

Jeu de la vie de Conway

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<sxh python; title : Conway_Game_of_Life_2D-JK-2012.py> #!/usr/bin/env python # -*- coding: utf-8 -
*- """A minimal implementation of Conway's Game of Life.
```

source : <http://www.exolette.com/code/life> modified by par Jérémie Knoops, BA2 chimie UMONS, 2011-2012 cf. http://fr.wikipedia.org/wiki/Jeu_de_la_vie & http://en.wikipedia.org/wiki/Conway%27s_Game_of_Life Each cell's survival depends on the number of occupied nearest and next-nearest neighbours (calculated in Grid::step). A living cell dies of overcrowding or loneliness if it has more than three or fewer than two neighbours; a dead cell is brought to life if it has exactly three neighbours (determined in Cell::setNextState).

Iain Haslam, June 2005.

```
""" from Tkinter import * import time
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Definition des cellules

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class Cell(Label):
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```
    DEAD = 0
    LIVE = 1
```

```
    def __init__(self, parent):
        Label.__init__(self, parent, relief="raised", width=2, borderwidth=1)
        self.bind("<Button-1>", self.toggle)
        self.displayState(Cell.DEAD)
```

```
    def toggle(self, event):
        self.displayState(1-self.state)
```

```
    def setNextState(self, numNeighbours):
        """Work out whether this cell will be alive at the next iteration."""
        if self.state==Cell.LIVE and \
            (numNeighbours>3 or numNeighbours<2):
            self.nextState = Cell.DEAD
        elif self.state==Cell.DEAD and numNeighbours==3:
            self.nextState = Cell.LIVE
        else:
            self.nextState = self.state
```

```
    def stepToNextState(self):
        self.displayState(self.nextState)
```

```
def displayState(self,newstate):
    self.state = newstate
    if self.state==Cell.LIVE:
        self["bg"] = "black"
    else:
        self["bg"] = "white"
```

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Definition de la grille

class Grid:

```
def __init__(self,parent,sizex,sizey):
    self.sizex = sizex
    self.sizey = sizey
    #numpy.zeros(sizex,sizey) is a better choice,
    #but an additional dependency might be rude...
    self.cells = []
    for a in range(0,self.sizex):
        rowcells = []
        for b in range(0,self.sizey):
            c = Cell(parent)
            c.grid(row=b, column=a)
            rowcells.append(c)
        self.cells.append(rowcells)
def step(self):
    """Calculate then display the next iteration of the game of life.
```

This function uses wraparound boundary conditions.

```
    """
    cells = self.cells
    for x in range(0,self.sizex):
        if x==0: x_down = self.sizex-1
        else: x_down = x-1
        if x==self.sizex-1: x_up = 0
        else: x_up = x+1
        for y in range(0,self.sizey):
            if y==0: y_down = self.sizey-1
            else: y_down = y-1
            if y==self.sizey-1: y_up = 0
            else: y_up = y+1
            sum = cells[x_down][y].state + cells[x_up][y].state + \
                cells[x][y_down].state + cells[x][y_up].state + \
                cells[x_down][y_down].state + cells[x_up][y_up].state + \
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        cells[x_down][y_up].state + cells[x_up][y_down].state
        cells[x][y].setNextState(sum)
    for row in cells:
        for Cell in row:
            Cell.stepToNextState()
    print self.calc()
def clear(self):
    for row in self.cells:
        for Cell in row:
            Cell.displayState(Cell.DEAD)
def modify(self,Coord):
    self.clear()
    for (x,y) in Coord:
        self.cells[x][y].displayState(Cell.LIVE)

```

```
def calc(self):
```

```

    n=0
    for row in self.cells:
        for Cell in row:
            if Cell.state==Cell.LIVE:
                n=n+1
    return n
def multistep(self):
    text1=KBvar1.get()
    try:
        ns=int(text1)
    except ValueError:
        ns = 1
    text2=KBvar2.get()
    try:
        delay=int(text2)
    except ValueError:
        delay = 0
    for a in range(ns):
        time.sleep(delay)
        self.step()
        self.update()

```

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def update(self):
    for row in self.cells:
        for Cell in row:
            Cell.update_idletasks()

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Programme principal

root = Tk() if name == "main":

```
Figures=[("Blinker",((0,1),(1,1),(2,1))),("Glider",((0,2),(1,0),(2,1),(1,2),(2,2))),("R-Pentomino",((0,1),(1,0),(1,1),(1,2),(2,0)))]
upframe = Frame(root)
upframe.grid(row=0,column=0)
middleFrame =Frame(root)
middleFrame.grid(row=1,column=0)
bottomFrame= Frame(root)
bottomFrame.grid(row=2,column=0)
gr = Grid(upframe,30,30)
for i,fig in enumerate(Figures):
    Button(middleFrame,
           text=fig[0],
           command=lambda toto=fig:
               gr.modify(toto[1])). \
        grid(row=i,column=0)
```

```
###ajout
textlab1=Label(middleFrame, text='Number of steps:', width=15, height=2,
fg="black")
textlab1.grid(row=0,column=1)
KBvar1=StringVar()
KB1=Entry(middleFrame,textvariable=KBvar1,width=5)
KB1.grid(row=0,column=2)
textlab2=Label(middleFrame, text='Delay(sec):', width=15, height=2,
fg="black")
textlab2.grid(row=1,column=1)
KBvar2=StringVar()
KB2=Entry(middleFrame,textvariable=KBvar2,width=5)
KB2.grid(row=1,column=2)
###
buttonStep = Button(bottomFrame,text="Step",command=gr.multistep)
buttonStep.grid(row=1,column=1)
buttonCalc = Button(bottomFrame,text="Calculate",command=gr.calc)
buttonCalc.grid(row=1,column=2)
buttonClear = Button(bottomFrame,text="Clear",command=gr.clear)
buttonClear.grid(row=1,column=3)
buttonQuit = Button(bottomFrame,text="Quit",command=root.destroy)
buttonQuit.grid(row=1,column=4)
```

```
root.mainloop()
```

</sxh>

Références

- <http://www.exolete.com/code/life>
- http://fr.wikipedia.org/wiki/Jeu_de_la_vie
- http://en.wikipedia.org/wiki/Conway%27s_Game_of_Life

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