Sample CS8 Midterm Exam Questions

1. Write a function that determines if a number is even or odd. Use the number, **n**, as the parameter to the function. Additionally, write a for-loop that tests out this function as it calls it using all integer numbers between 4 and 12 (inclusive). Make sure you clearly show the needed tabbed spaces.

2. Write a function that takes in 2 integers, `width` and `height`, and draws a rectangle with twice those parameters. Additionally, show how you would call this function with an example using the values 4 for `width` and 6 for `height`. You have to use the `turtle` module and at least one `for` loop to get full credit. Make sure you clearly show the needed tabbed spaces.

3. What is the exact output of this Python code?

```
for m in (1, 8, 2):
    print (m)
```

4. What is the exact output of this Python code?

```
s = 0
m = 20
for p in range(10, 30, 3):
    if p < m:
        s = s - p
    else:
        s = s + p
print (s)
```

5. What is the exact output of this Python code?

```
a = 10
b = 20
c = 5
if (a/c) >= (b/a):
    print ((b % c) != (a – 2*c))
else:
    print ((c ** 2)/a > 0)
```

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6. Repeat problem #5, but with **`c = 10.`**

7. Consider a string **`FullName`** set to **`'Jimbo Jones'`**, what is the value of the following strings?

```
a. FullName.count('j')
b. FullName.count('J')
c. FullName.find('e')
d. FullName.replace('J',' ')
e. (FullName[3:7].lower() + "ack").replace(' ','')
```

8. Consider a string **`character`** set to **`'z'`** and an integer **`code`** set to **3** what is the value of the following?

```
a. ord(character) - ord('y')
b. chr(ord(character) - code)
```

9. If we list all the natural numbers below 10 that are multiples of 3 or 5, we get 3, 5, 6 and 9. The sum of these multiples is 23. Write Python code that can find the sum of all the multiples of 3 or 5 below 1000.

10. The sum of the squares of the first ten natural numbers is:
    $\mathbf{1^2 + 2^2 + ... + 10^2 = 385}$.
    The square of the sum of the first ten natural numbers is:
    $\mathbf{(1 + 2 + ... + 10)^2 = 55^2 = 3025}$
    Hence the difference between the sum of the squares of the first ten natural numbers and the square of the sum is **3025 − 385 = 2640**.
    Write Python code that can find the difference between the sum of the squares of **the first one hundred** natural numbers and the square of their sum.

11. Write a function **`Encode(s)`** that takes a string **`s`** and changes each of its letters (characters) into a letter that is 3 places ahead in the alphabet (per the ASCII code), and returns that new string. For example, if `s = 'friend'`, `Encode(s)` would be `'iulhqg'`. If you always want `Encode(s)` to be made up of alphabet characters, what limitation does that place on string **`s`**?