RICHFIELD GRADUATE INSTITUTE OF TECHNOLOGY (PTY) LTD

FACULTY OF INFORMATION TECHNOLOGY

WEB TECHNOLOGY 512

2ND SEMESTER ASSIGNMENT

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Qualification: DIT 3 year **Semester:** 2 **Module Name:** Web Technology 512

Date Submitted: 27/09/2019

ASSESSMENT CRITERIA	MARK ALLOCATION	EXAMINER MARKS	MODERATOR MARKS
MARKS FOR CONTENT			
QUESTION ONE	70		
QUESTION TWO	20		
QUESTION THREE	10		
TOTAL MARKS	**100**		
MARKS FOR TECHNICAL ASPECTS			
1. TABLE OF CONTENTS Accurate numbering according to the numbering in text and page numbers.			
2. LAYOUT AND SPELLING Font – Calibri 12 Line Spacing – 1.0 Margin should be justified.			
3. REFERENCE According to the Harvard Method			
TOTAL MARKS			
TOTAL MARKS FOR ASSIGNMENT	**100**		
Examiner's Comments:			
Moderator's Comments:			
Signature of Examiner:	**Signature of Moderator:**		

WEB Technology 512

Assignment 2

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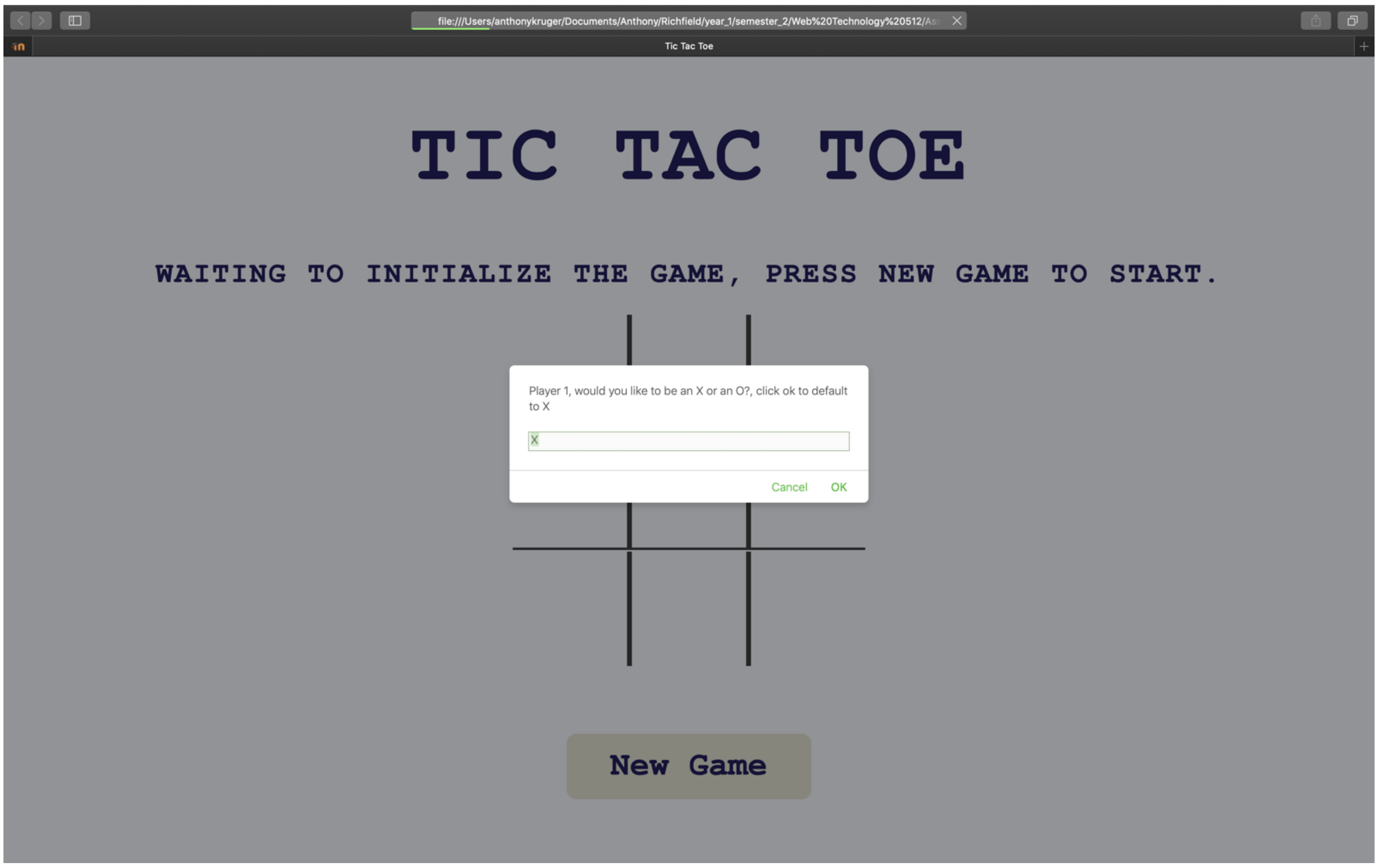
Table of contents:

Question 1: (70)

(Tic-Tac-Toe) Create a class Tic-Tac-Toe that will enable you to write a program to play Tic-Tac-Toe. The class contains a private 3-by-3 two-dimensional array. Use an enumeration to represent the value in each cell of the array. The enumeration's constants should be named X, O and EMPTY (for a position that does not contain an X or an O). The constructor should initialize the board elements to EMPTY. Allow two human players. Wherever the first player moves, place an X in the specified square, and place an O wherever the second player moves. Each move must be to an empty square. After each move, determine whether the game has been won and whether it's a draw. Also, allow the player to specify whether he or she wants to go first or second.

Screen shot of the game initializing and requesting player what symbol they would like to be:

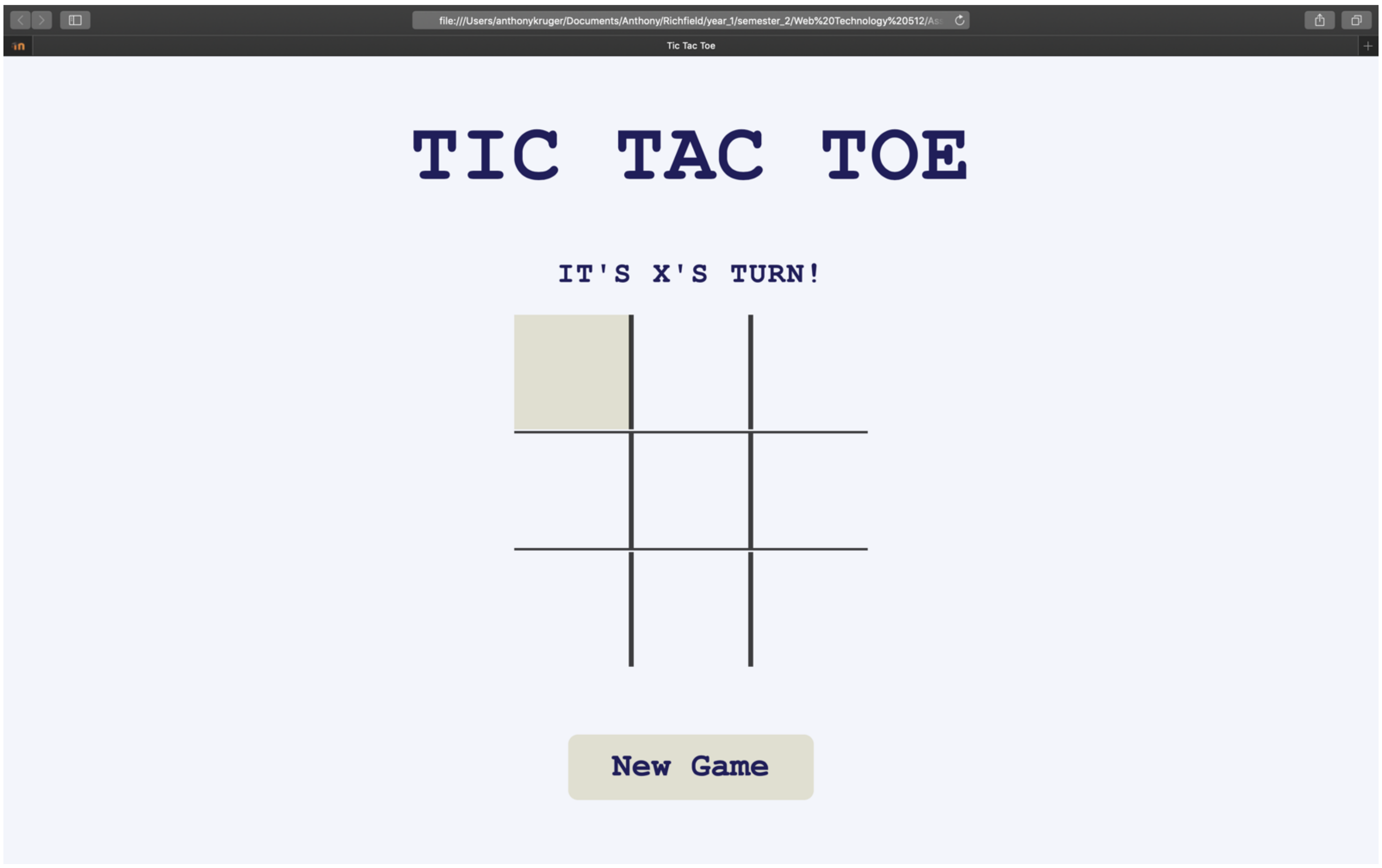

file:///Users/anthonykruger/Documents/Anthony/Richfield/year_1/semester_2/Web%20Technology%20512/As
Tic Tac Toe
X
Cancel
OK
New Game

TIC TAC TOE

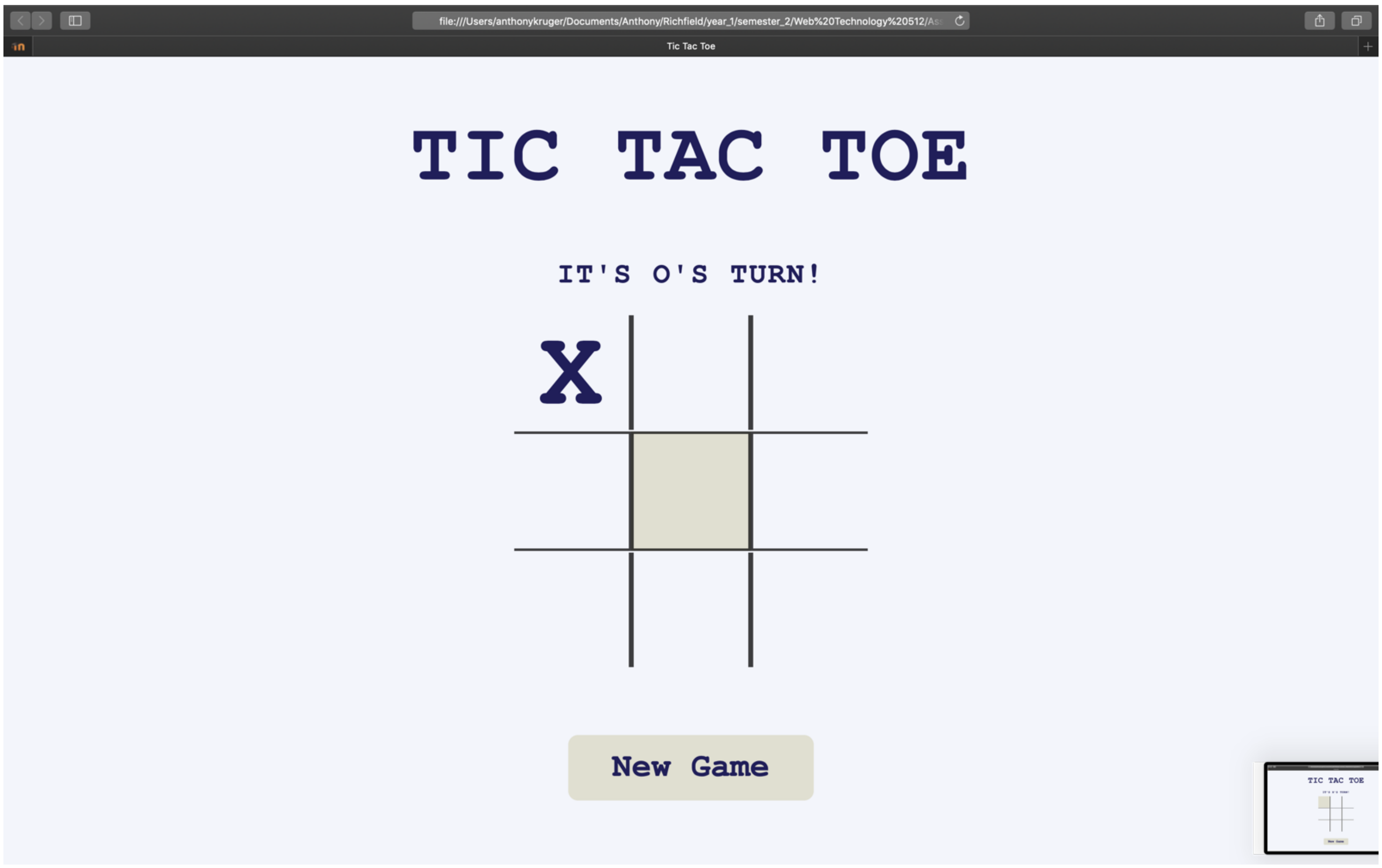
WAITING TO INITIALIZE THE GAME, PRESS NEW GAME TO START.

Player 1, would you like to be an X or an O?, click ok to default to X

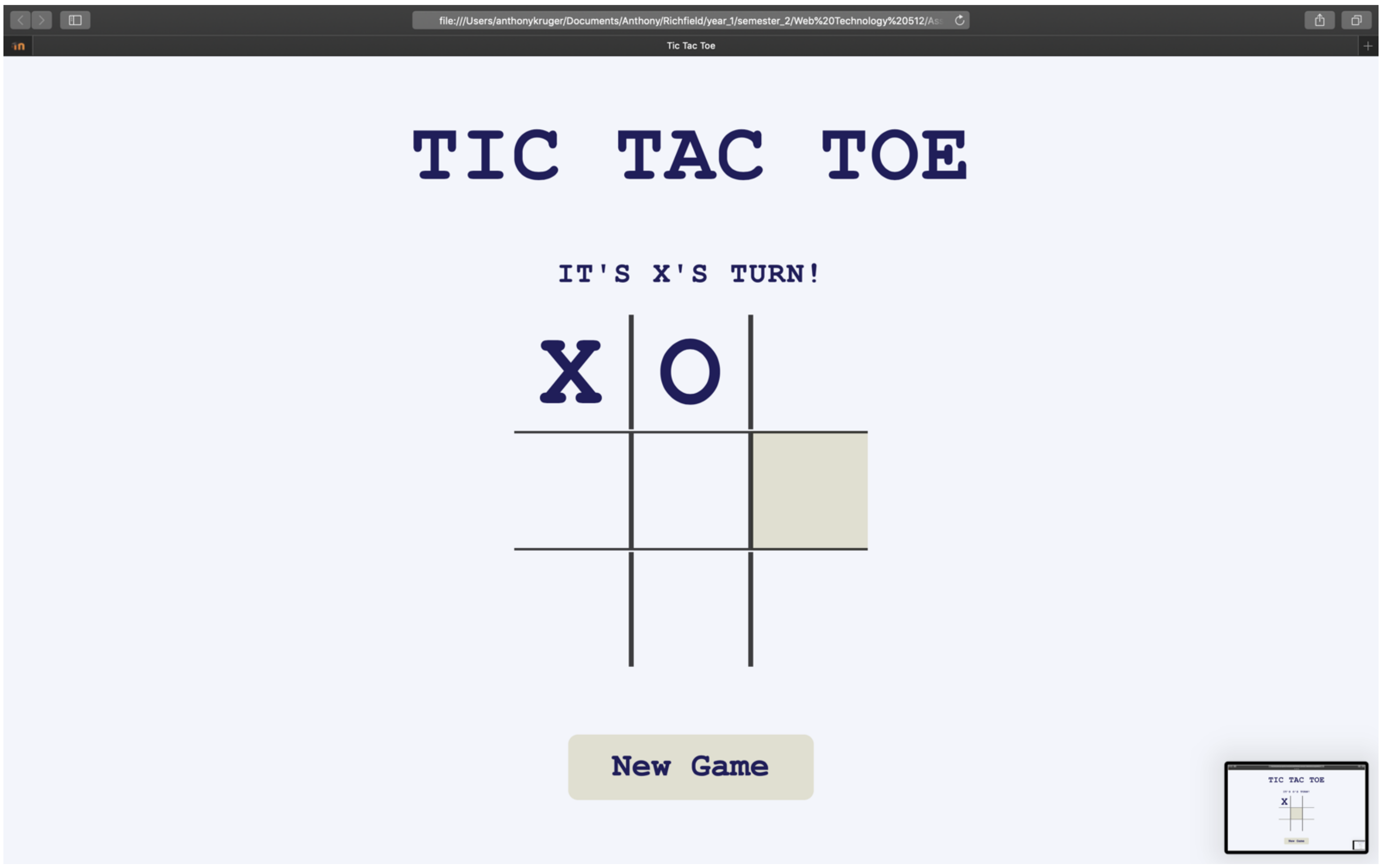
Screenshot of game initialized, the coloured square is an on mouse over event for the div and message showing it is X's turn:


file:///Users/anthonykruger/Documents/Anthony/Richfield/year_1/semester_2/Web%20Technology%20512/As
Tic Tac Toe
TIC TAC TOE
IT'S X'S TURN!
New Game

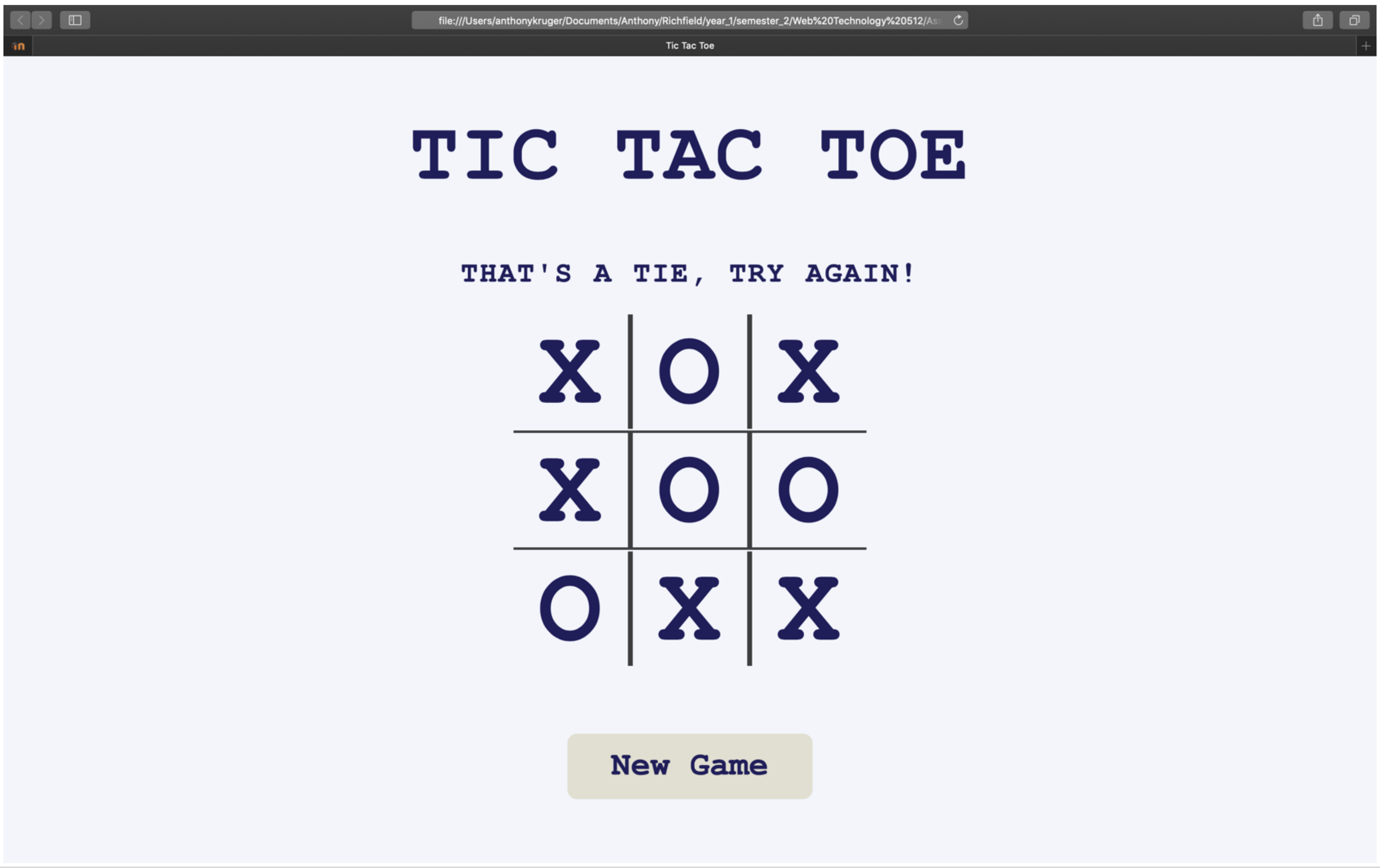
Screenshot showing that it is now O's turn and X has been displayed in the game:


file:///Users/anthonykruger/Documents/Anthony/Richfield/year_1/semester_2/Web%20Technology%20512/As
Tic Tac Toe
TIC TAC TOE
IT'S O'S TURN!
X
New Game

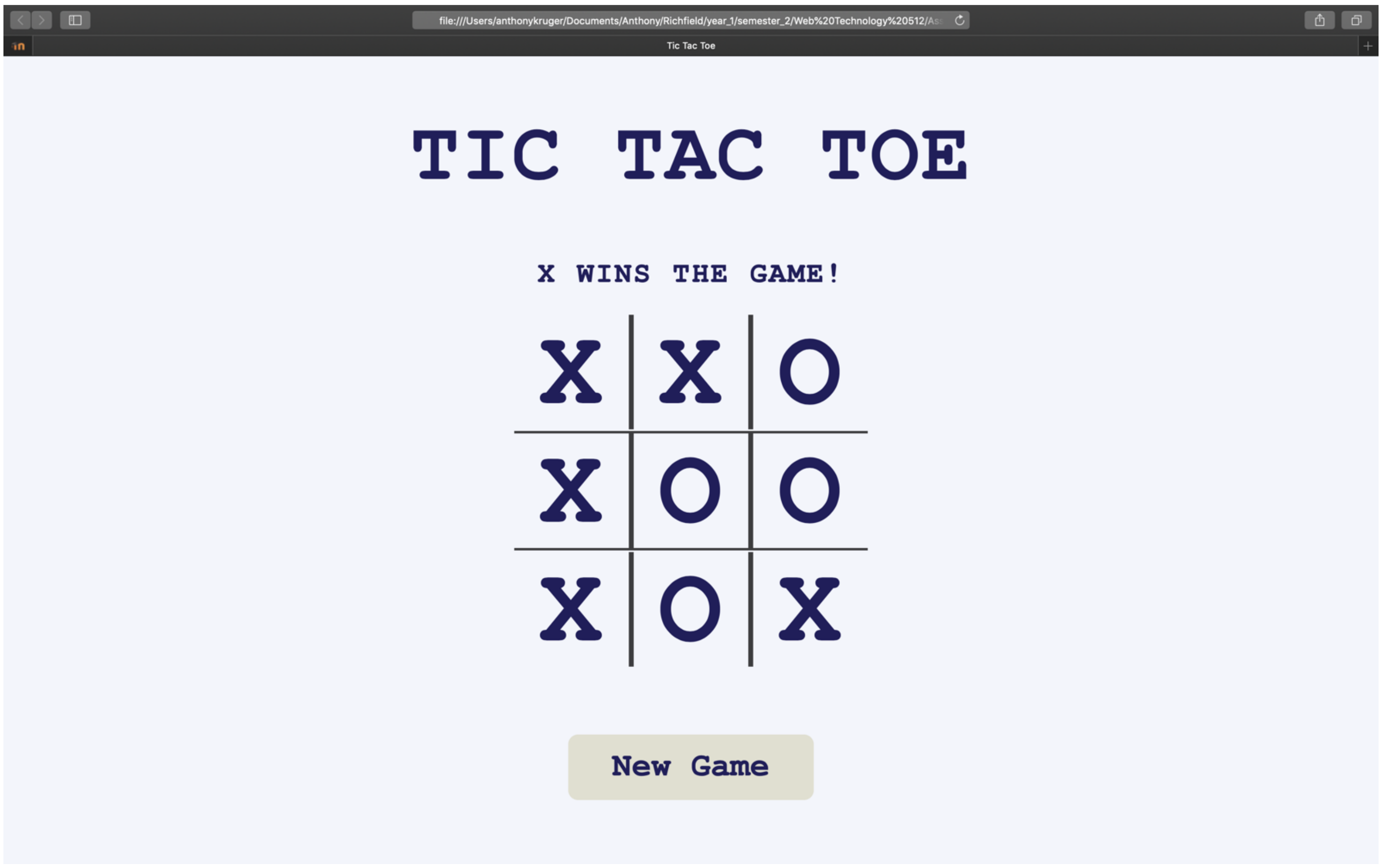
Screenshot showing that O has played and that it is now X's turn:


file:///Users/anthonykruger/Documents/Anthony/Richfield/year_1/semester_2/Web%20Technology%20512/A
Tic Tac Toe
TIC TAC TOE
IT'S X'S TURN!
X
O
New Game

Screenshot of the game ending in a tie:

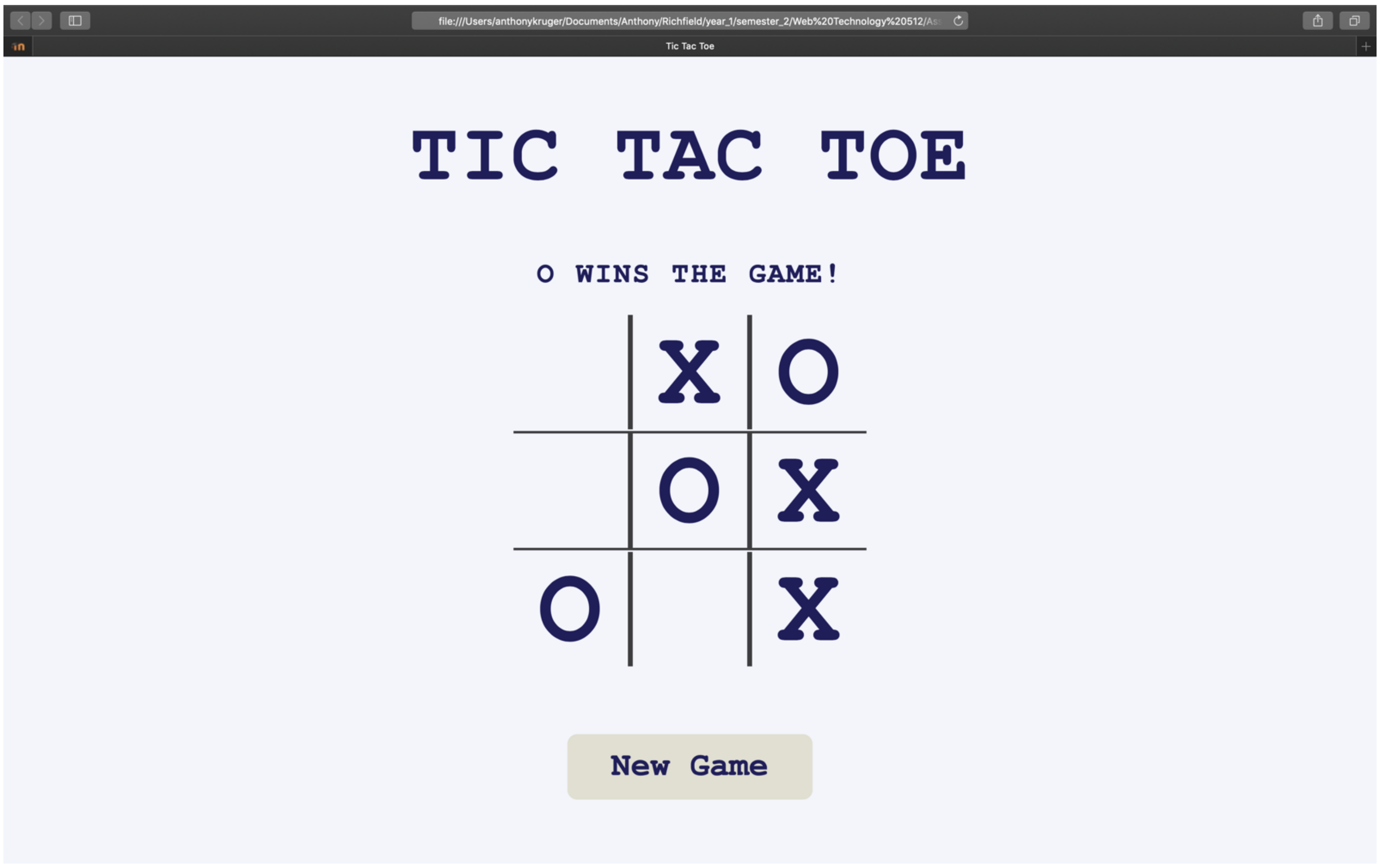

file:///Users/anthonykruger/Documents/Anthony/Richfield/year_1/semester_2/Web%20Technology%20512/A
Tic Tac Toe
TIC TAC TOE
THAT'S A TIE, TRY AGAIN!
X O X
X O O
O X X
New Game

Screenshot of X winning the game:


file:///Users/anthonykruger/Documents/Anthony/Richfield/year_1/semester_2/Web%20Technology%20512/As
Tic Tac Toe
TIC TAC TOE
X X O
X O O
X O X
New Game

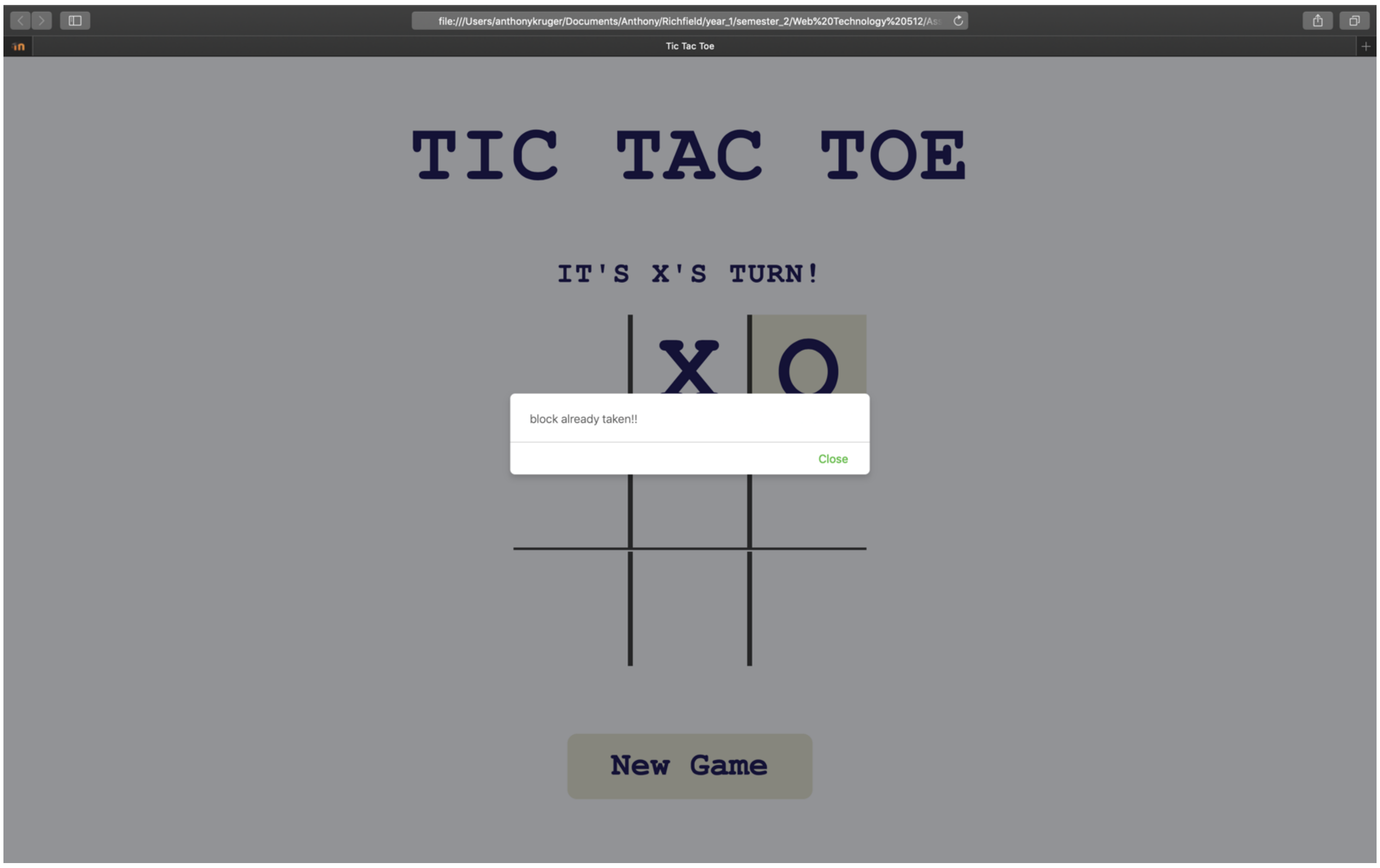
X WINS THE GAME!

Screenshot of O winning the game:


file:///Users/anthonykruger/Documents/Anthony/Richfield/year_1/semester_2/Web%20Technology%20512/As
Tic Tac Toe
TIC TAC TOE
X O
O X
O X
New Game

O WINS THE GAME!

Screenshot of an alert when a block is clicked twice:


file:///Users/anthonykruger/Documents/Anthony/Richfield/year_1/semester_2/Web%20Technology%20512/As
Tic Tac Toe
TIC TAC TOE
IT'S X'S TURN!
X
O
New Game

block already taken!!

Close

HTML source code:

```
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta http-equiv="X-UA-Compatible" content="ie=edge">
    <link rel="stylesheet" href="stylesheet.css">
    <script defer src="script.js"></script>
    <title>Tic Tac Toe</title>
</head>

<body>
    <h1>Tic Tac Toe</h1>
    <h2></h2>
    <br>
    <div class="flex-container flex-column">
        <div class="flex-container flex-wrap" id="board">
            <div class="square" id="cell0"></div>
            <div class="square" id="cell1"></div>
            <div class="square" id="cell2"></div>
            <div class="square" id="cell3"></div>
            <div class="square" id="cell4"></div>
            <div class="square" id="cell5"></div>
            <div class="square" id="cell6"></div>
            <div class="square" id="cell7"></div>
            <div class="square" id="cell8"></div>
        </div>
        <br>
        <br>
        <br>
        <br>
        <button id="reset-button"><strong>New Game</strong></button>
    </div>
</body>

</html>
```

CSS source code:

```
body {
    text-align: center;
    font-family: Arial, Helvetica, sans-serif;
}

h2 {
    margin: 0 auto;
    font-size: 35px;
    margin: 10px;
}

.flex-container {
    display: flex;
    justify-content: center;
    align-items: center;
}

h1 {
    font-size: 100px;
}

.flex-column {
    height: 100%;
    width: 100%;
    flex-direction: column;
}

.flex-wrap {
    flex-wrap: wrap;
    height: 432px;
    width: 432px;
}

.square {
    border: 3px solid rgba(0, 0, 0, .75);
    height: 140px;
    width: 140px;
    font-size: 130px;
    text-align: center;
    justify-content: center;
    cursor: pointer;
    border-collapse: collapse;
}

body {
    font-family: "Courier New", Courier, monospace;
    letter-spacing: 2px;
    word-spacing: 2px;
    color: #201E59;
    font-weight: bold;
    text-decoration: none;
    font-style: normal;
    font-variant: normal;
    text-transform: uppercase;
}

.square:hover {
    background-color: rgba(224, 223, 209, 88);
}

#reset-button {
    text-align: center;
    font-size: 40px;
    border: 0px;
    height: 80px;
    width: 300px;
    margin: 10px;
    background-color: rgba(224, 223, 209, 88);
    color: #201E59;
    border-radius: 12px;
    font-family: "Courier New", Courier, monospace;
}

body {
    background-color: rgb(243, 245, 250);
}

#cell0,
#cell1,
#cell2 {
    border-top: 0px;
    border-bottom: 0px;
}

#cell0,
#cell3,
#cell6 {
    border-left: 0px;
```

```
}

#cell2,
#cell5,
#cell8 {
    border-right: 0px;
}

#cell6,
#cell7,
#cell8 {
    border-bottom: 0px;
    border-top: 0px;
}
```

Javascript source code:

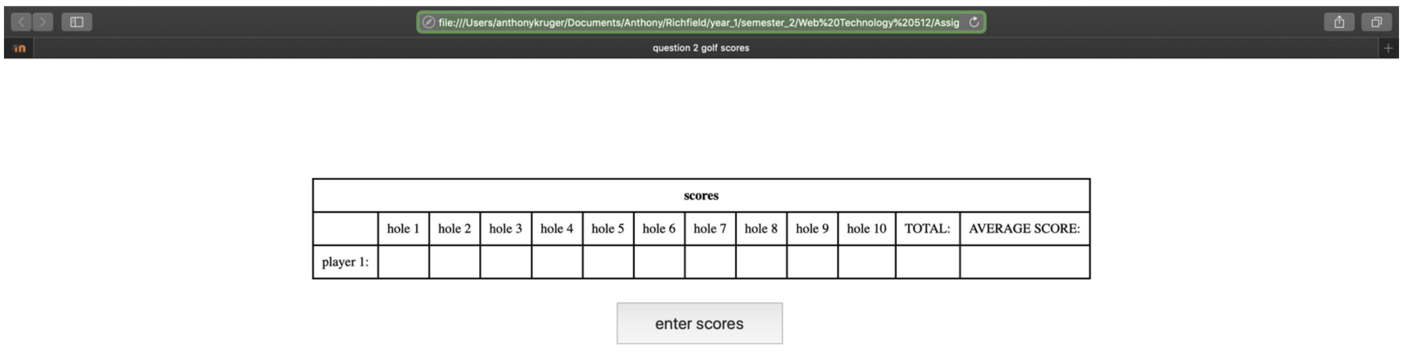
```
//this is an array that is made from all the div elements within the div container
const squares = Array.from(document.querySelectorAll("#board div"));

// This is an array of winning combinations used to check for whether the game has been won or
not
const winningCombos = [
    [0, 1, 2],
    [3, 4, 5],
    [6, 7, 8],
    [0, 3, 6],
    [1, 4, 7],
    [2, 5, 8],
    [0, 4, 8],
    [2, 4, 6]
];

//Variables needed to initialize the game before init function
let turn;
let board;
const messages = document.querySelector("h2");
let win;

//event listeners needed for click events occuring on the page
document.getElementById("board").addEventListener("click", handleTurn); //listener for click
events on divs
document.getElementById("reset-
button").addEventListener("click", init) //listener for click on new game button

// getWinner function: used in the handleTurn function to determaine if there is a winner,
//  if so then the event listener is remove so that no more blocks can be selected
//  and the message to the players is adusted accordingly
function getWinner() {
    let winner = null;
    winningCombos.forEach(function(combo, index) {
        if (board[combo[0]] && board[combo[0]] === board[combo[1]] && board[combo[0]] === board[
combo[2]]) {
```

```
            winner = board[combo[0]];
        };
    });
    return winner ? winner : board.includes('') ? null : 'T';
};

// handleTurn function: used by the event listener to handle the click event parsed onto the
document,
// iterates through the squares array and changes the relevent index in the array into the
symbol for the player
// and also changes the turn variable to be the next players turn and makes sure that the same
block isnt played twice
// it also makes a call to render in order to display the changes made to the squares
function handleTurn() {
    let idx = squares.findIndex(function(square) {
        return square === event.target;
    });
    if (board[idx] === "X" || board[idx] === "O") {
        alert("block already taken!!");
    } else {
        board[idx] = turn
        turn = turn === "X" ? "O" : "X";
        win = getWinner();
        render();
    };
};

// render function: this function is used in the init and the handleTurn functions. it is used
to update the display and according to who is currently
// meant to be playing and it maps out the markings of board array onto the square divs
function render() {
    board.forEach(function(mark, index) {
        squares[index].textContent = mark;
    });
    messages.textContent = win === 'T' ? `That's a TIE, try again!` : win ? `${win} wins the gam
e!` : `It's ${turn}'s turn!`;
    messages.textContent === `${win} wins the game!` ? document.getElementById("board").removeEv
entListener("click", handleTurn) : document.getElementById("board").addEventListener("click", ha
ndleTurn);;
};

//init function: this functions is called at the bottom of the script and is used to initialize
the game.
//  it is also called by a click event for the reset/new game button.
function init() {
    win = null;
    document.getElementById("board").addEventListener("click", handleTurn);
    messages.textContent = "Waiting to initialize the game, press new game to start.";
    turn = prompt("Player 1, would you like to be an X or an O?, click ok to default to X", "X")
;
    turn = turn.toUpperCase()
    messages.textContent = win === 'T' ? `That's a TIE, try again!` : win ? `${win} wins the gam
e!` : `It's ${turn}'s turn!`;
    board = [
        "", "", "",
        "", "", "",
        "", "", ""
    ];
    render();
};

// initializing function that starts the game
init();
```

Question 2: (20)

Write a javascript program that asks the user to enter up to 10 golf scores, which are to be stored in an array. You should provide a means for the user to terminate input prior to entering 10 scores. The program should display all the scores on one line and report the average score. Handle input, display, and the average calculation with three separate array processing functions.

Screenshot of scoresheet when the page loads:

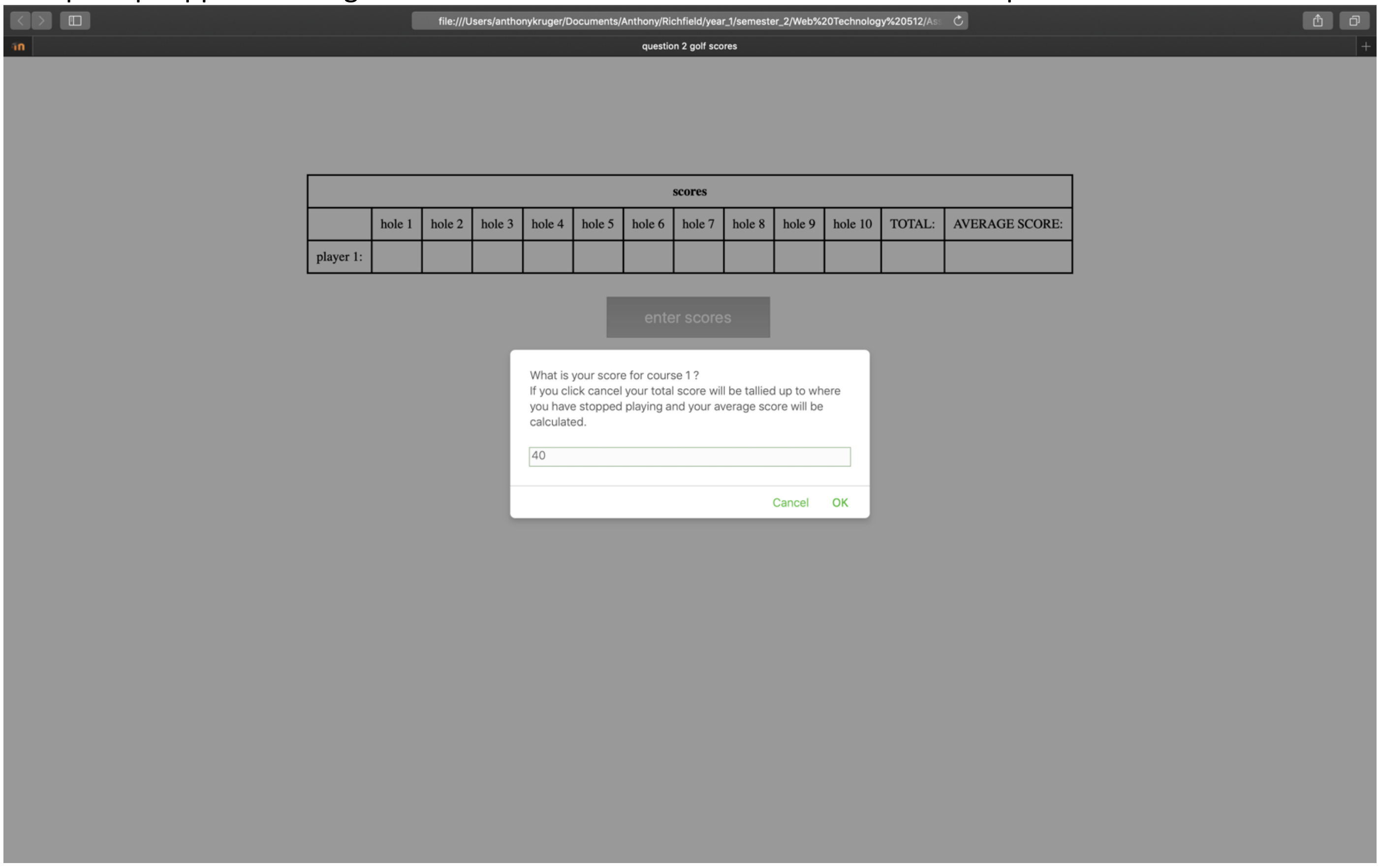


file:///Users/anthonykruger/Documents/Anthony/Richfield/year_1/semester_2/Web%20Technology%20512/Assig

question 2 golf scores

scores												
	hole 1	hole 2	hole 3	hole 4	hole 5	hole 6	hole 7	hole 8	hole 9	hole 10	TOTAL:	AVERAGE SCORE:
player 1:												

Screenshot of prompt that appears when enter scores button is pressed. Every time a score is entered a new prompt appears asking for another score. The user can also cancel at this point.

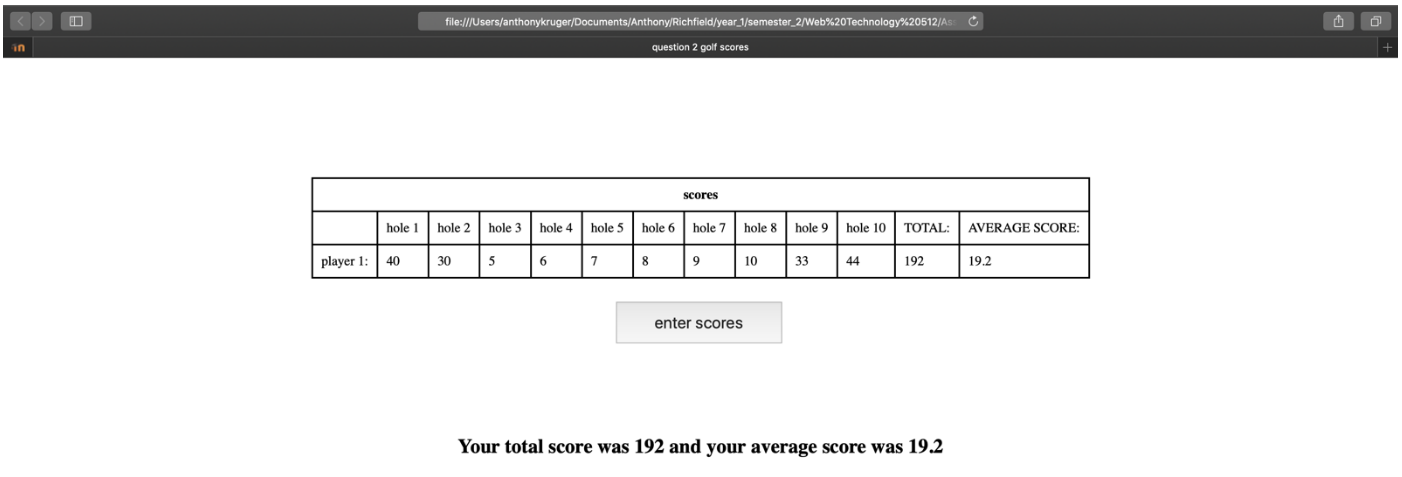

file:///Users/anthonykruger/Documents/Anthony/Richfield/year_1/semester_2/Web%20Technology%20512/As
question 2 golf scores
enter scores
Cancel
OK

scores												
	hole 1	hole 2	hole 3	hole 4	hole 5	hole 6	hole 7	hole 8	hole 9	hole 10	TOTAL:	AVERAGE SCORE:
player 1:												

What is your score for course 1 ?
If you click cancel your total score will be tallied up to where you have stopped playing and your average score will be calculated.

40

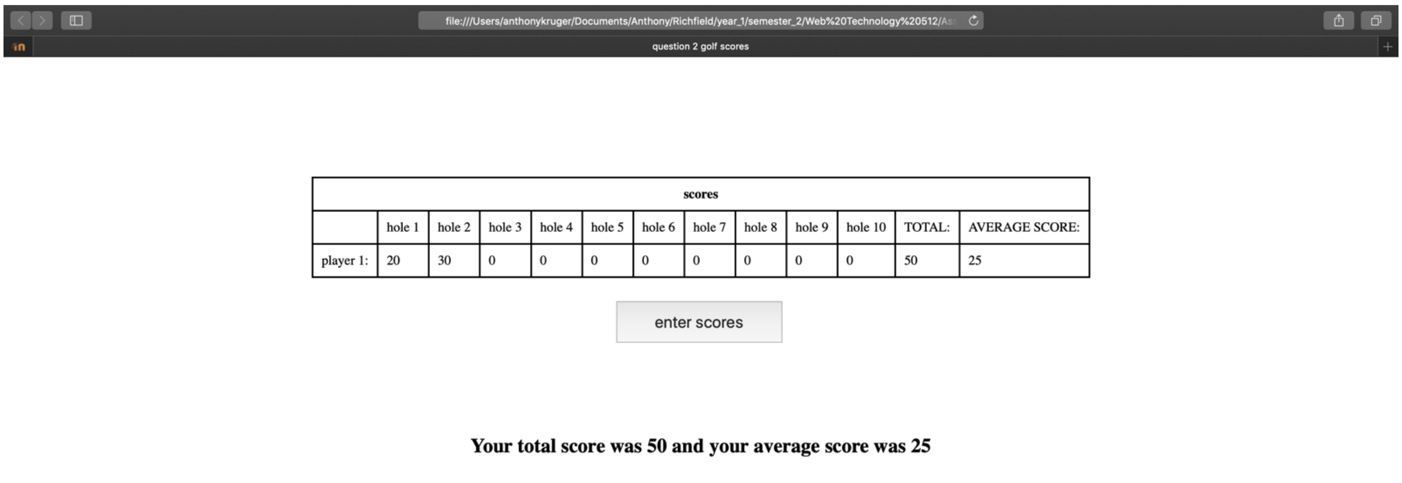
Screenshot of scoresheet with total scores and score average.


file:///Users/anthonykruger/Documents/Anthony/Richfield/year_1/semester_2/Web%20Technology%20512/As
question 2 golf scores
enter scores

scores												
	hole 1	hole 2	hole 3	hole 4	hole 5	hole 6	hole 7	hole 8	hole 9	hole 10	TOTAL:	AVERAGE SCORE:
player 1:	40	30	5	6	7	8	9	10	33	44	192	19.2

Your total score was 192 and your average score was 19.2

Screenshot of total score and average score should the user press cancel instead of entering a new score.


file:///Users/anthonykruger/Documents/Anthony/Richfield/year_1/semester_2/Web%20Technology%20512/As
question 2 golf scores
enter scores

scores												
	hole 1	hole 2	hole 3	hole 4	hole 5	hole 6	hole 7	hole 8	hole 9	hole 10	TOTAL:	AVERAGE SCORE:
player 1:	20	30	0	0	0	0	0	0	0	0	50	25

Your total score was 50 and your average score was 25

HTML source code:

```
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta http-equiv="X-UA-Compatible" content="ie=edge">
    <script defer src="script.js"></script>
    <link rel="stylesheet" href="stylesheet.css">
    <title>question 2 golf scores</title>
</head>
<br>
<br>
<br>
<br>
<br>
<br>
<br>
<center>
    <table id="scorechart">
        <tr>
            <th colspan="13">
                scores
            </th>
        </tr>
        <tr>
            <td>
            </td>
            <td>
                hole 1
            </td>
            <td>
                hole 2
            </td>
            <td>
                hole 3
            </td>
            <td>
                hole 4
            </td>
            <td>
                hole 5
            </td>
            <td>
                hole 6
            </td>
            <td>
                hole 7
            </td>
            <td>
                hole 8
            </td>
            <td>
                hole 9
            </td>
            <td>
                hole 10
            </td>
            <td>
                TOTAL:
            </td>
            <td>
                AVERAGE SCORE:
            </td>
        </tr>
        <tr>
            <td>
                player 1:
            </td>
            <td id="0">
            </td>
            <td id="1">
            </td>
            <td id="2">
            </td>
            <td id="3">
            </td>
            <td id="4">
            </td>
            <td id="5">
            </td>
            <td id="6">
            </td>
            <td id="7">
            </td>
            <td id="8">
            </td>
            <td id="9">
            </td>
            <td id="total">
            </td>
            <td id="average">
            </td>
        </tr>
    </table>
    <br>
    <button id="getScores"> enter scores</button>
    <br>
    <br>
    <br>
    <br>
    <br>
    <br>
    <h2 id="message"></h2>
</center>

<body>

</body>

</html>
```

CSS source code:

```
table,
th,
td {
    border: 2px solid black;
    border-collapse: collapse;
    margin: 10px;
    padding: 10px;
}

button {
    width: 200px;
    height: 50px;
    font-size: 20px;
}
```

Javascript source code:

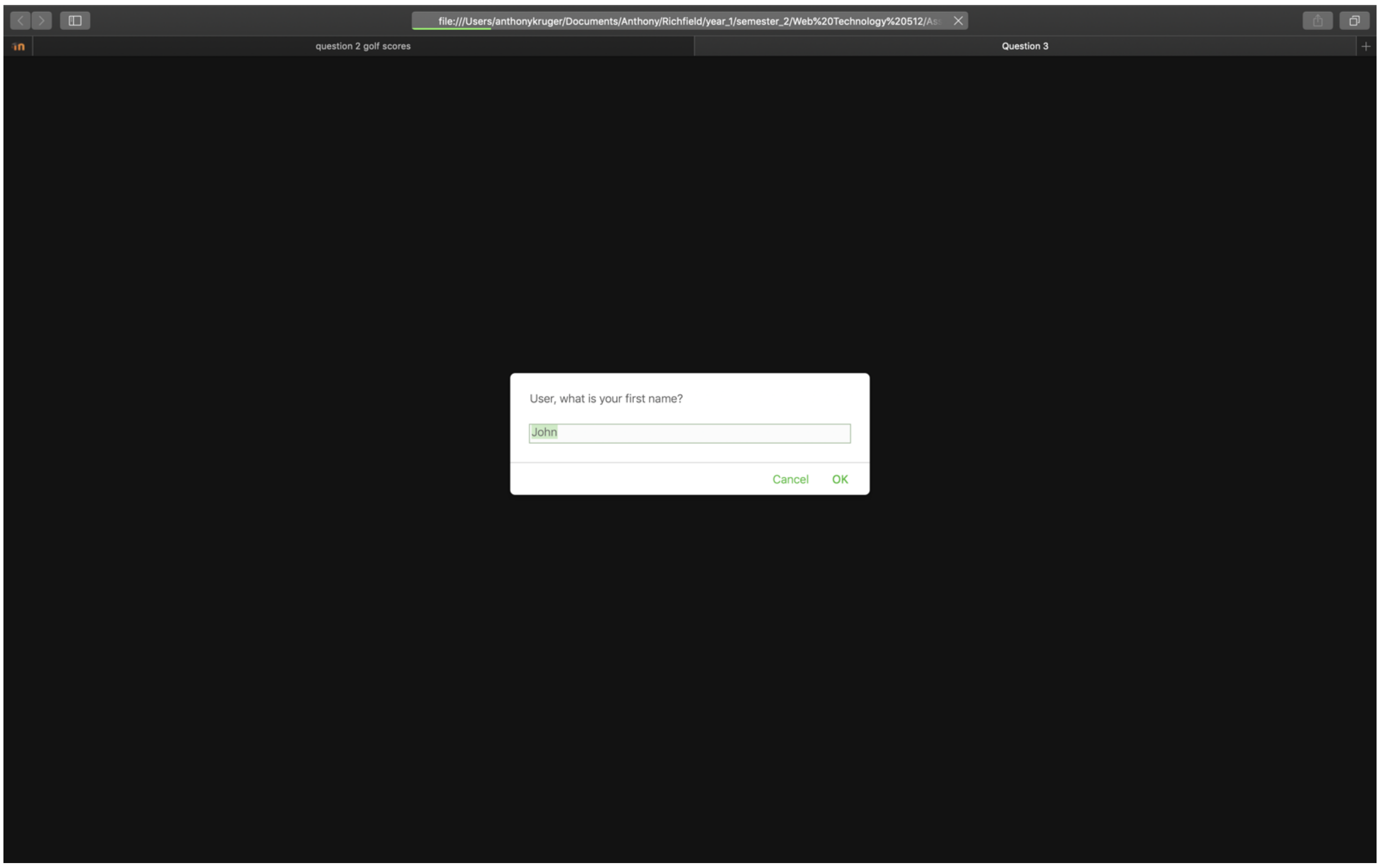
```
//event listeners
document.getElementById("scorechart").addEventListener("click", init);
document.getElementById("getScores").addEventListener("click", init);

//onload variables
let total;
let score;
let scoresArray = [0, 0, 0, 0, 0, 0, 0, 0, 0, 0];
let holesPlayed = 0;

//functions
//initializes game, called by enter scores button click event
function init() {
    getScores();
};

//uses a for loop to request scores through prompts for a user, breaks if cancel is pressed
function getScores() {
    clearScores();
    for (i = 0; i < scoresArray.length; i++) {
        score = prompt(`What is your score for course ${i + 1} ?\r\nIf you click cancel your tot
al score will be tallied up to where you have stopped playing and your average score will be cal
culated.`, "0");
        checkIfStillPlaying();
        addToTotal();
        render();
        if (score === 0) {
            break;
        };
    }
    if (holesPlayed === 0) {
        document.getElementById("message").innerHTML = `Your total score was ${total} and your a
verage score was ${total}`;
    } else {
        document.getElementById("message").innerHTML = `Your total score was ${total} and your a
verage score was ${total / holesPlayed}`;
    }
};

//function to clear scores when enter scores button is pressed after a game has been played
function clearScores() {
    holesPlayed = 0;
    total = 0;
    for (i = 0; i < scoresArray.length; i++) {
        scoresArray[i] = 0;
        document.getElementById("" + i).innerHTML = 0;
    };
};

//function to check whether cancel button was pressed on alert box
function checkIfStillPlaying() {
    if (score != null) {
        holesPlayed += 1;
    };
    score === null ? score = 0 : scoresArray[i] = parseFloat(score);
};

//function to add score entered to total
function addToTotal() {
    total += scoresArray[i];
};

//function to add score to scoresheet
function render() {
    document.getElementById("" + i).innerHTML = score;
    document.getElementById("total").innerHTML = total;
    if (score == 0 && holesPlayed == 0) {
        document.getElementById("average").innerHTML = total;
    } else {
        document.getElementById("average").innerHTML = total / holesPlayed;
    }
};
```

Question 3: (10)

Write a javascript program that asks the user to enter his or her first name and then last name, and then constructs, stores, and displays a third string consisting of the user's last name followed by a comma, a space, and first name. Use string objects and methods from the string header file. A sample run could look like this:

Enter your first name: **Paul**
Enter your last name: **Smith**
Here's the information in a single string: Smith, Paul

Screenshot of a prompt asking for your first name when document loads, default name is John if no name is entered.

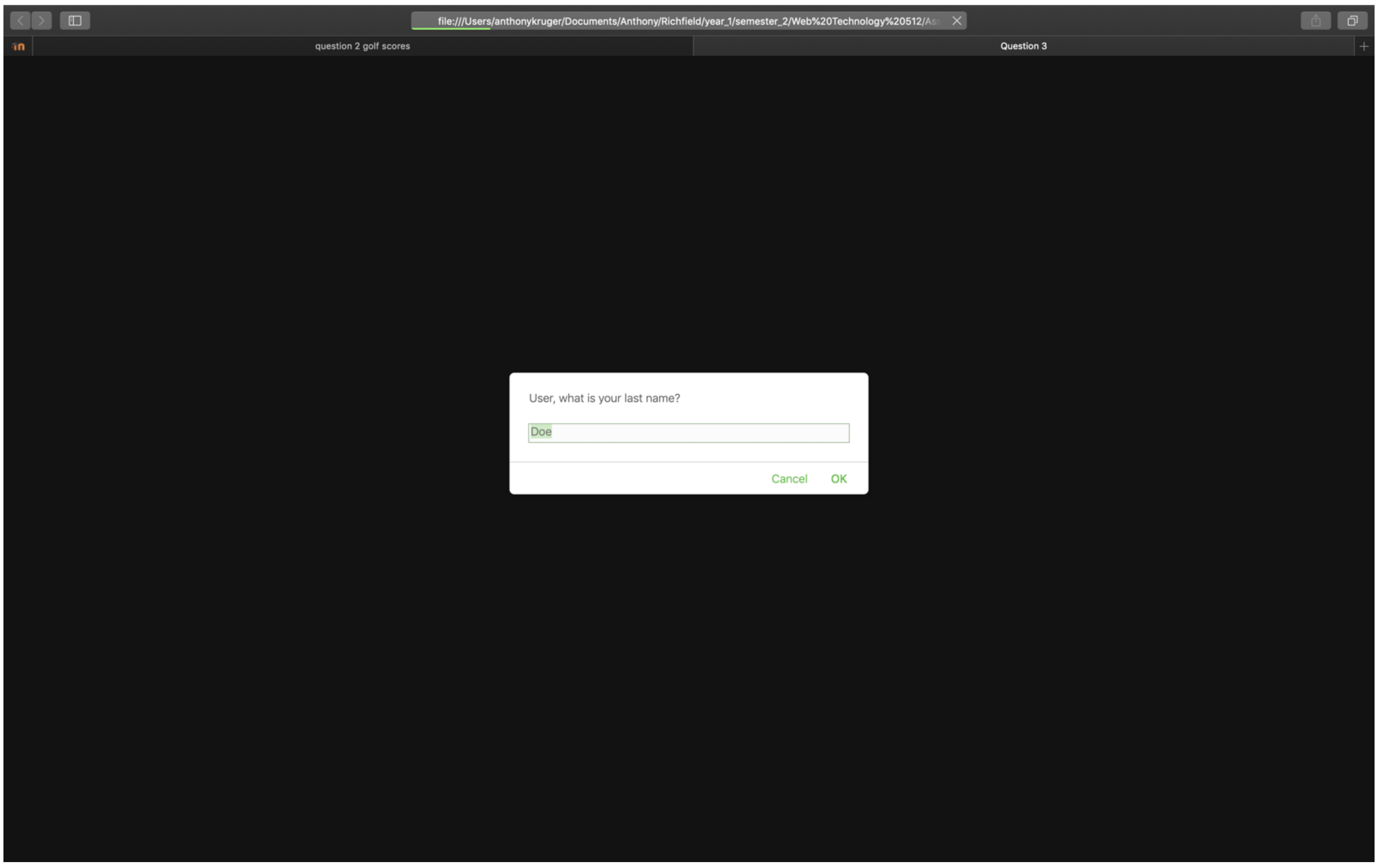


file:///Users/anthonykruger/Documents/Anthony/Richfield/year_1/semester_2/Web%20Technology%20512/As

User, what is your first name?

John

Screenshot of a prompt asking for your surname when document loads, default surname is Doe if no surname is entered.

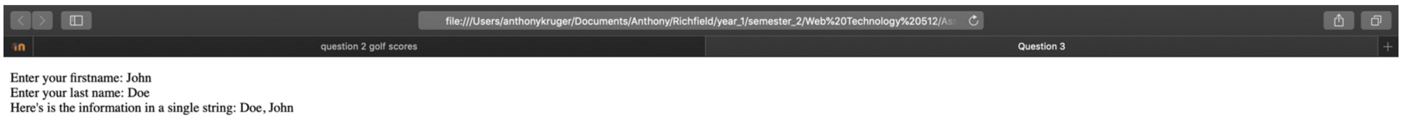


file:///Users/anthonykruger/Documents/Anthony/Richfield/year_1/semester_2/Web%20Technology%20512/As

User, what is your last name?

Doe

Screenshot of requested result


file:///Users/anthonykruger/Documents/Anthony/Richfield/year_1/semester_2/Web%20Technology%20512/As
question 2 golf scores
Question 3

```
Enter your firstname: John
Enter your last name: Doe
Here's is the information in a single string: Doe, John
```

HTML source code:

```
<!DOCTYPE html>
<html lang="en">
<script defer src="script.js"></script>

<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta http-equiv="X-UA-Compatible" content="ie=edge">
    <title>Question 3</title>
</head>

<body>
    <p id="details"></p>
</body>
</html>
```

No CSS used

Javascript source code:

```
firstName = prompt("User, what is your first name?", "John");
lastName = prompt("User, what is your last name?", "Doe")
document.getElementById("details").innerHTML = `Enter your firstname:
    ${firstName} </br> Enter your last name: ${lastName}
    <br>Here's is the information in a single string:
${lastName}, ${firstName}`;
```

Bibliography

freeCodeCamp.org, 2017. *JavaScript Tic Tac Toe Project Tutorial - Unbeatable AI w/ Minimax Algorithm.* [Online]
Available at: https://www.youtube.com/watch?v=P2TcQ3h0ipQ
[Accessed 05 09 2019].

w3schools.com, n.d. *Window prompt() method.* [Online]
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