

Carry1ST QA Assessment

Name: Stephen Temitope Adebajji

Email: stevooolalah@gmail.com

Question 1

You are required to perform an exploratory test on the Web app and the Android App of a Data collection system.

1. Question: A test plan and a test case for the following futures

- a. Signup
- b. Login
- c. Search
- d. Add to cart

Answers

Test Plan

1. Introduction

The purpose of this test plan is to outline the approach and strategy for conducting an exploratory test on both the web app and Android app of a data collection system. The primary objective is to verify the functionality of key features and identify any defects, usability issues, or areas for improvement. This test will ensure that the applications provide a seamless and efficient user experience.

2. Objective:

The objective of this exploratory test is to verify the functionality and identify any defects or usability issues in the data collection system's web and Android apps, ensuring they work as expected and provide a seamless user experience. Also providing recommendations to improving the user's experience.

3. Scope

This test will focus on the following features:

- Signup: Validate that new users can create accounts successfully.
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- Search: Verify that the search feature returns accurate and relevant results.
- Add to Cart: Confirm that users can add items to their cart without issues

4. Test Strategy

Testing Types

The following types of testing will be carried out on the web and mobile version of this app

- Functional Testing
- Usability Testing
- Exploratory Testing

Testing Levels

- System Testing
- Regression Testing

Test Approach

1. Exploratory Testing: Unscripted sessions to discover defects and usability issues.
2. Test Case Design: Develop detailed test cases covering positive, negative, and edge scenarios.

5. Test Tools/Environment

The test will be carried out on

- a PC (Chrome Web browser-For web app test) and
- An Android phone.

6. Test Resources

- **Human Resources:** A single QA Tester is needed for this test
- **Tools and Infrastructure:**
Hardware:
 1. **Servers:** For hosting test environments and tools.
 2. **Test Devices:** Variety of devices (desktops, laptops, mobile devices, tablets) for cross-platform testing.

Software:

1. **Operating Systems:** Windows, macOS, Linux for web testing; various Android versions for mobile testing.
2. **Browsers:** Chrome for web testing.
3. **Databases:** SQL Server, MySQL, Oracle, and others for database testing.

7. Test Deliverables

The following will be delivered:

- Test cases
- Test results report
- Bug reports
- Suggestions for improvements

8. Entry and Exit Criteria

Entry Criteria:

- The test environment for both the web app and Android app is fully configured and ready.
- All necessary hardware (e.g., testing devices) and software (e.g., required browsers, Android versions) are available and functioning.
- A comprehensive test plan has been developed, reviewed, and approved.
- Detailed test cases for signup, login, search, and add to cart functionalities have been created and reviewed.
- Any necessary test data required for the execution of test cases is prepared and available.
- All relevant project documentation, including requirements and user stories, is available for reference.

Exit Criteria:

- All planned test cases for signup, login, search, and add to cart functionalities have been executed.
- Exploratory testing sessions have been conducted thoroughly for these features.
- All critical and major defects identified during testing have been logged, tracked, and resolved.
- Defects are retested to ensure they have been fixed correctly.

- Adequate test coverage has been achieved, ensuring all critical paths and edge cases for the targeted functionalities have been tested.
- A comprehensive test summary report has been prepared, detailing the test execution results, defects found, and recommendations for improvements.
- The final test summary report, including defect status and testing outcomes, has been reviewed and approved by all key stakeholders.
- Confirmation from stakeholders that the application meets the required quality standards and is ready for the next phase (e.g., further testing, deployment).

9. Test Cases

Test ID	Description	Pre Conditions	Testing Steps	Expected Result	Test Result	Duration	Comments
1.	Verify that users can Sign up successfully.	User has launched the application on the web on their PC or their mobile Android phones.	1.Launch the application's URL on the browser 2. Click on my account 3. Click on Register 4. Click on continue on the New Customer registration modal 5. Verify that the users can fill the displayed form 6. Check that the product's privacy policy link is clickable and the company's policy is displayed . 7.Click on the check the checkbox beside it to proceed 8. Click on continue to proceed	1. The Application's landing page should be displayed 2. The dropdown shows the "Login" option and the "register option" 3. The page shows two modals. One for new customers and the other for returning customers. 4. A bio-data form to filled Is displayed 5. Users can fill the displayed form; the email field only accept an email and not plain text, the phone number field only accept numbers, all other input fields should retain user inputs. 6. The company's privacy and policies are displayed and the check box is checked. 7. Checkbox retains the user option 8. A successful message that says "Your account has been created" is displayed on the	PASS PASS PASS PASS PASS FAIL PASS PASS	5minutes	

				screen and you get an email that speaks to the signup.			
2	Users should be able to login	The User must have signed up on the Application	1. Click on my account 2. Click on Login 3. Verify that on the returning customer modal, users are able to enter a valid email 4. Verify that users are able to enter a valid password 5. Click on Login	1. The dropdown shows the "Login" option and the "register option" 2. The application shows two modals, one for the returning customer and one for new customers. 3. Users are able to enter a valid email and field retains the input and does not throw any error 2 4. Users are able to enter a password and the password field retains the text and masks it. 5. The button leads the user to the dashboard	PASS PASS PASS PASS PASS	2minutes	
3	Users should be able to Search on the system	1. The user must have launched the application on their phones or web app and also login	1. Verify that the users can click on the 'Search for product' on the top of the screen and type the name of an item 2. Verify that users can click on the search icon and the product type is searched 3. Check that users can Click on the desired item from the dropdown 4. Verify that the item selected is the item displayed in preview	1. Users can click on the 'Search for product' on the top of the screen and enter a text. The search field retains the text 2. If the product exist, a suggestive drop down will drop for users to be able to select the desired product 3. Item is selected 4. Item clicked is item displayed in preview	PASS PASS FAIL FAIL	5 minnutess	
4	Users should be able to add items to cart	The user must be logged into the application	1. Click on my account 2. Click on Login	1. The dropdown should show the "Login" option and the "register option" 2. The application shows two modals, one for the returning customer and one for new customers.	PASS PASS	5 minutes	

			3. Verify that on the returning customer modal, users can enter a valid email address	3. Users can enter a valid email address and the field retains the input and does not throw any error	PASS		
			4. Verify that a user can enter a valid password on the field.	4. The password field retains the text and masks it for security.	PASS		
			5. Click on Login	5. The button leads the user to the dashboard	PASS		
			6. Verify that the user can navigate and hover on "Mega Menu" on the screen	6. The User can navigate and hover on "Mega Menu" on the screen. A dropdown of different products is displayed	PASS		
			7.Confrim that the users can Click on any of the listed items	7.Users can click on any of the listed items and a new page is opened to display the item clicked	PASS		
			8. Check to see if the item clicked is what is displayed	8. Items clicked should be the same with the item displayed on the screen	FAIL		
			9. Hover on the searched item	9. Four icons are displayed on the displayed items	PASS		
			10. Click on the first icon displayed on the item to Add the item to cart	10. The icon is clicked and it adds item to cart	PASS		
			11. Check to see if a success message is displayed on the top right corner of the screen to let the users know that the item has been successfully added to cart	11. Success message is displayed to inform the users that item has been successfully added to cart.	PASS		
			12. Click on the cart icon on the top right hand side corner to confirm that the item added to cart is present in the cart	12. Item is displayed in cart	PASS		

Stakeholders review and sign-off is required to formally approve this test plan. The following stakeholders are required to sign.

Product Owner: _____

Question 2

Question: Explore the sign up, login, search and cart functionalities and write down Bugs and improvements

Answers:

1. Signup Email Notification Missing

Issue: New users do not receive a confirmation email upon signing up.

Steps to Reproduce:

1. Click on my account and click on register
2. Click on the new customer registration and Fill out the registration form and submit.
3. Check the registered email inbox for a confirmation email.

Expected Result: Users should receive an email confirming their successful registration.

Actual Result: No confirmation email is received.

2. Missing Content in Privacy Policy During Signup

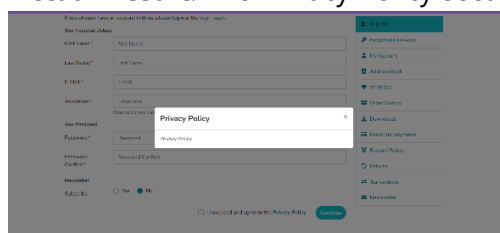
Issue: The Privacy Policy section is empty when accessed during the signup process.

Steps to Reproduce:

1. Navigate to the signup page.
2. Locate and click on the "Privacy Policy" link.

Expected Result: The Privacy Policy section should display the complete and relevant privacy policy content.

Actual Result: The Privacy Policy section is empty, showing no content.



