

### 15-112 Spring 2019 Quiz 2

Up to 20 minutes. No calculators, no notes, no books, no computers. Show your work!  
Do not use generators, string/list indexing, lists/dictionaries, or recursion on this quiz.

1. (20 points) **Code Tracing:** Indicate what the following program prints. Place your answer (and nothing else) in the box to the right of the code.

```
def ct(x, y):  
    for i in range(x):  
        for j in range(i, y):  
            if (i + j) % 3 == 0:  
                print(i, j)  
        if i < 2:  
            print("whee!")  
    return i + j  
  
print(ct(3, 5))
```

--	--

2. (30 points) **Free Response:** Write the function `countPalNumbers(n)`, which takes a positive integer `n` and returns the number of palindrome numbers (pal for short) that exist between 1 and `n` (inclusive). A palindrome number is an int that is the same forwards as backwards; for example, 121 is a palindrome number, as is 7. 1231 is not a palindrome number, as it is not equal to 1321. `countPalNumbers(10)` would return 9, as all single-digit numbers are palindromes; `countPalNumbers(44)` would return 13, as 11, 22, 33, and 44 are also palindromes.

**Hint:** you'll want to write at least one helper function. You'll also want to compute the reverse of a number.

**Note:** you may not use strings in this problem!! A solution that uses strings will receive 0 points.

3. (10 points) **Short Answer:** Write a single range expression that would make a for loop iterate over exclusively the following values in order: 20, 17, 14, 11, 8

4. (10 points) **Short Answer:** In the notes, we wrote code to draw a clock face. As part of that code, we set `hourAngle = math.pi/2 - 2*math.pi * (hour/12)` in the for loop. What would happen to the clock if we changed the minus sign to a plus?

5. (30 points) **Free Response:** Write the function `drawHallwayIllusion(c, w, h)` which takes a canvas `c` of width `w` and height `h` and draws the "Hallway Illusion", shown below with three examples of different canvas sizes. The illusion should fill the given canvas (apart from a 5px margin on each side), and should alternate black and white, as in the picture. Each of the "lines" is ten pixels wide/high. Remember- your code must not run forever! You do not need to write the graphics starter code; assume the canvas has already been created.

