



American International University-Bangladesh (AIUB)

Department of Computer Science

Faculty of Science & Technology (FST)

PROJECT TITLE

Automated Irrigation System that automates and controls the irrigation of crops based on soil moisture levels and weather conditions.

Submitted By:

Semester: Summer_21_22		Section:	Group Number:	
SN	Student Name	Student ID	Contribution (CO1+CO2)	Individual Marks
01	KHONDOKER MD. SABIT HASAN	21-45306-2	20%	
02	NOKIBUL ARFIN SIAM	21-44793-1	20%	
03	ABU NASER MD. ARMAN	21-45239-2	20%	
04	FAHIM RAHMAN	21-44399-1	20%	
05	MD. NAJIB HOSSAIN	21-45366-2	20%	

The project will be Evaluated for the following Course Outcomes

CO1: <i>Analyze</i> the impact of software engineering models over various context of software development to assess societal, health, safety, legal and cultural issues.	Total Marks	
Project Background Analysis and feasibility (needs, goal, benefits, etc.)	[5 Marks]	
Analysis the impact of societal, health, safety, legal and cultural issues	[5Marks]	
Review of existing Studies and Relevant Example	[5Marks]	
CO2: <i>Explain</i> appropriate software engineering model, project management roles and their skills in the context of professional engineering practice and solutions to complex engineering problems in a software development environment.	Total Marks	
Appropriate Process Model Selection and Argumentation with Evidence	[5Marks]	
Evidence of Argumentation regarding process model selection	[5Marks]	
Submission, Defense, Completeness, Spelling, grammar and Organization of the Project report	[5Marks]	

Student Name: KHONDOKER MD. SABIT HASAN

Student ID: 21-45306-2

Contribution in Percentage (20%):

Contribution in the Project:

- Project process model
- Use Case diagram.
- Functional requirements
- UI/UX design
- Test Case
- Work breakdown structure
- Effort estimation
- EVA

_____Sabit_____

Signature of the Student

Student Name: NOKIBUL ARFIN SIAM

Student ID: 21-44793-1

Contribution in Percentage (20%):

Contribution in the Project:

- Project proposal (Solution to the problem)
- Sequence Diagram
- UI/UX design
- Functional requirements
- Work breakdown structure
- Timeline Chart

_____Siam_____

Signature of the Student

Student Name: ABU NASER MD. ARMAN

Student ID: 21-45239-2

Contribution in Percentage (20%):

Contribution in the Project:

- Project Proposal (Background to the problem)
- Functional requirements
- Activity Diagram
- Test case
- Work breakdown structure

_____Arman_____

Signature of the Student

Student Name: FAHIM RAHMAN

Student ID: 21-44399-1

Contribution in Percentage (20%):

Contribution in the Project:

- Functional requirements
- Class diagram

- Test Case
- Timeline Chart
- Building risk table

_____Fahim

Signature of the Student

Student Name: MD. NAJIB HOSSAIN

Student ID: 21-45366-2

Contribution in Percentage (20%):

Contribution in the Project:

- Project process model
- Class diagram
- Test Case
- EVA
- Timeline Chart
- Building risk table

_____Najib

Signature of the Student

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1. PROJECT PROPOSAL

1.1 Background to the problem:

Agriculture is the primary source of livelihood for millions of people worldwide. Efficient irrigation practices can help ensure the long-term viability of farming and support rural communities. Farmers often rely on manual observations and subjective judgment in traditional irrigation methods to determine when and how much to water their crops. This method can be time-consuming and labor-intensive and may result in inconsistent irrigation practices. Furthermore, the increasing demand for food production and the growing scarcity of water resources make adopting more efficient irrigation techniques imperative.

1.2 Solution to the problem:

An automated Irrigation System is a solution aimed at improving the efficiency and productivity of agriculture by automating the irrigation process. This system utilizes soil moisture and weather data to determine the optimal water required for each crop. This helps farmers conserve water resources and avoid over-irrigation, leading to soil degradation and reduced crop yields. The Automated Irrigation System provides solutions to these problems using sensors and weather monitoring technology to collect data on soil moisture levels and weather conditions. This information will determine the optimal water required for each crop and automate the irrigation process. The system can also be programmed to consider crop type, soil type, and local weather patterns to optimize irrigation schedules. By automating the irrigation process, the Automated Irrigation System helps farmers to improve their yields, conserve water resources, and reduce labor costs. Some auto-irrigation software exists, but they don't check weather conditions. However, our software will take the weather information and make decisions based on the information that shows how much water is needed. Also, our study has utilized that the existing studies of irrigation process are too costly. Additionally, our study has focused on developing a scalable and purchasable cost solution for automated irrigation, making it accessible for small-scale farmers and agriculture firms. Furthermore, our study has emphasized incorporating real-time data analysis and visualization to help farmers make informed decisions regarding irrigation. This makes our study a significant contribution to the field of automated irrigation systems for irrigation. The target users for the "Automated Irrigation System that automates and controls the irrigation of crops based on soil moisture levels and weather conditions" are farmers and agricultural firms. This system is a step towards sustainable agriculture and helps ensure the long-term viability of farming.

2. FUNCTIONAL REQUIREMENTS

1. Sing up

- 1.1 User registration form will allow users to create an account on the app by entering their name, username, email, and password.
- 1.2 Email verification process to confirm the validity of the email address.
- 1.3 Username & Password will be used to log into the site.
- 1.4 Option to log in using a social media account (e.g., Facebook, Google).

2. Software Login

- 2.1 The software will allow users to log in with their username and password.
- 2.2 The login credentials (username and password) will be verified with database records.
- 2.3 The user account's home page will be displayed if the login is successful.
- 2.4 If the username and/or password has been inserted wrong, the random verification code, the system will generate and send the user's email address to retry login.
- 2.5 If the number of login attempt exceed its limit (3 times), the system shall block the user account login for one hour [optional function]

3. Weather forecast

- 3.1 The app will display the current weather conditions for the user's preferred location, including temperature, humidity, the possibility of rain, and wind speed. The information will be updated in real-time to provide the most accurate and up-to-date information.
- 3.2 Option to view the 7-day forecast, including high and low temperatures and weather conditions. This will help users plan for the week ahead and prepare for adverse weather conditions.
- 3.3 Ability to change the location to view weather forecasts for different cities.

4. Settings

- 4.1 Location: Ability to set a preferred location to view weather forecasts.
- 4.2 Language: Option to select a preferred language for the app.
- 4.3 Profile: Ability to view and edit personal information, such as name and email address. This will allow them to keep their knowledge up to date.
- 4.4 Password: Ability to change the old password.

5. Community Feedback

- 5.1 Users can provide feedback on the app, including suggestions for improvement.
- 5.2 Option for users to rate the app and leave reviews.
- 5.3 Developers can respond to user feedback and address any concerns. This will help build trust with users and demonstrate the developers' commitment to improving the app.

6. Check soil moisture

- 6.1 The app will allow users to check the moisture levels in their soil. This is useful for farmers to monitor the health of their crops and ensure they are getting the water they need.
- 6.2 The app will allow users to select their preferred soil type to provide the most accurate readings. This will consider the different moisture requirements of different kinds of soil.
- 6.3 Ability to view historical data on soil moisture levels.

7. Notifications

- 7.1 Option to receive notifications for important events, such as changes in weather alerts or reminders to check soil moisture.
- 7.2 Gives notification for agriculture articles, news, etc.
- 7.3 Gives notification if helpline or support center responds.

8. Helpline

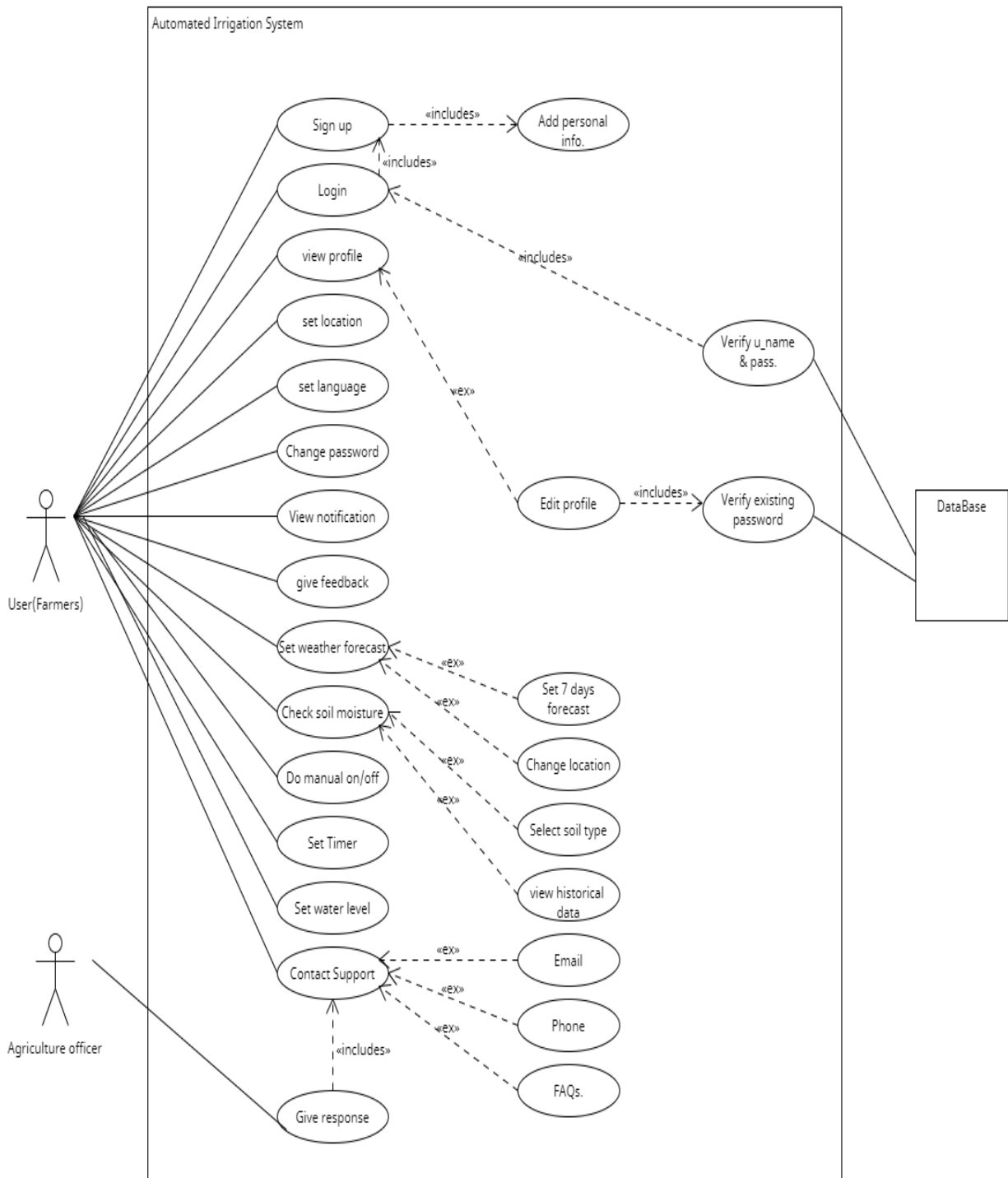
- 8.1 Access a helpline or support center for assistance with any issues or questions.
- 8.2 Option to contact support via email or phone.
- 8.3 FAQs: The app will have a section with frequently asked questions and answers to help users find the information they need quickly and easily.

9. Irrigation system setting

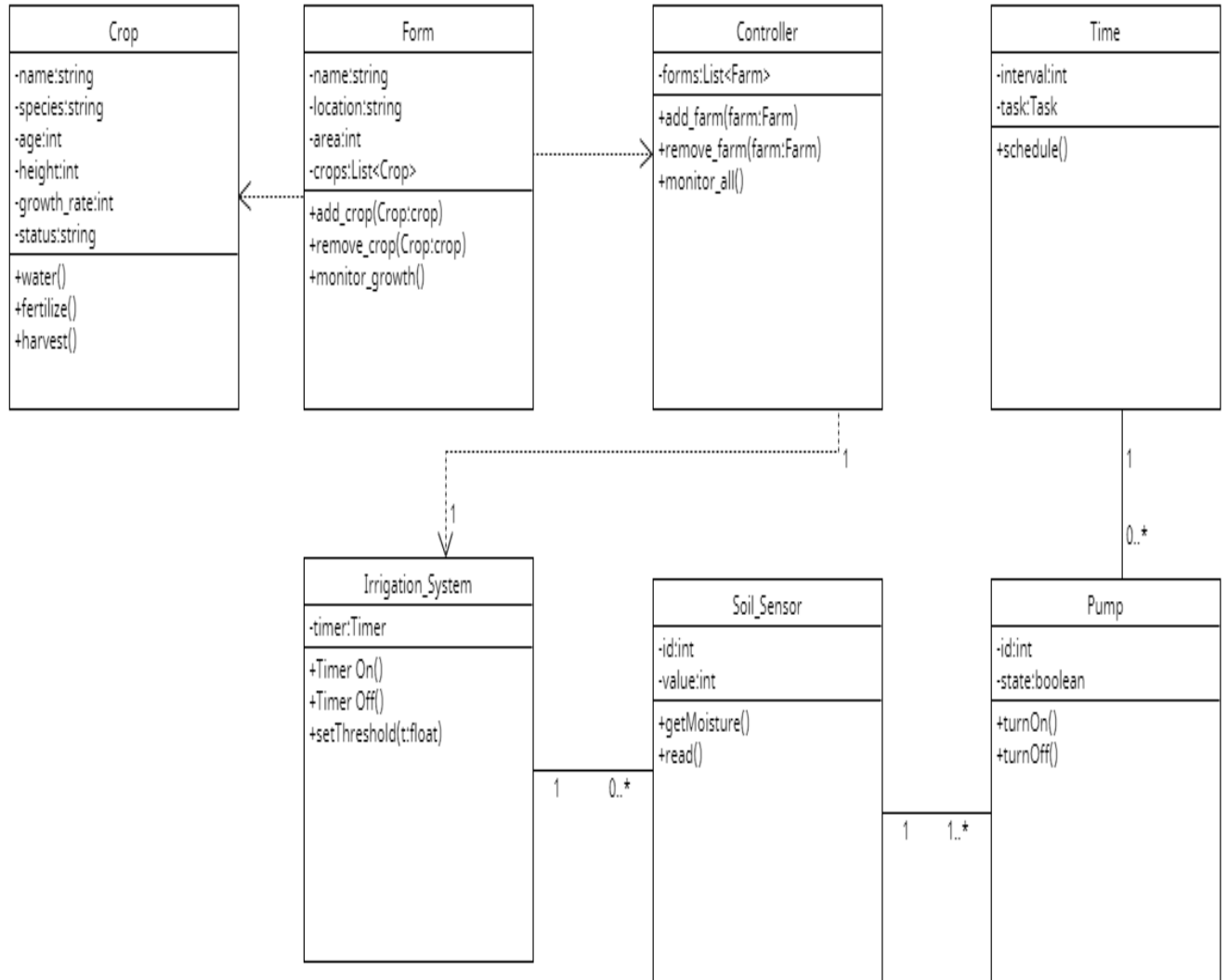
- 9.1 Auto On/Off: The app will be able to turn the irrigation system on and off automatically, based on pre-defined settings such as weather conditions or soil moisture levels.
- 9.2 Manual On/Off: The user can manually operate (On/Off) the irrigation system.
- 9.3 Set Timer: Ability to set a timer for the irrigation system to turn on and off.
- 9.4 Set Water Level: Option to set a preferred water level for the irrigation system.

3. DIAGRAMS

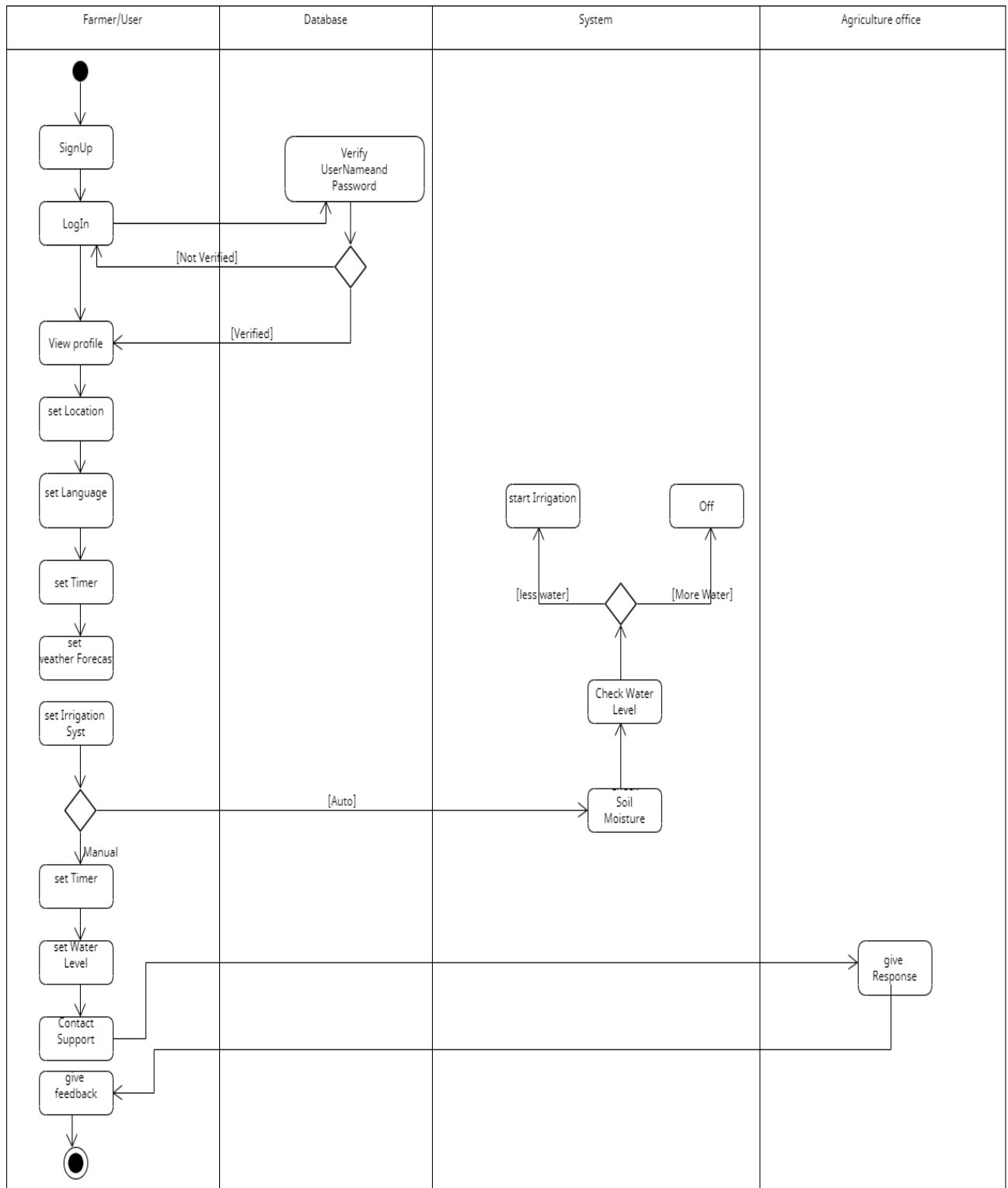
3.1: Use Case Diagram



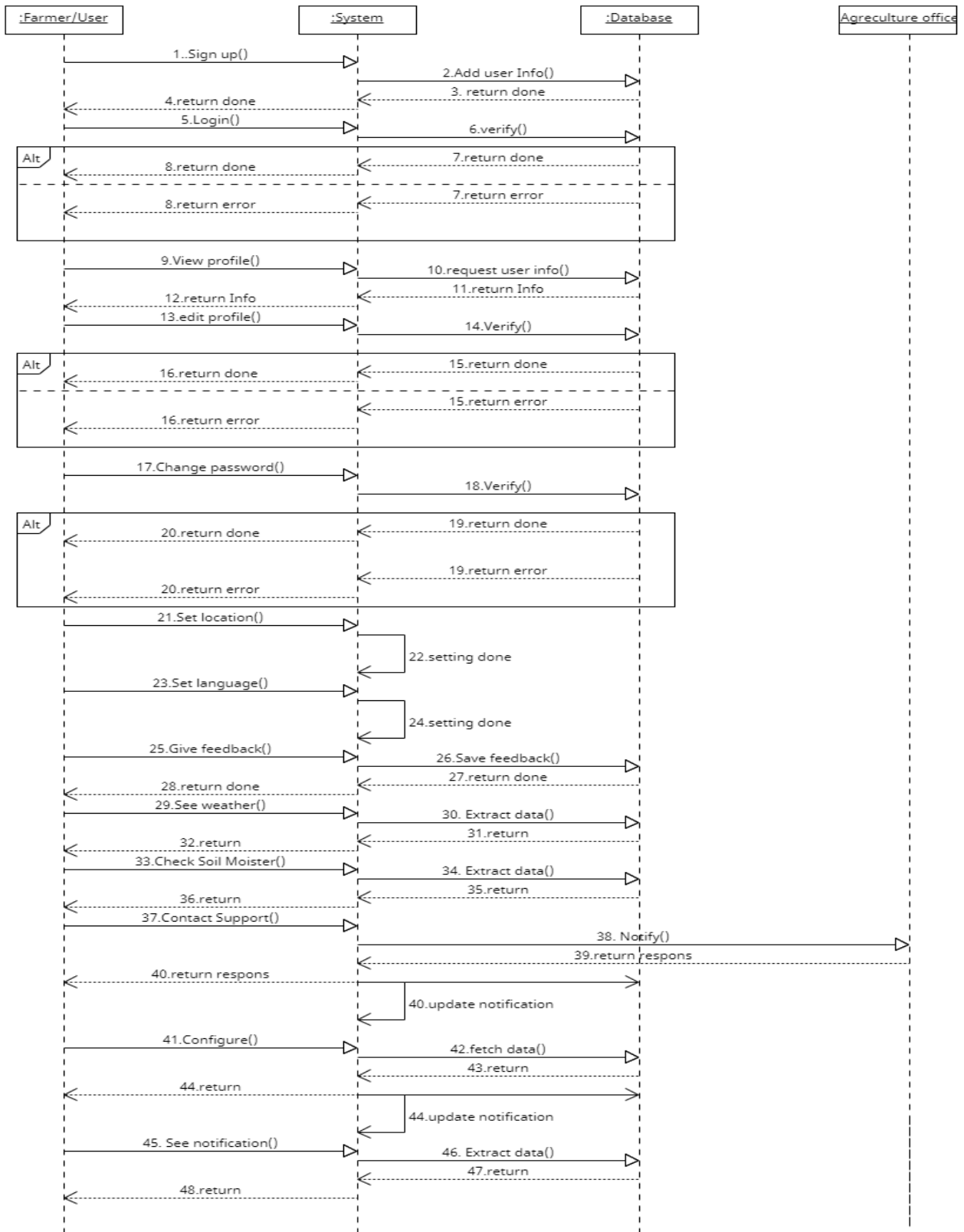
3.2: Class Diagram



3.3: Activity Diagram



3.4 Sequence Diagram



4. SOFTWARE DEVELOPMENT LIFE CYCLE

4.1 Process Model

For an Automated Irrigation System that automates and controls the irrigation of crops based on soil moisture levels and weather conditions, the software engineering model that is best suited is the Agile Model.

The Agile Model is an iterative and flexible software development approach, allowing for changes to be made quickly and efficiently as requirements and specifications change. This model is particularly well-suited for projects where requirements are likely to change frequently, such as in an agricultural system that relies on real-time weather data and soil moisture levels, which is the same as our project. By adopting an Agile development process, the Automated Irrigation System can be built flexibly and responsively, allowing for changes to be made quickly and efficiently as the system evolves. This will ensure that the system remains effective and efficient, providing optimal irrigation to crops based on real-time data and ultimately improving crop yields and reducing water waste.

But why not a plan-driven software development process? Because it is a traditional approach that emphasizes creating a comprehensive plan before starting development work. This process will not be well-suited for developing an automated irrigation system for several reasons:

1. Our automated irrigation system needs to respond to changing environmental conditions in real time, such as changes in weather, soil moisture levels, and plant water requirements. This means that the system must adapt to these changes quickly and dynamically, which may not be possible with a plan-driven approach that focuses on following a predetermined plan.
2. Our automated irrigation system involves multiple sensors and controllers that must work together seamlessly. Such a complex system may be challenging to plan for in advance, and changes or updates to the plan may be needed frequently during development.

Therefore, a more flexible and adaptive approach, agile software development, will be more suitable for developing an automated irrigation system. But there are several Agile models, each with specific characteristics and methodologies. However, for an Automated Irrigation System that automates and controls the irrigation of crops based on soil moisture levels and weather conditions, the Scrum model would be a good fit.

Scrum is an Agile model that focuses on delivering working software in short iterations called sprints. The development process is broken down into smaller, manageable tasks called user stories. Each sprint involves selecting a set of user stories to work on, completing them, and delivering a working product increment.


In the case of an Automated Irrigation System, each sprint could focus on adding new features or improving existing functionality, such as integrating new weather sensors or improving the system's ability to analyze soil moisture data. Scrum also emphasizes frequent communication and collaboration between the development team and stakeholders, with daily stand-up meetings, sprint reviews, and retrospectives. This ensures that the system remains aligned with the needs of the business and that any issues or concerns are addressed quickly.

Overall, the Scrum model would be a good fit for our Automated Irrigation System as it provides a flexible and responsive development process that can adapt to changing requirements and priorities while ensuring that the system is delivered in working increments that provide real value to the business.

5. USER INTERFACE AND EXPERIENCE (UI/UX)

Login

12:00



Welcome Back

Sign to continue



[Forgot Password?](#)

LOGIN

Don't have an account? [create a new account](#)


or,

Login Using



Sign Up

12:00

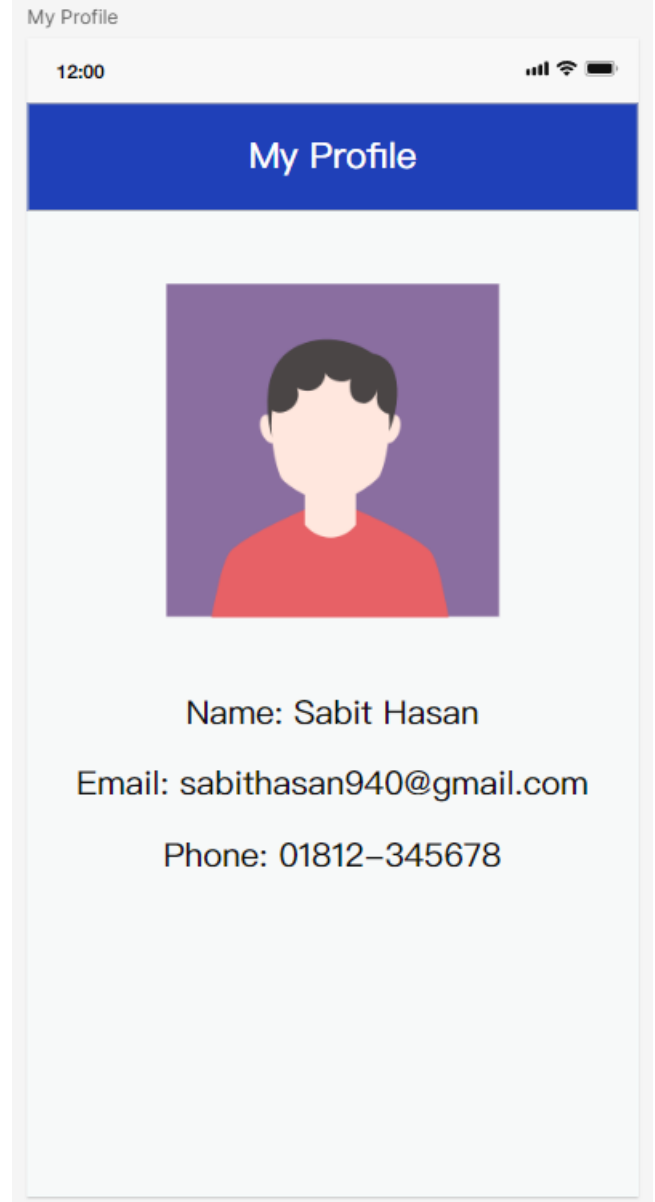
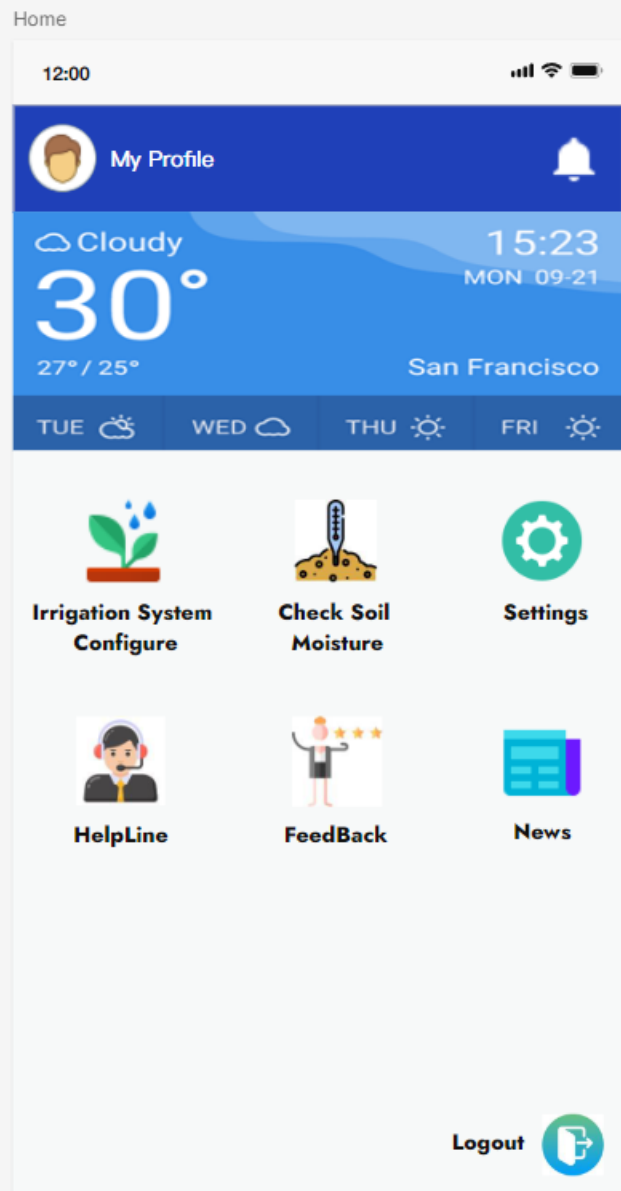


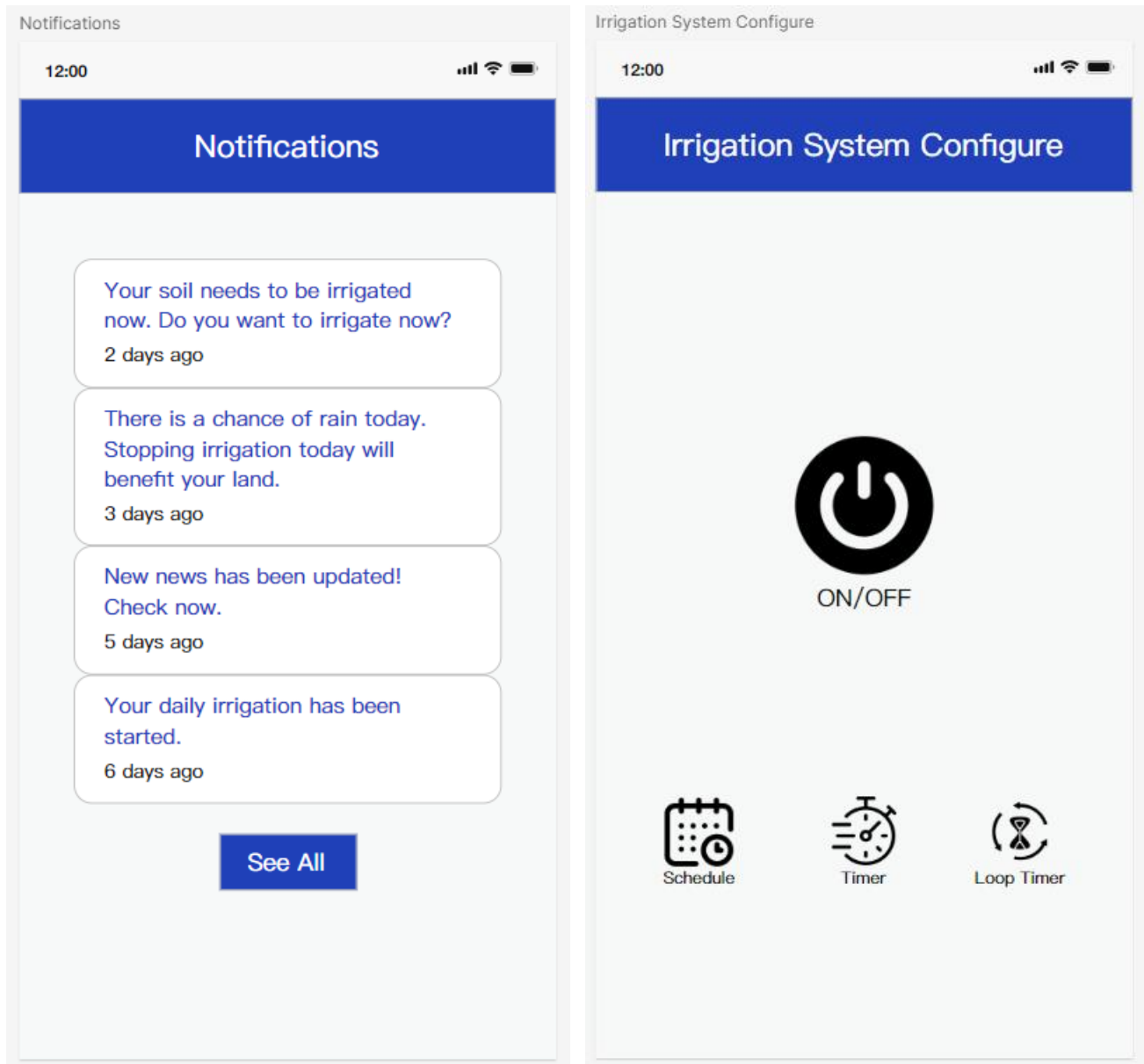
Create Account

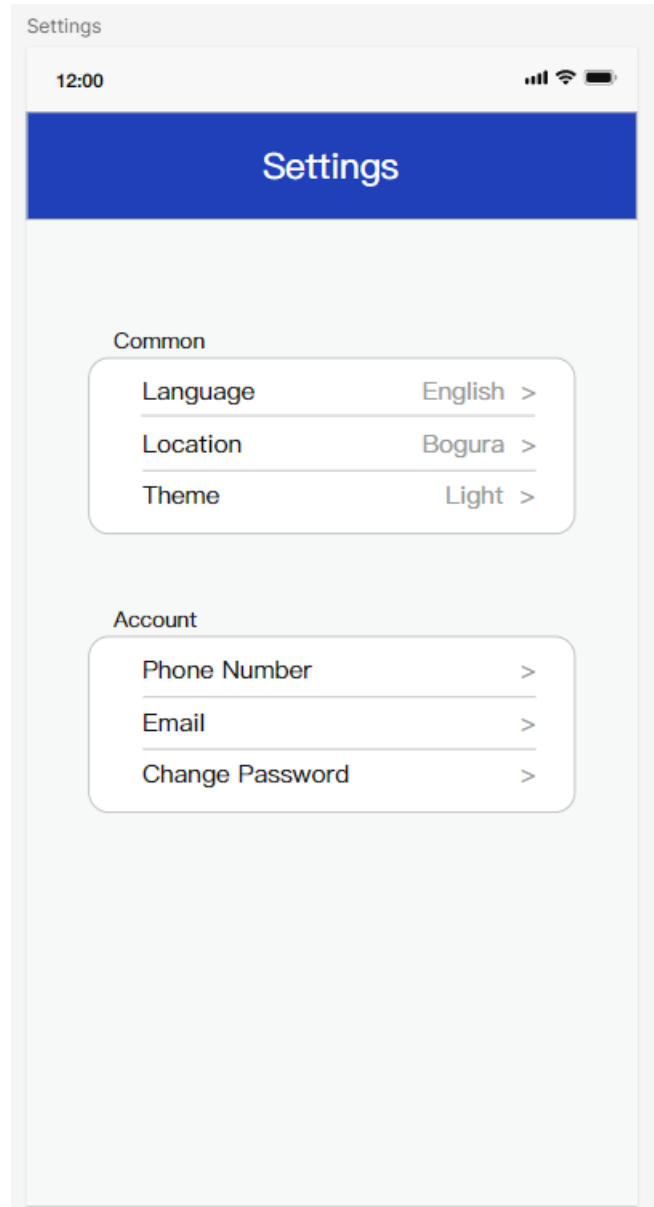
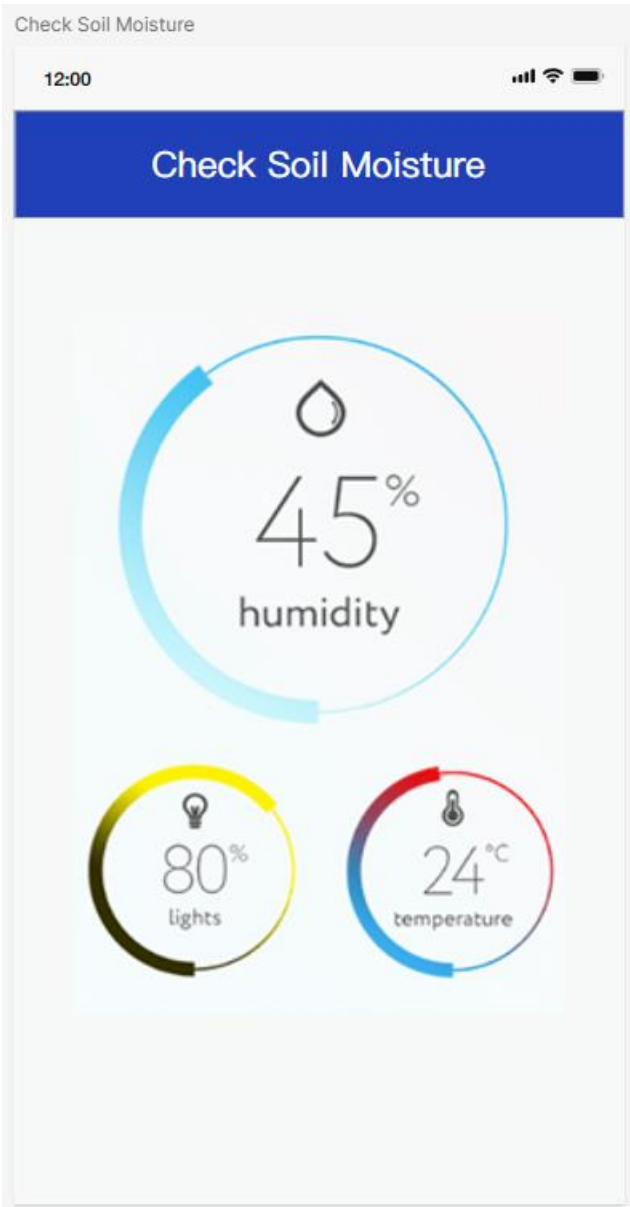
Create a new account

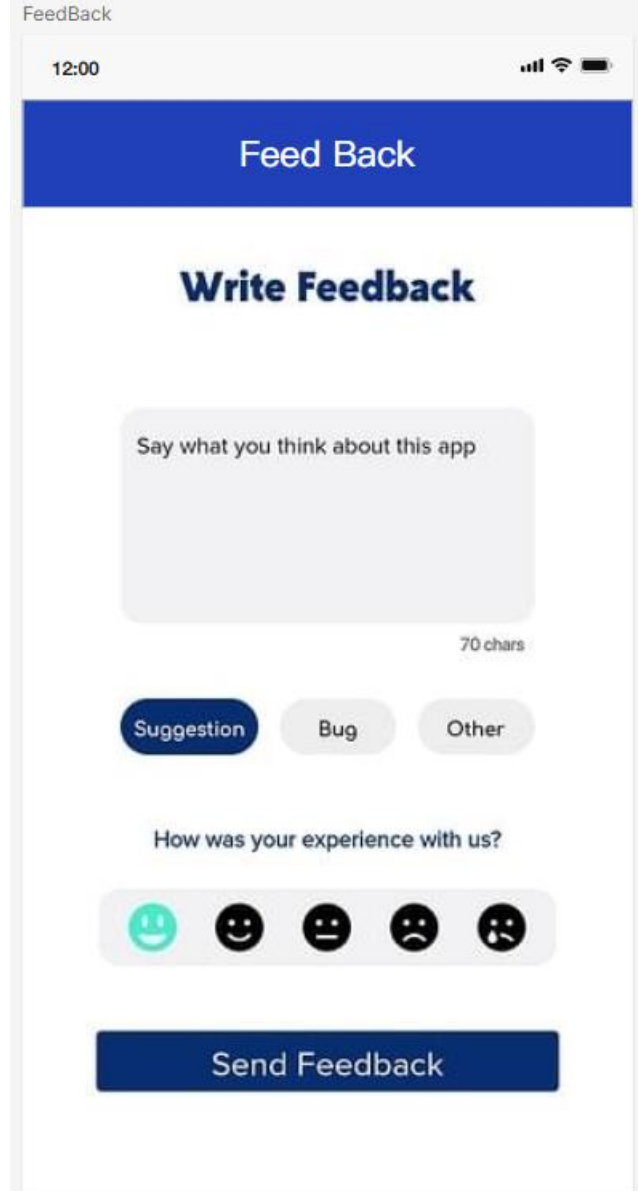
CREATE ACCOUNT

Already have an account? [Login](#)









News

কৃষি / শিলানুষ্টিতে বিধ্বস্ত আড়াই হাজার কৃষকের ফসল

৩ মন্টা নাগে


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শর্যের উৎপাদন এক বছরে বাড়ল ৪০ শতাংশ : কৃষি মন্ত্রণালয়

দেশে বছরে ভোজ্যভোগের চাহিদা রয়েছে রাত ২৪ ঘাণা টন। এর মধ্যে শর্ষ, তিল ও সূর্যমুখী থেকে স্থানীয়ভাবে উৎপাদিত হয় মাত্র ৬ ঘাণা টন, যা চাহিদার ১২ শতাংশ।

০১ মে ২০২৩


[Read More...](#)
মতামত / কৃষিতে বরাদ্দ বৃদ্ধি ও সরকারের নীতি গ্রহণের কার্যকারিতা

করোনা-পরবর্তী সময়ে বৈশ্বিক অর্থনৈতিক বিপর্যয় রোমে সরকার বিভিন্ন সত্তা সংস্থার সঙ্গে সমন্বয় রক্ষা করে তাদের লাভ থেকে ক্ষণসহায়তা নিচ্ছে। উন্নয়নশীল দেশ হিসেবে এসব...

২৬ এপ্রিল ২০২৩


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রাজশাহীতে নোডশেডিং / ফেটে যাচ্ছে ধানখেতের মাটি

বোরো ধানের শিষ বের হচ্ছে। এই সময় রাজশাহীতে দিনুতের নোডশেডিং পেড়েছে। চাহিদার বিপরীতে দিনুতের সরবরাহ ৩০ শতাংশে নেমে যাচ্ছে। এদিকে ডগাছে টনা ধরা।

১৭ এপ্রিল ২০২৩


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6. TEST CASES/TEST ITEMS

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Abu Naser MD. Arman		
Test Case ID: FR_1.1		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: User Registration		Test Execution date:		
Test Title: Verify User Registration with valid input data				
Description: Test user registration process				
Precondition (If any): User is on the registration page				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Go to the website 2. Click on the sign-up button 3. Enter valid name, username, email, and password 4. Click submit 5. Name: John Smith 6. Username: johnsmith123 7. Email: johnsmith123@gmail.com 8. Password: Password123 User account is created and user is redirected to the login page As expected, Pass 9. Check email for verification link and click on it User is redirected to a page confirming their email address 10. Enter the registered email and password 11. Click submit 12. Email: johnsmith123@gmail.com 13. Password: Password123 User is redirected to the	Name: John Doe Username: john_doe Email: john.doe@example.com Password: Abc12345	User should valid Username, Phone no and password		

user account's home page				
Post Condition: User account is created.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Abu Naser MD. Arman		
Test Case ID: FR_1.2		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): High		Test Executed by:		
Module Name: User Registration		Test Execution date:		
Test Title: Verify User Email				
Description: Test user email				
Precondition (If any): User is on the registration page				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
<div>1. Go to the website</div> <div>2. Click on the sign-up button</div> <div>3. Enter valid name, username, email, and password</div> <div>4. Click submit</div> <div>5. Name: John Smith</div> <div>6. Username: johnsmith123</div> <div>7. Email: johnsmith123@gmail.com</div> <div>8. Password: Password123</div> <div>9. User account is created and user is redirected to the login page As expected, Pass</div> <div>10. Check email for verification link and click on it User is redirected to a page confirming their email address</div> <div>11. Enter the registered email and password</div> <div>12. Click submit</div> <div>13. Email:</div>	<div>Name: John Doe</div> <div>Username: john_doe</div> <div>Email: john.doe@example.com</div> <div>Password: Abc12345</div>	User should valid Email address		

johnsmith123@gmail.com 11. Password: Password123 User is redirected to the user account's home page				
Post Condition: User account is created and verified with the email address. The user's information is stored in the database.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Abu Naser MD. Arman		
Test Case ID: FR_1.3		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): High		Test Executed by:		
Module Name: User Registration		Test Execution date:		
Test Title: Verify User Username and Password.				
Description: Test user username and password				
Precondition (If any): User is on the registration page				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Go to the website 2. Click on the sign-up button 3. Enter valid name, username, email, and password 4. Click submit 5. Username: johnsmith123 6. Email: johnsmith123@gmail.com 7. Password: Password123 User account is created and user is redirected to the login page As expected, Pass 8. Check email for verification link and click on it User is redirected to a page confirming	Name: John Doe Username: john_doe Email: john.doe@example.com Password: Abc12345	User should valid Username and password		

their email address 9. Enter the registered email and password 10. Click submit Email: johnsmith123@gmail.com 11. Password: Password123 User is redirected to the user account's home page				
Post Condition: User account is created and verified with the email address. The user's information is stored in the database.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Abu Naser MD. Arman		
Test Case ID: FR_1.4		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: User Registration		Test Execution date:		
Test Title: Verify login with social media account:				
Description: Test website login page with social media account				
Precondition (If any): User must have a social media account				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Go to the website 2. Click on the sign-up button 3. Enter valid name, username, email, and password 4. Click submit Name: John Smith 5. Username: johnsmith123 6. Email: johnsmith123@gmail.com 7. Password: Password123 User account is created and user is redirected to the login page As	Social Media account	User should have valid social media account		

expected, Pass 8. Check email for verification link and click on it User is redirected to a page confirming their email address 9. Enter the registered email and password 10. Click submit Email: johnsmith123@gmail.com 11. Password: Password123 User is redirected to the user account's home page				
Post Condition: User is validated with the social media account and successfully logged into the application. The account session details are logged in the database.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Abu Naser MD. Arman		
Test Case ID: FR_2.1		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): High		Test Executed by:		
Module Name: Login Session		Test Execution date:		
Test Title: Verify successful 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 website 2. Enter username 3. Enter password 4. Click submit	Username: john doe Password: Abc12345	User should login into the application		
Post Condition: User is validated with database and successfully login to account. The account session details are logged in the database.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Abu Naser MD. Arman		
Test Case ID: FR_2.2		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): High		Test Executed by:		
Module Name: Login Session		Test Execution date:		
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 website 2. Enter username 3. Enter password 4. Click submit	Username: john doe Password: Abc12345	User should login into the application		
Post Condition: User is validated with database and successfully login to account. The account sessiondetails are logged in the database.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Abu Naser MD. Arman		
Test Case ID: FR_2.3		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): High		Test Executed by:		
Module Name: Login Session		Test Execution date:		
Test Title: Verify successful login and display of home page.				
Description: Test website login page with correct username and password				
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 website 2. Enter username 3. Enter password 4. Click submit	Username: john doe Password: Abc12345	User should login into the application		
Post Condition: User is logged in and the home page of the user account is displayed. The user session details are logged in the database.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Abu Naser MD. Arman		
Test Case ID: FR_2.4		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): High		Test Executed by:		
Module Name: Login Session		Test Execution date:		
Test Title: Verify login with incorrect username and password				
Description: Test website login page with incorrect username and password:				
Precondition (If any): User must have incorrect username and password				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
<div>1. Go to the website</div> <div>2. Enter incorrect username</div> <div>3. Enter incorrect password</div> <div>4. Click submit</div> <div>Username: abc123</div> <div>Password: pass123</div> <div>User should be prompted with a verification code and an email should be sent to the user's email address As expected, Pass</div> <div>5. Check email for verification code and enter the verification code received in the email. User should be redirected to the website and prompted to enter the correct username and password</div> <div>6. Enter the correct username and password</div> <div>7. Click submit User should login into the application</div>	<div>Username: abc123</div> <div>Password: pass123</div> <div>Verification code: 12345</div>	User should login into the application		
Post Condition: User is logged in and the home page of the user account is displayed. The user session details are logged in the database.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Abu Naser MD. Arman		
Test Case ID: FR_2.5		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): High		Test Executed by:		
Module Name: Login Session		Test Execution date:		
Test Title: Verify account block after exceeding the login attempts.				
Description: Test website login page with maximum login attempts				
Precondition (If any): User must have entered incorrect login credentials 3 times.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Go to the website 2. Enter incorrect username 3. Enter incorrect password 4. Click submit Username: abc123 Password: pass123 User should be prompted with a verification code and an email should be sent to the user's email address As expected, Pass 5. Check email for verification code and enter the verification code received in the email. Verification code: 12345 User should be redirected to the website and prompted to enter the correct username and password. As expected, Pass 6. Enter the incorrect username and password two more times 7. Click submit after the third incorrect attempt User should be blocked from logging in for one hour As expected, Pass 8. Try to log in with the correct username	Username: 99999999 999 Password: 321	User should not log in into the application		

and password during the blocked period. User should be blocked from logging in, and an error message should be displayed to the user. As expected, Pass 9. Wait for one hour 10. Try to log in with the correct username and password again. Username: 99999999999 Password: 321 User should be able to log in successfully.				
Post Condition: User is logged in and the home page of the user account is displayed. The user session details are logged in the database.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Abu Naser MD. Arman		
Test Case ID: FR_3.1		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): High		Test Executed by:		
Module Name: Weather Forecast		Test Execution date:		
Test Title: Verify display of weather conditions for the user's preferred location				
Description: Test the app's ability to display weather conditions for the user's preferred location.				
Precondition (If any): User must have set a preferred location in the app.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Open the app 2. Verify that the app displays the user's preferred location. Preferred location: New York City 3. The app should display the current weather conditions, including temperature, humidity, the possibility of rain,		User get preferred location and weather forecast		

<p>and wind speed for New York City. As expected, Pass</p> <p>4. Verify that the app updates the weather information in real-time.</p> <p>5. Check the displayed weather conditions against a trusted weather source.</p> <p>6. Verify that the app displays the correct weather conditions for different times of day, including sunrise and sunset times. Expected weather conditions match the trusted weather source.</p> <p>7. The app should display sunrise and sunset times for the current day</p>				
<p>Post Condition: The app has displayed the current weather conditions for the user's preferred location, including temperature, humidity, the possibility of rain, wind speed, and sunrise and sunset times.</p>				

Project Name: <i>Automated Irrigation System</i>			Test Designed by: Abu Naser MD. Arman	
Test Case ID: FR_3.2			Test Designed date: 30/03/2023	
Test Priority (Low, Medium, High): High			Test Executed by:	
Module Name: Weather Forecast			Test Execution date:	
Test Title: Verify 7-day weather forecast display.				
Description: Test the functionality of the weather forecast application to display a 7-day				
Precondition (If any): The application should be loaded and the user should be logged in.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)

<ol style="list-style-type: none"> 1. Open the app 2. Click on the "7-day forecast" button in the application. 7-day forecast page should load with high and low temperatures and weather conditions for each day. 3. Verify that the first day in the forecast displays the correct information. Weather condition: Partly cloudy The first day should display the correct high and low temperatures and weather conditions. 4. Verify that the second day in the forecast displays the correct information. High temperature: 82 degrees Fahrenheit Low temperature: 61 degrees Fahrenheit Weather condition: Mostly sunny The second day should display the correct high and low temperatures and weather conditions. 5. Verify that the third day in the forecast displays the correct information. 	<p>High temperature: 80 degrees Fahrenheit Low temperature: 60 degrees Fahrenheit</p>			
<p>Post Condition: The app has displayed the current weather conditions for the user's preferred location, including temperature, humidity, the possibility of rain, wind speed, and sunrise and sunset times.</p>				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Abu Naser MD. Arman		
Test Case ID: FR_3.3		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Weather Forecast		Test Execution date:		
Test Title: Verify ability to change location to view weather forecasts for different cities				
Description: Test the ability of the software to change the location and view weather forecasts for different cities				
Precondition (If any): Weather forecast option is open.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
<div>1. Open the app</div> <div>2. Verify that the current city is displayed</div> <div>3. Click on the location change icon</div> <div>4. Enter the name of the city for which you want to view the weather forecast</div> <div>5. Click on the search button</div> <div>6. Verify that the weather forecast for the entered city is displayed</div> <div>7. Repeat steps 3-6 for multiple cities</div>	<div>City: Paris, France</div> <div>City: Tokyo, Japan</div> <div>City: New York, USA</div>	<div>Weather forecast for each city should be displayed</div>		
Post Condition: Weather forecasts for multiple cities are displayed correctly, and the software is able to switch between different locations.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Nokibul Arfin Siam			
Test Case ID: FR_4.1		Test Designed Date: 01-04-2023			
Test Priority (Low, Medium, High): High		Test Executed by:			
Module Name: Location Session		Test Execution date:			
Test Title: Verify user can set and change preferred location					
Description: Test location.					
Precondition (If any): The user needs to have a valid location that they want to set as their preferred location.					
Test Steps 1. Launch the app and go to the settings page. 2. Locate the option for setting the preferred location for weather forecasts. 3. Enter a new location. 4. Click the "Save" button to save the changes. 5. Verify that the preferred location is correctly displayed on the app's weather forecast page.		Test Data Set and change location	Expected Result The preferred location is saved and displayed correctly on both the and the weather forecast page.	Actual Result 	Status (Pass/fail)
Post Condition: The new preferred location is saved and displayed correctly on the weather forecast page, and that the changes persist even after closing and reopening the app.					

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Nokibul Arfin Siam			
Test Case ID: FR_4.2		Test Designed Date: 01-04-2023			
Test Priority (Low, Medium, High): High		Test Executed by:			
Module Name: Language Session		Test Execution date:			
Test Title: Verify user can select and change preferred language.					
Description: Test language page.					
Precondition (If any): The user needs to have a valid language that they want to set as their preferred language for the app. The app should support the language that the user wants to select.					
Test Steps 1. Go to the settings page. 2. Locate the option for setting the preferred language 3. Select a new language from the menu. 4. Click the "Save" button to save the changes. 5. Close the app and reopen it to ensure that the preferred language is still saved. 6. Verify that the preferred language is correctly displayed throughout the app.		Test Data Select and change language.	Expected Result The preferred language is saved and displayed all app text and menus are displayed in the newly selected language.	Actual Result	Status (Pass/fail)
Post Condition: All app text and menus are displayed in the newly selected language.					

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Nokibul Arfin Siam			
Test Case ID: FR_4.3		Test Designed Date: 01-04-2023			
Test Priority (Low, Medium, High): High		Test Executed by:			
Module Name: Profile Session		Test Execution date:			
Test Title: Verify user can view and change profile information.					
Description: Test profile information page.					
Precondition (If any): The user should have appropriate permissions to edit their own personal information, and the app should support the editing of personal information.					
Test Steps 1. Go to the settings page. 2. Locate the option for editing personal information. 3. Select the field that the user wants to edit. 4. Enter the new information in the appropriate field. 5. Click the "Save" button to save the changes. 6. Verify that the updated information is displayed correctly on the settings page. 7. Verify that the updated information is correctly displayed in the user profile page.		Test Data view and change profile information	Expected Result The personal information is saved and displayed correctly on both the settings page and the user profile page.	Actual Result	Status (Pass/fail)
Post Condition: N/A					

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Nokibul Arfin Siam		
Test Case ID: FR_5.1		Test Designed Date: 01-04-2023		
Test Priority (Low, Medium, High): High		Test Executed by:		
Module Name: Community feedback Session		Test Execution date:		
Test Title: Verify users can provide feedback on the app.				
Description: Test feedback page.				
Precondition (If any): The app has a feedback option available to users.				
Test Steps 1. Open the feedback section. 2. Enter a feedback message in the provided text field. 3. Click the "Submit" button to submit the feedback.	Test Data Feedback message	Expected Result the user is able to provide feedback on the app, and their suggestions are properly recorded and sent to the developers	Actual Result	Status (Pass/fall)
Post Condition: The feedback message is recorded and saved in the app.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Nokibul Arfin Siam		
Test Case ID: FR_5.2		Test Designed Date: 01-04-2023		
Test Priority (Low, Medium, High): High		Test Executed by:		
Module Name: Community feedback Session		Test Execution date:		
Test Title: Verify users can rate the app and leave reviews.				
Description: Test feedback page.				
Precondition (If any): The app has a rating and review option available to users.				
Test Steps 1. Open the rating and review page. 2. Select a rating and enter review text. 3. Click the "Submit" button to submit the rating and review.	Test Data User rating and review text.	Expected Result the user is able to rate the app and leave a review, and their rating and review are properly recorded and displayed to other users.	Actual Result	Status (Pass/fail)
Post Condition: The rating and review are recorded in the app.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Nokibul Arfin Siam		
Test Case ID: FR_5.3		Test Designed Date: 01-04-2023		
Test Priority (Low, Medium, High): High		Test Executed by:		
Module Name: Community feedback Session		Test Execution date:		
Test Title: Verify developers can respond to user feedback.				
Description: Test feedback page.				
Precondition (If any): The app has a feedback and response system in place.				
Test Steps 1. Receive user feedback through the app feedback system 2. Evaluate the feedback and determine appropriate response 3. Craft a response message and submit it through the app	Test Data Developer response message	Expected Result the developers are able to receive and view user feedback, and address any concerns or issues raised by the users.	Actual Result	Status (Pass/fail)
Post Condition: The user receives a response from the developer in the app.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Nokibul Arfin Siam		
Test Case ID: FR_6.1		Test Designed Date: 01-04-2023		
Test Priority (Low, Medium, High): High		Test Executed by:		
Module Name: Check soil moisture Session		Test Execution date:		
Test Title: Verify the app allows users to check soil moisture levels.				
Description: Check soil moisture page.				
Precondition (If any): The device has an active internet connection, The user has a sensor that can measure the moisture levels in the soil.				
Test Steps 1. Open the soil moisture checking feature. 2. Place the moisture sensor into the soil. 3. Verify that the moisture levels are displayed on the screen. 4. Repeat the test for different moisture levels and soil types.	Test Data Soil moisture sensor or device	Expected Result The moisture levels in the soil are displayed on the screen.	Actual Result	Status (Pass/fail)
Post Condition: The app successfully displays the moisture level reading for the soil, allowing users to monitor the health of their crops and ensure they are getting the water they need.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: Nokibul Arfin Siam			
Test Case ID: FR_6.2		Test Designed Date: 01-04-2023			
Test Priority (Low, Medium, High): High		Test Executed by:			
Module Name: Save soil moisture data Session		Test Execution date:			
Test Title: Verify the app allows users to view historical data on soil moisture levels. .					
Description: History of soil moisture.					
Precondition (If any): The app has access to the sensor data for soil moisture levels.					
Test Steps 1. Open the soil moisture checking feature. 2. Place the moisture sensor into the soil. 3. Verify that the moisture levels are displayed on the screen. 4. Record the moisture levels displayed on the screen. 5. Repeat the process over several days and record the moisture levels. 6. Open the historical data section.		Test Data Historical soil moisture data	Expected Result The app displays historical data on soil moisture levels, allowing users to view and track.	Actual Result	Status (Pass/fail)
Post Condition: The app is able to accurately display the soil moisture data for different locations and soil types.					

Project Name: <i>Automated Irrigation System</i>		Test Designed by: FAHIM RAHMAN		
Test Case ID: FR_7.1		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Notifications Session		Test Execution date:		
Test Title: Option to receive notifications for important events				
Description: Test notifications for important events				
Precondition (If any): N/A				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Go to the website. 2. Go to Notifications. 3. Go to weather updates. 4. Click enter		User should be able to view weather updates		
Post Condition: N/A				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: FAHIM RAHMAN		
Test Case ID: FR_7.2		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Notifications Session		Test Execution date:		
Test Title: Give notifications about agricultural articles, news, etc.				
Description: Test notifications for articles, news, etc.				
Precondition (If any): N/A.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Go to the website. 2. Go to Notifications. 3. Go to news. 4. Click enter		User should be able to view the latest news updates regarding agriculture		
Post Condition: N/A				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: FAHIM RAHMAN		
Test Case ID: FR_7.3		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Notifications Session		Test Execution date:		
Test Title: give notifications if helpline or support center responds				
Description: Test helpline center notifications				
Precondition (If any): User must have asked for helpline support				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Go to the website. 2. Go to Notifications. 3. Go to the helpline. 4. Click enter		User should be able to view response from helpline		
Post Condition: User is asked to rate the helpline support.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: FAHIM RAHMAN		
Test Case ID: FR_8.1		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Helpline Session		Test Execution date:		
Test Title: Access a helpline or support center for assistance.				
Description: Test helpline number.				
Precondition (If any): N/A				
Test Steps	Test Data	Expected Results	Actual Result	Status (Pass/Fail)
1. Go to the website. 2. Go to Helpline 3. Dial the number. 4. Press ring	Helpline: 0164327495 2	User should be able to contact helpline number.		
Post Condition: N/A				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: FAHIM RAHMAN		
Test Case ID: FR_8.2		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Helpline Session		Test Execution date:		
Test Title: Option to contact support via email				
Description: Test email				
Precondition (If any): N/A				
Test Steps	Test Data	Expected Results	Actual Result	Status (Pass/Fail)
1. Go to the website. 2. Go to the helpline. 3. Go to the mail page. 4. Send mail in the given address	Email Id: argi71@gmail.com	Email address will be valid.		
Post Condition: Check email for reply.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: FAHIM RAHMAN		
Test Case ID: FR_8.3		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Helpline Session		Test Execution date:		
Test Title: FAQs: The app will have a section with frequently asked questions.				
Description: Test FAQs page				
Precondition (If any): N/A				
Test Steps	Test Data	Expected Results	Actual Result	Status (Pass/Fail)
1. Go to the website. 2. Go to the helpline. 3. Go to FAQs session. 4. Check the answers	N/A	User should be given the appropriate answer for the common problems they face.		
Post Condition: N/A.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: MD. NAJIB HOSSAIN		
Test Case ID: FR_9.1.1		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Auto On/Off		Test Execution date:		
Test Title: The irrigation system turns ON automatically as per the scheduled				
Description: Verify the irrigation system turns ON automatically as per the scheduled time				
Precondition (If any): N/A				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
<div>1. Set the irrigation system to the "Auto On/Off" mode.</div> <div>2. Schedule the irrigation system to turn on at a specific time.</div> <div>3. Wait for the scheduled time.</div> <div>4. Verify that the irrigation system turns on automatically at the scheduled time.</div>		The irrigation system should turn ON automatically at the scheduled time.		
Post Condition: N/A				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: MD. NAJIB HOSSAIN		
Test Case ID: FR_9.1.2		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Auto On/Off		Test Execution date:		
Test Title: The irrigation system turns OFF automatically as per the scheduled				
Description: Verify the irrigation system turns OFF automatically as per the scheduled time				
Precondition (If any): N/A.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
<div>1. Set the irrigation system to the "Auto On/Off" mode.</div> <div>2. Schedule the irrigation system to turn off at a specific</div>		The irrigation system should turn OFF automatically at the scheduled time.		

time. 3. Wait for the scheduled time. 4. Verify that the irrigation system turns off automatically at the scheduled time.				
Post Condition: N/A				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: MD. NAJIB HOSSAIN		
Test Case ID: FR_9.1.3		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Auto On/Off		Test Execution date:		
Test Title: The irrigation system does not turn ON when the schedule is disabled				
Description: Verify the irrigation system does not turn ON when the schedule is disabled				
Precondition (If any): N/A.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Set the irrigation system to the "Auto On/Off" mode. 2. Disable the schedule for the irrigation system. 3. Wait for the scheduled time when the irrigation system was supposed to turn on. 4. Verify that the irrigation system does not turn on automatically.		The irrigation system should not turn ON when the schedule is disabled.		
Post Condition: N/A				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: MD. NAJIB HOSSAIN		
Test Case ID: FR_9.1.4		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Auto On/Off		Test Execution date:		
Test Title: The irrigation system does not turn OFF when the schedule is disabled				
Description: Verify the irrigation system does not turn OFF when the schedule is disabled				
Precondition (If any): N/A				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Set the irrigation system to the "Auto On/Off" mode. 2. Disable the schedule for the irrigation system. 3. Wait for the scheduled time when the irrigation system was supposed to turn off. 4. Verify that the irrigation system does not turn off automatically.		The irrigation system should not turn OFF when the schedule is disabled.		
Post Condition: N/A				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: MD. NAJIB HOSSAIN		
Test Case ID: FR_9.1.5		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Auto On/Off		Test Execution date:		
Test Title: The irrigation system turns ON when the schedule is re-enabled				
Description: Verify the irrigation system turns ON when the schedule is re-enabled				
Precondition (If any): N/A				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
<div>1. Set the irrigation system to the "Auto On/Off" mode.</div> <div>2. Disable the schedule for the irrigation system.</div> <div>3. Wait for the scheduled time</div>		The irrigation system should turn ON when the schedule is re-enabled.		

when the irrigation system was supposed to turn on. 4. Re-enable the schedule for the irrigation system. 5. Verify that the irrigation system turns on automatically.				
Post Condition: N/A				

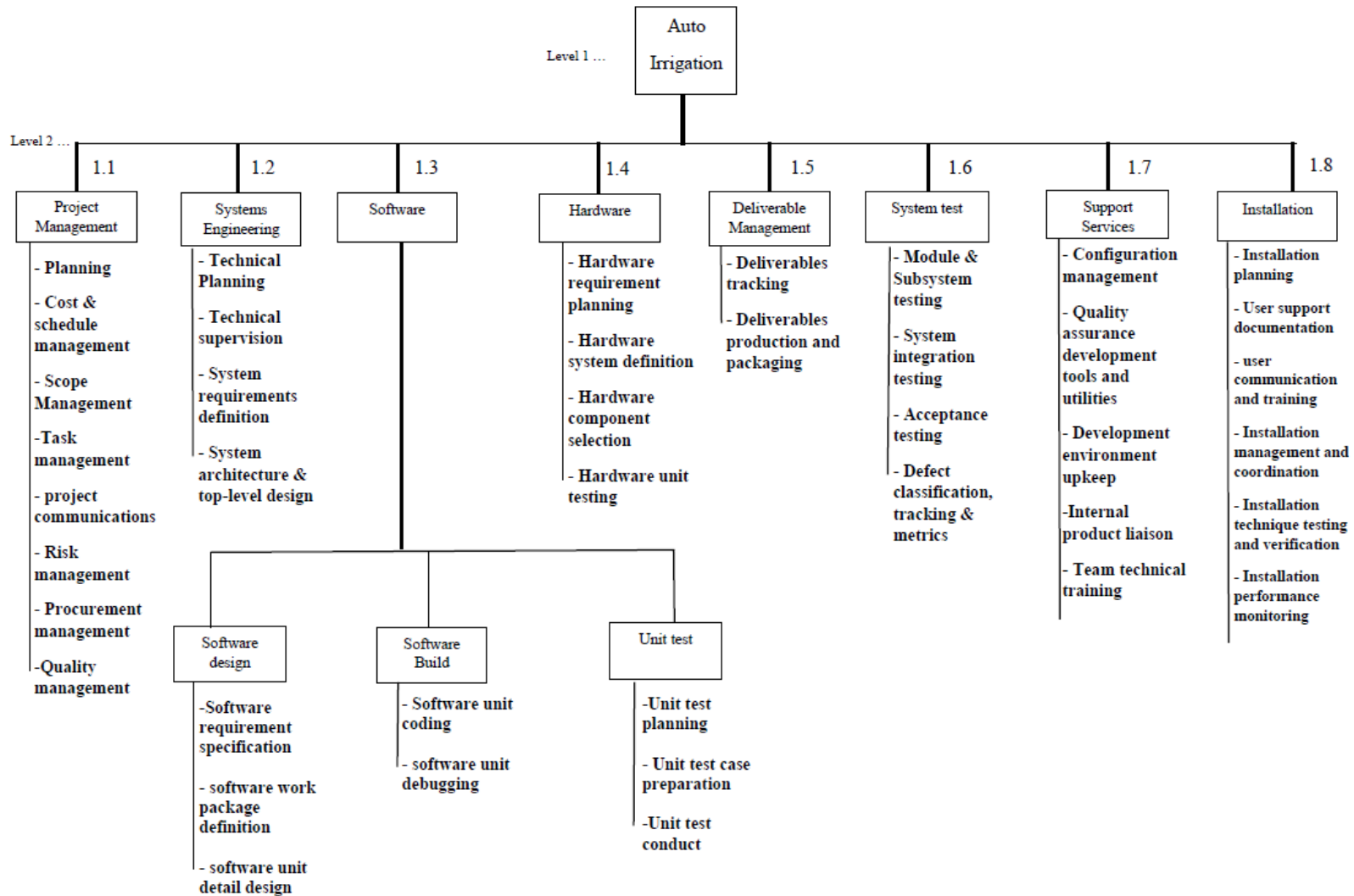
Project Name: <i>Automated Irrigation System</i>		Test Designed by: MD. NAJIB HOSSAIN		
Test Case ID: FR_9.1.6		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Auto On/Off		Test Execution date:		
Test Title: The irrigation system turns OFF when the schedule is re-enabled				
Description: Verify the irrigation system turns OFF when the schedule is re-enabled				
Precondition (If any): N/A				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
<div>1. Set the irrigation system to the "Auto On/Off" mode.</div> <div>2. Disable the schedule for the irrigation system.</div> <div>3. Wait for the scheduled time when the irrigation system was supposed to turn off.</div> <div>4. Re-enable the schedule for the irrigation system.</div> <div>5. Verify that the irrigation system turns off automatically.</div>		The irrigation system should turn OFF when the schedule is re-enabled.		
Post Condition: N/A				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: MD. NAJIB HOSSAIN		
Test Case ID: FR_9.2		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Manual On/Off		Test Execution date:		
Test Title: The irrigation system turns Manual On/Off setting				
Description: Verify that the "Manual On/Off" setting of an irrigation system				
Precondition : The irrigation system is installed and connected to a power source and water supply. The manual setting is available in the system. The user has access to the irrigation system and understands its features.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
<div>1. Open the irrigation system's control panel or app.</div> <div>2. Verify that the "Manual On/Off" setting is visible and accessible.</div> <div>3. Set the manual setting to "On".</div> <div>4. Verify that the irrigation system turns on and water is flowing through the pipes.</div> <div>5. Observe the irrigation system for a few minutes to ensure that all areas receiving water are covered.</div> <div>6. Set the manual setting to "Off".</div> <div>7. Verify that the irrigation system turns off and water flow stops immediately.</div>		<div>The "Manual On/Off" setting is visible and accessible.</div> <div>When the manual setting is turned on, water flows through the pipes and irrigates the designated areas.</div> <div>When the manual setting is turned off, the water flow stops immediately.</div> <div>The manual setting works consistently and reliably each time it is used.</div>		
Post Condition: The irrigation system is turned off.				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: MD. NAJIB HOSSAIN		
Test Case ID: FR_9.3		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Set Timer		Test Execution date:		
Test Title: The functionality of setting the timer for system				
Description: Verifies the functionality of setting the timer for an irrigation system.				
Precondition: The irrigation system is installed and configured. The system is turned on and ready to use.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
<div>1. Navigate to the irrigation system control panel.</div> <div>2. Locate the "Set Timer" option and select it.</div> <div>3. Verify that the timer settings are displayed on the screen.</div> <div>4. Set the timer for a specific time and duration (e.g., 7:00 AM for 30 minutes).</div> <div>5. Verify that the timer has been set correctly by checking the display or output.</div> <div>6. Wait for the scheduled time to elapse.</div> <div>7. Observe that the irrigation system turns on at the scheduled time and turns off after the scheduled duration has elapsed.</div> <div>8. Verify that the irrigation system has turned off after the scheduled duration has elapsed.</div>		<div>The timer settings should be displayed correctly.</div> <div>The timer should be set correctly, and the display or output should reflect the new settings.</div> <div>The irrigation system should turn on at the scheduled time and turn off after the scheduled duration has elapsed.</div> <div>The irrigation system should turn off after the scheduled duration has elapsed.</div>		
Post Condition: N/A				

Project Name: <i>Automated Irrigation System</i>		Test Designed by: MD. NAJIB HOSSAIN		
Test Case ID: FR_9.4		Test Designed date: 30/03/2023		
Test Priority (Low, Medium, High): Medium		Test Executed by:		
Module Name: Set Water Level		Test Execution date:		
Test Title: The irrigation system can set the water level as per the user's requirement.				
Description: Verify that the irrigation system can set the water level as per the user's requirement.				
Precondition: Irrigation system is installed and configured properly. User has access to the system and knows how to operate it.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
<div>1. Login to the irrigation system.</div> <div>2. Navigate to the "Set Water Level" section.</div> <div>3. Enter the desired water level in the input field.</div> <div>4. Click on the "Set" button to save the water level setting.</div> <div>5. Verify that the system displays a success message indicating that the water level has been set.</div> <div>6. Verify that the system has set the water level to the desired value.</div>		<div>The system should display a success message indicating that the water level has been set.</div> <div>The system should set the water level to the desired value.</div> <div>If the water level cannot be set to the desired value due to any technical issues, the system should display an error message explaining the issue.</div>		
Post Condition: N/A				

7. WORK BREAKDOWN STRUCTURE (WBS)



8. EFFORT ESTIMATION

Constructive Cost Model:

$$\text{SLOC} = 8000$$

$$P = 1.20 \text{ (Embedded)}$$

$$T = 0.32$$

$$\begin{aligned}\text{Effort} = \text{PM} &= \text{Coefficient} \times \text{Effort Factor} \times (\text{SLOC}/1000)^P \\ &= 3.6 \times (8000/1000)^{1.20} \\ &= 43.65 \text{ months}\end{aligned}$$

$$\begin{aligned}\text{Development time} = \text{DM} &= 2.50 \times (\text{PM})^T \\ &= 2.50 \times (43.65)^{0.32} \\ &= 8.37 \text{ months}\end{aligned}$$

$$\begin{aligned}\text{Required number of people} = \text{ST} &= \text{PM}/\text{DM} \\ &= 43.65/8.37 \\ &= 5.21 \\ &= 5\end{aligned}$$

EVA:

Task	Planned Effort	Actual Effort
1	12.0	12.5
2	15.0	11.0
3	13.0	17.0
4	8.0	9.5
5	9.5	9.0
6	18.0	19.0
7	10.0	10.0
8	4.0	4.5
9	12.0	10.0
10	6.0	6.5
11	5.0	-
12	14.0	-
13	16.0	-
14	6.0	-
15	8.0	-

When we were asked to do the earned value analysis, 10 tasks were completed. However, the project schedule indicates that 15 tasks should have been completed.