3. Non-responsive Search Suggestive Dropdown

Issue: Clicking an item in the suggestive dropdown after performing a search is not responsive.

Steps to Reproduce:

1. Enter a search term in the search bar.
2. Wait for the suggestive dropdown to appear.
3. Click on any item in the dropdown list.

Expected Result: The clicked item should be selected and navigated to its respective page.

Actual Result: The click does not respond, and the user remains on the same page.

4. Incorrect Item Displayed after Clicking on the item on the Product list

Issue: The item displayed in the preview is not the one selected from the product list.

Steps to Reproduce:

1. Navigate to and hover on mega menu
2. Browse the product list.
3. Click on an item to preview
4. Preview the page content.

Expected Result: The preview should display the exact item selected by the user.

Actual Result: A different item is displayed in preview.

Improvements

1. Signup Email Notification

Improvement: Implement an automated email notification system to send confirmation emails to new users immediately after they sign up. This should include a verification link to activate their account.

2. Privacy Policy Content Display

Improvement: Ensure that the Privacy Policy section is populated with the correct and comprehensive content. This should be accessible to users during the signup process. Regularly update and review the Privacy Policy to ensure it reflects current practices and legal requirements.

3. Enhanced Search Functionality

Improvement: Ensure the suggestive dropdown in the search function is fully responsive. Implement thorough testing for various search terms and dropdown selections to guarantee smooth navigation.

4. **Accurate Preview Functionality**

Improvement: Correct the item mapping in the preview functionality. Implement checks to ensure the selected item from the product list is accurately shown on the preview before it is added to cart. Conduct rigorous testing with different items to verify accuracy.

5. **UI/UX Enhancements**

Improvement: Improve the overall user interface and experience for the signup, search, and cart functionalities. Ensure intuitive navigation and clear instructions at each step to enhance user satisfaction.

By addressing these bugs and implementing the suggested improvements, the platform's usability and reliability will be significantly enhanced.

SECTION B

Question 3:

Define game testing and explain its importance in the development process.

Answer:

Game testing is a critical process in the game development lifecycle that involves systematically evaluating a video game to identify and resolve defects, bugs, and inconsistencies. This process ensures the game meets the desired quality standards and provides an enjoyable user experience.

Importance of Game Testing in the Development Process

1. **Detecting Bugs:** Game testing helps identify and fix bugs and glitches that can disrupt gameplay or cause crashes, ensuring a smooth and stable gaming experience.
2. **Ensuring Functionality:** It verifies that all game features, mechanics, and controls function as intended, preventing any operational issues that could hinder gameplay.
3. **Enhancing User Experience:** Game testing helps to ensure if the game is enjoyable and playable, with balanced difficulty levels, intuitive controls, and engaging content.
4. **Compatibility:** Game testing helps to check for Cross-Platform Consistency; it ensures the game works seamlessly across different platforms (PC, console, mobile) and operating systems, providing a consistent experience to all players.
5. It helps to ensure market readiness. A thoroughly tested game is more polished and ready for market release, reducing the risk of negative reviews and returns. Well-tested games stand out in the competitive market, attracting and retaining more players.
6. **Performance:** Game testing helps to check the game's responsiveness and loading times, ensuring it runs smoothly on various devices without lagging. It also assesses how the game uses system resources (CPU, GPU, memory), optimizing performance to prevent issues like overheating or battery drain on mobile devices.

Question 4

How would you approach compatibility testing for a mobile game across different devices and operating systems?

Answer:

Approaching compatibility testing for a mobile game across different devices and operating systems involves a structured and thorough process to ensure the game performs well on various platforms. The following are the approaches that I will employ for compatibility testing for a mobile game across different devices and operating systems.

1. Define Test Requirements and Objectives

List the operating systems (iOS, Android) and their specific versions you need to test and select a representative sample of devices, including different brands, models, screen sizes, resolutions, and hardware configurations.

2. Create a Comprehensive Test Case

Develop detailed test cases covering all aspects of the game, such as UI/UX, performance, functionality, and graphics. Include various usage scenarios like different game levels, in-app purchases, network conditions (offline, 3G, 4G, Wi-Fi), and user interactions.

3. Set up Testing Environment

Obtain a range of physical devices to ensure real-world testing conditions.

4. Perform Localization Testing

I will verify that the game correctly displays text and UI elements in different languages and ensure that the game adapts to regional settings like date formats, currency, and cultural nuances.

5. User Acceptance Testing (UAT)

I'll advise the release of a beta version to a group of real users covering different devices and OS versions. Gather feedback on performance, usability, and any issues encountered.

6. Continuous Testing and Updates

I'll regularly perform regression testing to ensure new updates don't introduce new bugs. Integrate testing into the continuous integration pipeline for ongoing quality assurance.

Question 5

Provide an example of a challenging bug you discovered during mobile game testing and how you approached reporting it.

Bug Description:

While testing a mobile game, I encountered a challenging bug where the game's progress was not saved consistently. Users reported losing their progress despite successfully completing levels and exiting the game properly.

Steps to Reproduce:

1. Launch the game application.
2. Play through several levels, ensuring successful completion.
3. Exit the game and relaunch it.
4. Check if the game progress is retained or reset to the beginning.

Observed Behaviour:

In some instances, the game progress was saved correctly, and users could resume from where they left off. However, in other cases, the progress was lost, and users had to start from the beginning, despite completing multiple levels previously.

Approach to Reporting the Bug:

1. User Feedback Collection: Gathered feedback from app reviews and community forums to understand the scope and frequency of the issue. Recorded specific instances and scenarios reported by users where progress loss occurred.
 2. Reproduction Attempts: Attempted to reproduce the bug on various devices and operating systems. Played through different levels multiple times, focusing on exit points and saving mechanisms.
 3. Isolation of Factors: Investigated potential factors that could contribute to progress loss, such as device type, operating system version, and network connectivity. I then experimented with different game exit methods (e.g., pressing the home button, using the back button) to identify any variations in behaviour.
 4. Logs and Analytics Analysis: Analysing game logs and analytics data to pinpoint any anomalies
- Regression Testing:
5. Detailed Bug Report: Compiled a detailed bug report and enter it into a defect management/project management tool.
 6. Bug Fixing: Through collaboration with the development team, it was discovered that the progress loss issue was related to a synchronization issue between the game client and the server. A fix was implemented to improve the reliability of the save system, ensuring that progress is consistently saved and loaded correctly.
 7. Retesting: A thorough test was carried out and it was confirmed that users no longer experienced progress loss, leading to improved user satisfaction and retention.

Question 6

Imagine you encounter a game-breaking bug in a mobile app game during testing. How would you approach troubleshooting and resolving this issue?

Approach to Resolving the Issue

- **Initial Investigation:** I will try to reproduce the issue on multiple devices and OS versions to determine if it's device-specific or affects multiple configurations.
- **Use of crash reporting tools:** I will make use of crash reporting tools (e.g., Firebase Crashlytics, Sentry) to collect detailed crash logs and stack traces.
- **Profiling and Monitoring:** I will make use of profiling tools to monitor memory usage, CPU load, and other performance metrics during gameplay. I will also identify any spikes or anomalies that correlate with the crash events.
- **Log Analysis:** I will analyse the crash logs and stack traces to identify the exact point of failure. I also try to identify any spikes or anomalies that correlate with the crash events.
- **Issue reporting:** I will provide a detailed description of the issue on the bug tracking and project management tool, attaching the detailed crash logs and, screen recording and screenshots where necessary to provide enough information to the engineer who is supposed to fix the issue.
- **Defect Resolution:** After the issue has been reported on the bug tracking tool, the Software Engineer will provide a fix for it
- **Retesting:** I will perform rigorous testing on the same and other devices after the fix to ensure the issue is resolved.
- **Continuous Monitoring:** I will continue to monitor the issue, user feedback and crash reports post-release to catch any recurring or new issues.

Question 7

Given a scenario of a simple mobile game Mancala Adventures (Android or iOS), create test cases covering basic functionality and edge cases.

Test ID	Description	Pre Conditions	Testing Steps	Expected Result	Test Result	Duration	Comments
1	Practice Tour Guide feature: Users of the application should be able to access a Practice Tour Guide upon opening the game. This guide will span the first four levels, providing step-by-step instructions and tips on how to play the game, ensuring a	1. The game application is installed on the test device. 2. The test device is powered on and connected to a stable internet connection 3. The game is launched	1. Click on the 1 st level on the home page 2. Follow the instructions provided by the Practice Tour Guide. 3. Click the "Next" button after completing each round. 4. Verify that the Practice Tour Guide appears each time the application is opened until the user reaches the 4th stage of solo play.	1. The first level launches 2. The game responds correctly to user actions as guided by the Practice Tour Guide. 3. After clicking the "Next" button, the game smoothly transitions to the next stage or level. 4. The Practice Tour Guide appears every time the application is opened until the user reaches the		10Minutes	

	smooth learning curve for new players.		<p>5. Confirm that the Practice Tour Guide offers advice on the next move to be taken during each of the first four levels.</p> <p>6. Ensure that after completing the 4th round, the practice tour ends, and players continue to play independently.</p>	<p>4th stage of solo play.</p> <p>5. The Practice Tour Guide provides relevant and actionable advice for each move in the first four levels.</p> <p>6. After completing the 4th round, the Practice Tour Guide ends automatically.</p>			
2	<p>Home menu functionality:</p> <p>Users of the application should be able to view the levels played, current level and levels to be played on one page</p>	1. The game is launched	<p>1. On the main window of the game, verify that there is Home menu icon on the bottom of the screen</p> <p>2. Verify that the menu displays the number levels played and levels to be played on the screen.</p> <p>3. Verify that the home page is scrollable to the left and right</p> <p>4. Verify that users can click on the previously played levels to replay and the current level to play</p> <p>EDGE CASE:</p> <p>5. Check to see if users can select a level when the current level has not been played</p>	<p>1. The main window of the game displays a Home menu icon at the bottom of the screen.</p> <p>2. The Home menu displays the number of levels played and the levels yet to be played.</p> <p>3. The home page is scrollable to the left and right.</p> <p>4. Users can click on previously played levels to replay them without any issues.</p> <p>5. Users cannot select a level beyond the current level until the current level has been played.</p>		2minutes	
3	<p>Online multiplayer:</p> <p>Users of the application should be able to play against other players with internet connection</p>	<p>1. Launch the game</p> <p>2. Turn on the internet connection of the mobile device</p>	<p>1. Navigate to the "Vs" mode on the bottom of the screen.</p> <p>2. Attempt to connect to the online multiplayer server.</p>	<p>1. The user successfully connects to the multiplayer server.</p> <p>2. A lobby screen is displayed.</p>			
4	Game Shop:	1. The user launched the game	1. Select the "Shop" menu on the game's window.	1. The shop menu is displayed		5Minutes	

	Users of the application should be able to use a shop menu and buy diamonds and hearts for different amount	2. The user has a valid payment method linked to their account.	<p>2. Verify that the shop menu displays correctly with options to purchase diamonds and hearts.</p> <p>3. Check that the shop menu lists various purchase options with different amounts and prices.</p> <p>4. Select a specific amount of diamonds to purchase (e.g., 155 diamonds for 2,500.00).</p> <p>5. Complete the payment process using the linked payment method.</p> <p>6. Verify that the purchased diamonds are added to the user's account immediately after the transaction.</p> <p>7. Check for any confirmation messages or notifications confirming the successful purchase.</p> <p>EDGE CASES</p> <p>8. Attempt to purchase diamonds or hearts with an invalid payment method.</p> <p>9. Verify that an appropriate error message is displayed and the transaction is not processed.</p>	<p>2.The shop menu is displayed correctly with various purchase options.</p> <p>3. The shop menu lists various purchase options with different amounts and prices.</p> <p>4 and 5. Users can successfully purchase diamonds and hearts.</p> <p>6. Purchased items are added to the user's account immediately after the transaction.</p> <p>7. Confirmation messages are displayed for successful purchases.</p> <p>8. Appropriate error messages are displayed for failed transactions.</p> <p>9. Transaction history reflects the purchases accurately.</p>			
5	Settings Menu: The users of the Application should be able to make some personal settings	1. Launch the game	<p>1. On the game's menu page, click on the settings icon at the top right hand side of the screen</p> <p>2. Check to see if can see the audio, volume and screen rotation icons</p> <p>3. Verify that clicking on the audio icon can mute or unmute the</p>	<p>1. Clicking on the settings icon at the top right-hand side of the game's menu page opens the settings menu.</p> <p>2. The settings menu displays icons for audio, volume, and screen rotation.</p>		5minutes	

