

15-112 Spring 2023 Lecture 3/4

Quiz 3

25 minutes

Name: _____

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Section: _____

- You may not use any books, notes, or electronic devices during this quiz.
- You may not ask questions about the quiz except for language clarifications.
- Show your work on the quiz (not scratch paper) to receive credit.
- If you use scratch paper, you must submit it with your andrew id on it, and we will ignore it.
- All code samples run without crashing unless we state otherwise. Assume any imports are already included as required.
- Do not use these topics: sets/dictionaries, recursion.
- You may use `almostEqual()` and `rounded()` without writing them. You must write everything else.

1. CT [15 pts, 5 pts each]

Indicate what these print. Place your answers (and nothing else) in the box next to each block of code.

```
def ct1(L, M):  
    L.append(M.pop(2))  
    M[1].extend(L)  
    return M  
L = [2]  
M = [3, [4], 5]  
print(ct1(L, M))
```

```
import copy  
  
def ct2(L, A, n):  
    A[0][0] += n  
    A[1] += [10*n]  
    L.append(n)  
  
L = [[3], [4]]  
C = copy.copy(L)  
D = copy.deepcopy(L)  
ct2(L, C, 5)  
ct2(L, D, 6)  
print(L)
```

```
def ct3(k):  
    M = [ ]  
    for i in range(2, k):  
        M.insert(0, [n*i for n in [0,1,2]])  
    return M  
print(ct3(4))
```



2. Free Response: removeColsWithTarget(L, target) [85pts]

Write the mutating function `removeColsWithTarget(L, target)` that takes a non-empty rectangular 2d list `L` of integers and an integer `target`, and mutatingly removes all the columns in `L` that contain the target. The function also returns the number of columns that were removed. For example:

```
L1 = [[1, 2, 3],
      [4, 5, 6],
      [7, 1, 6]]
M1 = [[1, 2],
      [4, 5],
      [7, 1]]
assert(removeColsWithTarget(L1, 6) == 1) # 1 column was removed
assert(L1 == M1)

L2 = [[1, 2, 3],
      [4, 5, 6],
      [7, 1, 6]]
M2 = [[3],
      [6],
      [6]]
assert(removeColsWithTarget(L2, 1) == 2) # 2 columns were removed
assert(L2 == M2)

L3 = [[1, 2, 3],
      [4, 5, 6],
      [7, 1, 6]]
M3 = [[1, 2, 3],
      [4, 5, 6],
      [7, 1, 6]]
assert(removeColsWithTarget(L3, 9) == 0) # no columns were removed
assert(L3 == M3)

L4 = [[6, 5, 4, 3, 4, 5, 6]]
M4 = [[5, 4, 3, 4, 5]]
assert(removeColsWithTarget(L4, 6) == 2)
assert(L4 == M4)
```

This page is blank (for your removeColsWithTarget solution).

3. Bonus [5 pts]

Indicate what these print. Place your answers (and nothing else) in the box next to each block of code.

```
import string

def bonusCt1():
    x = y = 0
    s = 3 * string.ascii_uppercase
    for c in s:
        x += ord(c) - ord('A')
        y += ord('N') - ord(c)
    return (x, y)

print(bonusCt1())
```

```
def bonusCt2(n):
    def f(n):
        c = 0
        while n > 0:
            c += n%2
            n //= 2
        return c
    k = f(n)
    while f(n) <= k:
        n += 1
    return (n, f(n))

print(bonusCt2(23))
```