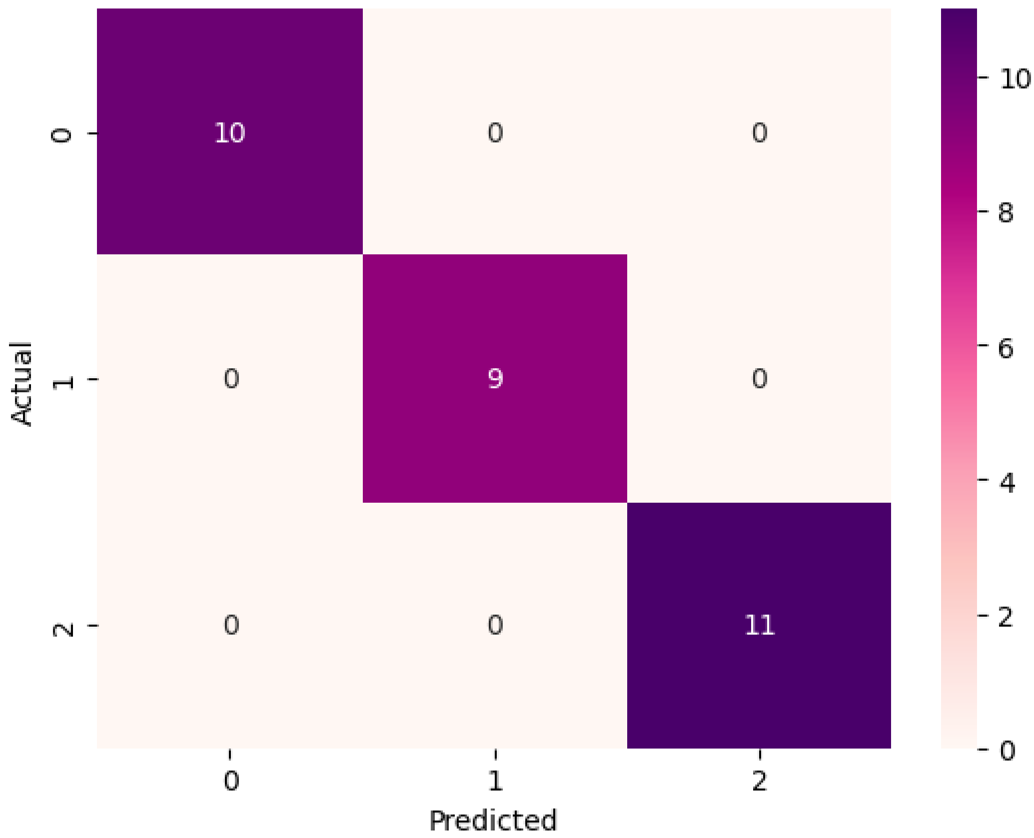
In [28]:

```
#random forest

import numpy as np
import pandas as pd
from sklearn.datasets import load_iris
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score, classification_report
import seaborn as sns
import matplotlib.pyplot as plt

# Load the Iris dataset
iris = load_iris()
X = iris.data  # Features
y = iris.target  # Target variable

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0

# Create a Random Forest Classifier
clf = RandomForestClassifier(n_estimators=100, random_state=42)

# Train the model on the training data
clf.fit(X_train, y_train)

# Make predictions on the test data
y_pred = clf.predict(X_test)

# Evaluate the model
accuracy = accuracy_score(y_test, y_pred)
report = classification_report(y_test, y_pred)

print(f'Accuracy: {accuracy}')
print('Classification Report:')
print(report)

# Visualize the results using a Seaborn heatmap
confusion_matrix = pd.crosstab(y_test, y_pred, rownames=['Actual'], c
sns.heatmap(confusion_matrix, annot=True, fmt='d', cmap='RdPu')
plt.show()
```

```
Accuracy: 1.0
Classification Report:
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        10
           1       1.00      1.00      1.00         9
           2       1.00      1.00      1.00        11

    accuracy                           1.00        30
   macro avg       1.00      1.00      1.00        30
weighted avg       1.00      1.00      1.00        30
```


