



American International University-Bangladesh (AIUB)
Department of Computer Science
Faculty of Science & Technology (FST)

A Medical Software

A Software Engineering Project Submitted By:

| Semester: Spring_24_25 | | Section: P | Group Number: 04 | |
|------------------------|----------------------|------------|------------------------|------------------|
| SN | Student Name | Student ID | Contribution (CO3+CO4) | Individual Marks |
| 01 | Yea Ahmed Nipul | 22-48584-3 | | |
| 02 | Mahmodul Hasan Moein | 22-48746-3 | | |
| 03 | Naimul Islam | 22-48900-3 | | |
| 04 | Akib Ashfaq | 22-48928-3 | | |
| 05 | Md Mridul Ali | 22-48929-3 | | |

The project will be evaluated for the following Course Outcomes

| CO3: <i>Select</i> appropriate software engineering models, project management roles, and their associated skills for the complex software engineering project and evaluate the sustainability of developed software, taking into consideration the societal and environmental aspects | Total Marks | |
|--|-------------|--|
| | | |
| Appropriate Process Model Selection and Argumentation with Evidence | [5 Marks] | |
| Evidence of Argumentation Regarding Process Model Selection | [5Marks] | |
| Analysis of the impact of societal, health, safety, legal, and cultural issues | [5Marks] | |
| Submission, Defense, Completeness, Spelling, grammar, and Organization of the Project report | [5Marks] | |
| CO4: <i>Develop</i> a project management plan to manage software engineering projects following the principles of engineering management and economic decision process | Total Marks | |
| | | |
| Develop the project plan, its components of the proposed software products | [5Marks] | |

| | | |
|---|-------------|--|
| Identify all the activities/tasks related to project management and categorize them within the WBS structure. Perform detailed effort estimation correspond with the WBS and schedule the activities with resources | [5Marks] | |
| Identify all the potential risks in your project and prioritize them to overcome these risk factors. | [5Marks] | |
| CO5: Perform as an effective team member or leader in diverse team settings and solve multi-disciplinary problems in the computer science and engineering domain | Total Marks | |
| | | |
| Taking project responsibility: perform assigned tasks on time independently | [5 Marks] | |
| Contribution to project group meetings, sharing fruitful ideas | [5Marks] | |
| Positive attitude towards group work, collaboration, compromise, helping others to understand their project work responsibility | [5Marks] | |
| Showing respect and value towards other team member's opinion | [5Marks] | |

Description of Student's Contribution in the Project work

| |
|--|
| <p>Student Name: Yea Ahmed Nipul Student ID: 22-48584-3 Contribution in Percentage (%): 20 % <u>Contribution in the Project:</u></p> <ul style="list-style-type: none"> ▪ Effort Estimation (COCOMO) ▪ Risk Management Plan <p>_____</p> <p>Signature of the Student</p> |
| <p>Student Name: Mahmodul Hasan Moein Student ID: 22-48746-3 Contribution in Percentage (%): 20 % <u>Contribution in the Project:</u></p> <ul style="list-style-type: none"> ▪ Effort Estimation (COCOMO) ▪ Risk Management Plan <p>_____</p> <p>Signature of the Student</p> |

Student Name: Naimul Islam

Student ID: 22-48900-3

Contribution in Percentage (%): 20 %

Contribution in the Project:

- System Interface Design (UI/UX)

Signature of the Student

Student Name: Akib Ashfaq

Student ID: 22-48928-3

Contribution in Percentage (%): 20 %

Contribution in the Project:

- Test Cases & Test Plan
- Gantt Chart

Signature of the Student

Student Name: Md Mridul Ali

Student ID: 22-48929-3

Contribution in Percentage (%): 20 %

Contribution in the Project:

- Test Cases & Test Plan
- Work Breakdown Structure (WBS)

Signature of the Student

9:41



9:41



Quit



Your trusted health care &
medical support

Stay healthy with MediHope.
Book doctors, call
ambulances, and manage your
health - all from your phone.

Next →



Lets get started

Login to enjoy the fetures we've provided,
and stay healthy!

Emergency Login

Login / Sign Up

Emergency Log in

9:41



9:41

Previous



Phone number

Phone Number

Next →

OTP

OTP

Verify →



Previous

9:41



Doctor Consultation

Nearby
Hospital LocationEmergency
Ambulance Callout

Medical Record

Famous Doctors

Burn & Plastic Surgery Unit
Dr. Foara Tasnim

MBBS (DMC)MS
LABAID Cardiac Hospital
House- 01, Road 04, Dhanmondi, Dhaka
1205, Bangladesh

Cardiology
Prof. Dr. M.A Baqui

MBBS, D-Card(DU), FACC, FSCAI
(America)
Bis Sina Diagnostio & Imaging Centre
Dhanmondi
House 48, Road 5/A, Dhanmondi,
Dhaka 1209



