

## Test Cases

The updated details are coloured in red.

The “Actual Result” and “P/F” columns for each use case are filled in as well.

ID	Test Case Description	Precondition	Steps	Expected Result	Actual Result	P/F
ST1	Navigate to <u>Choose Account</u> page.	-	1. Navigates to the web portal.	1. Can see a list of the names at the <u>Choose Account</u> page.	Same as expected result.	P
ST2	View <u>Tutorial Video</u> .	1. Navigated to the <u>Choose Account</u> page.	1. Click the video icon.	1. The <u>tutorial video</u> shows in a pop-up window.	Same as expected result.	P
ST3	Close <u>Tutorial Video</u> .	1. Navigated to the <u>Choose Account</u> page.  2. Clicked the video icon.  3. Is watching the <u>tutorial video</u> in a pop-up window.	1. Click the close button.	1. The <u>tutorial video</u> is closed.  2. Will still be at the <u>Choose Account</u> page.	Same as expected result.	P
ST4	User login.	1. Navigated to <u>Choose Account</u> page.	1. Choose an existing account.	1. Successfully chosen an account.  2. Will be directed to the user home screen.	Same as expected result.	P
ST5	Choose <u>Puzzle mode</u> for game mode.	1. Must be logged in.  2. Navigated to <u>Home page</u> .	1. Click on “Puzzle Mode” button.	1. Directed to <u>Puzzle mode</u> page.	Same as expected result.	P
ST6	<b>Step through</b> puzzle with the <b>wrong answer</b> .	1. Must be logged in.  2. In level 2 of <u>Puzzle mode</u> .	1. Drag and drop a “Turn Right” option into step “1” block.  2. Drag and drop another “Forward” option into step “2” block.  3. Click on the “Step” button.	1. An incorrect answer prompt will be displayed.  2. Car is not moving.	Same as expected result.	P
ST7	<b>Step through</b> puzzle with the <b>correct</b>	1. Must be logged in.  2. In level 2 of	1. Drag and drop a “Forward” option into step “1” block.	1. A correct answer prompt will be displayed.	Same as expected result.	P

	<b>answer without any obstacles.</b>	<u>Puzzle mode.</u> 3. Car pathway should be free of obstacles	2. Drag and drop another “Forward” option into step “2” block. 3. Click on the “Step” button. 4. Wait for the car to stop moving. 5. Click on the “Step” button again.	2. The car will start moving and stop after reaching the end of a block. 3. Car will start moving again when the “Step” button is clicked for the second time. It will stop after reaching the end of a block. 4. Score of will be incremented. 5. Will be navigated to the next stage.		
ST8	<b>Step through puzzle with the correct answer with obstacles.</b>	1. Must be logged in. 2. In level 2 of <u>Puzzle mode.</u> 3. An obstacle is placed in between the first block and second block.	1. Drag and drop a “Forward” option into step “1” block. 2. Drag and drop another “Forward” option into step “2” block. 3. Click on the “Step” button. 4. Wait for the car to stop moving. 5. Click on the “Step” button again.	1. A correct answer prompt will be displayed. 2. Car will start moving and stop after reaching the end of a block. 3. Car will start moving and stop when it is near the obstacle. 4. A prompt will be displayed to ask the user to remove the obstacle and reposition the car to the end of the previous block.	Same as expected result.	P
ST9	<b>Solve puzzle with the wrong answer.</b>	1. Must be logged in. 2. In level 2 of <u>Puzzle mode.</u>	1. Drag and drop a “Turn Right” option into step “1” block. 2. Drag and drop a “Forward” option into step “2” block.	1. An incorrect answer prompt will be displayed. 2. Car is not moving.	Same as expected result.	P

