```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import accuracy_score, confusion_matrix, classification_report
from sklearn.datasets import load_iris, load_diabetes
import pandas as pd
from sklearn.model_selection import train_test_split, GridSearchCV
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import accuracy_score, confusion_matrix, classification_report
import seaborn as sns
import matplotlib.pyplot as plt
```

```
from google.colab import files
uploaded = files.upload()
```

Choose Files iris.csv

- **iris.csv**(text/csv) - 4617 bytes, last modified: 4/21/2025 - 100% done

```
Saving iris.csv to iris.csv
```

```
df = pd.read_csv('iris.csv')
df
```

	sepal_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	Iris-virginica
146	6.3	2.5	5.0	1.9	Iris-virginica
147	6.5	3.0	5.2	2.0	Iris-virginica
148	6.2	3.4	5.4	2.3	Iris-virginica
149	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 5 columns

Next steps: Generate code with df View recommended plots New interactive sheet

```
X = df.drop('species', axis=1)
y = df['species']
```

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=42)
```

```
rf_default = RandomForestClassifier(n_estimators=10, random_state=42)
rf_default.fit(X_train, y_train)
y_pred_default = rf_default.predict(X_test)
default_score = accuracy_score(y_test, y_pred_default)
print(f"Default RF Accuracy (n_estimators=10): {default_score:.4f}")
```

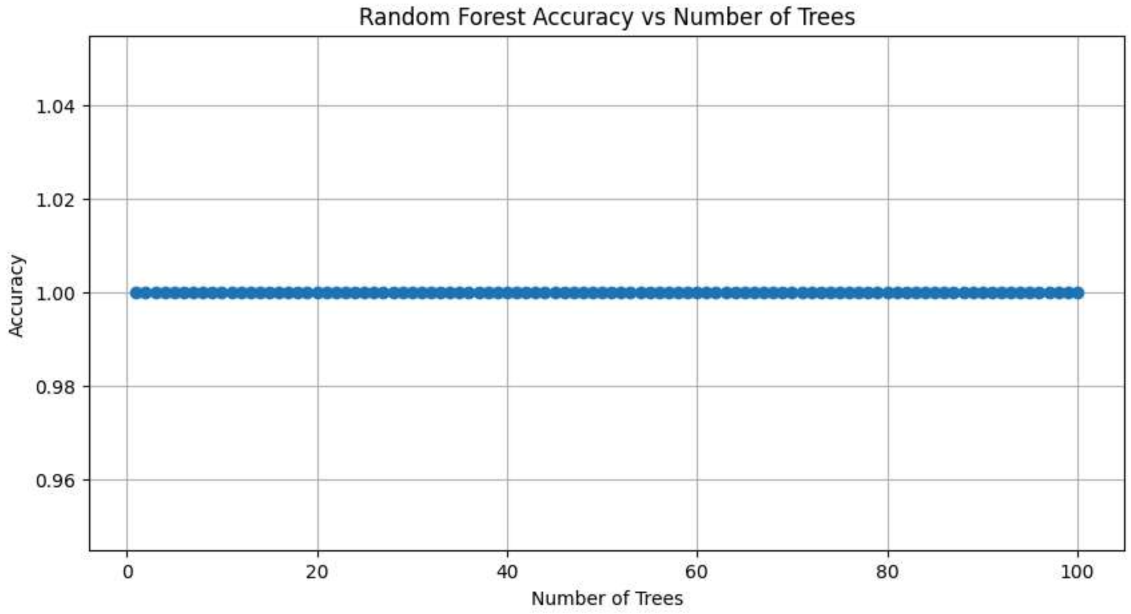
```
Default RF Accuracy (n_estimators=10): 1.0000
```

```
scores = []
tree_range = range(1, 101)
for n in tree_range:
    rf = RandomForestClassifier(n_estimators=n, random_state=42)
    rf.fit(X_train, y_train)
    y_pred = rf.predict(X_test)
    acc = accuracy_score(y_test, y_pred)
    scores.append(acc)


best_score = max(scores)
best_n = tree_range[scores.index(best_score)]
print(f"Best Accuracy: {best_score:.4f} with {best_n} trees")
```

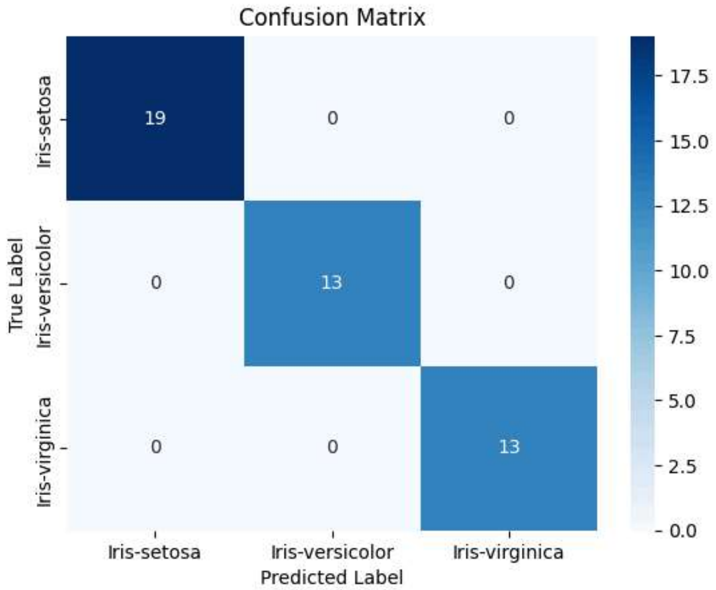
```
Best Accuracy: 1.0000 with 1 trees
```

```
plt.figure(figsize=(10, 5))
plt.plot(tree_range, scores, marker='o')
plt.title('Random Forest Accuracy vs Number of Trees')
plt.xlabel('Number of Trees')
plt.ylabel('Accuracy')
plt.grid(True)
plt.show()
```



```
from sklearn.metrics import confusion_matrix
import seaborn as sns
import matplotlib.pyplot as plt
rf_best = RandomForestClassifier(n_estimators=1, random_state=42)
rf_best.fit(X_train, y_train)
y_pred_best = rf_best.predict(X_test)
cm = confusion_matrix(y_test, y_pred_best)
print("Confusion Matrix:\n", cm)
sns.heatmap(cm, annot=True, fmt='d', cmap='Blues', xticklabels=rf_best.classes_, yticklabels=rf_best.classes_)
plt.title("Confusion Matrix")
plt.xlabel("Predicted Label")
plt.ylabel("True Label")
plt.show()
```

```
Confusion Matrix:
 [[19  0  0]
 [ 0 13  0]
 [ 0  0 13]]
```


Confusion Matrix
Iris-setosa
Iris-versicolor
Iris-virginica
True Label
Iris-setosa
Iris-versicolor
Iris-virginica
Predicted Label