

CGCV Lab 10 Report

Group 8: Chris Beem, Nolan Cardozo, Ajinkya Indulkar

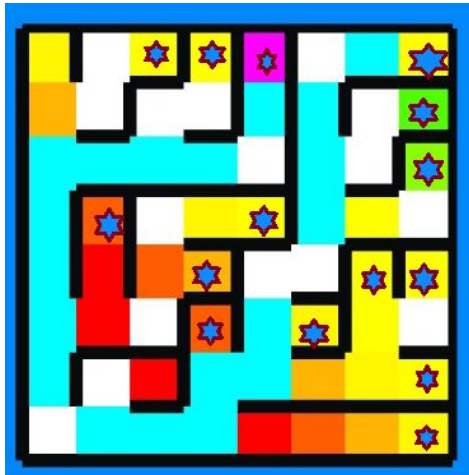
This report:

This report briefly describes the features extracted from an average of 1000 mazes, Generated with 4 different algorithms.

Features:

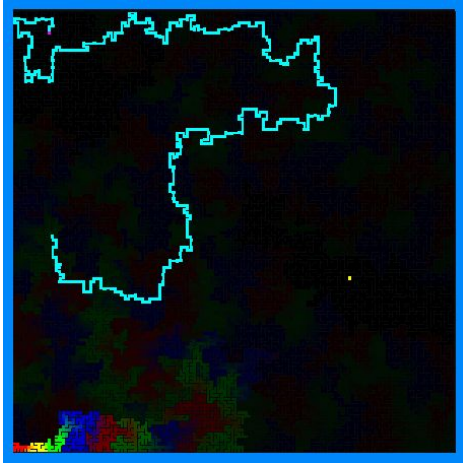
Dead Ends:

Cells where the player is forced to turn 180 degrees. As the starred cells in the maze below.



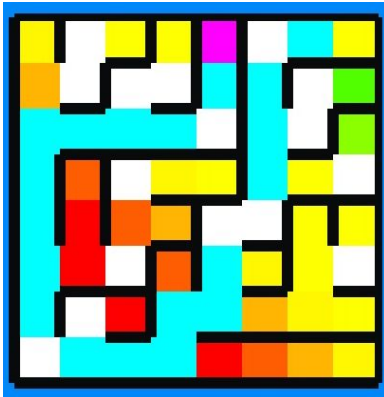
Longest path:

The longest path that a player can take in the maze. As seen in the image below.



Twistyness:

How many times a player who is navigating the maze is FORCED to make a direction change. In the image below these are the white squares.

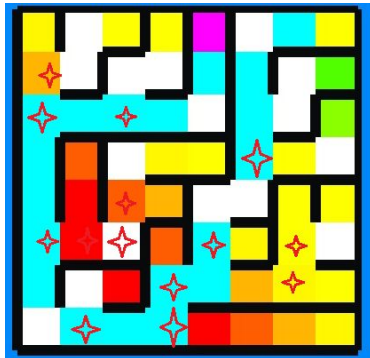


Directness:

Directness is the opposite of twistyness. Ergo, the count of cells where the player cannot take a decision.

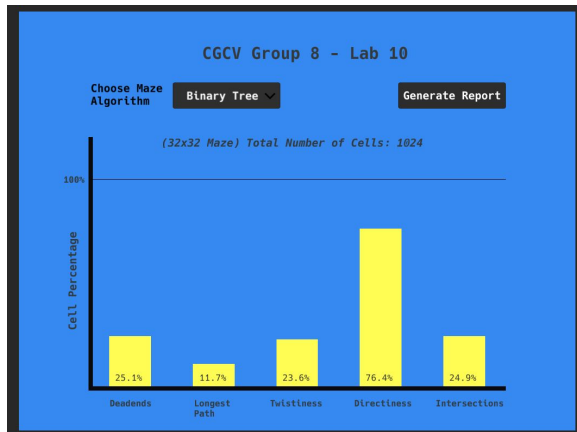
Intersections:

Where the player has to make a choice, as all the starred cells in the image below.



Results

Binary Tree Algorithm (bias: NE)



[19:46:53] Average Number of Deadends: 257.252
UnityEngine.Debug:Log(Object)

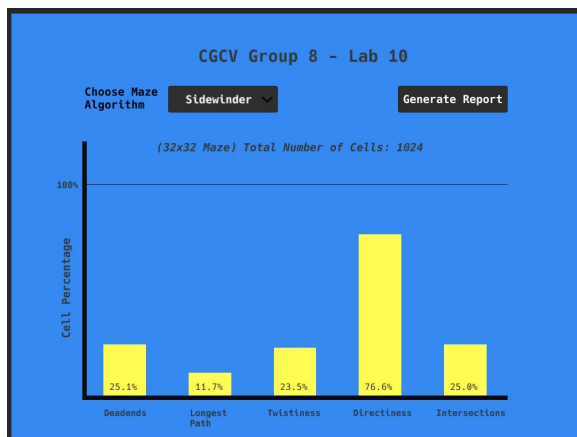
[19:46:53] Average Longest Path: 119.297
UnityEngine.Debug:Log(Object)

[19:46:53] Average Twistiness: 241.533
UnityEngine.Debug:Log(Object)

[19:46:53] Average Directness: 782.467
UnityEngine.Debug:Log(Object)

[19:46:53] Average Intersections: 255.252
UnityEngine.Debug:Log(Object)

Sidewinder Algorithm



[19:56:11] Average Number of Deadends: 257.2532
UnityEngine.Debug:Log(Object)

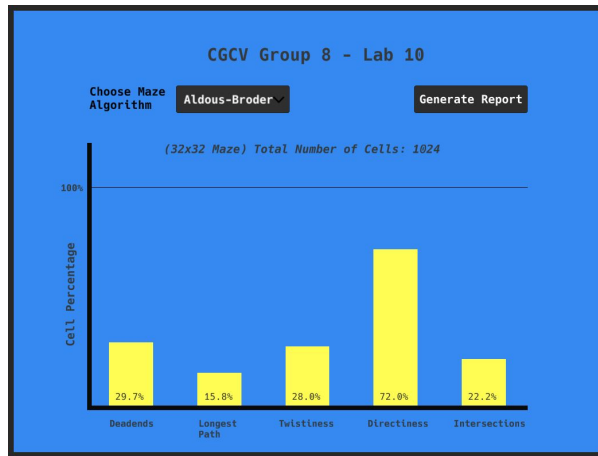
[19:56:11] Average Longest Path: 119.5603
UnityEngine.Debug:Log(Object)

[19:56:11] Average Twistiness: 240.6385
UnityEngine.Debug:Log(Object)

[19:56:11] Average Directness: 784.3855
UnityEngine.Debug:Log(Object)

[19:56:11] Average Intersections: 256.2513
UnityEngine.Debug:Log(Object)

Aldous-Broder Algorithm



[20:05:26] Average Number of Deadends: 303.794
UnityEngine.Debug:Log(Object)

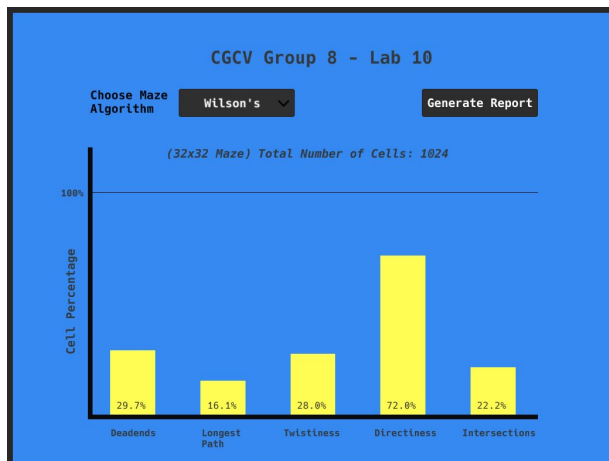
[20:05:26] Average Longest Path: 162.181
UnityEngine.Debug:Log(Object)

[20:05:26] Average Twistiness: 287.043
UnityEngine.Debug:Log(Object)

[20:05:26] Average Directness: 736.957
UnityEngine.Debug:Log(Object)

[20:05:26] Average Intersections: 227.685
UnityEngine.Debug:Log(Object)

Wilson's Algorithm



[20:02:49] Average Number of Deadends: 304.09
UnityEngine.Debug:Log(Object)

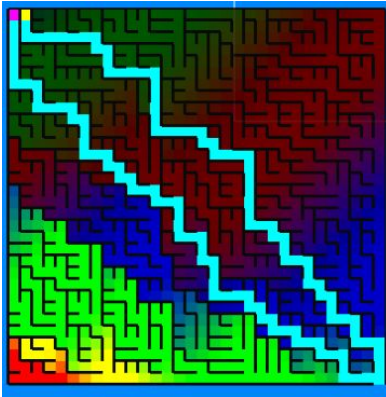
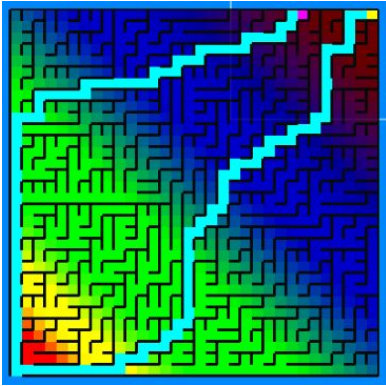
[20:02:49] Average Longest Path: 164.695
UnityEngine.Debug:Log(Object)

[20:02:49] Average Twistiness: 287.195
UnityEngine.Debug:Log(Object)

[20:02:49] Average Directness: 736.805
UnityEngine.Debug:Log(Object)

[20:02:49] Average Intersections: 227.298
UnityEngine.Debug:Log(Object)

Observations



Binary tree, North eastern orientation, and North western orientation.

As this is a binary tree algorithm with a certain orientation, the entire maze looks like one big tree.

The **longest path** always wraps around the “crown” of the tree.

In a 32×32 (1024 cells) maze:

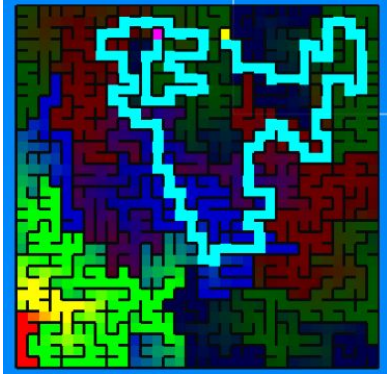
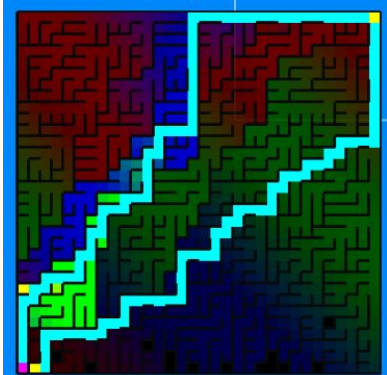
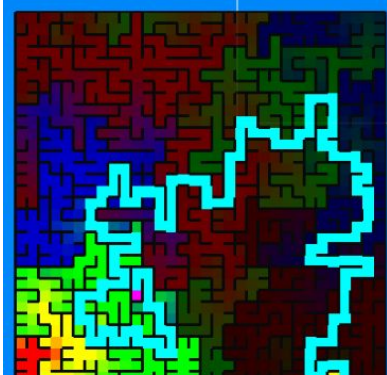
There are on average 257 cells that lead in a dead end.

The average longest path takes you past ~120 cells.

The player has to change direction on average on ~240 cells.

The player can go straight in the remaining ~780 cells.

And has to make a decision on ~255 cells.

 <p>Aldous-Broder</p>	<p>The longest path in a maze generated by the aldous-Broder algorithm is a lot more twisty and much longer than in the binary tree maze.</p> <p>The maze looks more uniformly generated, with no obvious preferred direction.</p> <p>In a 32*32 (1024 cells) maze: There are on average ~300 cells that lead in a dead end. The average longest path takes you past ~160 cells. The player has to change direction on average on ~290 cells. The player can go straight in the remaining ~740 cells. And has to make a decision on ~230 cells.</p>
 <p>SideWinder algorithm</p>	<p>The sidewinder has the look that is similar to the binary tree algorithm.</p> <p>The maze as an obvious preferred directionness.</p> <p>In a 32*32 (1024 cells) maze: There are on average ~260 cells that lead in a dead end. The average longest path takes you past ~120 cells. The player has to change direction on average on ~240 cells. The player can go straight in the remaining ~785 cells. And has to make a decision on ~255 cells.</p>
 <p>Wilson's algorithm</p>	<p>The Wilson's algorithm looks a lot like the Aldous-Broder.</p> <p>In a 32*32 (1024 cells) maze: There are on average ~300 cells that lead in a dead end. The average longest path takes you past ~160 cells. The player has to change direction on average on ~290 cells. The player can go straight in the remaining ~740 cells. And has to make a decision on ~230 cells.</p> <p>This is very similar to the features in the Aldous-Broder.</p>