Problem Set

1. Write a program which will find all such numbers which are divisible by 7 but are not a multiple of 5, between 2000 and 3200 (both included). The numbers obtained should be printed in a comma-separated sequence on a single line.
    a. Hint: Consider use range(begin, end) method
2. Write a function that takes a character (i.e. a string of length 1) and returns True if it is a vowel, False otherwise.
3. Write a program which can compute the factorial of a given numbers.
    a. Hint: A factorial, denoted by n!, is the product of all positive integers less than or equal to n. For example, $5 ! = 5 \times 4 \times 3 \times 2 \times 1 = 120$.
    b. Challenge: Create a recursive version of this program (call a function within its very own function definition)
4. "99 Bottles of Beer" is a traditional song in the United States and Canada. It is popular to sing on long trips, as it has a very repetitive format which is easy to memorize, and can take a long time to sing. The song's simple lyrics are as follows:
    a. 99 bottles of beer on the wall, 99 bottles of beer.
    b. Take one down, pass it around, 98 bottles of beer on the wall.

    The same verse is repeated, each time with one fewer bottle. The song is completed when the singer or singers reach zero.
    Your task here is write a Python program capable of generating all the verses of the song.
5. Write a program that accepts sequence of lines as input and prints the lines after making all characters in the sentence capitalized.
    a. Suppose the following input is supplied to the program:
        i. Hello world
        ii. Practice makes perfect
    b. Then, the output should be:
        i. HELLO WORLD
        ii. PRACTICE MAKES PERFECT
6. Define a function reverse() that computes the reversal of a string. For example, reverse("I am testing") should return the string "gnitset ma I".
7. Write a function find_longest_word() that takes a list of words and returns the length of the longest one.
8. Define a function is_palindrome() that recognizes palindromes (i.e. words that look the same written backwards). For example, is_palindrome("radar") should return True.
9. Define a function overlapping() that takes two lists and returns True if they have at least one member in common, False otherwise.
10. A trident is a fork with three tines (prongs). A simple picture of a trident can be made from asterisks and spaces:

In this example, each tine is a vertical column of 3 asterisks. Each tine is separated by 2 spaces. The handle is a vertical column of 4 asterisks below the middle tine. Tridents of various shapes can be drawn by varying three parameters:

- t, the height of the tines
- s, the spacing between tines
- h, the length of the handle. For the example above we have t = 3, s = 2, and h = 4.

You are to write an interactive program to print a trident. Your program should accept as input the parameters t, s, and h, and print the appropriate trident. You can assume that t, s, h are each at least 0 and not larger than 10.

Sample Session *User input in italics*

```
Enter tine length:
   4
Enter tine spacing:
   3
Enter handle length:
   2
*   *   *
*   *   *
*   *   *
*   *   *
********
    *
    *
```

11. Make a two-player Rock-Paper-Scissors game.
    a. Hint: Ask for player plays (using input), compare them, print out a message of congratulations to the winner, and ask if the players want to start a new game
    b. Remember the rules:
        i. Rock beats scissors
        ii. Scissors beats paper
        iii. Paper beats rock