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

In [2]:
```
housing = pd.read_csv("HousingData.csv")
```

In [3]:
```
housing.columns
```

Out[3]:
```
Index(['CRIM', 'ZN', 'INDUS', 'CHAS', 'NOX', 'RM', 'AGE', 'DIS', 'RAD', 'TAX',
       'PTRATIO', 'B', 'LSTAT', 'MEDV'],
      dtype='object')
```

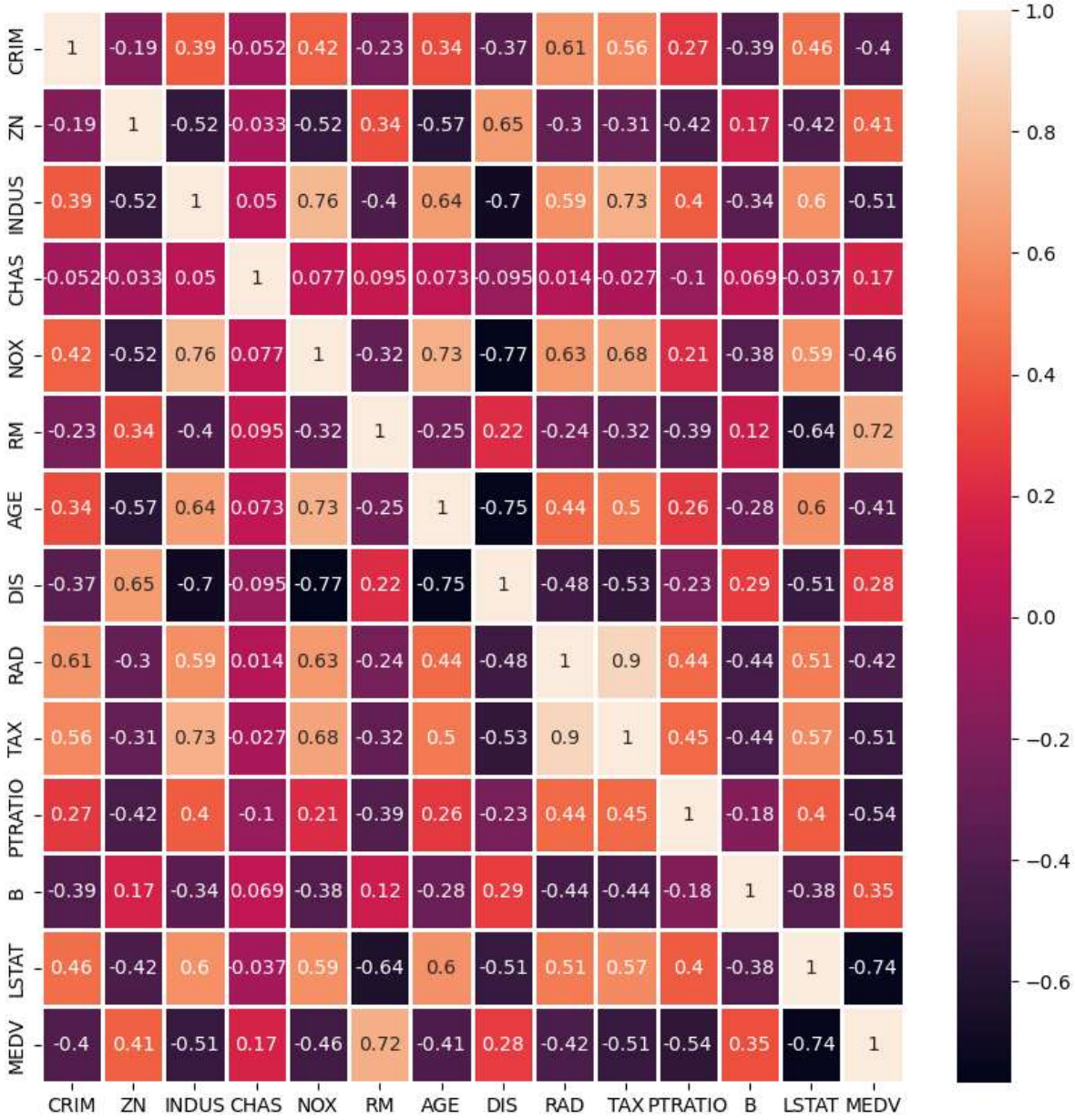
In [4]:
```
housing.dropna(inplace=True)
```

