

fullName:_____andrewID:_____ recitationLetter:_____

15-112 F23

Quiz4 version A (25 min)

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 list indexing or slicing, dictionaries, sets, or recursion.
- We may test your code using additional test cases. Do not hardcode.
- 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.

Multiple Choice 1 [24pts]

Which of the following would be considered an MVC violation?

Select ALL that apply. (fill in at least one square).

- 1. Incrementing the variable `i` (an integer) in `redrawAll`
- 2. Using a for loop in `onMousePress`
- 3. Calling `drawLabel` in `onMousePress`
- 4. Setting the variable `i` (an integer) to 5 in `onKeyPress`
- 5. Setting the variable `app.petName` (a string) to 'Chee' in `redrawAll`
- 6. Calling `drawLabel` in `redrawAll`
- 7. Using a for loop in `redrawAll`
- 8. Calling `drawCircle` in `onAppStart`
- 9. None of the above

Free Response 1: Two Circle Animation [40pts]

Write an animation with the following features. Read the whole problem before you begin!

- When the app starts:
 - A blue circle with a radius of 50 pixels is drawn centered on the canvas. (We will refer to this as the center circle.)
 - A red circle with a radius of 25 pixels is also drawn centered on the canvas, in front of the blue circle. (We will refer to this as the follower circle.)
 - If the mouse is pressed **inside** the center circle, the center circle's radius **increases** by 25 pixels (but will not increase above a radius of 200 pixels).
 - If the mouse is pressed **outside** the center circle, the center circle's radius **decreases** by 25 pixels (but will not decrease below a radius of 50 pixels).
 - When the mouse is moved, the follower circle's location changes so that it is centered on the mouse cursor. Note: Mouse drag events (i.e. when the mouse button is held down) do not move the circle.
 - The follower circle should be red whenever it is touching or inside the center circle. Whenever the circles are not touching, the follower circle should be green.

Notes:

- You may assume the canvas is 400x400 for this problem.
- You will be penalized if your code results in an MVC violation
- Make reasonable choices for anything not specified above.
- Please write your code using the provided function headers for `onAppStart`, `redrawAll`, `onMousePress`, `onMouseMove`. As usual, you may write and use additional helper functions if you wish. (You may also add other event functions if you feel you must, but this would probably be a bad idea.)
- We have also defined the distance function, which you may use if you wish.

Begin your FR1 answer here:

```
from cmu_graphics import *  
  
def onAppStart(app):
```

Continue your FR1 answer here

```
def distance(x0, y0, x1, y1):  
    return ((x0-x1)**2 + (y0-y1)**2)**0.5
```

```
def redrawAll(app):
```

```
def onMousePress(app, mouseX, mouseY):
```

Continue your FR1 answer here

```
def onMouseMove(app, mouseX, mouseY):
```

```
runApp()
```

Free Response 2: Erasing Message Animation [36pts]

Write an animation with the following features. Read the whole problem before you begin!

- When the app starts:
 - The word "Begin" is drawn centered on the canvas. We will refer to this label as the message.
 - Every second after the app starts, one character disappears from the beginning of the message. For example, if the message is "Begin", after 1 second it will become "egin". After another second, it becomes "gin" and so on.
 - Regardless of its length, the message is always centered on the canvas
 - Whenever a key is pressed:
 - If the key is a letter or number, that character is added to the end of the message.
 - If the spacebar key is pressed, one space character (" ") is added to the end of the message.
 - All other key values (such as "." and "?" and other punctuation characters) are ignored.
 - The message may never be longer than 30 characters. If adding a new character causes the message to exceed this length, a character is immediately removed from the beginning of the message.

Notes:

- You may assume the canvas is 400x400 for this problem.
- You will be penalized if your code results in an MVC violation
- Make reasonable choices for anything not specified above, such as the size, color, or font of the message.
- Please write your code using the provided function headers for `onAppStart`, `redrawAll`, `onKeyPress`, and `onStep`. As usual, you may write and use additional helper functions if you wish. (You may also add other event functions if you feel you must, but this would probably be a bad idea.)

Begin your FR2 answer on the next page:

Begin your FR2 answer here

```
from cmu_graphics import *
```

```
def onAppStart(app):
```

```
def redrawAll(app):
```

Continue your FR2 answer here

```
def onKeyPress(app, key):
```

```
def onStep(app):
```

```
runApp()
```