Python 4 Problem Set

1. Write a script that uses a `while loop` to print out the number 1 to 100
2. Write a script that uses a `while loop` to calculate the factorial of 1000.
3. Iterate through each element of this list using a for loop: [101,2,15,22,95,33,2,27,72,15,52]

- Print out only the values that are even (use modulus operator).

2. Iterate through each of the elements of the above list, but make sure to sort them numerically.

- Print each element.
- Create two cumulative sums, one of all the even values and one of all the odd values.
- Print the two sums.

5. Use `pop()` and `remove()` with the list of integers.

- `pop()`
  - Print your list before you start.
  - Store the value returned by `pop()`.
  - Print the value and the list.
  - What happened to the orginal list?
- `remove()`
  - Print your list before you start.
  - Store the value returned by `remove()`.
  - Print the value and the list.
  - What happened to the orginal list?

6. Write a script that uses `range()` in a `for loop` to print out every number between 0 and 99
7. Add a loop that uses `range()` to print out every number bewteen 1 and 100
8. Rewrite the script to take to values from the command line
9. Now only print the number if it is odd.
10. Use a `for loop`, with the variable containing the list as the *sequence*, to iterate through each element of this list `['ATGCCCGGCCCGGC','GCGTGCTAGCAATACGATAAACCGG', 'ATATATATCGAT','ATGGGCCC']`. i.e, `for var in list:`
    - Print out each element
    - Print out the length along with the sequence i.e., "4\tATGC\n"
11. Use a `for loop` with `range()` instead of using the list variable to iterate through each element the list from the last Question. i.e, `for var in range(x):`

- Print out each element
- Print out the length along with the sequence i.e., "4\tATGC\n"

12. Create a shuffled sequence
    - Use a for loop to perform the following procedure N times (N = length of seq)
    - Select a random position A with randrange()
    - Select a random position B with randrange()
    - Exchange the letters at list indices A and B
    - Print the final shuffled sequence
    - Remember to test your code with test data.
13. Start with 2 very similar DNA sequences. Use your favorites or use Python_04.fasta
    - Align with ClustalW, TCoffee, or some other web alignment application.
    - Output should be in FASTA format.

- Store (copy and paste) each aligned sequence, including dashes, as two separate string variables.
- Be aware of the newlines (if any)
- Use a `for loop` with `range()` to compare each index for nucleotide differences.
- Report the nucleotide position of each difference.

14. Write a script in which you construct a dictionary of your favorite things.

    Some of my favorites:

Type	Favorite
book	Jitterbug Perfume
song	Tom Petty - I Won't Back Down
tree	Cedar

15. Write a script that iterates through each nucleotide of a DNA string:
    - Print out each nucleotide
    - Create a counter for each nucleotide. Count each nucleotide without using `count()`.
    - Print out the final count of each nucleotide.

```
A = A_total
T = T_total
G = G_total
C = C_total
```

16. Alter your counter in the last script use a dictionary for counting each nucleotide.

17. Write a script to find the intersection, difference, union, and symetrical difference between these two sets.

```
Set A = 3 14 15 9 26 5 35 9
Set B = 60 22 14 0 9
```

18. Have you been commiting you work?