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

Out[5]:
```
CRIM       0
ZN         0
INDUS      0
CHAS       0
NOX        0
RM         0
AGE        0
DIS        0
RAD        0
TAX        0
PTRATIO    0
B          0
LSTAT      0
MEDV       0
dtype: int64
```

In [6]:
```
import seaborn as sns
import matplotlib.pyplot as plt
```

In [7]:
```
plt.figure(figsize=(10, 10))
sns.heatmap(housing.corr(), annot=True , linewidths=1);
```



In [8]:
```
from sklearn.cluster import KMeans
k = 3
```

In [9]:
```
data_sample= housing.loc[:,['CRIM','MEDV']]
```

In [10]:
```
model = KMeans(n_clusters=3)

model.fit(data_sample)

labels = model.predict(data_sample)
```

```
C:\Users\91902\anaconda3\lib\site-packages\sklearn\cluster\_kmeans.py:1416: FutureWa
rning: The default value of `n_init` will change from 10 to 'auto' in 1.4. Set the v
alue of `n_init` explicitly to suppress the warning
  super()._check_params_vs_input(X, default_n_init=10)
C:\Users\91902\anaconda3\lib\site-packages\sklearn\cluster\_kmeans.py:1440: UserWarn
ing: KMeans is known to have a memory leak on Windows with MKL, when there are less
chunks than available threads. You can avoid it by setting the environment variable
OMP_NUM_THREADS=2.
  warnings.warn(
```

In [11]:
```
data_sample['Label_data']=labels
```

In [12]:
```
data_sample
```

Out[12]:

	CRIM	MEDV	Label_data
0	0.00632	24.0	1
1	0.02731	21.6	1
2	0.02729	34.7	0
3	0.03237	33.4	0
5	0.02985	28.7	0
...	...	...	...
499	0.17783	17.5	1
500	0.22438	16.8	1
502	0.04527	20.6	1
503	0.06076	23.9	1
504	0.10959	22.0	1

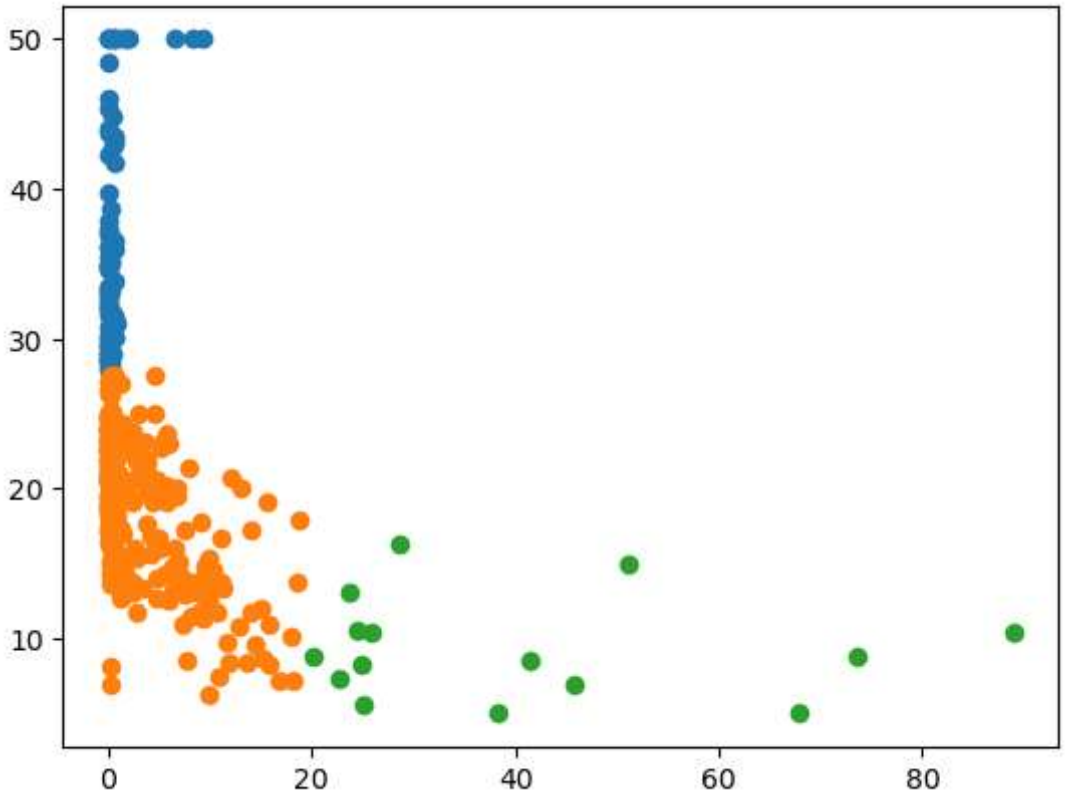
394 rows × 3 columns

In [13]:
```
clusters= {}
for i in range(k):
  clusters[i] = []

for i in range(k):
  clusters[i].append(data_sample[data_sample['Label_data'] == i])
```

