

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

```
1 A = A_total
2 T = T_total
3 G = G_total
4 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 symmetrical difference between these two sets.

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

18. Have you been committing your work?