1. Testing and Evaluation

1.1 System State Diagram

Figure 20: System State Diagram.

For the purpose of the project deliverables, the states and transitions of **UC11** and UC**12** are highlighted in the System State Diagram as the main focus. The system test cases of focus are **ST1** to **ST5**.

1.2 System Test Cases (User Acceptance Test)
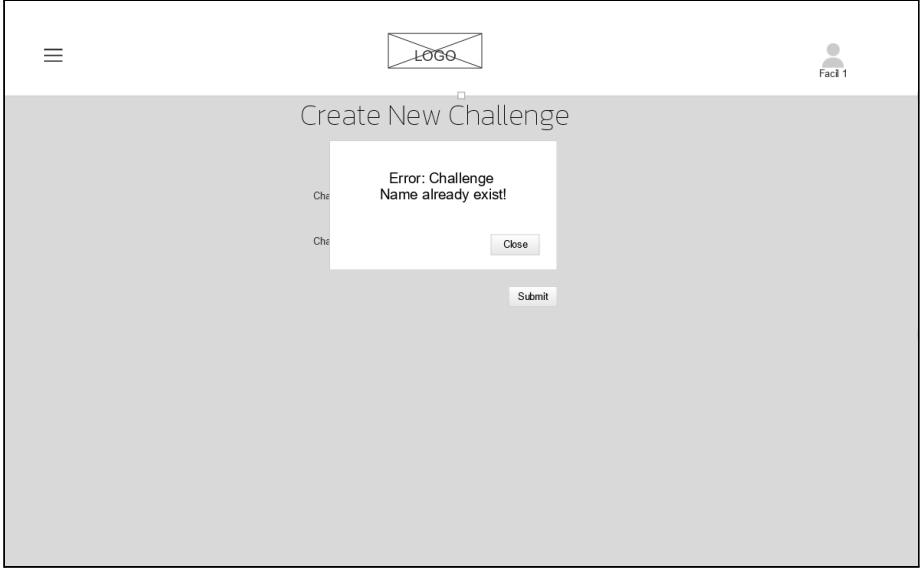
1.2.1 Generate One-Time Password

System Test Identifier	ST1
Relevant Use Case ID	UC11
System Test Name	Generate One-Time Password
Preconditions	1. Tester is signed in as Facilitator 2. Tester is on the Facilitator Dashboard page
Steps	1. Click on "Generate OTP" button 2. Observe screen
Expected Result	
Actual Result	
Pass/Fail	
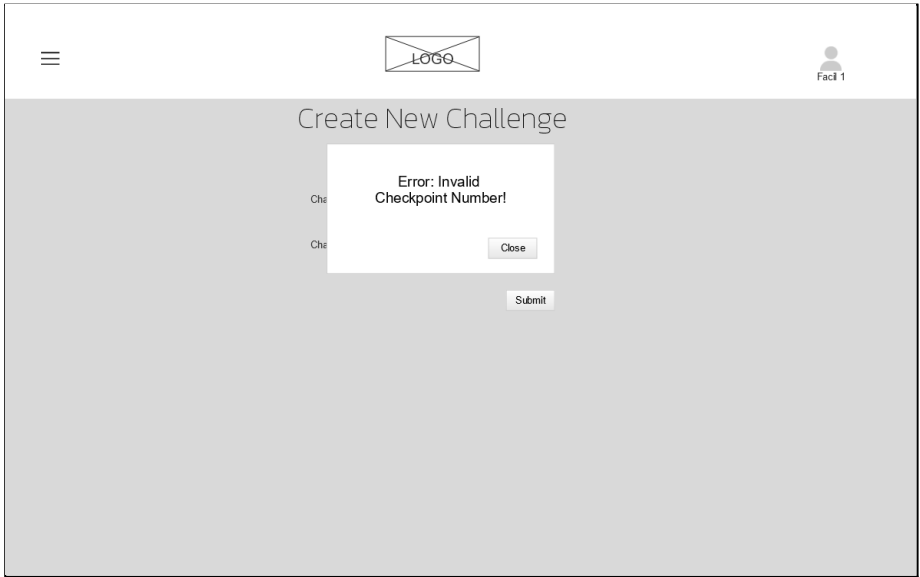
1.2.2 Add New Challenge

System Test Identifier	ST2
Relevant Use Case ID	UC13
System Test Name	Add New Challenge
Preconditions	1. Tester is signed in as Facilitator 2. Tester is on the Facilitator Add Challenge page
Steps	1. Input "Challenge 1" into the "Challenge Name" input box 2. Input "2" into the "Number of Checkpoints" input box 3. Click on "Upload Image" button 4. Select "challenge1.png" when prompted 5. Click on "Submit" button 6. Observe screen
Expected Result	 After closing success message
Actual Result	
Pass/Fail	

1.2.3 Duplicate Challenge Name When Adding Challenge

System Test Identifier	ST3
Relevant Use Case ID	UC13
System Test Name	Duplicate Challenge Name When Adding Challenge
Preconditions	1. Tester is signed in as Facilitator 2. Tester is on the Facilitator Add Challenge page 3. Tester completed ST2 successfully
Steps	1. Input "Challenge 1" into the "Challenge Name" input box 2. Input "2" into the "Number of Checkpoints" input box 3. Click on "Upload Image" button 4. Select "challenge2.png" when prompted 5. Click on "Submit" button 6. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.4 Invalid Checkpoint Value When Adding Challenge

System Test Identifier	ST4
Relevant Use Case ID	UC13
System Test Name	Invalid Checkpoint Value When Adding Challenge
Preconditions	1. Tester is signed in as Facilitator 2. Tester is on the Facilitator Add Challenge page
Steps	1. Input "Challenge 2" into the "Challenge Name" input box 2. Input "a" into the "Number of Checkpoints" input box 3. Click on "Upload Image" button 4. Select "challenge2.png" when prompted 5. Click on "Submit" button 6. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

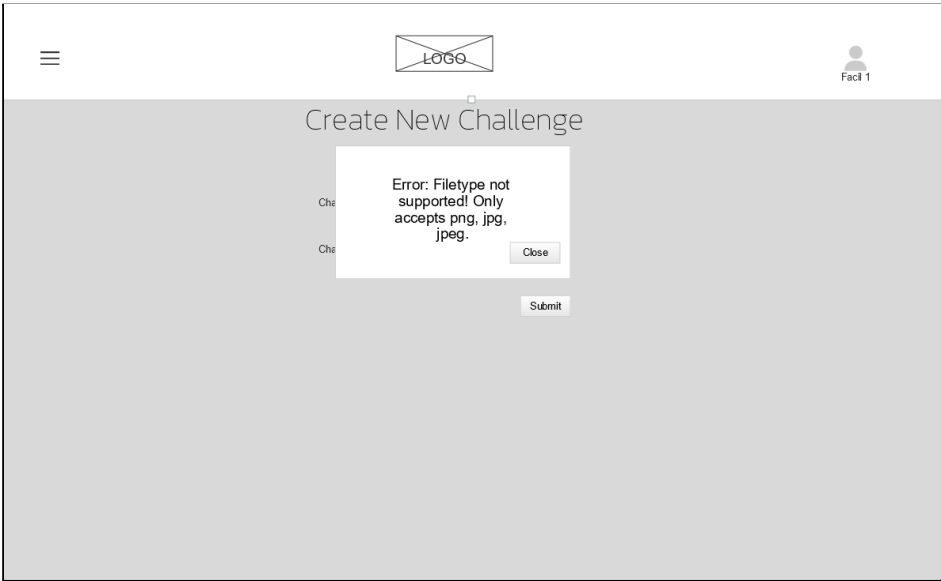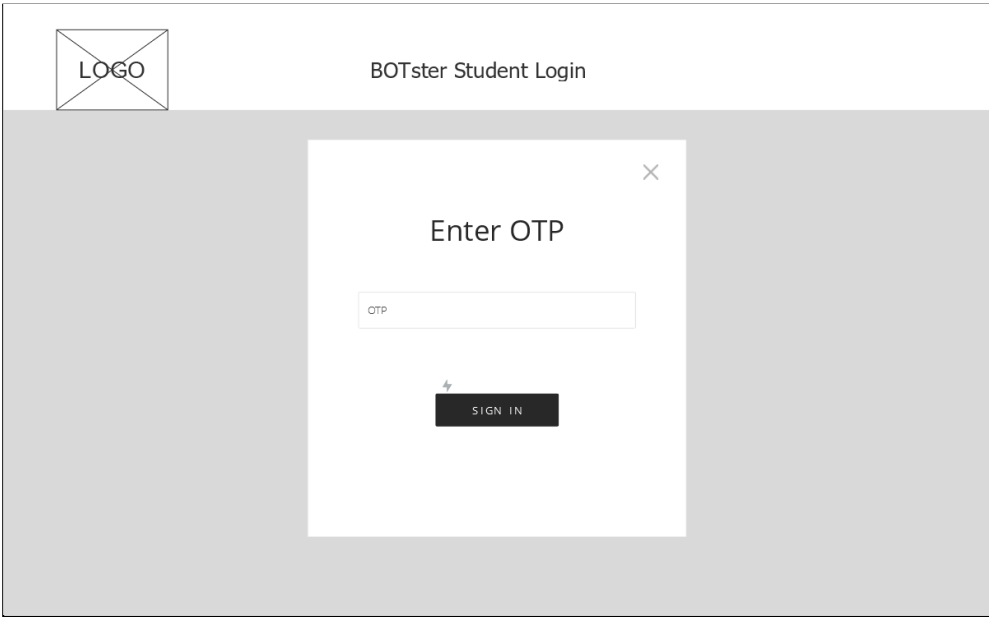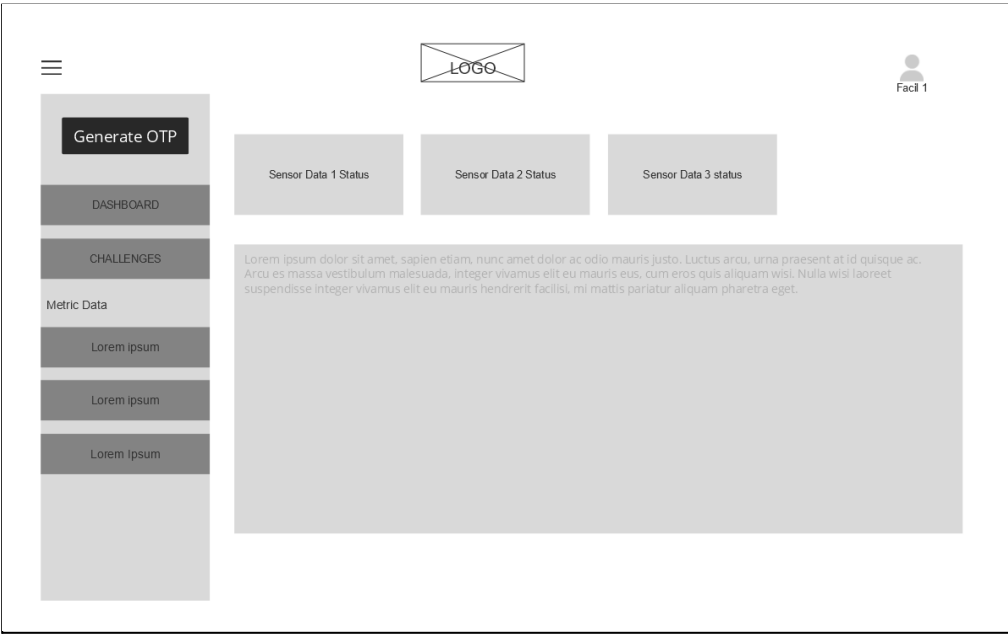## 1.2.5 Invalid File Uploaded When Adding Challenge

System Test Identifier	ST5
Relevant Use Case ID	UC13
System Test Name	Invalid File Uploaded When Adding Challenge
Preconditions	1. Tester is signed in as Facilitator 2. Tester is on the Facilitator Add Challenge page
Steps	1. Input "Challenge 2" into the "Challenge Name" input box 2. Input "2" into the "Number of Checkpoints" input box 3. Click on "Upload Image" button 4. Select "challenge2.txt" when prompted 5. Click on "Submit" button 6. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.6 Open BOTster

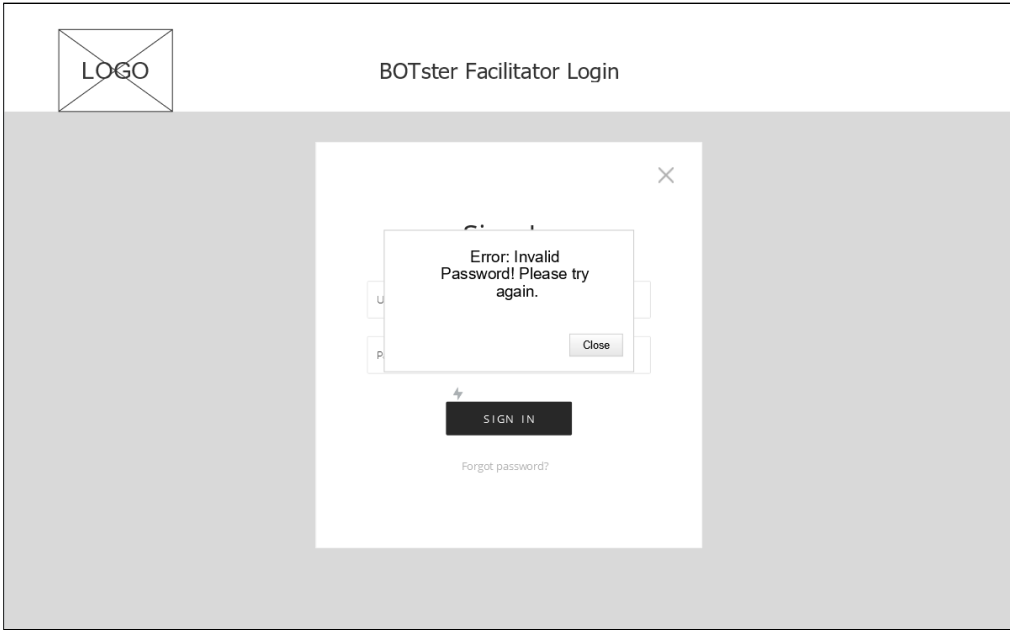| System Test Identifier	ST6
Relevant Use Case ID	-
System Test Name	Open BOTster
Preconditions	1. Web browser is running in foreground 2. BOTster web application is running 3. Tester's computer is connected to the same network as BOTster web application 4. Tester is not logged in
Steps	1. Type "http://192.168.1.10" into the web browser's URL bar 2. Press the enter key on the keyboard 3. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.7 Login as Facilitator

System Test Identifier	ST7
Relevant Use Case ID	UC8
System Test Name	Login as Facilitator
Preconditions	1. Web browser is open 2. Tester is not logged in 3. Tester is on BOTster Login page
Steps	1. Select "Facilitator" for the "Login as" dropdown input 2. Enter "P@ssw0rd" into the "Password" input field 3. Press the "Login" button 4. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.8 Facilitator Login using Invalid Password

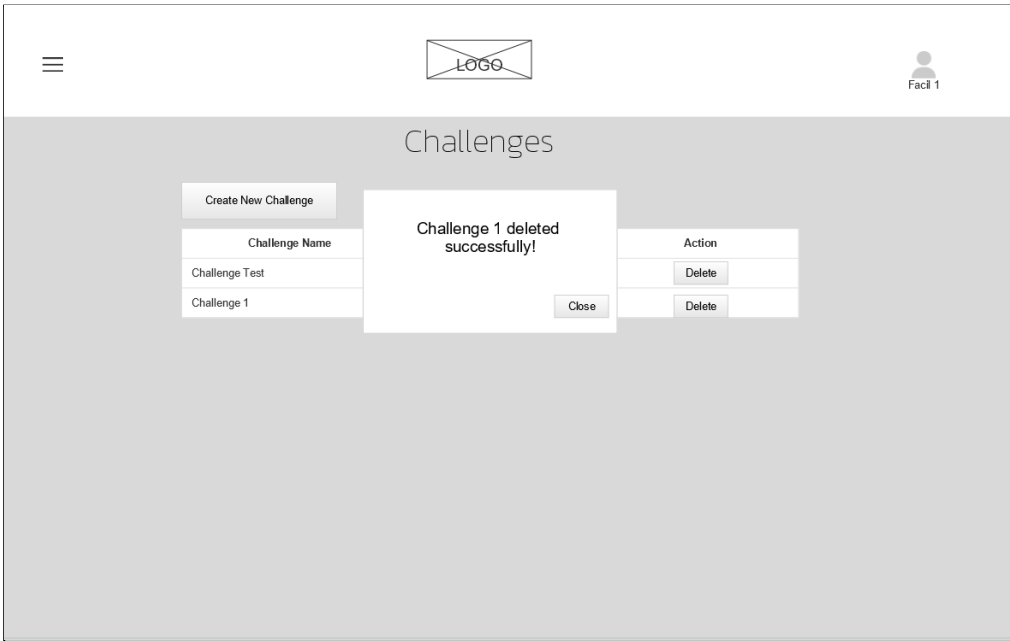|	
System Test Identifier	ST8
Relevant Use Case ID	UC8
System Test Name	Facilitator Login using Invalid Password
Preconditions	1. Web browser is open 2. Tester is not logged in 3. Tester is on BOTster Login page
Steps	1. Select "Facilitator" for the "Login as" dropdown input 2. Enter "invalid" into the "Password" input field 3. Press the "Login" button 4. Observe screen
Expected Result	
Actual Result	
Pass/Fail	
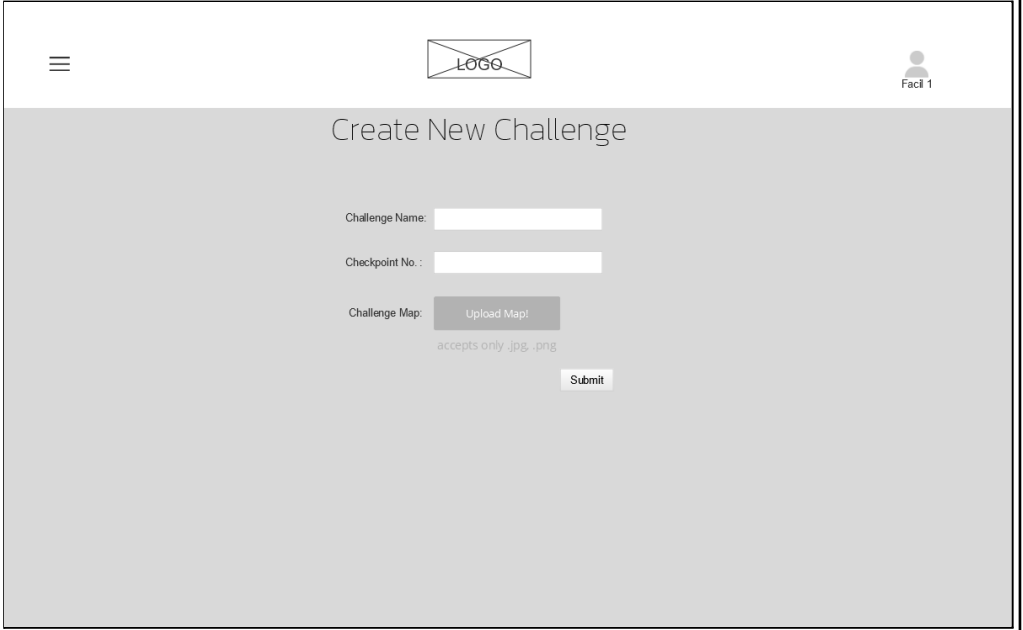
1.2.9 View Challenges List as Facilitator

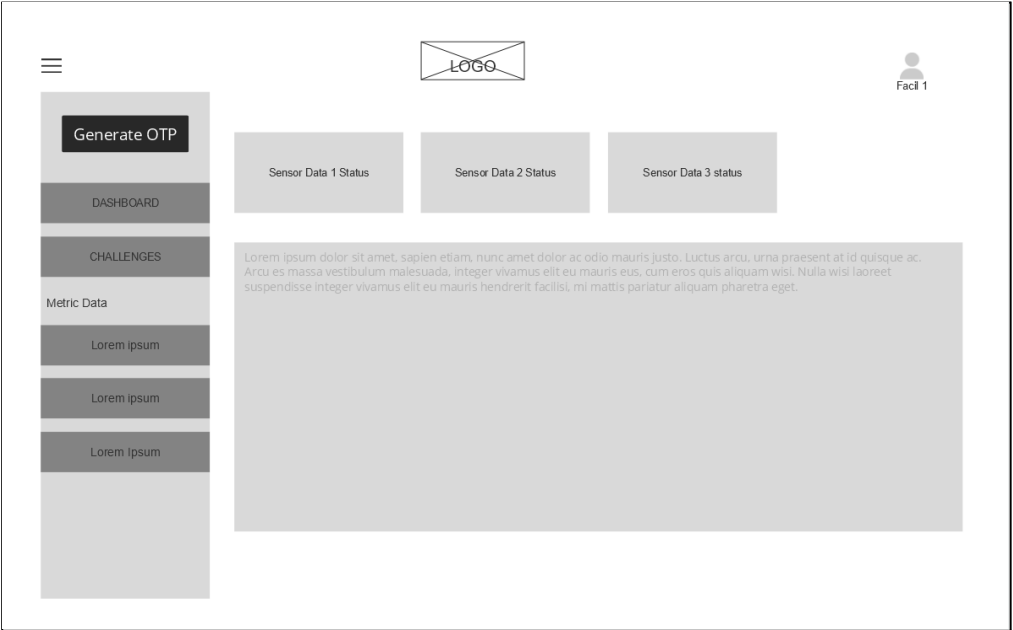| System Test Identifier	ST9
Relevant Use Case ID	UC12
System Test Name	View Challenge List as Facilitator
Preconditions	1. Tester is logged as Facilitator 2. Tester is on the Facilitator Dashboard page
Steps	1. Click on "All Challenges" 2. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.10 Delete Existing Challenge

System Test Identifier	ST10
Relevant Use Case ID	UC14
System Test Name	View Challenge List as Facilitator
Preconditions	1. Tester is logged as Facilitator 2. Tester is on the Facilitator All Challenges page
Steps	1. Click on the "Delete" button beside "Challenge 1" 2. Observe screen
Expected Result	
Actual Result	
Pass/Fail	
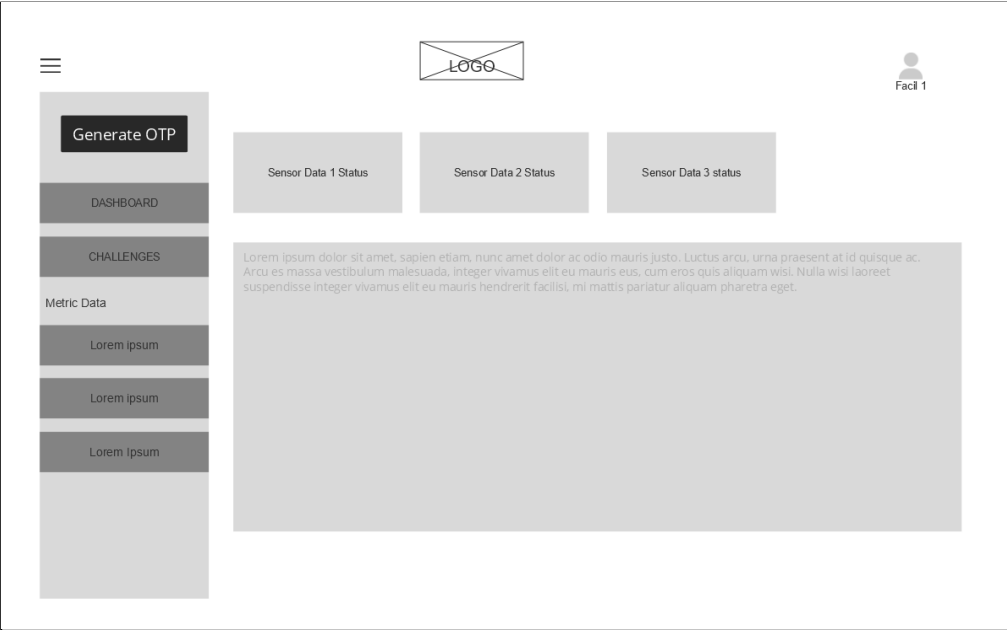
1.2.11 Display Add Challenge Page

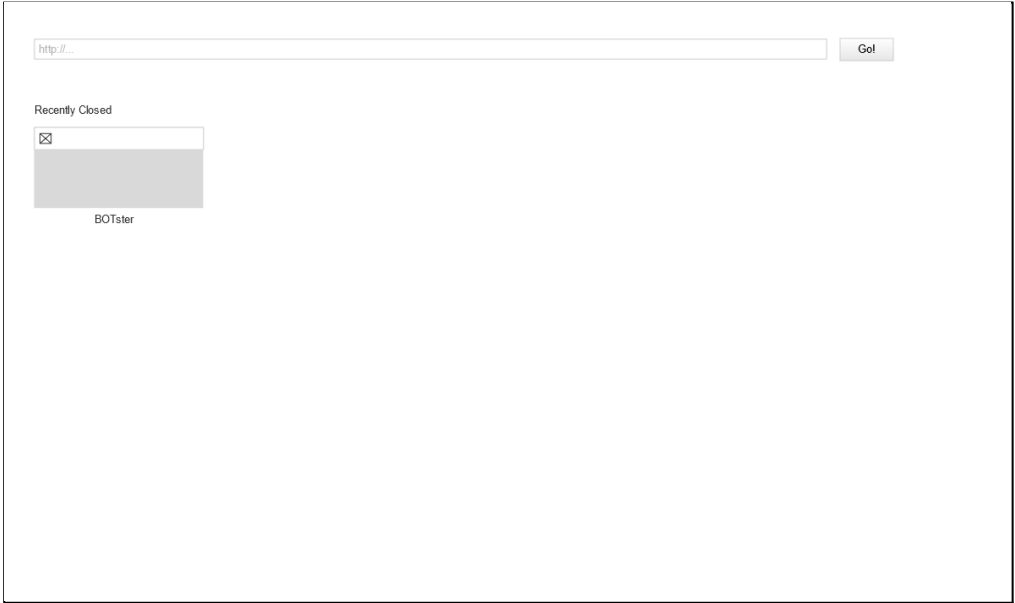|	
System Test Identifier	ST11
Relevant Use Case ID	-
System Test Name	Display Add Challenge Page
Preconditions	1. Tester is logged as Facilitator 2. Tester is on the Facilitator All Challenges page
Steps	1. Click on the "Add Challenge" button 2. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.12 Back to Facilitator Dashboard from Facilitator Challenge Listing

System Test Identifier	ST12
Relevant Use Case ID	-
System Test Name	Back to Facilitator Dashboard from Facilitator Challenge Listing
Preconditions	1. Tester is logged as Facilitator 2. Tester is on the Facilitator All Challenges page
Steps	1. Click on the "Dashboard" link 2. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.13 Closing Generated One-Time Password Modal

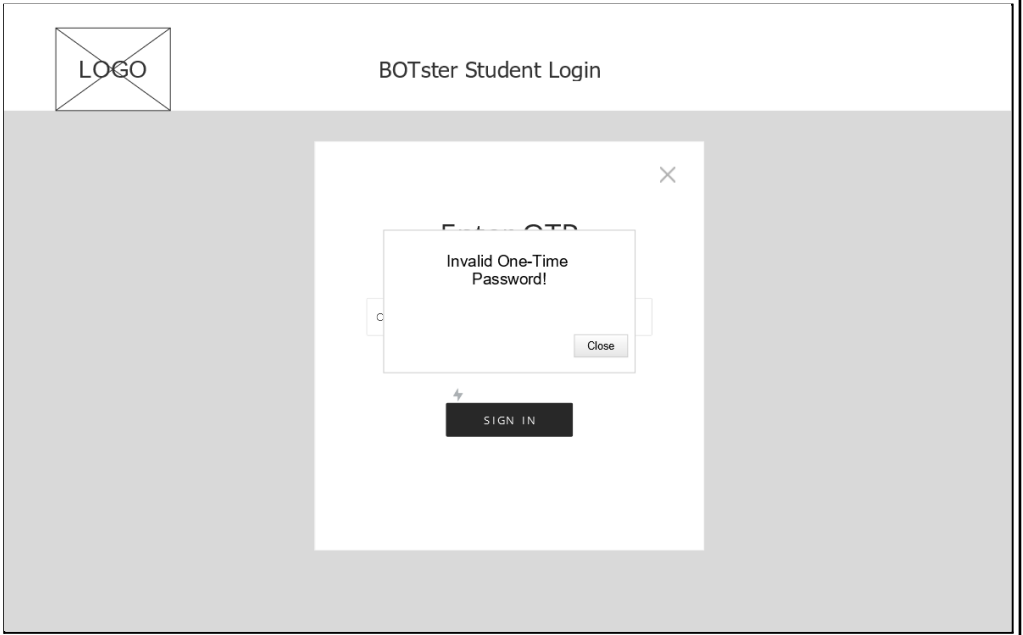|	
System Test Identifier	ST13
Relevant Use Case ID	-
System Test Name	Closing Generated One-Time Password Modal
Preconditions	1. Tester is logged as Facilitator 2. Tester completed ST1 successfully
Steps	3. Click on the "Close" button 4. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.14 Closing BOTster from Facilitator Dashboard

System Test Identifier	ST14
Relevant Use Case ID	-
System Test Name	Closing BOTster from Facilitator Dashboard
Preconditions	3. Tester is logged as Facilitator 4. Tester is on the Facilitator Dashboard
Steps	5. Click on the "X" button on the tab that has BOTster web application opened 6. Observe screen
Expected Result	
Actual Result	
Pass/Fail	
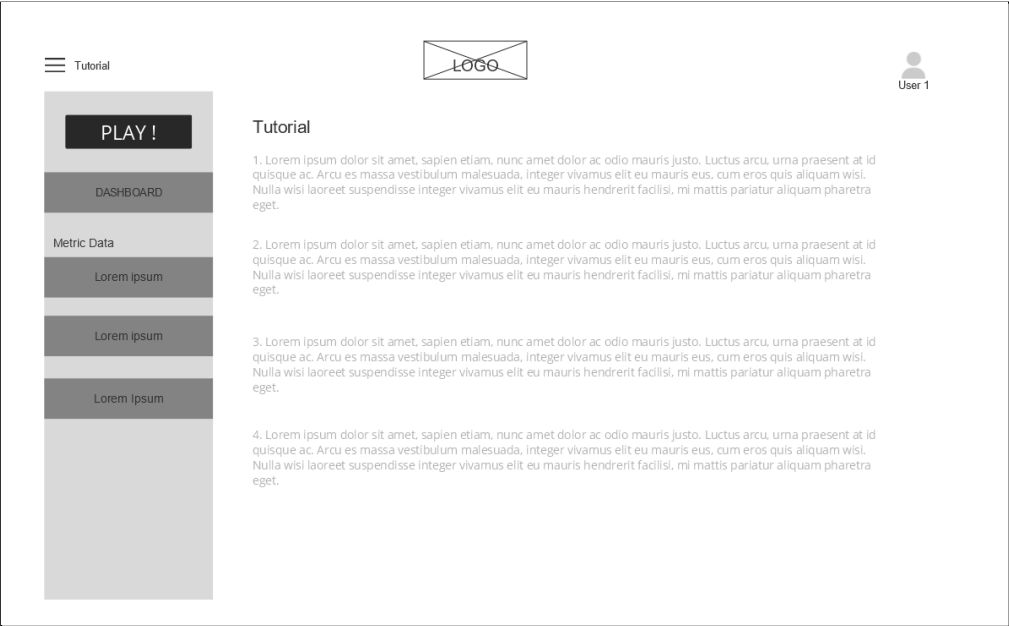
1.2.15 Login as Student

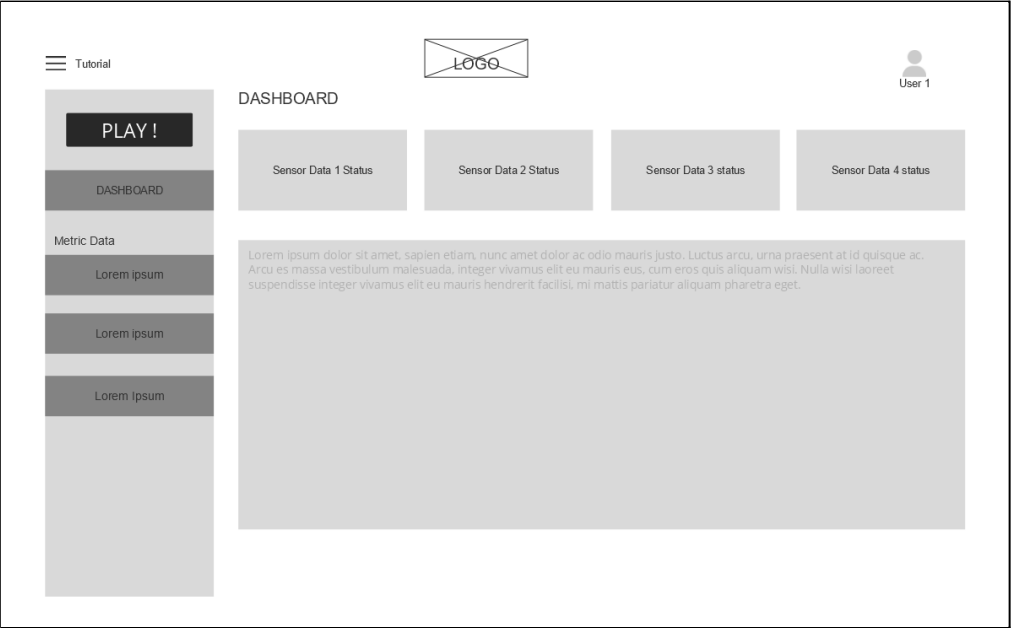| System Test Identifier	ST15
Relevant Use Case ID	UC1
System Test Name	Login as Student
Preconditions	1. Web browser is open 2. Tester is not logged in 3. Tester is on BOTster Login page 4. Generated One-Time Password from ST1 is 123456
Steps	1. Select "Student" for the "Login as" dropdown input 2. Enter "123456" into the "One-Time Password" input field 3. Press the "Login" button 4. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.16 Login using Invalid One-Time Password

