HACD Game of life

inspired by Conway's Game of Life, HACD can break through the limitations of visualization and advance to a new stage of "dynamics" and "gameplay".

HACD originally has a random data fragment called "Visual Gene". This fragment comes from the six letters of the diamond and the hash obtained by calculating the random data such as the block hash and bidding fee through SHA3_256. We can use this randomly generated hash as the "Life Gene" of HACD, with a length of 32 bytes (256 bits).

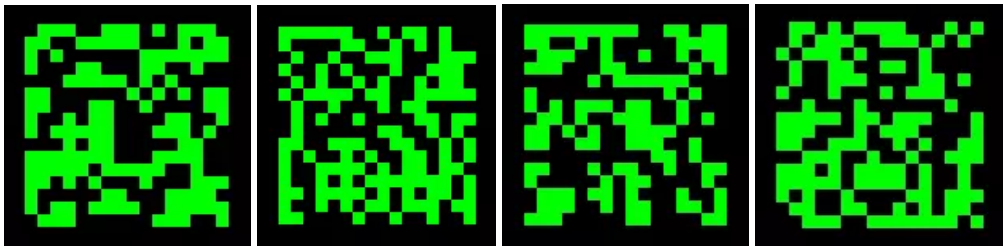
This "Life Gene" can be used not only for the random data of this Game of Life, but also for more HACD dynamic and gamification proposals in the future.

The principle and gameplay of "HACD Game of life" will be described below.

Life Gene is a 256 bits hash value, for example:

> 5d8f581dfad634a670aaf954fc1a3aff8bd20bd2f7a26ba3a00b1e1dc6ec56a1

By converting this random 256-bit hash value into a 16 × 16 matrix, when the point is 1, it displays green, indicating survival, and when the point is 0, it displays black, indicating death. This will result in a displayed image similar to a QR code:



We can create some unique styles to enhance the display effect and avoid being too monotonous. Some unique attributes and their occurrence probability are:

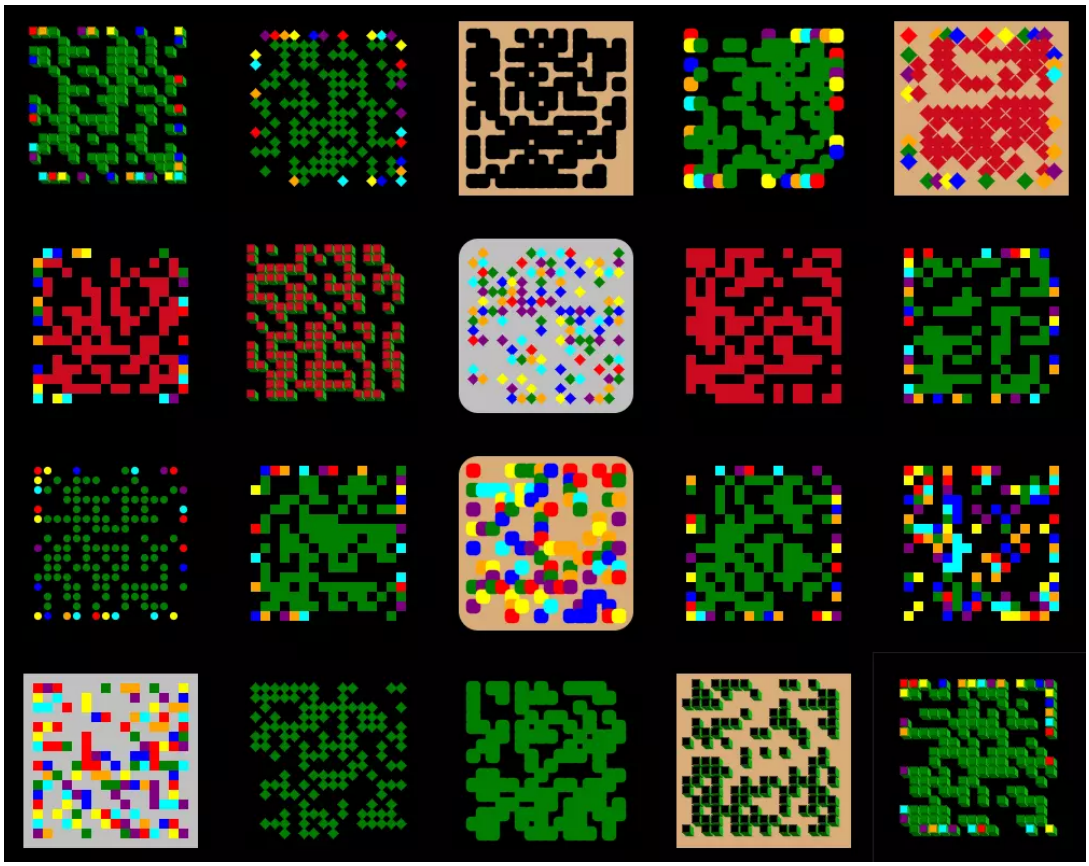
> The first level probability is 1/10:
>
> 1. Grey background
> 2. Rounded rectangle background
> 3. Circular life point
> 4. Rhombus life point
>
> The first level probability is 1/20:
>
> 5. None background
> 6. Peripheral colorful

