In [27]:

```
import os
import pandas as pd
from math import sin, cos, sqrt, atan2, radians
```

In [28]:

```
road =
pd.read_csv(os.getcwd()+'\\data\\busan_road_info_full_addr_lonlat.csv',sep=',',encoding='utf-8')
```

In [29]:

```
df = pd.read_csv(os.getcwd()+'\\data\\3_df_cctv_prior_parking_utf8.csv',sep=',',encoding='utf-8')
```

In [30]:

```
df.head()
```

Out[30]:

	Unnamed: 0	count_all	count_sum	count_2016	count_2017	count_2018	gungu	address_for_geo	dicted_ori_addr_lst	
0	0	302	0	0	0	0	동래구	명륜동 충렬대로 181번길	명륜동 충렬대로181번길	35
1	1	166	166	41	76	49	남구	부산광역시 남구 신선로 566 지번	용호동 GS하이츠자이아파트부근	35
2	2	115	115	42	68	5	남구	부산광역시 남구 분포로 115 지번	용호1동 분포로부근	35
3	3	276	276	93	183	0	동래구	부산광역시 동래구 삼성대길 44 지번	명륜동 삼성대길	35
4	4	294	0	0	0	0	동래구	온천동 중앙대로 1381번길	온천동 중앙대로 1381번길	35

5 rows × 46 columns

In [31]:

```
road.head()
```

Out[31]:

	시도명	시군구명	읍면동명	도로명	새주소건물본번	새주소건물부번	건물명	건물용도분류	관할행정동	X좌표	Y좌표	addr	full_addr	longitude	latitude
0	부산광역시	중구	영주동	초량상로	1	4	NaN	근린생활시설	영주제1동	1139873.245	1680775.058	부산광역시 중구 초량상로	부산광역시 중구 초량상로 1-4	129.034850	35.112514
1	부산광역시	중구	영주동	초량상로	5	0	NaN	유통시설	영주제1동	1139887.148	1680801.613	부산광역시 중구 초량상로	부산광역시 중구 초량상로 5	129.034972	35.112664

	시도명	시군구명	읍면동명	도로명	새주소건물본번	새주소건물부번	건물명	건물용도분류	관할행정동	X좌표	Y좌표	addr	full_addr	longitude	latitude
2	부산광역시	중구	영주동	초량상로	6	0	NaN	근린생활시설	영주제1동	1139903.748	1680798.522	부산광역시 중구 초량상로	부산광역시 중구 초량상로 6	129.035354	35.112551
3	부산광역시	중구	영주동	초량상로	9	0	NaN	근린생활시설	영주제1동	1139914.870	1680846.186	부산광역시 중구 초량상로	부산광역시 중구 초량상로 9	129.035291	35.113081
4	부산광역시	중구	영주동	초량상로	9	2	NaN	주택	영주제1동	1139906.787	1680840.836	부산광역시 중구 초량상로	부산광역시 중구 초량상로 9-2	129.035224	35.113030

In [32]:

```
building_01_1 = list(df['building_01'])
building_02_1 = list(df['building_01'])
building_03_1 = list(df['building_01'])
building_04_1 = list(df['building_01'])
building_05_1 = list(df['building_01'])
building_06_1 = list(df['building_01'])
building_07_1 = list(df['building_01'])
building_08_1 = list(df['building_01'])
building_09_1 = list(df['building_01'])
building_10_1 = list(df['building_01'])
building_11_1 = list(df['building_01'])
building_12_1 = list(df['building_01'])
building_13_1 = list(df['building_01'])
building_14_1 = list(df['building_01'])
building_14_1 = list(df['building_01'])
building_15_1 = list(df['building_01'])
building_16_1 = list(df['building_01'])
building_17_1 = list(df['building_01'])
building_18_1 = list(df['building_01'])
building_01_2 = list(df['building_01'])
building_02_2 = list(df['building_01'])
building_03_2 = list(df['building_01'])
building_04_2 = list(df['building_01'])
building_05_2 = list(df['building_01'])
building_06_2 = list(df['building_01'])
building_07_2 = list(df['building_01'])
building_08_2 = list(df['building_01'])
building_09_2 = list(df['building_01'])
building_10_2 = list(df['building_01'])
building_11_2 = list(df['building_01'])
building_12_2 = list(df['building_01'])
building_13_2 = list(df['building_01'])
building_14_2 = list(df['building_01'])
building_14_2 = list(df['building_01'])
building_15_2 = list(df['building_01'])
building_16_2 = list(df['building_01'])
building_17_2 = list(df['building_01'])
building_18_2 = list(df['building_01'])
```

In [33]:

```
code = list(road['건물용도분류'])
r_lat = list(road['latitude'])
r_lon = list(road['longitude'])
df_lat = list(df['latitude'])
df_lon = list(df['longitude'])
```

In [34]:

```
def distance(lat1, lon1, lat2, lon2):
    R = 6371
    x = (lon2 - lon1) * cos( 0.5*(lat2+lat1) )
```

```
    y = lat2 - lat1
    d = R * sqrt( x*x + y*y )
    return(d)
```

In [ ]:

```
for i in range(len(df_lat)):
    #print(i)
    for j in range(len(r_lat)):
        temp = distance(df_lat[i], df_lon[i], r_lat[j], r_lon[j])

        if temp <= 2.0  and code[j].find('환경정화시설')>=0:
            building_01_1[i] = building_01_1[i] +1

        elif temp <= 2.0  and code[j].find('문화/관광/레저시설')>=0:
            building_02_1[i] = building_02_1[i] +1

        elif temp <= 2.0  and code[j].find('종교시설')>=0:
            building_03_1[i] = building_03_1[i] +1

        elif temp <= 2.0  and code[j].find('근린생활시설')>=0:
            building_04_1[i] = building_04_1[i] +1

        elif temp <= 2.0  and code[j].find('보안/위험시설')>=0:
            building_05_1[i] = building_05_1[i] +1

        elif temp <= 2.0  and code[j].find('공장/창고시설')>=0:
            building_06_1[i] = building_06_1[i] +1

        elif temp <= 2.0  and code[j].find('자동차관련시설')>=0:

            building_07_1[i] = building_07_1[i] +1
        elif temp <= 2.0  and code[j].find('업무시설')>=0:

            building_08_1[i] = building_08_1[i] +1
        elif temp <= 2.0  and code[j].find('교육및복지시설')>=0:

            building_09_1[i] = building_09_1[i] +1
        elif temp <= 2.0  and code[j].find('여객(화물)운송시설')>=0:

            building_10_1[i] = building_10_1[i] +1
        elif temp <= 2.0  and code[j].find('농축수산시설')>=0:

            building_11_1[i] = building_11_1[i] +1
        elif temp <= 2.0  and code[j].find('유통시설')>=0:

            building_12_1[i] = building_12_1[i] +1
        elif temp <= 2.0  and code[j].find('유흥/위락시설')>=0:

            building_13_1[i] = building_13_1[i] +1
        elif temp <= 2.0  and code[j].find('장묘시설')>=0:

            building_14_1[i] = building_14_1[i] +1
        elif temp <= 2.0  and code[j].find('숙박시설')>=0:

            building_15_1[i] = building_15_1[i] +1
        elif temp <= 2.0  and code[j].find('주택')>=0:

            building_16_1[i] = building_16_1[i] +1
        elif temp <= 2.0  and code[j].find('의료시설')>=0:

            building_17_1[i] = building_17_1[i] +1
        elif temp <= 2.0  and code[j].find('공공용시설')>=0:

            building_18_1[i] = building_18_1[i] +1
        if temp <= 5.0  and code[j].find('환경정화시설')>=0:

            building_01_2[i] = building_01_2[i] +1
        elif temp <= 5.0  and code[j].find('문화/관광/레저시설')>=0:

            building_02_2[i] = building_02_2[i] +1
        elif temp <= 5.0  and code[j].find('종교시설')>=0:

            building_03_2[i] = building_03_2[i] +1
        elif temp <= 5.0  and code[j].find('근린생활시설')>=0:
```

```
            building_04_2[i] = building_04_2[i] +1
        elif temp <= 5.0  and code[j].find('보안/위험시설')>=0:

            building_05_2[i] = building_05_2[i] +1
        elif temp <= 5.0  and code[j].find('공장/창고시설')>=0:

            building_06_2[i] = building_06_2[i] +1
        elif temp <= 5.0  and code[j].find('자동차관련시설')>=0:

            building_07_2[i] = building_07_2[i] +1
        elif temp <= 5.0  and code[j].find('업무시설')>=0:

            building_08_2[i] = building_08_2[i] +1
        elif temp <= 5.0  and code[j].find('교육및복지시설')>=0:

            building_09_2[i] = building_09_2[i] +1
        elif temp <= 5.0  and code[j].find('여객(화물)운송시설')>=0:

            building_10_2[i] = building_10_2[i] +1
        elif temp <= 5.0  and code[j].find('농축수산시설')>=0:

            building_11_2[i] = building_11_2[i] +1
        elif temp <= 5.0  and code[j].find('유통시설')>=0:

            building_12_2[i] = building_12_2[i] +1
        elif temp <= 5.0  and code[j].find('유흥/위락시설')>=0:

            building_13_2[i] = building_13_2[i] +1
        elif temp <= 5.0  and code[j].find('장묘시설')>=0:

            building_14_2[i] = building_14_2[i] +1
        elif temp <= 5.0  and code[j].find('숙박시설')>=0:

            building_15_2[i] = building_15_2[i] +1
        elif temp <= 5.0  and code[j].find('주택')>=0:

            building_16_2[i] = building_16_2[i] +1
        elif temp <= 5.0  and code[j].find('의료시설')>=0:

            building_17_2[i] = building_17_2[i] +1
        elif temp <= 5.0  and code[j].find('공공용시설')>=0:

            building_18_2[i] = building_18_2[i] +1
        else:
            pass
```

