

Your name: \_\_\_\_\_

1. You are about to write a method that does some complex math. As usual, **you start by doing a concrete example by hand**. What are some things you should do? Check all that apply:

- \_\_\_\_\_ Choose your numbers to be big and complicated.
- \_\_\_\_\_ Choose numbers that avoid symmetry.
- \_\_\_\_\_ Give names to the relevant items.
- \_\_\_\_\_ Track how you calculate the answer by hand.
- \_\_\_\_\_ Use this example as a unit test that you write first before writing your code.

In the following problems, consider the two code snippets below. They are intended to indicate whether or not the given grade is a Passing or Failing grade, where 70 is the lowest Passing grade

<p><b><u>Snippet A:</u></b></p> <pre>if grade &gt;= 70:     print "pass" if grade &lt; 70:     print "fail"</pre>	<p><b><u>Snippet B:</u></b></p> <pre>if grade &gt;= 70:     print "pass" else:     print "fail"</pre>
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2. Given the same value for **grade**, the snippets produce the same output.      **True**      **False**      (circle your choice)

3. Given the same value for **grade**, which snippet **runs faster**? (Circle your choice.)

***The one on the LEFT***      ***The one on the RIGHT***      ***Neither (they are equally fast)***

4. Which snippet is **better**? (Circle your choice.)

***The one on the LEFT***      ***The one on the RIGHT***      ***Neither (they are equally good)***

5. One of the most important reasons to use the appropriate form in problems like the above is (check all that apply):

- \_\_\_\_\_ If you use the inappropriate form at a job interview, you will embarrass yourself and not get the job.
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6. In the space to the right, write code for a function that has a single parameter whose value must be one of the following letter grades:

"A"      "B"      "C"

(everyone gets a passing grade in this function!)

The function returns the value of the letter grade (4 for an A, 3 for a B, 2 for a C).

```
def grade(letter):
```

7. In the box below, write an implementation of a function *is\_odd* that takes a non-negative integer and returns *True* if the integer is odd, and *False* otherwise.

Hint: Think about the expression  $X \% 2$  and what it evaluates to when  $X$  is odd, and when  $X$  is even. For example, to what do the following evaluate?

$17 \% 2$        $18 \% 2$        $371934 \% 2?$        $12345 \% 2$

```
def is_odd(n):
```

8. Suppose that you are given a function `sum_of_digits` that takes a non-negative integer and returns the sum of the digits in that integer. For example:

`sum_of_digits(81323)` returns `8 + 1 + 3 + 2 + 3`, which is 17.

Suppose that you are also given a function `is_odd` that takes a non-negative integer and returns `True` if the integer is odd, and `False` otherwise. For example:

`is_odd(17)` returns `True` and `is_odd(147204)` returns `False`

In the box below, write an implementation of a function `count_odd_digit_sums` that takes a non-negative integer `m` and returns the number of integers `X` from `m` to `(2 times m) + 1`, inclusive, for which the *sum-of-digits of (X squared) is odd*. For example:

`count_odd_digit_sums(5)` returns `5` because:

`5 squared` is `25`, whose sum of digits is `7`, which is odd.

`6 squared` is `36`, whose sum of digits is `9`, which is odd.

`7 squared` is `49`, whose sum of digits is `13`, which is odd.

`8 squared` is `64`, whose sum of digits is `10`, which is NOT odd.

`9 squared` is `81`, whose sum of digits is `9`, which is odd.

`10 squared` is `100`, whose sum of digits is `1`, which is odd.

`11 squared` is `121`, whose sum of digits is `4` which is NOT odd.

Your solution MUST use (i.e. call) the functions `sum_of_digits` and `is_odd` appropriately. As in ALL problems through Exam 1, you may NOT use the multiple-argument form of RANGE.

```
def count_odd_digit_sums(m):
```