			3. Click on the "Solve" button.			
ST10	<b>Solve</b> puzzle with the <b>correct answer without any obstacles.</b>	<ol style="list-style-type: none"> <li>1. Must be logged in.</li> <li>2. In level 2 of <u>Puzzle mode</u>.</li> <li>3. Car pathway should be free of obstacles.</li> </ol>	<ol style="list-style-type: none"> <li>1. Drag and drop a "Forward" option into step "1" block.</li> <li>2. Drag and drop another "Forward" option into step "2" block.</li> <li>3. Click on the "Solve" button.</li> </ol>	<ol style="list-style-type: none"> <li>1. A correct answer prompt will be displayed.</li> <li>2. Car will start moving and stop after reaching the end of 2 blocks.</li> <li>3. Score of the user will be incremented.</li> <li>4. Will be directed to the next stage.</li> </ol>	Same as expected result.	P
ST11	<b>Solve</b> puzzle with the <b>correct answer with obstacles.</b>	<ol style="list-style-type: none"> <li>1. Must be logged in.</li> <li>2. In level 2 of <u>Puzzle mode</u>.</li> <li>3. An obstacle is placed in between the first block and second block.</li> </ol>	<ol style="list-style-type: none"> <li>1. Drag and drop a "Forward" option into step "1" block.</li> <li>2. Drag and drop another "Forward" option into step "2" block.</li> <li>3. Click on the "Solve" button.</li> </ol>	<ol style="list-style-type: none"> <li>1. A correct answer prompt will be displayed.</li> <li>2. Car will start moving and stop when the obstacle is detected.</li> <li>3. A prompt will be displayed to ask the user to remove the obstacle and reposition the car to the starting point.</li> </ol>	Same as expected result.	P
ST12	Back to the home screen from the <u>Puzzle Mode page</u> .	<ol style="list-style-type: none"> <li>1. Must be logged in.</li> <li>2. In the <u>Puzzle mode page</u>.</li> </ol>	1. Click on the "Back" button.	1. Redirected back to the <u>Home page</u> .	Same as expected result.	P
ST13	Navigate to the Admin <u>Login Page</u> .	-	1. Navigates to <u>Admin Login Page</u> .	1. Successfully navigate to the <u>Admin Login Page</u> .	Same as expected result.	P
ST14	Admin login with correct password.	1. Navigated to the <u>Admin Login Page</u> .	<ol style="list-style-type: none"> <li>1. Enter "admin" in the username field.</li> <li>2. Enter "P@ssw0rd" in</li> </ol>	<ol style="list-style-type: none"> <li>1. Successful login.</li> <li>2. Successfully directed to the <u>Admin Home</u></li> </ol>	Same as expected result.	P

			<p>the password field.</p> <p>3. Click on the “Login” button.</p>	Page		
ST1 5	Admin login with incorrect password.	1. Navigated to the <u>Admin Login Page</u> .	<p>1. Enter “admin” in the username field.</p> <p>2. Enter “password” in the password field.</p> <p>3. Click on the “Login” button.</p>	<p>1. Unsuccessful login.</p> <p>2. Prompted to try again.</p>	Same as expected result.	P
ST1 6	Admin login without inputting any fields.	1. Navigated to the <u>Admin Login page</u> .	<p>1. Leave the username and password field empty.</p> <p>2. Click on the “Login” button.</p>	<p>1. Unsuccessful login.</p> <p>2. Prompted to try again.</p>	Same as expected result.	P
ST1 7	List and manage all Profiles.	<p>1. Successfully logged into the web portal.</p> <p>2. Navigated the <u>Admin Home Page</u>.</p>	1. Click the “Manage Profile” button.	<p>1. Will be redirected to the <u>Manage Profile</u> page.</p> <p>2. Able to view a list of existing user profile(s).</p>	Same as expected result.	P
ST1 8	Back to the <u>Admin Home Page</u> from the <u>Manage Profile</u> page.	<p>1. Successfully logged into the web portal.</p> <p>2. Navigated to the <u>Manage Profile</u> page.</p>	1. Click the “Back to Home” button.	1. Redirected back to the <u>Admin Home Page</u> .	Same as expected result.	P
ST1 9	Admin <u>create profile</u> with valid input.	<p>1. Navigated to the <u>Manage Profile</u> page</p> <p>2. Click on the “Create User” button</p> <p>3. Must have navigated to the “Enter new user’s username” pop up.</p>	<p>1. Enter “Xiao Ming” into the username field.</p> <p>2. Click the “Create” button.</p>	<p>1. Receives a success message for creating a new user profile</p> <p>2. Remain in the <u>Manage Profile</u> page.</p>	Same as expected result.	P

ST2 0	Admin <u>create profile</u> with invalid input where the username already exists.	<ol style="list-style-type: none"> <li>1. Navigated to the <u>Manage Profile</u> page.</li> <li>2. Able to see the “Xiao Ming” user in the user list.</li> <li>3. Click on the “Create User” button</li> <li>4. Must be at the “Enter new user’s username” pop up.</li> </ol>	<ol style="list-style-type: none"> <li>1. Enter “Xiao Ming” into the username field.</li> <li>2. Click the “Create” button.</li> </ol>	<ol style="list-style-type: none"> <li>1. Receives a failure message for creating a new user profile.</li> <li>2. Remain in the <u>Manage Profile</u> page.</li> <li>3. Remain in the create user popup.</li> </ol>	Same as expected result.	P
ST2 1	Admin create profile with empty input.	<ol style="list-style-type: none"> <li>1. Must be at the <u>Manage Profile</u> page</li> <li>2. Must click “Create User” button</li> <li>3. Must be at the “Enter new user’s username” pop up.</li> </ol>	<ol style="list-style-type: none"> <li>1. Leaves any input field empty.</li> <li>2. Click on the “Create” button.</li> </ol>	<ol style="list-style-type: none"> <li>1. Receives a failure message for creating a new user profile.</li> <li>2. Still be in <u>Manage Profile</u> Page</li> <li>3. Still be in the create user popup.</li> </ol>	Same as expected result.	P
ST2 2	Admin cancel create profile	<ol style="list-style-type: none"> <li>1. Must be at the <u>Manage Profile</u> Page.</li> <li>2. Must click “Create User” button</li> <li>3. Must be at the “Enter new user’s username” pop up.</li> </ol>	<ol style="list-style-type: none"> <li>1. Click on the “Cancel” button at the “Enter new user’s username” pop up.</li> </ol>	<ol style="list-style-type: none"> <li>1. Successfully cancel the create user pop up</li> <li>2. Still be in the <u>Manage Profile</u> Page.</li> </ol>	Same as expected result.	P
ST2 3	Admin confirms to delete user profile	<ol style="list-style-type: none"> <li>1. Must be at the <u>Manage Profile</u> Page.</li> <li>2. Must click on the “Delete” button beside an existing user account.</li> <li>3. Admin must be at the “Delete User” pop up.</li> </ol>	<ol style="list-style-type: none"> <li>1. Click on the “Yes” button on the delete user confirmation pop up.</li> </ol>	<ol style="list-style-type: none"> <li>1. Receives a success message on deleting the user account.</li> <li>2. Should still be in the <u>Manage Profile</u> Page.</li> </ol>	Same as expected result.	P

ST2 4	Admin rejects to delete user profile	<ol style="list-style-type: none"> <li>1. Must be at the <u>Manage Profile Page</u>.</li> <li>2. Must click the "Delete" button beside an existing user account.</li> <li>3. Must be at the "Delete User" pop up.</li> </ol>	<ol style="list-style-type: none"> <li>1. Click on the "No" button on the delete user confirmation pop up.</li> </ol>	<ol style="list-style-type: none"> <li>1. Receives a delete failed message on deleting the user account.</li> <li>2. Should still be in the <u>Manage Profile Page</u>.</li> <li>3. Should still be in the delete user popup.</li> </ol>	Same as expected result.	P
ST2 5	Admin update user profile name with valid input (non-existing username)	<ol style="list-style-type: none"> <li>1. Must be at the Manage Profile page</li> <li>2. Must click the "Edit" button beside an existing user account.</li> <li>3. Must be at the "Edit User" pop up.</li> </ol>	<ol style="list-style-type: none"> <li>1. Enter "Xiao Hua" into the username field.</li> <li>2. Admin clicks the "Save" button</li> </ol>	<ol style="list-style-type: none"> <li>1. Can successfully update the user account and receive a success message.</li> <li>2. Should still be in Manage Profile Page</li> </ol>	Same as expected result.	P
ST2 6	Admin update user profile name with invalid input (existing username)	<ol style="list-style-type: none"> <li>1. Must be at the Manage Profile page</li> <li>2. Must click the "Edit" button beside an existing user account.</li> <li>3. Must be at the "Edit User" pop up.</li> </ol>	<ol style="list-style-type: none"> <li>1. Enter "Xiao Ming" into the username field.</li> <li>2. Admin clicks the "Save" button</li> </ol>	<ol style="list-style-type: none"> <li>1. Cannot update the user account and receive a failure message.</li> <li>2. Should still be in Manage Profile Page</li> <li>3. Should still be in the edit user popup.</li> </ol>	Same as expected result.	P
ST2 7	Admin update user profile name with empty input	<ol style="list-style-type: none"> <li>1. Must be at the Manage Profile page</li> <li>2. Must click the "Edit" button beside an existing user account.</li> <li>3. Must be at the "Edit User" pop up.</li> </ol>	<ol style="list-style-type: none"> <li>1. Leave any input field empty.</li> <li>2. Click on the "Save" button</li> </ol>	<ol style="list-style-type: none"> <li>1. Cannot update the user account and receive a failure message.</li> <li>2. Should still be in Manage Profile Page</li> <li>3. Should still be in the edit user popup.</li> </ol>	Same as expected result.	P
ST2	Admin cancel	<ol style="list-style-type: none"> <li>1. Must be at the</li> </ol>	<ol style="list-style-type: none"> <li>1. Click on the</li> </ol>	<ol style="list-style-type: none"> <li>1. Can</li> </ol>	Same as	P

8	update user profile name	<p>Manage Profile page</p> <ol style="list-style-type: none"> <li>Must click the "Edit" button beside an existing user account.</li> <li>Must be at the "Edit User" pop up.</li> </ol>	cancel button in the form of an "X" on the edit user pop up.	<p>successfully cancel the edit user pop up.</p> <ol style="list-style-type: none"> <li>Should still be in the Manage Profile Page</li> </ol>	expected result.	
ST2 9	Admin change password for admin with valid input	<ol style="list-style-type: none"> <li>Must be at the Manage Profile page</li> <li>Must click the "Change Password" button beside the admin account.</li> <li>Must be at the "Change Password for Admin" pop up.</li> </ol>	<ol style="list-style-type: none"> <li>Enter "P@ssw0rd" in the old password field.</li> <li>Enter "P@ssw0rd2" in the new password field.</li> <li>Enter "P@ssw0rd2" in the new password confirm field.</li> <li>Click on the "Change" button</li> </ol>	<ol style="list-style-type: none"> <li>Can successfully change password and receives a success message</li> <li>Should still be in the Manage Profile Page</li> </ol>	Same as expected result.	P
ST3 0	Admin change password for admin with invalid input (Old Password)	<ol style="list-style-type: none"> <li>Must be at the Manage Profile page</li> <li>Must click the "Change Password" button beside the admin account.</li> <li>Must be at the "Change Password for Admin" pop up.</li> </ol>	<ol style="list-style-type: none"> <li>Enter "wrongP@ssw0rd" in the old password field.</li> <li>Enter "P@ssw0rd2" in the new password field.</li> <li>Enter "P@ssw0rd2" in the new password confirm field.</li> <li>Click on the "Change" button</li> </ol>	<ol style="list-style-type: none"> <li>Cannot change password and receives a failure message</li> <li>Should still be in the Manage Profile Page</li> <li>Should still be in the change password popup.</li> </ol>	Same as expected result.	P
ST3 1	Admin change password for admin with invalid input (New Password does not match)	<ol style="list-style-type: none"> <li>Must be at the Manage Profile page</li> <li>Must click the "Change Password" button beside the admin account.</li> </ol>	<ol style="list-style-type: none"> <li>Enter "P@ssw0rd" in the old password field.</li> <li>Enter "P@ssw0rd2" in the new password field.</li> </ol>	<ol style="list-style-type: none"> <li>Cannot change password and receives a failure message</li> <li>Should still be in the Manage Profile Page.</li> </ol>	Same as expected result.	P

		<ol style="list-style-type: none"> <li>Must be at the "Change Password for Admin" pop up.</li> </ol>	<ol style="list-style-type: none"> <li>Enter "wrongP@sswOrd2" in the new password confirm field.</li> <li>Click on the "Change" button</li> </ol>	<ol style="list-style-type: none"> <li>Should still be in the change password popup.</li> </ol>		
ST3 2	Admin change password for admin with invalid input (empty input)	<ol style="list-style-type: none"> <li>Must be at the Manage Profile page</li> <li>Must click the "Change Password" button beside the admin account.</li> <li>Must be at the "Change Password for Admin" pop up.</li> </ol>	<ol style="list-style-type: none"> <li>Leave any input field empty.</li> <li>Clicks the "Change" button</li> </ol>	<ol style="list-style-type: none"> <li>Cannot change password and receives a failure message</li> <li>Should still be in the Manage Profile Page.</li> <li>Should still be in the change password popup.</li> </ol>	Same as expected result.	P
ST3 3	Admin cancel change password for admin	<ol style="list-style-type: none"> <li>Must be at the Manage Profile page</li> <li>Must click the "Change Password" button beside the admin account.</li> <li>Must be at the "Change Password for Admin" pop up.</li> </ol>	<ol style="list-style-type: none"> <li>Click on the cancel button in the form of an "X" on the change password pop up.</li> </ol>	<ol style="list-style-type: none"> <li>Can successfully cancel the edit user pop up.</li> <li>Should still be in the Manage Profile Page</li> </ol>	Same as expected result.	P
ST3 4	List all the puzzles created in the <u>Manage Puzzle</u> page	<ol style="list-style-type: none"> <li>Logged in as admin.</li> <li>Must be at the <u>Admin Home Page</u>.</li> </ol>	<ol style="list-style-type: none"> <li>Click the "Manage Puzzle" button.</li> </ol>	<ol style="list-style-type: none"> <li>Should be able to view a list of the puzzles created in the <u>Manage Puzzle</u> page.</li> </ol>	Same as expected result.	P
ST3 5	Back to the <u>Admin Home Page</u> from the <u>Manage Puzzle</u> page.	<ol style="list-style-type: none"> <li>Logged in as admin.</li> <li>Must be at the <u>Admin Home Page</u>.</li> <li>Clicked the "Manage Puzzle"</li> </ol>	<ol style="list-style-type: none"> <li>Click the "Back to Home" button.</li> </ol>	<ol style="list-style-type: none"> <li>Redirected back to the <u>Admin Home Page</u>.</li> </ol>	Same as expected result.	P



		button.				
ST3 6	Create a puzzle with <b>valid input</b>	<ol style="list-style-type: none"> <li>1. Logged in as admin.</li> <li>2. Must be at the <u>Manage Puzzle</u> page.</li> <li>3. Clicked the "Create Puzzle" button.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill in "test puzzle" for the puzzle name.</li> <li>2. Choose 3 for the difficulty level.</li> <li>3. Define 4 for the steps required.</li> <li>4. Drag the directions for puzzle steps in sequence of , "Forward", "Turn Right", "Forward", and "Forward"</li> <li>5. Input "38,31,32,33" for puzzle shape.</li> <li>6. Click the "Create" button.</li> </ol>	<ol style="list-style-type: none"> <li>1. See a message that indicates the puzzle is created successfully.</li> <li>2. Redirected back to the <u>Manage Puzzle</u> page.</li> <li>3. The newly created puzzle "test puzzle" is displayed in the puzzle list in the <u>Manage Puzzle</u> page.</li> </ol>	Same as expected result.	P
ST3 7	Create a puzzle with <b>invalid input</b> where the puzzle shape and puzzle steps defined are the same as one of the existing puzzles in the system.	<ol style="list-style-type: none"> <li>1. Logged in as admin.</li> <li>2. Must be at the <u>Manage Puzzle</u> page.</li> <li>3. Clicked the "Create Puzzle" button.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill in "test puzzle 2" for the puzzle name.</li> <li>2. Choose 4 for the difficulty level.</li> <li>3. Define 4 for the steps required.</li> <li>4. Drag the directions for puzzle steps in sequence of , "Forward", "Turn Right", "Forward", and "Forward"</li> <li>5. Input "38,31,32,33" for puzzle shape.</li> <li>6. Click the "Create" button.</li> </ol>	<ol style="list-style-type: none"> <li>1. See a message that indicates the puzzle creation is failed as the puzzle already exists.</li> <li>2. Still be at the <u>Create Puzzle</u> page.</li> <li>3. Will not see the "test puzzle 2" puzzle in the puzzle list after clicking the "Cancel" button and being redirected back to the <u>Manage Puzzle</u> page.</li> </ol>	Same as expected result.	P
ST3 8	Create a puzzle with <b>invalid input</b> where the puzzle shape is not achievable with the puzzle steps	<ol style="list-style-type: none"> <li>1. Logged in as admin.</li> <li>2. Must be at the <u>Manage Puzzle</u> page.</li> <li>3. Clicked the "Create</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill in "test puzzle 3" for the puzzle name.</li> <li>2. Choose 4 for the difficulty level.</li> <li>3. Define 4 for the steps required.</li> </ol>	<ol style="list-style-type: none"> <li>1. See a message that indicates the puzzle creation is failed as the puzzle shape is not achievable with the puzzle</li> </ol>	Same as expected result.	P

