In [14]:

```
#Name: Mane Shivraj Pandurang
#Roll No. : 37 B.E.A.I & D.S.
# CL IV (Business Intelligence)
# Practical No. 4
```

In [5]:

```
# import required libraries
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score , classification_report, confusion_matri
```

In [4]:

```
# Load the Iris dataset
iris = sns.load_dataset("iris")
iris.head()
```

Out[4]:

	sep al_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	setosa
1	4.9	3.0	1.4	0.2	setosa
2	4.7	3.2	1.3	0.2	setosa
3	4.6	3.1	1.5	0.2	setosa
4	5.0	3.6	1.4	0.2	setosa

In [6]:

```
# Encode target labels as numbers
iris['species'] = iris['species'].astype('category').cat.codes   # 'setosa' -> 0, 'v

# Define features (X) and target (y)
X = iris.drop(columns=['species'])
y = iris['species']

# Split data into training (80%) and testing (20%) sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
random_state=42, stratify=y)
```

In [7]:

```
# Standardizing the features
scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)
```

In [9]:

```
# Initialize and train the Random Forest model
rf_model  = RandomForestClassifier(n_estimators=100, random_state=42)
# 100 trees in the forest
rf_model.fit(X_train, y_train)
```

Out[9]:

```
▾ RandomForestClassifier

RandomForestClassifier(random_state=42)
```

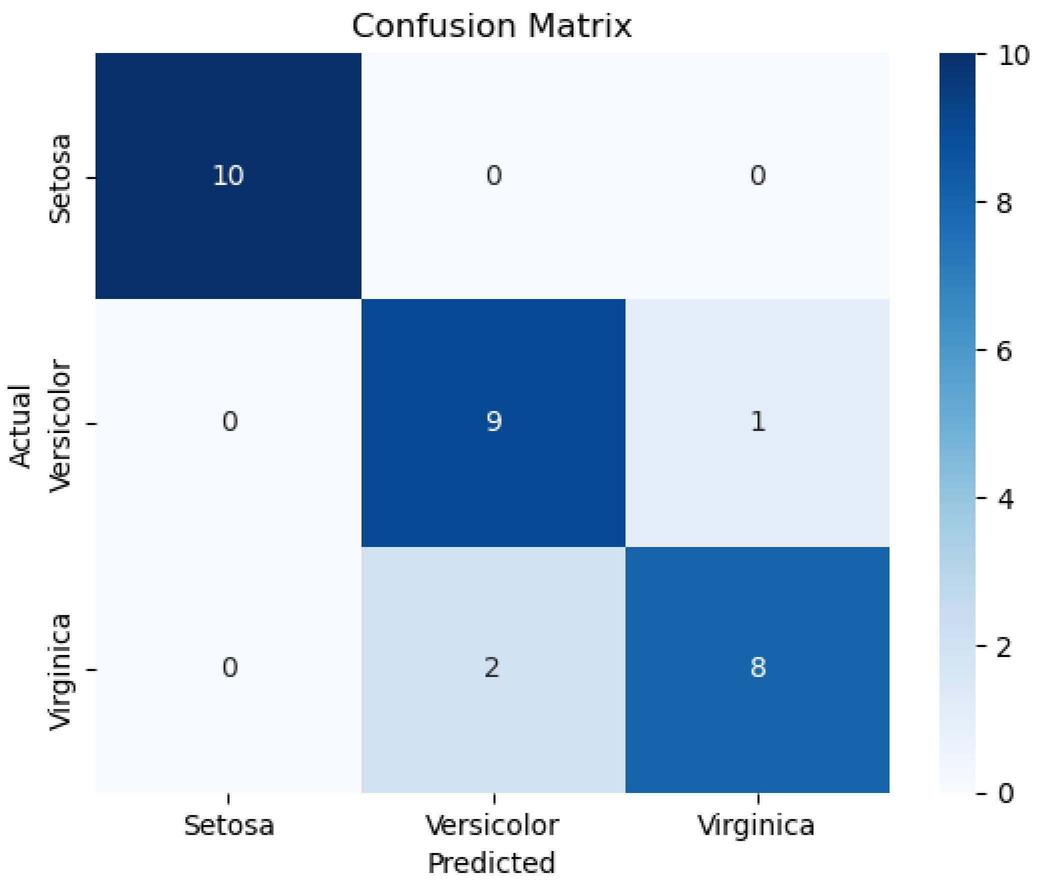
In [10]:

```
# Predict on test data
y_pred = rf_model.predict(X_test)
```

In [12]:

```
# Accuracy Score
accuracy = accuracy_score(y_test, y_pred)
print(f"Accuracy: {accuracy:.2f}")

# Classification Report
print("Classification Report:\n", classification_report(y_test, y_pred))

# Confusion Matrix
conf_matrix = confusion_matrix(y_test, y_pred)
sns.heatmap(conf_matrix, annot=True, cmap="Blues", fmt="d",
xticklabels=['Setosa', 'Versicolor', 'Virginica'], yticklabels=['Setosa',
'Versicolor', 'Virginica'])
plt.xlabel("Predicted")
plt.ylabel("Actual")
plt.title("Confusion Matrix")
plt.show()
```

```
Accuracy: 0.90
Classification Report:
               precision    recall  f1-score   support

           0       1.00      1.00      1.00        10
           1       0.82      0.90      0.86        10
           2       0.89      0.80      0.84        10

    accuracy                           0.90        30
   macro avg       0.90      0.90      0.90        30
weighted avg       0.90      0.90      0.90        30
```


Confusion Matrix
Actual
Setosa
Versicolor
Virginica
10
0
0
0
9
1
0
2
8
Setosa
Versicolor
Virginica
Predicted
10
8
6
4
2
0

In [ ]: