NAVODAYA INSTITUTE OF TECHNOLOGY

MACHINE LEARNING LAB (BCSL606)

Program 2

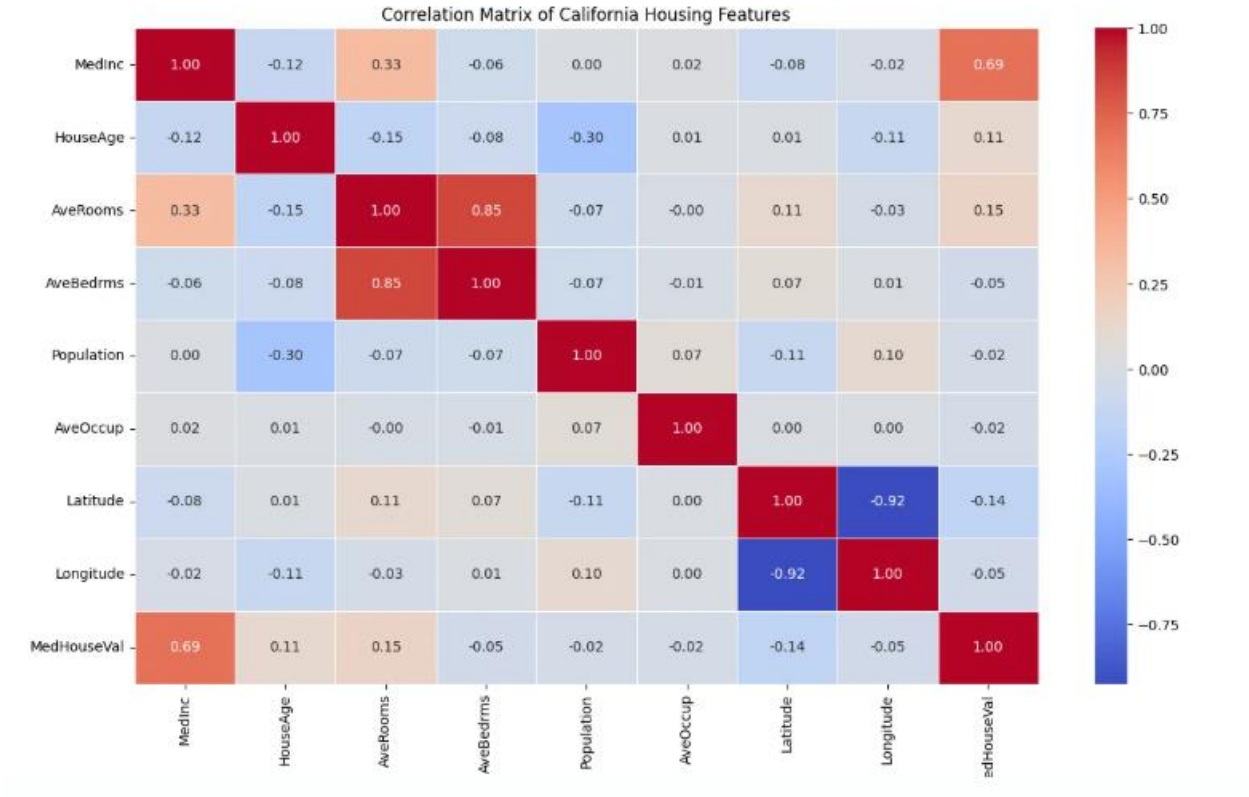
2. Develop a program to Compute the correlation matrix to understand the relationships between pairs of features. Visualize the correlation matrix using a heatmap to know which variables have strong positive/negative correlations. Create a pair plot to visualize pairwise relationships between features. Use California Housing dataset.

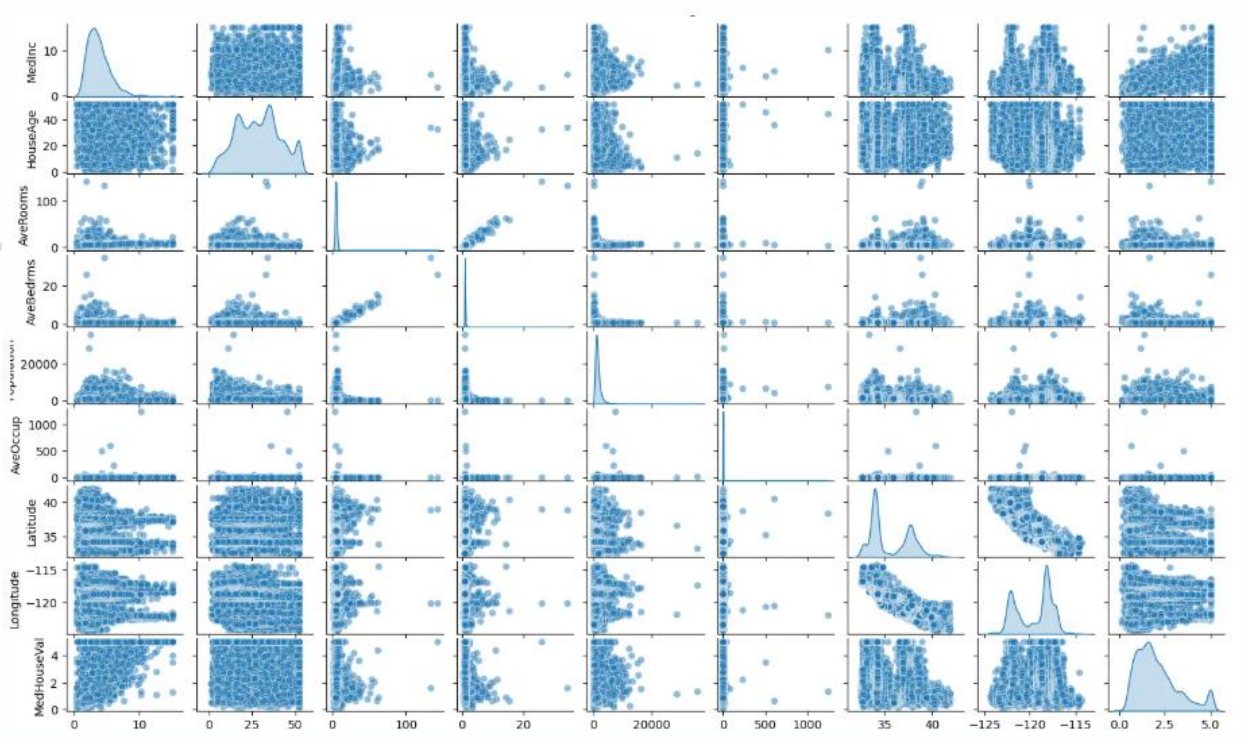
PROGRAM:

```
import pandas as pd

import seaborn as sns

import matplotlib.pyplot as plt

from sklearn.datasets import fetch_california_housing


# Step 1: Load the California Housing Dataset

california_data = fetch_california_housing(as_frame=True)

data = california_data.frame


# Step 2: Compute the correlation matrix

correlation_matrix = data.corr()
```

```
# Step 3: Visualize the correlation matrix using a heatmap
plt.figure(figsize=(10, 8))
sns.heatmap(correlation_matrix, annot=True, cmap='coolwarm', fmt='.2f', linewidths=0.5)
plt.title('Correlation Matrix of California Housing Features')
plt.show()


# Step 4: Create a pair plot to visualize pairwise relationships
sns.pairplot(data, diag_kind='kde', plot_kws={'alpha': 0.5})
plt.suptitle('Pair Plot of California Housing Features', y=1.02)
plt.show()
```

OUTPUT:


Correlation Matrix of California Housing Features
MedInc 1.00 -0.12 0.33 -0.06 0.00 0.02 -0.08 -0.02 0.69
HouseAge -0.12 1.00 -0.15 -0.08 -0.30 0.01 0.01 -0.11 0.11
AveRooms 0.33 -0.15 1.00 0.85 -0.07 -0.00 0.11 -0.03 0.15
AveBedrms -0.06 -0.08 0.85 1.00 -0.07 -0.01 0.07 0.01 -0.05
Population 0.00 -0.30 -0.07 -0.07 1.00 0.07 -0.11 0.10 -0.02
AveOccup 0.02 0.01 -0.00 -0.01 0.07 1.00 0.00 0.00 -0.02
Latitude -0.08 0.01 0.11 0.07 -0.11 0.00 1.00 -0.92 -0.14
Longitude -0.02 -0.11 -0.03 0.01 0.10 0.00 -0.92 1.00 -0.05
MedHouseVal 0.69 0.11 0.15 -0.05 -0.02 -0.02 -0.14 -0.05 1.00
MedInc
HouseAge
AveRooms
AveBedrms
Population
AveOccup
Latitude
Longitude
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75


MedInc
HouseAge
AveRooms
AveBedrms
AveOccup
Latitude
Longitude
MedHouseVal