10
0
0
0
9
0
0
0
11
Actual
Predicted
0
1
2
0
1
2
10
8
6
4
2
0

In [19]:

```
#Logistic regression

import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score, classification_report

# Generate some sample data
np.random.seed(0)
X = np.random.randn(100, 2)  # Two features
y = (X[:, 0] + X[:, 1] > 0).astype(int)  # Binary target variable

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0

# Create a Logistic Regression model
clf = LogisticRegression()

# Train the model on the training data
clf.fit(X_train, y_train)

# Make predictions on the test data
y_pred = clf.predict(X_test)

# Evaluate the model
accuracy = accuracy_score(y_test, y_pred)
report = classification_report(y_test, y_pred)

print(f'Accuracy: {accuracy}')
print('Classification Report:')
print(report)
```

```
Accuracy: 1.0
Classification Report:
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        13
           1       1.00      1.00      1.00         7

    accuracy                           1.00        20
   macro avg       1.00      1.00      1.00        20
weighted avg       1.00      1.00      1.00        20
```

In [22]:

```
#naive bias

import numpy as np
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.naive_bayes import MultinomialNB
from sklearn.metrics import accuracy_score, classification_report
from sklearn.model_selection import train_test_split

# Sample text data for classification
documents = [
    "I love machine learning",
    "I enjoy coding in Python",
    "Machine learning is fun",
    "Python is a versatile language",
    "Bayesian statistics is interesting"
]

# Corresponding labels for each document
labels = ["Positive", "Positive", "Positive", "Positive", "Negative"]

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(documents, labels

# Create a CountVectorizer to convert text data into numerical featur
vectorizer = CountVectorizer()
X_train_vectorized = vectorizer.fit_transform(X_train)
X_test_vectorized = vectorizer.transform(X_test)

# Create a Multinomial Naive Bayes classifier
naive_bayes_classifier = MultinomialNB()

# Train the classifier on the training data
naive_bayes_classifier.fit(X_train_vectorized, y_train)

# Make predictions on the test data
y_pred = naive_bayes_classifier.predict(X_test_vectorized)

# Calculate accuracy and print classification report
accuracy = accuracy_score(y_test, y_pred)
classification_rep = classification_report(y_test, y_pred)

print("Accuracy:", accuracy)
print("Classification Report:\n", classification_rep)
```

```
Accuracy: 1.0
Classification Report:
               precision    recall  f1-score   support

    Positive       1.00      1.00      1.00         1

    accuracy                           1.00         1
   macro avg       1.00      1.00      1.00         1
weighted avg       1.00      1.00      1.00         1
```

In [24]:

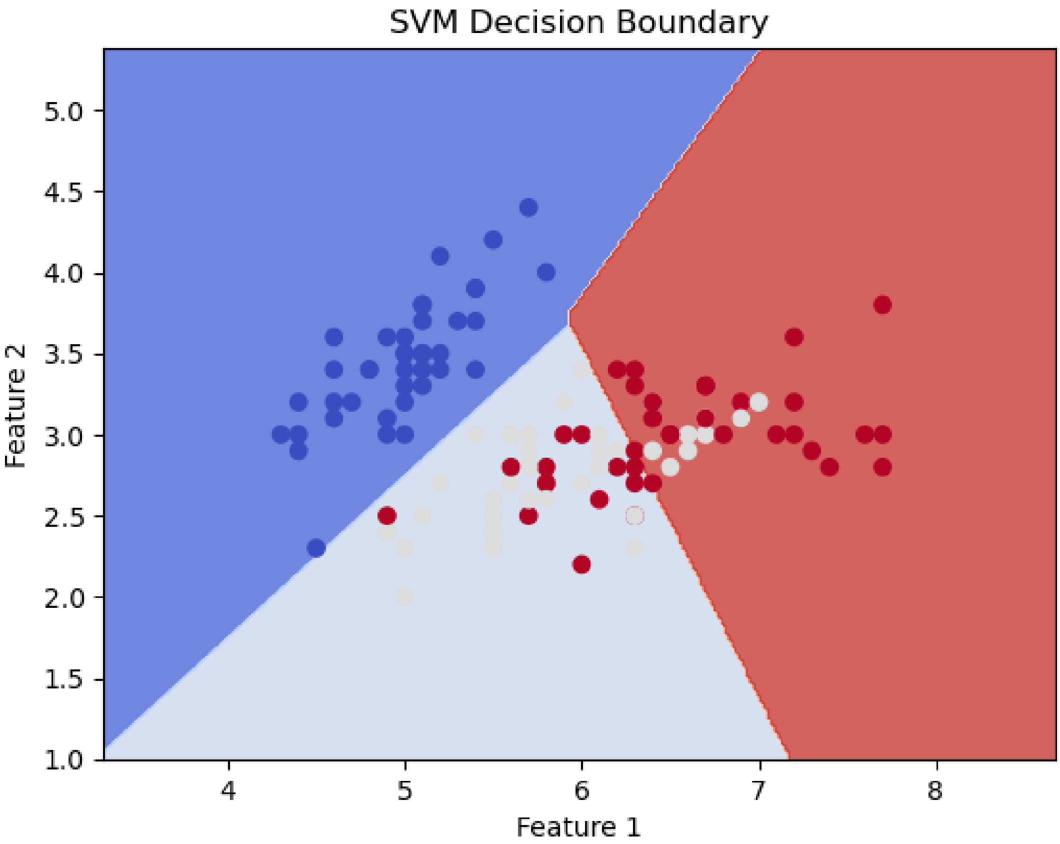
```
#decision tree

# Import necessary libraries
from sklearn import datasets
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeClassifier
from sklearn.metrics import accuracy_score

# Load a dataset (Iris dataset is used here as an example)
iris = datasets.load_iris()
X = iris.data
y = iris.target

# Split the dataset into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0

# Create a decision tree classifier
clf = DecisionTreeClassifier(random_state=42)

# Fit the classifier to the training data
clf.fit(X_train, y_train)

# Make predictions on the test data
y_pred = clf.predict(X_test)

# Calculate accuracy
accuracy = accuracy_score(y_test, y_pred)
print("Accuracy:", accuracy)
```

```
Accuracy: 1.0
```

