Data Cleaning with Python and Pandas: Detecting Missing Values

The features are as follows:

- ST_NUM: Street number
- ST_NAME: Street name
- OWN_OCCUPIED: Is the residence owner occupied
- NUM_BEDROOMS: Number of bedrooms

Importing libraries

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

In [2]:
```
import seaborn as sns
```

Load the data set

In [3]:
```
orgData = pd.read_csv("data/property_data.csv")
```

In [4]:
```
print('shape=',orgData.shape)
print('is null : ',orgData.isnull().values.any())
orgData
```

```
shape= (9, 7)
is null :  True
```

Out[4]:

	PID	ST_NUM	ST_NAME	OWN_OCCUPIED	NUM_BEDROOMS	NUM_BATH	SQ_F
0	100001000.0	104.0	PUTNAM	Y	3	1	100
1	100002000.0	197.0	LEXINGTON	N	3	1.5	
2	100003000.0	NaN	LEXINGTON	N	NaN	1	85
3	100004000.0	201.0	BERKELEY	12	1	NaN	70
4	NaN	203.0	BERKELEY	Y	3	2	160
5	100006000.0	207.0	BERKELEY	Y	NaN	1	80
6	100007000.0	NaN	WASHINGTON	NaN	2	HURLEY	95
7	100008000.0	213.0	TREMONT	Y	--	1	Nal
8	100009000.0	215.0	TREMONT	Y	na	2	180

Detection and visualizing Standard missing value

In reading a csv file by default the following values are interpreted as NaN: '', '#N/A', '#N/A N/A', '#NA', '-1.#IND', '-1.#QNAN', '-NaN', '-nan', '1.#IND', '1.#QNAN', 'N/A', 'NA', 'NULL', 'NaN', 'n/a', 'nan', 'null'

pandas.isnull() recognize all these standard null value.

for example in Num_BEDROOMS column pandas recognized the “NAN” or n/a as a missing value but not "na" value and "--".

In [5]:
```
orgData.isnull().sum()
```

Out[5]:
```
PID             1
ST_NUM          2
ST_NAME         0
OWN_OCCUPIED    1
NUM_BEDROOMS    2
NUM_BATH        1
SQ_FT           1
dtype: int64
```

In [6]:
```
print(orgData['NUM_BEDROOMS'].isnull().value_counts())

pd.concat([orgData['NUM_BEDROOMS'],orgData['NUM_BEDROOMS'].isnull()],axis=1)
```

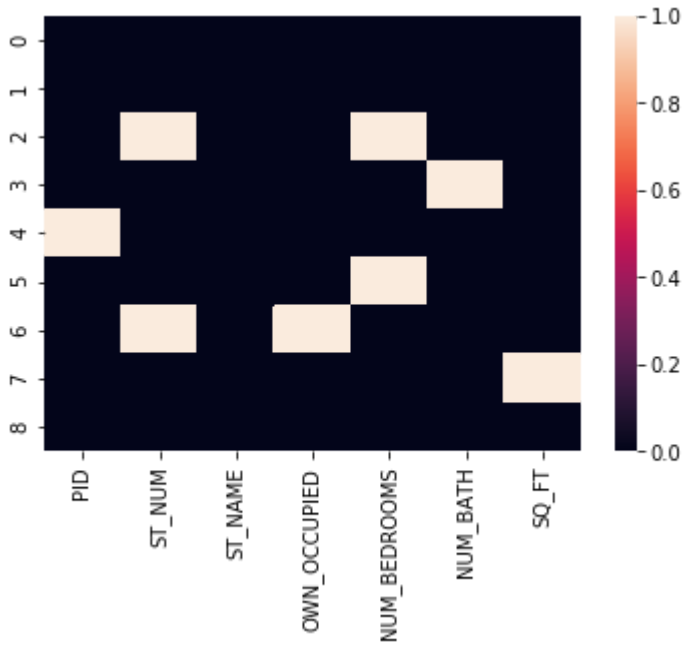
```
False    7
True     2
Name: NUM_BEDROOMS, dtype: int64
```

Out[6]:

	NUM_BEDROOMS	NUM_BEDROOMS
0	3	False
1	3	False
2	NaN	True
3	1	False
4	3	False
5	NaN	True
6	2	False
7	--	False
8	na	False

In [7]:
```
#Just like before, Pandas recognized the “NA” as a missing value. Unfortunatel
y, the other types weren’t recognized
sns.heatmap(orgData.isnull())
```

Out[7]: <matplotlib.axes._subplots.AxesSubplot at 0x1f1ad3799e8>



Handling Non-Standard missing values:

making a list of different type of missing value

Therefor pandas handle that during reading

In [8]:
```
# Making a list of missing value types
missing_values = [ "na", "--"]

cleanData = pd.read_csv("data/property_data.csv", na_values = missing_values)
cleanData
```

Out[8]:

	PID	ST_NUM	ST_NAME	OWN_OCCUPIED	NUM_BEDROOMS	NUM_BATH	SQ_F
0	100001000.0	104.0	PUTNAM	Y	3.0	1	1000.
1	100002000.0	197.0	LEXINGTON	N	3.0	1.5	Nal
2	100003000.0	NaN	LEXINGTON	N	NaN	1	850.
3	100004000.0	201.0	BERKELEY	12	1.0	NaN	700.
4	NaN	203.0	BERKELEY	Y	3.0	2	1600.
5	100006000.0	207.0	BERKELEY	Y	NaN	1	800.
6	100007000.0	NaN	WASHINGTON	NaN	2.0	HURLEY	950.
7	100008000.0	213.0	TREMONT	Y	NaN	1	Nal
8	100009000.0	215.0	TREMONT	Y	NaN	2	1800.

Handling unexpected missing values:

for example: numeric value in string column, the number 12 in following column

In [9]:
```
pd.concat([cleanData['OWN_OCCUPIED'], cleanData['OWN_OCCUPIED'].isnull()], axis=1)
```

Out[9]:

	OWN_OCCUPIED	OWN_OCCUPIED
0	Y	False
1	N	False
2	N	False
3	12	False
4	Y	False
5	Y	False
6	NaN	True
7	Y	False
8	Y	False

In [10]:
```
cleanData['OWN_OCCUPIED'].str.isnumeric()
```

Out[10]:
```
0    False
1    False
2    False
3     True
4    False
5    False
6      NaN
7    False
8    False
Name: OWN_OCCUPIED, dtype: object
```

In [ ]:
```

```

In [ ]:
```

```

Detecting numbers with try/except method

In [13]:
```
cnt=0
for row in cleanData['OWN_OCCUPIED']:
    try:
        int(row)
        cleanData.loc[cnt, 'OWN_OCCUPIED']=np.nan
    except :
        pass
    cnt+=1
```

In [15]:
```
cleanData["OWN_OCCUPIED"]
```

Out[15]:
```
0      Y
1      N
2      N
3    NaN
4      Y
5      Y
6    NaN
7      Y
8      Y
Name: OWN_OCCUPIED, dtype: object
```

In [16]:
```
cleanData.isnull().sum()
```

Out[16]:
```
PID             1
ST_NUM          2
ST_NAME         0
OWN_OCCUPIED    2
NUM_BEDROOMS    4
NUM_BATH        1
SQ_FT           2
dtype: int64
```

In [ ]: