MTH 3300 Problem Set 3

Due date: Feb 23, 2025 at 11:59PM

For the programming assignment, please follow the following naming convention for your Python files. mth3300_<lastname>_<firstname>_pset3_part<#>.py

As with previous problem sets, the written portion should be a separate PDF.

What will the following code snippets output? (15 points)

For each of the following, add an explanation in plain English to justify the output

```
1. s = "lorem ipsum"
  i, j = 0, len(s) - 1
  aux = ""
  while i < j:
    aux += f"{s[j]}{s[i]}"
    i += 1
    j -= 1
  print(aux)
2. s = "CodeMaster"
  result = ""
  for i in range(len(s) // 2):
    result += s[i] + s[-(i + 1)]
  print(result)
3. text = "hello"
  new_text = ""
   for i in range(len(text)):
      new_char = chr(((ord(text[i]) - ord('a') + i) % 26) + ord('a'))
      new_text += new_char
  print(new_text)
```

While-loops (30 points)

Note that for questions in this section, your solution should use a while-loop

1. Write a program that reads from the user a positive integer (in a decimal representation) and prints its binary (base 2) representation.

Enter an integer: 76 The binary representation of 76 is 1001100

2. Write a program that reads a sequence of positive integers from the user, calculates their geometric mean and prints it out to the user.

A geometric mean of a dataset is given by the following formula:

$$\sqrt[n]{a_1 \cdot a_2 \cdot a_3 \cdot \ldots \cdot a_n}$$

In order to calculate the nth root of a number, you need to use the exponentiation operator **.

Keep reading the stream of positive integers until the user enters -1.

```
Please enter a non-empty sequence of positive integers End your sequence by typing -1: 1 2
```

```
3
-1
The geometric mean is 1.8171
```

For-loops (30 points)

Note that for questions in this section, your solution should use a for-loop

1. Write a program that asks the user to input a positive integer n, and prints the following image of an hourglass made of 2n - 1 lines with asterisks.

For example, if n = 4, the program should print:

```
******
***
*
***
****
*****
```

- 2. Write a program that takes a string from the user that contains at least 2 space-separated words. We want to construct a string such that the following is true:
 - Every word in the string is reversed
 - The order of the words in the sentence should remain the same

Note that you cannot use the string split function here

Enter a string: hello world olleh dlrow

Enter a string: Python is fun nohtyP si nuf