FeedbackFruits

How was the Ember QA Challange

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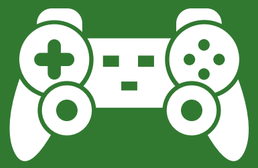
Project Link : https://github.com/Eaylcn/TicTacToest

Research Section

First of all, I started doing research on the internet about the tools I would use to get an idea about the task given to me. Ember, QUnit and Javascript were the 3 keywords I came across for the first time. I started to gather information about these 3 keywords by using the links on the PDF. I managed to download the necessary tools to my computer and open the game at "http://localhost:4200" with the instructions on github. After opening the game, I started by exploring what other buttons on the site do.

Ember.js **QUnit** **Acceptance**

Prepare Test Scenarios



Gameplay

I thought all 8 different ways x or o could win in Gameplay should be tested.

Mixing

I also reduced the number of scenarios and reduced the test time with the Pairwise technique that I found in my research on the internet.

Buttons

Buttons on all screens of the application that I saw had to be tested in separate scenarios.

Pairwise

Pairwise testing is an effective test case generation technique that is based on the observation that most faults are caused by interactions of at most two factors. Pairwise-generated test suites cover all combinations of two therefore are much smaller than exhaustive ones yet still very effective in finding defects.

Before Pairwise

The scenarios I wrote consisted of a total of 32 tests and the running time was approximately 3123ms.

After Pairwise

As a result, with this technique, I was able to reduce the number of tests from 32 to 18, reducing the run time by about 1000 ms.

Benefits

Thanks to Pairwise, shortening of testing time, improvement in optimization and increase in efficiency were gained.

Before Pairwise

22.12.2022 15:42 localhost:4200/tests?nocontainer

Tictactoe Tests

Hide passed tests | Check for Globals | No try-catch | Hide container | Disable Linting | Development mode

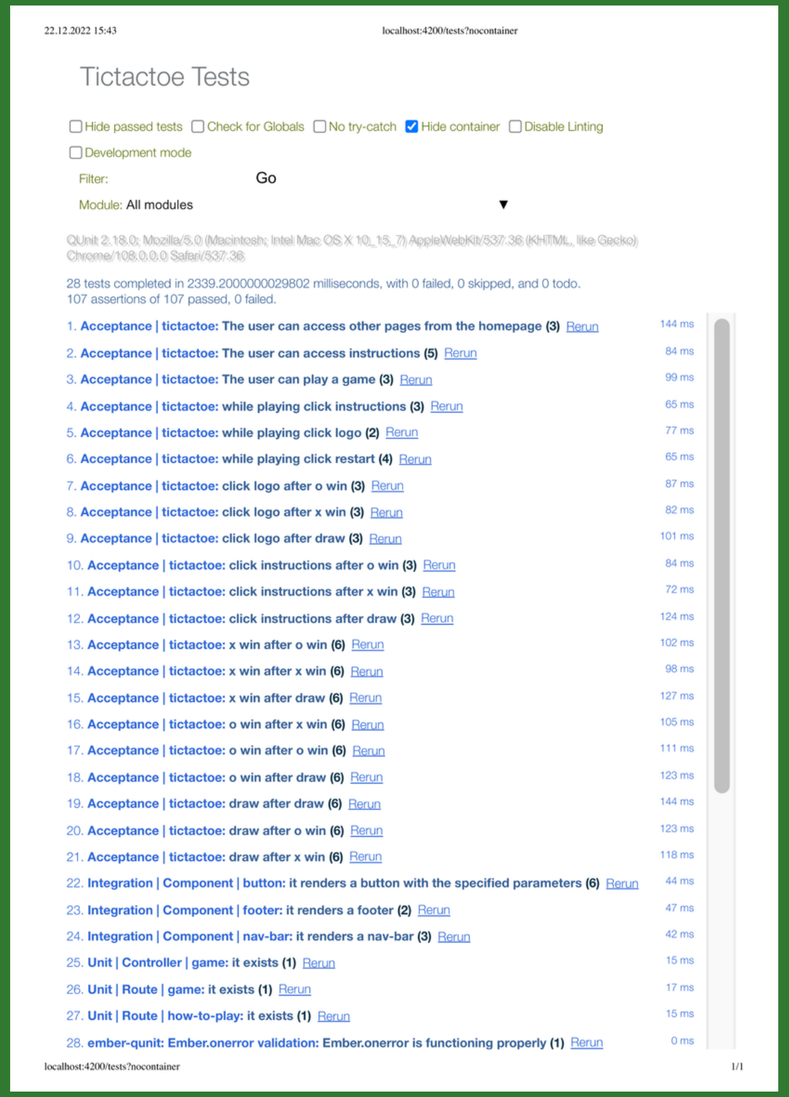
Filter: Go Module: All modules

QUnit 2.18.0; Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/108.0.0.0 Safari/537.36

42 tests completed in 3123.7999999970198 milliseconds, with 0 failed, 0 skipped, and 0 todo.
117 assertions of 117 passed, 0 failed.

1. **Acceptance | tictactoe: The user can access other pages from the homepage (3)** Rerun 62 ms
2. **Acceptance | tictactoe: The user can access instructions (5)** Rerun 69 ms
3. **Acceptance | tictactoe: The user can play a game (3)** Rerun 50 ms
4. **Acceptance | tictactoe: x win first column (2)** Rerun 76 ms
5. **Acceptance | tictactoe: x win second column (2)** Rerun 74 ms
6. **Acceptance | tictactoe: x win third column (2)** Rerun 78 ms
7. **Acceptance | tictactoe: x win first row (2)** Rerun 78 ms
8. **Acceptance | tictactoe: x win second row (2)** Rerun 80 ms
9. **Acceptance | tictactoe: x win third row (2)** Rerun 76 ms
10. **Acceptance | tictactoe: x win 0 to 8 diagonal line (2)** Rerun 75 ms
11. **Acceptance | tictactoe: x win 2 to 6 diagonal line (2)** Rerun 82 ms
12. **Acceptance | tictactoe: o win first column (2)** Rerun 80 ms
13. **Acceptance | tictactoe: o win second column (2)** Rerun 82 ms
14. **Acceptance | tictactoe: o win third column (2)** Rerun 83 ms
15. **Acceptance | tictactoe: o win first row (2)** Rerun 83 ms
16. **Acceptance | tictactoe: o win second row (2)** Rerun 83 ms
17. **Acceptance | tictactoe: o win third row (2)** Rerun 71 ms
18. **Acceptance | tictactoe: o win 0 to 8 diagonal line (2)** Rerun 80 ms
19. **Acceptance | tictactoe: o win 2 to 6 diagonal line (2)** Rerun 83 ms
20. **Acceptance | tictactoe: while playing click instructions (3)** Rerun 63 ms
21. **Acceptance | tictactoe: while playing click logo (2)** Rerun 67 ms
22. **Acceptance | tictactoe: while playing click restart (4)** Rerun 67 ms
23. **Acceptance | tictactoe: result is draw (2)** Rerun 103 ms
24. **Acceptance | tictactoe: restart after draw (5)** Rerun 104 ms
25. **Acceptance | tictactoe: restart after o win (5)** Rerun 86 ms
26. **Acceptance | tictactoe: restart after x win (5)** Rerun 82 ms
27. **Acceptance | tictactoe: o win after restart (5)** Rerun 88 ms
28. **Acceptance | tictactoe: x win after restart (5)** Rerun 91 ms
29. **Acceptance | tictactoe: draw after restart (5)** Rerun 110 ms
30. **Acceptance | tictactoe: click logo after o win (3)** Rerun 94 ms
31. **Acceptance | tictactoe: click logo after x win (3)** Rerun 81 ms
32. **Acceptance | tictactoe: click logo after draw (3)** Rerun 122 ms
33. **Acceptance | tictactoe: click instructions after o win (3)** Rerun 90 ms
34. **Acceptance | tictactoe: click instructions after x win (3)** Rerun 78 ms
35. **Acceptance | tictactoe: click instructions after draw (3)** Rerun 110 ms
36. **Integration | Component | button: it renders a button with the specified parameters (6)** Rerun 46 ms
37. **Integration | Component | footer: it renders a footer (2)** Rerun 54 ms
38. **Integration | Component | nav-bar: it renders a nav-bar (3)** Rerun 52 ms
39. **Unit | Controller | game: it exists (1)** Rerun 20 ms
40. **Unit | Route | game: it exists (1)** Rerun 16 ms
41. **Unit | Route | how-to-play: it exists (1)** Rerun 18 ms
42. **ember-qunit: Ember.onerror validation: Ember.onerror is functioning properly (1)** Rerun 1 ms

After Pairwise



22.12.2022 15:43 localhost:4200/tests?nocontainer

Tictactoe Tests

Hide passed tests | Check for Globals | No try-catch | Hide container | Disable Linting

Development mode

Filter: Go

Module: All modules

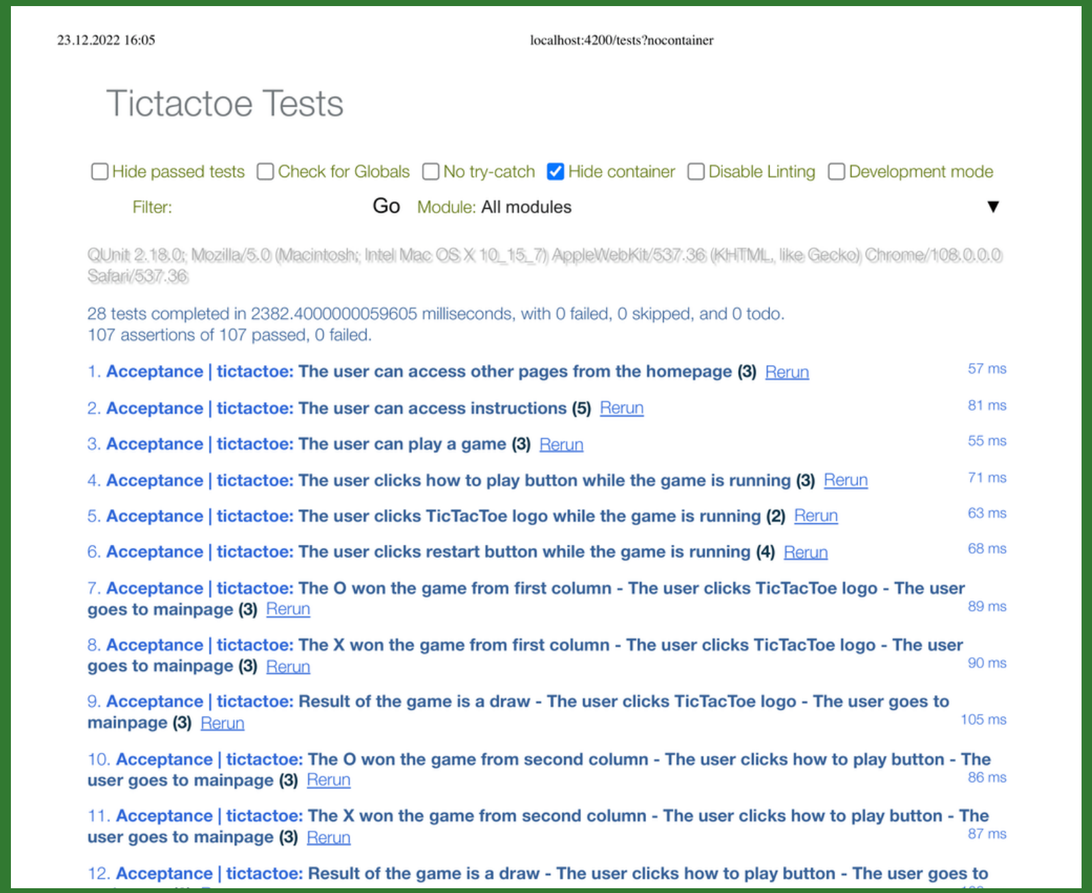
QUnit 2.18.0; Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/108.0.0.0 Safari/537.36

28 tests completed in 2339.2000000029802 milliseconds, with 0 failed, 0 skipped, and 0 todo.
107 assertions of 107 passed, 0 failed.

1. **Acceptance | tictactoe: The user can access other pages from the homepage (3)** Rerun 144 ms
2. **Acceptance | tictactoe: The user can access instructions (5)** Rerun 84 ms
3. **Acceptance | tictactoe: The user can play a game (3)** Rerun 99 ms
4. **Acceptance | tictactoe: while playing click instructions (3)** Rerun 65 ms
5. **Acceptance | tictactoe: while playing click logo (2)** Rerun 77 ms
6. **Acceptance | tictactoe: while playing click restart (4)** Rerun 65 ms
7. **Acceptance | tictactoe: click logo after o win (3)** Rerun 87 ms
8. **Acceptance | tictactoe: click logo after x win (3)** Rerun 82 ms
9. **Acceptance | tictactoe: click logo after draw (3)** Rerun 101 ms
10. **Acceptance | tictactoe: click instructions after o win (3)** Rerun 84 ms
11. **Acceptance | tictactoe: click instructions after x win (3)** Rerun 72 ms
12. **Acceptance | tictactoe: click instructions after draw (3)** Rerun 124 ms
13. **Acceptance | tictactoe: x win after o win (6)** Rerun 102 ms
14. **Acceptance | tictactoe: x win after x win (6)** Rerun 98 ms
15. **Acceptance | tictactoe: x win after draw (6)** Rerun 127 ms
16. **Acceptance | tictactoe: o win after x win (6)** Rerun 105 ms
17. **Acceptance | tictactoe: o win after o win (6)** Rerun 111 ms
18. **Acceptance | tictactoe: o win after draw (6)** Rerun 123 ms
19. **Acceptance | tictactoe: draw after draw (6)** Rerun 144 ms
20. **Acceptance | tictactoe: draw after o win (6)** Rerun 123 ms
21. **Acceptance | tictactoe: draw after x win (6)** Rerun 118 ms
22. **Integration | Component | button: it renders a button with the specified parameters (6)** Rerun 44 ms
23. **Integration | Component | footer: it renders a footer (2)** Rerun 47 ms
24. **Integration | Component | nav-bar: it renders a nav-bar (3)** Rerun 42 ms
25. **Unit | Controller | game: it exists (1)** Rerun 15 ms
26. **Unit | Route | game: it exists (1)** Rerun 17 ms
27. **Unit | Route | how-to-play: it exists (1)** Rerun 15 ms
28. **ember-qunit: Ember.onerror validation: Ember.onerror is functioning properly (1)** Rerun 0 ms

localhost:4200/tests?nocontainer 1/1

Also I Changed Test Names to be more descriptive



23.12.2022 16:05 localhost:4200/tests?nocontainer

Tictactoe Tests

☐ Hide passed tests ☐ Check for Globals ☐ No try-catch ☑ Hide container ☐ Disable Linting ☐ Development mode

Filter: Go Module: All modules

QUnit 2.18.0; Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/108.0.0.0 Safari/537.36

28 tests completed in 2382.4000000059605 milliseconds, with 0 failed, 0 skipped, and 0 todo.
107 assertions of 107 passed, 0 failed.

1. **Acceptance | tictactoe: The user can access other pages from the homepage (3)** Rerun 57 ms
2. **Acceptance | tictactoe: The user can access instructions (5)** Rerun 81 ms
3. **Acceptance | tictactoe: The user can play a game (3)** Rerun 55 ms
4. **Acceptance | tictactoe: The user clicks how to play button while the game is running (3)** Rerun 71 ms
5. **Acceptance | tictactoe: The user clicks TicTacToe logo while the game is running (2)** Rerun 63 ms
6. **Acceptance | tictactoe: The user clicks restart button while the game is running (4)** Rerun 68 ms
7. **Acceptance | tictactoe: The O won the game from first column - The user clicks TicTacToe logo - The user goes to mainpage (3)** Rerun 89 ms
8. **Acceptance | tictactoe: The X won the game from first column - The user clicks TicTacToe logo - The user goes to mainpage (3)** Rerun 90 ms
9. **Acceptance | tictactoe: Result of the game is a draw - The user clicks TicTacToe logo - The user goes to mainpage (3)** Rerun 105 ms
10. **Acceptance | tictactoe: The O won the game from second column - The user clicks how to play button - The user goes to mainpage (3)** Rerun 86 ms
11. **Acceptance | tictactoe: The X won the game from second column - The user clicks how to play button - The user goes to mainpage (3)** Rerun 87 ms
12. **Acceptance | tictactoe: Result of the game is a draw - The user clicks how to play button - The user goes to mainpage (3)** Rerun 108 ms
13. **Acceptance | tictactoe: The O won the game from third column - The user clicks restart button - The X won the game from third column (6)** Rerun 109 ms
14. **Acceptance | tictactoe: The X won the game from 0-8 diagonal way - The user clicks restart button - The X won the game from 2-6 diagonal way (6)** Rerun 105 ms
15. **Acceptance | tictactoe: Result of the game is a draw - The user clicks restart button - The X won the game from first row (6)** Rerun 134 ms
16. **Acceptance | tictactoe: The X won the game from second row - The user clicks restart button - The O won the game from first row (6)** Rerun 124 ms
17. **Acceptance | tictactoe: The O won the game from 0-8 diagonal way - The user clicks restart button - The O won the game from 2-6 diagonal way (6)** Rerun 127 ms
18. **Acceptance | tictactoe: Result of the game is a draw - The user clicks restart button - The O won the game from second row (6)** Rerun 154 ms
19. **Acceptance | tictactoe: Result of the game is a draw - The user clicks restart button - Result of the game is a draw (6)** Rerun 166 ms
20. **Acceptance | tictactoe: The O won the game from third row - The user clicks restart button - Result of the game is a draw (6)** Rerun 149 ms
21. **Acceptance | tictactoe: The X won the game from third row - The user clicks restart button - Result of the game is a draw (6)** Rerun 140 ms
22. **Integration | Component | button: it renders a button with the specified parameters (6)** Rerun 46 ms
23. **Integration | Component | footer: it renders a footer (2)** Rerun 50 ms
24. **Integration | Component | nav-bar: it renders a nav-bar (3)** Rerun 46 ms
25. **Unit | Controller | game: it exists (1)** Rerun 20 ms
26. **Unit | Route | game: it exists (1)** Rerun 17 ms
27. **Unit | Route | how-to-play: it exists (1)** Rerun 16 ms
28. **ember-qunit: Ember.onerror validation: Ember.onerror is functioning properly (1)** Rerun 0 ms

localhost:4200/tests?nocontainer 1/1

The problems that i encountered

Technical Difficulities

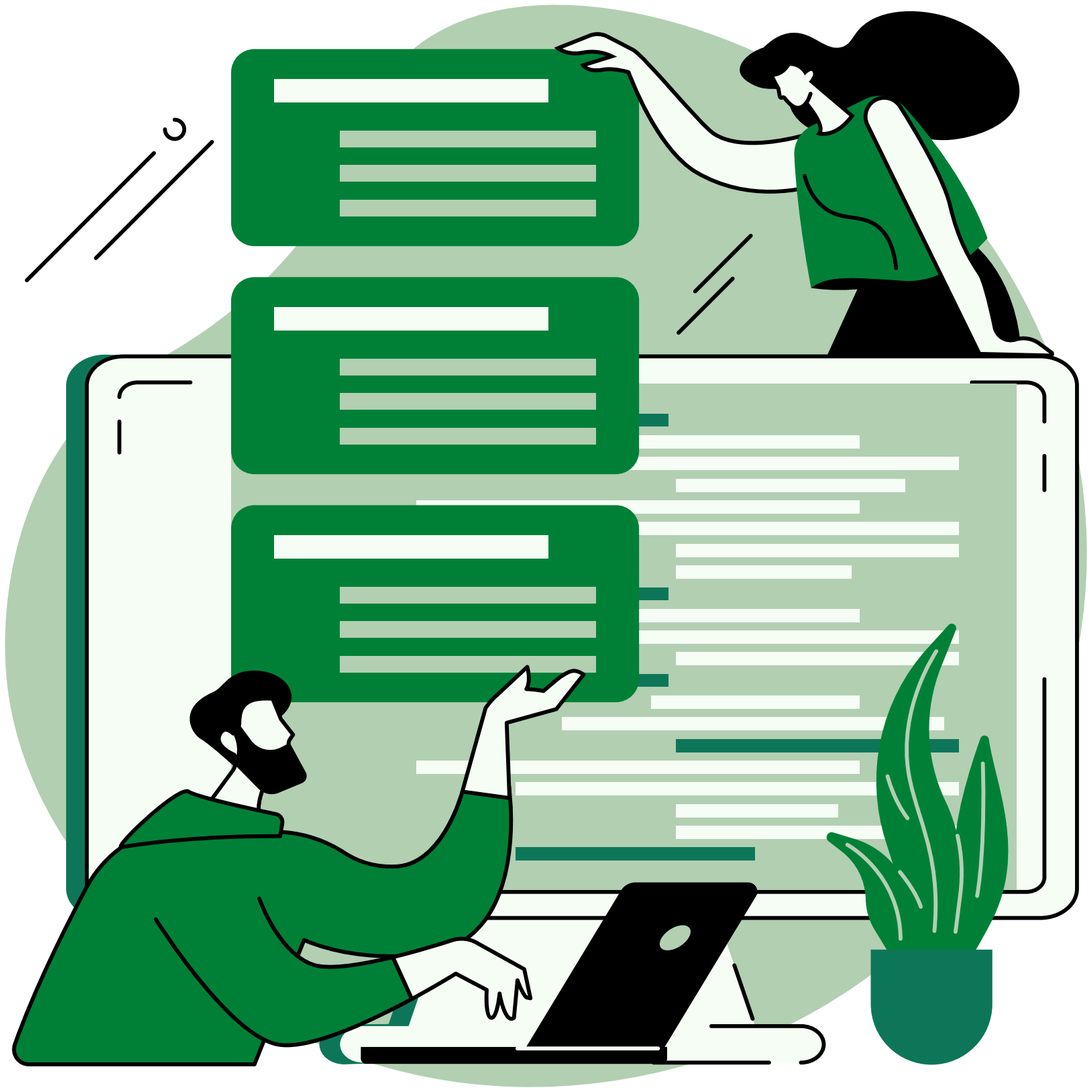
I could not test a few scenarios that needed to be tested due to technical inadequacies, some of these scenarios were important tests.

1 difference between X and O

At the end of each game there must be only 1 difference between X and O. In order for this to be tested, I need to find an element with a certain ID, but QUnit does not allow me to pull this element in the DOM.

O should appear after X

When I move the mouse to a cell on the game screen, an X or O appears on the cell. But the cell element does not have any changing properties, so "I could not test the scenario where O should appear after X.



