In [1]:
```
import pandas as pd
import re
```

In [2]:
```
volume_df = pd.read_csv('volume_df.csv')
```

4.2 Show traffic heatmap of 2018. (5 Marks) ¶

In [3]:
```
# process multistring into array of coordinates
def get_coordinates(multistring):
    list_coordinate=re.sub('[^-0-9, .]','',multistring).split(",")
    coords=[]
    for i in list_coordinate:
        coord=list(float(j) for j in (i.strip().split(" ")[::-1]))
        coords.append(coord)
        exit()
    return coords
```

In [4]:
```
# process the data to create:
# lat lon volume dataframe for heatmap plotting
def generate_volume_points_df(volume_df):
    volume_points_df=pd.DataFrame(columns=['latitude','longitude','volum
e'])
    for i in range(volume_df.shape[0]):
        volume_coord=volume_df["multilinestring"].values[i]
        coor=get_coordinates(volume_coord)
        for j in range(len(coor)):
            coor[j].append(volume_df["VOLUME"].values[i])
            volume_points_df.loc[len(volume_points_df)]=coor[j]
    return  volume_points_df
```

In [5]:
```
# this line is causing kernel problem, maybe python cannot hold such hug
h list?
# volume_list=generate_traffic_volume_list(volume_df)
volume_points_df = generate_volume_points_df(volume_df)
volume_points_df.to_csv('volume_points_df.csv', index=False)
```