CMSC 131 Lab Exercise
Wednesday, February 24th

1. Calculate the Harmonic sum (1/1 + 1/2 + 1/3 +... + 1/n) for input n.
    a. Do you get different answers for 1/1 +...+ 1/n vs. 1/n +…+ 1/1?
2. Calculate the Geometric sum (1/1 + 1/2 + 1/4 + 1/8 +…+ $1/2^n$) for input n.
    a. Hint: use Math.pow()
    b. Does it ever reach 2 (Zeno's paradox)?
    c. Do you get different answers using double vs. float variables? Why?
3. Write code to test Collatz Conjecture for any positive integer n.
    a. See Wikipedia (2nd paragraph) for a description of the conjecture.
    b. Add a feature to print the number of steps to reach 1.
    c. Add a feature to print the largest number reached before reaching 1. Is this number a power of 2?
4. Write code to ask the user for a character, a height, and a width. Then draw a rectangle using that character.
    a. Try asking for two characters and making a checkerboard pattern.
5. Write code to ask the user for a character and a width. Then draw an hourglass using that character.
    a. Make sure it works for even and odd widths.
6. Ask the user for a sentence and tell them if it is a palindrome.
    a. Example input: "Go hang a salami, I'm a lasagna hog!"

Example problem 4:

```
Enter a character:
$
Enter height:
3
Enter width:
7

$$$$$$$
$$$$$$$
$$$$$$$
```

Example problem 5:

```
Enter a character:
@
Enter width:
6

@@@@@@
 @@@@
  @@
  @@
 @@@@
@@@@@@
```