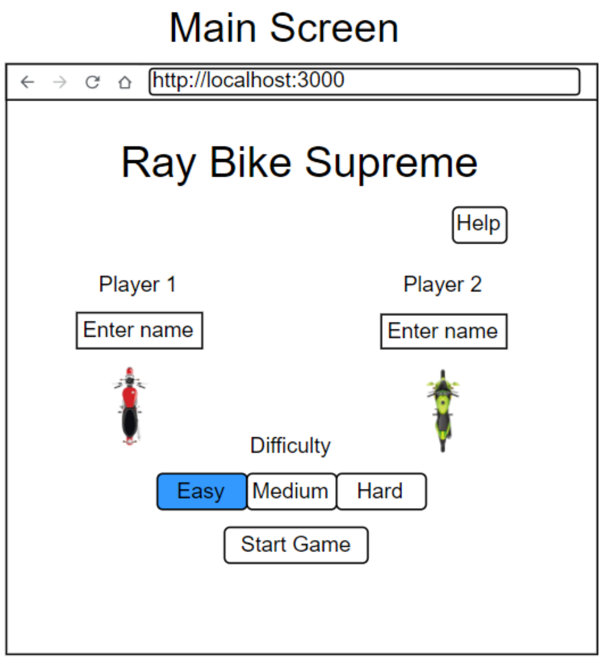
Game Plan

Ray Bike Supreme

Game Description

The game starts with a main landing page where the players can find the game play instructions, enter their name and select the game difficulty before pressing the start game button. When the game starts, the two players will control their bikes using the keyboard buttons (asdw for player one and up-down-left-right for player two). The goal of the game is to use the trail that each of the bikes leaves behind to trap the other player and force that player to run into it. The score earned by the winner will be the number of seconds the game lasted. When the game is over, the players can see their highest score so far and their accumulated score from the game over page. From that page, the players can choose to play again or return to the main menu.

Screen by Screen Description of the UI



HTML Elements:

title h1 element

help button element

“Player” p element

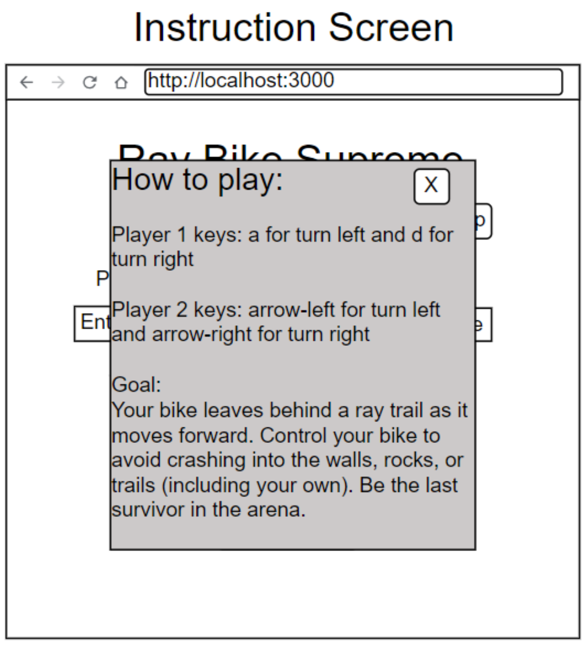
name input elements

bike image elements

“Difficulty” p element

Difficulty selection Nav bar element

Start game button element



Player 1 keys: a for turn left and d for turn right

Player 2 keys: arrow-left for turn left and arrow-right for turn right

Goal:
Your bike leaves behind a ray trail as it moves forward. Control your bike to avoid crashing into the walls, rocks, or trails (including your own). Be the last survivor in the arena.

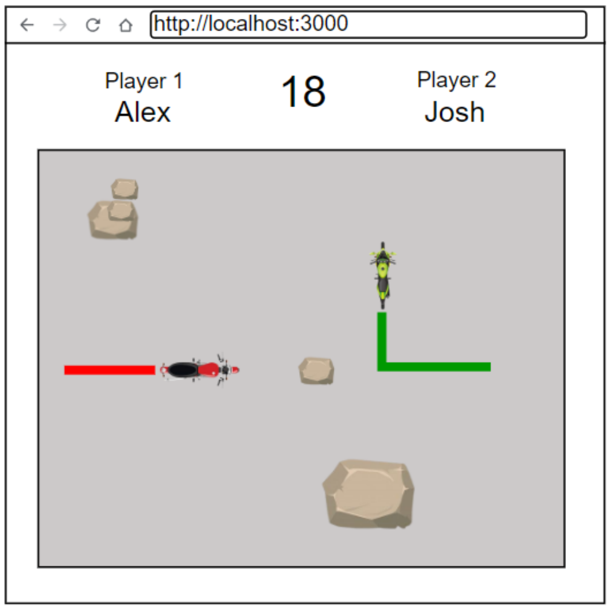
HTML Elements:

Modal div element

Close screen button element

Instruction p elements

Game Screen



HTML Elements:

"Player" text p elements

Player name p elements

Score p elements

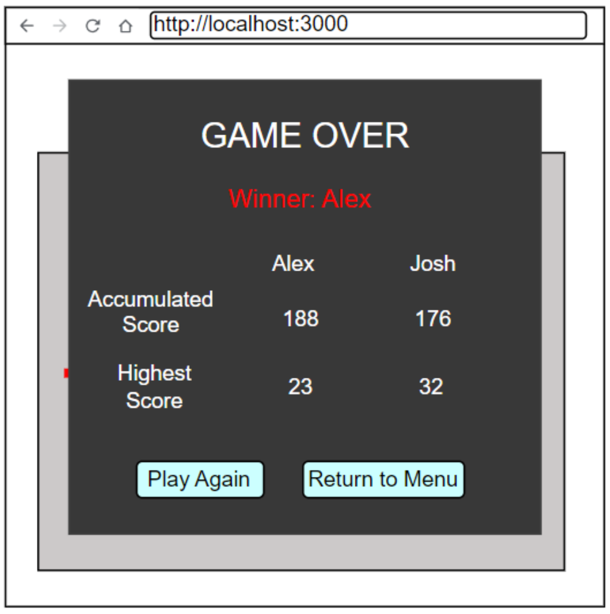
Arena div elements

Bike image elements

Rays canvas elements

Rock image elements

Game Over Screen



HTML Elements:

Modal elements

Text and score stats p elements

Play again button element

Return to Menu button elements

Breakdown of Functional Components

Main screen

- Player name input section
- difficulty selection menu
- Help/Instruction button
- Start game button

Instruction screen

- game play instruction text
- exist screen button

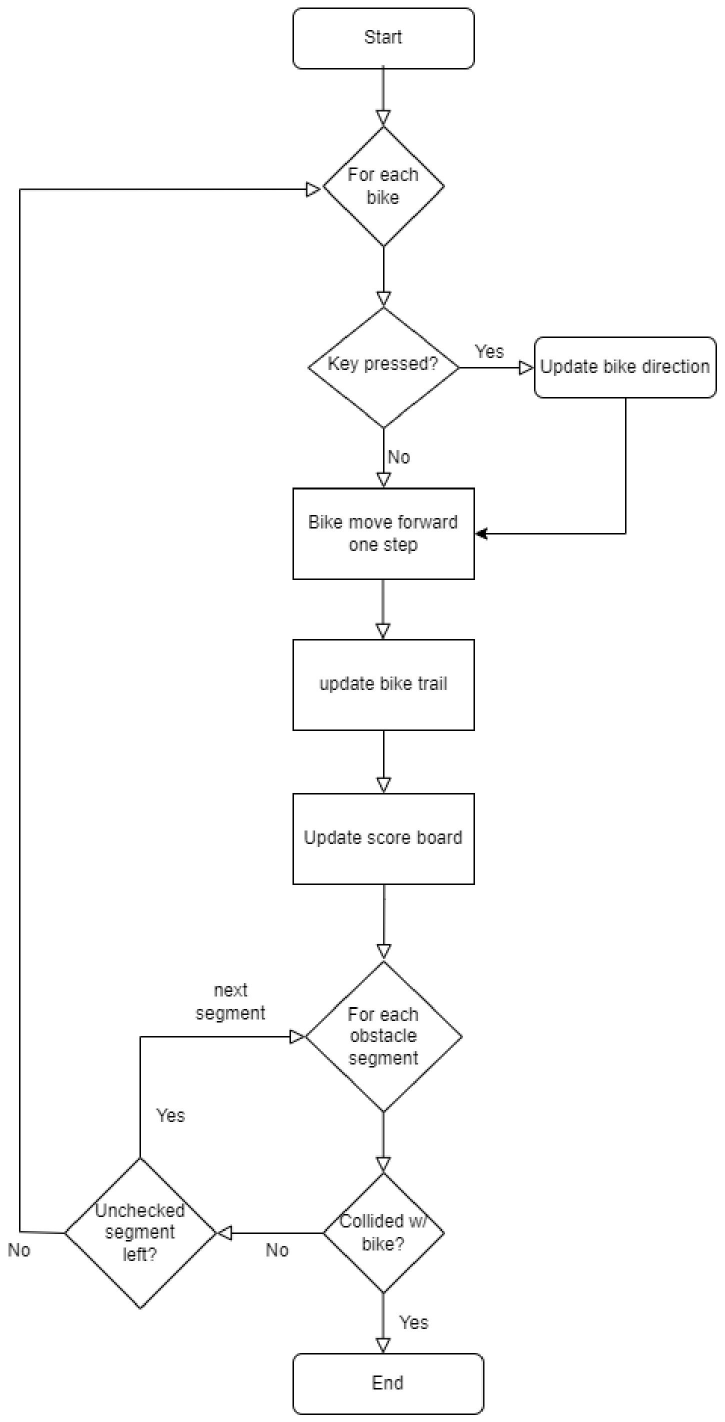
Game screen

- Scoreboard
- Gameplay arena

Game over screen

- current game score
- accumulated game score
- return to main screen button (erases accumulated score)
- play again button

Gameplay logic flow chart:



Glossary of Class, Constants, Variables and Methods:

```
class Game {
     //constants
    _SEGLENGTH :number              //intrinsic segment length of the game
    _RAYWIDTH :number               //width of bike ray
    _BIKESPEED :number              //number of pixel advance per game logic loop
    _ARENA_WIDTH :number             //pixel width of gameplay arena
    _ARENA_HEIGHT :number           //pixel height of gameplay arena
    _ARENA_CEN_POS :number         //[left, top] of arena's center
    _GAME_START_TIME :Date          //Datetime object of the game start time
    _MIN_OBS_HEIGHT :number        //min pixel height of rocks in medium difficulty mode
    _MAX_OBS_HEIGHT :number         //max pixel height of rock in medium difficulty mode
    _OBS_IMG_PATH :string          //path of the rock image
    _BIKE_IMG_PATH :string          //path of bike image

    //variables
    _difficulty :number              //1 to 3 for easy to hard game mode, respectively
    _score :number                  // track score of the game
    _obsSegments :number [][]      //array of obstacles segments, each segment is an array [x1,
                                      y1, x2, y2]
    _trailCanvases: HTMLElement    //list of canvases html elements used to draw bike trails
    _arena: HTMLElement            //html element of the gameplay arena
    _bikes: Bike[]                //list of Bike objects

    //methods
    _setupArena()                   //create div element with appropriate css tags then add to DOM
    _setupScoreBoard()             //create div element with appropriate css tags then add to DOM
    _setupCanvases()               //create canvases elements in DOM and also add them to
                                     _trailCanvases variable
    _createBikes()                 //add bike images DOM with appropriate position and create
                                      Bike object and added to _bikes list
    _addObstacles()                //randomly places obstacles (rock) on arena by appending rock
                                      images element to arena elements, also add image
                                      boundaries to _obsSegment array
    _checkImgOverlap()             //return Boolean of weather two obstacles(rock) image overlaps
    _evolveGame()                  //initiate game logic loop with a indefinitely while loop
    _incrementScore()              //increment score board score
    _draw_Trail()                  //draw or redraw bike trails
}
```

```
Class Bike {
      //constants
      _DIR_ARRAY :string[]              //array of directions ordered by how it evolves as as user hits the
                                            right key
     _BikeRotation :enum                //enum relating bike direction and degrees of image rotation

     //variables
     _arena :HTMLElement                //arena html element
     _bikeElement :HTMLELEMENT          //img html element of the bike
     _imgPosition :number[]             //[left,top] of img when it's first loaded
     _imgWidth :number                  //img width when it's first loaded
     _imgHeight :number                 //img height when it's first loaded
     _kbControl :string[]               //an array [up,down,left,right] keyboard control key of bike
     _headPosition :number[]            //[x,y] position of bike's head
     _centerPosition :number[]          //[x,y] position of bike's center
     _tailPosition :number[]            //[x,y] position of bike's tail
     _direction :string                 //current direction of bike's motion
     _speed :number                     //num pixel bike moves per game interation
     _bikeId :string                    //id field of bike's img html element
     _centerSeg :number[]               //[x_old, y_old, x_new, y_new],evolution of bike center position
                                          during last interation
     _trail :number[][]                 // a list of [x1,y1,x2,y2] segments the bike has travelled over
     _trailColor :string                //color of the trail
     _cttSegNum :number                 //number of segments needed to span from bike center to bike tail

      //methods
      _getHeadPosition() :number[]             //get list [x,y] of bike's head position
      _getCenterPostion() :number[]            //get list [x,y] of bike's center position
      _getTailPosition() :number[]             //get list [x,y] of bike's tail position
      _calculateHeadPosition() :number[]       //get list [x,y] of head position base on current image
                                                  placement
      _calculateCenterPosition() :number[]     //get list [x,y] of center position base on current image
                                                  placement
      _calculateTailPosition() :number[]       //get list [x,y] of tail position base on current image
                                                  placement
      _getImgPosition() :number[]              //get list [left,top] of the bike image on the page
      _updateDirection()                       //update bike direction and image placement base on key
                                                 pressed
      _getNewDirection() :str                  //determine new direction using DIR_ARRAY
      getTrail() :number[][]                   //get list of [x1,y1,x2,y2] of trail segments left behind by
```

```
                                                    the bike
    getTrailColor() :str                           //getter method for trail color
    moveForward()                                  //advance bike’s motion along its current direction
    hasCollided(obsSegment:number[][]):bool    //determine if a bike has collided with the list of
                                                         obstacles segments
}
```