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Assignment 1

Write a Python program **that can take strings of different lengths** - each string**may include digits, characters, and special symbols -**and then sort them - you can use any sorting algorithm that interests you.  You need to **define the rule for sorting** and then implement the sorting function using Python - **DO NOT use any existing sort function from either Python or an external module** - that is, program the "sort" algorithm yourself.  Using Python, **visualize a list of input strings - the list must include at least 500 strings of differing lengths**.   **Use a scatter plot to do the visualization** - one dimension will be the length of each string - and the other dimension could be the order of the string in the list.

## **Python Code:**

import random

import string

import matplotlib.pyplot as p

inp = input('Enter the String: ')

inp1 = list(inp)

alpha = []

dig = []

spec\_charact = []

for de in inp:

    if de.isalpha():

        alpha.append(de)

    elif de.isdigit():

      dig.append(de)

    else:

      spec\_charact.append(de)

e=len(alpha)

f=len(dig)

for i in range(e):

    for j in range(1, e-i):

        if alpha[j-1] < alpha[j]:

            (alpha[j-1], alpha[j]) = (alpha[j], alpha[j-1])

for i in range(f):

    for j in range(1, f-i):

        if dig[j-1] < dig[j]:

            (dig[j-1], dig[j]) = (dig[j], dig[j-1])

for i in range(len(spec\_charact)):

    for j in range(i + 1, len(spec\_charact)):

        if spec\_charact[i] > spec\_charact[j]:

           spec\_charact[i], spec\_charact[j] = spec\_charact[j], spec\_charact[i]

output=''.join(dig+alpha+spec\_charact)

def ran\_st(size):

        gen\_st=[];

        for i in range(size):

            j=random.randrange(1,20)

            s=''.join(random.choice(string.ascii\_uppercase +string.ascii\_lowercase +string.digits+string.punctuation)for n in range(j))

            gen\_st.append(s)

        return gen\_st

Q=ran\_st(500)

xaxis=[]

yaxis=[]

for i in range(0,len(Q)):

    xaxis.append(i)

    yaxis.append(len(Q[i]))

p.xlabel('xaxis')

p.ylabel('yaxis')

p.scatter(xaxis,yaxis)

p.show()

**Explanation about code**:

Generally, data sorting helps us to organize data so that it is easier to analyze and visualize data. Here I used Bubble sorting algorithm to sort 500 strings of various lengths into an order (it can be ascending order or descending order), Here the output obtained is of following order special characters > numbers > alphabets. At first I imported random and string libraries and then we defined alphabets in alpha list, digits in dig list and special characters in spec\_charact list. By using Bubble sorting technique we get the expected order of strings. In order to visualize data, I used MatplotLib Library so as to create scatter plot of 500 strings of different lengths with x-label and y-label as order and length of the string.