

# Your Simulated Formalized Life-game

— A visual simulator of a specialized  
kind of cellular automata

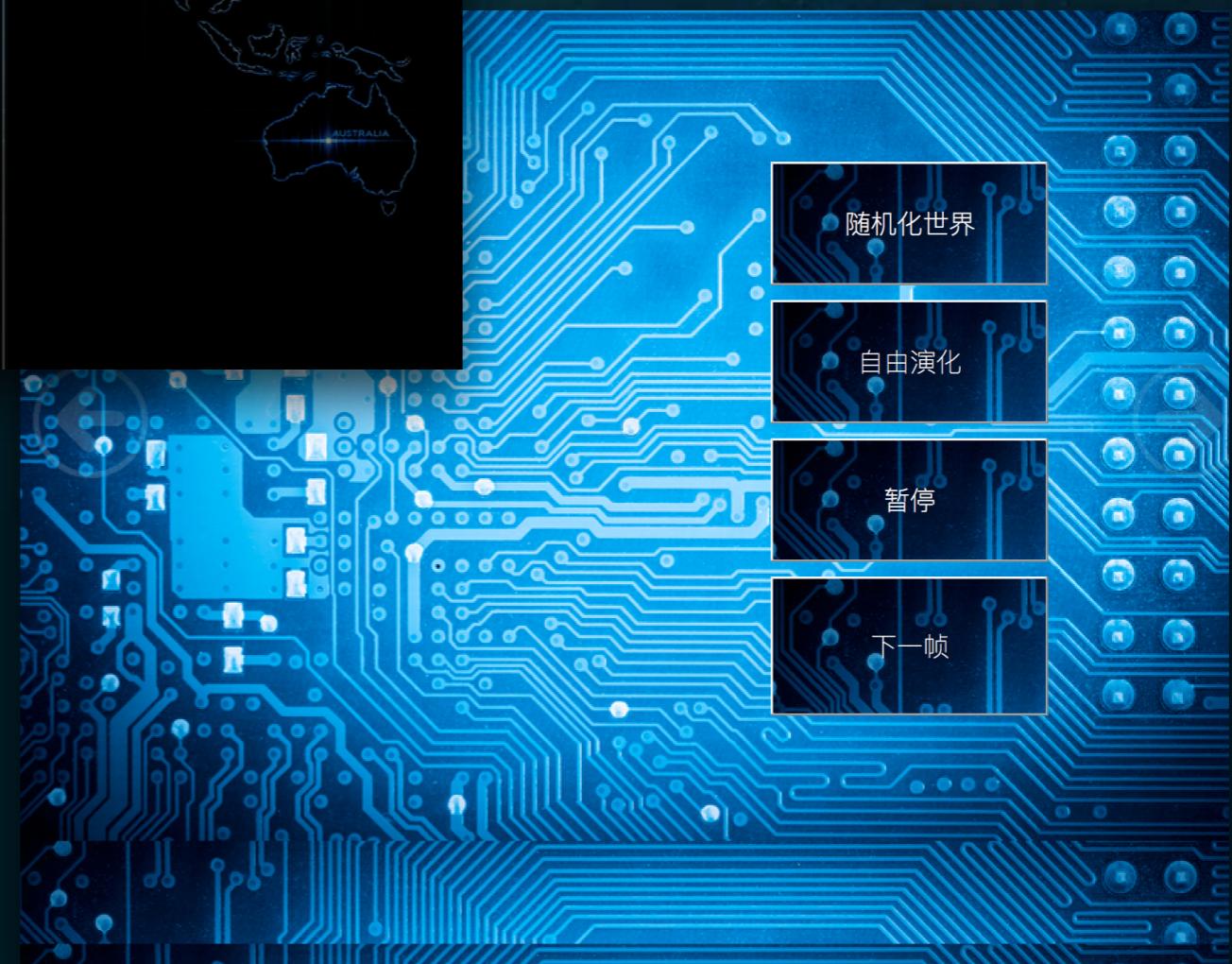
HELLO.  
WELCOME TO OUR WORLD!

# World Components



World Size:  
100 \* 100 pixels

Life State:  
0~die 1~alive



# Life Properties



DNA : A\*T\*G\*C\*



Horizon:  $x$  ( $x \in [1, 10]$ )



DNA  
interpreter

# Life Rules

If

Equals

Detect

TTC

TTA

CTA

CTC

ATA

ATC

TTT

TTG

CTT

CTG

ATT

ATG

born

die

still

TCA

TCT

CCA

CCT

ACA

ACT

TCC

TCG

CCC

CCG

ACC

ACG

1	2	3	4	5	6	7	8	9	10
GTX	GCX	TAX	CAX	AAX	GAX	TGX	CGX	AGX	GGX

X ∈ {A, T, C, G}

# Life Rules

If (bool x, state y, state z) :

return y (x = 1)

return z (x = 0)

Equals (int x, int y)

return 1 (x = y)

return 0 (x != y)

Detect(int x)

return (number of lives within horizon(x))

Examples : (Initial DNA Sequences)

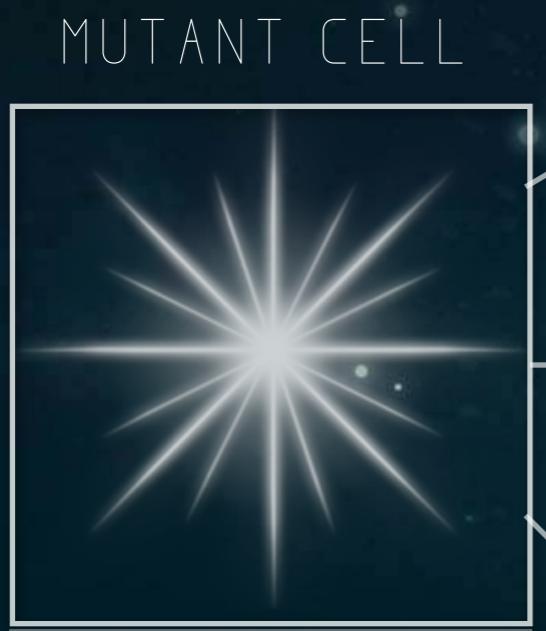
TTT TTG ATA GTA TAT TCT CCG

If ( equals ( detect(1), 3), born, die)

TTT TTG ATA GTA GCT ACA TTC TTG ATT GTT TAT TCC CCA

if ( equals ( detect ( 1 ), 2 ), still , if ( equals ( detect ( 1 ), 3 ), born, die ) )

# Generic Mutation



## MUTATION TYPES

1. SUBSTITUTION
2. DUPLICATION

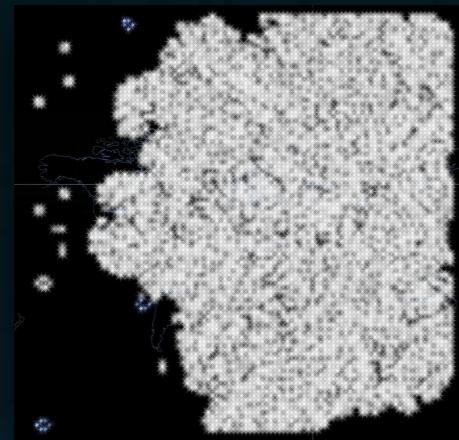
## MUTATION RATE

1/10000

## MUTATION RESULTS

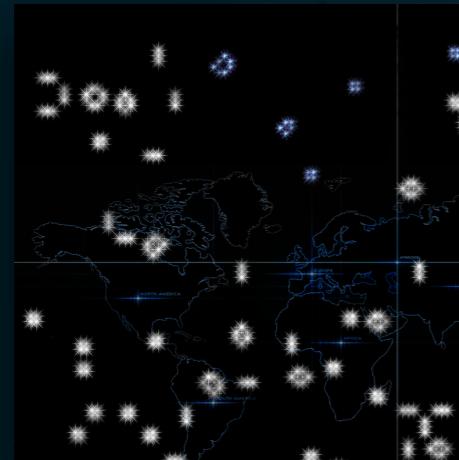
- CHANGE OF HORIZON
- LIVING CONDITION
- COMPILE ERROR (DIE)

# Special Paradigm



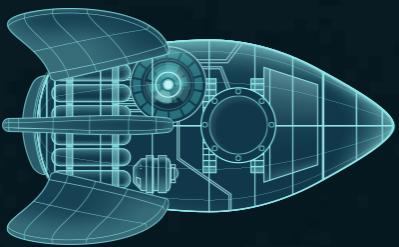
#1-IMMORTALIZED CELL

由于新诞生细胞的DNA编号规则为：取视野范围8个格子里面非0格DNA代码的算术平均，当一个细胞演化为永生型时，该类细胞将会持续繁殖占据大部分世界区域。而此时我们也可以看到一些无法蔓延的“真空地带”，这些地带上存在着具有抗原属性的一些细胞。



当有效突变未发生时，固定的生存规则下会有一些稳态集群，即形态永恒不变或周期性变化。比较经典的一些图案有：2\*2正方形，十字架，脉冲星、滑翔机

#2-EQUILIBRIUM STATE



# GROUP MEMBER



YOU ZHIYU

游志宇

YOUR

SHENG PEIYAO

盛佩瑤

SIMULATED

FANG ZHIYONG

方智涌

FORMALIZED

LU SIDI

盧思迪

LIFE-GAME

LIU SIQI

劉思柒

2016.06.18