Importing Library

```
import pandas as pd
import numpy as np
import matplotlib
import matplotlib.pyplot as plt
```

Loading Data

```
from google.colab import drive

drive.mount('/content/gdrive')
```

```
Drive already mounted at /content/gdrive; to attempt to forcibly remount, call drive
```

```
main_directory1  = '/content/gdrive/MyDrive/Pattern Lab/Assignment3/train_knn.txt'
main_directory2  = '/content/gdrive/MyDrive/Pattern Lab/Assignment3/test_knn.txt'

train = pd.read_csv(main_directory1, sep=',' , header = None)
test = pd.read_csv(main_directory2, sep=',' , header = None)
print(train)
print(test)
```

```
     0  1  2
0    7  7  1
1    7  4  1
2    6  4  1
3    7  5  1
4    7  6  1
5    6  7  1
6    6  6  1
7    3  4  2
8    2  3  2
9    3  2  2
10   4  3  2
11   3  3  2
12   4  4  2
13   1  4  2
    0  1
0   3  7
1   7  7
2   4  3
3   2  8
4   3  5
5   1  2
6   4  8
7   8  3
8   8  4
```

Dividing Into Classes

```
class_1 = train[train[2]==1]
class_1
```

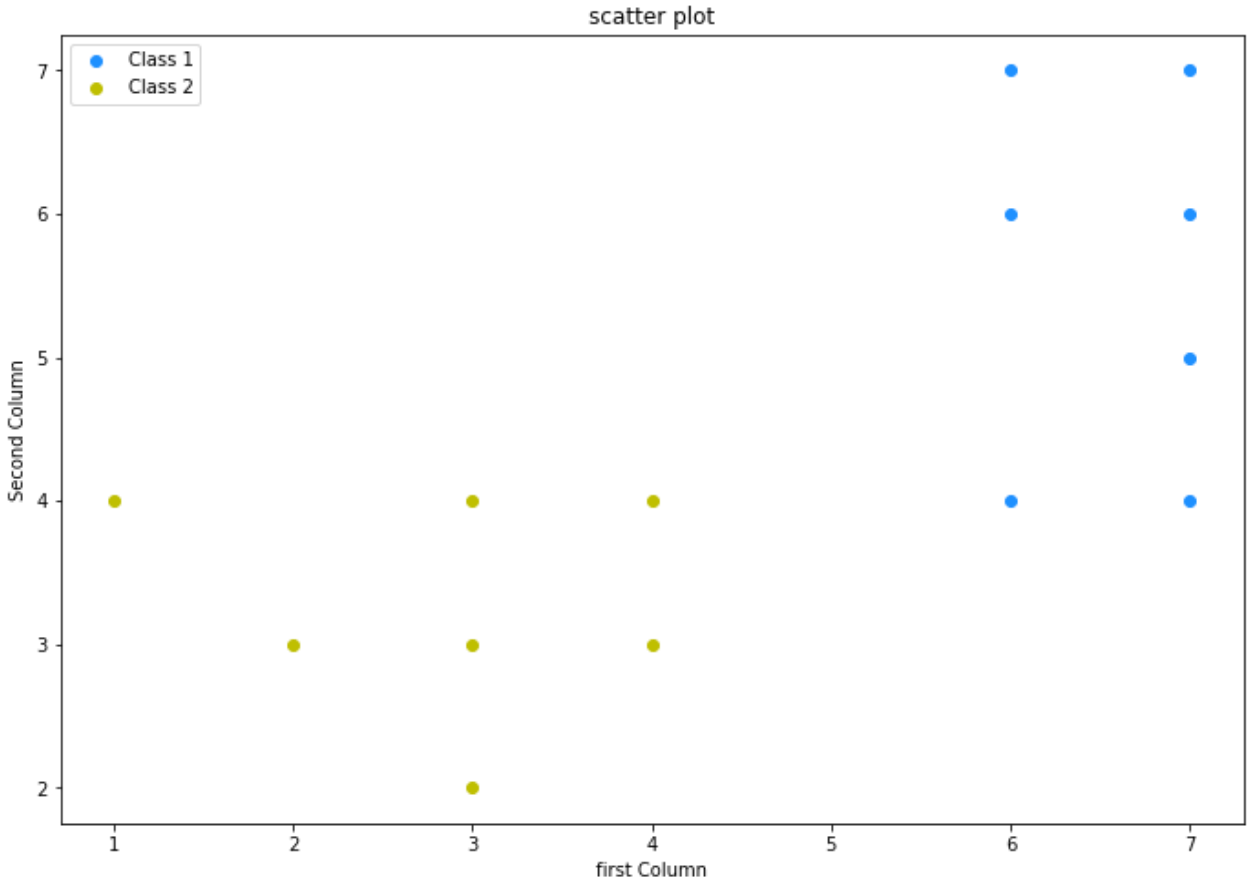
	0	1	2
0	7	7	1
1	7	4	1
2	6	4	1
3	7	5	1
4	7	6	1
5	6	7	1
6	6	6	1

```
class_2 = train[train[2]==2]
class_2
```

	0	1	2
7	3	4	2
8	2	3	2
9	3	2	2
10	4	3	2
11	3	3	2
12	4	4	2
13	1	4	2

Plotting Graph

```
fig=plt.figure()
ax=fig.add_axes([0,0,1.5,1.5])
ax.scatter(class_1[0], class_1[1], color='dodgerblue', label="Class 1")
ax.scatter(class_2[0], class_2[1] , color='y', label="Class 2")
ax.set_xlabel('first Column')
ax.set_ylabel('Second Column')
ax.set_title('scatter plot')
plt.legend(loc="upper left")
plt.show()
```



Defining BubbleSort Function

```
def bubbleSort(array, target_label):
    for i in range(len(array)):
        for j in range(0, len(array) - i - 1):
            if array[j] > array[j + 1]:
                temp = array[j]
                array[j] = array[j+1]
                array[j+1] = temp

                temp = target_label[j]
                target_label[j] = target_label[j+1]
                target_label[j+1] = temp
    return array


def calculate_dist(x,y):
    global train
    dist = []
    target_label = list(train[2])
    for i,j in zip(train[0], train[1]):
        dist.append(((i-x)**2 +(j-y)**2))
    dist = bubbleSort(dist,target_label)
    return dist,target_label
```

```
distances = []
target_labels = []
for i,j in zip(test[0], test[1]):
    a, b = calculate_dist(i,j)
    distances.append(a)
    target_labels.append(b)
```

```
distances = np.array(distances)
distances.shape
```

```
(9, 14)
```

```
target_labels = np.array(target_labels)
target_labels.shape
```

```
(9, 14)
```

```
test = np.array(test)
```

Taking User Input

```
k=input ("Enter value of k :")
k=int(k)
type(k)
```

```
Enter value of k :5
int
```

KNN Algorithm

```
output = []
predicted_class_1 = []
predicted_class_2 = []
prediction_text = []
for i in range(len(test)):
    count_1, count_2 = 0, 0
    print('Test Point: ', test[i])
    s = 'Test Point: '+ str(test[i]) + '\n'
    prediction_text.append(s)
    for j in range(k):
        print('Distance : ', distances[i][j], 'Class : ', target_labels[i][j])
        s = 'Distance : '+ str(distances[i][j])  + '   Class : ' + str(target_labels[i][j]
        prediction_text.append(s)
        if target_labels[i][j] == 1:
            count_1 += 1
        else:
```

```
        count_2 += 1
if count_1 > count_2:
    print('Predicted Class 1')
    prediction_text.append('Predicted Class 1' + '\n\n')
    predicted_class_1.append(list(test[i]))
else:
    print('Predicted Class 2')
    prediction_text.append('Predicted Class 2' + '\n\n')
    predicted_class_2.append(list(test[i]))
print('\n\n')
```

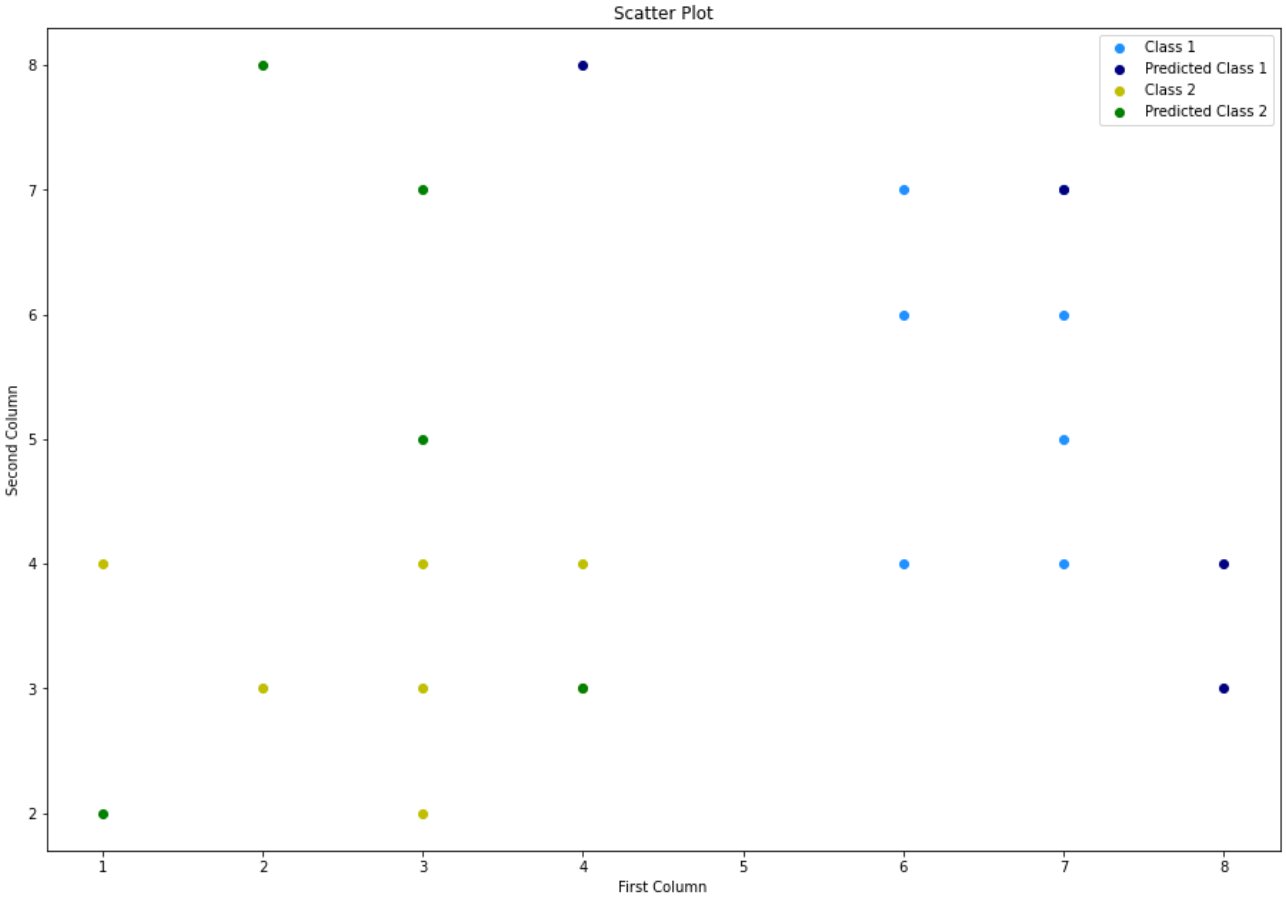
```
 Distance :  17 Class :  2
 Distance :  17 Class :  2
 Distance :  20 Class :  1
 Distance :  20 Class :  2
 Predicted Class 2



 Test Point:  [3 5]
 Distance :  1 Class :  2
 Distance :  2 Class :  2
 Distance :  4 Class :  2
 Distance :  5 Class :  2
 Distance :  5 Class :  2
 Predicted Class 2



 Test Point:  [1 2]
 Distance :  2 Class :  2
 Distance :  4 Class :  2
 Distance :  4 Class :  2
 Distance :  5 Class :  2
 Distance :  8 Class :  2
 Predicted Class 2



 Test Point:  [4 8]
 Distance :  5 Class :  1
 Distance :  8 Class :  1
 Distance :  10 Class :  1
 Distance :  13 Class :  1
 Distance :  16 Class :  2
 Predicted Class 1



 Test Point:  [8 3]
 Distance :  2 Class :  1
 Distance :  5 Class :  1
 Distance :  5 Class :  1
 Distance :  10 Class :  1
 Distance :  13 Class :  1
 Predicted Class 1
```

```
Test Point:  [8 4]
Distance :  1 Class :  1
Distance :  2 Class :  1
Distance :  4 Class :  1
Distance :  5 Class :  1
Distance :  8 Class :  1
Predicted Class 1
```

```
with open('prediction.txt', 'w') as writefile:
    for line in prediction_text:
        writefile.write(line)
```

```
df1 = pd.DataFrame(predicted_class_1, columns = [0,1])
df2 = pd.DataFrame(predicted_class_2, columns = [0,1])
```

```
fig=plt.figure()
ax=fig.add_axes([0,0,2,2])
ax.scatter(class_1[0], class_1[1], color='dodgerblue', label="Class 1")
ax.scatter(df1[0], df1[1], color='navy', label="Predicted Class 1")
ax.scatter(class_2[0], class_2[1] , color='y', label="Class 2")
ax.scatter(df2[0], df2[1] , color='g', label="Predicted Class 2")
ax.set_xlabel('First Column')
ax.set_ylabel('Second Column')
ax.set_title('Scatter Plot')
plt.legend(loc="upper right")
plt.show()
```



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