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### 15-112 Summer 2018 Quiz 2

Up to 25 minutes. No calculators, notes, books, or computers. Do not use recursion, dictionaries, or sets. Show your work!

#### 1. (20 points) Code Tracing

Indicate what the following programs print. Place your answers (and nothing else) in the box to the right of the code.

```
import copy
def ct1(L):
    a = L
    b = copy.copy(L)
    c = L[0: len(L)]
    d = copy.deepcopy(L)
    a[0] = 15
    b[0] = 26
    c[0] = 13
    b[1][0] = 18
    c[1][1] = 66
    d[0][0] = 7
    d[1].extend([9,4])
    a.insert(0, "hi")
    print("a:", a)
    print("b:", b)
    print("c:", c)
    print("d:", d)
m = [[2,0],[1,3]]
ct1(m)
print("m:", m)
```

2. (10 points) **Reasoning Over Code:** Find an argument (the value of L) for roc1 that makes it return True. Place your answer (and nothing else) in the box below the code.

```
def roc1(L):
    assert(len(L) == 3)
    count = 0
    for row in L:
        assert(len(row) == 3)
        for i in range(1, len(row)):
            if count % 2 == 0:
                assert(sum(row) == 18)
                assert(row[i-1] < row[i])
            else:
                assert(sum(row) == 15)
                assert(row[i] < row[i-1])
        count += 1
    return True
```

3. (70 points) **Free Response:** Using our animation framework and assuming `run()` is already written, write the `init(data)`, `mousePressed(event, data)`, `keyPressed(event, data)`, and `redrawAll(canvas, data)` functions for an animation which has the following elements:

1. A 10x10 grid is displayed on the screen. The grid should fill the entire screen for any width and height specified.
2. A player starts in the top left corner of the screen (`row=0, col=0`) as a blue oval.
3. The player can move down and right using the arrow keys. Pressing an arrow key should move the player into an entirely new cell. The player should always be centered in its current cell, and the player's size should not be larger than the cell.
4. Pressing the mouse should move the player to the cell that was clicked.
5. When the player reaches the cell in the bottom right corner of the screen the player wins the game and the canvas should display the text "You won!" in the center of the screen. The grid and player should not display once the game has been won.
6. You do **not** have to handle the situation where the player goes off the grid.

**Note:** Feel free to abbreviate `canvas`, `data`, and `event` as `c`, `d`, and `e`. Also remember that the animation framework automatically stores the canvas width and height for you as `data.width` and `data.height`.

YOU MAY CONTINUE WRITING ANIMATION CODE ON THIS PAGE.