In [41]:

```
df['building_01_1'] = building_01_1; df['building_07_1'] = building_07_1; df['building_13_1'] = bui
lding_13_1;
df['building_02_1'] = building_02_1; df['building_08_1'] = building_08_1; df['building_14_1'] = bui
lding_14_1;
df['building_03_1'] = building_03_1; df['building_09_1'] = building_09_1; df['building_15_1'] = bui
lding_15_1;
df['building_04_1'] = building_04_1; df['building_10_1'] = building_10_1; df['building_16_1'] = bui
lding_16_1;
df['building_05_1'] = building_05_1; df['building_11_1'] = building_11_1; df['building_17_1'] = bui
lding_17_1;
df['building_06_1'] = building_06_1; df['building_12_1'] = building_12_1; df['building_18_1'] = bui
lding_18_1;
df['building_01_2'] = building_01_2; df['building_07_2'] = building_07_2; df['building_13_2'] = bui
lding_13_2;
df['building_02_2'] = building_02_2; df['building_08_2'] = building_08_2; df['building_14_2'] = bui
lding_14_2;
df['building_03_2'] = building_03_2; df['building_09_2'] = building_09_2; df['building_15_2'] = bui
lding_15_2;
df['building_04_2'] = building_04_2; df['building_10_2'] = building_10_2; df['building_16_2'] = bui
lding_16_2;
df['building_05_2'] = building_05_2; df['building_11_2'] = building_11_2; df['building_17_2'] = bui
lding_17_2;
df['building_06_2'] = building_06_2; df['building_12_2'] = building_12_2; df['building_18_2'] = bui
lding_18_2;
```

In [43]:

In [15]:

```
pd.DataFrame.to_csv(df,os.getcwd()+'\\data\\4_df_cctv_prior_parking_building_utf8.csv',sep=',',enco
ding='utf-8')
```