Effort Estimated = 1310 Person Day

$$\text{BAC} = 1310.00$$

$$\text{BCWP} = 107.5$$

$$\text{BCWS} = 156.5$$

$$\text{ACWP} = 109$$

$$\text{SPI} = \text{BCWP}/\text{BCWS} = 107.5/156.5 = 0.6869$$

$$\text{SV} = \text{BCWP} - \text{BCWS} = 107.5 - 156.5 = -49 \text{ person-day}$$

$$\text{CPI} = \text{BCWP}/\text{ACWP} = 107.5/109 = 0.986$$

$$\text{CV} = \text{BCWP} - \text{ACWP} = 107.5 - 109 = -1.5 \text{ person-day}$$

$$\% \text{ schedule for completion} = \text{BCWS}/\text{BAC} = 156.5/1310 = 11.947\%$$

[% of work schedule to be done at this time]

$$\% \text{ complete} = \text{BCWP}/\text{BAC} = 107.5/1310 = 8.206\%$$

[% of work completed at this time]

9. TIMELINE CHARTS

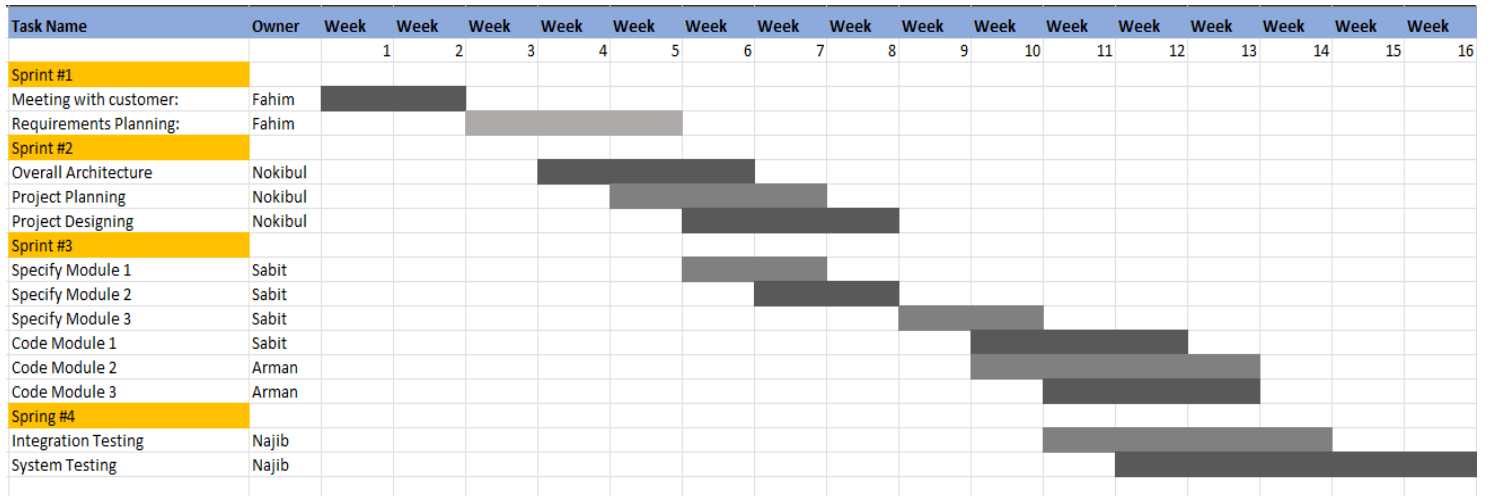
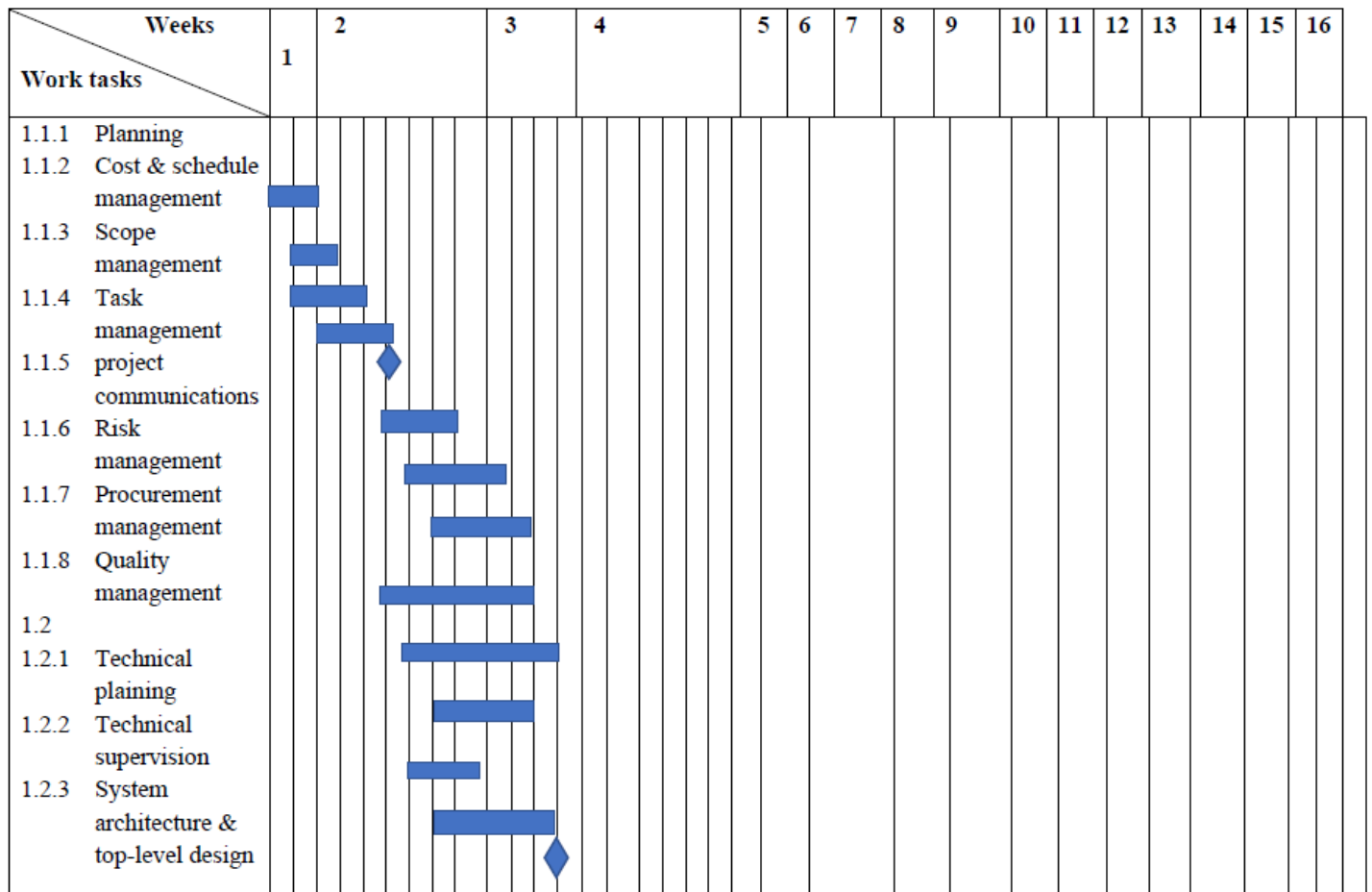
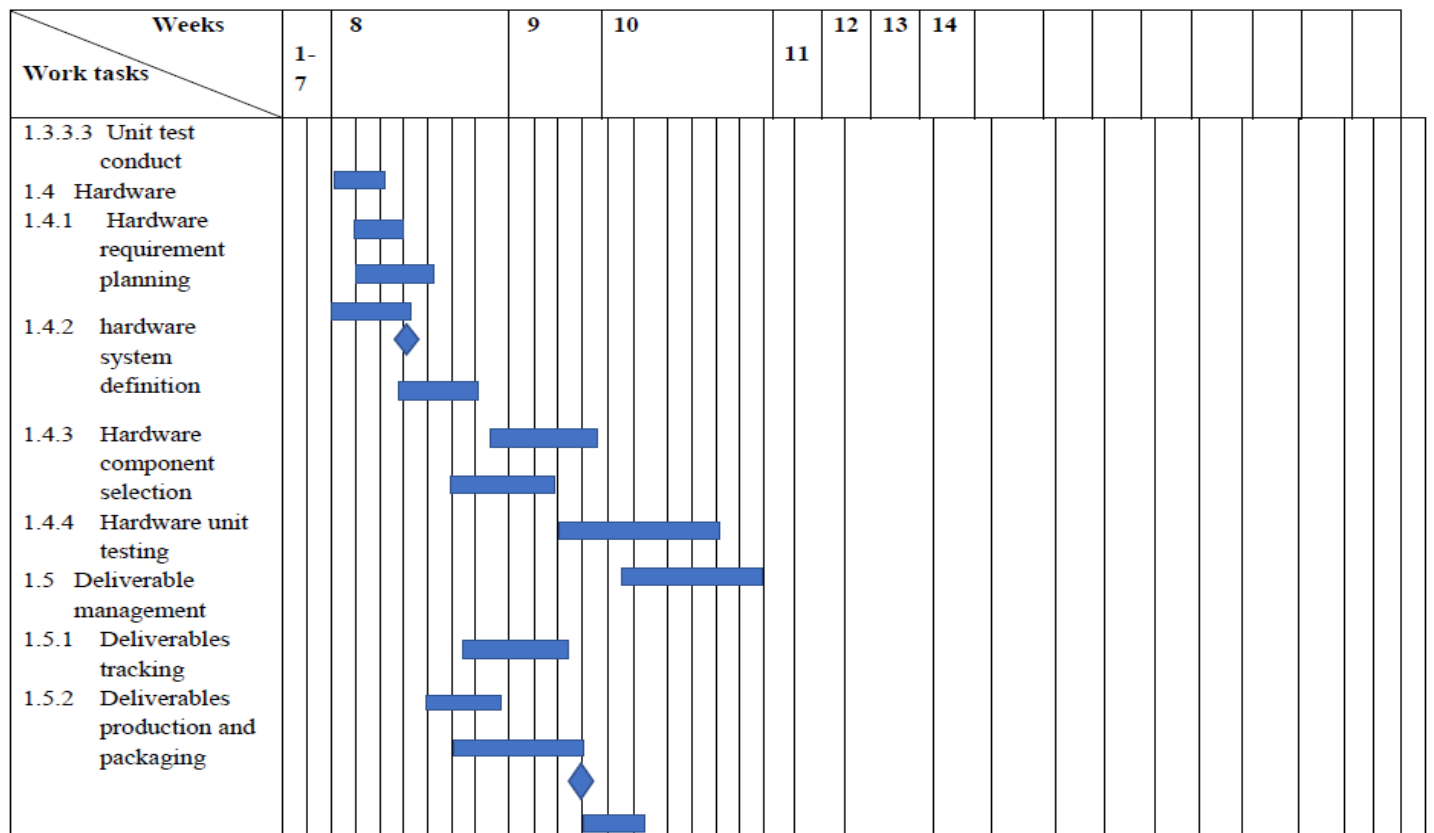
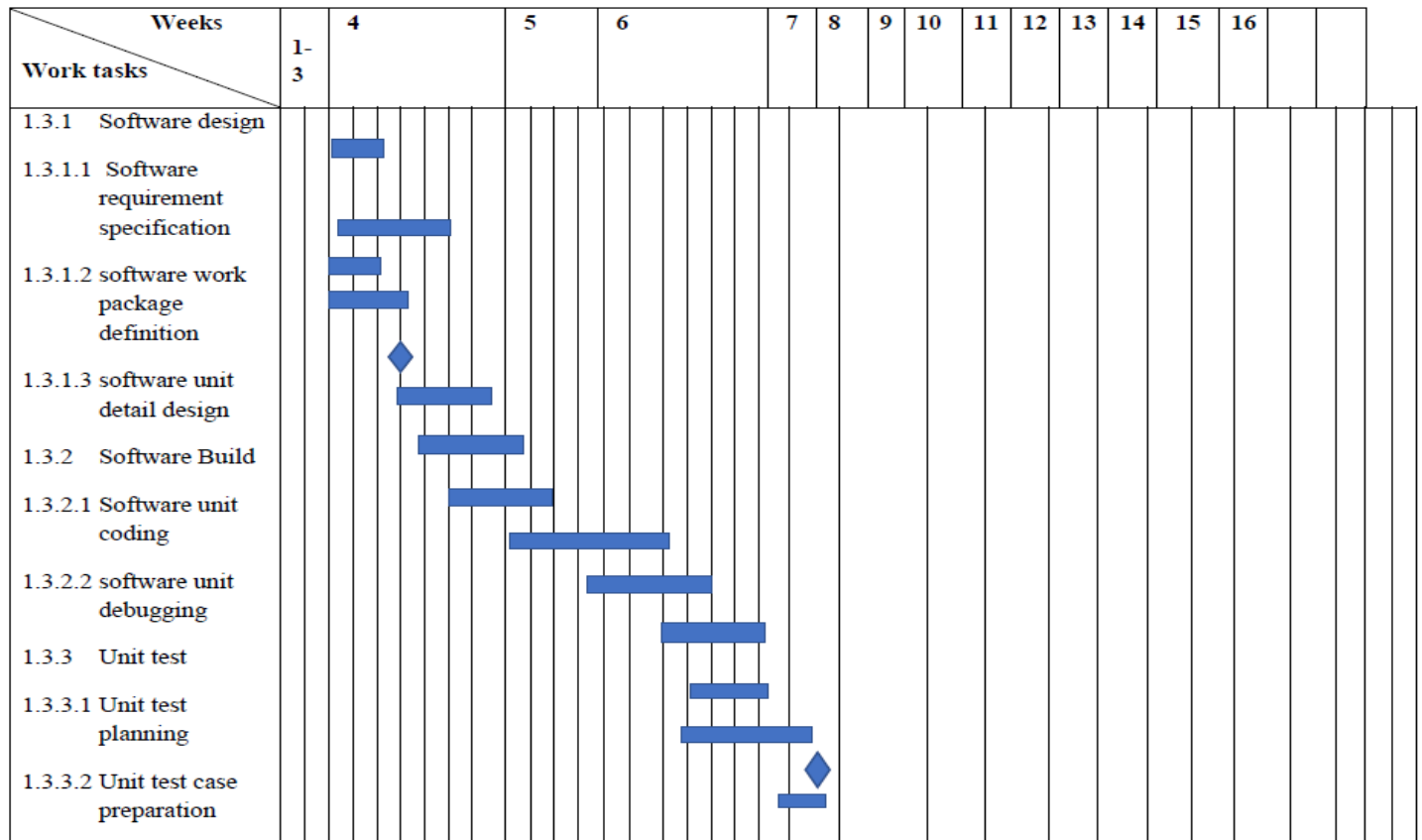
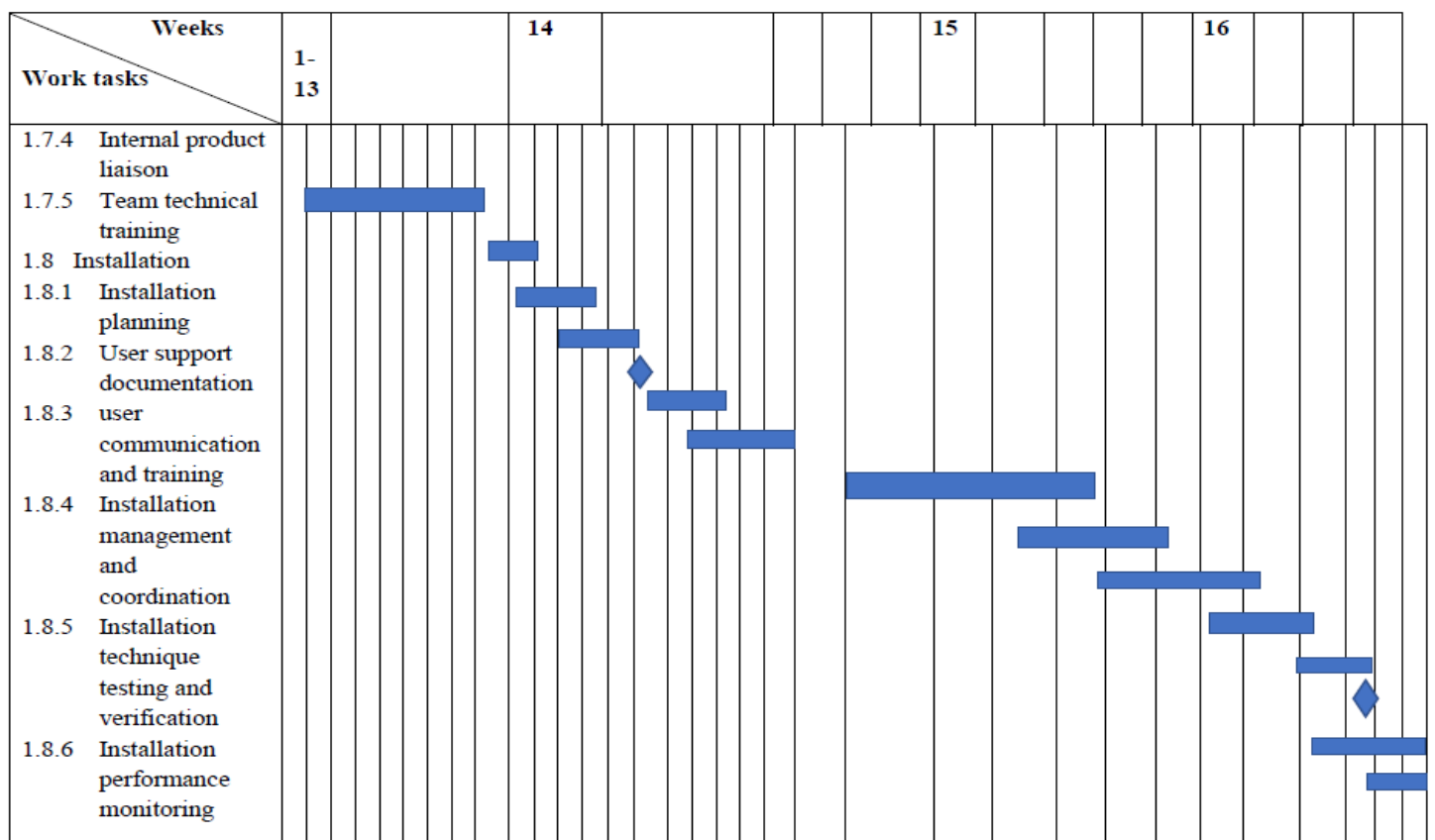
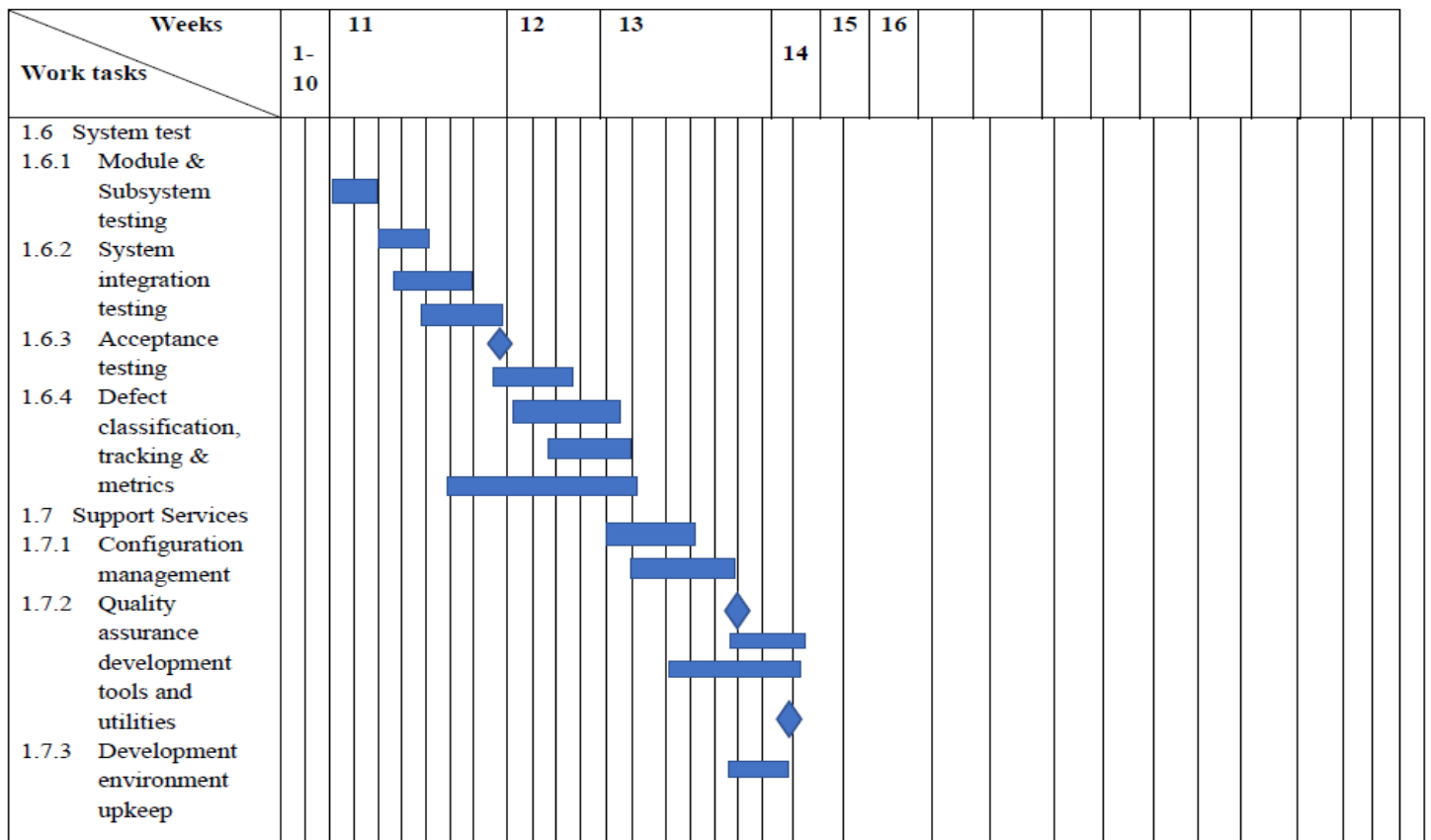


Fig: Overall project plan as a bar chart







10. BUILDING RISK TABLE

Risks	Category	Probability	Impact
Size estimate may be significantly low	PS	60%	2
Larger number of users than planned	PS	30%	3
Less reuse than planned	PS	70%	2
End-users resist system	BU	40%	3
Delivery deadline will be tightened	BU	50%	2
Funding will be lost	CU	40%	1
Customer will change requirements	PS	80%	2
Technology will not meet expectations	TE	30%	1
Lack of training on tools	DE	80%	3
Staff inexperienced	ST	30%	2
Staff turnover will be high	ST	60%	2
Staff fall sick	ST	30%	2
Wrong user interface	CU	40%	2
Wrong software functions	PR	30%	1
Gold Plating	CU	50%	2
Unclear requirements or Changing requirements	PS	80%	2
Lack of user adoption or acceptance	DE	10%	2
Unable to manage risk	DE	30%	1
Security vulnerabilities or data breaches	PR	10%	1
End-users resist system	BU	40%	3
Delays in software developments or testing	CU	50%	3
Technical difficulties on system integration issues	BU	40%	2