

15-112 Spring 2019 Quiz 5

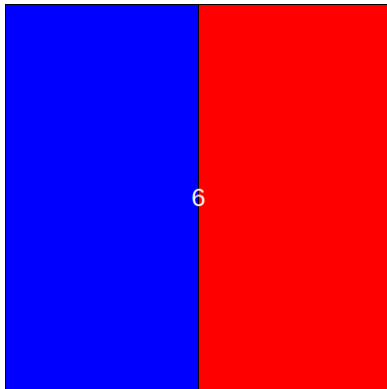
Up to 30 minutes. No calculators, no notes, no books, no computers. Show your work!

Do not use dictionaries, sets, try/except, or recursion on this quiz.

- (50 points) **Free Response:** Your task in this problem is to write a basic graphical game. You must follow MVC conventions in your solution. You will need to write `init(d)`, `mousePressed(e, d)`, `keyPressed(e, d)`, and `redrawAll(c, d)`; you may assume the `run()` function is already implemented. We recommend abbreviating data as `d`, event as `e`, and canvas as `c` (as shown above) to save time.

The animation should have the following properties:

- The basic screen contains three elements. One half of the screen is red, the other half is blue, and a score is printed in the center of the screen in white. Which half of the screen is blue and which is red is chosen at random when the game starts. Here is an example:



- If the user clicks on the blue portion of the screen, then nothing happens.
- If the user clicks on the red portion of the screen, then the score is increased by 1 point and which half of the screen is blue and which is red is re-chosen at random. (This means the colors might stay the same or they might swap.)
- Typing the letter 'r' resets the score to 0.
- Once the score reaches 10 points, then gameplay should stop (meaning no more clicking can occur) and the score should be replaced with the words "You Win". (The user can still press 'r' to reset the score and start over, however.)

Extra space for answer to Question 1.

2. (15 points) **Code Tracing:** Indicate what the following program prints. Place your answer (and nothing else) in the box next to the code.

```
import copy
def ct(a):
    b = copy.copy(a)
    c = copy.deepcopy(a)

    a[0][1] = 7
    b[1][1] = 8
    c[2][1] = 9

    print(a)
    print(b)
    print(c)

listOfNums = [[1,2],[3,4],[5,6]]
ct(listOfNums)
```

3. (15 points) **Short Answer:** Write out the names of the three elements of the MVC framework, and next to each element, write the core animation functions associated with it. Recall that the four core animation functions are `init`, `mousePressed`, `keyPressed`, and `redrawAll`.

4. (20 points) **Free Response:** Write the function `diagonalsMatch(a)` which, given a 2D list of integers, `a`, returns `True` if the two diagonals of the list contain the same items, in the same order, and `False` otherwise. The first diagonal goes from the upper left to the lower right. The second diagonal goes from the lower left to the upper right. You can assume that the 2D list is non-ragged and has the same number of rows as columns.

For example:

Test Code	Result
<code>diagonalsMatch([[1,2,5], [1,5,9], [1,8,9]])</code>	Returns False because the first diagonal contains 1,5,9 while the second contains 1,5,5.
<code>diagonalsMatch([[1,2,9], [4,5,6], [1,8,9]])</code>	Returns True because the first and second diagonal both contain 1,5,9.
<code>diagonalsMatch([[1,2,1], [4,5,6], [9,8,9]])</code>	Returns False because the first diagonal is 1,5,9 and the second is 9,5,1.