Week 6 Practice Problems

#1. Redo Q1b from Week 5 but this time use a for-loop.

#2. Redo Q2 from Week 5 with a for-loop.

#3. You are given two pieces of data:

1. A string s of length n.
2. An integer k, where k is a factor of n.

Because n is divisible by k, we can split string s into n/k sub-strings where each segment consists of a contiguous block of k characters.

Write a program that gets the user to enter a string and an integer k and prints the segments in order but have the characters in each segment reversed, separate segments by space. Example:

```
Please enter the string: University
Please enter k: 2
nU vi re is yt

Please enter the string: Hello!
Please enter k: 3
leH !ol
```

Hint: Break the problem into three steps: 1. Get the input. 2. Break the string into n/k substrings. 3. Reverse each sub-string and print it. You should write at least one function to do this.

Hint #2: The main algorithm for doing this (e.g. after the input, etc) is only a few lines of string manipulation.

#4. Write a function that takes in a string of any length as a parameter and prints out a table that specifies the number of times each vowel (a,e,i,o,u) appears. Your function should take be able to identify a vowel whether it is upper or lower-case.

a. Write the function using the count() method.
b. Write the function without using the count() method.

#5: In fluid dynamics, the dimensionless Iribarren Number defined below is a parameter used to model waves on beaches and coastal structures.

$$\textbf{Iribarren Number} = \tan(\alpha)/\sqrt{H/L}$$

where α is the bed slope (in radians), *H* is the breaking wave height (in meters) at the edge of the surf zone, and *L* is the water wavelength (in meters).

Depending on the Iribarren number, the breaking waves are classified into *spilling*, *plunging*, and *collapsing or surging* as follows

Wave type	**Iribarren Number (IR) number**
surging or collapsing	3.3 < IR
plunging	0.5 < IR <= 3.3
spilling	IR <= 0.5

Write a function which takes as input parameter a string containing the bed slope, the wave height and the water wavelength as a string in the following format: "number1,number2,number3", e.g., "1.2,2.3,5.7" and returns a string indicating the type of wave: `"surging or collapsing"`, `"plunging"` and `"spilling"`.

You can assume that:

- the input string does not contain any white spaces
- the three numbers are separated by commas
- the three numbers are in their correct units
- each of the three numbers may have any number of digits. The following are all valid inputs: "1,2,3", "1.245,5.60,23", "1.0,2.3456789,2.19"