A screen shot of a game

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*AS2 SNACKMAN GAME*

Web development CSY1063

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# Checklist

|  |  |
| --- | --- |
| D+ to D- | |
| The start Game Button is hidden when clicking. |  |
| * The player cannot move until the start button has been clicked. |  |
| Maze wall collision with the player |  |
| * Multiple points of collision for the maze walls (top left and top right for the up direction) |  |
| Point element collision with the player. |  |
| * Points are hidden from the maze. |  |
| The score p tag is updated for every point the player collects. |  |
| A game-over message appears after collecting all the points in the maze. |  |
| Once the game has ended, the player can no longer move. |  |
| The game is over when the player collides with an enemy character. |  |
| * Display the death animation upon enemy collision (dead CSS class) |  |
| C+ to C- | |
| Randomise the position of enemies at the start of the game. |  |
| Prevent the enemies from being created outside of the maze. |  |
| * Prevent enemies from being created where there are walls. |  |
| Enemies randomly move around in the maze. |  |
| * Enemy movement has wall collision (cannot move through walls) |  |
| * The enemy does not stop upon collision with the wall instead it moves in a new direction. |  |
| Enemies stop moving when the game-over state has been reached. |  |
| Reset button instead of game over (resets game state) |  |
| Implement the arrow buttons. The player will continue moving in that direction when an arrow button is clicked. |  |
| * The Arrow GUI button movement does not impact the arrow key movement. |  |
| B+ to B- | |
| At the end of the game, ask the player to enter their name. |  |
| * Save the name and score using local storage. |  |
| Display the scores of all the players on the leaderboard. |  |
| The leaderboard should be organised in order from the highest score to the lowest score. |  |
| Add the lives through JavaScript (not the HTML) at the start of the game. |  |
| Remove a life instead of the Game Over/restart button when the player collides with an enemy. |  |
| * Add the hit class and prevent the player from moving for 1.5 seconds while the animation plays. |  |
| Display the game over/restart button when all three lives are lost. |  |
| A+ to A- | |
| Once all the points are collected, reconfigure the maze and create a new layout for each level. |  |
| * Implement increasing difficulty. As the game goes on, it should get more challenging. |  |
| Create an infinite number of levels (not premade mazes but randomly created) |  |
| * Prevent an impossible-to-solve maze. |  |
| Add two unique features to the game. The better the feature, the more marks |  |
| * The ability to make the maze bigger and smaller |  |
| * Extra lives feature randomly spawn on the map |  |

Table 1 Checklist

# Introduction

This document will go into detail about the development of my snack man game I created, why certain things have been added to the game, What methods I used to create the game and any difficulties I had throughout the process , talking about what I like about the game , strengths and weaknesses and if I had more time what I would add to it .

# Testing

## How did I test that my code worked?

Throughout the development of the Game I used many testing methods when I encountering any bugs I was having or if I just wanted to make sure my code was working how it was supposed to be  , I find testing one of the best ways for making sure everything works smoothly if by testing that it can make sure come up with a decision  on what to add or how something will work which I did may times and I will go through in this document.

## Testing certain aspects of the code

A method I used to test my code was printing variables to the console to allow me to see if the values are wanted were correct allowing me to make sure the game logic of my game is correct.

A blue background with yellow and blue text

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Image 1 using console.log on local storage contents

This is how I was making sure everything I wanted for the leader board was getting added to local storage and it was in correct layout, I had a lot of problems with this, but I managed to sort this out and put the username has the key which will access the score allowing me to retrieve it and add it to the on screen leader board.

A screen shot of a computer

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Image 2 Showing the contents of local storage

I was happy when I saw this in the console getting added as it showed me that the code I had done for the leader board was working as everything I wanted was getting added and in the way I wanted it to and because of testing it was getting added it let me add the logic later to add it to the screen as  I wanted to make sure it was all getting added to local storage before I started working on the logic to display it.

Something I also did was put certain code in a test js file to allow me to test certain parts of my code which allowed me to just focus on the part of code I wanted to test and making sure that particular part was working before adding to my main document I also used Git Branches to help with this as well as it would let me change parts of my code but without the worry about of creating loads of bugs as if I needed to I could go back to the main branch of my  code where all the code that I added isn’t there unless I wanted to add it

A screenshot of a computer program

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Image 3 Showing that points gets updated on collision

Using the console came in handy when I was making sure the score would continually update and making sure it was correct I console.log the score variable and it showed me the score continually updating once the suer collected all the points , so I found it really important being able to test individual parts of the code.

Something I also did to make it easier to test was switching variables values , for example with making the level more difficult when the user collects all the points instead of making it each time having to collect them all when testing what I would do instead is change the value to 3 so I collect 3 points and then it goes to the next level as this saved me a lot of time to go to the next level and I really found it made the testing process a lot faster .

## What tests did I carry out and the outcomes?

Throughout the development process of the game I carried out many tests of the game to make sure the functionality of my game was working and the logic was correct . Two methods I used was black and white box testing .

### Black box testing

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Requirement | Expected output | Actual output | Result | Notes |
| On Click of the start button it should disappear | The button disappear if the user clicks it | Start button disappears of the screen | Y | Test is successful |
| Player movement should be allowed once the start button is pressed | Player is allowed to move once the start button is pressed | Player can only start to move once the start button is pressed | Y | Test is successful |
| Enemy movement starts on start | Enemy movement starts when the game is started | The enemy only starts to move once the game starts | Y | Test is successful but is a start delay for the enemy to start moving |
| When an player collets a point the point should disappear | The point goes when the player collides with it | The point changes opacity on collision to acknowledge the collision | Y | The test is successful but the point doesn’t fully disappear just the opacity changes |
| The Player can’t go through walls | The players is not able to move throughs walls of the maze | The player stops moving when they collide with a wall | Y | Test successful the player not able to move through walls |
| The score goes up by 1 when a player collects a point | When a point is collected the scores goes up | When a player collides with a point the score goes up by 1 | Y | Test successful |
| The player loses a life with collision with a player | The players lives goes down by 1 on collision | When an enemy hits a player the player loses a life | Y | Test successful the hit animation is applied unless all lives are lost then the player dies |
| User asked for name once they lose all lives | A prompt appears to ask the user for a name | When the user loses all their lives they are asked to insert a username | Y | Test successful |
| Leader board in top 5 scores | The leader board should only show the top 5 scores that have been played | At the start of the game the leader board is updated to show the top 5 scores in descending order | Y | Test successful but only updates on the start of the game not as soon as the player enters a name |
| Once player collects all points goes to a new level | When all points have been collected the player is sent to a new level | Once the player has collected all the points they wait a couple of seconds before getting sent to a new level for which they get played instantly | Yd | This will happen an infinite amount of times |

Table 2 Black box

### White box testing

|  |  |  |  |
| --- | --- | --- | --- |
| Feature | Test | Result | Notes |
| Start button | Left click on the start button should make the div display none , and clicking anywhere else on the screen doesn’t start it | Menu is set to display none  On click of the button only | Test successful did this test multiple times throughout and a couple of times it was starting when I clicked anywhere on the screen but I fixed the code that was causing which was that the event was happened on document click no menu div |
| Start button | Right clicking on the menu div should not trigger an event of to make display none | Right clicking on the menu div doesn’t not start the game and doesn’t set display to none | Test successful |
| Maze increase and decrease | The maze should be width of 8 and height of 8 to begin with and they increase by 1 each time a level is completed allowing each level the maze to get bigger | The width and height of the maze are 8 to start with only 1 enemy in the maze to start with | Test successful each time the player gets all the points they go to the next level , did have a problem at the start when increasing the width it mess-up the whole layout of the level but now I got it to work by making a function and calling it at the start when the content has loaded and when the new level is created |
| User lives | The lives are added by js at the start of the game as li and that when the user collides with an enemy the user loses a life | When the game is loaded the 3 lives are added by js and when the user collides with an enemy a function is called to take away one of the lives | Test successful , many tests of this failed as the take away lives function would get called instantly on collision so the user would die instantly but fixed that now by creating a cool down of 5 seconds on contact. |
| Extra life powerup | The extra life powerup should randomly spawn on the map and when the user collides with it they get an extra life added as a li to the live div | One life a does spawn on the map a level and when the user does collect it they do get an extra life added to the lives div | Test successful however I made it so the life can spawn as a point the user already collected meaning they might not be able to collect the extra life as it can’t be added |
| Extra life powerup | When the user loses a life it should be updated using js to lose the correct amount of heart before adding the dead animation | The player does lose the correct amount of lives before the dead animation is added using the hearts variable so it updates the amount of hearts the user should lose | Test successful but at the start the user didn’t lose the correct number of lives before dying it was the original three . |
| leader board | If the player dies it should ask for a username to add to the leatherboard with there score and it will be added if its beats the current top 5 scores | When the user dies it calls a prompt for them to ask to put a username and when they do it will be updated when a new game starts the score will only be added if its beats the top 5 scores | Test successful , had a lot of problems with updating the score , it doesn’t update as soon as the user types it in only when the starts a new game |
| leader board | The user should only be able enter a name of characters not being able to just do space , and they can’t click the cancel button to not give a name | when the user tries to enter just spaces it will be invalid because of the trim function as if the username is false the function gets called again and also username already exists the function gets called again | Test successful had a lot of problems and bugs with the user putting existing username but fixed by looping through local storage and making sure it doesn’t |
| Random maze | Each time the users gets to a new level it should generate a completely random maze with an increasing difficulty and assign the correct classes to the walls points and enemy | When the user collects all the points the level becomes more difficult as increase difficulty function will be called making more enemies and more points for the user to collect, it also it’s a completely new maze for user to play on | Test successful |
| Random maze being unplayable | Each time the player refreshes the page it should check to make sure that each level is playable and checking no points are made impossible to collect | When the user refreshes the page it will generate a completely random new level for the user to play on and it is always playable as it makes it so the walls can’t be diagonal from each other | Test successful how it is always playable but the check sometimes crashes the whole game occasionally . |

Table 3 White box

## What bugs were there ?

Through out the development process I experienced many bugs with my code that made the game unplayable , do things that weren’t expected or crash the game completely .But using testing and looking through my code I managed to solve a lot of them through out the process .

I had a lot of errors when certain properties could not be read I had this a lot when the player or enemy is trying to move into a wall which would make it return none and the code didn’t like that so after lot of tyring and testing I came up with solution to only run the code when its not null



Image 4 Showing an error I got through out development

A screen shot of a computer code

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Image 5 How I fixed the error

By adding the btml && btmr it solved this bug and didn’t cause that error again because it only runs once the user has a position. And when I had this problem later I knew instantly had to fix as I already had it .

A black screen with a white cross

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Image 6 Game crashing error

A screen shot of a computer error

Description automatically generated

Image 7 what was causing the game to crash

When there was errors when the maze wasn’t loading it was mostly because of syntax errors or something was correctly defined and by testing the code it lets you find and fix these bugs as you go .

A bug I had for a long time was when the user gets to the leader board and enters a username and the game over message appears if the user clicks anyway on the screen first it would glitch the game out as the event would conflict but after researching online I found this event command which would prevent this from happening and by white box testing this flaws in the program it allows you to find problems you might not of found otherwise.

A blue background with yellow and purple text

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Image 8 How I fixed the leaderboard bug

# Evaluation

## Known bugs and the weak points of the game.

Mentioned earlier there were a lot of bugs during the development of the game , but there isn’t many and the developed stage although there is a big bug that I couldn’t fix where if you refresh the game enough it can continually on loading and after enough testing I brought it down to the unplayable function trying to create a wall where it shouldn’t and creating an infinite loop which is something I can’t figure out how to fix and is a weak point of my game.

Another weakness of my game is that the leaderboard only updates was a new game has started not straight away , although that isn’t a bug it is a weak point in my game which I would like to change if I had more time .

## what went well?

I feel like a lot of my game went well , liked the development of it and I believe it has achieved all the assignment criteria that was set . I also believe that the unique features I added being the walls being able to change size and that their can be a random extra life powerup spawn in the maze I really liked and really think they got implemented well and really fit the game and make it better experience for the player. I also really enjoyed developing this game which made it a lot more enjoyable working on it , when you want to do something.

## future improvements

Future improvements I would definitely want to work on the weaknesses of the game how the leaderboard doesn’t update straight away and the also the random game crash on refresh which I would really want to get sorted as a future improvement as I found it can make it quite annoying if randomly your playing and the game just doesn’t load in , I would also want to make the game more accessible maybe add more control options , like ‘WASD’ or touch screen capabilities in the future making the game more enjoyable .

## If I had more time, what would I add

If I had more time I would definitely work on adding more powerups which is something I really wanted to do if I got more time, I would add a speed boost powerup , or maybe event the ability for the player to just get randomly teleported on the map if they collect something that would be cool and would watch the idea I wanted to go for with this game .

I would also like to add a hardcore mode , giving the game even extra difficulty which would be the game without powerups and the player only has 1 life which would allow for the player to have that more difficult experience if that is what they are looking for .

And a big feature which I would really like to add was the ability for the game to be two player which would allow a new dynamic to the game and one that I would really think would make it even better .

## How easy would it be to development more functionality.

I feel like with how I coded the game it would be very easy to develop more functionality to the game as I used a lot of functions to develop my game so it will be quite easy to develop from that and add more features to that , Although some of my code can be a bit messy and be very difficult to understand or build off so that could limit the amount of functionality that can be added to the game in the future . And is something that already weakened my game as it was the reason I couldn’t get the leaderboard to update as soon as the user enters their name . They have to wait until they reload the game.

But adding the powerups based on my code would be easy to use the current functionality and add to that and using functionality I have already included with the extra life functionality.

## What would I do differently?

If I was to create something similar , what I would do differently would be to plan more as sometimes I felt I didn’t know what I should work on next and felt a bit lost when there was a lot I needed to work on , I would also test more as I found testing really helpful but sometimes I didn’t white box test when I should of and this could of really helped me create and even better game.

# Conclusion

I did really enjoy developing this game and the process is one I will remember , there were ups and downs when I couldn’t figure something out but I really enjoyed that I got given a template to work with and I get to add my own ideas to it to get it to work , I really enjoyed this assignment and I feel a lot better at coding in Java script and hope to develop similar things in the future .

# Video demonstration

<https://www.youtube.com/watch?v=J8qVVR5sxnE>

second video on bugs and features that didn’t go into as much detail in the first video .

<https://www.youtube.com/watch?v=JtweWJlqNno>

# References

developer.mozilla.org. (2024). *Event.stopPropagation() method - Web APIs | MDN*. [online] Available at: https://developer.mozilla.org/en-US/docs/Web/API/Event/stopPropagation.

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