California Residential Pricing Data 1990

Import packages

In [17]:

```
# import

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from pandas.plotting import scatter_matrix
```

Reading data

In [2]:

```
# reading data

residency = pd.read_csv(r"C:\Users\USP\AppData\Local\Temp\Temp1_housing.csv.zip\housing.csv")
residency.head()
```

Out[2]:

	longitude	latitude	housing_median_age	total_rooms	total_bedrooms	population	households	median_income	median_ho
0	-122.23	37.88	41.0	880.0	129.0	322.0	126.0	8.3252	
1	-122.22	37.86	21.0	7099.0	1106.0	2401.0	1138.0	8.3014	
2	-122.24	37.85	52.0	1467.0	190.0	496.0	177.0	7.2574	
3	-122.25	37.85	52.0	1274.0	235.0	558.0	219.0	5.6431	
4	-122.25	37.85	52.0	1627.0	280.0	565.0	259.0	3.8462	

Stats:

In [3]:

```
# details:

residency.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 20640 entries, 0 to 20639
Data columns (total 10 columns):
longitude             20640 non-null float64
latitude              20640 non-null float64
housing_median_age    20640 non-null float64
total_rooms           20640 non-null float64
total_bedrooms        20433 non-null float64
population            20640 non-null float64
households            20640 non-null float64
median_income         20640 non-null float64
median_house_value    20640 non-null float64
ocean_proximity       20640 non-null object
dtypes: float64(9), object(1)
memory usage: 1.6+ MB
```

In [4]:

```
residency["median_house_value"].value_counts().head()
```

Out[4]:

```
500001.0    965
137500.0    122
162500.0    117
112500.0    103
187500.0     93
Name: median_house_value, dtype: int64
```

In [5]:

```
residency["ocean_proximity"].value_counts()
```

Out[5]:

```
<1H OCEAN     9136
INLAND        6551
NEAR OCEAN    2658
NEAR BAY      2290
ISLAND           5
Name: ocean_proximity, dtype: int64
```

In [6]:

```
residency.describe()
```

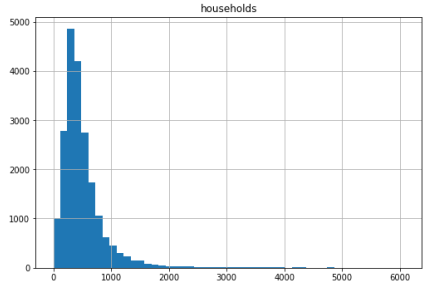
Out[6]:

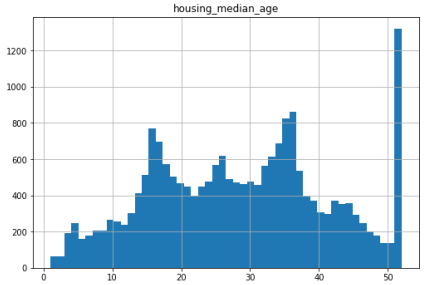
	longitude	latitude	housing_median_age	total_rooms	total_bedrooms	population	households	median_i
count	20640.000000	20640.000000	20640.000000	20640.000000	20433.000000	20640.000000	20640.000000	20640.
mean	-119.569704	35.631861	28.639486	2635.763081	537.870553	1425.476744	499.539680	3.
std	2.003532	2.135952	12.585558	2181.615252	421.385070	1132.462122	382.329753	1.
min	-124.350000	32.540000	1.000000	2.000000	1.000000	3.000000	1.000000	0.
25%	-121.800000	33.930000	18.000000	1447.750000	296.000000	787.000000	280.000000	2.
50%	-118.490000	34.260000	29.000000	2127.000000	435.000000	1166.000000	409.000000	3.
75%	-118.010000	37.710000	37.000000	3148.000000	647.000000	1725.000000	605.000000	4.
max	-114.310000	41.950000	52.000000	39320.000000	6445.000000	35682.000000	6082.000000	15.

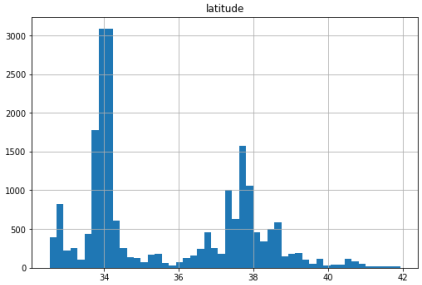
Plotting:

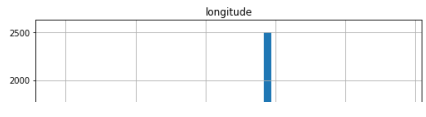
In [7]:

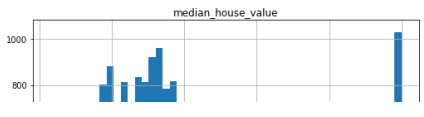
```
# plotting

residency.hist(bins = 50, figsize = (30, 20))
plt.show()
```

