In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.datasets import load_breast_cancer
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LogisticRegression
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier
from sklearn.svm import SVC
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import accuracy_score, classification_report
```

Load Dataset

In [2]:
```
data = load_breast_cancer()
df = pd.DataFrame(data.data, columns=data.feature_names)
df['target'] = data.target
```

Data Preprocessing

In [3]:
```
scaler = StandardScaler()
X = scaler.fit_transform(df.drop(columns=['target']))
y = df['target']
```

Split Data

In [4]:
```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42
```

Initialize Models

In [5]:
```
models = {
    "Logistic Regression": LogisticRegression(),
    "Decision Tree": DecisionTreeClassifier(),
    "Random Forest": RandomForestClassifier(),
    "SVM": SVC(),
    "k-NN": KNeighborsClassifier()
}
```

Train and Evaluate Models

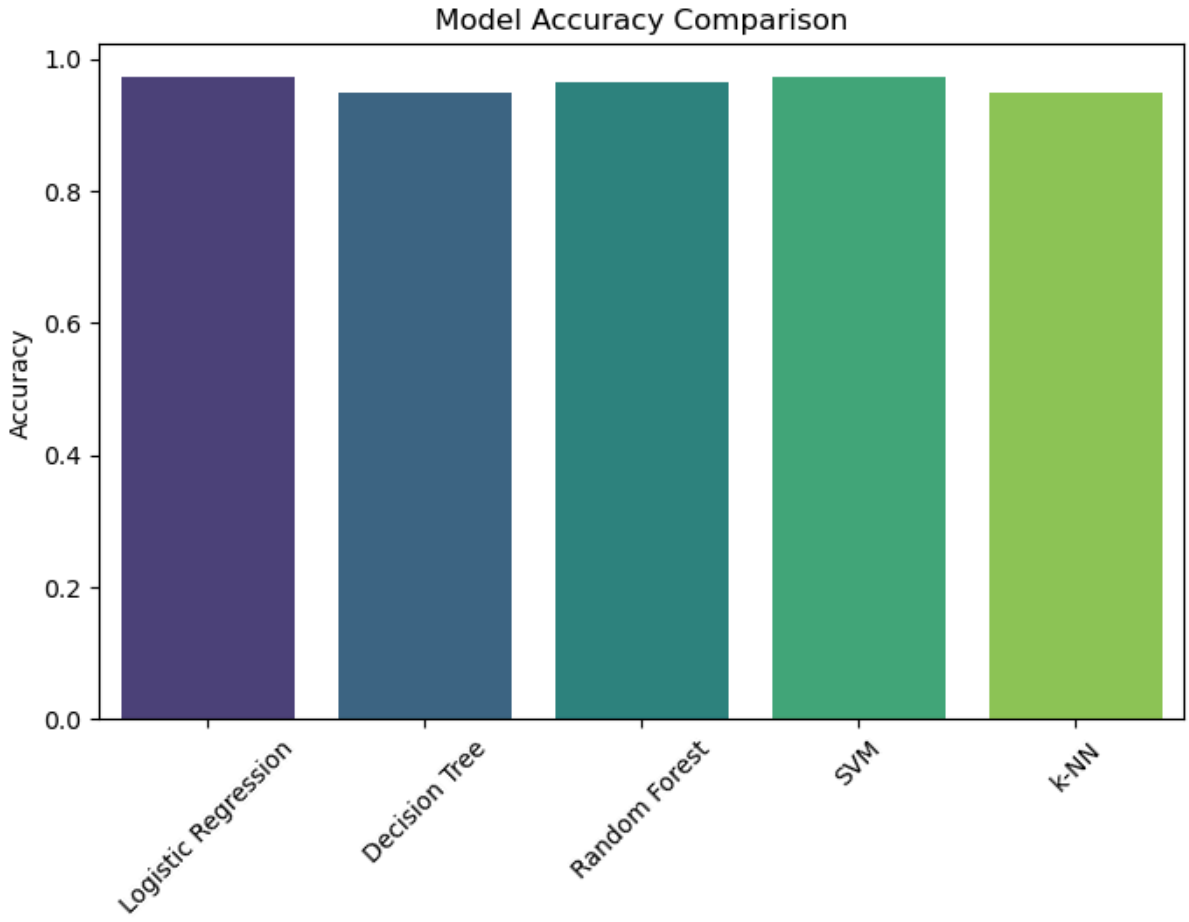
In [6]:

```
results = {}
for name, model in models.items():
    model.fit(X_train, y_train)
    y_pred = model.predict(X_test)
    accuracy = accuracy_score(y_test, y_pred)
    results[name] = accuracy
    print(f"{name} Accuracy: {accuracy:.4f}")
    print(classification_report(y_test, y_pred))
    print("-"*50)
```

```
Logistic Regression Accuracy: 0.9737
              precision    recall  f1-score   support

           0       0.98      0.95      0.96        43
           1       0.97      0.99      0.98        71

    accuracy                           0.97       114
   macro avg       0.97      0.97      0.97       114
weighted avg       0.97      0.97      0.97       114

--------------------------------------------------
Decision Tree Accuracy: 0.9474
              precision    recall  f1-score   support

           0       0.93      0.93      0.93        43
           1       0.96      0.96      0.96        71

    accuracy                           0.95       114
   macro avg       0.94      0.94      0.94       114
weighted avg       0.95      0.95      0.95       114

--------------------------------------------------
Random Forest Accuracy: 0.9649
              precision    recall  f1-score   support

           0       0.98      0.93      0.95        43
           1       0.96      0.99      0.97        71

    accuracy                           0.96       114
   macro avg       0.97      0.96      0.96       114
weighted avg       0.97      0.96      0.96       114

--------------------------------------------------
SVM Accuracy: 0.9737
              precision    recall  f1-score   support

           0       0.98      0.95      0.96        43
           1       0.97      0.99      0.98        71

    accuracy                           0.97       114
   macro avg       0.97      0.97      0.97       114
weighted avg       0.97      0.97      0.97       114

--------------------------------------------------
k-NN Accuracy: 0.9474
              precision    recall  f1-score   support

           0       0.93      0.93      0.93        43
           1       0.96      0.96      0.96        71

    accuracy                           0.95       114
   macro avg       0.94      0.94      0.94       114
weighted avg       0.95      0.95      0.95       114

--------------------------------------------------
```

Compare Model Performance

In [7]:
```
plt.figure(figsize=(8, 5))
sns.barplot(x=list(results.keys()), y=list(results.values()), palette='viridis')
plt.title("Model Accuracy Comparison")
plt.xticks(rotation=45)
plt.ylabel("Accuracy")
plt.show()
```



Identify Best and Worst Performing Models

In [8]:
```
best_model = max(results, key=results.get)
worst_model = min(results, key=results.get)
print(f"Best Performing Model: {best_model} with {results[best_model]:.4f} accuracy")
print(f"Worst Performing Model: {worst_model} with {results[worst_model]:.4f} accuracy")
```

```
Best Performing Model: Logistic Regression with 0.9737 accuracy
Worst Performing Model: Decision Tree with 0.9474 accuracy
```

In [ ]:
```

```