PRACTICAL NO. 04

PROGRAM: -

A]

```
import pandas as pd
import numpy as np
from sklearn.datasets import load_iris

# Load the iris dataset
iris = load_iris()
iris_df = pd.DataFrame(data=np.c_[iris['data'], iris['target']], columns=iris['feature_names'] + ['target'])

# Compute the correlation matrix
correlation_matrix = iris_df.corr()

# Print the correlation matrix
print("CORRELATION MATRIX")
print(correlation_matrix)
```

B]

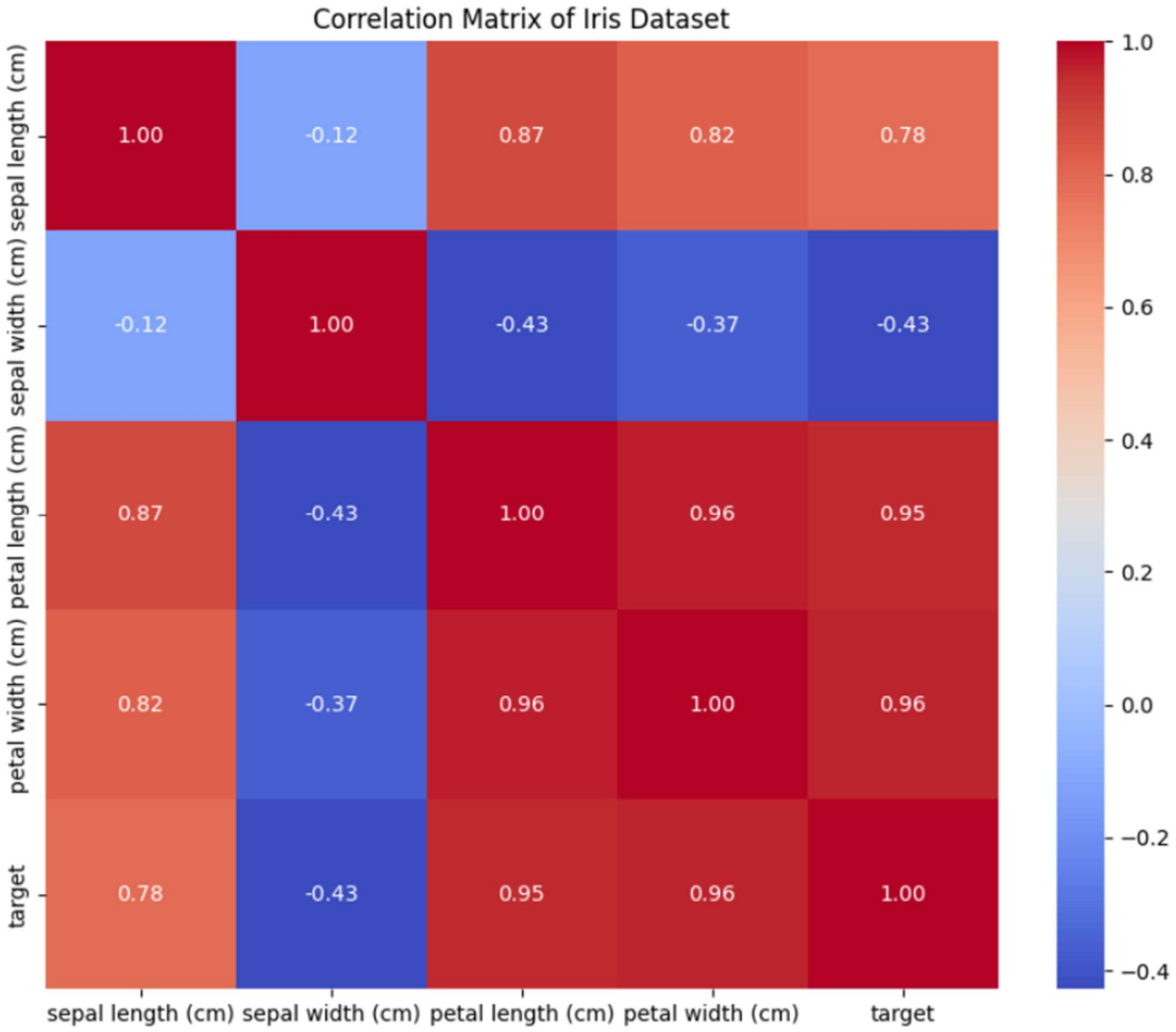
```
import seaborn as sns
import matplotlib.pyplot as plt
from a import correlation_matrix

# Plot the correlation matrix
plt.figure(figsize=(10, 8))
sns.heatmap(correlation_matrix, annot=True, cmap='coolwarm', fmt=".2f")
plt.title('Correlation Matrix of Iris Dataset')
plt.show()
```

C]

```
from scipy.stats import f_oneway


from a import iris_df, iris


# Check if 'target' column exists in the dataframe
if 'target' in iris_df.columns:
    # Grouping by target and calculating variance of each feature
    variance_by_target = iris_df.groupby('target').var()


    # Perform ANOVA for each feature
    for feature in iris['feature_names']:
        anova_result = f_oneway(
            *[iris_df[iris_df['target'] == i][feature] for i in range(len(iris.target_names))]
        )
        print(f"{feature} ANOVA:", anova_result)
else:
    print("No categorical variable found for ANOVA.")
```

OUTPUT: -

```
C:\WorkSpace\Python\Python39\PycharmProjects\pythonProject\pr4\Scripts\python.exe C:\Users\Abhishek\D
CORRELATION MATRIX
                   sepal length (cm)  ...    target
sepal length (cm)           1.000000  ...  0.782561
sepal width (cm)           -0.117570  ... -0.426658
petal length (cm)           0.871754  ...  0.949035
petal width (cm)            0.817941  ...  0.956547
target                      0.782561  ...  1.000000

[5 rows x 5 columns]
sepal length (cm) ANOVA: F_onewayResult(statistic=119.26450218450468, pvalue=1.669669190769383e-31)
sepal width (cm) ANOVA: F_onewayResult(statistic=49.160040089612075, pvalue=4.49201713330911e-17)
petal length (cm) ANOVA: F_onewayResult(statistic=1180.161182252981, pvalue=2.856776610961539e-91)
petal width (cm) ANOVA: F_onewayResult(statistic=960.007146801809, pvalue=4.1694458394430593e-85)

Process finished with exit code 0
```


Correlation Matrix of Iris Dataset
sepal length (cm)
sepal width (cm)
petal length (cm)
petal width (cm)
target
1.00
-0.12
0.87
0.82
0.78
-0.12
1.00
-0.43
-0.37
-0.43
0.87
-0.43
1.00
0.96
0.95
0.82
-0.37
0.96
1.00
0.96
0.78
-0.43
0.95
0.96
1.00
sepal length (cm)
sepal width (cm)
petal length (cm)
petal width (cm)
target
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4