Home



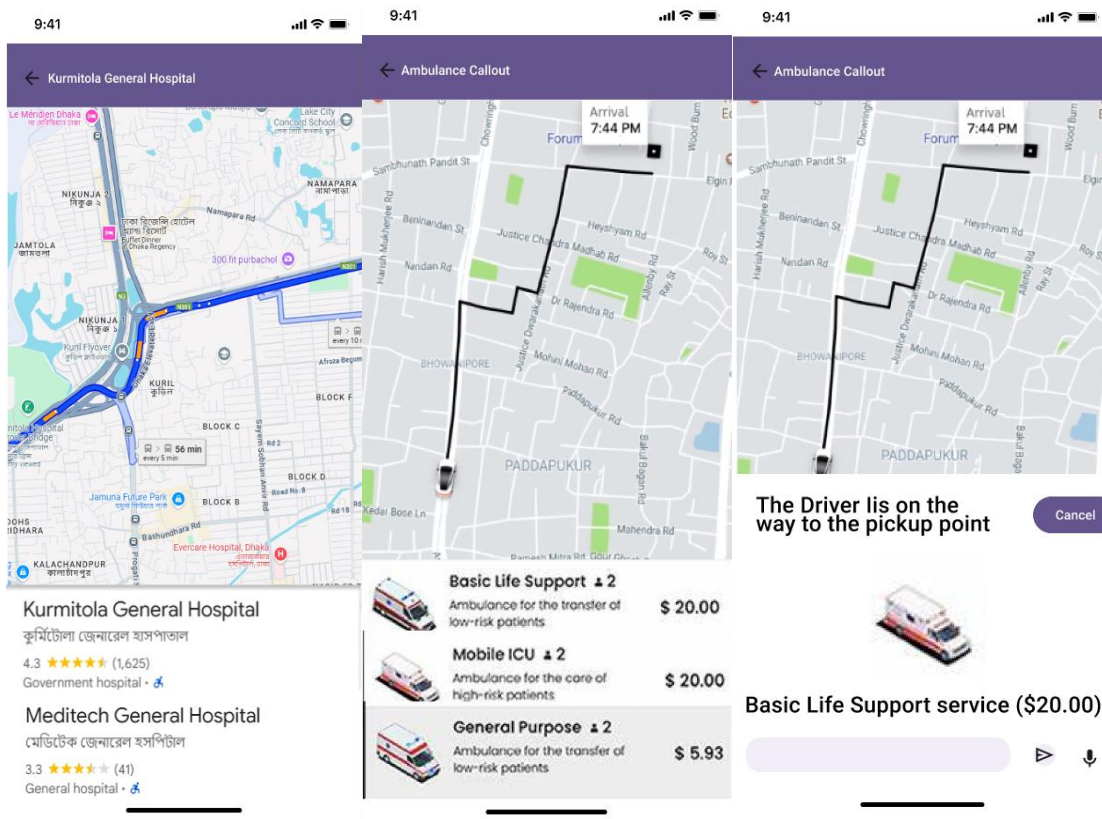
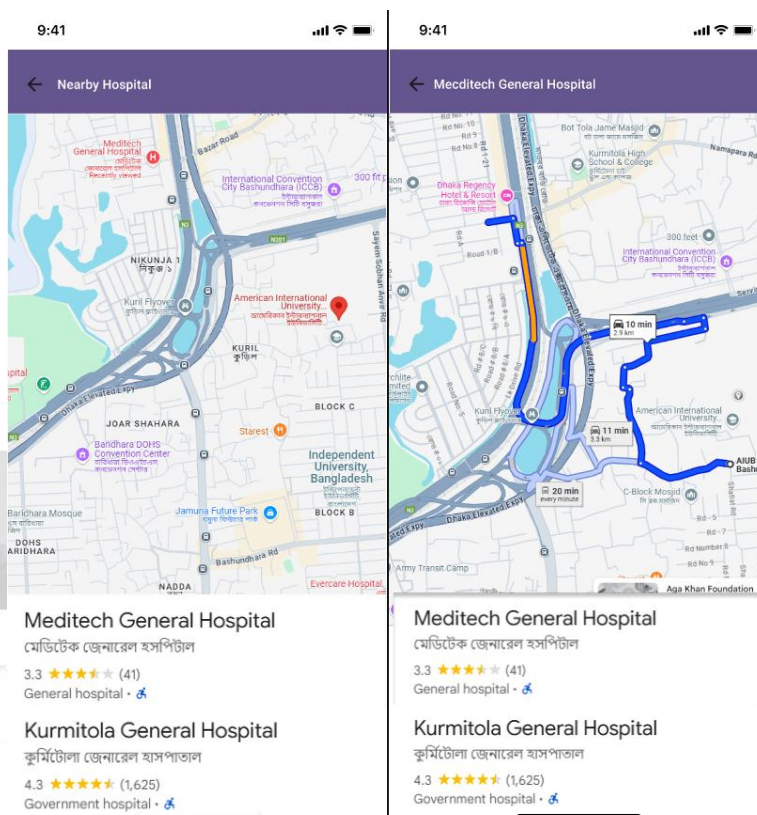
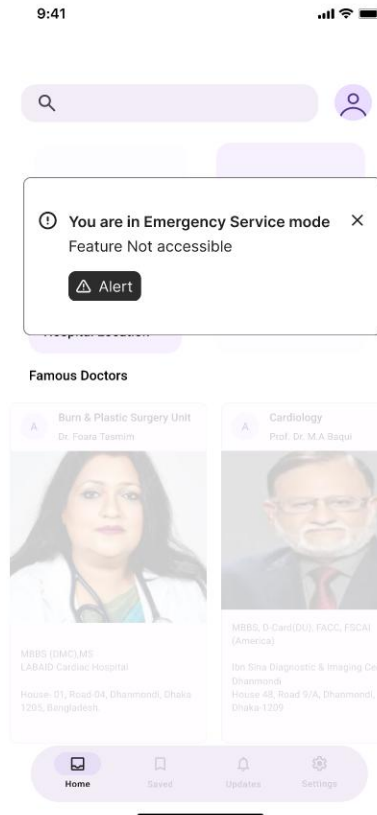
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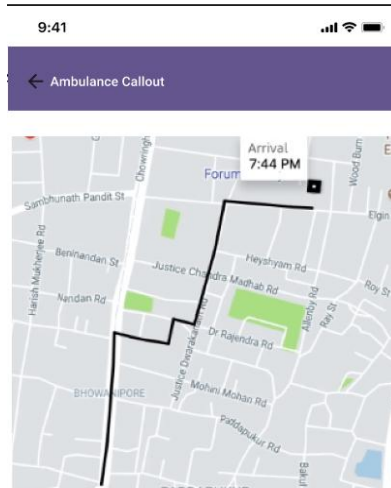


Updates



Settings



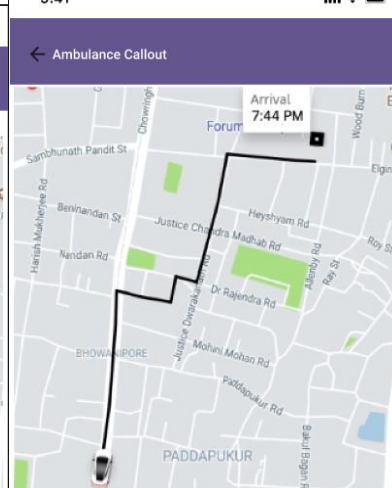


The Driver lies on the way to the pickup point

Cancel



Mobile ICU (\$20.00)



The Driver lies on the way to the pickup point

Cancel



General Purpose (\$5.93)



Phone number

Phone Number

Password

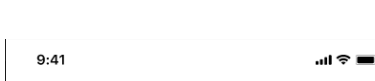
Password

Sign in >

Forgot password?

