
TeamTris

TEAMTRIS CODE DOCUMENTATION
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1 StartScreen

Author: Steven Dellamore

Description: Startscreen will build the startscreen and create all the buttons needed for the user to get into a game with their friends. The mouseClicks and the keyboard imports all all forwarded to this class when `gamestate == 0`

1.1 constructor

Author: Steven Dellamore

`constructor()`

Description: The constructor gets called when making a startscreen object. It will init all the values and set up the socket listener for the server to send things too. Here are the init values of the class variables:

```
this.TokenBoxText = "";
this.usernameBoxStroke = false;
this.usernameText = "username";
this.usernameTextTouched = false;
this.gameStateStartScreen = 0;
this.titleAnimation = [300, 500, 400, 700];
```

These variables will be updated throughout the life of start screen. `this.TokenBoxText` will init the token box to nothing, since the user has yet to do anything. the `this.usernameBoxStroke` will be set to false so the program knows if the user as tried to submit. `this.titleAnimation = [300, 500, 400, 700];` is the starting position of the title, and will fall every X frames.

Parameters:

void : constructor takes no params

Returns:

StartScreen : An object of start class

1.2 draw

Author: Steven Dellamore

`draw()`

Description: This function will be ran at 60 frames a second and will call all the functions needed to draw the launch screen. The draw function will call the title functions, the highscore functions, and call the join and create button rendering/hitboxes with `Buttonloop()`. Depending on what `this.gameStateStartScreen` is evaluated to.

```
switch (this.gameStateStartScreen) {  
    case 0:  
        this.drawUsernameBox();  
        break;  
    case 1:  
        this.drawTokenBox();  
        break;  
}
```

Parameters:

void : draw takes no arguments

Returns:

void : void

1.3 animateTitle

Author: Steven Dellamore

`animateTitle()`

Description: Will check and add/subtract the locations of the T's falling when you go to the launch screen.

```
if (this.titleAnimation[i] > 0) {  
    this.titleAnimation[i] -= 10;  
}
```

Once `this.titleAnimation[i]`, where `i` is between `[0,4]`, is negative, the array index will no longer be decremented.

Parameters:

void : `animateTitle` takes no arguments

Returns:

void

1.4 drawUsernameBox

Author: Steven Dellamore

`drawUsernameBox()`

Description: This function will draw the white username box onto the screen displaying the `this.usernameText` in the center. This function will also use `this.usernameBoxStroke` to display the red outline around the username box.

Parameters:

void : `drawUsernameBox` takes no arguments

Returns:

void

1.5 drawTitle

Author: Steven Dellamore

`drawTitle()`

Description: This function will draw the title (Teamtris) onto the launch screen. Also, the function will be responsible for displaying the current falling location of the two T's falling at the start of the screen. We make rects based on the current location of `this.titleAnimation`.

```

let yStart;
rect(-windowWidth / 4.3, (yStart = windowHeight / 2.6) -
    this.titleAnimation[0], squareSize, squareSize)

rect(-windowWidth / 4.3, (yStart - (spaceBetweenSquares)) -
    this.titleAnimation[0], squareSize, squareSize)

fill(255, 0, 0) // fill red

rect(-windowWidth / 4.3, yStart - (2 * spaceBetweenSquares) -
    this.titleAnimation[1], squareSize, squareSize)

rect(-windowWidth / 4.3 - spaceBetweenSquares,
    yStart - (2 * spaceBetweenSquares) - this.titleAnimation[1],
    squareSize, squareSize)

rect(-windowWidth / 4.3 + spaceBetweenSquares,
    yStart - (2 * spaceBetweenSquares) - this.titleAnimation[1],
    squareSize, squareSize)

```

The important thing to note is to see the y val of the rect is being changed by 10 every frame in `function animateTitle()`.

Parameters:

void : drawTitle takes no arguments

Returns:

void

1.6 drawTokenBox

Author: Steven Dellamore

`drawTokenBox()`

Description: This function will draw the token box once the user clicks "join game". It will display the token box and the accept button. Unlike other buttons, all mouse clicks are handled.

Parameters:

void : drawTokenBox takes no arguments

Returns:

void

1.7 mouseClickedStart

Author: Steven Dellamore

`mouseClickedStart()`

Description: This function is being called whenever `gameState = 0` AND the user clicks their mouse. First, we will check what `this.gameStateStartScreen` is. If its 0, we will check the `function ClickedLoop()` to see if the user is clicking on the join game, create game, or highscore score buttons. If the user clicks on a the create game button with a valid username we are going to send them into the lobbyscreen.

```
// Creating my lobbyscreen object
mLobbyScreen = new LobbyScreen(
    new Player(
        this.usernameText, Math.floor(Math.random() * 100), true));

gameState = 1; // Switch to lobby screen
```

We need to create a new Player, and set their ownership value to 0. We see its constructor defined here:

```
constructor(username, id, owner){
    this.username = username;
    this.id = id;
    this.owner = owner;
    this.playerNum;
}
```

We then pass this object into the lobbyscreen and switch the `gameState = 1` to move the user to the next screen.

Parameters:

void : mouseClickedStart takes no arguments

Returns:

void

1.8 drawHighScoreButtonCheckMouse

Author: Steven Dellamore

`drawHighScoreButtonCheckMouse()`

Description: This function is being called whenever the user clicks with gamestate of the `this.gameStateStartScreen == 0`;. This function checks if the mouse is over the highscore button and returns `true` if it is, `false` if its not.

Parameters:

void : drawHighScoreButtonCheckMouse takes no arguments

Returns:

bool :

true => If mouse is over score button

false => If mouse is not over score button

1.9 drawHighScoreButton

Author: Steven Dellamore

`drawHighScoreButton()`

Description: This function will draw the three bars in the bottom left of the screen. It will first check what `this.drawHighScoreButtonCheckMouse()` and set accordingly:

```
let fillHighScore = "white"; // default value is white
/* Checks if the mouse is over the highscore */
if (this.drawHighScoreButtonCheckMouse()) {
    /* if the mouse is over, it will change the boxes to green */
    fillHighScore = "rgb(0,255,0)";
}
```

If `this.drawHighScoreButtonCheckMouse()` returns true, then we set `fillHighScore` to `"green"`, otherwise keep it `"white"`.

Parameters:

void : takes no arguments

Returns:

void : no return

1.10 keyPressedStart

Author: Steven Dellamore

keyPressedStart()

Description: Called whenever the `General::function keyPressed()` function routes the signal to this function. a.k.a whenever `gameState == 0`. This function first checks the `this.gameStateStartScreen` like so:

```
switch(this.gameStateStartScreen) {  
    case 0:  
        // username box active  
        ...  
    case 1:  
        // token box active  
        ...  
}
```

From here, we can figure out where the user is trying to type and add the types characters accordingly.

Parameters:

void : keyPressedStart takes no arguments

Returns:

void

2 LobbyScreen

Author: Steven Dellamore

Description: The lobby screen is where players will create or join lobbys and wait to be put into game. The owner will be the one that has the start button and will bring everyone into game.

2.1 constructor

Author: Steven Dellamore

`constructor(player)`

Description: The Constructor is in charge of createing all the init values for the lobby screen to use and create all the buttons. The owner will be the only ones with the "add bot", "remove bot" , "Start". The lobby screen will also be communicating to and from the backend, the setup starts in this function.

```
socket.onmessage = (event) => {  
    // Listen for backend packets.  
    // Parse them and call the correct functions  
    ...  
};
```

Parameters:

Player player : The player that is joining the lobby

Returns:

LobbyScreen : An object of Lobby Screen

2.2 changeOwnerToMe

Author: Steven Dellamore

`changeOwnerToMe()`

Description: When the owner leaves the backend will send a notification with the new owner. If the new owner is this current player, then we will have to start drawing the owner buttons on the screen so they can start the game. We use the `Buttons()` class to aid us in this process.

2.3 draw

Author: Steven Dellamore

`draw()`

Description: This will be called 60 times a second when `gameState == 1`. `"sketch.js"` is where it takes care of the routing for this.

2.4 addAndRemoveBotButton

Author: Steven Dellamore

`addAndRemoveBotButton(addOrRemove)`

Description: Will be called when the user clicks on either the "Add bot" or "Remove bot" button. `mouseClickedLobby()` is who calls this function. This function will form and send a response based on which button you clicked.

Add Bot:

```
var data = JSON.stringify({"action": 1, "lobbyid":this.team.lobbyToken.toLowerCase()})
socket.send(JSON.stringify({"type": "7", "data": data}));
```

Remove bot:

```
var data = JSON.stringify({"action": 0, "lobbyid":this.team.lobbyToken.toLowerCase()})
socket.send(JSON.stringify({"type": "7", "data": data}));
```

Parameters:

addOrRemove : This param can either be the following

"addbot": Clicked add bot button.

"removebot": Clicked remove bot button

2.5 drawToken

Author: Steven Dellamore

`drawToken()`

Description: draws the token onto the screen for everyone in the lobby

```
// draw the token with p5 text() function  
text("Token: " + this.team.lobbyToken,windowWidth/10,windowHeight/1.1)
```

2.6 drawTitle

Author: Steven Dellamore

`drawTitle()`

Description: draws the title ("lobby") onto the screen for all players in the lobby.

2.7 newPlayerJoins

Author: Steven Dellamore

`newPlayerJoins(player)`

Description: Will check if a new player can be added to the lobby. If they can, a new player card will be made for the new user.

```
// add a new playercard to the playerCard array  
this.playerCards.push(  
  new PlayerCard(  
    player, windowWidth/6, (windowHeight/4), .6, windowHeight/60));
```

Otherwise the function will return false and nothing will be changed.

Parameters:

Player player : The player trying to join the lobby

Returns:

boolean : If the new player is added.

true: if new player was added.

false: if new player was denied from lobby (Lobby is full).

2.8 playerLeaves

Author: Steven Dellamore

```
playerLeaves ( player )
```

Description: Will eject a player from the team's list and allow another spot for a new player to join.

```
this.team.playersInTeam.forEach(function(playerInList, index, object) {  
    if(playerInList == player) {  
        object.splice(index, 1);  
    }  
});
```

This shows how we go through the array and splice out the player that has left.

Parameters:

Player player : The player trying to leave the lobby

2.9 keyPressedLobby

Author: Steven Dellamore

```
keyPressedLobby ( )
```

Description: This function will handle all key presses by the user. Since we only have one place to press a key, the team box, when `this.lobbyGameState` is set to 0, we will append to the teamname. The teamname cannot go above 11 chars or below 0.

2.10 mouseClickedLobby

Author: Steven Dellamore

mouseClickedLobby()

Description: Handles all the mouse clicks when the user clicks on the lobby screen.

```
switch (this.lobbyGameState) {  
  case 0:  
    // check if owner accepted the team name  
    ...  
  case 1:  
    // check addbot, removebot, start game buttons  
    ...  
}
```

"mouseClicked.js" is responsible for routing clicks to the correct screen.

3 Player

Author: Steven Dellamore, Richard Hansen

Description: Every user will have their own object of the Player class. This is going to be passed around to other people in the lobby. This class will tell the game screen who is who and will help identify moves.

3.1 constructor

Author: Steven Dellamore

constructor(username, id, owner)

Description: The constructor takes in three things, a name, id and a owner flag. It will then create an object of `Player` and init all class variables. This Class is used throughout all stages of the program.

Parameters:

String username : username of the new Player
int id : id, [0,4], of the new player.
boolean owner : `true` or `false` if they are owner

Returns:

Player : An object of Player class

3.2 setPlayerNum

Author: Steven Dellamore

`setPlayerNum(num)`

Description: Will set `this.playerNum` equal to `num`. This is just a helper function.

Parameters:

int num : sets the `this.playerNum = num`

Returns:

void : returns nothing

4 Team

Author: Steven Dellamore, Richard Hansen

Description: The team class will contain all the other players that are in your game, the team name and the token for your lobby. Once new players come `addPlayer` will be called to push a newplayer onto the `playersInTeam` array.

4.1 constructor

Author: Steven Dellamore

`constructor()`

Description: The constructor gets called anytime someone joins or create a game.

Parameters:

void: no parameters

Returns:

Team : A object of the class

4.2 addPlayer

Author: Steven Dellamore

`addPlayer(player)`

Description: The add player function gets called whenever a bot or a real player joins your lobby. This function will also be called to populate the lobby when you join.

Parameters:

Player player: This parameter is the new player/bot that is joining your team.

Returns:

void : no return

5 General

Author: Steven Dellamore, Richard Hansen

Description: This is an abstract class that will hold mouseClicked and keyPressed p5 functions.

5.1 mouseClicked

Author: Steven Dellamore, Richard Hansen

mouseClicked()

Description: Will be called whenever the user clicks on anywhere on the screen. Once called, it will go straight into a switch to decide where to route to based on the gameState

```
switch (gameState) {  
  case 0:  
    // start screens mouseClicked  
    mStartScreen.mouseClickedStart();  
    break;  
  case 1:  
    // lobby screens mouseClicked  
    mLobbyScreen.mouseClickedLobby();  
    break;  
  case 2:  
    break;  
  case 3:  
    break;  
}
```

The variables `gameState`, `mStartScreen`, `mLobbyScreen` are all defined in `sketch.js`

Parameters:

void : takes no parameters

Returns:

void : returns nothing

5.2 keyPressed

Author: Steven Dellamore, Richard Hansen

mouseClicked()

Description: Will be called whenever the presses a key. Once called, it will go straight into a switch to decide where to route to based on the gameState

```
switch (gameState) {  
  case 0:  
    mStartScreen.keyPressedStart();  
    break;  
  case 1:  
    mLobbyScreen.keyPressedLobby();  
    break;  
  case 2:  
    mGameScreen.keyPressedGame();  
    break;  
  case 3:  
    // mScoreScreen.keyPressedScore();  
    break;  
}
```

The variables `gameState`, `mStartScreen`, `mLobbyScreen` are all defined in `sketch.js`

Parameters:

void : takes no parameters

Returns:

void : returns nothing

6 Block

Author: ???

Description: TODO

7 Board

Author: ???

Description: Board class to include the information that the board will need to have for a bot

7.1 board

Author: ???

```
public int [,] board()
```

Description: TODO

Parameters:

type name : what it does

Returns:

type : what it does

7.2 numFilledFloor

Author: ???

```
public int numFilledFloor()
```

Description: has the number of heights that are not 0 - meaning that they have already been filled

Parameters:

type name : what it does

Returns:

type : what it does

8 Play

Author: ???

Description: TODO

8.1 Play

Author: ???

```
public Play()
```

Description: TODO

9 Player

Author: ???

Description: TODO

9.1 constructor

Author: Steven Dellamore

```
constructor(username , id , owner)
```

Description: The constructor takes in three things, a name, id and a owner flag. It will then create an object of `Player` and init all class variables. This Class is used throughout all stages of the program.

Parameters:

String username : username of the new Player

int id : id, [0,4], of the new player.

boolean owner : `true` or `false` if they are owner

Returns:

Player : An object of Player class

9.2 setPlayerNum

Author: Steven Dellamore

setPlayerNum (num)

Description: Will set `this.playerNum` equal to `num`. This is just a helper function.

Parameters:

`int num` : sets the `this.playerNum = num`

Returns:

`void` : returns nothing

10 Prints

Author: ???

Description: TODO

11 Program

Author: ???

Description: TODO

12 SingleBot

Author: JavaComSci

Description: Single bot extends the abstract bot class defined here:

```
public abstract class Bot {
    public abstract List<Tuple<int, int>> GetMove(
        Board board,
        List<Block> blocks,
        bool allRotations = false
    );
}
```

The SingleBot class will be made if the player requires only one bot in their game.

12.1 SingleBot

Author: JavaComSci

SingleBot()

Description: Creates a new board for the bot.

Parameters:

void : SingleBot takes no params

Returns:

SingleBot : An object of single bot class

12.2 getFit

Author: JavaComSci

List<...> getFit(Board board, Block block, int rotation)

Description: need desc here TODO

Parameters:

Board board : contains the the board that we want to make the move on

Block block : contains the block that we want to fit

int rotation : which roation we are trying to fit for

Returns:

List<...> compatiblePieces : information about the pieces that are compatible on the board

12.3 GetMove

Author: JavaComSci

```
public override List<...> GetMove(Board, List<Block>, bool)
```

Description: need desc here TODO

Parameters:

int[][] board : current environment

List<Block> blocks : contains the list of all the blocks to try to fit in this location

Returns:

List<...> bestPiecePlacementOfCurrentBlock : contains the list of the indices of where the piece would be on the board

13 DoubleBot

Author: JavaComSci

Description: DoubleBot bot extends the abstract bot class defined here:

```
public abstract class Bot {  
    public abstract List<Tuple<int, int>> GetMove(  
        Board board,  
        List<Block> blocks,  
        bool allRotations = false  
    );  
}
```

The DoubleBot class will be made if the player requires two bots in their game.

14 TripleBot

Author: JavaComSci

Description: TripleBot extends the abstract bot class defined here:

```

public abstract class Bot {
    public abstract List<Tuple<int, int>> GetMove(
        Board board,
        List<Block> blocks,
        bool allRotations = false
    );
}

```

The TripleBot class will be made if the player requires three bots in their game.

15 BotManager

Author: JavaComSci

Description: TODO

16 FrontendTests

Author: Steven Dellamore, Richard Hansen

Description: This is the testing doc for all the frontend tests. We decided to not go with a framework because we didnt think we needed everything the framework gives us. This framework uses the idea of dependency injection. We mock out all the p5 variables like so:

```

global.mouseY = 30;
global.LEFT_ARROW = 37;
global.RIGHT_ARROW = 39;
global.DOWN_ARROW = 40;
global.createCanvas = function (x,y) { }
global.push = function () { }
global.pop = function () { }
global.translate = function () { }
... // Keeps going

```

This allows us to control all aspects of the test and really unit test every line of code in our functions. More over, we are able to mock out other classes that are being used by the class we are trying to test like so:

```

global.buttonList = button[0];
global.Buttons = button[1];
global.Buttonloop = button[2];
global.ClickedLoop = button[3];
global.FindButtonbyID = button[4];

```

Once again, we can really drill down to the functions and have a really good understanding of what its doing and its return values.

16.1 CheckSame

Author: Steven Dellamore, Richard Hansen

```
CheckSame( string , string , string , boolean = false )
```

Description: Checks to see if the `given` and `expected` strings are the same. If they are not this function will return false and print what the expected was.

```

console.log(
    red, numTests++ + ". " + name + " failed should have been " +
        expect + " but was " + given);

```

If its true it will print a success message.

Parameters:

string given : real output

string expect : expected output

string name : name of test

boolean debug : `true` if you want debug statments printed

Returns:

boolean : true if given and expected match, false otherwise

16.2 testDefaultUsername

Author: Steven Dellamore

```
async function testDefaultUsername()
```

Description: Checks to see if the default `mStartScreen.usernameText` is `"username"`.

16.3 testDefaultTokenValue

Author: Steven Dellamore

```
async function testDefaultTokenValue()
```

Description: Checks to see if the default `mStartScreen.TokenBoxText` is `""`.

16.4 testCheckInitStartScreenValues

Author: Steven Dellamore

```
async function testCheckInitStartScreenValues()
```

Description: Checks to see if all the other init startscreen values are correct.

```
// check usernameTextTouched is false
CheckSame(
    mStartScreen.usernameTextTouched, false,
    "checkInitStartScreenValues.usernameTextTouched");

// check titleAnimation [0-4] is set to the correct values
CheckSame(
    mStartScreen.titleAnimation[0], 300,
    "checkInitStartScreenValues.titleAnimation[0]");
... // other indexes of titleAnimation

// Check the stroke of the box is set to false
CheckSame(
    mStartScreen.usernameBoxStroke, false,
    "checkInitStartScreenValues.usernameBoxStroke");
```

16.5 testCheckTitlePosAfterTwoDraw

Author: Steven Dellamore

```
async function testCheckTitlePosAfterTwoDraw()
```

Description: Run `mStartScreen.draw()` twice and check that the title pos values have been updated correctly.

16.6 testChangeUserUsername

Author: Steven Dellamore

```
async function testChangeUserUsername()
```

Description: Will set the `keyCode` equal to 65 and 66 and call the `keyPressedStart()` function. Which tells the start screen that a key has been presesed. We then check if `mStartScreen.usernameText` was changed to "A" and "AB".

16.7 testChangeMaxUsername

Author: Steven Dellamore

```
async function testChangeMaxUsername()
```

Description: Will call the `keyPressedStart()` function with letters ABCDEFGHIJKLMNOPQRS and check to ensure that the `mStartScreen.usernameText` does not get above 11 chars.

```
for(var i = 0; i < 15; i++) {  
    mStartScreen.keyPressedStart(); // Press Key  
    str += strFull.charAt(i);  
    CheckSame(mStartScreen.usernameText,str,"testUsernameText" + str);  
    global.keyCode++; // go next key  
}
```

16.8 testDeleteUsername

Author: Steven Dellamore

```
async function testDeleteUsername()
```

Description: Does the same thing as `testChangeMaxUsername` but deletes characters 15 times and checks `mStartScreen.usernameText` to ensure that everything has been deleted.

Note: `keyCode=8` is the delete key.

16.9 testCheckSpecialChars

Author: Steven Dellamore

```
async function testCheckSpecialChars()
```

Description: Will try to add special chars like ASCII codes 10, 240, 33 and then make sure `mStartScreen.usernameText` is unchanged because you can't have special chars in ur username.

16.10 testHighScoreButton

Author: Steven Dellamore

```
async function testHighScoreButton()
```

Description: Sets the mouse positions to be over the high score button.

```
global.mouseX = mStartScreen.RightX + 1;
global.mouseY = mStartScreen.TopY + 1;
CheckSame(mStartScreen.gameStateStartScreen, 0,
  "testCheckInitGameStateScoreButton");
CheckSame(mStartScreen.drawHighScoreButtonCheckMouse(), true,
  "testDrawHighScoreButtonCheckMouse");
```

Then we check that `gameStateStartScreen == 0` still equals zero since we havent clicked yet, and check that the high score button is being highlighted correctly. The test then checks if we click on the Score Button `gameState == 1`.

16.11 testCreateGameButton

Author: Steven Dellamore

```
async function testCreateGameButton()
```

Description: Sets the mouse to be over the "Create Game" Button and checks to see if it gets highlighted correctly. Then we click on the button with an empty `mStartScreen.usernameText` and check to make sure we did not get moved into the Lobby screen. Finally we add a username `mStartScreen.usernameText = "Steven"` and click on the "Create Game" button. We then check we got moved into the lobby screen correctly.

16.12 testJoinLobbyButton

Author: Steven Dellamore

```
async function testJoinLobbyButton()
```

Description: Sets the `mouseX` and `mouseY` to be over the "Join Game" button. Then we call `mStartScreen.mouseClickedStart()` and check to that we are being put into the token screen correctly.

16.13 testCheckLobbyInitValues

Author: Steven Dellamore

```
async function testCheckLobbyInitValues()
```

Description: Check the init values when moving to the lobby screen from the start screen. We first check to make sure the `Player` object is set correctly like so:

```
CheckSame(mLobbyScreen.player.username, "Steven", "testCheckInitUsername");  
CheckSame(mLobbyScreen.player.owner, true, "testCheckInitOwnerTrue");  
CheckSame(typeof mLobbyScreen.player.id, "number", "testCheckInitID");
```

Then we need to check the `Team` object like so:

```
CheckSame(mLobbyScreen.team.playersInTeam[0].username, "Steven", "testCheckInitTeamUsername");
CheckSame(mLobbyScreen.team.playersInTeam[0].owner, true, "testCheckInitTeamOwnerTrue");
CheckSame(typeof mLobbyScreen.team.playersInTeam[0].id, "number", "testCheckInitTeamID");
CheckSame(mLobbyScreen.team.teamName, "", "testCheckInitTeamName");
CheckSame(typeof mLobbyScreen.team.lobbyToken, "string", "testCheckInitLobbyToken");
```

Once these are checked we know that we have good init values.

16.14 testCheckTokenIsBeingDisplayed

Author: Steven Dellamore

```
async function testCheckTokenIsBeingDisplayed()
```

Description: Checks to see if the Token is being displayed by the frontend in the correct position. This is an example of how we can use Dependency Injection:

```
var strInside;
var x;
var y;
global.text = function(str, xx, yy) {
  x = xx;
  y = yy;
  strInside = str;
};
mLobbyScreen.drawToken();
CheckSame(strInside, "Token: ", "testCheckTextPositionWithNoValue");
CheckSame(x, 256, "testCheckYOfTextCall");
CheckSame(y, 1454.5454545454545, "testCheckYOfTextCall");
```

As you can see we are checking what `drawToken()` is sending the p5 function `text()`, which is sent the token, `xPos` and `yPos`.

16.15 testAddAndRemoveBotsFromLobby

Author: Steven Dellamore

```
async function testAddAndRemoveBotsFromLobby()
```


Description: Checks to see if the owner of the lobby can add and remove bots from their lobby. We set `mouseX` and `mouseY` to the position of the add bot button and then call `mouseClickedLobby()` and check if the bot has been increased.

16.16 checkPlayCardValues

Author: Steven Dellamore

```
async function checkPlayCardValues()
```

Description: Checks the init values of the player cards. Also check that the playcards are being rendered within the bounds of `windowWidth` and `windowHeight`.

16.17 integrationTest1

Author: Steven Dellamore

```
async function integrationTest1()
```

Description: This integration test will render the start screen 90,000 times and do different actions at certain times to ensure the start screen as a whole is working correctly.

```
for(var i = 0; i < 90000; i++) {  
    mStartScreen.draw();  
    if(i == 500) {  
        // Do Action  
    } else if(i == 700) {  
        // Do another action  
    } else if(i == 1000) {  
        // Do another action  
    } else if(i == 55000) {  
        // Do another action  
    }  
}
```

Here we are rendering the draw method 90,000 times and at different renders we are doing different actions (like mouse clicking, or key pressing).

16.18 testGameArrayNotNull

Author: Richard Hansen

```
async function testGameArrayNotNull()
```

Description: TODO

16.19 testGameScreenRotateKeyPress

Author: Richard Hansen

```
async function testGameScreenRotateKeyPress()
```

Description: TODO

16.20 testGameScreenFailRotateKeyPress

Author: Richard Hansen

```
async function testGameScreenFailRotateKeyPress()
```

Description: TODO

16.21 testGameScreenFailRotateKeyPress

Author: Richard Hansen

```
async function testGameScreenFailRotateKeyPress()
```

Description: TODO

16.22 testFourRotate

Author: Richard Hansen

```
async function testFourRotate()
```

Description: TODO

16.23 testMove

Author: Richard Hansen

```
async function testMove()
```

Description: TODO

16.24 testNewSquare

Author: Richard Hansen

```
async function testNewSquare()
```

Description: TODO

16.25 testNumberOfPlayers

Author: Richard Hansen

```
async function testNumberOfPlayers()
```

Description: TODO

16.26 testRunnerSetupStartScreen

Author: Steven Dellamore, Richard Hansen

```
async function testRunnerSetupStartScreen ()
```

Description: TODO