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

Software Quality Assurance and Testing

Virtual Interior Design Studio

A Report submitted
By

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Under the supervision of

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Associate Professor

Software Test Plan

for

<Virtual Interior Design Studio >

Version 1.0 approved

Prepared by <Rifat, Riya, Sharia, Tasnova>

< American International University-Bangladesh>

<26-04-2023>

Checked By Industry Personnel

Name: Wasif Zaman

Designation: Sr. SQA Engineer

Company: Riseup Labs

Sign:

Date:

Table of Contents

Revision History

Revision	Date	Updated by	Update Comments
0.1	2023-04-18	Hossen, Md. Rifat	First Draft
0.2	2023-04-20	Riya Basak Risha	Second Draft
0.3	2023-04-22	Sharia Arfin Tanim	Third Draft
0.4	2023-04-24	Tasnova Ahmed Apon	Fourth Draft
0.5	2023-04-26	Riya Basak Risha	Fifth Draft
0.6	2023-04-28	Sharia Arfin Tanim	Sixth Draft
0.7	2022.05.01	Hossen, Md. Rifat	Final

1. TEST PLAN IDENTIFIER: RS-MTP01.3

2. REFERENCES

1) Hui, J. (2015, August). Approach to the interior design using augmented reality technology. In *2015 Sixth International Conference on Intelligent Systems Design and Engineering Applications (ISDEA)* (pp. 163-166). IEEE.
2) Sandu, M., & Scarlat, I. S. (2018). Augmented Reality Uses in Interior Design. *Informatica Economica*, *22*(3).

3. INTRODUCTION

Background to the Problem

The world is evolving at an unprecedented pace, and so is the way we live our lives. In recent times, we have seen a shift towards virtual solutions, and one of the areas where this shift is especially noticeable is interior design. Traditionally, interior design services require in-person consultations and visits to the client's space, which can be time-consuming and costly. Additionally, many clients struggle to visualize the final product and may have difficulty communicating their vision to the designer. To solve these problems, a Virtual Interior Design Studio is being developed to provide clients with a more streamlined and convenient interior design experience.

At Virtual Interior Design Studio, we understand the challenges that people face when trying to get their interiors designed. We believe that everyone should have access to affordable and high-quality interior design services, regardless of their location. Our platform aims to make the process of interior design easier and more convenient for everyone.

Solution to the Problem

Despite being a common issue faced by many individuals in their daily lives, no reliable and efficient solution has been found to address this problem. Our proposed solution is to combine augmented reality (AR) and virtual reality (VR) technologies with a mobile app to solve this issue. This will allow clients to interact with realistic computer-generated 3D models of interior design elements and furniture, providing a more accurate and immersive representation of the final product. AR and VR technology can be a game changer in the interior design industry. This can make the interior design process more efficient, cost-effective, and enjoyable for clients. Additionally, AR and VR can also be used by interior designers to showcase their work and attract more clients. Overall, the combination of AR and VR can revolutionize the interior design industry and provide a

better experience for both clients and designers. By utilizing AR and VR, clients can experience designs in real-time and visualize changes in design elements in a way that traditional 2D presentations or sketch cannot provide. The target market for the system will be home owners, office owners, hotel owners, any types of occasions or events ceremonies organizer, renters, and small business owners looking to renovate or decorate their space.

Our application is called “Virtual Interior Design Studio” which will have 4 types of users and they are admin, customer, interior designer, e-commerce. This app will allow us to do certain operations such as:

1. Intuitive drag-and-drop interface for easy design and customization.
2. Large library of furniture, fixtures, and decor items to choose from.
3. Real-time rendering and visualization for instant feedback on designs.
4. Ability to save and share designs with others.
5. Integration with e-commerce platforms to enable purchasing of selected items directly from the platform.

4. REQUEIREMNT SPECIFICATION

4.1 System Features

Functional Requirements

1) User Registration

i) The software will allow users to register with the necessary information, including their name, email, and password.
ii) The system also allows users to register with Google, Facebook or Twitter account.
iii) The system must verify user email and phone number.

