Name: _____ Andrew Id: _____

15-112 Spring 2024 Quiz 5

Up to 25 minutes. No calculators, no notes, no books, no computers. Show your work!
Do not use lists, tuples, dictionaries, sets, try/except, or recursion on this quiz.

1. (6 points) **Code Tracing**:

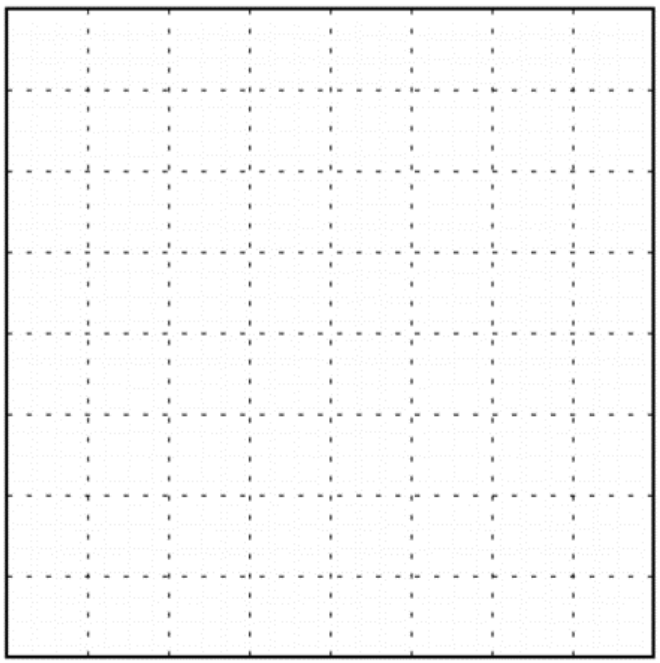
```
def drawCT1(app, m, n):
    d = app.width
    x = 0
    y = 0
    for i in range(n):
        if i%2 == 0:
            color = 'black'
        else:
            color = 'white'
        drawRect(x, y, d, d, fill=color, border='black')
        d -= m
        x += m//2
        y += m//2
    drawLabel("112 Rocks", app.width//2, app.height//2,
              align='center', fill='black')

def redrawAll(app):
    drawCT1(app, 100, 4)

runApp()
```

Given that the box below is your canvas, with a width and height of 400 each, draw what the above code would display. You can assume that this is called within the appropriate graphics helper code.

Hint: Each of the small boxes on the canvas is 50x50 pixels.



2. (6 points) **Free Response**: drawNiceFlower

Write the function `drawNiceFlower(app, n)`, which draws a nice flower using (`'pink'`)-colored ovals and a (`'lightCyan'`)-colored circle centered in the flower. The function takes as an input an integer `n` representing the number of ovals that are used to draw the flower. Consider the following two examples:

(a) `drawNiceFlower(app, 2)`

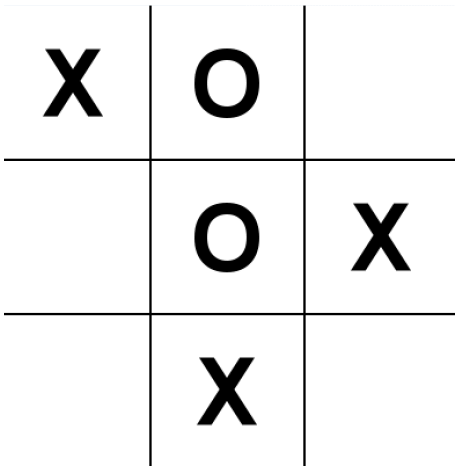
(b) `drawNiceFlower(app, 5)`

You can assume that `app.width==app.height`. The ovals and the circle should be centered on the canvas. The oval's height should be 2/3 of the canvas height and its width should be 1/3 of the canvas width. The circle should fit inside the last oval. You can assume that `cmu_graphics` is already imported and there is a function `redrawAll(app)` that will call your function.

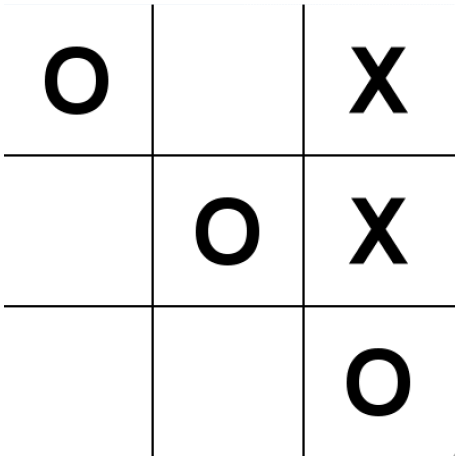
Hint: Remember that shapes can be rotated using an argument to the function that draws the shape.

3. (8 points) **Free Response**: drawTicTacToe

Write the function `drawTicTacToe(app, s)`, which draws a 3x3 TicTacToe board game with Xs and Os. The function takes as an input a string `s` that specifies the content of the nine board cells. Each character of `s` refers to one cell and specifies whether it has X (`'x'`), O (`'o'`), or Nothing (`'_'`). The first character in `s` corresponds to the first cell which is the top-left one and the last character corresponds to the last cell which is the right-bottom one. Consider the following two examples:



(a) `drawTicTacToe(app, "xo__ox_x_")`



(b) `drawTicTacToe(app, "o_x_ox__o")`

You can assume that `app.width==app.height`. The nine cells should be drawn to span the entire canvas. Your code should be able to handle window resize. To simplify things for you, feel free to draw the Xs and Os as text instead of drawing them manually. You can assume that `cmu_graphics` is already imported and there is a function `redrawAll(app)` that will call your function.