	defined.	Puzzle” button.	<ol style="list-style-type: none"> <li>4. Drag the directions for puzzle steps in sequence of , “Forward”, “Turn Right”, “Forward”, and “Forward”</li> <li>5. Input “38,31,32” for puzzle shape.</li> <li>6. Click the “Create” button.</li> </ol>	<ol style="list-style-type: none"> <li>2. Still be at the <u>Create Puzzle</u> page.</li> <li>3. Will not see the “test puzzle 3” puzzle in the puzzle list when clicking the “Cancel” button and being redirected back to the <u>Manage Puzzle</u> page.</li> </ol>		
ST3 9	Cancel the puzzle creation.	<ol style="list-style-type: none"> <li>1. Logged in as admin.</li> <li>2. Must be at the <u>Manage Puzzle</u> page.</li> <li>3. Clicked the “Create Puzzle” button.</li> </ol>	<ol style="list-style-type: none"> <li>1. Click the “Cancel” button.</li> </ol>	<ol style="list-style-type: none"> <li>1. Redirected back to the “Manage Puzzle” page.</li> <li>2. Will not see any changes made to the puzzle list.</li> </ol>	Same as expected result.	P
ST4 0	Edit an existing puzzle with <b>valid input.</b>	<ol style="list-style-type: none"> <li>1. Logged in as admin.</li> <li>2. Must be at the <u>Manage Puzzle</u> page.</li> <li>3. Can see the “test puzzle” is shown in the puzzle list.</li> <li>4. Click the “Edit Puzzle” button for the “test puzzle”.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill in “test puzzle” for the puzzle name.</li> <li>2. Choose 3 for the difficulty level.</li> <li>3. Define 5 for the steps required.</li> <li>4. Drag the directions for puzzle steps in sequence of , “Forward”, “Turn Right”, “Forward”, “Forward”, and “Forward”</li> <li>5. Input “38,31,32,33,34” for puzzle shape.</li> <li>6. Click the “Update” button.</li> </ol>	<ol style="list-style-type: none"> <li>1. See a message that indicates the puzzle is updated successfully.</li> <li>2. Redirected back to the <u>Manage Puzzle</u> page.</li> <li>3. When clicking the “view” button for the “test puzzle” in the <u>Manage Puzzle</u> page, will see the details of this puzzle updated successfully.</li> </ol>	Same as expected result.	P
ST4 1	Edit an existing puzzle with	<ol style="list-style-type: none"> <li>1. Logged in as admin.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill in “test puzzle” for the puzzle name.</li> </ol>	<ol style="list-style-type: none"> <li>1. See a message that indicates the</li> </ol>	Same as expected result.	P

	<p><b>invalid input</b> where the updated puzzle shape and puzzle steps are the same as one of the other existing puzzles in the system.</p>	<ol style="list-style-type: none"> <li>Must be at the <u>Manage Puzzle</u> page.</li> <li>A puzzle with the following details should be created. <ol style="list-style-type: none"> <li>Puzzle name = "old puzzle"</li> <li>Difficulty level=4</li> <li>Required step = 6</li> <li>Puzzle directions = "Forward", "Turn Right", "Forward", "Forward", "Forward", and "Forward"</li> <li>Puzzle shape = "38,31,32,33,34,35"</li> </ol> </li> <li>Can see both "old puzzle" and "test puzzle" are shown in the puzzle list.</li> <li>Click the "Edit Puzzle" button for the "test puzzle".</li> </ol>	<ol style="list-style-type: none"> <li>Choose 3 for the difficulty level.</li> <li>Define 6 for the steps required.</li> <li>Drag the directions for puzzle steps in sequence of , "Forward", "Turn Right", "Forward", "Forward", and "Forward"</li> <li>Input "38,31,32,33,34,35" for puzzle shape.</li> <li>Click the "Update" button.</li> </ol>	<p>puzzle details are not updated successfully.</p> <ol style="list-style-type: none"> <li>Still be at the <u>Edit Puzzle</u> page.</li> <li>When clicking the "cancel" button to go back to <u>Manage Puzzle</u> page and subsequently click the "view" button for the "test puzzle" in the <u>Manage Puzzle</u> page, will see the details of this puzzle remain unchanged.</li> </ol>		
ST4 2	<p>Edit an existing puzzle with <b>invalid input</b> where the updated puzzle shape is not achievable with the updated puzzle steps.</p>	<ol style="list-style-type: none"> <li>Logged in as admin.</li> <li>Must be at the <u>Manage Puzzle</u> page.</li> <li>Can see the "test puzzle" is shown in the puzzle list.</li> <li>Click the "Edit Puzzle" button for the "test puzzle".</li> </ol>	<ol style="list-style-type: none"> <li>Fill in "test puzzle" for the puzzle name.</li> <li>Choose 3 for the difficulty level.</li> <li>Define 5 for the steps required.</li> <li>Drag the directions for puzzle steps in sequence of , "Forward", "Turn Right", "Forward", "Forward", and</li> </ol>	<ol style="list-style-type: none"> <li>See a message that indicates the puzzle details are not updated successfully as the puzzle shape is not achievable with the puzzle directions defined.</li> <li>Still be at the <u>Edit Puzzle</u> page.</li> </ol>	Same as expected result.	P

			<p>“Forward”</p> <ol style="list-style-type: none"> <li>Input “38,31,32,33” for puzzle shape.</li> <li>Click the “Update” button.</li> </ol>	<ol style="list-style-type: none"> <li>When clicking the “cancel” button to go back to <u>Manage Puzzle</u> page and subsequently click the “view” button for the “test puzzle” in the <u>Manage Puzzle</u> page, will see the details of this puzzle remain unchanged.</li> </ol>		
ST4 3	Cancel the puzzle edition	<ol style="list-style-type: none"> <li>Logged in as admin.</li> <li>Must be at the <u>Manage Puzzle</u> page.</li> <li>Can see the “test puzzle” is shown in the puzzle list.</li> <li>Click the “Edit Puzzle” button for the “test puzzle”.</li> </ol>	<ol style="list-style-type: none"> <li>Click the “Cancel” button.</li> </ol>	<ol style="list-style-type: none"> <li>Redirected back to the <u>Manage Puzzle</u> page.</li> <li>When clicking the “view” button for the “test puzzle” in the <u>Manage Puzzle</u> page, will see the details of this puzzle remain unchanged.</li> </ol>	Same as expected result.	P
ST4 4	View the details of an existing puzzle	<ol style="list-style-type: none"> <li>Logged in as admin.</li> <li>Must be at the <u>Manage Puzzle</u> page.</li> <li>Can see the “test puzzle” is shown in the puzzle list.</li> </ol>	<ol style="list-style-type: none"> <li>Click the “View” button for the “test puzzle”.</li> </ol>	<ol style="list-style-type: none"> <li>Can view the puzzle details (e.g. puzzle shape and puzzle steps) of “test puzzle” in a new page.</li> </ol>	Same as expected result.	P
ST4 5	Delete an existing puzzle	<ol style="list-style-type: none"> <li>Logged in as admin.</li> <li>Must be at the <u>Manage Puzzle</u> page.</li> <li>Can see the “test puzzle” is shown in the puzzle list.</li> </ol>	<ol style="list-style-type: none"> <li>Click the “Delete” button for “test puzzle”.</li> <li>Click the “Yes” button when the system prompts to confirm the deletion.</li> </ol>	<ol style="list-style-type: none"> <li>Will see the “test puzzle” is removed from the puzzle list in the <u>Manage Puzzle</u> page.</li> </ol>	Same as expected result.	P
ST4	Cancel the	<ol style="list-style-type: none"> <li>Logged in as</li> </ol>	<ol style="list-style-type: none"> <li>Click the “Delete”</li> </ol>	<ol style="list-style-type: none"> <li>Will see the</li> </ol>	Same as	P

6	puzzle deletion	<p>admin.</p> <ol style="list-style-type: none"> <li>Must be at the <u>Manage Puzzle</u> page.</li> <li>Can see the “old puzzle” is shown in the puzzle list.</li> </ol>	<p>button for “old puzzle”.</p> <ol style="list-style-type: none"> <li>Click the “No” button when the system prompts to confirm the deletion.</li> </ol>	<p>“old puzzle” is still in the puzzle list in the <u>Manage Puzzle</u> page.</p>	expected result.	
ST4 7	From <u>User Home Page</u> to <u>Freestyle Mode</u> page.	<ol style="list-style-type: none"> <li>Must be at the <u>User Home Page</u> page.</li> </ol>	<ol style="list-style-type: none"> <li>Click on the “Freestyle mode” button.</li> <li>Observe the screen.</li> </ol>	<ol style="list-style-type: none"> <li>See a list of command blocks with the execute button in the <u>Freestyle Mode</u> page.</li> </ol>	Same as expected result.	P
ST4 8	Back to <u>User Home Page</u> from <u>Freestyle Mode</u> page.	<ol style="list-style-type: none"> <li>Must be in <u>Freestyle Mode</u> page.</li> </ol>	<ol style="list-style-type: none"> <li>Click the “Back” button.</li> <li>Observe the screen.</li> </ol>	<ol style="list-style-type: none"> <li>See 2 game modes for the user to choose from in the <u>User Home Page</u> page.</li> </ol>	Same as expected result.	P
ST4 9	User executes more than the step limit in the <u>Freestyle Mode</u> page.	<ol style="list-style-type: none"> <li>Must be in the <u>Freestyle Mode</u> page.</li> </ol>	<ol style="list-style-type: none"> <li>Inputs steps more than the required limit.</li> <li>Execute the commands.</li> </ol>	<ol style="list-style-type: none"> <li>An error prompt would appear stating that the step limit has been breached.</li> </ol>	Same as expected result.	P
ST5 0	User executes within the step limit in the <u>Freestyle Mode</u> page.	<ol style="list-style-type: none"> <li>Must be in the <u>Freestyle Mode</u> page.</li> </ol>	<ol style="list-style-type: none"> <li>The user inputs steps not more than the required limit.</li> <li>User executes the commands.</li> </ol>	<ol style="list-style-type: none"> <li>The user observes the robotic car moves as it iterates through the steps in the <u>Execute All</u> state.</li> <li>The waypoint in the web portal moves in accordance with the command execution in the <u>Freestyle Mode</u> page.</li> </ol>	Same as expected result.	P
ST5 1	Robotic car encountering obstacles or boundaries when executing commands in	<ol style="list-style-type: none"> <li>Must be in the <u>Freestyle Mode</u> page.</li> <li>Must execute the command within the step</li> </ol>	<ol style="list-style-type: none"> <li>Put obstacles in front of the robotic car.</li> <li>Execute command to let the robotic car go</li> </ol>	<ol style="list-style-type: none"> <li>The robotic car would halt and go into the <u>Pause Program</u> state.</li> <li>The waypoint</li> </ol>	Same as expected result.	P

	the <u>Freestyle Mode</u> page while in the <u>Execute All</u> state.	limit.	into the <u>Execute All</u> state.	in the <u>Freestyle Mode</u> page would highlight that there is an obstacle detected.		
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