Priority Level: High

Precondition: Not applicable.

2) User Login

Users must be able to log in using their registered email and password.

i) If the email and/or password have been entered incorrectly more than five times, the user will get a verification code via email to verify their authentication.

Priority Level: High

Precondition: The user must have a valid email and password.

3) Search for Design Elements or Furniture.

i) Users will be able to search for interior design elements or furniture.

Priority Level: Medium

Precondition: User must have valid account.

4) 3D Visualization

i) Clients will be able to see a virtual representation of their space with different interior design elements and furniture to better understand the design plan and make decisions.

Priority Level: High

Precondition: User must have valid account.

5) **Product Sourcing**

i) The app will allow clients to purchase design elements and furniture directly through the app.
ii) The app will provide recommendations and suggestions based on the client's style and budget.

Priority Level: High

Precondition: User must have valid account

6) Messaging for Service Details

i) The software allows user to send message to the interior designer for any problems or query.

Priority Level: Medium

Precondition: User must have valid account.

7) Payment Gateway

i) User can payment their purchased product from the e-commerce site or interior designer for their services. Three types of payment method.
   1. Bkash/ Nagad/Rocket
   2. Banking
   3. Cash on delivery

Priority Level: High

Precondition: User must have valid account, buy product or service.

8) Tracking the delivery process

i) User can trace the final product delivery status.

Priority Level: Low

Precondition: User must have valid account, order medicine.

4.2 System Quality Attributes

1. Usability: The app must be user-friendly and intuitive, with a simple and easy-to-use interface.
2. Efficiency: The app should be able to perform its functions smoothly and without lag. Any task should be completed with optimal efficiency.
3. Security: The app must ensure the privacy and security of user data, and protect against unauthorized access and data breaches.
4. Modularity: The app's code should be modular, with separate and well-defined modules for each function.
5. Testability: The app should be easily testable and debuggable, with minimal errors and difficulty.
6. Flexibility: The app should be flexible enough to allow for customization and personalization, and adapt to changing user needs and preferences.
7. Reusability: The app's code should be reusable, with modules and libraries that can be used in other projects or versions of the app.

4.3 System Interface

Figure 1: Home page

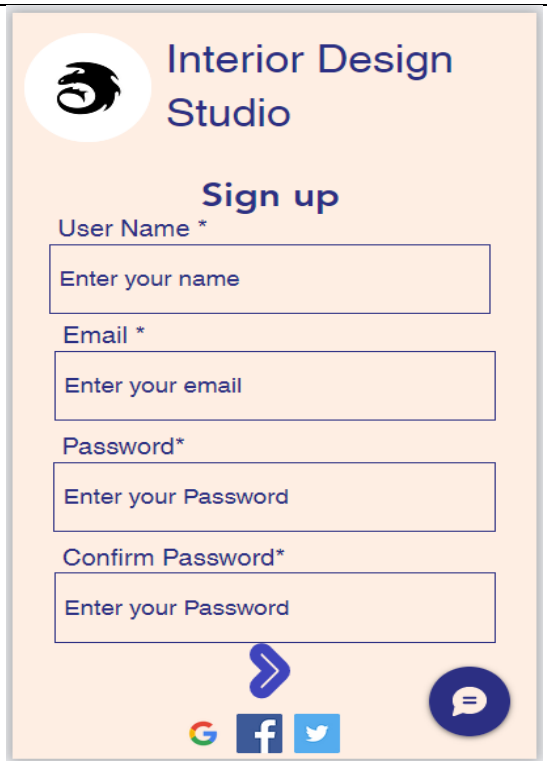

Figure 2: Registration page

Figure 3: Login page

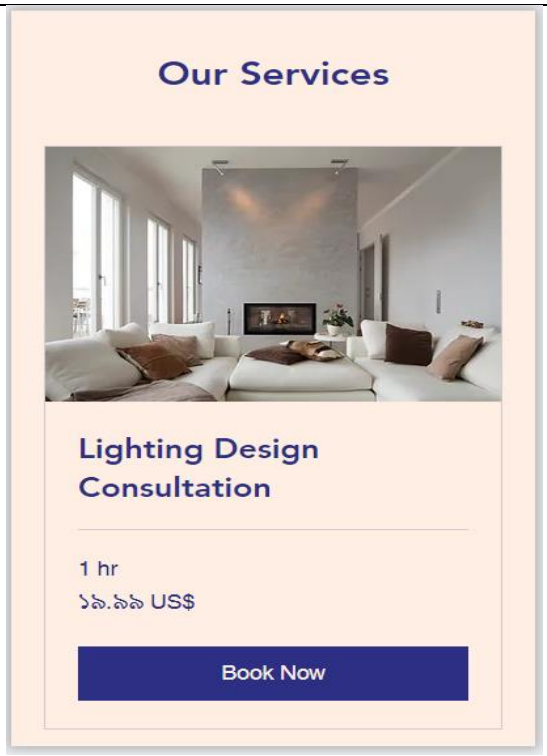

Figure 4: Service page

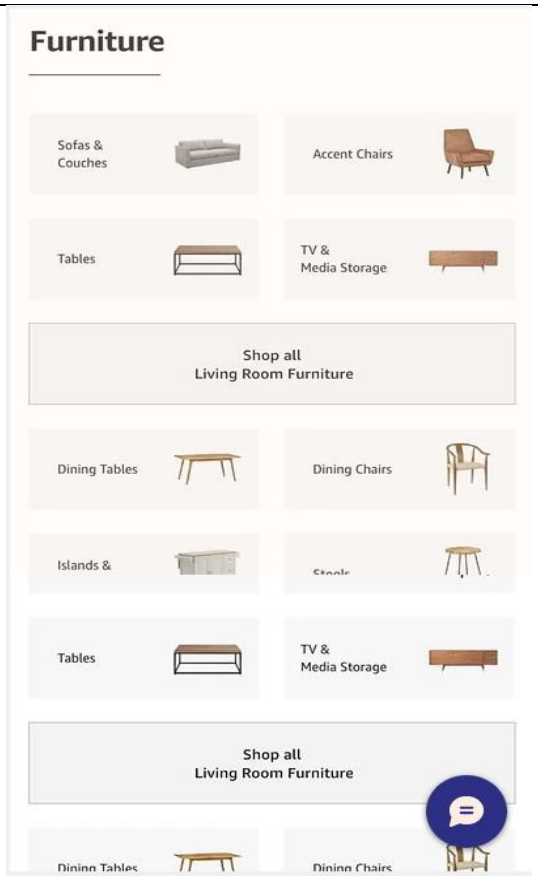

Figure 5: Furniture page

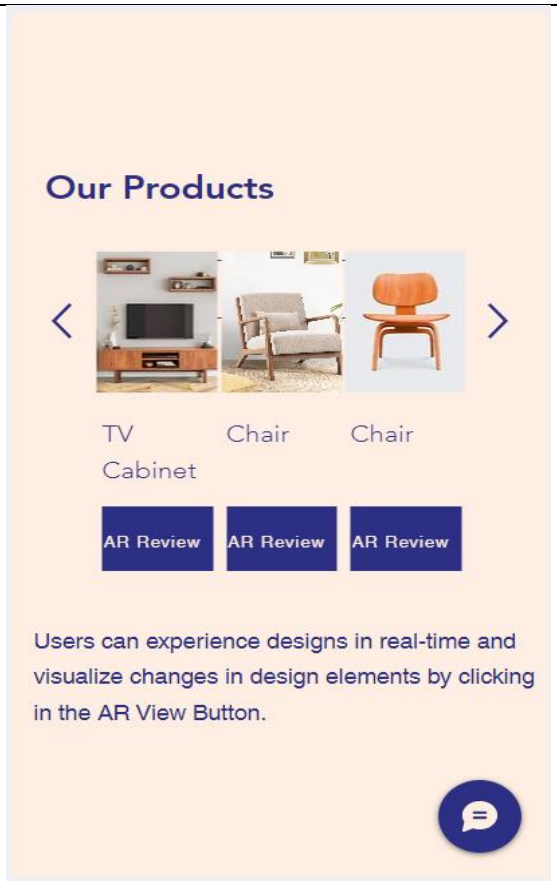

Figure 6: Product page

4.4 Project Requirements

i) The source code must be in java language.
ii) For software databases, we shall use an Oracle database server, but other databases are also acceptable.
iii) For software development, we shall use Android studio.
iv) For testing, we shall use Selenium Automation.
v) The software size is maximum 1GB.

Constructive Cost Model

Software project type: Semi-detached.
We know,
Coefficient<Effort Factor> = 3
P = 1.12 and T = 0.35
SLOC = 30000 Lines
Effort = PM = Coefficient<Effort Factor> × (SLOC / 1000) ^{P}
= 3 × (30000/1000)$^{1.12}$
= 135.36 Persons-months
Development time, DM = 2.50 × (PM)^{T}
= 2.50 × (135.36)$^{0.35}$
= 13.93 = 14 months
= 14×4×40 = 2240 Working hours in total (Per week 40 hours)
Required number of people, ST = PM/DM
= 135.36/14
= 9.67 = 10 people

Budgeting

Per developer salary per working hour = 400 Taka per hour
Developer Salary in 14 months
Total salary = 500 × 2240 × 10 = **8, 960, 000 Taka**

QA Engineer salary per working hour = 200 Taka per hour
2 QA Salary in 14 months
Total salary = 200 × 2240 × 2 = **896, 000 Taka**

Requirement analysis:
Time Needed: 1 month 25 working days = 200 working hours
Total requirement analysis expense = 250 × 200 = 5**0, 000 Taka**
Transportation cost: **15, 000 Taka** (Approximate)
Hardware expense: 50**0, 000 Taka** (Approximate)

Rent expenses:
Total in 14 months = 4**20, 000 Taka** [Per month = 30, 000 Taka]
Total utilities in 14 months: 1**40, 000** Taka (Approximate)
Maintenance (Till 3 months after delivery):
Cost per hour = 1,200 Taka
Total estimated time needed for maintenance = 60 hours
Total estimated maintenance cost = 1,200 × 60 = **72, 000 Taka**

Accountant's salary:
Per month salary = 20,000 Taka
Total salary = 20, 000 × 14 = **280, 000 Taka**

Total expense: 8, 960, 000 + 896, 000 + 50, 000 + 15, 000 + 500, 000 + 420, 000 + 140, 000 + 72, 000 + 280, 000 = **11, 333, 000 Taka**
Profit: 25% of total expense = 31,437,000 × 25% = 2**, 833, 250 Taka (**consuming**)**
Total budget: 11, 333, 000 + 2, 833, 250 = **14, 166, 250 Taka**

5. FEATURES NOT TO BE TESTED

1. Networks compatibility
2. Hardware compatibility
3. Users' registration information (Name, Address)
4. User behavior

6. TESTING APPROACH

6.1 Testing Levels

The "Virtual Interior Design Studio" project will be tested at various levels, including Unit, Integration, Functional, System, Performance, and Acceptance testing. This project team has allocated two full-time independent testing engineers for all levels of testing. To optimize the testing process, the team will prioritize careful planning, critical area focus, and test automation tools where possible. Success of the project hinges on quality testing, defect identification, and resolution during the testing phase. In case of any delay or challenges during the testing phase, the development team will be available to support the testing efforts alongside the two experienced QA engineers who are leading the testing process.

1) Unit Testing: In this testing, individual software modules or components of the Virtual Interior Design Studio will be tested to ensure they function as expected. This level of testing would be performed by the developers themselves and would focus on testing specific functions and features of the software.