			<p>game's sound.</p> <p>4. Click to see if the volume can be turned off and on</p> <p>5 Click to see if the rotation icons actually rotates the screen</p> <p>6. Verify to see if there is a support button on the page and is functional</p> <p>7. Verify to see if you can see a community segment with Instagram, facebook and tiktok icons</p> <p>8. Click on each of the icons to confirm if they are functional and they lead to each of the game's social media account</p> <p>9. Check to confirm if ID, Cloud ID and version number are present on the settings screen</p> <p>10. Verify to confirm if the close button on the top right hand side of the modal closes the modal</p>	<p>3.- Clicking on the audio icon mutes the game's sound. -Clicking the audio icon again unmutes the game's sound.</p> <p>4. Clicking on the volume icon allows users to turn the game's volume off and on.</p> <p>5. Clicking the screen rotation icon rotates the game screen.</p> <p>6. The settings menu contains a support button.</p> <p>7. The settings menu displays a community segment with icons for Instagram, Facebook, and TikTok.</p> <p>8. Clicking on each social media icon (Instagram, Facebook, TikTok) opens the respective platform.</p> <p>9. The settings screen displays the user's ID, Cloud ID, and the game's version number.</p> <p>10. The settings menu contains a close button at the top right-hand side.</p>			
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Question 8

Explain 5 common game mechanics and elements (e.g., gameplay, controls, user interface) and how they would test these aspects.

1. Gameplay Mechanics

Description: Gameplay mechanics are the rules and systems that define how the game is played. This includes objectives, challenges, player actions, rewards, and progression.

Testing Approach:

- **Functional Testing:** Verify that all game rules and systems work as intended. Ensure objectives are clear and achievable, and rewards are correctly awarded.
- **Balance Testing:** Check for fair difficulty progression and balance between different game elements (e.g., weapons, levels).
- **Playtesting:** Have real users play the game to provide feedback on the fun factor, challenge level, and overall experience.
- **Regression Testing:** Ensure that new updates or changes do not break existing gameplay mechanics.

2. Controls

Description: Controls refer to how players interact with the game, including input methods such as touch, keyboard, mouse, or gamepad.

Testing Approach:

- **Input Testing:** Verify that all controls respond correctly and consistently across different devices and platforms. Ensure no input lag or unregistered inputs.
- **Usability Testing:** Ensure that the control scheme is intuitive and easy to use. Collect user feedback to identify any confusing or difficult controls.
- **Accessibility Testing:** Ensure controls are accessible to players with disabilities. Test alternative input methods and customizable control settings.
- **Stress Testing:** Test controls under various conditions, such as rapid inputs or simultaneous multiple inputs, to ensure robustness.

3. User Interface (UI)

Description: The UI encompasses all on-screen elements that allow players to interact with the game, including menus, buttons, Heads-up display, and notifications.

Testing Approach:

- **UI Functionality Testing:** Verify that all UI elements work correctly. Ensure buttons, menus, and other interactive elements respond as expected.
- **Consistency Testing:** Check for visual and functional consistency across different screens and devices. Ensure the UI adheres to design guidelines.
- **Usability Testing:** Conduct usability tests to ensure the UI is intuitive and easy to navigate. Collect user feedback to identify any confusing or inefficient elements.
- **Localization Testing:** Verify that the UI correctly displays text and elements in different languages. Ensure no text truncation or misalignment.

4. Graphics and Animations

Description: Graphics and animations refer to the visual elements of the game, including character models, environments, special effects, and animations.

Testing Approach:

- Visual Quality Testing: Ensure high-quality graphics and animations across different devices and resolutions. Check for visual artifacts, glitches, or low-quality textures.
- Performance Testing: Verify that the game maintains a consistent frame rate and performance. Test on various devices to ensure smooth gameplay.
- Compatibility Testing: Ensure graphics and animations render correctly on different hardware configurations and GPU models.
- Stress Testing: Test how the game handles high-load scenarios with many on-screen elements and animations. Ensure no crashes or significant performance drops.

5. Audio

Description: Audio includes all sound elements in the game, such as background music, sound effects, voiceovers, and ambient sounds.

Testing Approach:

- Audio Quality Testing: Ensure high-quality sound across different devices. Check for clarity, volume balance, and absence of distortions.
- Synchronization Testing: Verify that audio elements synchronize correctly with visual actions and events. Ensure no noticeable delays or mismatches.
- Compatibility Testing: Ensure audio plays correctly on various audio output devices, such as headphones, speakers, and different OS versions.
- Localization Testing: Verify that localized audio tracks play correctly and match the corresponding visual and textual elements.