

NumPy Task 1

Creating vectors and basic operations:

1. Create a Python list `lst = [4, 5, 2, 9, 5]` and a NumPy array with the same contents
2. Add 4 to all elements of the list/array
3. Multiply all elements by 2
4. **Bonus:** Take the NumPy array and append 9 to it.

NumPy Task 2

Basic indexing:

1. Extract the subarray from the 2nd element to the 4th
2. Extract everything but the last element
3. Reverse the array
4. **Bonus:** insert 8 into the array at the second position.

NumPy Task 3

Matrices:

1. Take the table from the wiki and calculate the number of rows and columns
2. Extract the submatrix with only the first two columns
3. Extract only the third sequence
4. **Bonus:** Extract a subalignment with only the first two sequences and the two central columns

NumPy Task 4

File communication:

1. Read the file `animal_ID_heads_legs.txt`
2. Calculate the average number of heads and the standard deviation
3. Write the results back into a text file (not the same!)
4. **Bonus:** Do a similar thing for an Excel table ;-)

NumPy Task 5

Sorting and searching:

1. Convert two lists,

```
lst1 = [2, 5, -3, 6]
lst2 = ['Fish', 'Panda', 'Human', 'The ancestral mitochondrion']
```

to arrays. This represents the average number of intelligent actions in an organism's life.

2. Sort `lst1`
3. Sort `lst2` in reverse alphabetical order
4. **Bonus:** Sort both according to decreasing order of `lst1`.
5. Find the minimal value for `lst2`.
6. **Bonus:** Argue about the presence of mitochondria in all humans but not vice versa.

NumPy Task 6

Statistics:

1. Two plant populations produce the following number of flowers:

```
pop1 = [4, 45, 3, 6, 4, 2, 1, 0, 0, 4, 5, 2, 3, 4, 68]
pop2 = [5, 7, 2, 0, 0, 0, 0, 0, 0, 7, 8, 9, 7, 9, 0]
```

calculate the mean and variance in flower numbers for each population.

2. Are the two distributions of flower number different?
3. **Bonus:** repeat the analysis taking out evident outliers.