A PYTHON PROGRAM TO IMPLEMENT DIMENSIONALITY REDUCTION USING PCA

EXP NO. 10

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Code:

```
from sklearn import datasets
import pandas as pd
from sklearn.preprocessing import StandardScaler
from sklearn.decomposition import PCA
import seaborn as sns
import matplotlib.pyplot as plt

iris = datasets.load_iris()
df = pd.DataFrame(iris['data'], columns=iris['feature_names'])
print(df.head())

scalar = StandardScaler()
```

```python
scaled_data = pd.DataFrame(scalar.fit_transform(df),
columns=df.columns)


plt.figure(figsize=(6, 4))
sns.heatmap(scaled_data.corr(), annot=True, cmap='coolwarm')
plt.title('Correlation Heatmap (Before PCA)')
plt.show()


pca = PCA(n_components=3)
pca.fit(scaled_data)
data_pca = pca.transform(scaled_data)
data_pca = pd.DataFrame(data_pca, columns=['PC1', 'PC2',
'PC3'])
print(data_pca.head())


plt.figure(figsize=(6, 4))
sns.heatmap(data_pca.corr(), annot=True, cmap='coolwarm')
plt.title('Correlation Heatmap (After PCA)')
plt.show()
```
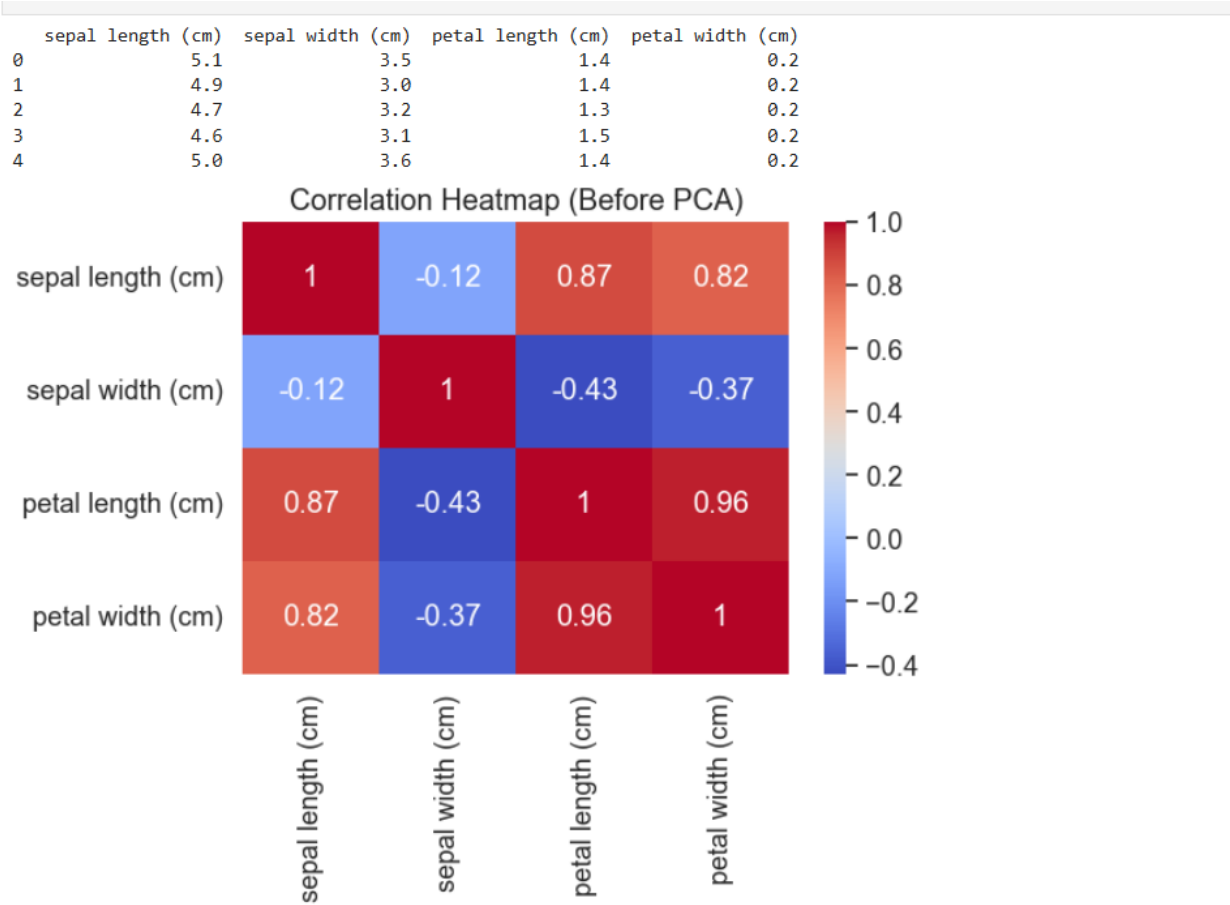
output:

```
     sepal length (cm)  sepal width (cm)  petal length (cm)  petal width (cm)
0                  5.1               3.5                1.4               0.2
1                  4.9               3.0                1.4               0.2
2                  4.7               3.2                1.3               0.2
3                  4.6               3.1                1.5               0.2
4                  5.0               3.6                1.4               0.2
```

Correlation Heatmap (Before PCA)

	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)
sepal length (cm)	1	-0.12	0.87	0.82
sepal width (cm)	-0.12	1	-0.43	-0.37
petal length (cm)	0.87	-0.43	1	0.96
petal width (cm)	0.82	-0.37	0.96	1

```
       PC1       PC2       PC3
0  -2.264703  0.480027  0.127706
1  -2.080961 -0.674134  0.234609
2  -2.364229 -0.341908 -0.044201
3  -2.299384 -0.597395 -0.091290
4  -2.389842  0.646835 -0.015738
```

Correlation Heatmap (After PCA)