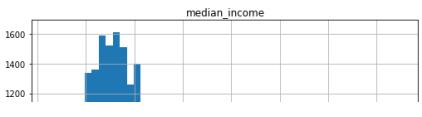


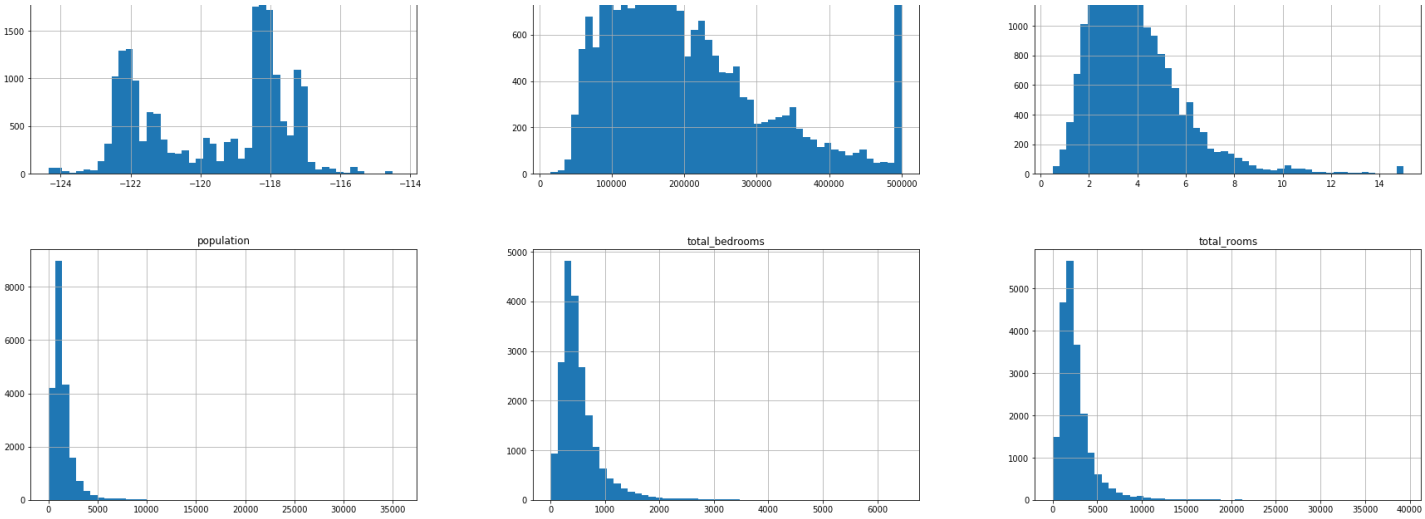












Splitting Data:

In [8]:

```
# using scikit learn

train_set, test_set = train_test_split(residency, test_size = 0.2, random_state = 42)
print(len(train_set))
print(len(test_set))
```

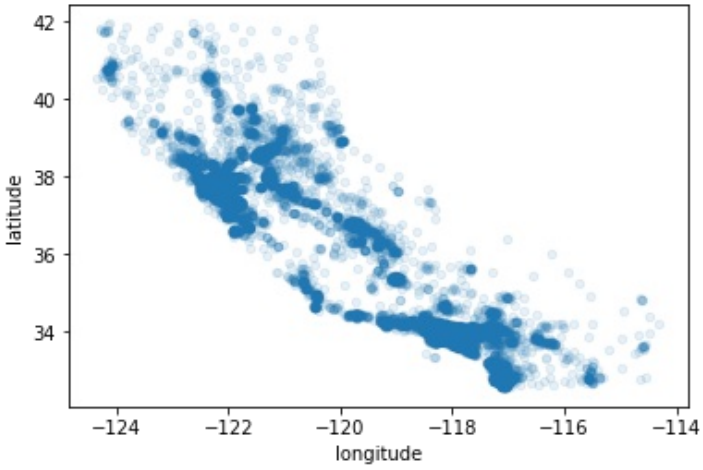
```
16512
4128
```

In [9]:

```
residency = train_set.copy()
residency.plot(kind = "scatter", x = "longitude", y = "latitude", alpha = 0.1)
```