In [14]:
```
print(clusters[1][0]['MEDV'])
```

```
0      24.0
1      21.6
7      27.1
8      16.5
10     15.0
       ...
499    17.5
500    16.8
502    20.6
503    23.9
504    22.0
Name: MEDV, Length: 298, dtype: float64
```

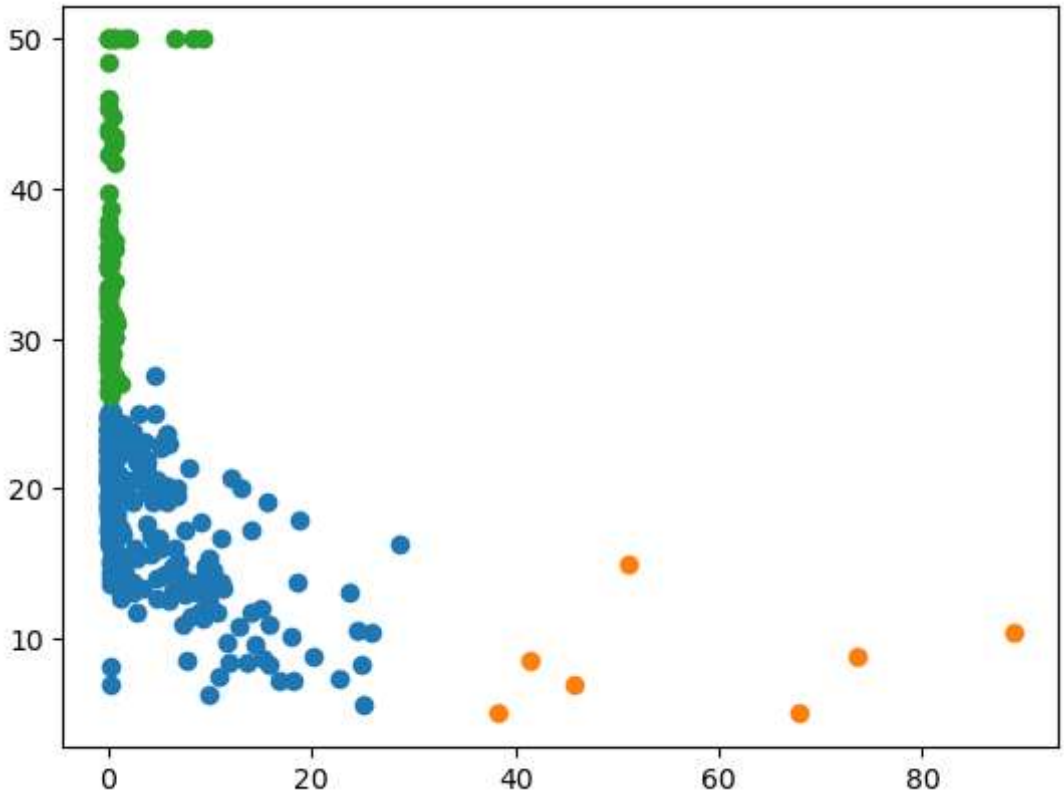
In [15]:
```
for i in range(k):
  plt.scatter(clusters[i][0]['CRIM'],clusters[i][0]['MEDV'])

plt.show()
```



In [16]:
```
from sklearn.cluster import AgglomerativeClustering
data_sample2 = data_sample
# Create Hierarchical clustering object
hierarchical = AgglomerativeClustering(n_clusters=3)

# Fit the model
hierarchical.fit(data_sample2)

# Get cluster labels
labels = hierarchical.labels_
```

In [17]:
```
data_sample2['Label_data']=labels

clusters= {}
for i in range(k):
  clusters[i] = []

for i in range(k):
  clusters[i].append(data_sample2[data_sample2['Label_data'] == i])
```

In [18]:
```
for i in range(k):
  plt.scatter(clusters[i][0]['CRIM'],clusters[i][0]['MEDV'])

plt.show()
```



In [ ]: