Sample Midterm 1

The first set of questions are without the help of a computer.

1. What is the output of the program below:

```
def problem1(a, b):
      return a/b+1

print(problem(2,1))
```

   (A) 3
   (B) 1
   (C) ZeroDivisonError …
   (D) 1.5

2. What is the output of the program below:

```
def problem2([a,b]):
    return a+b

print(problem2([2,3])
```

   (A) Syntax Error (The program cannot be executed.)
   (B) [5]
   (C) 5
   (D) RangeError

3. What is the output of the program below:

```
for i in range(5,10,3):
    print(i**2)
```

   (A) 25, 225, 400 (on separate lines)
   (B) 25, 64 (on separate lines)
   (C) 25, 36, 49, 64, 81
   (D) 25, 36, 49, 64, 81, 100

4. What is the output of the program below:

```
def problem4(n,m):
    for i in range(n, m):
        print(i**n)

problem4(3,6)
```

(A) 27, 64, 125 (on separate lines)
(B) 27, 256 (on separate lines)
(C) 27, 256, 3125 (on separate lines)
(D) 729, 4096, 1562 (on separate lines)

The following problems are solved on a computer. You will need to show the solution to the proctor. For your own safety, consider emailing the solution to yourself. (We know email forensics better than you so we can figure out if you fibbed an email to yourself.)

5. Write a program that asks the user for the number of inches and returns the answer in centimeters. An inch corresponds to 2.54 centimeters.

6. Write a program that calculates the sum $\frac{1}{1^1} + \frac{1}{2^2} + \frac{1}{3^3} + \frac{1}{4^4} + \ldots + \frac{1}{10^{10}}$ using a for-loop.

7. Write a program that uses the function `math.factorial` (located obviously in the math module) to calculate the following approximation for the Euler constant e:

$$\sum_{i=0}^{40} \frac{1}{i!} \approx e.$$

The symbol $i!$ is the Mathematicians' way to write the factorial of i.

8. Write a function that counts the number of "a" (lower-case A) in a string.