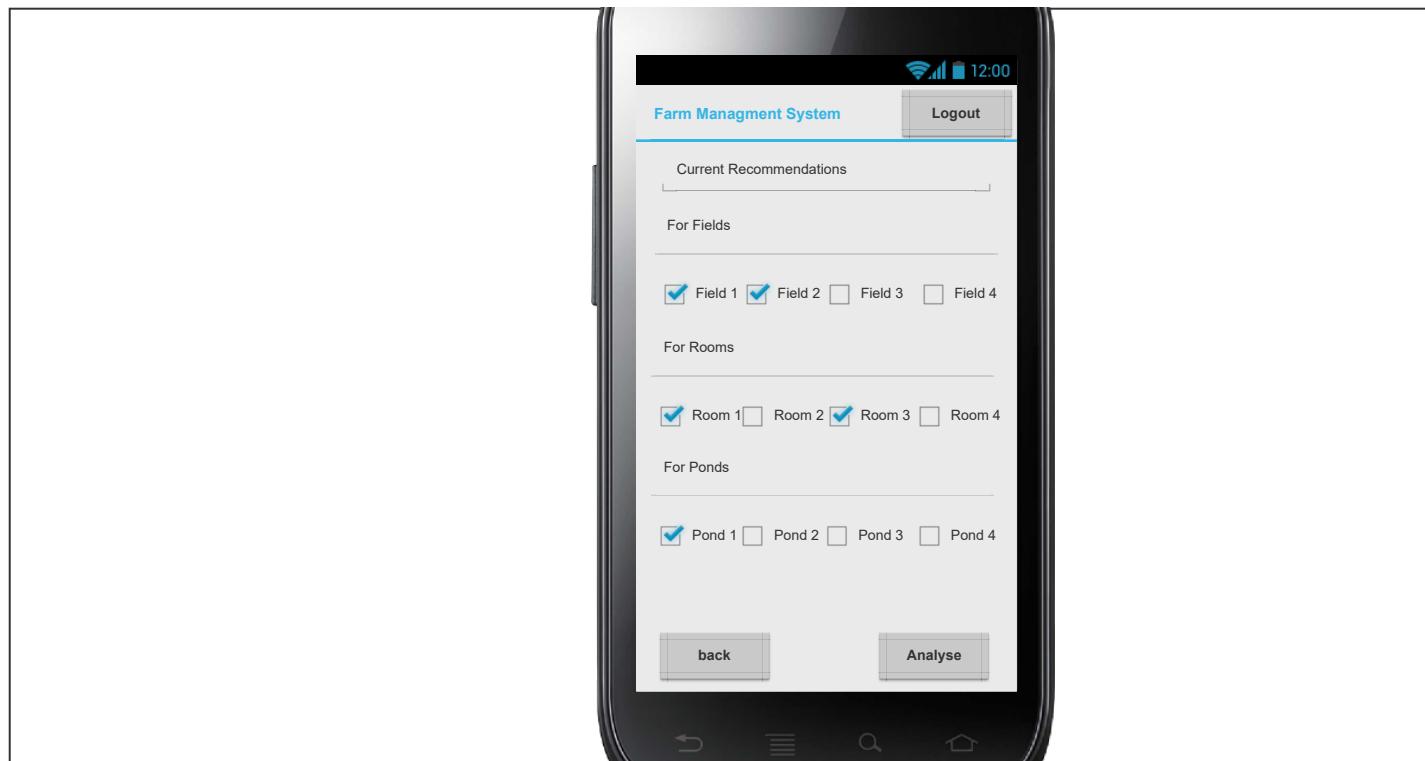
Daily Notifications



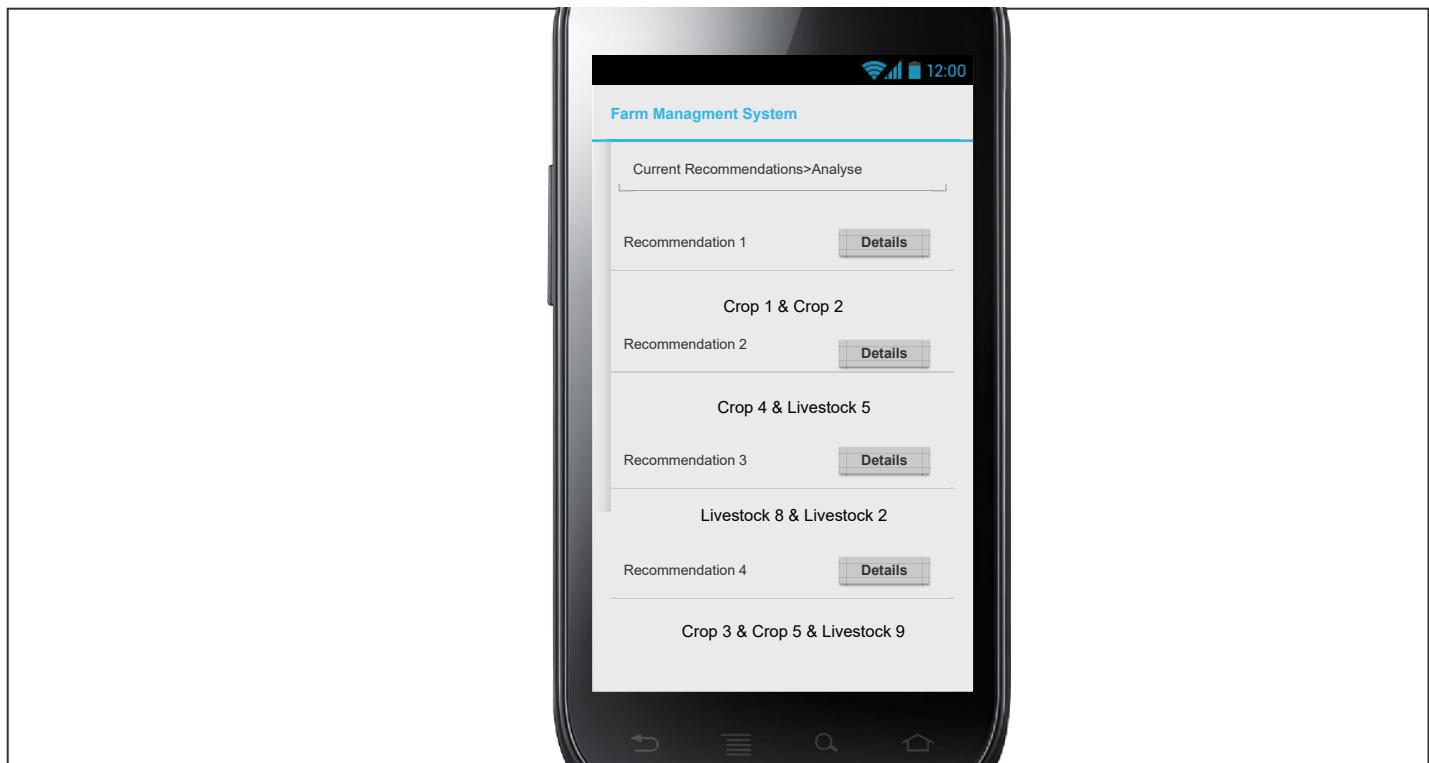
Browse General info



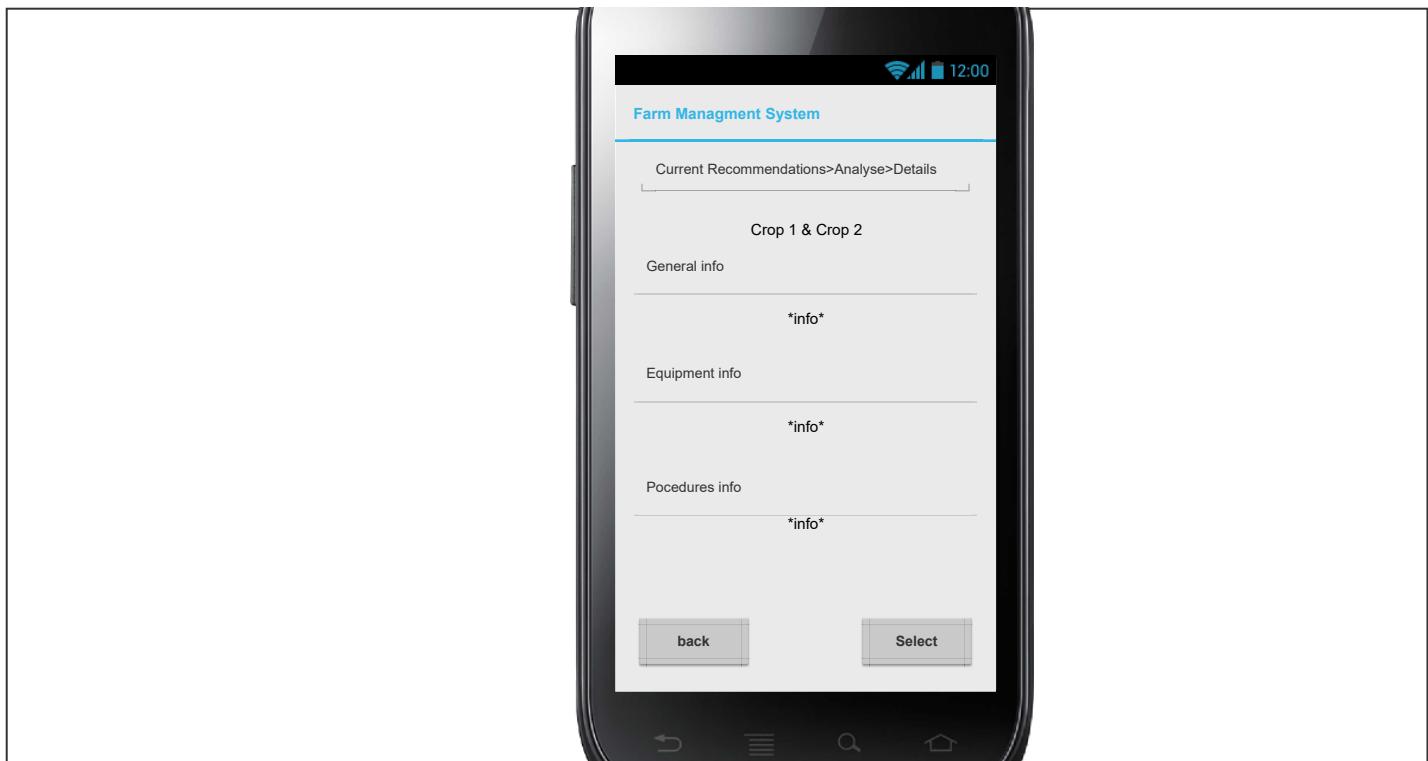
Current Recommendations



Analyse



Details



We will be doing **Functional testing** from **Black box testing** in our project.

As our project Farm management system is very end user heavy and has very complex functional requirements for the end users, we want to use Functional testing.

- We will attempt to find errors in the following categories:

- (1) incorrect or missing functions
- (2) interface errors
- (3) errors in external database access (accessibility)
- (4) behavior or performance errors
- (5) initialization and termination errors

EXERCISE - 6: Project Test Planning

Project Name: Farm Management System	Test Designed by: Jahid Hasan							
Test Case ID: FR_1	Test Designed date:11/7/2021							
Test Priority (Low, Medium, High): Medium	Test Executed by: Nasiruddin							
Module Name: Login Session	Test Execution date:11/7/2021							
Test Title: verify login with valid username and password								
Description: Test website login page								
Precondition (If any): User must have valid username and password								
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)				
1. Go to the application 2. Enter username 3. Enter password 4. Click login	Username: 9999999999 Password: 321	User should login into the application	As expected,	Pass				

Project Name: Farm Management System		Test Designed by: Jahid Hasan					
Test Case ID: FR_2		Test Designed date:11/7/2021					
Test Priority (Low, Medium, High): Medium		Test Executed by: Nasiruddin					
Module Name: Edit Profile		Test Execution date:11/7/2021					
Test Title: verify the ability to change profile information							
Description: Test edit profile function							
Precondition (If any): User must have valid username and password							
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)			
1. Go to the application 2. Login 3. Click on User Profile 4. Click edit profile 5. Edit Name 6. Enter password 7. Click confirm	Username: 99999999999 Password: 321 New Username: 1111111111	User profile should be changed to the new data.	As expected,	Pass			

Project Name: Farm Management System		Test Designed by: Jahid Hasan					
Test Case ID: FR_3		Test Designed date:11/7/2021					
Test Priority (Low, Medium, High): Medium		Test Executed by: Nasiruddin					
Module Name: Change Password		Test Execution date:11/7/2021					
Test Title: verify the ability to change password							
Description: Test change password function							
Precondition (If any): User must have valid username and password							
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)			
1. Go to the application 2. Login 3. Click on User Profile 4. Click edit profile 5. Click Change password 6. Enter new password 7. Confirm new password 8. Enter old password 9. Click confirm 10. Login with new password	Username: 9999999999 Password: 321 New password: 56789	User password should be changed to the new password.	As expected,	Pass			

Project Name: Farm Management System		Test Designed by: Jahid Hasan					
Test Case ID: FR_4		Test Designed date:11/7/2021					
Test Priority (Low, Medium, High): Medium		Test Executed by: Nasiruddin					
Module Name: Add Sensor		Test Execution date:11/7/2021					
Test Title: verify the ability to add new sensors via Bluetooth							
Description: Test Add Sensors via Bluetooth function							
Precondition (If any): User must have a valid username, password and sensor							
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)			
1. Go to the application 2. Login 3. Click Add Sensor 4. Select via Bluetooth 5. Click confirm	Username: 9999999999 Password: 321 Sensor	New sensor should be added in user profile.	As expected,	Pass			

Project Name: Farm Management System		Test Designed by: Jahid Hasan					
Test Case ID: FR_5		Test Designed date:11/7/2021					
Test Priority (Low, Medium, High): Medium		Test Executed by: Nasiruddin					
Module Name: Add Sensor		Test Execution date:11/7/2021					
Test Title: verify the ability to add new sensors manually							
Description: Test Add Sensors manually function							
Precondition (If any): User must have a valid username, password and sensor id							
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)			
1. Go to the application 2. Login 3. Click Add Sensor 4. Select Manually enter sensor id 5. Enter sensor id 6. Click confirm	Username: 9999999999 Password: 321 Sensor id: 99999999	New sensor should be added in user profile.	As expected,	Pass			

Project Name: Farm Management System		Test Designed by: Jahid Hasan					
Test Case ID: FR_6		Test Designed date:11/7/2021					
Test Priority (Low, Medium, High): Medium		Test Executed by: Nasiruddin					
Module Name: Add Sensor		Test Execution date:11/7/2021					
Test Title: verify the ability to add new sensors with QR code							
Description: Test Add Sensors by scanning QR code function							
Precondition (If any): User must have a valid username, password and sensor QR code							
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)			
1. Go to the application 2. Login 3. Click Add Sensor 4. Select scan QR code 5. Click camera icon 6. Scan the QR code with camera 7. Click confirm	Username: 99999999999 Password: 321 Sensor QR picture	New sensor should be added in user profile.	Camera could not focus and read QR code	Fail			

Project Name: Farm Management System		Test Designed by: Jahid Hasan					
Test Case ID: FR_7		Test Designed date:11/7/2021					
Test Priority (Low, Medium, High): Medium		Test Executed by: Nasiruddin					
Module Name: Sync Data		Test Execution date:11/7/2021					
Test Title: verify the ability to instantly initiate syncing of sensor data							
Description: Test manual syncing of sensor data function							
Precondition (If any): User must have a valid username, password and connected sensor							
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)			
1. Go to the application 2. Login 3. Click Sync Data 4. Click Sync now	Username: 9999999999 Password: 321 Sensor *connected*	Sensor data should be updated in user profile.	As expected,	Pass			

Project Name: Farm Management System		Test Designed by: Jahid Hasan					
Test Case ID: FR_8		Test Designed date:11/7/2021					
Test Priority (Low, Medium, High): Medium		Test Executed by: Nasiruddin					
Module Name: Sync Data		Test Execution date:11/7/2021					
Test Title: verify the ability to automatically sync sensor data							
Description: Test automatic syncing of sensor data function							
Precondition (If any): User must have a valid username, password and connected sensor							
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)			
1. Go to the application 2. Login 3. Click auto sync to turn on 4. Select 1h 5. Click back 6. Wait 1h	Username: 99999999999 Password: 321 Sensor *connected*	Sensor data should be updated in user profile.	As expected,	Pass			

Project Name: Farm Management System		Test Designed by: Jahid Hasan					
Test Case ID: FR_8		Test Designed date:11/7/2021					
Test Priority (Low, Medium, High): Medium		Test Executed by: Nasiruddin					
Module Name: Add Space		Test Execution date:11/7/2021					
Test Title: verify the ability to add crop fields							
Description: Test Adding Crop field function							
Precondition (If any): User must have a valid username, password							
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)			
1. Go to the application 2. Login 3. Click Add Space 4. Select Crop field 5. Select field length and width 6. Click add	Username: 9999999999 Password: 321 Length: 5 Width: 6	New crop field should be added in user profile.	As expected,	Pass			

Project Name: Farm Management System		Test Designed by: Jahid Hasan					
Test Case ID: FR_9		Test Designed date:11/7/2021					
Test Priority (Low, Medium, High): Medium		Test Executed by: Nasiruddin					
Module Name: Add Space		Test Execution date:11/7/2021					
Test Title: verify the ability to add Animal rooms							
Description: Test Adding Animal room function							
Precondition (If any): User must have a valid username, password							
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)			
1. Go to the application 2. Login 3. Click Add Space 4. Select Animal room 5. Select room length and width 6. Click add	Username: 9999999999 Password: 321 Length: 5 Width: 6	New Animal room should be added in user profile.	As expected,	Pass			

Project Name: Farm Management System		Test Designed by: Jahid Hasan					
Test Case ID: FR_10		Test Designed date:11/7/2021					
Test Priority (Low, Medium, High): Medium		Test Executed by: Nasiruddin					
Module Name: Add Space		Test Execution date:11/7/2021					
Test Title: verify the ability to add Fish ponds							
Description: Test Adding Fish Pond function							
Precondition (If any): User must have a valid username, password							
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)			
1. Go to the application 2. Login 3. Click Add Space 4. Select Fish Pond 5. Select pond length, width and depth 6. Click add	Username: 9999999999 Password: 321 Length: 5 Width: 6 Depth: 4	New Fish pond should be added in user profile.	Wrong unit of depth was added	Fail			

Farm Management System



- Farm Management System

- 1.1.1.1. Analysis

- 1.1.1.1.1. Requirement specification

- 1.1.1.1.2. Business analysis

- 1.1.1.1.3. Feasibility study

- 1.1.1.2. Design

- 1.1.1.2.1.1. Hardware design

- 1.1.1.2.1.1.1. Sensor design

- 1.1.1.2.1.1.2. Logical design

- 1.1.1.2.1.1.2.1. Use case diagram

- 1.1.1.2.1.1.2.2. Class diagram

- 1.1.1.2.1.1.2.3. Activity diagram

- 1.1.1.2.1.1.2.4. Sequence diagram

- 1.1.1.2.1.1.3. User interface design

- 1.1.1.2.1.1.3.1. Form Designing

- 1.1.1.2.1.1.3.1.1. Login form

- 1.1.1.2.1.1.3.1.2. Signup form

- 1.1.1.2.1.1.3.1.3. Main menu form

- 1.1.1.2.1.1.3.1.4. Profile form

- 1.1.1.2.1.1.3.1.5. Edit profile form

- 1.1.1.2.1.1.3.1.6. Change Password form

- 1.1.1.2.1.1.3.1.7. Subscription form

- 1.1.1.2.1.1.3.1.8. Transaction backlog form

- 1.1.1.2.1.1.3.1.9. Add Sensor form

- 1.1.1.2.1.1.3.1.10. Sync Data form

- 1.1.1.2.1.1.3.1.11. Add Space form

- 1.1.1.2.1.1.3.1.12. Daily Notifications form

- 1.1.1.2.1.1.3.1.13. Browse General info form

- 1.1.1.2.1.1.3.1.14. Current Recommendations form

- 1.1.1.2.1.1.3.1.15. Analyze form

- 1.1.1.2.1.1.3.1.16. Details form

- 1.1.1.3. Coding

- 1.1.1.3.1.1.1. Management logic

- 1.1.1.3.1.1.2. Sensor data gathering logic

- 1.1.1.3.1.1.3. Sensor data syncing logic

- 1.1.1.3.1.1.4. Environmental data analyzing logic

- 1.1.1.4. Testing

- 1.1.1.4.1.1.1. Blackbox testing

- 1.1.1.4.1.1.2. Functional testing

- 1.1.1.5. Installation

- 1.1.1.5.1.1.1. Hardware verification
- 1.1.1.5.1.1.2. Operating System verification
- 1.1.1.6. Maintenance
 - 1.1.1.6.1.1.1. Software maintenance
 - 1.1.1.6.1.1.2. Hardware maintenance
 - 1.1.1.6.1.1.3. Updation

Months / Task: Person	Month 1				Month 2				Month 3				Month 4				Month 5				Month 6				Month 7				Month 8			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
A: Azizul																																
B: Azizul																																
C: Jawadul																																
D: Nasiruddin																																
E: Azizul																																
F: Jahid																																
G: Jahid																																

A. Analysis
B. Hardware design
C. Logical & Interface design
D. Coding
E. Testing
F. Installation
G. Maintenance

Farm Management System

$$\text{Effort} = PM = 2.4 * (6000/1000)^{1.05} = 16$$

$$\text{Development time} = DM = 2.5 * 16^{0.38} = 8$$

$$\text{Required number of People} = ST = 16/8 = 2$$

Task	Planned Effort	Actual Effort
1.1.1.1.1.1.1. Requirement specification	10	8
1.1.1.1.1.1.2. Business analysis	5	6
1.1.1.1.1.1.3. Feasibility study	5	5
1.1.1.2.1.1.1.1. Sensor design	20	22
1.1.1.2.1.1.2.1. Use case diagram	3	2
1.1.1.2.1.1.2.2. Class diagram	4	5
1.1.1.2.1.1.2.3. Activity diagram	4	4
1.1.1.2.1.1.2.4. Sequence diagram	4	5
1.1.1.2.1.1.3.1.1. Login form	3	2
1.1.1.2.1.1.3.1.2. Signup form	2	2
1.1.1.2.1.1.3.1.3. Main menu form	5	5
1.1.1.2.1.1.3.1.4. Profile form	5	4
1.1.1.2.1.1.3.1.5. Edit profile form	5	3
1.1.1.2.1.1.3.1.6. Change Password form	5	5
1.1.1.2.1.1.3.1.7. Subscription form	5	6
1.1.1.2.1.1.3.1.8. Transaction backlog form	5	4
1.1.1.2.1.1.3.1.9. Add Sensor form	10	
1.1.1.2.1.1.3.1.10. Sync Data form	10	
Given Total Task = 34 Effort Estimation = 320 Person days	110	88
	BCWS	ACWP

BAC =	320
BCWP =	90
SPI = BCWP/ BCWS =	0.818181818
SV = BCWP - BCWS =	-20 person day
CPI = BCWP/ ACWP	1.022727273
CV = BCWP – ACWP =	2 person day
% schedule for completion = BCWS/ BAC =	34.375 %
% complete = BCWP/ BAC =	28.125 %

Risks	Category	Probability	Impact
Effort is greater than estimated	PS	60	2
A delay in one task causes cascading delays in dependent tasks	ST	50	2
Inefficient team structure reduces productivity	ST	45	3
Budget cuts upset project plans	BU	50	2
End-user insists on new requirements	CU	25	2
End-user ultimately finds product to be unsatisfactory, requiring redesign and rework	CU	10	1
Customer will not participate in review cycles for plans, prototypes and specifications or is incapable of doing so, resulting in unstable requirements and time-consuming changes	CU	70	3
Contractor delivers components of unacceptably low quality, and time must be added to improve quality	DE	60	2
Vaguely specified areas of the product are more time-consuming than expected	PR	55	2
Error-prone modules require more testing, design and implementation work than expected	TE	40	3
Personnel need extra time to learn unfamiliar hardware environment	ST	50	3
People's assignments do not match their strengths	ST	40	3
Components developed separately cannot be integrated easily, requiring redesign and rework	TE	60	2

Impact Values:

1. – Catastrophic
2. – Critical
3. – Marginal
4. – Negligible