Don't have an account?

Register Here

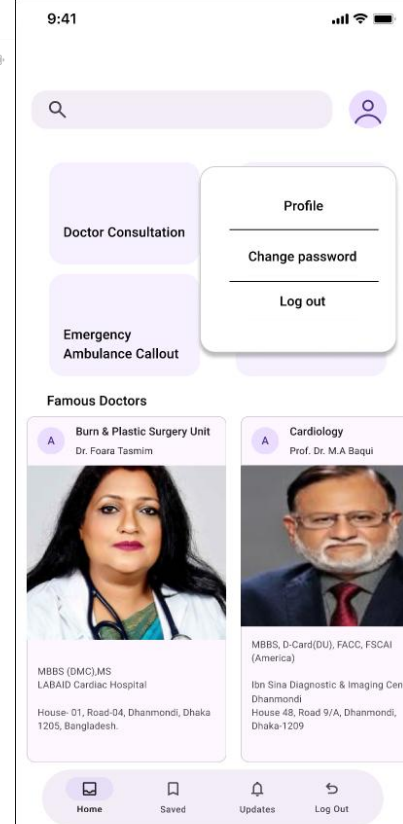


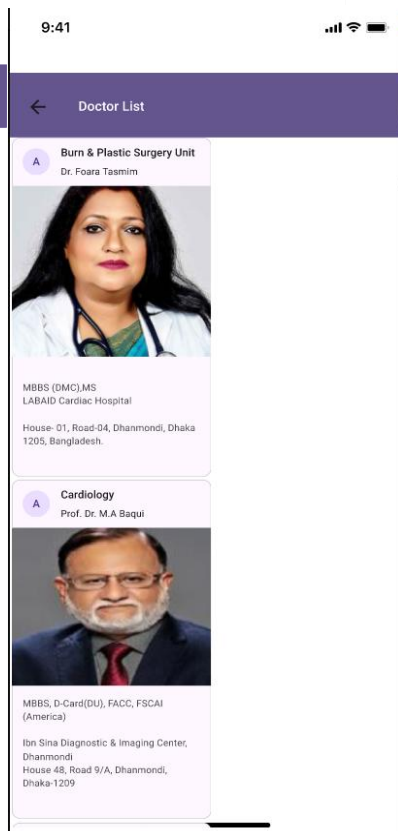
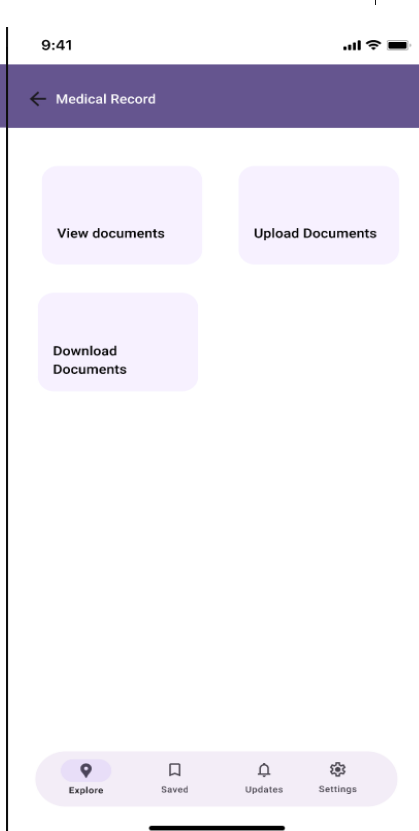
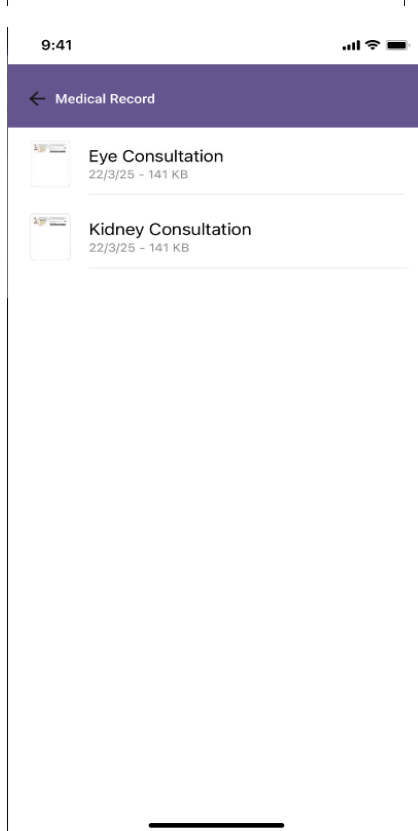
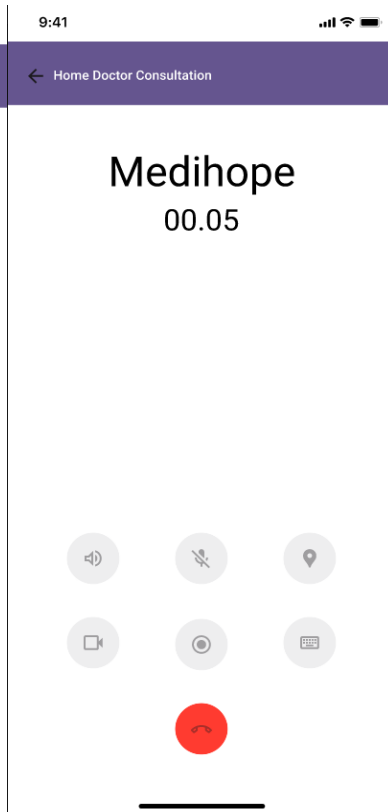
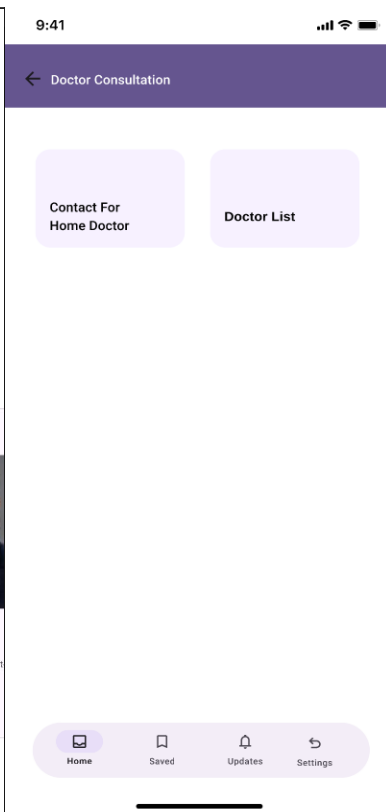
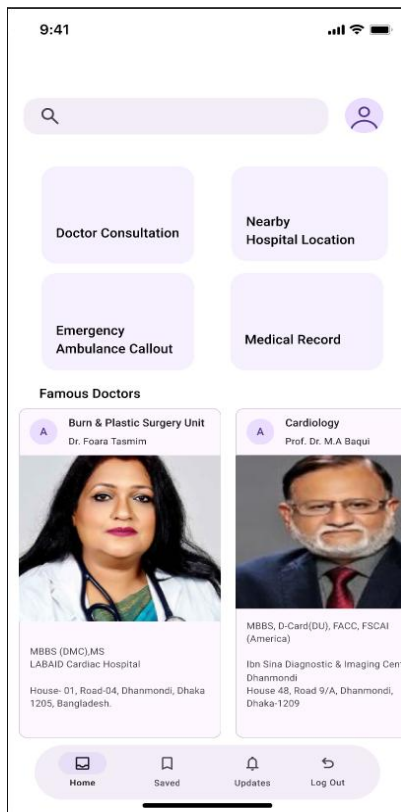
Congrats

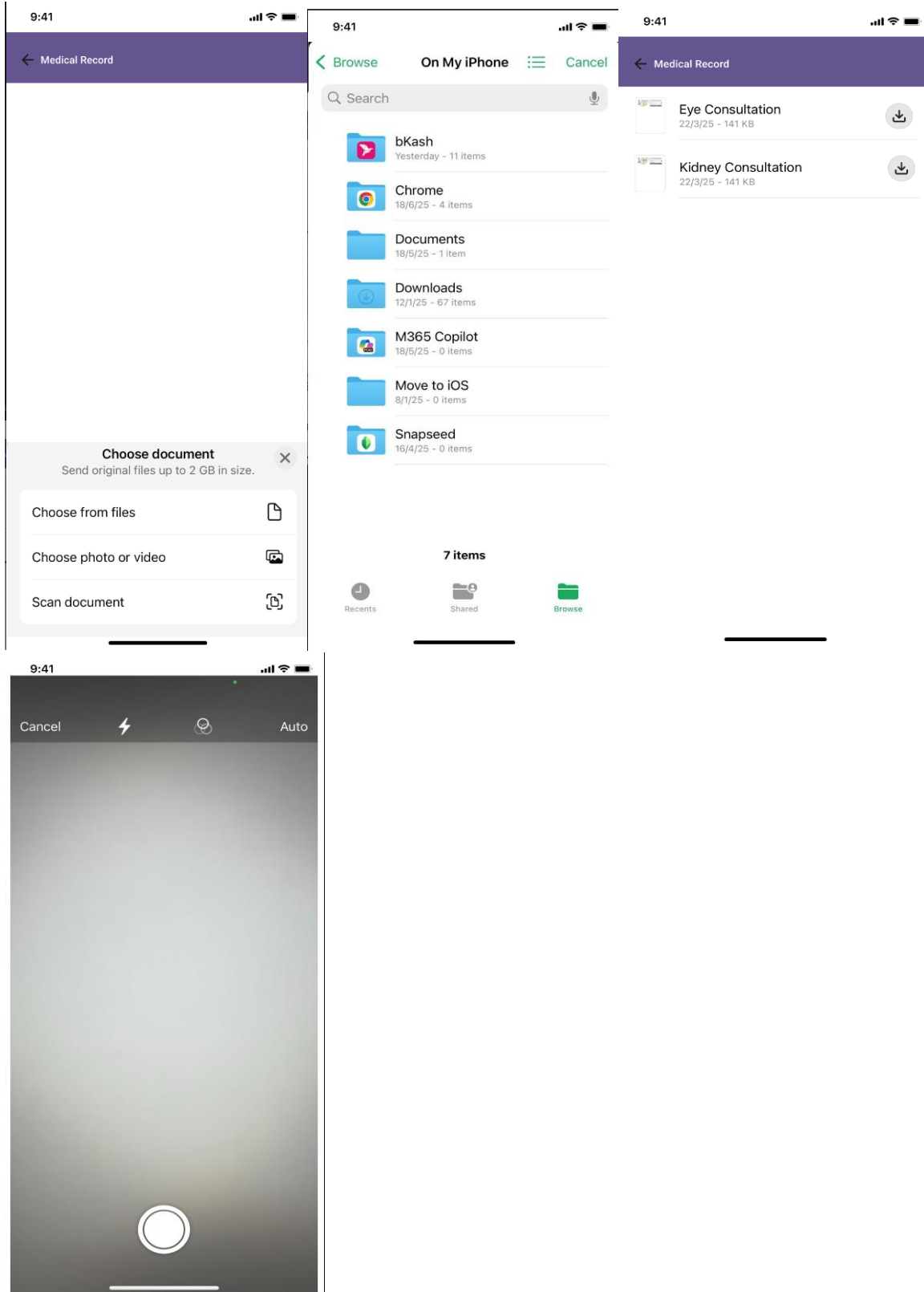
Username & Password Mached

Continue

Regular Log in







Test Cases & Test Plan:

Our developed software will be operated in Mobile. Here is the list of modules of system that can be tested, for testing we used **Black box** testing.

1. Emergency Login
2. Login
3. Registration
4. Additional Information
5. Change Password
6. Profile
7. Logout
8. Doctor Consultation
9. Emergency Ambulance Callout
10. Medical Record
11. View Documents
12. Upload Documents
13. Download Documents

Test Case Design:

Test case for Emergency Login:

| | | | | |
|--|-----------|---|----------------|--------------------|
| Project Name: Medi Hope | | Test Designed date:01/05/2025 Test Executed by: 01/05/2025 | | |
| Test Case ID:M100 | | | | |
| Test Priority (Low, Medium, High): High | | | | |
| Module Name: Emergency Login | | | | |
| Test Title: Verify Emergency Login with Phone Number and OTP | | | | |
| Description: Test app Emergency Login | | | | |
| Precondition (If any): Press next button on intro home page | | | | |
| Test Steps | Test Data | Expected Results | Actual Results | Status (Pass/Fail) |

| | | | | |
|--|-------------------------------------|---------------------------------------|-------------|------|
| 1.Go to app 2.Enter the Phone Number 3.Click Next button 4.Enter OTP 5.Click Verify button | Phone Number:013*****71 OTP:9999 | User should go to emergency home page | As expected | Pass |
| Post Condition: User will login to the system(emergency home page) with some feature locked. | | | | |

Test case for Login:

| | | | | |
|---|--|--|----------------|--------------------|
| Project Name: Medi Hope | | Test Designed date: 01/05/2025 Test Executed by: 01/05/2025 | | |
| Test Case ID:M100 | | | | |
| Test Priority (Low, Medium, High): High | | | | |
| Module Name: Login | | | | |
| Test Title: Verify Login with Phone Number and Password | | | | |
| Description: Test app Login | | | | |
| Precondition (If any): Press next button on intro page. | | | | |
| Test Steps | Test Data | Expected Results | Actual Results | Status (Pass/Fail) |
| 1.Go to app 2.Enter the Phone Number 3.Enter Password 4.Click Sign in | Phone Number:013*****71 Password:1032#\$M | User should go to home page | As expected | Pass |
| Post Condition: User will login to the system(home page) with their accessible feature (Paid or free) | | | | |

Test case for Registration:

| | | | | |
|--|--|---|----------------|--------------------|
| Project Name: Medi Hope | | Test Designed date: 01/05/2025 | | |
| | | Test Executed by: 01/05/2025 | | |
| Test Case ID:M100 | | | | |
| Test Priority (Low, Medium, High): High | | | | |
| Module Name: Registration | | | | |
| Test Title: User can registration with they are Phone Number and Password | | | | |
| Description: Test app Registration | | | | |
| Precondition (If any): If, User have no account | | | | |
| Test Steps | Test Data | Expected Results | Actual Results | Status (Pass/Fail) |
| 1.Go to app, click login/signup 2.Have no account click Registration here 3.Enter Phone Number 4.Give Password 5.Click Register button | Phone Number:013*****71 Password:103240M\$@71 | User should go to Additional information page | As expected | Pass |
| Post Condition: After successfully registered, User have to put they are additional information. | | | | |

Test case for Addition Information:

| | |
|---|--|
| Project Name: Medi Hope | Test Designed date: 01/05/2025 Test Executed by: 01/05/2025 |
| Test Case ID:M100 | |
| Test Priority (Low, Medium, High): Medium | |
| Module Name: Additional Information | |
| Test Title: User have to add they are Name, surname, Phone number, Full Address | |

| Description: Test app Additional Information | | | | |
|--|--|-----------------------------|----------------|--------------------|
| Precondition (If any): After successfully registered | | | | |
| Test Steps | Test Data | Expected Results | Actual Results | Status (Pass/Fail) |
| 1.Go to app 2.Enter the Name 3.Enter the surname 4.Enter Phone number 5.Enter Full Address 6.Click Submit button. | Name: Nipul Surname: Yeah Phone number: 013*****45 Full Address: Nazira bazar | User should go to home page | As expected | Pass |
| Post Condition: User will go to the home page and able to see which kind of services user can take from this app. | | | | |

Test case for Change Password:

| | | | | |
|--|-----------|--------------------------------|----------------|--------------------|
| Project Name: Medi Hope | | Test Designed date: 01/05/2025 | | |
| | | Test Executed by: 01/05/2025 | | |
| Test Case ID:M100 | | Test Designed date: | | |
| | | Test Executed by: | | |
| Test Priority (Low, Medium, High): High | | Test Designed date: | | |
| | | Test Executed by: | | |
| Module Name: Change Password | | | | |
| Test Title: Change password with current, new and confirm password | | | | |
| Description: Test app Change Password | | | | |
| Precondition (If any): | | | | |
| Test Steps | Test Data | Expected Results | Actual Results | Status (Pass/Fail) |

| | | | | |
|---|--|---|-------------|------|
| 1.Go to profile and click change password 2.Enter current password 3.Enter new password 4.Enter confirm password 5.Click Reset password button 6.Click Continue button | Current password:103240M\$@71 New Password:1612678224@# Confirm Password: 1612678224@# | After clicking the reset password button user will see the pop-up message (password updated) and after clicking the continue button user will go to the home page | As expected | Pass |
| Post Condition: User will go to the home page and able to see which kind of services user can take from this app. | | | | |

Test case for Profile:

| | | | | |
|--|-----------|--------------------------------|----------------|--------------------|
| Project Name: Medi Hope | | Test Designed date: 01/05/2025 | | |
| | | Test Executed by: 01/05/2025 | | |
| Test Case ID:M100 | | | | |
| Test Priority (Low, Medium, High): Medium | | | | |
| Module Name: Profile | | | | |
| Test Title: User able to see they are information | | | | |
| Description: Test app Profile | | | | |
| Precondition (If any): Go to the Home page and click user icon | | | | |
| Test Steps | Test Data | Expected Results | Actual Results | Status (Pass/Fail) |

| | | | | |
|---|--|---|-------------|------|
| 1.Go to Home page 2.Click user icon then click Profile | | User should go to they are Information page | As expected | Pass |
| Post Condition: User able to see they are information. | | | | |

Test case for Logout:

| Project Name: Medi Hope | | Test Designed date: 15/05/2025 | | |
|--|---|------------------------------------|----------------|--------------------|
| | | Test Executed by: 15/05/2025 | | |
| Test Case ID:M100 | | | | |
| Test Priority (Low, Medium, High): Medium | | | | |
| Module Name: Logout | | | | |
| Test Title: User can logout they are account from the system. | | | | |
| Description: Test Logout | | | | |
| Precondition (If any): Go to the Home page and click user icon | | | | |
| Test Steps | Test Data | Expected Results | Actual Results | Status (Pass/Fail) |
| 1.Go to the home page 2. Click user icon then click Profile | Phone Number:013*****71 OTP:9999 | User should go out from the System | As expected | Pass |
| Post Condition: User will go out from the System. | | | | |

Test case for Doctor Consultation:

| | | | | |
|---|-----------|---|----------------|--------------------|
| Project Name: Medi Hope | | Test Designed date: 15/05/2025 | | |
| | | Test Executed by: 15/05/2025 | | |
| Test Case ID:M100 | | | | |
| Test Priority (Low, Medium, High): Medium | | | | |
| Module Name: Doctor Consultation | | | | |
| Test Title: User able to show Doctor List and Contact for Home Doctor | | | | |
| Description: Test app Doctor Consultation | | | | |
| Precondition (If any): Go to the Home page | | | | |
| Test Steps | Test Data | Expected Results | Actual Results | Status (Pass/Fail) |
| 1.Go to the Home page 2.Click Doctor Consultation module | | User should go to the Doctor list and Contact for Home Doctor page. | As expected | Pass |
| Post Condition: User will go to the Doctor list and Contact for Home Doctor page. | | | | |

Test case for Emergency Ambulance Callout:

| | | | | |
|---|-----------|--------------------------------|----------------|--------------------|
| Project Name: Medi Hope | | Test Designed date: 15/05/2025 | | |
| | | Test Executed by: 15/05/2025 | | |
| Test Case ID:M100 | | | | |
| Test Priority (Low, Medium, High): Medium | | | | |
| Module Name: Emergency Ambulance Callout | | | | |
| Test Title: User able to see Ambulance list | | | | |
| Description: Test app Emergency Ambulance Callout | | | | |
| Precondition (If any): Go to the Home page | | | | |
| Test Steps | Test Data | Expected Results | Actual Results | Status (Pass/Fail) |

| | | | | |
|--|--|---------------------------------------|-------------|------|
| 1.Go to the home page 2.Click Emergency Ambulance Callout | | User should go to Ambulance list page | As expected | Pass |
| Post Condition: User able to see Ambulance list. | | | | |

Test case for Medical Record:

| | | | | |
|---|-----------|--|----------------|--------------------|
| Project Name: Medi Hope | | Test Designed date: 15/05/2025 | | |
| | | Test Executed by: 15/05/2025 | | |
| Test Case ID:M100 | | | | |
| Test Priority (Low, Medium, High): Medium | | | | |
| Module Name: Medical Record | | | | |
| Test Title: User able to see View Documents, Upload Documents and Download Documents | | | | |
| Description: Test app Medical Record | | | | |
| Precondition (If any): Go to the Home page | | | | |
| Test Steps | Test Data | Expected Results | Actual Results | Status (Pass/Fail) |
| 1.Go to the home page 2.Click Medical Record module | | User should go to View Documents, Upload Documents and Download Documents page | As expected | Pass |
| Post Condition: User will go to the View Documents, Upload Documents and Download Documents page. | | | | |

Test case for View Documents:

| | | | | |
|---|-----------|--------------------------------|----------------|--------------------|
| Project Name: Medi Hope | | Test Designed date: 15/05/2025 | | |
| | | Test Executed by: 15/05/2025 | | |
| Test Case ID:M100 | | | | |
| Test Priority (Low, Medium, High): Medium | | | | |
| Module Name: View Documents | | | | |
| Test Title: User able to see their Documents | | | | |
| Description: Test app View Documents | | | | |
| Precondition (If any): Go to the Home page then click Medical record module | | | | |
| Test Steps | Test Data | Expected Results | Actual Results | Status (Pass/Fail) |
| 1.Go to the home page 2.Click Medical Record 3.Click View Documents | | User will see their Documents | As expected | Pass |
| Post Condition: User will go to the Documents Page. | | | | |

Test case for Upload Documents:

| | | | | |
|---|-----------|--------------------------------|----------------|--------------------|
| Project Name: Medi Hope | | Test Designed date: 15/05/2025 | | |
| | | Test Executed by: 15/05/2025 | | |
| Test Case ID:M100 | | | | |
| Test Priority (Low, Medium, High): Medium | | | | |
| Module Name: Upload Documents | | | | |
| Test Title: User able to Upload their Documents | | | | |
| Description: Test app Upload Documents | | | | |
| Precondition (If any): Go to the Home page then click Medical record module | | | | |
| Test Steps | Test Data | Expected Results | Actual Results | Status (Pass/Fail) |

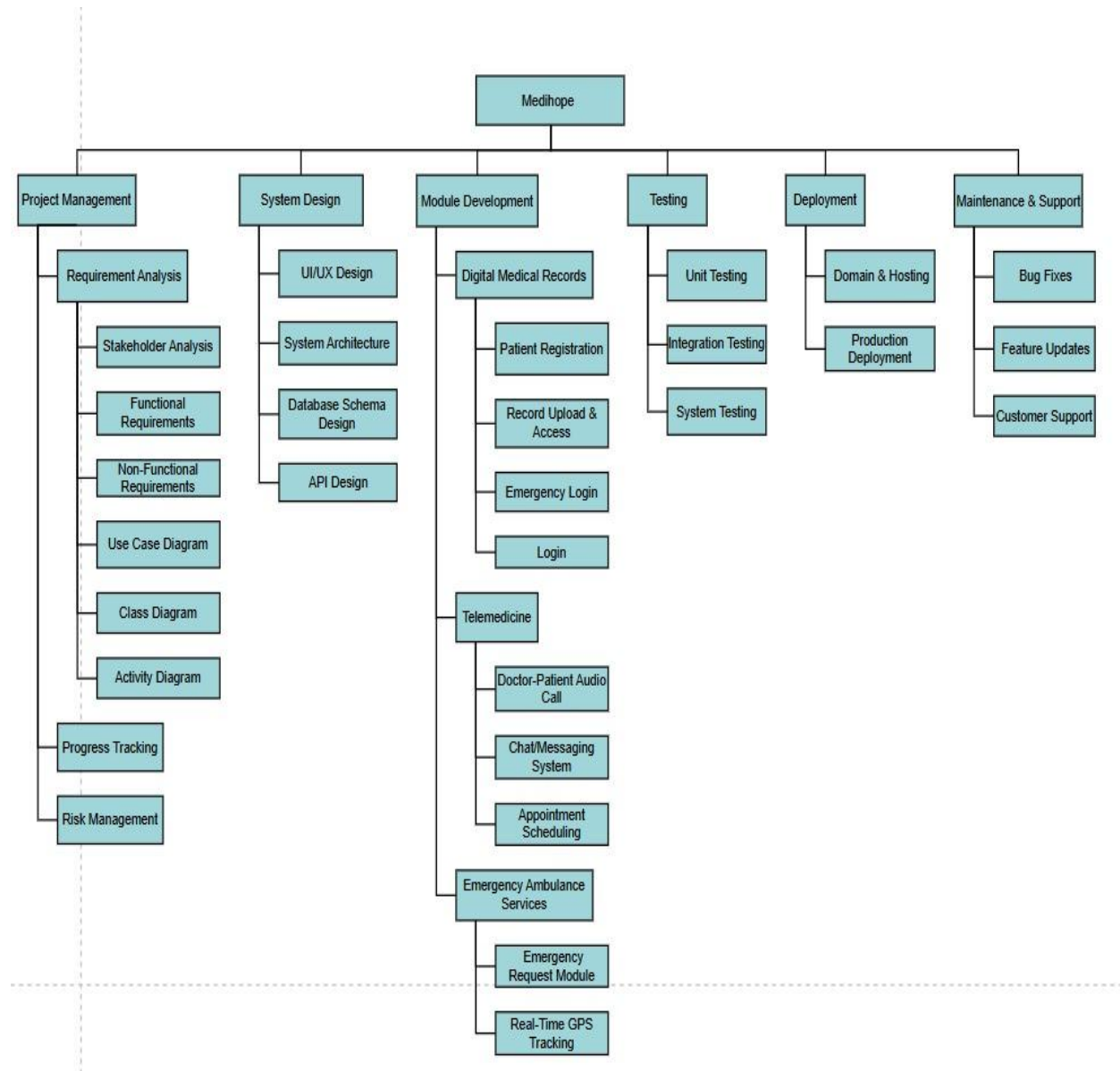
| | | | | |
|--|------------|-------------------------------------|-------------|------|
| 1.Go to home page 2. Click Medical Record 3.Click Upload Documents | Input file | User able to upload their Documents | As expected | Pass |
| Post Condition: User will go to the Upload Page. | | | | |

Test case for Download Documents:

| | | | | |
|--|-----------|-------------------------------------|----------------|--------------------|
| Project Name: Medi Hope | | Test Designed date: 15/05/2025 | | |
| | | Test Executed by: 15/05/2025 | | |
| Test Case ID:M100 | | | | |
| Test Priority (Low, Medium, High): Medium | | | | |
| Module Name: Download Documents | | | | |
| Test Title: User able to Download their Documents | | | | |
| Description: Test app Download Documents | | | | |
| Precondition (If any): Go to the Home page then click Medical record module | | | | |
| Test Steps | Test Data | Expected Results | Actual Results | Status (Pass/Fail) |
| 1.Go to the home page 2. Click Medical Record 3.Click Download Documents | | User able to upload their Documents | As expected | Pass |
| Post Condition: . | | | | |

Project Schedule & Effort Estimation:

Work Breakdown Structure (WBS) Diagram:



Effort Estimation (COCOMO):

Project category is Semi-Detached. Because medium size, moderately complex and team has mixed experience.

| Software Project Type | Coefficient <Effort Factor> | P | T |
|------------------------------|--|----------|----------|
| Organic | 2.4 | 1.05 | 0.38 |
| Semi-detached | 3.0 | 1.12 | 0.35 |
| Embedded | 3.6 | 1.20 | 0.32 |

PM: person-months needed for project (labor working hours)

SLOC: source lines of code = 20,000 (As this is a medium size project)

P: project complexity = 1.12 (semidetached)

DM: duration time in months for project (weekdays)

T: SLOC-dependent coefficient =0.35(semidetached)

ST: average staffing necessary.