Improvements for TicTacToe to increase the Testability

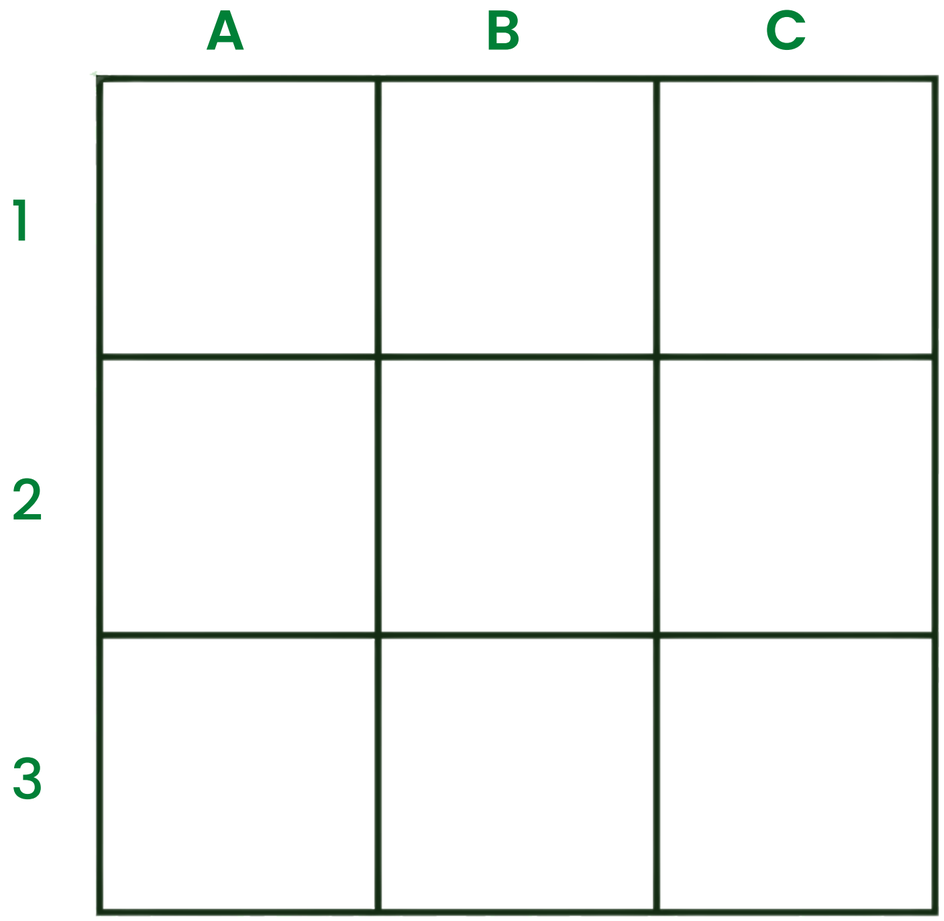
ALWAYS X

Since X always starts the game first, I couldn't test any scenario where O starts.

DONT CLICK HOW TO PLAY

A user who wants to look at the game rules in the middle of the game cannot continue if the user wants to continue the game after opening the rules and looking at them again. Maybe I caught a bug :)

My strategy while preparing test cases about gameplay



First Row is 1(A,B,C)

Second Row is 2(A,B,C)

Third Row is 3(A,B,C)

First Column is A(1,2,3)

Second Column is B(1,2,3)

Third Column is C(1,2,3)

0-8 Diagonal Way is 1A, 2B, 3C

2-6 Diagonal Way is 1C, 2B, 3A

Results

Technical

Within the scope of the project, I used QUnit, Ember.js, Git and I improved my tool usage and technical knowledge on this subject by researching them.

Testing

I learned and implemented the process of how to write Acceptance tests. I was able to increase the optimization by researching the pairwise technique and applying it to the scenarios at hand.

References

Github
https://github.com/mainmatter/qunit-dom/blob/HEAD/API.md

NPM
https://docs.npmjs.com/

QUnit
https://api.qunitjs.com/

Ember Testing
https://medium.com/@sarbbottam/the-ember-js-testing-guide-i-made-for-myself-c9a073a0c718

QUnit Assertions
https://www.tutorialspoint.com/qunit/qunit_using_assertions.htm

Acceptance Test
https://www.softwaretestinghelp.com/what-is-acceptance-testing/

Thanks!

Presenter : Emir Ata Yalçın