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### 15-112 Fall 2017 Quiz 2

Up to 15 minutes. No calculators, no notes, no books, no computers. Show your work!

**Note that you may not use strings or lists in this quiz.**

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

```
def ct(a, b):
    while a > 0:
        for c in range(1, 9, b):
            print(a, b, c)
            a -= 2
        b += 1
ct(8, 3)
```

2. (15 points) **Reasoning Over Code:** Find a value of  $n$  for the following function that makes it return True. Place your answer (and nothing else) in the box to the right.

```
def roc(n):
    a = 0
    b = 9
    while n > b:
        c = n % 10
        if c ** 2 <= b:
            a += 1
        n = n // 10
    return a == n and n > 0
```

3. (15 points) **Mystery Code:** In the box below, write a comment of fifteen words or less that describes what the following function does.

```
def puzzle(a):
    b = 0
    c = 1
    while (c <= a):
        if (c % 2 == 0):
            b = b + c
        c = c + 1
    return b
```

**QUIZ CONTINUES ON THE BACK OF THE PAGE.**

4. (50 points) **Free Response:** We'll say that a non-negative integer is an "even increasing number" (Ein number for short) if all of the digits of that number are even and they strictly increase from left to right. 246, 248, and 268 are all Ein numbers, but 264, 244, and 256 are not.

Write the function `nthEinNumber(n)` which takes a non-negative integer `n` and returns the `n`th Ein number. `nthEinNumber(0)` should return 0. The first several Ein numbers are: 0, 2, 4, 6, 8, 24, 26, 28, 46, 48, 68, 246, 248, 268, 468 ...