$$\text{Effort} = \text{PM} = \text{Coefficient} * (\text{SLOC}/1000) ^ P =$$

$$= 3 * (20000/1000) ^ 1.12$$

$$= 85.96 \text{ Person-Months (labor working hours)}$$

$$\text{Development time} = \text{DM} = 2.50 * (\text{PM}) ^ T$$

$$= 2.50 * (85.96) ^ 0.35$$

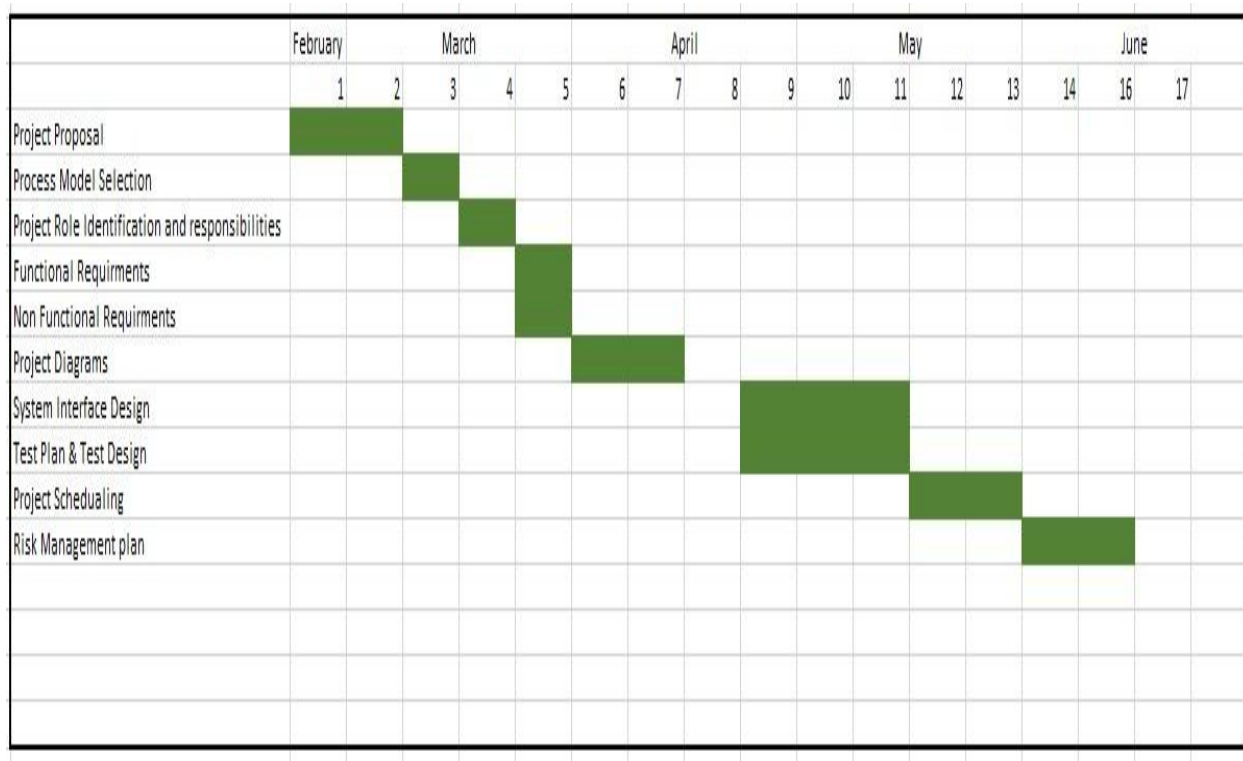
$$= 11.88 \text{ Months (weekdays)}$$

$$\text{Required number of people} = \text{ST} = \text{PM}/\text{DM}$$

$$= 85.96 / 11.88$$

$$= 7.23 \approx 8$$

Gantt Chart:



Risk Table

| # | Risks | Category | Probability | Impact | RMMM (Risk Monitoring, Mitigation, or Management) |
|---|---|----------|-------------|------------------|--|
| 1 | Emergency login fails (e.g., delay or unresponsive during crises) | TE | 80% | Critical (2) | Mitigation: Ensure high-priority server load balancing and test emergency login paths frequently. |
| 2 | Ambulance real-time tracking failure | TE | 70% | Critical (2) | Monitoring: Implement health checks and backup GPS tracking systems. |
| 3 | Patient data breach (e.g., unencrypted records) | SE | 50% | Catastrophic (1) | Mitigation: Encrypt data at rest and in transit, follow HIPAA/GDPR compliance, implement MFA. |
| 4 | Password reset vulnerabilities (token hijacking) | SE | 40% | Catastrophic (1) | Mitigation: Secure token generation, expiration, and MFA during sensitive actions. |

| | | | | | |
|----|---|----|-----|------------------|--|
| 5 | Telemedicine session crashes during consultations | TE | 60% | Critical (2) | Monitoring: Use performance logs and auto-scaling servers; optimize video compression. |
| 6 | Language misconfiguration (e.g., wrong language during emergency use) | PE | 40% | Marginal (3) | Mitigation: Test multilingual modules; default to English if detection fails. |
| 7 | Role-based access issues (e.g., patients accessing doctor features) | DE | 50% | Critical (2) | Management: Conduct regular RBAC testing; maintain audit logs. |
| 8 | Senior home-visit alerts not reaching doctors | TE | 30% | Critical (2) | Mitigation: Implement push notification retries and fallback communication (SMS/email). |
| 9 | Broken navigation (e.g., wrong redirect after login) | SE | 60% | Marginal (3) | Mitigation: Regular UI/UX testing and fallback navigation logic. |
| 10 | Cloud server crash leading to loss of access | DE | 30% | Catastrophic (1) | Management: Use multi-region cloud redundancy and auto-recovery with 1-min recovery target. |

9.2 Risk Analysis

High Probability Risks ($\geq 70\%$)

1. Emergency Login Failure

- **Probability:** 80%
- **Impact:** Critical (2)
- **Mitigation:** Prioritize uptime for emergency features. Conduct stress tests during peak times.

2. Ambulance Real-Time Tracking Failure

- **Probability:** 70%
- **Impact:** Critical (2)
- **Monitoring:** Use GPS fallback and real-time system health monitoring.

Moderate Probability Risks (30–70%)

1. Patient Data Breach

- **Probability:** 50%
- **Impact:** Catastrophic (1)
- **Mitigation:** Implement encryption, access control, and security audits.

2. Password Reset Vulnerabilities

- **Probability:** 40%
- **Impact:** Catastrophic (1)
- **Mitigation:** Time-sensitive secure tokens, MFA, IP/device checks.

3. Telemedicine Crash

- **Probability:** 60%
- **Impact:** Critical (2)
- **Monitoring:** Optimize backend for live video, implement auto-recovery.

4. Role-Based Access Errors

- **Probability:** 50%
- **Impact:** Critical (2)
- **Management:** Regular role testing, logging unauthorized access attempts.

5. Broken Navigation

- **Probability:** 60%
- **Impact:** Marginal (3)
- **Mitigation:** UX validation and robust redirect fallback.

6. Language Misconfiguration

- **Probability:** 40%
- **Impact:** Marginal (3)
- **Mitigation:** Manual override and accurate locale detection.

Low Probability Risks ($\leq 30\%$)

1. Home Visit Alerts Not Reaching

- **Probability:** 30%
- **Impact:** Critical (2)
- **Mitigation:** Multi-channel alerts with status tracking.

2. Cloud Crash/Data Loss

- **Probability:** 30%
- **Impact:** Catastrophic (1)
- **Management:** Redundant backups, auto-restart systems, multi-region hosting.