2) Integration Testing: Once the individual software components have been tested and verified to function correctly, integration testing will be performed. This testing will ensure that all the software modules and components of the Virtual Interior Design Studio work together seamlessly as a single system. The testing would be performed by a dedicated testing team or by the developers themselves.

3) Functional Testing: This testing level will verify the overall functionality of the Virtual Interior Design Studio. Test cases would be created to verify that all the features and functions of the software work as expected and that all user requirements are met. This level of testing would be performed by a dedicated testing.

4) System Testing: This level verifies that the Virtual Interior Design Studio meets system requirements and specifications. It tests the system as a whole to ensure all components, modules, and functions work together as intended. The testing is done by a dedicated team or the developers themselves with support from the two experienced QA engineers. Its goal is to ensure the software meets quality standards and is ready for the next stage of testing.

5) Performance Testing: This testing level will evaluate how the Virtual Interior Design Studio performs under various loads and conditions. This testing would involve simulating high user loads and verifying that the software can handle the expected amount of traffic without crashing or slowing down.

6) Acceptance Testing: This testing level is the final stage of testing and is used to ensure that the software meets the specified requirements and is ready for deployment. This testing would involve verifying that all the bugs and issues identified during the previous testing levels have been fixed, and the software is ready for release.

6.2 Test Tools

1) The Selenium Web driver Tool will be used for automated testing. We utilize this instrument to discover errors and verify that our systems are of high quality, responsive, progressive, and consistent.

2) The development team will use Visual Studio to write, test, and debug the code. The Visual Studio will provide a suite of tools to enhance coding efficiency, such as code highlighting, debugging tools, and version control.

6.3 Meeting

Regular meetings are essential for effective collaboration and communication among the project team. The test team will hold weekly meetings to review progress, identify trends in errors, and address any issues early on. The test team leader will also meet with the development team and project manager once every two weeks to discuss any critical updates or changes in the project. These meetings will be scheduled on alternate weeks to ensure optimal coverage. Additionally, the development team will utilize GitHub for daily code reviews and version control to facilitate effective collaboration and streamline the testing process. In case of emergency situations, additional meetings may be scheduled as required.

7. Test Cases

Project Name: Virtual Interior Design Studio			Test Designed by: Riya	
Test Case ID: VD_1			Test Designed date:11.4.23	
Test Priority (Low, Medium, High): High.			Test Executed by:	
Module Name: System login session.			Test Execution date:	
Test Title: Verify the Home Page feature.			Test Executed by:	
Description: Test to view website home 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 application log in page. 2. Enter user id. 3. Enter user password 4. Click submit	User Id: riyabasak121@gmail.com Password: riya@121	User can login into the application.	As expected	Pass
Post Condition: Users have to contain a valid user id with a valid password with database to successfully login to his/her account. The account season details are logged in the database.				

Project Name: Virtual Interior Design Studio	Test Designed by: Riya
Test Case ID: VD_2	Test Designed date: 11.4.23
Test Priority (Low, Medium, High): High.	Test Executed by:
Module Name: Create New Account Session	Test Execution date:
Test Title: New user with new Id & password.	
Description: Test website Create new Id feature.	

Precondition (If any): User must have valid email id or phone number.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Open the website account login page. 2. Click Create New Account. 3. Enter Email id or Phone number. 4. Enter Confirmation Code. 5. Enter New Password. 6. Click Submit.	E-Mail: riyabasak121@gmail.com Code: 1606 New Password: riya@121	User should login into the webpage	As expected	Pass
Post Condition: User can successfully login to his/her account.				

Project Name: Virtual Interior Design Studio			Test Designed by: Riya	
Test Case ID: VD_3			Test Designed date: 11.4.23	
Test Priority (Low, Medium, High): Medium.			Test Executed by:	
Module Name: Forgot Password Session			Test Execution date:	
Test Title: Provide user with new password.				
Description: Test website forgot password feature.				
Precondition (If any): User must have valid email id or phone number.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Open the website account login page. 2. Click Forgot Password. 3. Enter Email id or Phone number. 4. Enter Confirmation Code. 5. Enter New Password. Click Submit.	E-Mail: riyabasak121@gmail.com Code: 1610 New Password: riya@123	User should login into the webpage.	As expected	Pass

Post Condition: User can successfully login to his/her account.

