

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 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','ATATATATC-GAT','ATGGGCCC']`. i.e, `for var in list:`
 - Print out each element
 - Print out the length along with the sequence i.e., `"4\tATGC\n"`
7. 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"`
10. 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.
11. 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.

12. 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?