Out[9]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x20c7c54bf98>
```

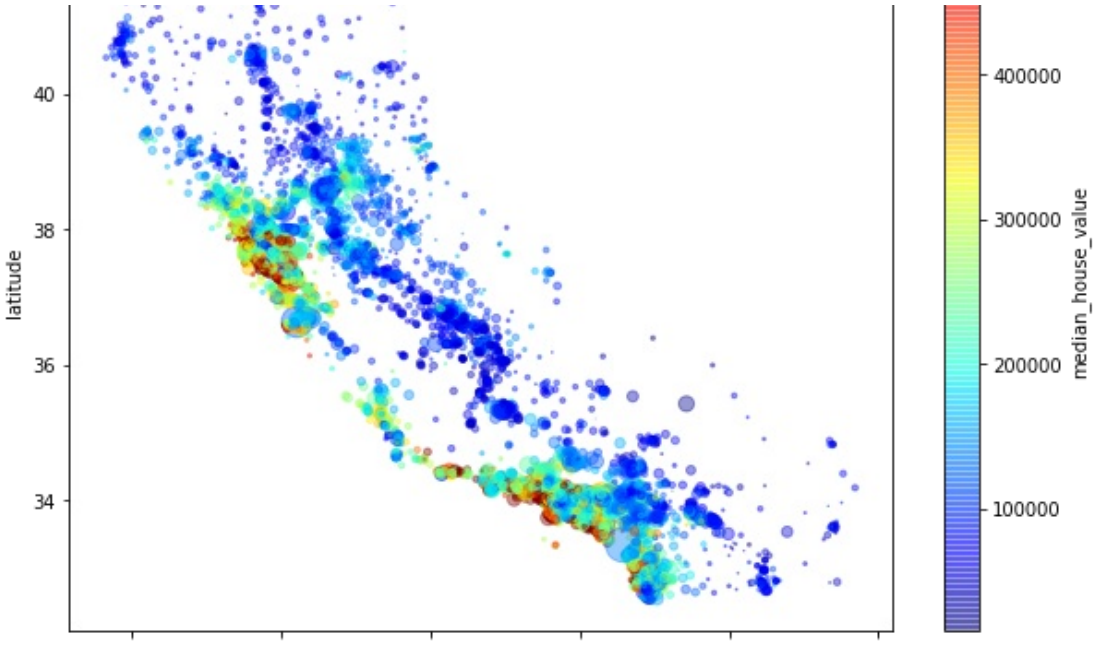


In [10]:

```
residency.plot(kind="scatter", x="longitude", y="latitude", alpha=0.4, s=residency["popu
lation"]/100, label="population", figsize=(10,7), c="median_house_value", cmap=plt.get_c
map("jet"), colorbar=True)

plt.legend()
```

Out[10]:

```
<matplotlib.legend.Legend at 0x20c7d707d68>
```



In [11]:

```
corr_matrix = residency.corr()
corr_matrix["median_house_value"].sort_values(ascending=False)
```

Out[11]:

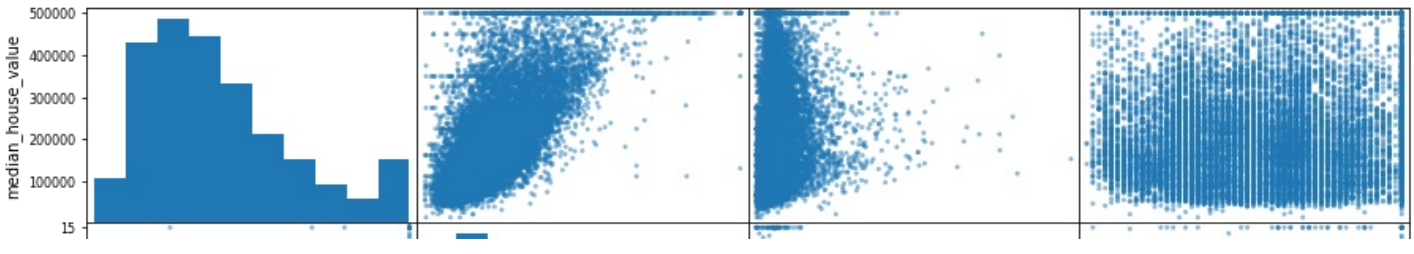
```
median_house_value    1.000000
median_income         0.690647
total_rooms           0.133989
housing_median_age    0.103706
households            0.063714
total_bedrooms        0.047980
population           -0.026032
longitude            -0.046349
latitude             -0.142983
Name: median_house_value, dtype: float64
```

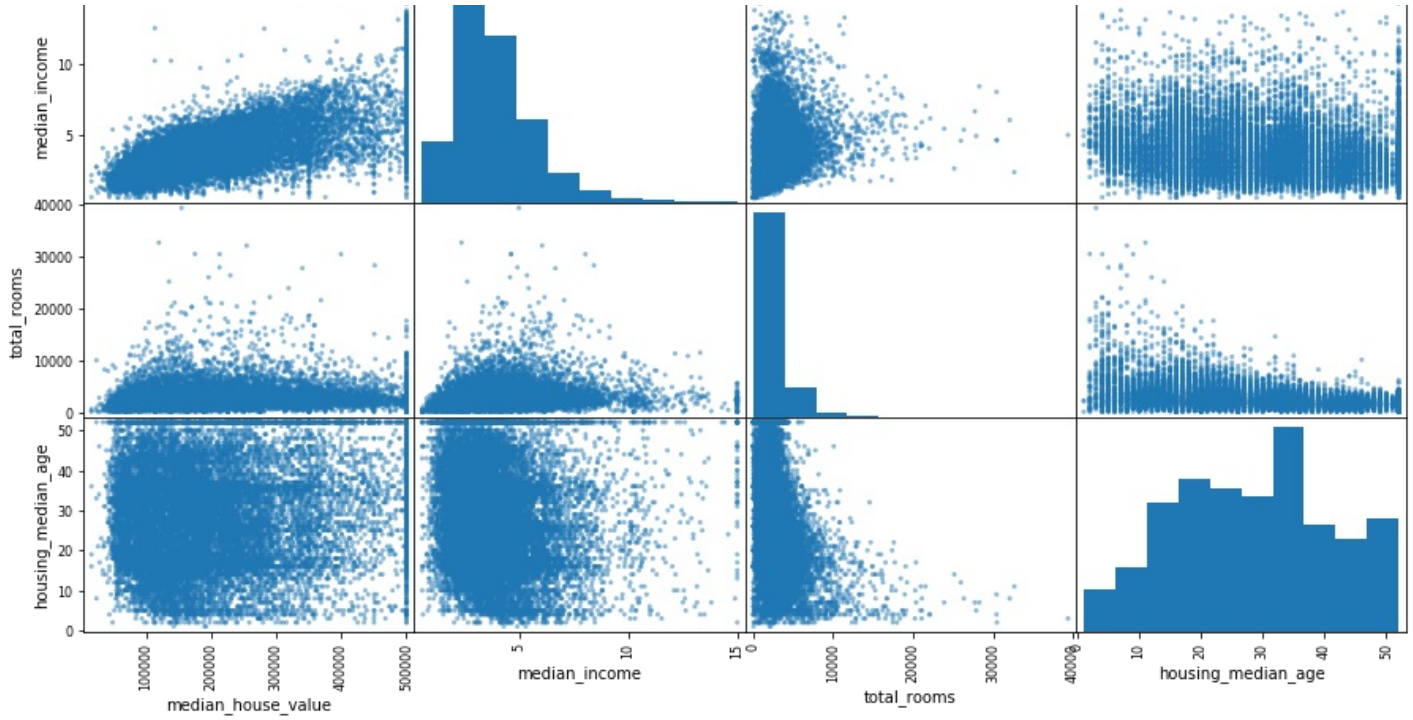
In [12]:

```
attributes = ["median_house_value", "median_income", "total_rooms", "housing_median_age"]
scatter_matrix(residency[attributes], figsize=(15,10))
```

Out[12]:

```
array([[<matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7C4D79B0>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7CC81160>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7CCA87F0>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7CD00E80>],
       [<matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7CD30550>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7CD30588>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7CD882B0>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7CDB0940>],
       [<matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7CDD9FD0>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7CE0A6A0>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7CE34D30>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7CF953C8>],
       [<matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7CFBAA58>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7CFF0128>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7D0167B8>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x0000020C7D03EE48>]],
      dtype=object)
```





In [13]:

```
residency["rooms_per_household"] = residency["total_rooms"] / residency["households"]
print(residency["rooms_per_household"].head())

residency["bedrooms_per_room"] = residency["total_bedrooms"] / residency["total_rooms"]
print(residency["bedrooms_per_room"].head())

residency["population_per_household"] = residency["population"] / residency["households"
]
print(residency["population_per_household"].head())
```

```
14196    5.017657
8267     4.473545
17445    5.645833
14265    4.002817
2271     6.268421
Name: rooms_per_household, dtype: float64
14196    0.200576
8267     0.232703
17445    0.174486
14265    0.258269
2271     0.180940
Name: bedrooms_per_room, dtype: float64
14196    3.691814
8267     1.738095
17445    2.723214
14265    3.994366
2271     2.300000
Name: population_per_household, dtype: float64
```

In [14]:

```
corr_matrix = residency.corr()
corr_matrix["median_house_value"].sort_values(ascending=False)
```

Out[14]:

```
median_house_value          1.000000
median_income               0.690647
rooms_per_household         0.158485
total_rooms                 0.133989
housing_median_age          0.103706
households                  0.063714
total_bedrooms              0.047980
population_per_household   -0.022030
population                 -0.026032
longitude                  -0.046349
```

```
latitude                   -0.142983
bedrooms_per_room          -0.257419
Name: median_house_value, dtype: float64
```

In [15]:

```
residency = train_set.drop("median_house_value", axis=1)
residency_labels = train_set["median_house_value"].copy()
```