Conway's Game of Life

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1 WHAT IS THE CONWAY'S GAME OF LIFE?

The Game of Life is a cellular automaton, devised by the British mathematician John Horton Conway in 1970. Which have four basic rules:

1.Any live cell with fewer than two live neighbours dies.
2.Any live cell with two or three live neighbours lives on to the next generation.
3.Any live cell with more than three live neighbours dies.
4.Any dead cell with exactly three live neighbours becomes a live cell.

1.1 HOW TO RUN IT ON PYTHON?

1.Download and Install python
2.Open your Terminal
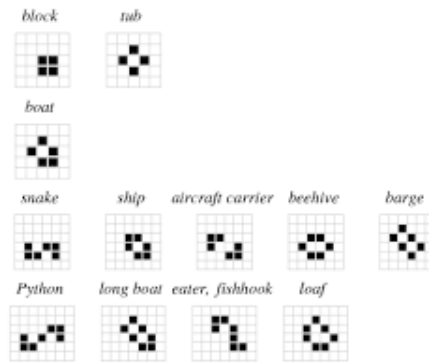3.Type in:"git clone https://github.com/Trismeg/python$_{b}eg$"

Figure 1.1: Game of Life

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Python Code:


import random
from graphics import *

#this function creates an NxN array filled with zeros
def empty(N):
    a=[]
    for i in range(N):
        b=[]
        for j in range(N):
            b=b+[0]
        a=a+[b]
    return a

#this function fills the array a with a portion p of live cells
def fill(a,p):
    N=len(a)
    for i in range(N):
        for j in range(N):
            if random.uniform(0,1)<p:
                a[i][j]=1

def update(A,B):
    N=len(A)
    for i in range(N):
        for j in range(N):
            neigh=A[(i-1)%N][(j-1)%N]+A[(i-1)%N][j]+A[(i-1)%N][(j+1)%N]+A[i][(j-1)%N]+A[i]
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```python
                if A[i][j]==0:
                    if neigh==3:
                        B[i][j]=1
                    else:
                        B[i][j]=0
                else:
                    if neigh==2 or neigh==3:
                        B[i][j]=1
                    else:
                        B[i][j]=0


def gen2Dgraphic(N):
    a=[]
    for i in range(N):
        b=[]
        for j in range(N):
            b=b+[Circle(Point(i,j),.49)]
        a=a+[b]
    return a

def push(B,A):
    N=len(A)
    for i in range(N):
        for j in range(N):
            A[i][j]=B[i][j]

def drawArray(A,a,window):
#A is the array of 0,1 values representing the state of the game
#a is an array of Circle objects
#window is the GraphWin in which we will draw the circles
    N=len(A)
    for i in range(N):
        for j in range(N):
            if A[i][j]==1:
                a[i][j].undraw()
                a[i][j].draw(window)
            if A[i][j]==0:
                a[i][j].undraw()

def slider(a,x,y):
    a[0+x][0+y]=1
    a[0+x][1+y]=1
    a[2+x][1+y]=1
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    a[0+x][2+y]=1
    a[1+x][2+y]=1

N=50
win = GraphWin("Title",600,600)
win.setCoords(-1,-1,N+1,N+1)
grid=empty(N)
grid2=empty(N)
circles=gen2Dgraphic(N)
#fill(grid,0.1)
for i in range(10):
    slider(grid,5*i,5*i)

while True:
    drawArray(grid,circles,win)
    update(grid,grid2)
    push(grid2,grid)
```

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(FOUR! Essential Python Code You need to Know:)
1.this function creates an NxN array filled with zeros def empty(N):
2.this function fills the array a with a portion p of live cells def fill(a,p):
3.window is the GraphWin in which we will draw the circles N=len(A)
4.fill(grid,0.1) for i in range(10):

PRACTICAL MEANING OF GAME OF LIFE (PERSONAL UNDERSTOOD)

1.2 CIVILIZATION SIMULATOR

- Create a brand new world on your computer.

  – Game of life, also called cellular automaton. Theoretically, you could stimulate everything you can do on on your computer in this program. Which can also stimulate any complex evaluation.

    Game of Life is really a thoughtful game, and you can easily code it on your python. So you don't you try it?