System Test Identifier	ST16
Relevant Use Case ID	UC1
System Test Name	Login using Invalid One-Time Password
Preconditions	1. Web browser is open 2. Tester is not logged in 3. Tester is on BOTster Login page 4. Generated One-Time Password from ST1 is 123456
Steps	1. Select "Student" for the "Login as" dropdown input 2. Enter "000000" into the "One-Time Password" input field 3. Press the "Login" button 4. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.17 Access Tutorial

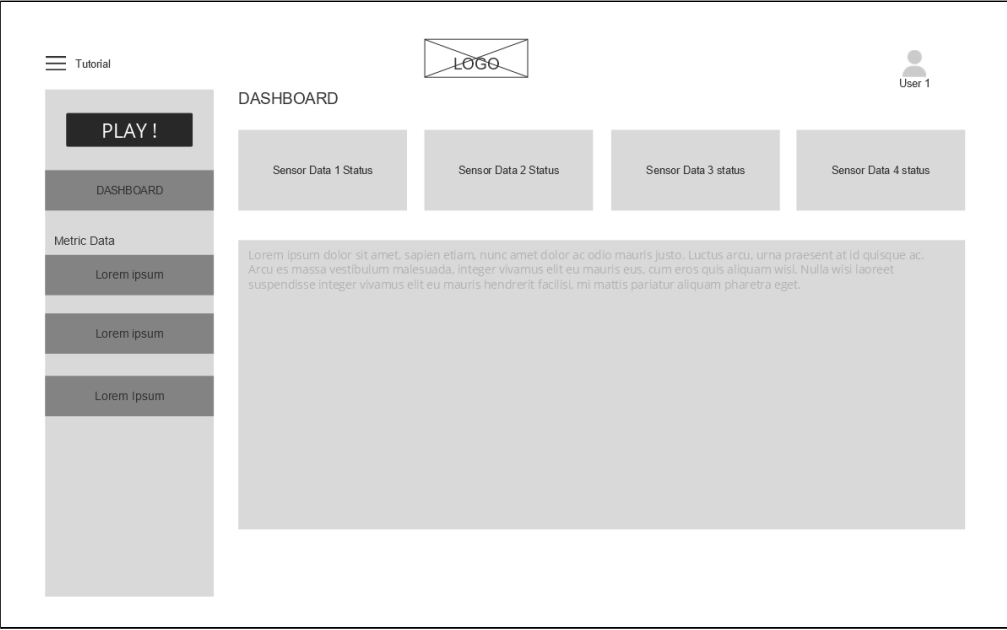|	
System Test Identifier	ST17
Relevant Use Case ID	UC3
System Test Name	Access Tutorial
Preconditions	1. Tester is logged as Student 2. Tester is on the Student Dashboard page
Steps	1. Click on "Tutorial" 2. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.18 Back to Dashboard from Tutorial

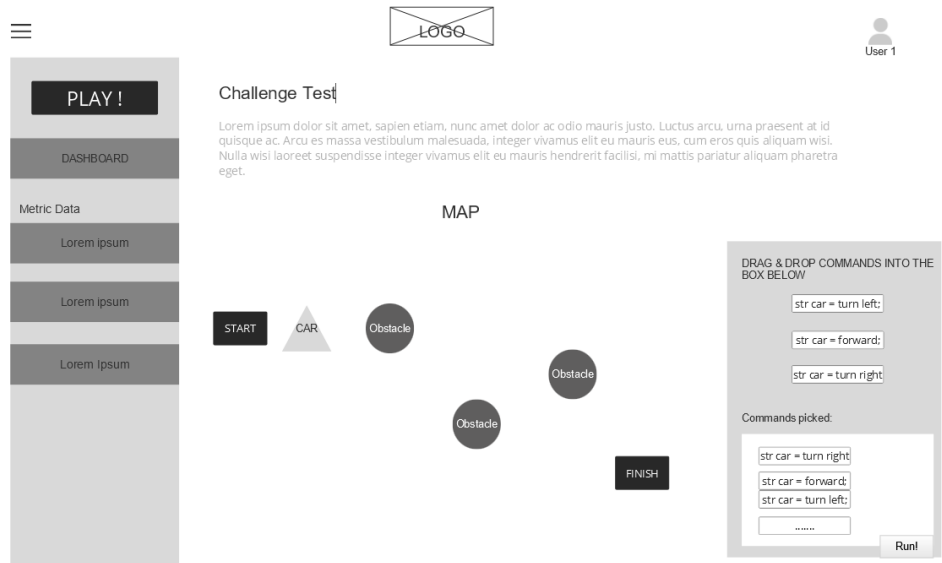| System Test Identifier	ST18
Relevant Use Case ID	UC3
System Test Name	Back to Dashboard from Tutorial
Preconditions	1. Tester is logged as Student 2. Tester is on the Tutorial page
Steps	1. Click on the "Dashboard" link 2. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.19 View Challenges List as Student

System Test Identifier	ST19
Relevant Use Case ID	-
System Test Name	View Challenge List as Student
Preconditions	1. Tester is logged as Student 2. Tester is on the Student Dashboard page
Steps	1. Click on "All Challenges" 2. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.20 Back to Dashboard from Student Challenges List

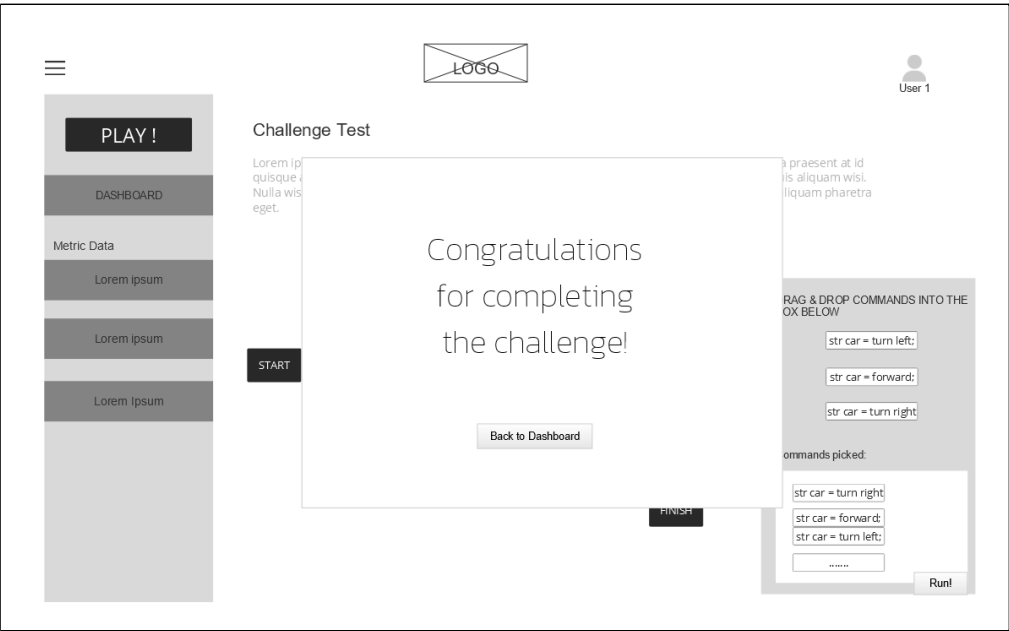|	
System Test Identifier	ST20
Relevant Use Case ID	-
System Test Name	Back to Dashboard from Student Challenges List
Preconditions	1. Tester is logged as Student 2. Tester is on the Student Challenge List page
Steps	1. Click on the "Dashboard" link 2. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.21 Start Challenge

System Test Identifier	ST21
Relevant Use Case ID	UC4
System Test Name	Start Challenge
Preconditions	1. Tester is logged as Student 2. Tester is on the Student Challenge List page
Steps	1. Click on the "Start" button beside "Challenge Test" 2. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.22 ~~Lost Connection to Robotic Car on Challenge Game Screen~~ (REMOVED)
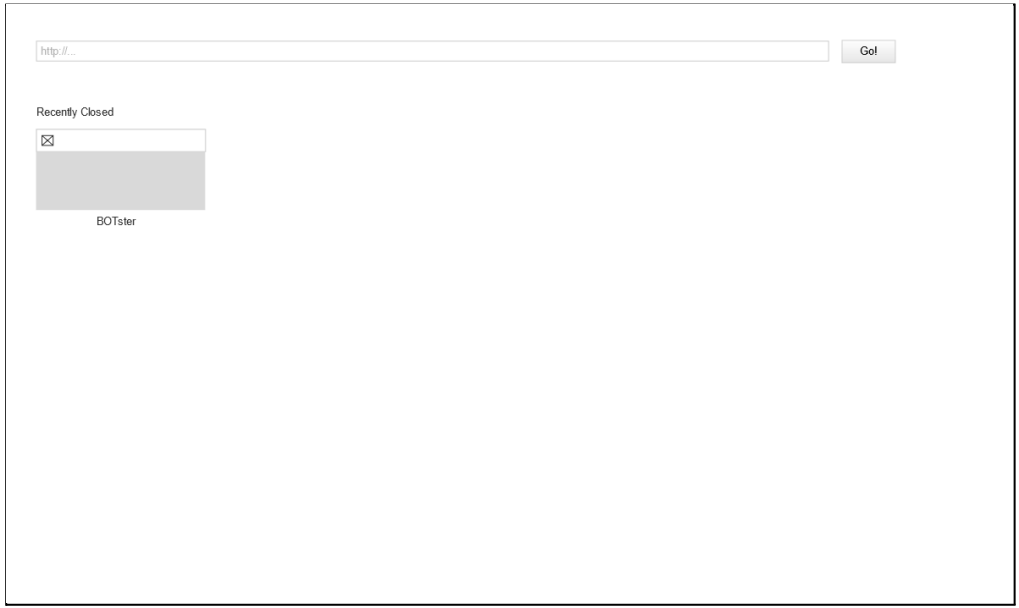
System Test Identifier	ST22

1.2.23 Complete Challenge

System Test Identifier	ST23
Relevant Use Case ID	-
System Test Name	Complete Challenge
Preconditions	1. Tester is logged as Student 2. Tester completed ST21 successfully
Steps	1. Drag and drop the "Move Forward" command block onto the Command panel 2 times 2. Press the "Issue Command" button 3. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.24 Back to Dashboard after Challenge Completion

System Test Identifier	ST24
Relevant Use Case ID	-
System Test Name	Back to Dashboard after Challenge Completion
Preconditions	1. Tester is logged as Student 2. Tester completed ST23 successfully
Steps	1. Press the "Back to Dashboard" button 2. Observe screen
Expected Result	
Actual Result	
Pass/Fail	

1.2.25 Closing BOTster after Student Challenge Completion

System Test Identifier	ST25
Relevant Use Case ID	-
System Test Name	Closing BOTster after Student Challenge Completion
Preconditions	1. Tester is logged as Facilitator 2. Tester completed ST23 successfully
Steps	1. Click on the "X" button on the tab that has BOTster web application opened 2. Observe screen
Expected Result	
Actual Result	
Pass/Fail	