In [26]:

```
#SVM(Support Vector Machine)

import numpy as np
import matplotlib.pyplot as plt
from sklearn import datasets
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score

# Load a sample dataset (Iris dataset)
iris = datasets.load_iris()
X = iris.data[:, :2]  # Using only the first two features for visuali
y = iris.target

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0

# Create an SVM classifier
svm_classifier = SVC(kernel='linear', C=1)  # Linear SVM

# Train the SVM classifier on the training data
svm_classifier.fit(X_train, y_train)

# Make predictions on the test data
y_pred = svm_classifier.predict(X_test)

# Calculate the accuracy of the model
accuracy = accuracy_score(y_test, y_pred)
print("Accuracy:", accuracy)

# Visualize the decision boundary
def plot_decision_boundary(X, y, classifier):
    h = .02  # Step size in the mesh
    x_min, x_max = X[:, 0].min() - 1, X[:, 0].max() + 1
    y_min, y_max = X[:, 1].min() - 1, X[:, 1].max() + 1
    xx, yy = np.meshgrid(np.arange(x_min, x_max, h), np.arange(y_min,
    Z = classifier.predict(np.c_[xx.ravel(), yy.ravel()])
    Z = Z.reshape(xx.shape)
    plt.contourf(xx, yy, Z, cmap=plt.cm.coolwarm, alpha=0.8)
    plt.scatter(X[:, 0], X[:, 1], c=y, cmap=plt.cm.coolwarm)
    plt.xlabel("Feature 1")
    plt.ylabel("Feature 2")
    plt.title("SVM Decision Boundary")
    plt.show()

# Plot the decision boundary
plot_decision_boundary(X_train, y_train, svm_classifier)
```

```
Accuracy: 0.9
```


SVM Decision Boundary
Feature 2
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
4
5
6
7
8
Feature 1

In [27]:

```
#multiple regression

import numpy as np
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score
from sklearn.model_selection import train_test_split

# Generate some sample data
np.random.seed(0)
n_samples = 100
X = np.random.rand(n_samples, 2)  # Two independent variables
y = 2 * X[:, 0] + 3 * X[:, 1] + np.random.rand(n_samples)  # Dependen

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0

# Create a linear regression model
model = LinearRegression()

# Fit the model to the training data
model.fit(X_train, y_train)

# Make predictions on the test data
y_pred = model.predict(X_test)

# Evaluate the model
mse = mean_squared_error(y_test, y_pred)
r2 = r2_score(y_test, y_pred)

print("Mean Squared Error:", mse)
print("R-squared:", r2)
```

```
Mean Squared Error: 0.10301986565637011
R-squared: 0.915042827808076
```

In [ ]: