

ProcMaze

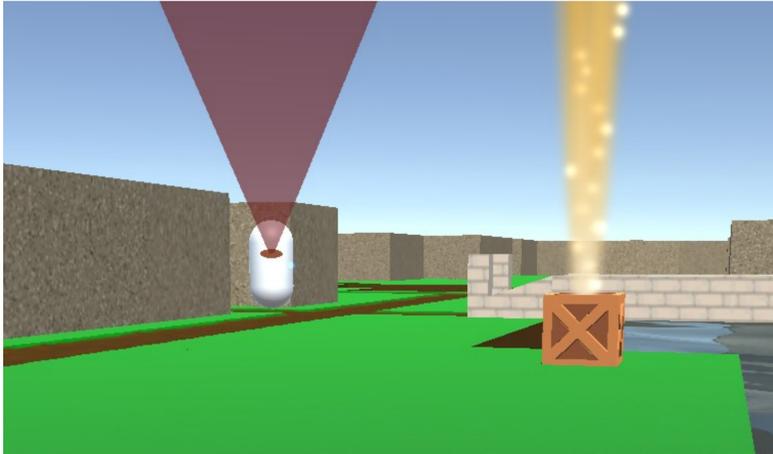
An infinite maze game



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What is it?

ProcMaze is an infinite maze game. An implementation of the **Wave Function Collapse** (WFC) algorithm was used to generate the maze.



Main Features

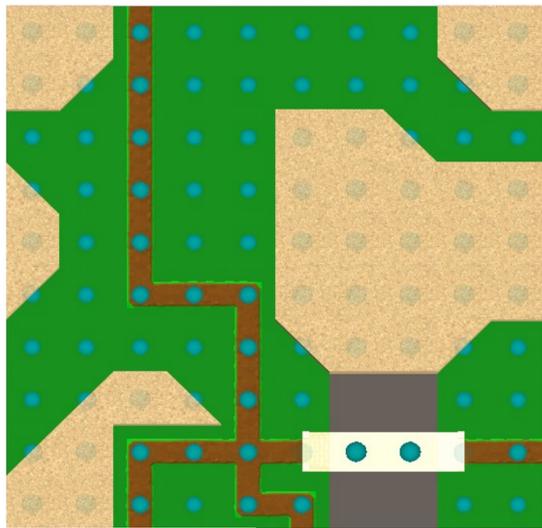
The maze is divided into an **infinite** number of chunks. Each chunk is generated independently from the other chunks. New chunks are generated as the player character moves. Old chunks are unloaded if the player character is too far away and reloaded if the player goes near an unloaded chunk.

The goal of this game is to gain as high score as possible. This can be achieved by collecting boxes and pushing enemies. The boxes and the enemies are randomly placed on the grass and the road tiles.

While exploring be careful not to be noticed by the enemies. They will shoot on sight.

The Wave Function Collapse Algorithm

1) Read the input grid and count NxM patterns.



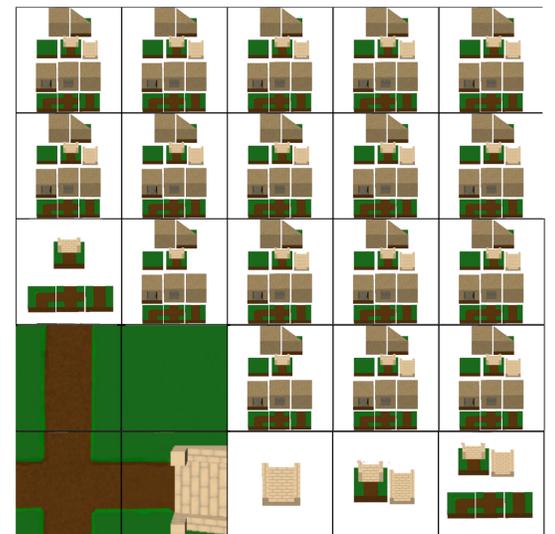
4) Repeat the following steps:

Observation:

i) Find a wave element with the least nonzero true coefficients. If there is no such elements then break the cycle and go to step (5).

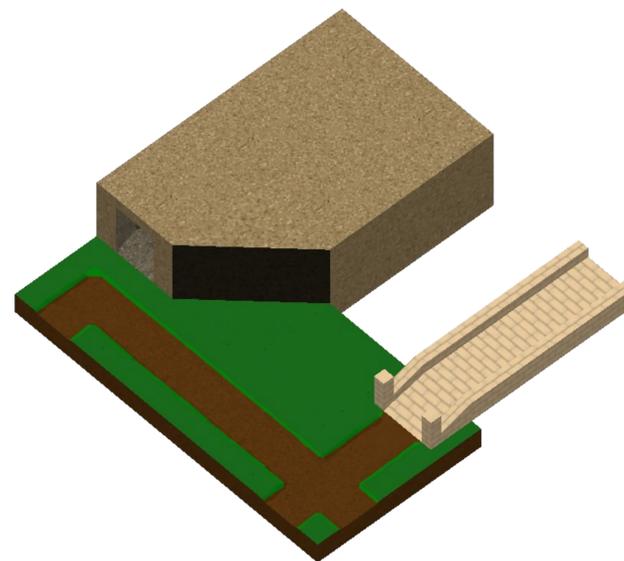
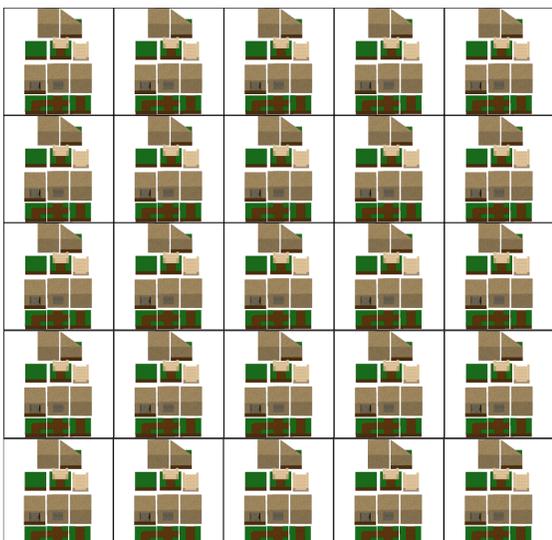
ii) Collapse this element into a definite state according to its coefficients and the distribution of NxM patterns in the input.

Propagation: propagate information gained on the previous observation step.



2) Create an array (called wave here) with dimensions of the output where each element is in a superposition of NxM patterns of the input with Boolean coefficients. False coefficient means that the corresponding pattern is forbidden, true coefficient means that the corresponding pattern is not yet forbidden.

3) Initialize the wave array in the completely unobserved state.



5) By now all the wave elements are in a completely observed state (all the coefficients except one being true) or in the contradictory state (all the coefficients being false). In the first case return the output. In the second case finish the work without returning anything.

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Try it yourself:

<https://github.com/MeelisPerli/ProcMaze/files/3212228/ProcMaze.zip>

More about the project:

<https://courses.cs.ut.ee/2019/cg-pro/spring/Main/Project-ProcMaze>

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