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```
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("✅ Original Data:")
print(df.head())
scaler = StandardScaler()
scaled_data = pd.DataFrame(scaler.fit_transform(df), columns=df.columns)
plt.figure(figsize=(6,4))
sns.heatmap(scaled_data.corr(), annot=True, cmap='coolwarm')
plt.title("Correlation Heatmap (Scaled Data)")
plt.show()
pca = PCA(n_components=3)
pca_data = pca.fit_transform(scaled_data)
pca_df = pd.DataFrame(pca_data, columns=['PC1', 'PC2', 'PC3'])
print("\n✅ Data after PCA:")
print(pca_df.head())
plt.figure(figsize=(6,4))
sns.heatmap(pca_df.corr(), annot=True, cmap='coolwarm')
plt.title("Correlation Heatmap (PCA Components)")
plt.show()
```

```
✅ Original Data:
   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
```

Variables Terminal

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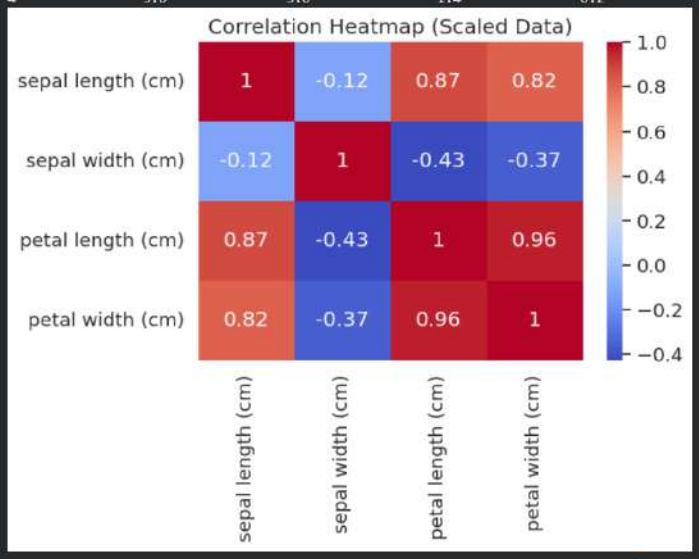
```
0  5.1  3.5  1.4  0.2
1  4.9  3.0  1.4  0.2
2  4.7  3.2  1.3  0.2
3  4.6  3.1  1.5  0.2
4  5.0  3.6  1.4  0.2
```



Data after PCA:

	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