Project Name: Virtual Interior Design Studio			Test Designed by: Riya	
Test Case ID: VD_4			Test Designed date: 11.4.23	
Test Priority (Low, Medium, High): Medium			Test Executed by:	
Module Name: Menu			Test Execution date:	
Test Title: Provide Types of provide service.				
Description: User takes their service				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Open the website. 2. Log in. 3. Choose items. 4. Request design. 5. Request service.	User menu.	User should see service option.	As expected	Pass
Post Condition: User successfully gets to see his/her service.				

Project Name: Virtual Interior Design Studio			Test Designed by: Riya	
Test Case ID: VD_5			Test Designed date: 11.4.23	
Test Priority (Low, Medium, High): High			Test Executed by:	
Module Name: Check order.			Test Execution date:	
Test Title: Checking customers' order form.				
Description: Customers order checking feature.				
Precondition (If any): Users must have logged in.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)

1. Open the website. 2.Log in as a customer 3.Select types of order- *Delivery, *Pickup 4. Select delivery location. 5. Click customer order.	Order request	User will be able to see ordered form.	As expected	Pass
Post Condition: User can successfully see the order request notices.				

Project Name: Virtual Interior Design Studio			Test Designed by: Riya	
Test Case ID: VD_6			Test Designed date: 11.4.23	
Test Priority (Low, Medium, High): High			Test Executed by:	
Module Name: Check payment methods.			Test Execution date:	
Test Title: Checking customers payment.				
Description: Customers payment methods checking feature.				
Precondition (If any):				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Open the website 2. Log in 3. Select your order. 4. Click payment. 5. Choose online payment. 6. Select -VISA/ BKASH / ROCKET /NAGAD 7. Enter your amount 8. Select agree 9. Place order.	Payment method	User will be able to see all available payment method.	As expected	Pass
Post Condition: User can successfully see the payment notices.				

Project Name: Virtual Interior Design Studio	Test Designed by: Riya
Test Case ID: VD_7	Test Designed date: 11.4.23

Test Priority (Low, Medium, High): High			Test Executed by:	
Module Name: Chatting system			Test Execution date:	
Test Title: Checking Chatting option				
Description: Customers message to the serviceman feature.				
Precondition (If any): Users must have logged in.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Open the website. 2.Log in 3. Select your menu. 4. After selecting an option For more details contact with service man with chat bot.	Chatting	User will be able to see chat icon to communication with serviceman	As expected	Pass
Post Condition: User can successfully interact with chat bot.				

Project Name: Virtual Interior Design Studio			Test Designed by: Riya	
Test Case ID: VD_8			Test Designed date: 11.4.23	
Test Priority (Low, Medium, High): Medium.			Test Executed by:	
Module Name: Request for design			Test Execution date:	
Test Title: Checking design request				
Description: Test website design request				
Precondition (If any): Users must have logged in.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Open the website account login page. 2. Click Menu Button 3. Menu to request for design.	Order Design	User will be able to order any design.	As expected	Pass
Post Condition: User can successfully get the design.				

8. ITEM PASS/FAIL CRITERIA

Before moving to the next phase of testing, certain conditions must be met at each step of the testing process. These conditions determine whether the testing has passed or failed. These conditions are explained below.

1) If the design is difficult to use or understand, it will be considered a failure.
2) A test will be considered as a failure if an item is tested ten times and works correctly only nine times, but fails once.
3) If the system is vulnerable to hacking, data breaches, or unauthorized access, it will be deemed a failure.
4) If the system takes too long to respond, displays errors frequently, or crashes under heavy load, it will be considered a failure.
5) If the system is not compatible with certain browsers, devices, or operating systems as stated in the requirements, it will be deemed a failure.
6) If the system does not meet accessibility standards and cannot be used by people with disabilities, it will be considered a failure.
7) If the system fails to perform a specific function or task as required in the scenario, it will be considered a failure.
8) If the system cannot handle a large volume of users or data, it will be deemed a failure.
9) If above mention all the test is successful then it will be deemed a pass.

9. TEST DELIVERABLES

1) Test case
2) Test documentation
3) Test summary report
4) Test plan
5) Test data
6) Defect or Bug report summaries
7) Test logs reports

10. STAFFING AND TRAINING NEEDS

To properly carry out system, integration, and acceptance testing, it is recommended to have at least two full-time testers. Most employees are willing to take on challenging tasks. The following are job descriptions for the roles involved in the testing process:

1) Project Manager: Responsible for overseeing the project as a whole, including drafting requirements and managing the testing process. Training in these areas is necessary for project managers.
2) Test Manager: Responsible for developing effective testing strategies, evaluating testing outcomes, managing testing cycles, and making recommendations for completing the testing process. Test managers must have the qualifications to evaluate testing designs to professional standards.

3) QA Engineer: Responsible for designing tests, creating testing methods, generating test data, carrying out tests, creating automated testing strategies, and providing measurement information to the test administrator. Test engineers should be proficient in planning and executing automated test cases.

4) Developer: Responsible for writing code and creating software applications based on technical specifications. Developers require training in programming languages, software development methodologies, and techniques for debugging.

11. RESPONSIBILITIES

Role/ Responsibility	TM	PM	Developer	QA Team
Requirements Gathering		X	X	
Concept Design Reviews		X		
Detailed Design Reviews		X		
Development			X	
Unit Test documentation & execution	X		X	
Integration test documentation & execution	X			X
System Test documentation & execution	X			X
Acceptance test documentation & execution	X			X
Test procedures and rules	X	X		X

Screen & Report prototype reviews			X	
Change Control and regression testing	X	X	X	X

12. TESTING SCHEDULE

Task	**Month 1-2**	**Month 3-5**	**Month 6-8**	**Month 9-11**	**Month 12-14**
Plan and research AR/VR technologies and mobile app features					
Develop and design mobile app core functionality and UI					
Create 3D models of interior design elements and furniture					
Integrate AR/VR technology with the mobile app					
Test and debug the application					
Develop user guides and tutorials for the application					
Release the application on relevant app stores					
Gather user feedback and make necessary improvements					

13. PLANNING RISKS AND CONTINGENCIES

1) User adoption: Even if the software is technically sound, there is always a risk that users will not adopt it as intended. This can be due to a variety of factors, such as poor user experience, lack of training, or insufficient marketing and outreach.

2) Illness or Injury: If employees become ill or injured, the organization may experience disruptions to their operations and a decrease in productivity. To mitigate this risk, the organization could have policies and procedures in place to provide employees with paid sick leave and accommodations to support their recovery. Cross-training employees on critical functions could also help to ensure that operations can continue if key personnel are unable to work. Additionally, implementing health and safety protocols, such as regular cleaning and providing personal protective equipment, can help to prevent the spread of illnesses within the workplace.

3) Employee Turnover: To mitigate the risk of losing key personnel, a contingency plan could involve creating a succession plan and cross-training employees to ensure that critical knowledge is retained even if an employee leaves the company. Additionally, the company could implement policies and benefits to attract and retain top talent, such as competitive compensation and benefits packages.

14. APROVALS

Project Sponser – Sharia Arfin Tanim	Approved
Development Management- Md. Rifat Hossen	Approved
EDI Project Manager- Riya Basak Risha	Approved
RS Test Manager- Sharia Arfin Tanim	Approved
RS Development Team Manager- Md. Rifat Hossen	Approved
Reassigned Sales- Riya Basak Risha	Approved
Order Entry EDI Team Manager- Tasnova Ahmed Apon	Approved