7. Enlarged life point
8. Red life point

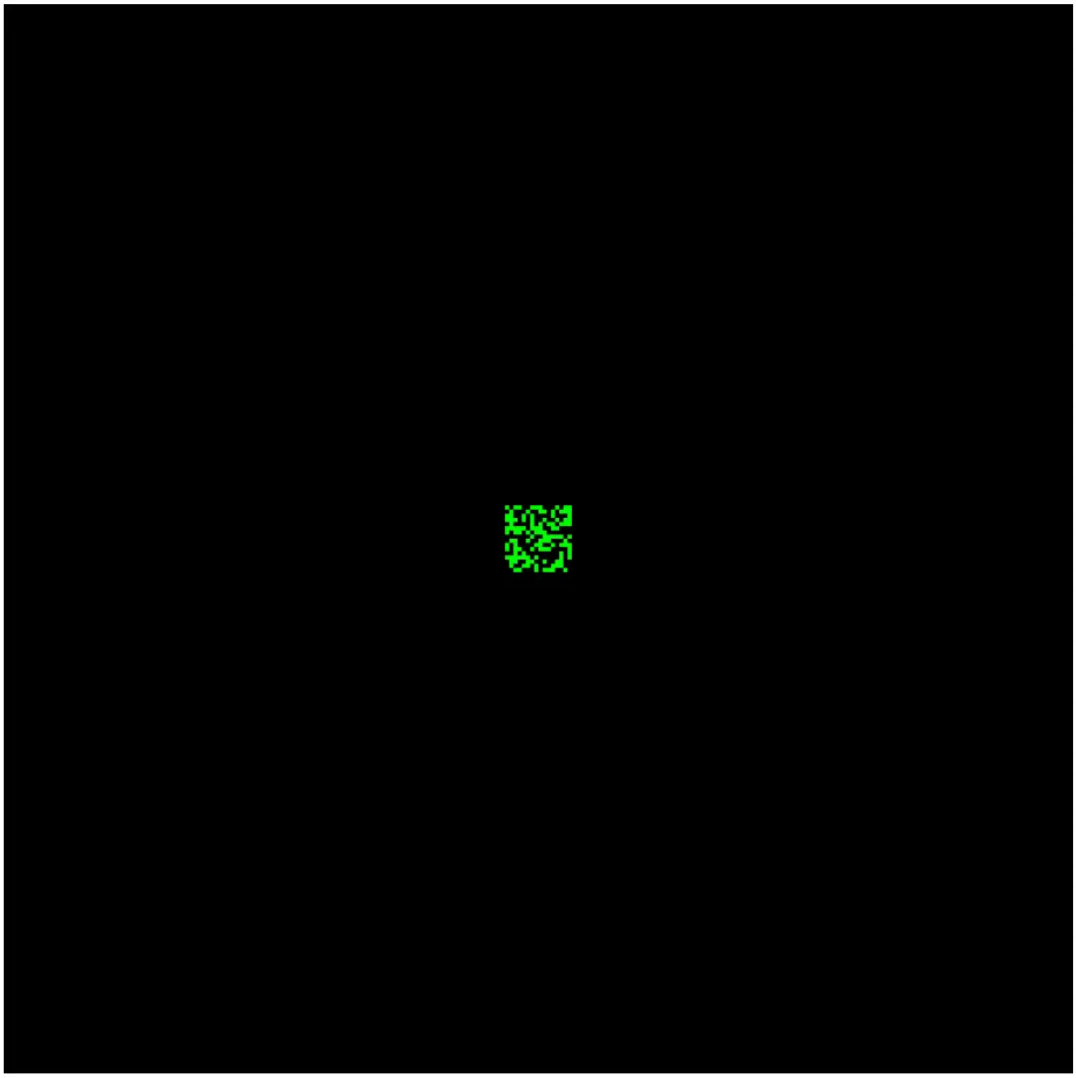
The first level probability is 1/40:

9. Hollow out gold
10. Full colorful point
11. Solid block point
12. Rainbow background

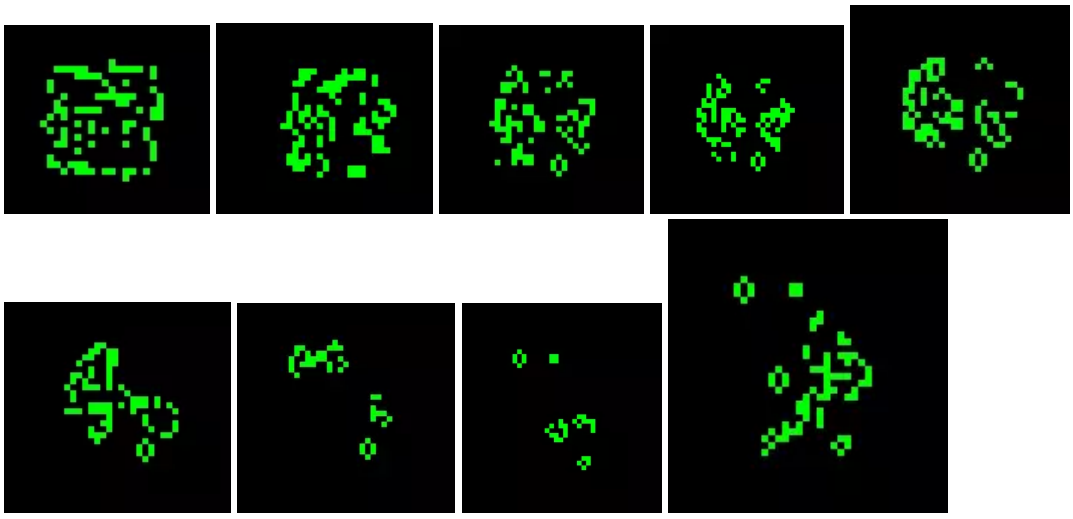
These special styles are combined as shown below:

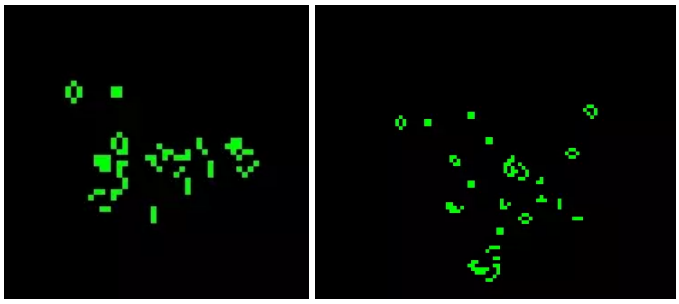


This matrix of width 16 is then placed in the center of a larger matrix of width 256 as the initial state of the evolution of ”Conway’s Life” (which may be called the gene or seed of life). As follows:



This background matrix with the width of 256 is just the universe where the life of HACD is. At this time, according to the rules of Conway's life game, the evolution of life (birth, maintenance and death) will be carried out from generation to generation, and the image of life will move, breaking through the scope of the original 16 × 16 matrix. The evolution process is shown in the figure below:



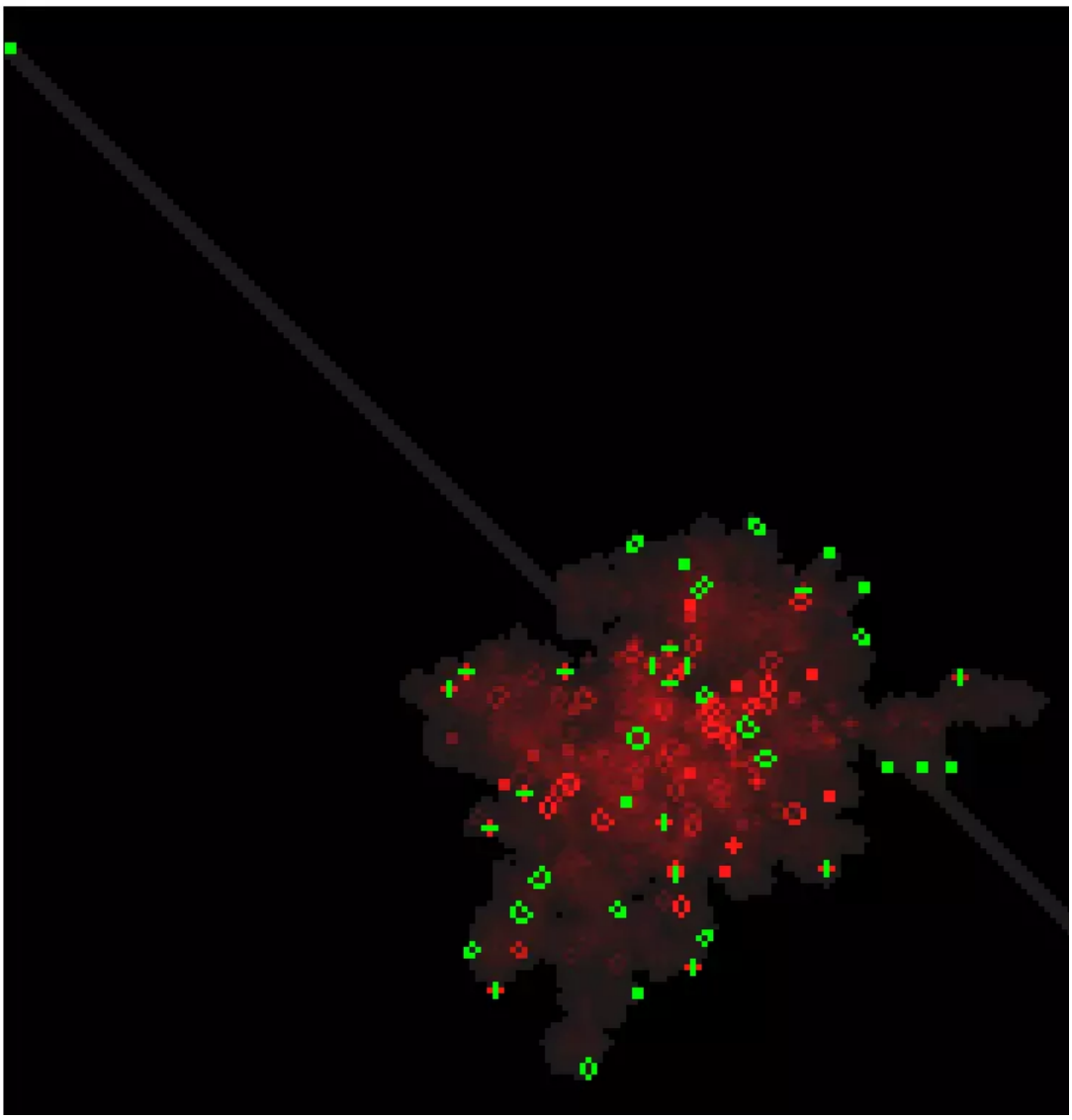


After several life evolutions, the system will enter a ”stable state”, at which time the external expansion of life ends, the number of existing life remains unchanged, and no new life is born. At this point, the game of life is over, and the state is as follows:

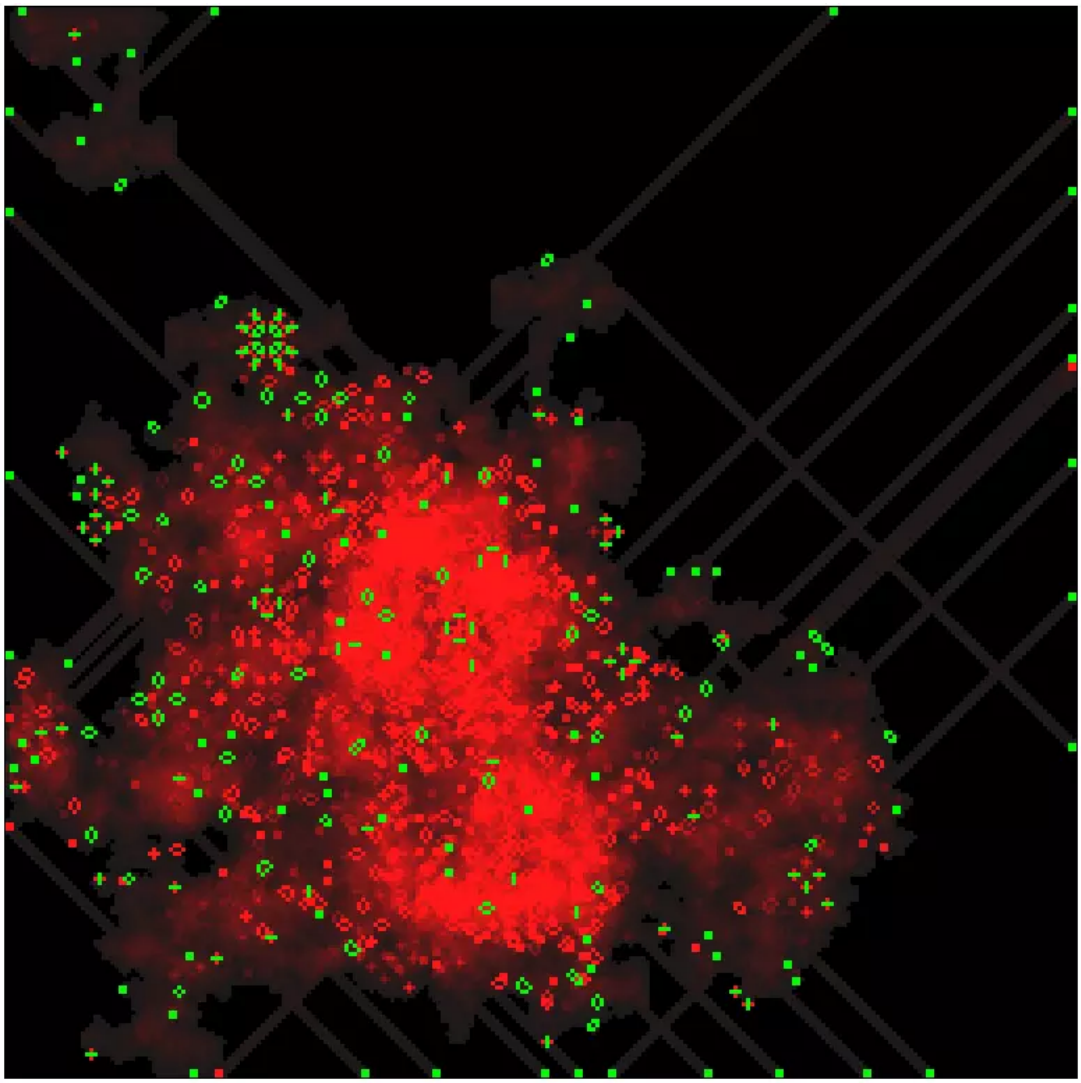
Among them, the green part is the area that is still in the living state after stabilization, the gray part is the area where life once appeared (the red depth of the gray area represents the frequency of life appearing in this position), and the rest of the black part is the dead area that life has not reached .

In fact, if we use the size of the area where life reaches or the length of time it remains active as the criterion for judging vitality, due to the difference in the initial ”life gene”, the final result of evolution will show a very big difference. Here’s an example of a other result:

The result of stronger vitality, and evolved an ”explorer” leaping to the edge of the universe (the green square in the upper left corner):



If some life genes happen to be able to maintain longer-term evolution, then it will expand the footprint of life to most of the entire ”universe” and send out more ”explorers”:



As a ”Game of life”, we count the results of life evolution, and there are the following five data:

1. Vitality: how many times life has appeared in history
2. Time: How many times did it evolve before reaching a stable level
3. Territory: the size of the area that life has traveled
4. Living: How many lives are still alive after reaching a steady state
5. Expedition: How many life ”spaceships” have evolved to fly to the edge of the universe

Statistics data such as:

> Vitality: 57437, Territory: 2317, Times: 621, Living: 82, Expedition: 4

We can use the size of the above statistical data as the scarcity standard of ”HACD life”, but this is not absolute. Perhaps, the HACD with the smallest statistical value will be sought after instead, or the most beautiful stable pattern will have the greatest scarcity sex.

For more information, please refer to the code:

https://github.com/hacash/explorer/blob/master/static/jslib/diamondlifegame.js