Name: _____ Andrew Id: _____

15-112 Spring 2024 Quiz 4

Up to 25 minutes. No calculators, no notes, no books, no computers. Show your work!
Do not use lists, tuples, dictionaries, sets, try/except, or recursion on this quiz.

1. **Code Tracing**: Indicate what the following two programs print. Place your answers (and nothing else) in the boxes below the code.

   (a) (4 points) CT1

```
def f1(s):
    return s[::2][::-1] + s[::-1][::2]

def f2(s):
    ret = ""
    for i in range(len(s) // 2):
        ret += s[i : i + 3 : 2]
    return ret

def f3(s):
    s = s[: len(s) // 2] + s[len(s) // 4 : len(s) - 1]
    return s

def ct1(magic):
    print("1: ", f1(magic))
    print("2: ", f2(magic))
    print("3: ", f3(magic))
    return magic

print(ct1("112rocks"))
```

(b) (6 points) CT2 (Hint: Letters in a square grid)

```
def t(r, c, w):
    return r * w + c

def ct2(s, w):
    ret = ""
    for c in range(w - 1, -1, -1):
        print(f"c = {c}")
        for r in range(w):
            idx = t(r, c, w)
            ret += s[idx]
        print(f"ret: {ret}")
    return ret

ct2("onetwelve", 3)
```

2. (10 points) **Free Response**: Case Changer

   Write the function `caseChanger(s)` which takes a string, `s`, and returns an alphabetic only version of the string with the cases of the letters changed using the rules specified below.

   Whenever you encounter a non-alphabetic character in the string, this tells you that the letters after it need to have the opposite case of the ones before it. Initially you are converting characters to lowercase.

   Carefully consider the following test cases:

```
# A simple case
assert caseChanger("Hi_ThErE_mY_nAmE_iS_bOb") == "hiTHEREmyNAMEisBOB"
# You can also change case with a variety of symbols
assert caseChanger("Hi_ThErE-mY6nAmE^iS/bOb") == "hiTHEREmyNAMEisBOB"
# Note that SPEND and AT are both uppercase.  Make sure you understand why...
assert caseChanger("I-like_To^spend $100 at<LuLu>") == "iLIKEtoSPENDATlulu"
# If there are not alphabetic characters, return an empty string
assert caseChanger("$1-") == ""
```

   Go back and check the testcases again. Make sure you understand what this function is supposed to do. (It is *not* simply changing the case of all the alphabetic characters.)