

Grass Watering Simulator *2018*

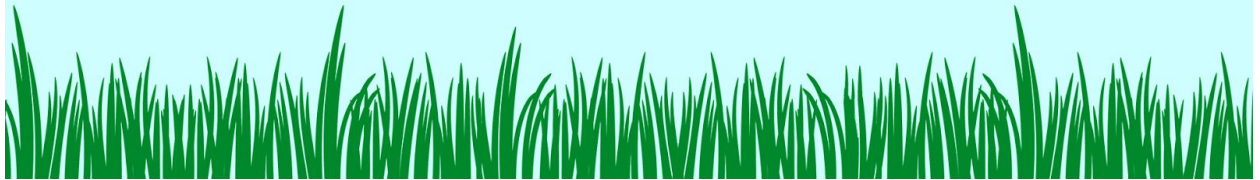


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Context

In *Grass Watering Simulator 2018*, aka *GWS*, the player takes on the role of a homeowner. The environmentally inconsiderate Homeowners Association is charging extreme fees for an unkempt lawn, so the player needs to keep their lawn in tip-top shape.

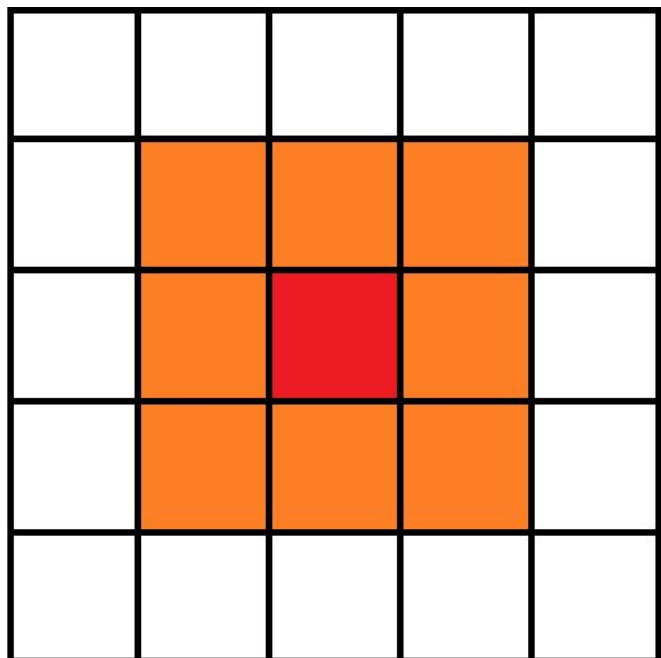
Systems

Tile States

The core game loop in *GWS* is the player studying the state of their grass, watering their grass as they see fit to keep it healthy, then reacting when the grass state changes. This is shown first through the tile state system, in game shown as patches of grass. The player clicks on tiles, raising their states. The tiles raise two states for the clicked tile, one state for all surrounding. Each tile has five states to toggle between. This pairs with my next system, the calendar system.

The red tile is where the player clicked. That tile's state will go up by two.

The tiles surrounding the player's clicked tile, represented in orange, will increase by one state.



Level Length

GWS keeps track of the turn that the player is on via a calendar system, turning each turn into a day. This also allows the game to have levels that use a month's calendar. The calendar gives the player a sense of realism and motivation. The days also mark certain events in the game. At the end of each day, all of the tile's states are decreased by one. At the beginning of each week, the player is given money, the next system in *GWS*.

November 7th, 2017

Tuesday

Example of the
Calendar system

Money

The money system is what makes the game challenging for the player. It acts as a resource that the player must manage to win the game. There are two sources of income for the player, a one time boost at the start of the game, and a smaller boost at the beginning of each week. This money is spent to increase the state of tiles as well as fixing broken tiles. At the end of each week, a fee is applied to the player depending on the states of their tiles. This makes the player carefully manage their resources day by day as well as making them think ahead for future events.

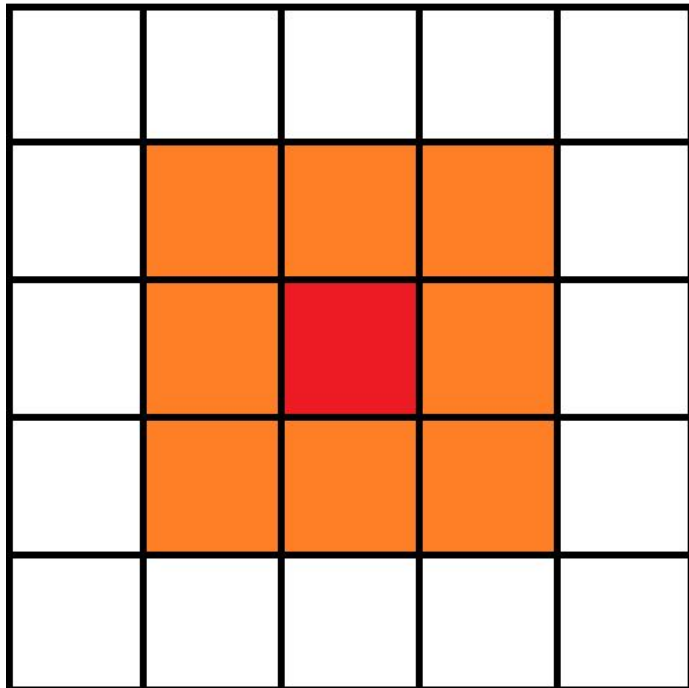
November 7th, 2017

\$800

Tuesday

- \$10

Example of the money system. When the player clicks a tile it decreases the money amount



Mechanics

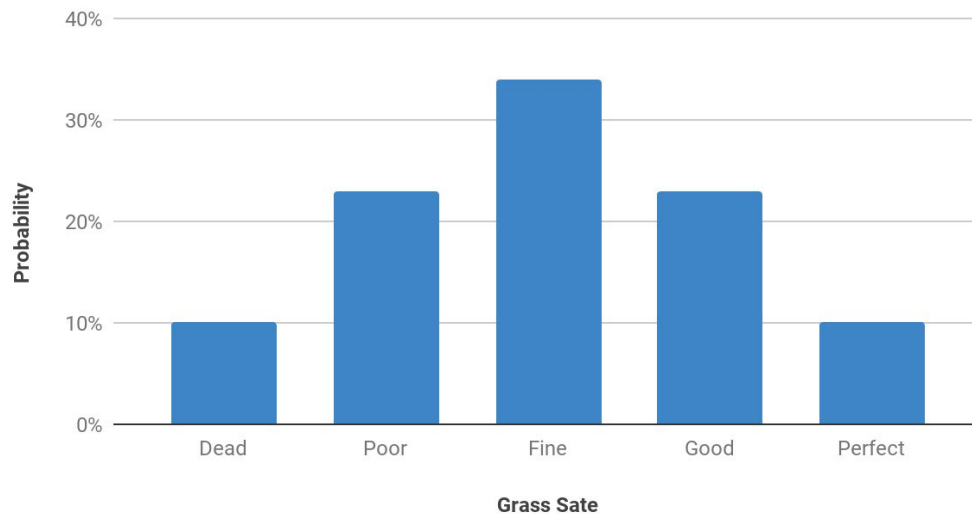
Tile States

Tile states are increased or decreased by player or turn events. There are 5 states a tile can be, shown in the chart below. When the player clicks on a tile, its state is increased by two, and the surrounding states are increased by one.

Tile States	
Name	State Number
Perfect	4
Good	3
Fine	2
Poor	1
Dead	0

If a state is at four and is increased, it overflows to state zero. Tiles in state zero can only be increased by directly clicking on them, which sets that tile, and only that tile, to state four. At the start of the game, the states for the tiles are randomized through a bell curve, shown below.

Probability of Grass State Spawn



Level Length

The calendar mechanic is based on real calendar years. The length of each level is tied to the amount of days in that month, shown below. After the end of the last turn, the game ends.

Calendar		
Month Name	Month Index	Max Turns
January	1	31
February	2	28
March	3	31
April	4	30
May	5	31
June	6	30
July	7	31
August	8	31
September	9	30
October	10	31
November	11	30
December	12	31

Money

Money is used as a resource to add challenge to the game. The player has two ways to gain money and four ways to lose it. These amounts always stay the same value and are only accessed once their event has been called.



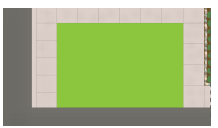

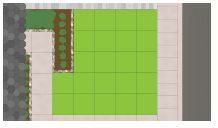

Money	
Event	Amount
Beginning of the game	+\$800
End of the week	+\$400
Clicking on a non-dead tile	-\$10
Clicking on a dead tile	-\$25
Fee per dead grass (weekly)	-\$50
Fee for >20% poor grass (weekly)	-\$25



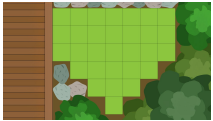

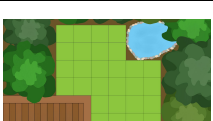

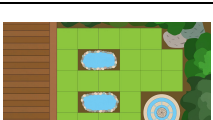
Clicking

When a player clicks on a tile, its state is increased by two and all surrounding states by one. This is accomplished through having two objects, a Dead Checker object and a Trigger object, which both exist outside the play view. When a player taps, the Dead Checker is sent to that location. If the grass state is dead, then the Dead Checker checks to see if the player has enough money to fix the Dead tile. If so, it sets the tile to Perfect, subtracts \$25, and moves back offscreen. If the grass is not dead, the Dead Checker once again checks the money, then adds one to the grass tile, subtracts \$10, and then calls the Trigger to the Dead Checker's location. The trigger checker is large enough to cover nine tiles, or the tapped tile and all the surrounding tiles using an OnTriggerEnter2D function. This specific distance is outlined in the [Levels](#) section. Once everything is complete, the objects head back to their starting positions.

Levels

The grass patches are placed in blocks the Rows and Columns column shows the dimensions of the grass tile array. The tiles are held in place by an empty Game Object called GameHolder. The spacer variable designates the space (plus 1 unit) between each tile needed in order to form a solid area. The grass scale is the scale of the grass prefab. In levels, grass tiles are removed to add more challenge. These removed tiles are shown in the empty patches column. Any level with a .36 grass scale has a trigger collider size of (3.6, 3.6). A .3 grass scale has a trigger collider size of (3, 3).

Name	Image	Month	Rows x Columns	Game Holder Position	Empty Patches (First = 0)	Spacer amount, Grass scale
Tutorial Level		January	5 x 5	(-3.8, -3.6)	None	.8, .36
Level 1		May	5 x 5	(-3.8, -3.6)	None	.8, .36
Level 2		June	6 x 4	(-3.8, -2.5)	None	.8, .36
Level 3		July	7 x 5	(-3.7, -2.4)	None	.5, .3
Level 4		August	5 x 5	(-3.8, -3.6)	10, 15, 20	.8, .36
Level 5		September	6 x 6	(-3.6, -3.74)	2, 3, 8, 9, 14, 15	.5, .3

Level 6		October	7 x 5	(-4.2, -2.3)	3, 4, 9, 10, 15, 16, 21, 22, 28	.5, .3
Level 7		November	8 x 4	(-4.5, -3)	4, 5, 6, 7, 12, 28	.5, .3
Level 8		December	6 x 6	(-3.6, -3.75)	14, 15, 20, 21	.5, .3
Level 9		January	7 x 6	(-3.9, -3.75)	0, 1, 2, 4, 5, 6, 7, 8, 12, 13, 14, 20	.5, .3
Level 10		February	6 x 6	(-3.7, -3.75)	0, 1, 6, 7, 28, 29, 34, 35	.5, .3
Level 11		March	6 x 6	(-3.6, -3.8)	2, 8, 9, 14, 15, 21, 26, 27, 32	.5, .3
Level 12		April	6 x 5	(-3.4, -3.6)	4, 5, 7, 8, 10, 11, 19, 20, 29	.8, .36

Art and Animation

The art style for the game is hard edges and soft colors. Almost everything has an outline, except for the grass. The grass patches have no outline. Here are examples of the art:

In order of appearance:

1. Title Screen
2. Options Screen
3. Level Select Screen
4. Tutorial
5. Level 1
6. Pause Screen
7. Homeowners Association Bill
8. Watering animation



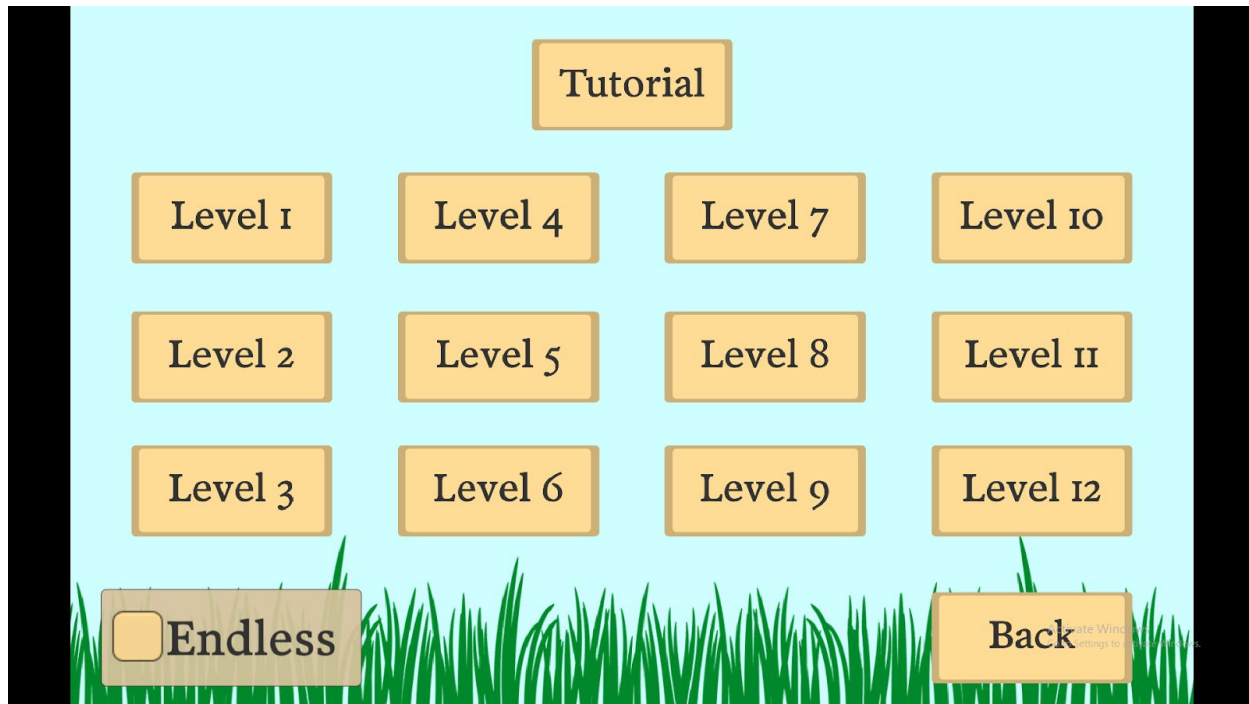
Toggle
Music

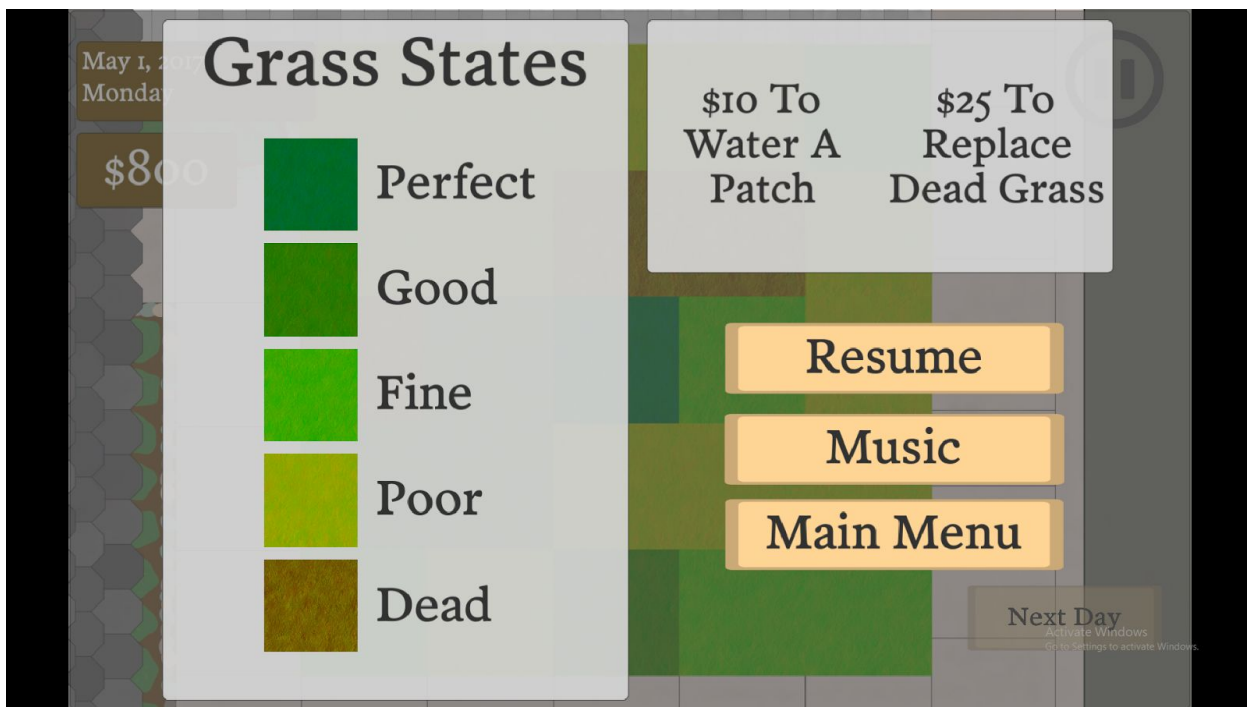
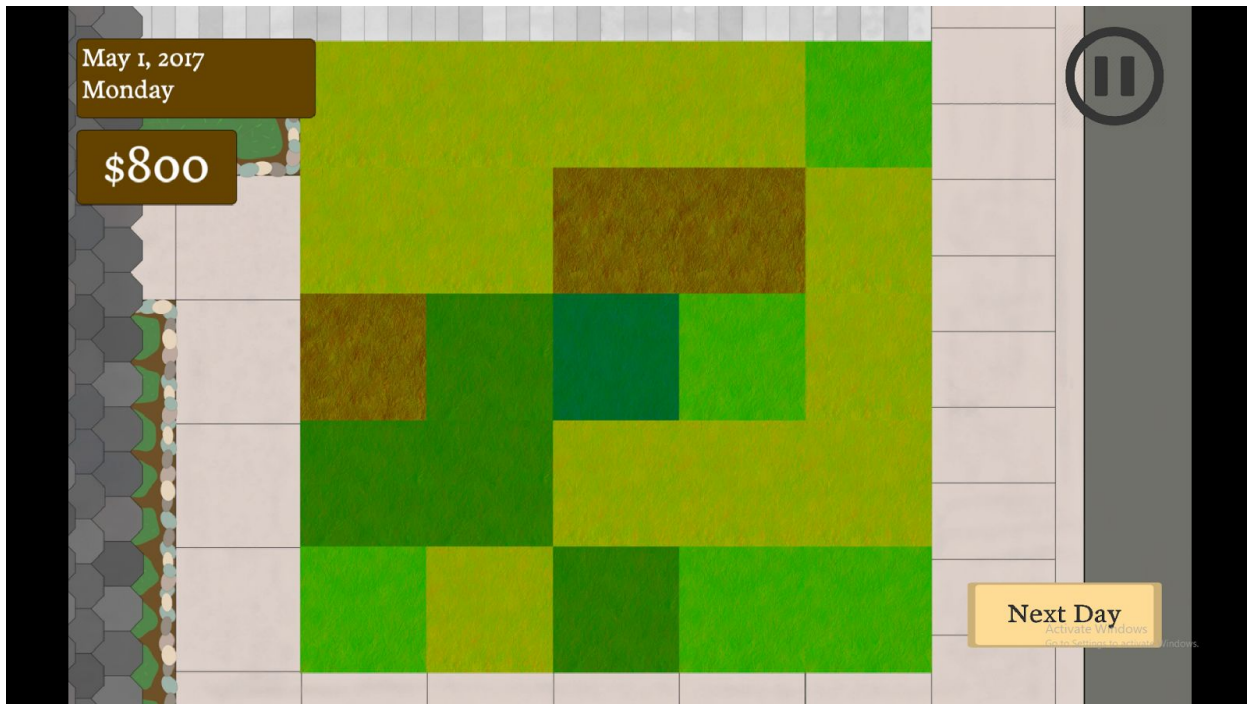
Reset
Data

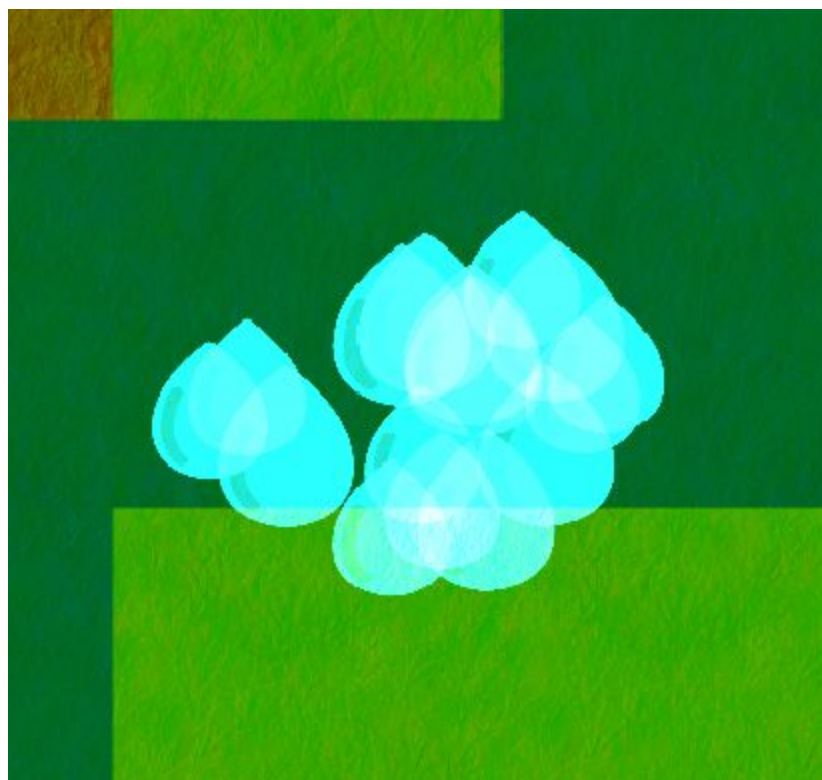
This game was made by
~Zach Phillips~
I hope you enjoy!

Back

Phone icons made by Vaadin from www.flaticon.com
Music from Bensounds.com and Freesound.org

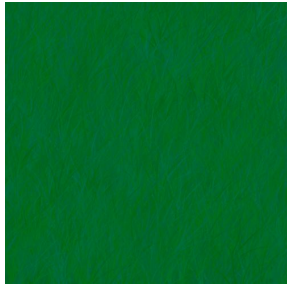
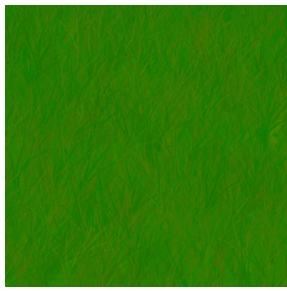
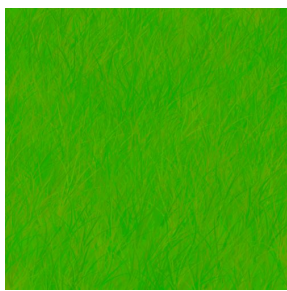
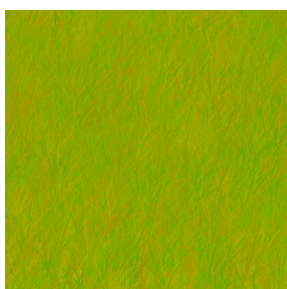








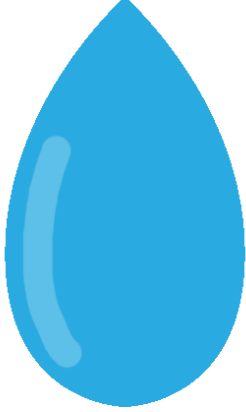
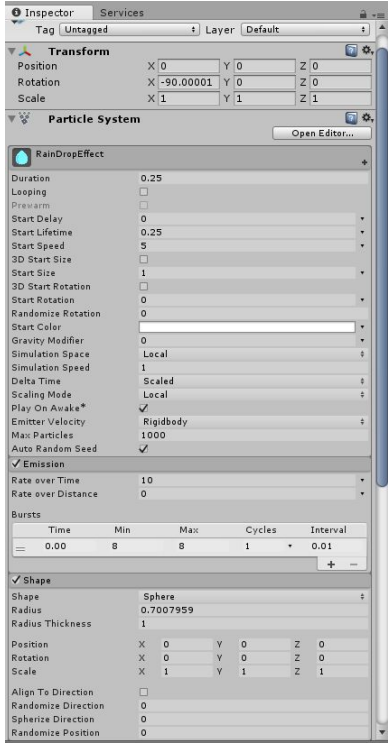
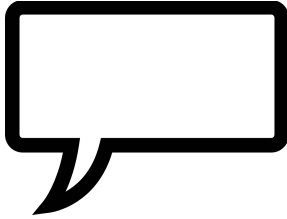



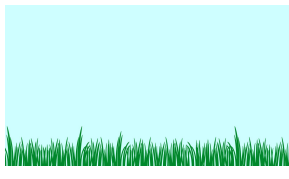
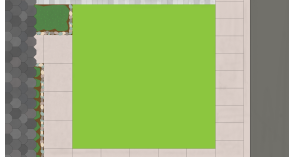


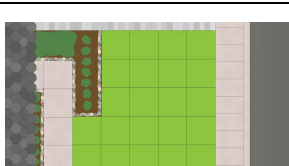


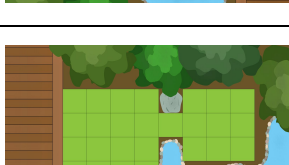
The watering animation creates a burst of the Water Drop sprite using the particle effector burst setting. The exact settings can be found in the sprite list.


Sprite List

Name	Sprite	Dimension s	Other
Perfect Grass		500 x 500	
Good Grass		500 x 500	
Fine Grass		500 x 500	
Poor Grass		500 x 500	

Dead Grass		500 x 500	
Tutorial Phone		1000 x 1000	
Button		500 x 300	<p>This sprite was used as the button sprite for all the buttons. It was usually given the hex color #FFDC96FF, except for the Reset Data button in the options screen which had the code #FF9696FF</p>
Pause Icon		512 x 512	

<p>Water Drop</p>		<p>289 x 417</p>	<p>This was used for the watering animation. The exact details can be seen here:</p>  <p>There was also an Size over Time variable, which was a decreasing parabola, the 6th default option.</p>
<p>Speech Bubble</p>		<p>1000 x 755</p>	<p>This sprite was 9 cut so that it could be scaled to fit the tutorial words.</p>
<p>Title Screen</p>		<p>1920 x 1080</p>	

Basic Screen		1920 x 1080	This is used in the options screen and Level select screen
Level 1 Background		1920 x 1080	
Level 2 Background		1920 x 1080	
Level 3 Background		1920 x 1080	
Level 4 Background		1920 x 1080	
Level 5 Background		1920 x 1080	
Level 6 Background		1920 x 1080	
Level 7 Background		1920 x 1080	

Level 8 Background		1920 x 1080	
Level 9 Background		1920 x 1080	
Level 10 Background		1920 x 1080	
Level 11 Background		1920 x 1080	
Level 12 Background		1920 x 1080	
Application Icon		512 x 512	

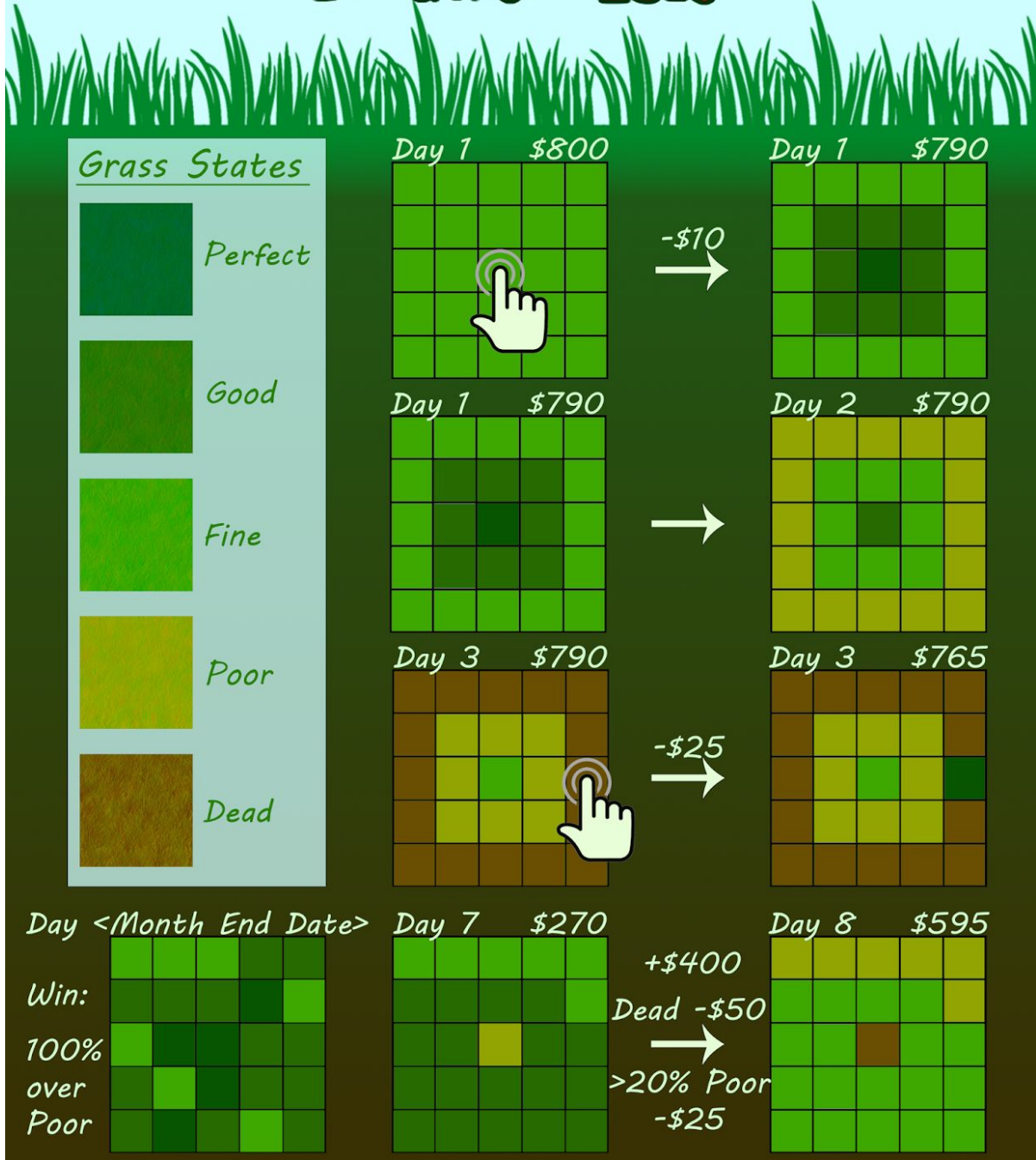
Font

This game uses the font PoynterText Regular. It can be found here:
<http://fontsgreek.com/fonts/PoynterText-Regular>

Font Sizing	
Menu Buttons	25 pt.
Pause Menu Buttons	35 pt.
Pause Menu Money Reminders	30 pt.
Grass State List Title	50 pt.
Grass State Tile Descriptions	35 pt.
Tutorial Phone Words	20 pt.
Tap Anywhere To Continue	30 pt.
Next Turn Button	20 pt.
Date Panel	18 pt.
Money Display	35 pt.
Money Fade Up	40 pt.
Homeowners Association Bill Title	50 pt.
Homeowners Association Bill Text	35 pt.

Visual Design Document

Grass Watering Simulator 2018



QA - Physical Prototype

After testing the physical prototype, my testers said they would like it more if the patches were randomized at the start of the game, preventing them from repeating a pattern. They also said that they wished they started with more money to balance out the chaos that it would bring. I took that into account and decided I liked starting with random states. I also gave the player a \$800 to start, instead of \$400.

In later tests, the testers talked about adding random events to the game which would sap the player's money. While I couldn't add those at the time, I noted it and put it as a stretch goal for my digital version.

However, the biggest feedback I got was that it was too hard to play a turn due to the amount of pieces on the board. To fix this, I created another identical board to place on top of the master board. I also added the tile for the state under the current one so that after a day, the player can just flip over their board to reset to a new turn. This allowed me to make the act of playing the physical prototype much faster.

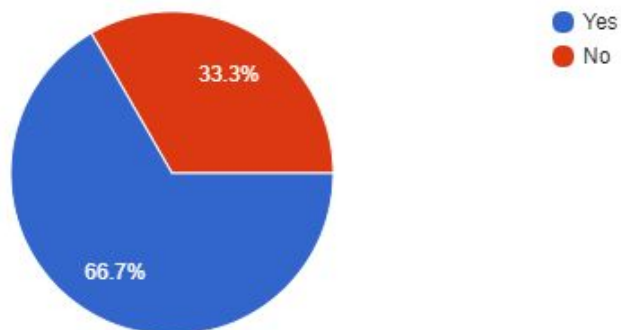
QA - Digital Prototype

First Session - 11/7/17

For my digital prototype QA, I had my players play a full level of my game and then fill out a 10 question survey. First, I wanted to figure out how many people play puzzle games on a regular basis. I found that 66% of my testers had. This was great news, because now I had a group of people that knew what they liked, and a smaller group that hadn't played as many puzzle games.

Do you play puzzle games often?

9 responses

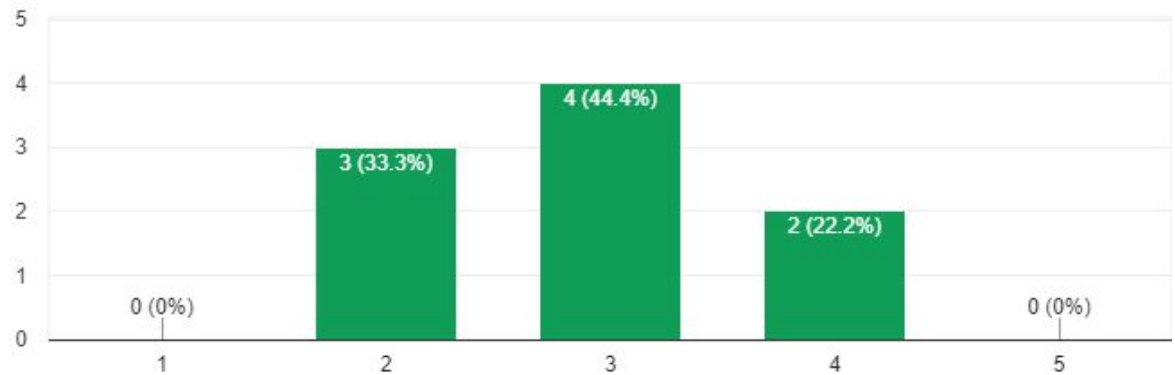


Next, I asked if the players understood the rules of the game, as well as if they liked how the surrounding tiles were watered as well. For both questions I got 100% yes. This was really great to hear, because I have been improving on how to make my rules more simple and easy to understand. As for the surrounding tiles, I'm glad the player's liked it, because that was the core mechanic of the game.

I then went into questions about the money system. I first asked if the starting amount of money felt right. The question was out of 5, where 1 meant the player thought they needed way more, and 5 thought the player needed way less. 44% of testers felt it was the perfect amount, but there was a split for the other 56% on either side. I am interpreting this as the money should stay the way it is.

How did you feel about the starting amount of money?

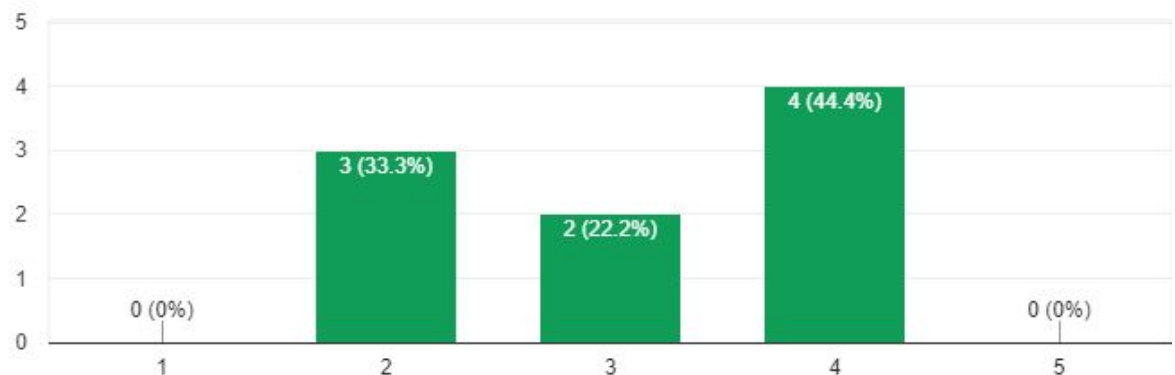
9 responses



After that I asked about the penalties. Once again, on a 1 to 5 scale, 1 meant the penalties were too easy and 5 meant the penalties were too harsh. The majority, with 44% said 4, that the penalties were just a little too harsh. The other 56% had a mix between a little too easy and perfect. I'm going to interpret this the same as before, I'll just keep it the way it is. However, since the majority was skewed on one side, I'll be testing this question again.

How do you feel about the penalties from the Homeowner's Association?

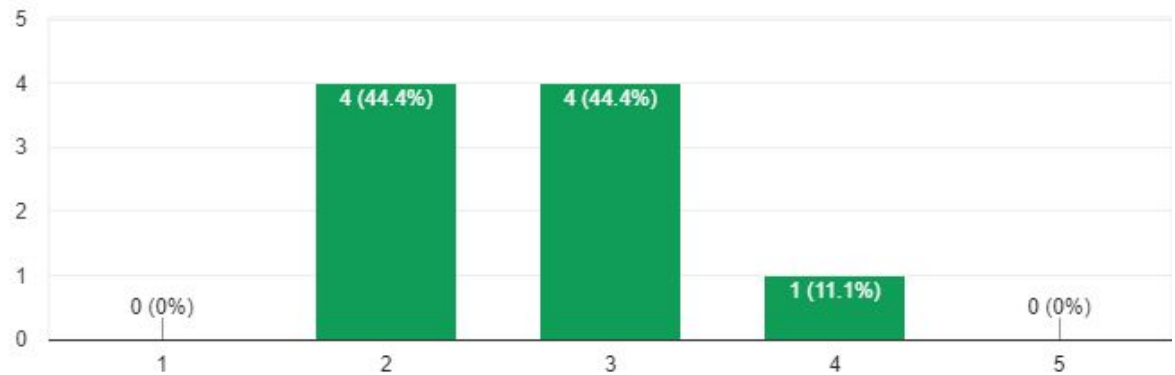
9 responses



I then asked about the timeframe of the level. I wanted my players to actually experience living in a month, and I wanted to know if they thought it was too long or too short. On a 1 to 5 scale, with 1 meaning less days and 5 meaning more days, I had a split for majority between 2 and 3. Only one person wanted slightly more time, but I will ignore that as an outlier. As for the 2 results, I will keep it the way it is now, but I will test for different ideas on how to make the game feel more engaging so that the player feels like they spend less time in the game.

How does the one month = 1 level time frame feel?

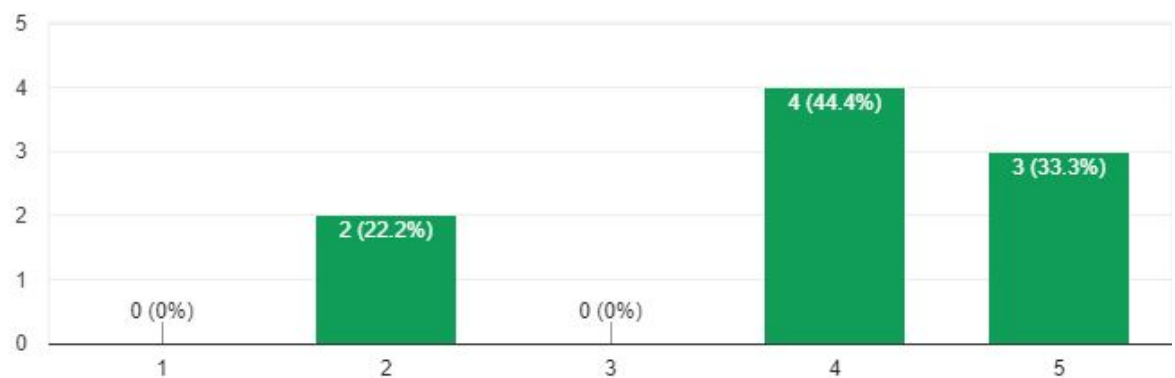
9 responses



The last scale question I asked was about future plans. I asked if the player would like random events such as rain or firestorms as long as they were warned of it ahead of time. With 1 meaning they hate the idea and 5 meaning they love it, the majority at 44% said they would be excited for it. The next largest group, 33%, said they would love the idea. I did have two people say that they would really dislike the idea. This concerned me a little bit, but I decided that I would take caution to keep the events balanced as I created them.

How would you feel about random events such as rain or firestorms if they were announced at the beginning of the week?

9 responses



The next two questions I asked were short answer. I asked the testers what they thought was the most fun and if they had any other thoughts on the game. Overwhelmingly the response was the strategy and planning that they went through. They were excited to think about the game and their future moves, which makes me think my game is successful in its concept. The final thoughts section was filled with cool ideas for future implantation such as different watering styles and lawn upgrades that I will certainly keep in mind as I move forward in development.

To summarize, I learned that people liked my core mechanic of grass states, as well as the values I have for money. I need to be cautious moving forward, but for the most part everything is leaning towards what the player's want. I also learned that the players would want random events, and I will work towards implementing that as well as making sure that they are balanced with the rest of the game.

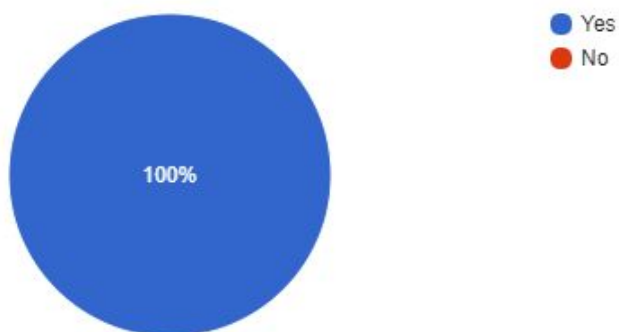
Second Session - 12/2/17

For my second QA session, I wanted to test the usability of my game. I had created a tutorial, and I wanted to make sure that, 1) the skills needed to play the game were taught, and 2) the skills carried over to a real game. To test this, I had my testers play the tutorial level and then half of Level 1. I had not introduced the missing tiles yet, so there was nothing new from the tutorial to Level 1. Overall, I had 36 people test the game and give feedback.

The first question I asked after my testers played the game was "Did you understand what to do?". 100% of testers said yes. This was a huge relief to me, and it meant that the tutorial was effective. Next, I asked, "Was the tutorial engaging?". I had ~78% of people say yes. This meant that almost a fourth of people didn't find the tutorial engaging, but I think this is an acceptable range of error since not everyone who tested my game was in my target audience.

Did you understand what you had to do?

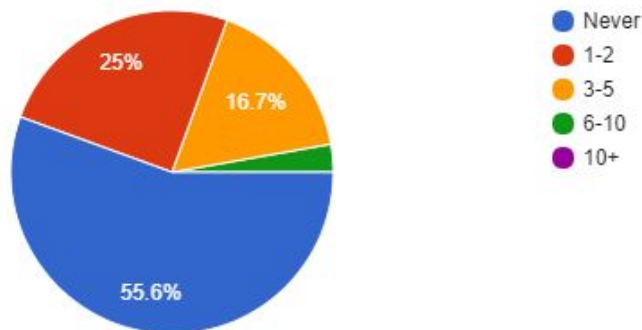
36 responses



The next question I asked was, “How often did you have to check the grass state charts?” ~55% said never, 25% said 1-2, ~17% said 3-5, and ~3% (one person) said 6-10. This means that the tutorial was memorable for most people, and if it wasn’t, then most needed 5 or less checks through the whole game. I think these are very good results, and it shows that the colors I used are memorable.

How often did you have to check the grass state charts?

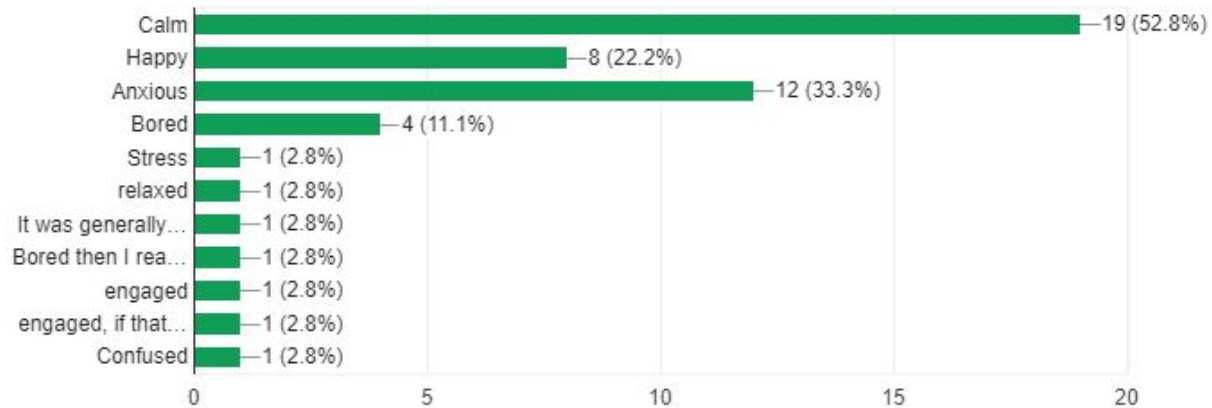
36 responses



Something I was interested in while creating this game was the emotion of the player’s that were playing. I wanted this game to be calming and relaxing, and didn’t want the players to be angry or stressed. In this question, I allowed the testers to put in as many emotions as they wanted. ~53% said that they felt calm, ~33% were anxious, ~22% were happy, and ~11% were bored, with the rest of the results including, relaxed, stressed, and engaged. Overall, since ~75% of testers felt calm, I consider the emotions of this game to be a success. However, since ~33% felt anxious, I want to make sure I enforce the calming environment. Also, ~11% said they were bored. I will chalk that up to the testers not being in my target audience since the number is so small.

What emotion did you feel while playing the game?

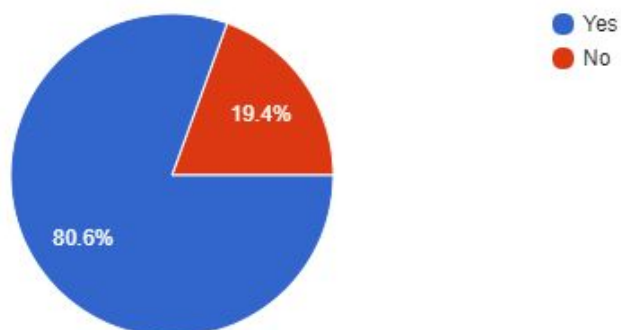
36 responses



Next, I asked, “Did you feel invested in the game?” This question is important because my game relies on replayability. If the game was not engaging, that meant that my game model was broken. However, ~81% of testers said that they felt invested, so that validates my game model. For the other ~19%, I’ll chalk that up to audience, or people who don’t like puzzle games.

Did you feel invested in the game?

36 responses



The last question I asked was, “Did you feel like the game was unfair in anyway?” The majority of testers said no, but those who did feel like the game was unfair mostly had issues with learning the specifics of the game. Out of all the yes responses, most said that they didn’t understand some of the control and tapping mechanic. This can be solved by improving the tutorial, so I’m not too worried. The rest had a variety of issues, the second most common being

that they didn't understand that watering Perfect grass makes it Dead. this, again, can be improved through the tutorial.

In conclusion, I felt like this QA was a huge success and it gave me a lot of data to use to better improve my game, and to tell me how the players played my game.

Iteration

11/7/17 - Based off of QA results, I:

- Added Random events to my backlog
- Solidified my starting mechanic
 - Locked down the Homeowner's Fees, starting money, and money deduction amounts

12/3/17 - In preparation for QA, I:

- Added a tutorial level which teaches the player about the basics of the game
- Added theme music
- Added sound effects for most actions
 - Didn't have a sound effect for replacing dead grass

12/5/17 - Based off of QA results, I:

- Made the "Click to continue text larger"
- Added a clearer description to the tutorial
- Reorganized my levels to make them flow better
- Fixed a clicking bug due to unity's frame updates
- Improved the tutorial to include the specifics of Dead grass management

12/7/17 - Last day. This is what I did:

- Cut random events
- Released my game on Android and did minor bug and QoL fixes
 - Fixed a problem with water animation not being random enough
 - Added a sound for when a Dead tile is replaced