Name: _____ Andrew Id: _____

15-112 Spring 2021 Quiz 04

20 minutes. Take careful note of the restrictions in place on the free response problems.

1. Code Tracing (Part 1) [4 pts] Indicate what the following program prints. **Put a box around your final answer.**

```python
def ct1(L):
    ret = []
    for item in L:
        if isinstance(item, int):
            print("L1", L[item])
            ret.insert(0, L[item])
        else:
            print("L2", item)
    print(ret)
    return ret

print(ct1([3, "dog", "5", "cat", 1, "hamster"]))
```

2. Reasoning Over Code [4 pts] For the following function, find a value z which will cause `roc(z)` to return `True`. **Put a box around your final answer.**

```python
def roc(z):
    total = 0
    while z > 0:
        for y in range(0, z, 2):
            total += 1
        z -= 2
    return ((z == 0) and (total == 1+2+3+4+5))
```

3. Free Response – isDopplish Number [8 pts]   Restrictions: Do not use strings, lists, dictionaries, sets, try/except, or recursion on this problem.

We'll say that an integer is a dopplish number (coined term) if none of its digits are 0 and the sum of the digits that are even is equal to the sum of the digits that are odd.

For example, 5362 is dopplish because none of its digits are 0 and the sum of the digits that are odd (5+3=8) is equal to the sum of the digits that are even (6+2=8).

Here are some other numbers that are dopplish: 249221, 744944, 171834, 744724, 492764

Write the function `isDopplish(n)` that, given a positive integer `n`, returns `True` if that number is dopplish and `False` otherwise.

Hint: To make this easier, you should write helper functions and use them.

4. Free Response – nthDopplish Number [4 pts] **Restrictions:** Do not use strings, lists, dictionaries, sets, try/except, or recursion on this problem.

Write the function `nthDopplishNumber(n)` which takes a positive integer `n` and returns the nth dopplish number.

The first 10 dopplish numbers are: 112, 121, 134, 143, 156, 165, 178, 187, 211, and 314.

`nthDopplishNumber(1)` should return `112`.

While writing your answer to this question, you may assume that your `isDopplish` function works correctly, even if yours does not.