Spring Semester, Project with Big Data

Analyzing Airbnb Accommodation Dataset

컴퓨터공학과

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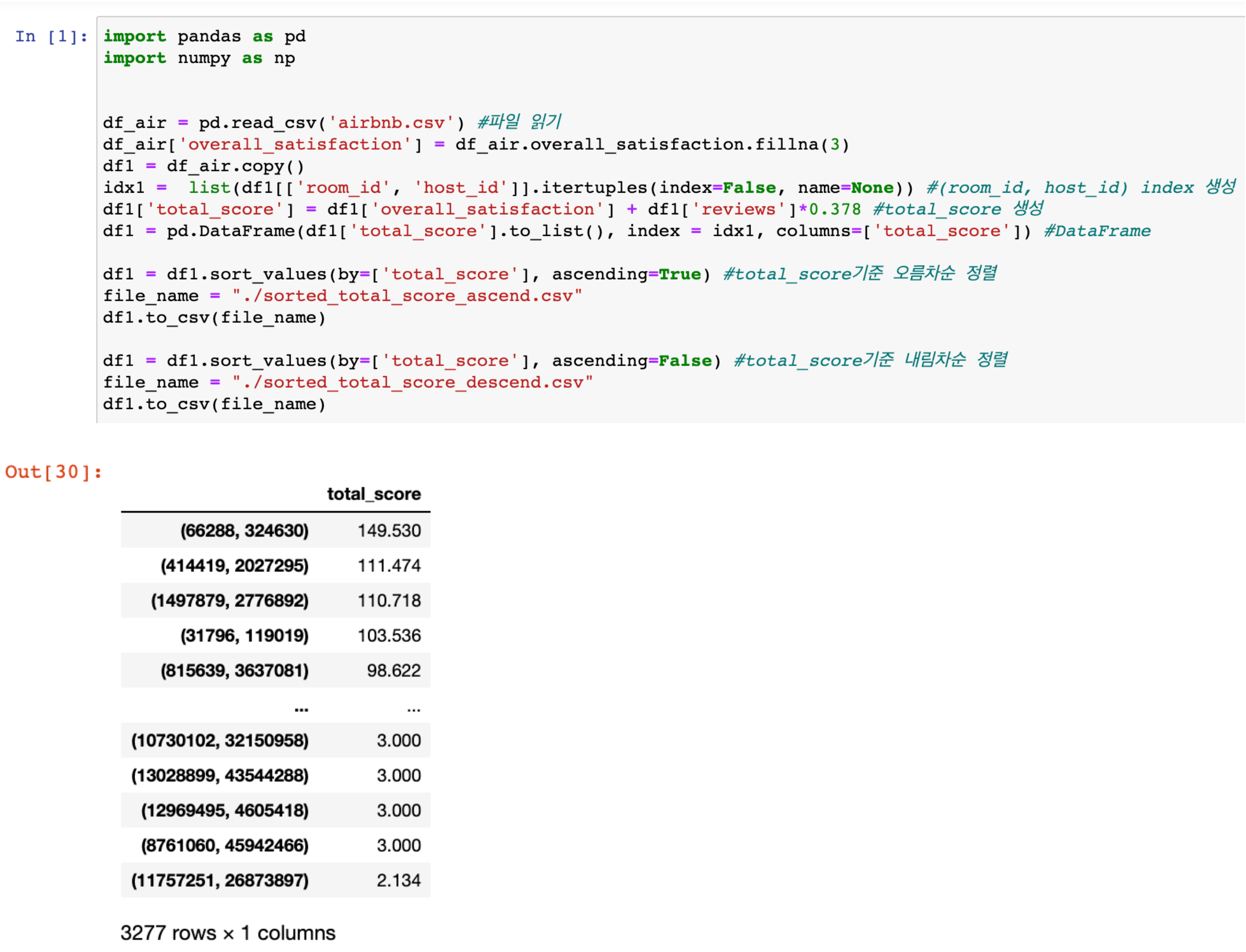
1. Dataframe: listing each room_id, host_id with total score in two sorting ways

1. 1) index = (**room_id**, **host_id)**
2. 2) column = **total_score**: **o verall_satisfaction** + **reviews** * **0.378**
3. 3) output = **1**. sorted total_score in ascending **2**. sorted total_score in descending

= sorted_total_score_ascend.csv, sorted_total_score_descend.csv



```
In [1]: import pandas as pd
        import numpy as np


        df_air = pd.read_csv('airbnb.csv') #파일 읽기
        df_air['overall_satisfaction'] = df_air.overall_satisfaction.fillna(3)
        df1 = df_air.copy()
        idx1 =  list(df1[['room_id', 'host_id']].itertuples(index=False, name=None)) #(room_id, host_id) index 생성
        df1['total_score'] = df1['overall_satisfaction'] + df1['reviews']*0.378 #total_score 생성
        df1 = pd.DataFrame(df1['total_score'].to_list(), index = idx1, columns=['total_score']) #DataFrame

        df1 = df1.sort_values(by=['total_score'], ascending=True) #total_score기준 오름차순 정렬
        file_name = "./sorted_total_score_ascend.csv"
        df1.to_csv(file_name)

        df1 = df1.sort_values(by=['total_score'], ascending=False) #total_score기준 내림차순 정렬
        file_name = "./sorted_total_score_descend.csv"
        df1.to_csv(file_name)
```

Out[30]:

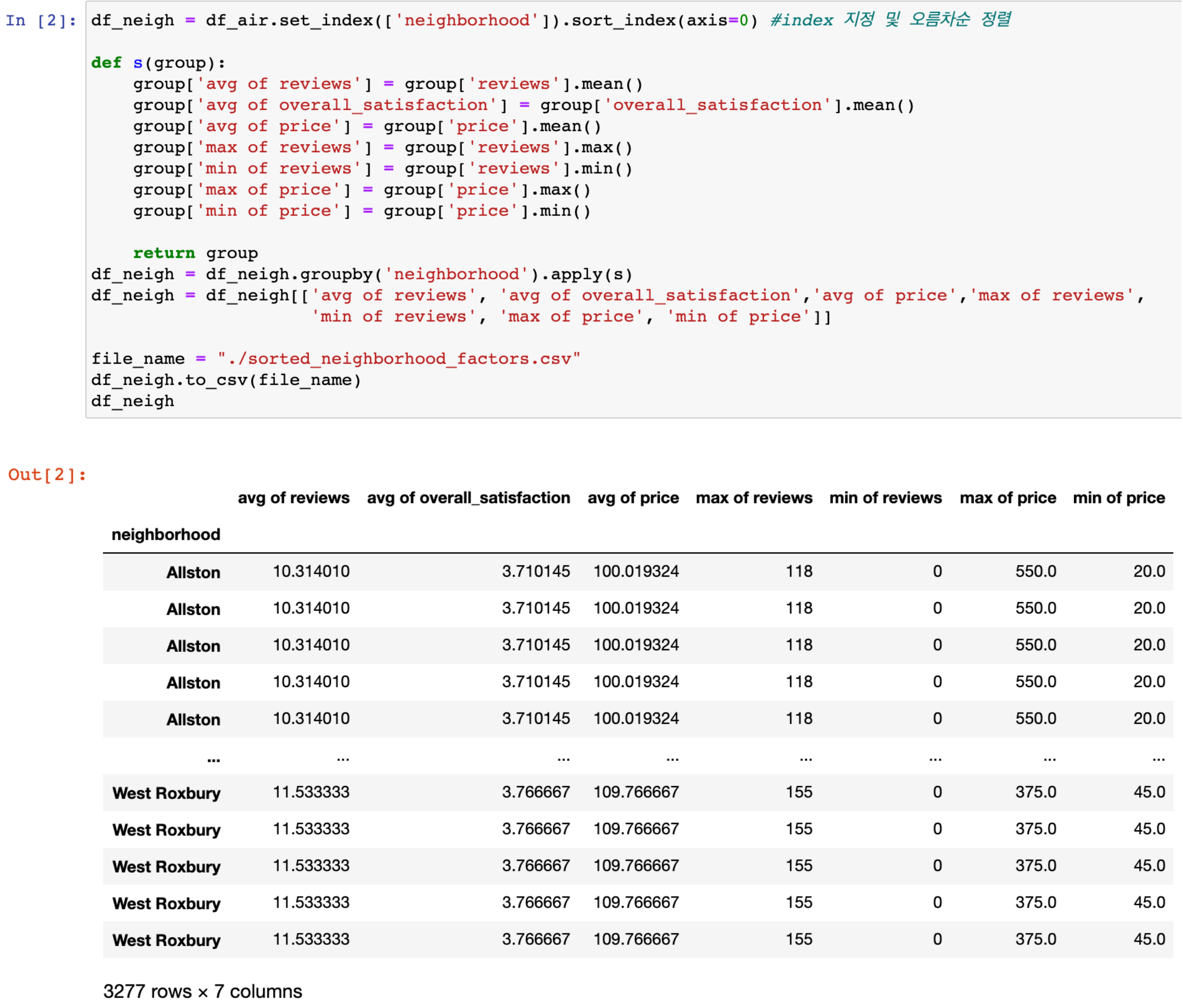
	total_score
(66288, 324630)	149.530
(414419, 2027295)	111.474
(1497879, 2776892)	110.718
(31796, 119019)	103.536
(815639, 3637081)	98.622
...	...
(10730102, 32150958)	3.000
(13028899, 43544288)	3.000
(12969495, 4605418)	3.000
(8761060, 45942466)	3.000
(11757251, 26873897)	2.134

3277 rows × 1 columns

2. Dataframe: listing average of factors by grouped neighborhood

1. 1) index = (**neighborhood)**
2. 2) column = **avg of reviews | avg of overall_satisfaction | avg of price | max of reviews | min of reviews | max of price | min of price**
3. 3) output = **1**. sorted neighborhood in ascending

= sorted_neighborhood_factors.csv



```
In [2]: df_neigh = df_air.set_index(['neighborhood']).sort_index(axis=0) #index 지정 및 오름차순 정렬

        def s(group):
            group['avg of reviews'] = group['reviews'].mean()
            group['avg of overall_satisfaction'] = group['overall_satisfaction'].mean()
            group['avg of price'] = group['price'].mean()
            group['max of reviews'] = group['reviews'].max()
            group['min of reviews'] = group['reviews'].min()
            group['max of price'] = group['price'].max()
            group['min of price'] = group['price'].min()

            return group
        df_neigh = df_neigh.groupby('neighborhood').apply(s)
        df_neigh = df_neigh[['avg of reviews', 'avg of overall_satisfaction','avg of price','max of reviews',
                             'min of reviews', 'max of price', 'min of price']]

        file_name = "./sorted_neighborhood_factors.csv"
        df_neigh.to_csv(file_name)
        df_neigh
```

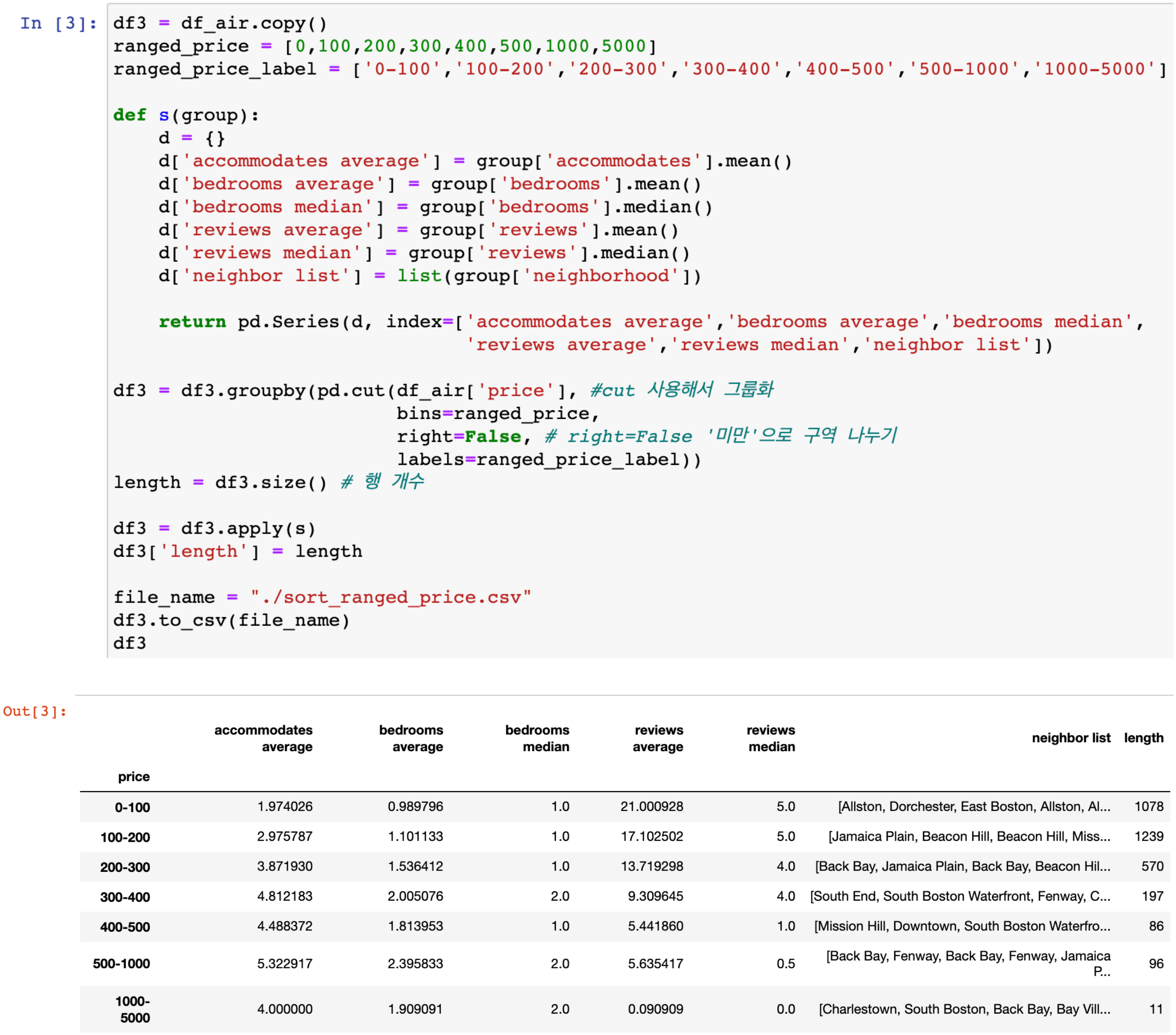
Out[2]:

	avg of reviews	avg of overall_satisfaction	avg of price	max of reviews	min of reviews	max of price	min of price
neighborhood							
Allston	10.314010	3.710145	100.019324	118	0	550.0	20.0
Allston	10.314010	3.710145	100.019324	118	0	550.0	20.0
Allston	10.314010	3.710145	100.019324	118	0	550.0	20.0
Allston	10.314010	3.710145	100.019324	118	0	550.0	20.0
Allston	10.314010	3.710145	100.019324	118	0	550.0	20.0
...	...	...	...	...	...	...	...
West Roxbury	11.533333	3.766667	109.766667	155	0	375.0	45.0
West Roxbury	11.533333	3.766667	109.766667	155	0	375.0	45.0
West Roxbury	11.533333	3.766667	109.766667	155	0	375.0	45.0
West Roxbury	11.533333	3.766667	109.766667	155	0	375.0	45.0
West Roxbury	11.533333	3.766667	109.766667	155	0	375.0	45.0

3277 rows × 7 columns

3. Dataframe: listing average of factors by grouped ranged prices

index = ranged prices
output = sort_ranged_price.csv



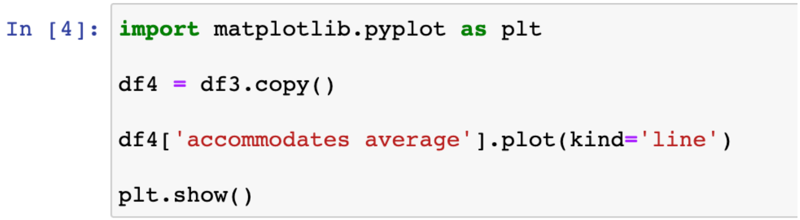
In [3]:
```
df3 = df_air.copy()
ranged_price = [0,100,200,300,400,500,1000,5000]
ranged_price_label = ['0-100','100-200','200-300','300-400','400-500','500-1000','1000-5000']

def s(group):
    d = {}
    d['accommodates average'] = group['accommodates'].mean()
    d['bedrooms average'] = group['bedrooms'].mean()
    d['bedrooms median'] = group['bedrooms'].median()
    d['reviews average'] = group['reviews'].mean()
    d['reviews median'] = group['reviews'].median()
    d['neighbor list'] = list(group['neighborhood'])

    return pd.Series(d, index=['accommodates average','bedrooms average','bedrooms median',
                               'reviews average','reviews median','neighbor list'])

df3 = df3.groupby(pd.cut(df_air['price'], #cut 사용해서 그룹화
                         bins=ranged_price,
                         right=False, # right=False '미만'으로 구역 나누기
                         labels=ranged_price_label))
length = df3.size() # 행 개수

df3 = df3.apply(s)
df3['length'] = length

file_name = "./sort_ranged_price.csv"
df3.to_csv(file_name)
df3
```

Out[3]:

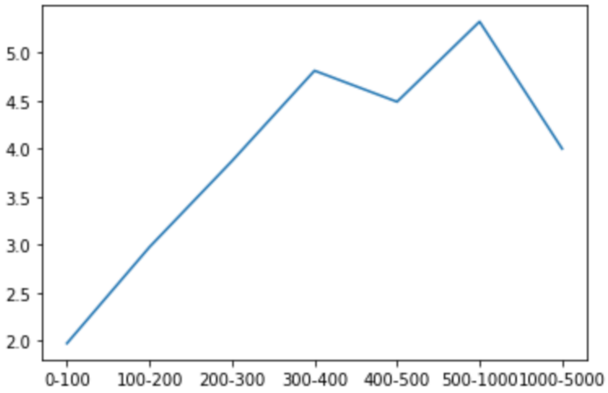
price	accommodates average	bedrooms average	bedrooms median	reviews average	reviews median	neighbor list	length
0-100	1.974026	0.989796	1.0	21.000928	5.0	[Allston, Dorchester, East Boston, Allston, Al...	1078
100-200	2.975787	1.101133	1.0	17.102502	5.0	[Jamaica Plain, Beacon Hill, Beacon Hill, Miss...	1239
200-300	3.871930	1.536412	1.0	13.719298	4.0	[Back Bay, Jamaica Plain, Back Bay, Beacon Hil...	570
300-400	4.812183	2.005076	2.0	9.309645	4.0	[South End, South Boston Waterfront, Fenway, C...	197
400-500	4.488372	1.813953	1.0	5.441860	1.0	[Mission Hill, Downtown, South Boston Waterfro...	86
500-1000	5.322917	2.395833	2.0	5.635417	0.5	[Back Bay, Fenway, Back Bay, Fenway, Jamaica P...	96
1000-5000	4.000000	1.909091	2.0	0.090909	0.0	[Charlestown, South Boston, Back Bay, Bay Vill...	11

4. Graph: draw each graph by the following lists

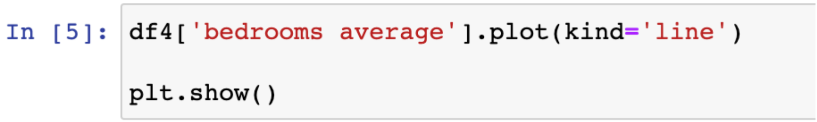
1) lineplot xaxis=rangedprice|yaxis=accommodateaverage



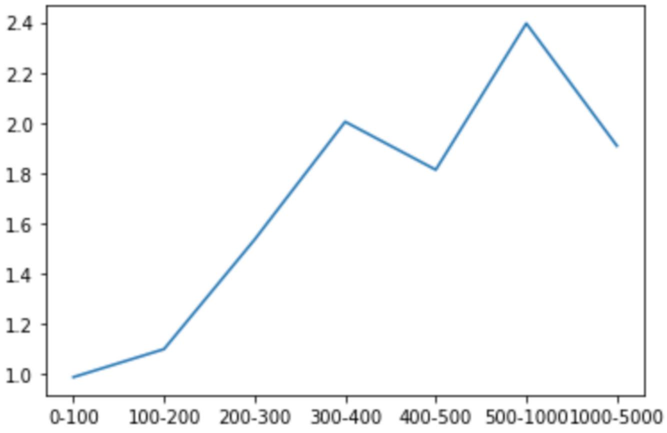
```
In [4]: import matplotlib.pyplot as plt

        df4 = df3.copy()

        df4['accommodates average'].plot(kind='line')

        plt.show()
```



2) line plot x axis = ranged price | y axis = bedrooms average

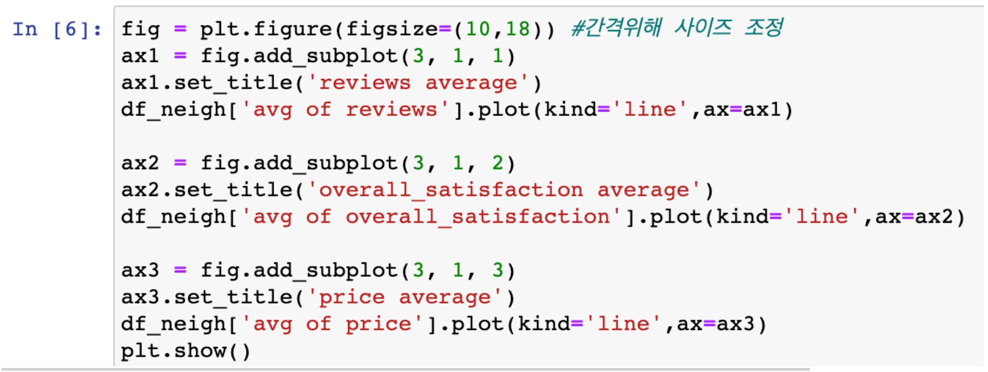


```
In [5]: df4['bedrooms average'].plot(kind='line')

        plt.show()
```

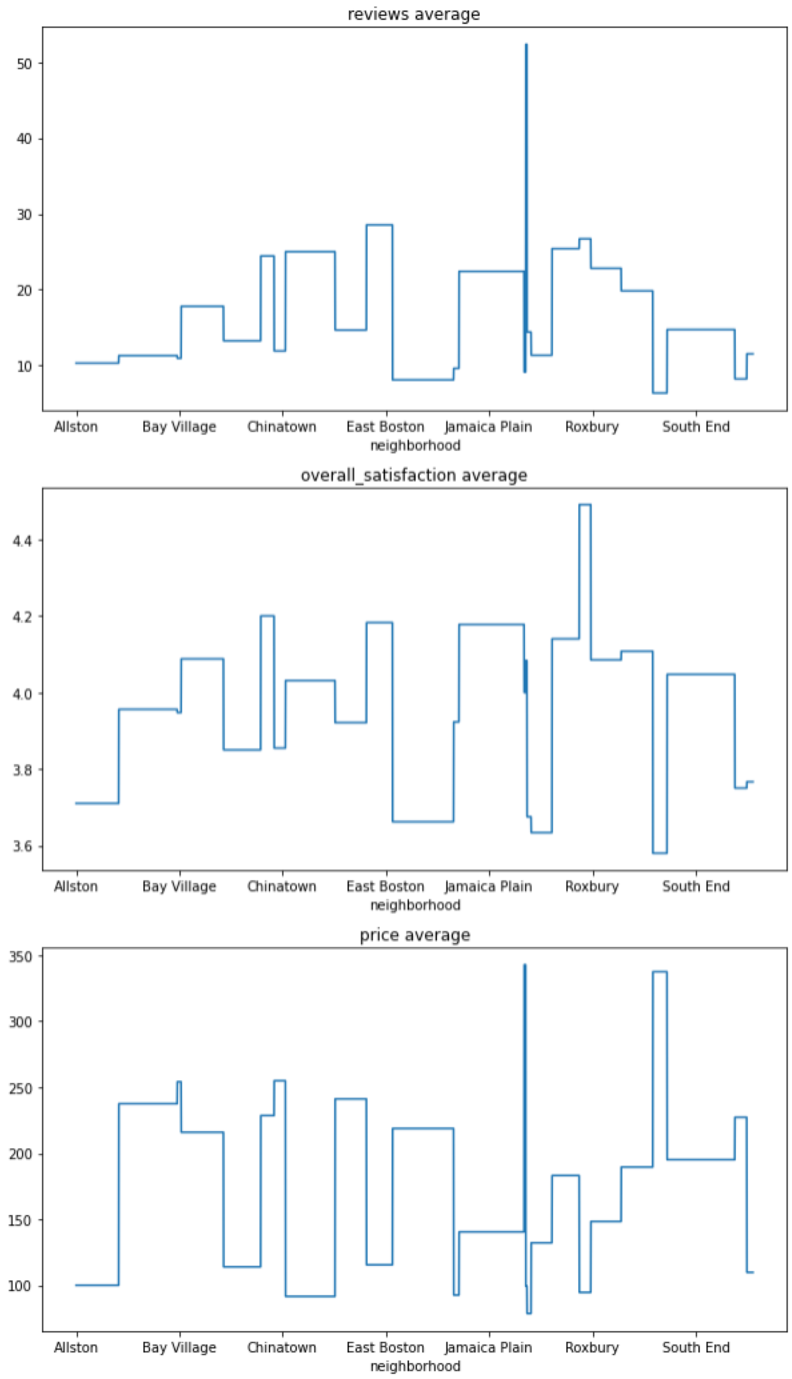


3) line **subplot** x axis = neighborhood

| y axis = reviews average
| y axis = overall satisfaction average
| y axis = average price average



```
In [6]: fig = plt.figure(figsize=(10,18)) #간격위해 사이즈 조정
        ax1 = fig.add_subplot(3, 1, 1)
        ax1.set_title('reviews average')
        df_neigh['avg of reviews'].plot(kind='line',ax=ax1)

        ax2 = fig.add_subplot(3, 1, 2)
        ax2.set_title('overall_satisfaction average')
        df_neigh['avg of overall_satisfaction'].plot(kind='line',ax=ax2)

        ax3 = fig.add_subplot(3, 1, 3)
        ax3.set_title('price average')
        df_neigh['avg of price'].plot(kind='line',ax=ax3)
        plt.show()
```



reviews average

overall_satisfaction average

price average