fullName:_____andrewID:_____ recitationLetter:_____

15-112 S24

WS4+Quiz4 version B

You **MUST** stop writing and hand in this **entire** quiz when instructed in lecture.

- You may not unstaple any pages.
- Failure to hand in an intact quiz will be considered cheating. Discussing the quiz with anyone in any way, even briefly, is cheating. (You may discuss it only once the quiz has been posted to the course website.)
- You may not use your own scrap paper. If you must use additional scrap paper, raise your hand and we will provide some. You must hand any scrap paper in with your paper quiz, and we will not grade it.
- You may not ask questions during the quiz, except for English-language clarifications. If you are unsure how to interpret a problem, take your best guess.
- You may not use any concepts (including builtin functions) which we have not covered in the notes in weeks 1-4 / units 1-3.
- You may not use lists, tuples, dictionaries, sets, or recursion.
- We may test your code using additional test cases.
- Assume almostEqual(x, y) and rounded(n) are both supplied for you. You must write all other helper functions you wish to use, unless we specify otherwise.

Writing Session 4 (10% of HW4)

WS1. Did you complete all, or very nearly all, of hw4?

○ a) Yes (full credit)

○ b) No (no credit)

Quiz4

Free Response 1: Animation [100pts]

Just one animation problem... Write an animation with the following features:

- When you first run the animation, it first counts down from 5 to 0. More precisely, it starts with the number 5 drawn in a size-100 font centered in the window. Each second, this number goes down by 1. When it reaches 0, instead of drawing 0, the rest of the app runs as described below.

- After the countdown, the app draws a 300x200 red rectangle centered in the window.

- The app draws 10 black circles, just touching side-by-side so that they just exactly fill the rectangle horizontally. The top of the circles should touch the top of the rectangle.

- Each time the user presses 's', the colors of the circles swap with the color of the rectangle. So after the first 's', the rectangle is black and the circles are red.

- If the user *moves* the mouse inside the red rectangle while the 'g' key is held down, then the app's background (behind the rectangle) turns green. The background remains green until they release the 'g' key (even if the mouse moves outside the rectangle in that time). After they release the ‘g’ key, the background turns back to white.

- After 2 seconds, the message 'Wow!' appears, centered in the rectangle, in cyan text with font-size 20. It remains displayed for 1/2 second. Then this cycle continues -- 2 seconds without 'Wow' followed by 1/2 second with 'Wow'.

Requirements:

- Assume the canvas is fixed at 400x400 for this problem.
- Set app.stepsPerSecond = 20 in onAppStart and never change that value.
- Do not use onKeyHold()
- Do not use time.time()
- Do not use lists or anything else we have not yet covered.
- **You must adhere to MVC rules.** Code that violates MVC will be ignored, and will result in very large deductions.

Begin your FR1 answer here:

Continue your FR1 answer here:

Continue your FR1 answer here:

bonusGraphicsCt1 [optional, 2pts]

This problem is not required. Given the following code, use the box below to sketch what will be drawn in the canvas. The box represents a 400x400 canvas. Your drawing does not need to be perfect, but should strongly resemble what the code would actually display.

```
from cmu_graphics import *
def redrawAll(app):
    x = y = r = 100
    drawCircle(x, y, r, border='black', fill=None)
    for q in range(400):
        n, d = q%4, r*(q//4)/100
        dx, dy = n%2 if n%2 else -1, n//2 if n//2 else -1
        drawLine(x+dx*(r-d), y, x, y+dy*d)
def main(): runApp()
main()
```