



American International University-Bangladesh (AIUB)

Department of Computer Science

Faculty of Science & Technology (FST)

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Section: A

Software Quality Assurance and Testing

Affordable Healthcare Access

A Report submitted
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Sign:

Date:

Software Test Plan

for

< Affordable Healthcare Access >

Version 1.0 approved.

Prepared by <MD. Tanvir Islam, MD. Aminur Rahman Asif, Tazdik Hossain>

<American International University-Bangladesh >

<29 September 2024 >

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Revision History

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0.1	18-09-2024	MD. Aminur Rahman Asif	First Draft
0.2	19-09-2024	MD. Tanvir Islam	Second Draft
0.3	20-09-2024	MD. Aminur Rahman Asif	Third Draft
0.4	21-09-2024	Tazdik Hossain	Updated Features
0.5	22-09-2024	MD. Tanvir Islam	Updated Test Cases
0.6	23-09-2024	Tazdik Hossain	Updated Requirements
0.7	25-09-2024	MD. Tanvir Islam	Final Revision
0.8	27-09-2024	Tazdik Hossain	Final Revision
0.9	28-09-2024	MD. Aminur Rahman Asif	Final Revision

1. TEST PLAN IDENTIFIER: RB-TP01.0

2. REFERENCES

- healthcare: https://en.wikipedia.org/wiki/Health_care
- Understanding the affordable care: <https://www.ama-assn.org/health-care-advocacy/access-care/understanding-affordable-care-act>

3. INTRODUCTION

Background to the Problem

Bangladesh faces significant challenges in providing affordable healthcare access to its population, particularly in rural and underserved urban areas. The country's healthcare system is under immense pressure due to a growing population, with nearly 165 million people relying on limited resources and infrastructure. Despite progress in healthcare delivery, many citizens still lack access to essential services, leading to increased morbidity and mortality rates.

One of the main issues is the disparity in healthcare access between urban and rural populations. While urban areas may have better facilities and healthcare providers, rural regions often suffer from a shortage of medical professionals and resources. This inequality exacerbates health outcomes, as many individuals cannot travel long distances to seek medical attention, particularly for non-communicable diseases and maternal and child health issues.

Moreover, the cost of healthcare remains a significant barrier. High out-of-pocket expenses prevent many families from seeking necessary treatments, leading to a reliance on informal healthcare providers, which may not offer quality care.

Solution to the Problem

To address the challenges of affordable healthcare access in Bangladesh, we propose the development and implementation of a dedicated web-based application called "**Health Connect Bangladesh.**" This innovative

solution aims to enhance healthcare accessibility, particularly for underserved populations, by providing a comprehensive platform for patients, healthcare providers, and community health resources.

Health Connect Bangladesh

Health Connect Bangladesh is designed to bridge the gap in healthcare access through its multifaceted features and user-friendly interface. By leveraging technology, the application seeks to streamline healthcare delivery, reduce costs, and promote health literacy among users.

Key Features:

- **Telemedicine Services:** Users can access virtual consultations with licensed healthcare professionals, eliminating the need for long-distance travel and reducing associated costs. This feature is crucial for rural populations who face barriers to accessing in-person healthcare.
- **Appointment Scheduling:** The app allows users to book appointments with healthcare providers at their convenience, providing reminders to reduce no-show rates and improve patient engagement.
- **Health Education and Resources:** The application offers a repository of educational materials, including articles, videos, and infographics about common health issues, preventive care, and healthy living. This feature aims to increase health literacy and empower users to make informed decisions.
- **Medication Reminders and E-Prescriptions:** Users can receive reminders for medication intake and easily access their prescriptions electronically, ensuring adherence to treatment plans.
- **Community Health Initiatives:** Health Connect incorporates community engagement tools, such as health challenges and reward programs, to incentivize participation in preventive health activities (e.g., vaccination drives, health screenings).
- **Insurance Information and Cost Transparency:** The app provides users with information about available health insurance plans and services covered, along with cost estimates, to facilitate informed choices about care options.

Objectives:

The primary objective of **Health Connect Bangladesh** is to improve healthcare accessibility and affordability while enhancing health outcomes in the community. By facilitating efficient communication between patients and providers, the application aims to reduce the barriers to accessing care and ensure that individuals receive timely medical attention.

Local Relevance:

While several global healthcare solutions exist, **Health Connect Bangladesh** is tailored specifically to the socio-economic context and healthcare challenges faced in Bangladesh. By focusing on the unique needs of the population, the application is positioned to effectively promote affordable healthcare access and enhance public health. The feasibility of this solution is bolstered by the increasing adoption of mobile technology and internet connectivity in Bangladesh, enabling a broader reach to diverse communities.

In summary, **Health Connect Bangladesh** represents a strategic response to the pressing issue of affordable healthcare access, leveraging technology to foster a healthier and more informed society.

4. REQUIREMENT SPECIFICATION

4.1 System Features

1. User Registration

Functional Requirements:

- 1.1 The software shall provide a registration form for new users to create an account by entering their name, email, phone number, and address.
- 1.2 Upon submission, the system shall verify the uniqueness of the email and phone number to prevent duplicate accounts.
- 1.3 After successful registration, users shall receive a confirmation email or SMS containing a verification link or code.

Priority Level: High

Precondition: User has access to a valid email or phone number.

2. User Login

Functional Requirements:

- 2.1 The software shall provide a login interface for registered users to access their accounts by entering their username and password.
- 2.2 Upon submission, the system shall validate the entered username and password against the stored credentials in the database.
- 2.3 If the username and/or password are incorrect, the system shall display an error message prompting the user to re-enter the credentials.
- 2.4 After three consecutive failed login attempts, the system shall generate a random verification code to be entered by the user for additional security.
- 2.5 If the number of login attempts exceeds the limit of five times, the system shall temporarily block the user account login for one hour.

Priority Level: High

Precondition: User has a valid username and password.

3. Telemedicine Meet

Functional Requirements:

2.1 The software shall include a feature allowing registered users to book virtual consultations by specifying the type of medical service (e.g., general consultation, specialist consultation) and their preferred date and time.

2.2 Users shall have the option to choose between two modes of consultation:

2.2.1 "Scheduled Consultation": Users can book a virtual consultation for a specific future date and time.

2.2.2 "Immediate Consultation": Users can request an on-demand virtual consultation with the next available doctor.

2.3 Upon submission of the request, the system shall:

2.3.1 For "Scheduled Consultation":

Display available time slots for the selected date and the corresponding available doctors.

Provide confirmation of the booking with details of the appointment time and the assigned doctor.

2.3.2 For "Immediate Consultation":

Assign the next available doctor for an immediate virtual session based on the user's preference or service type.

Generate a confirmation notification via email or SMS with details of the upcoming consultation, including the doctor's name and estimated start time.

2.4 Users shall receive confirmation notifications via email or SMS with details of the consultation, including the doctor's name, consultation mode, and scheduled time for both "Scheduled" and "Immediate" consultations.

Priority Level: High

Precondition: User is logged into the system and has a registered account.

4. Feedback Feature

Functional Requirements:

4.1 The software shall include a feedback feature allowing logged-in users to provide their opinions and suggestions about the website.

4.2 Users shall be presented with a feedback form or interface where they can enter their comments, suggestions, or concerns.

4.3 The system shall capture and store user feedback securely for further analysis and improvement.

4.4 Users shall have the option to submit feedback anonymously.

4.5 The software shall notify administrators or designated personnel about new feedback submissions for timely review and response.

Priority Level: Medium

Precondition: User is logged into the system to access the feedback feature on the website.

5. User Logout

Functional Requirements:

- 5.1 The software shall include a logout functionality allowing users to securely log out of their accounts.
- 5.2 Upon clicking the logout button, the system shall clear the user's session and invalidate the authentication token.
- 5.3 After successful logout, the system shall redirect the user to the login page or display a confirmation message.
- 5.4 Users shall not be able to access any restricted pages or functionalities after logout until they log in again.

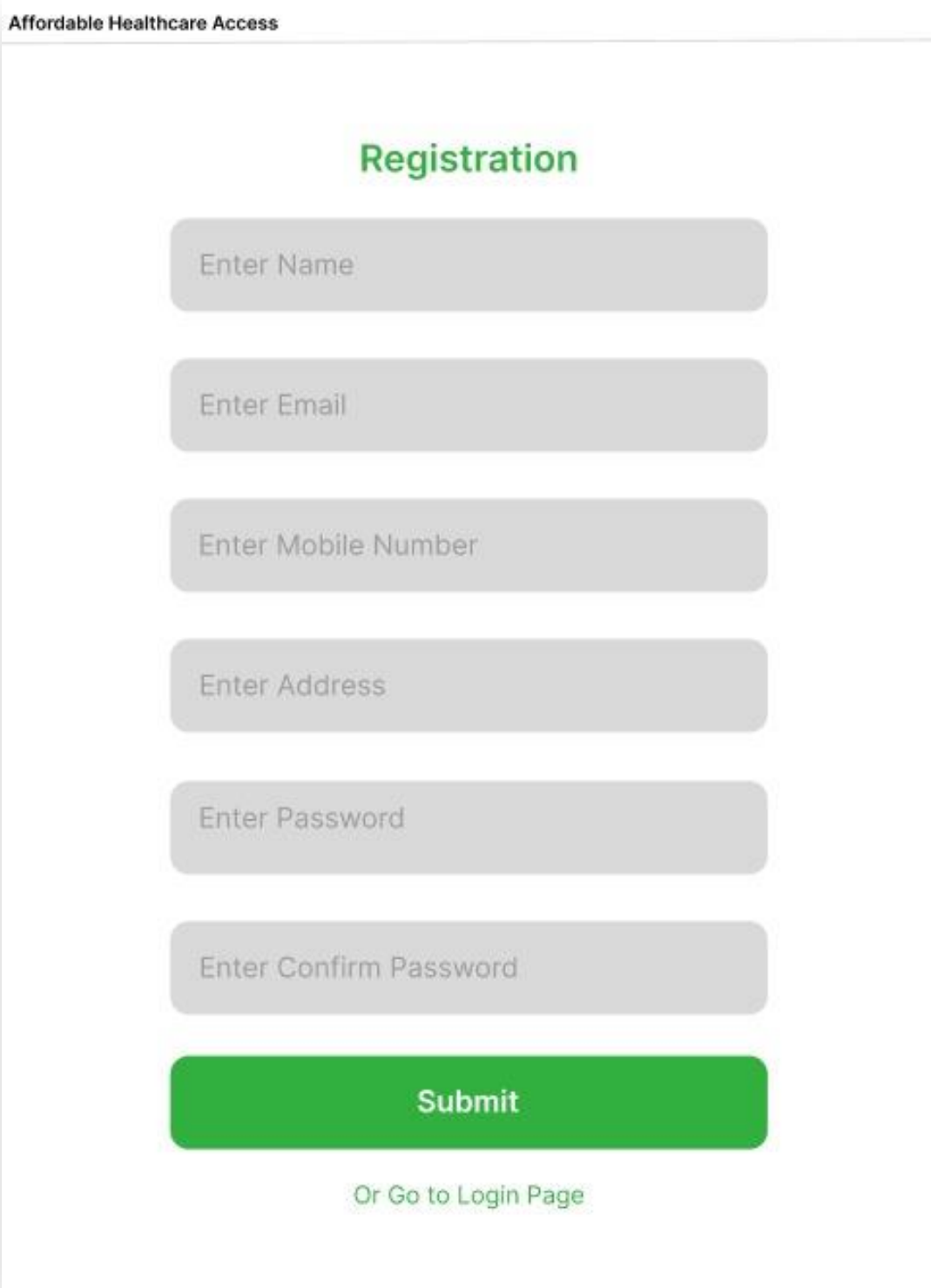
Priority Level: Medium

Precondition: User is logged into the system.

4.2 System Quality Attributes

- Usability: Users should be able to navigate the website easily and access features such as telemedicine meet without confusion or difficulty.
- Performance: The website should load quickly and respond promptly to user interactions, ensuring a smooth and efficient user experience.
- Reliability: The system should be reliable and available for users to always access without unexpected downtime or interruptions.
- Security: User data and transactions should be protected with robust security measures to prevent unauthorized access or data breaches.
- Scalability: The system should be able to handle increasing user traffic and data volume as the user base grows without compromising performance or reliability.
- Maintainability: The website should be designed with clean and modular code, making it easy for developers to maintain and update in the future.
- Accessibility: The website should be accessible to users with disabilities, complying with accessibility standards to ensure equal access for all users.

4.3 System Interface



Affordable Healthcare Access

Registration

Enter Name

Enter Email

Enter Mobile Number

Enter Address

Enter Password

Enter Confirm Password

Submit

[Or Go to Login Page](#)

The image shows a registration form titled 'Affordable Healthcare Access' with a green 'Registration' header. It contains six input fields for Name, Email, Mobile Number, Address, Password, and Confirm Password, followed by a green 'Submit' button and a link to the login page.

Fig: before login user must be registered in the system using this registration form

Affordable Healthcare Access

Login Page

Enter Email

Enter Password

[Forgot Password?](#)

Log In

[Or create a account](#)

Fig: User must login by the system for accessing all the facilities of the system

Affordable Healthcare Access

[Home](#) [Service](#) [About us](#) [Feedback](#) [Log out](#)

Appointment Booking


Choose your disease type


[Kidney Problem](#) [Heart Problem](#)


Find a Healthcare

Enter location... **Search**

Nearby Healthcare

 **Sasthosheba healthcare**

 **Evercare healthcare**

 **PG healthcare**

[Back](#) [Next](#)

Fig: user can search healthcare and book appointment by the system



System provides a doctor list of those healthcare to see your disease information.

Choose your doctor...



Name: Roman
Specialist: Neuro medicine
Contact Number: 01956600001
Available: 6:00-9:00 pm



Name: Cena
Specialist: Neuro medicine
Contact Number: 01956600002
Available: 6:00-9:00 pm

Fig: Patient can see all doctor list with available time and contact number to those healthcare

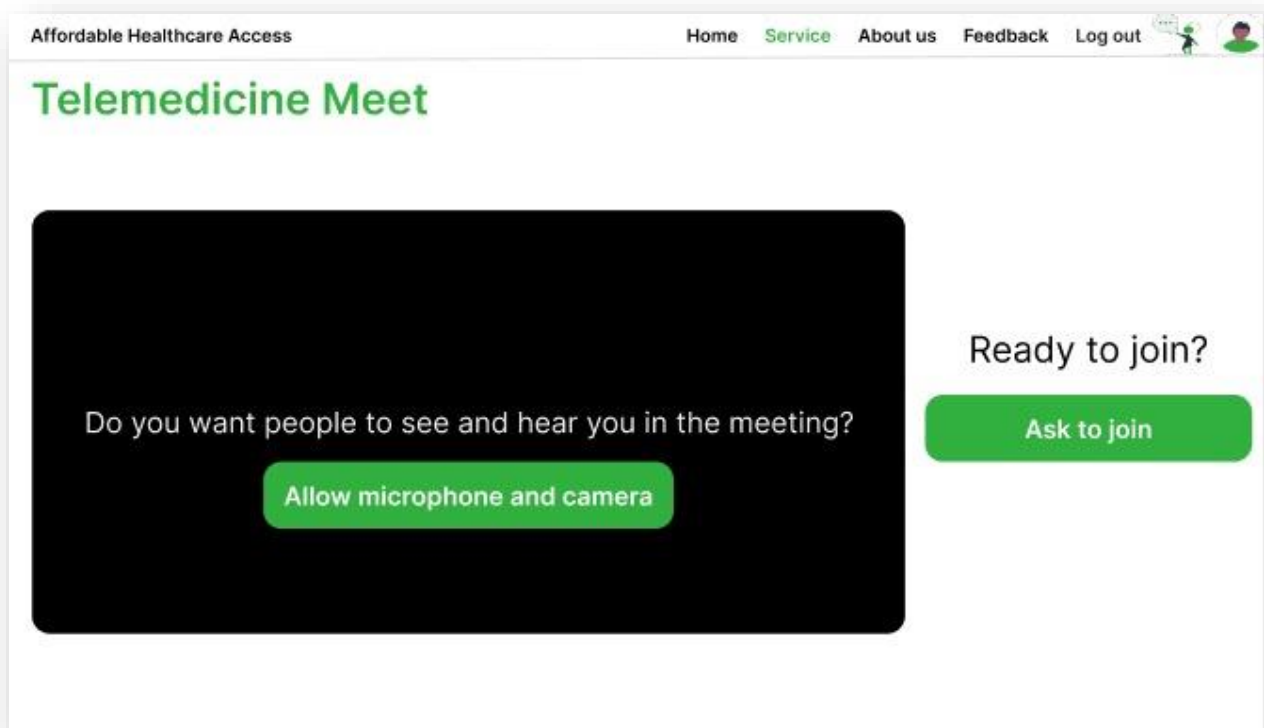


Fig: patient and doctor can virtually meet with each other by the system with the fixed schedule

Affordable Healthcare Access

Home
Service
About us
Feedback
Log out

Feedback

Hello!!! I hope you are well. We need to our feedback because We're always looking for ways to improve. Please give some your feedback about our service.

Write your feedback here.....

Submit

Fig: both users can send feedback with their experiences

4.4 Project Requirements

Some of those constraints in our context of project are-

Time The project must be completed within the specified timeframe to align with stakeholder expectations and fulfill market demands.

Budget: It is crucial to remain within the designated budget for development, testing, marketing, and operational costs. Efficient cost management is necessary to prevent exceeding financial limits.

Resources: The project requires adequate human resources, including developers, testers, designers, and project managers. Ensuring that there are sufficient personnel with the right skill sets for each phase of the project is essential.

Budget Estimation:

Budget Category	Estimated Cost (TAKA)
Developer Salaries (4*30,000)	360,000 for 3 months
Software Tools and Licenses	10,000
Server and hosting	20,000 and ongoing
Tester (2*30000)	180,000 for 3 months
Testing Tools and Software	10,000
Advertising Cost	20,000
Administrative Expense	50,000

Contingency Budget	20,000
Miscellaneous Expense	10,000
Total Cost	680,000 Taka

Time Estimation:

Time phase	Estimated Time (Days)
Gathering information	10
Feasibility study	5
Design	8
Development	35
Testing	30
Other Assessment	2
	90 days

5. FEATURES NOT TO BE TESTED

The following areas will not be directly tackled in the project. Any testing related to these areas will be indirect, relying on the outcomes of other testing efforts:

- **External Health Applications and Tools:** This includes third-party health applications or tools that are not integral to the core functionalities of the Health Bangladesh platform, such as fitness tracking apps or general health assessment tools. The testing of these applications will fall under the responsibility of their respective developers or maintainers. However, relevant data format specifications will be provided to facilitate data extraction for integration purposes. Testing will occur indirectly by validating the integration of data and ensuring compatibility with the Health Connect platform.

This approach ensures that while these external tools may not be tested directly, their integration will still be considered during the validation process to enhance the overall functionality of the healthcare access solution.

6. TESTING APPROACH

6.1 Testing Levels

For the "Affordable Healthcare Access" project, the testing will involve the following levels:

1. Unit Testing:

- Unit testing will be conducted by individual developers and approved by the development team leader.
- Developers must provide proof of unit testing, including a test case list, sample output, data printouts, and defect information to the team leader.
- All unit test information will be provided to the test manager for reference.

2. System/Integration Testing:

- System and integration testing will be carried out by the test manager and development team leader, with assistance from individual developers as needed.
- No specific test tools are allocated for this project.
- Programs will enter system/integration testing after critical defects have been rectified. A program may have up to two major defects, provided they do not obstruct testing and have workarounds available.

3. Acceptance Testing:

- Acceptance testing will involve actual end users, supported by the test manager and development team leader.
- The acceptance test will run concurrently with the existing manual process for a month following the completion of the system/integration testing phase.
- Due to budget constraints and project timelines, most testing tasks will be managed by the test manager, with active participation from the development teams. This approach ensures comprehensive testing coverage while optimizing available resources.

6.2 Test Tools

For the " Affordable Healthcare Access" project, the test tools will primarily revolve around Selenium WebDriver due to its suitability for web application testing:

1. Version Control Management:

- While Selenium WebDriver is primarily used for web application testing, version control management will be handled separately. The team will utilize a dedicated version control system such as Git or SVN to manage source code versions, track changes, and facilitate collaboration among team members.

2. Screen Prototyping:

- The initial prototypes for new screens will still be developed using appropriate tools like AS/400 Screen Design Aid (SDA) or other UI design tools. However, Selenium WebDriver will play a crucial role in testing the functionality and behavior of these screens within the web application environment. It will ensure that the screens function correctly according to specifications and user requirements.

6.3 Meetings

The testing team for the " Affordable Healthcare Access" project will convene weekly to assess ongoing progress, pinpoint emerging error patterns, and address any identified issues promptly. Additionally, every two weeks, the test team leader will hold discussions with the development team and project manager. These meetings will be scheduled for alternate weeks to ensure comprehensive coverage. As necessary, ad-hoc meetings may be arranged to address urgent matters or unforeseen challenges.

7. TEST CASES/TEST ITEMS

1. Login

Project Name: Affordable Healthcare System		Test Designed by: MD Tanvir Islam		
Test Case ID: FR_1		Test Designed date: 20 Sep 2024		
Test Priority (Low, Medium, High): High		Test Executed by: Tazdik Hosssain		
Module Name: Login Session		Test Execution date: 21 Sep 2024		
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: tanvir Password: 12345#	User should login into the application	Request successfully sent	Pass
Post Condition: User is validated with database and successfully login to account. The account session details are logged in the database.				

2. Search

Project Name: Affordable Healthcare System			Test Designed by: MD Tanvir Isalm	
Test Case ID: FR_2			Test Designed date: 20 Sep 2024	
Test Priority (Low, Medium, High): High			Test Executed by: Tazdik Hossain	
Module Name: search request			Test Execution date: 21 Sep 2024	
Test Title: verifying the Search request				
Description: Testing the search request functionality				
Precondition (If any): User must have been logged in				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Go to the website 2. Click search request 3. Select mode 4. Enter required field 5. Click Request	Search type: cmh	User should be able to request for saerch	As expected,	Pass
Post Condition: Upon submission ensuring acknowledgment of the Search request.				

3. Schedule

Project Name: Affordable healthcare system		Test Designed by: Aminur Rahman Asif		
Test Case ID: FR_3		Test Designed date: 22 Sep 2024		
Test Priority (Low, Medium, High): High		Test Executed by: MD. Tanvir Islam		
Module Name: Schedule		Test Execution date: 23 Sep 2024		
Test Title: Verifying the Schedule functionality				
Description: Verify that users can securely Schedule				
Precondition (If any): User must have been logged in				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Navigate to the “service” section 2. Enter Schedule time 3. Click Confirm button	Schedule time: 9:00pm Confirm: confirmed	User should be able to schedule	As expected,	Pass
Post Condition: Receive a Schedule by email				

4. Feedback

Project Name: Affordable Healthcare system		Test Designed by: Aminur Rahman Asif		
Test Case ID: FR_5		Test Designed date: 22 Sep 2024		
Test Priority (Low, Medium, High): Medium		Test Executed by: MD. Tanvir Islam		
Module Name: Feedback module		Test Execution date: 23 Sep 2024		
Test Title: Verifying the Healthcare service				
Description: Test to verify that logged in user can submit feedback				
Precondition (If any): User is logged into the system to access the feedback feature				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Login to system 2. Navigate to feedback 3. Enter the name field of the user 4. Enter feedback message in the field 5. Click on Submit	Name: Cena Message: This is a feedback	After submission, the user will be able to submit their feedback message	As expected,	Pass
Post Condition: Administrators or designated personnel should receive emails for new feedback submissions				

5. User registration

Project Name: Affordable Healthcare system		Test Designed by: MD. Tanvir Islam		
Test Case ID: FR_7		Test Designed date: 21 Sep 2024		
Test Priority (Low, Medium, High): High		Test Executed by: Tazdik Hossain		
Module Name: Registration module		Test Execution date: 21 Sep 2024		
Test Title: Verifying the user registration process				
Description: Test website’s registration process and initiate new account				
Precondition (If any):				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Go to website 2. Navigate to registration 3. Fill out the necessary fields message in the field 4. Click on Submit	Name: Asif Email: asif@mail.com Phone:012345678 Address: Dhaka Password:1234	After submission, with valid data the user should be able to create a new account	As expected,	Pass
Post Condition: Head to signup.				

6. Logout

Project Name: Affordable Healthcare system		Test Designed by: MD. Tanvir Islam		
Test Case ID: FR_9		Test Designed date: 21 Sep 2023		
Test Priority (Low, Medium, High): Medium		Test Executed by: Tazdik Hossain		
Module Name: Logout		Test Execution date: 21 Sep 2023		
Test Title: Verifying the logout process				
Description: Test website’s logout process				
Precondition (If any): User is logged into the system				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
5. Click on Logout		User should be logged out from the account	As expected,	Pass
Post Condition: Head to sign in page				

8. ITEM PASS/FAIL CRITERIA

All core functionalities outlined in the individual test cases must operate smoothly without critical defects. An end user should be able to navigate through features such as login, waste collection request, donation, feedback submission, and access to waste sorting guidelines seamlessly, with the ability to complete tasks without encountering errors. The success criteria involve ensuring that 95% of all test cases pass, and any failed cases should not hinder the end user's ability to use the application effectively. Additionally, users should be able to initiate actions such as waste collection requests and donations without encountering any issues, and processes like refund initiation should be error-free. Fail criteria include encountering critical defects in core functionalities, any impediment to the end user's ability to complete tasks or encountering errors during essential processes like fund initiation.

9. TEST DELIVERABLES

Test deliverables are the tangible outputs generated during the testing process, such as test plans, reports, documentation which provide a comprehensive overview of testing activities, results, and findings to stakeholders.

- **Test Cases:** Detailed descriptions of individual test scenarios, including test titles, descriptions, steps, expected results, and test data.
- **Test Data:** Data sets used for testing various functionalities, including valid and invalid inputs, boundary cases, and edge scenarios.
- **Test Reports:** Documentation of test execution results, including pass/fail status, issues encountered, and overall assessment of system quality.
- **Defect Reports:** Reports detailing any defects or issues identified during testing, including steps to reproduce, severity, and priority.
- **Acceptance Test Plan:** A document outlining the approach, scope, and criteria for acceptance testing, including test scenarios and acceptance criteria agreed upon by stakeholders.
- **System/Integration Test Plan:** A comprehensive plan detailing the testing approach, objectives, scope, resources, and schedule for system and integration testing activities.
- **Unit Test Plans/Turnover Documentation:** Documentation detailing unit test plans for individual components/modules, along with turnover documentation for handing over tested units to the integration testing team.

10. STAFFING AND TRAINING NEEDS

For the " Affordable Healthcare Access" project, staffing and training needs are as follows:

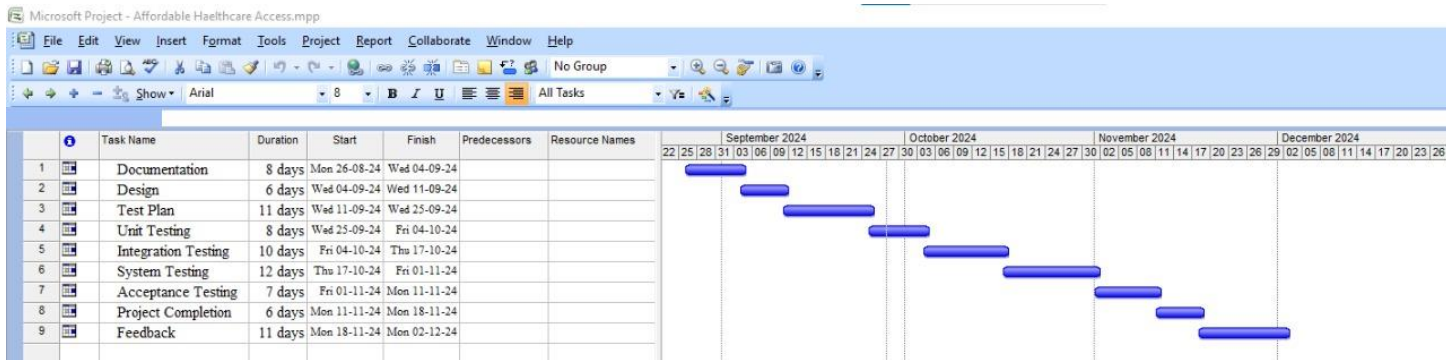
- **Testing Personnel:** It is crucial to designate at least one full-time tester for the system/integration and acceptance testing phases. Initially, a part-time tester will be engaged in the review processes, with the possibility of transitioning to a full-time role approximately four months into the project, if required. If a dedicated tester cannot be allocated, the project manager or test manager will assume this responsibility.
- **Training on EDI Interface:** Both developers and testers will need to participate in training sessions focused on the fundamental operations of the Electronic Data Interchange (EDI) interface. This training is essential to ensure that the team is proficient in managing EDI-related tasks and processes. Additionally, operations staff will receive thorough training on the EDI communications workflow to ensure seamless operations and effective collaboration.
- **Training for Sales Administration Staff:** Sales administration personnel will need training on the new screens and reports implemented as part of the project. This training will help them become familiar with the functionalities and usage of these new features, enabling them to effectively leverage the system for sales-related activities and reporting tasks.

By addressing these staffing and training needs, the " Affordable Healthcare Access " project can ensure that team members are equipped with the necessary skills and knowledge to contribute effectively to project success.

11. RESPONSIBILITIES

	TM	PM	Dev Team	Test Team	Client
Test cases documentation	X	X	X	X	
Test Procedures and rules	X		X	X	
Unit test documentation & execution			X	X	
Integration test Documentation & Execution	X		X	X	
System test Documentation & Execution		X		X	
System Design Reviews	X	X	X	X	X
Details Design Reviews	X	X	X	X	
Screen & Report prototype reviews	X	X		X	X
Change Control and regression testing	X	X	X	X	X
Acceptance test Documentation & Execution	X	X		X	X

12. TESTING SCHEDULE



13. PLANNING RISKS AND CONTINGENCIES

Risk	Contingency Plan
Limited Staff Availability	If there are staffing shortages, project timelines for reviews and testing will be adjusted accordingly.
Technical Challenges	In case of technical difficulties, the development team will allocate additional resources and time.
Insufficient User Adoption	To address low user adoption, targeted marketing campaigns and user training sessions will be conducted.
Data Security Breach	In the event of a data breach, immediate action will be taken to mitigate the breach and enhance security measures.
Supplier Delays	If suppliers experience delays, alternate suppliers will be sourced, and project timelines will be adjusted accordingly.

14. APPROVALS

Name	Role	Signature
AIUB	Project Sponsor	
Tazdik Hossain	Reassigned Sales	
Tazdik Hossain	EDI Project Manager	
MD. Aminur Rahman Asif	RS Test Manager	
MD. Aminur Rahman Asif	RS Development Team Manager	
MD. Tanvir Islam	Development Management	
MD. Tanvir Islam	Order Entry EDI Team Manager	