```
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.metrics import accuracy_score, classification_report, confusion_matrix

from sklearn.linear_model import LogisticRegression
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier
```

```
df = pd.read_csv("/content/mobile_price.csv")
df.head()
```

	battery_power	blue	clock_speed	dual_sim	fc	four_g	int_memory	m_dep	mobile_wt	n_cores	...	px_height	px_width	ram
0	842	0	2.2	0	1	0	7	0.6	188	2	...	20	756	2549
1	1021	1	0.5	1	0	1	53	0.7	136	3	...	905	1988	2631
2	563	1	0.5	1	2	1	41	0.9	145	5	...	1263	1716	2603
3	615	1	2.5	0	0	0	10	0.8	131	6	...	1216	1786	2769
4	1821	1	1.2	0	13	1	44	0.6	141	2	...	1208	1212	1411

5 rows × 21 columns

```
df.shape
```

```
(2000, 21)
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2000 entries, 0 to 1999
Data columns (total 21 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   battery_power  2000 non-null   int64  
 1   blue           2000 non-null   int64  
 2   clock_speed    2000 non-null   float64
 3   dual_sim       2000 non-null   int64  
 4   fc             2000 non-null   int64  
 5   four_g         2000 non-null   int64  
 6   int_memory     2000 non-null   int64  
 7   m_dep          2000 non-null   float64
 8   mobile_wt      2000 non-null   int64  
 9   n_cores        2000 non-null   int64  
 10  pc             2000 non-null   int64  
 11  px_height      2000 non-null   int64  
 12  px_width       2000 non-null   int64  
 13  ram            2000 non-null   int64  
 14  sc_h           2000 non-null   int64  
 15  sc_w           2000 non-null   int64  
 16  talk_time      2000 non-null   int64  
 17  three_g        2000 non-null   int64  
 18  touch_screen   2000 non-null   int64  
 19  wifi           2000 non-null   int64  
 20  price_range    2000 non-null   int64  
dtypes: float64(2), int64(19)
memory usage: 328.3 KB
```

```
df.describe()
```

	battery_power	blue	clock_speed	dual_sim	fc	four_g	int_memory	m_dep	mobile_wt	n_co
count	2000.000000	2000.0000	2000.000000	2000.000000	2000.000000	2000.000000	2000.000000	2000.000000	2000.000000	2000.000
mean	1238.518500	0.4950	1.522250	0.509500	4.309500	0.521500	32.046500	0.501750	140.249000	4.520
std	439.418206	0.5001	0.816004	0.500035	4.341444	0.499662	18.145715	0.288416	35.399655	2.287
min	501.000000	0.0000	0.500000	0.000000	0.000000	0.000000	2.000000	0.100000	80.000000	1.000
25%	851.750000	0.0000	0.700000	0.000000	1.000000	0.000000	16.000000	0.200000	109.000000	3.000
50%	1226.000000	0.0000	1.500000	1.000000	3.000000	1.000000	32.000000	0.500000	141.000000	4.000
75%	1615.250000	1.0000	2.200000	1.000000	7.000000	1.000000	48.000000	0.800000	170.000000	7.000
max	1998.000000	1.0000	3.000000	1.000000	19.000000	1.000000	64.000000	1.000000	200.000000	8.000

```
df.isnull().sum()
```

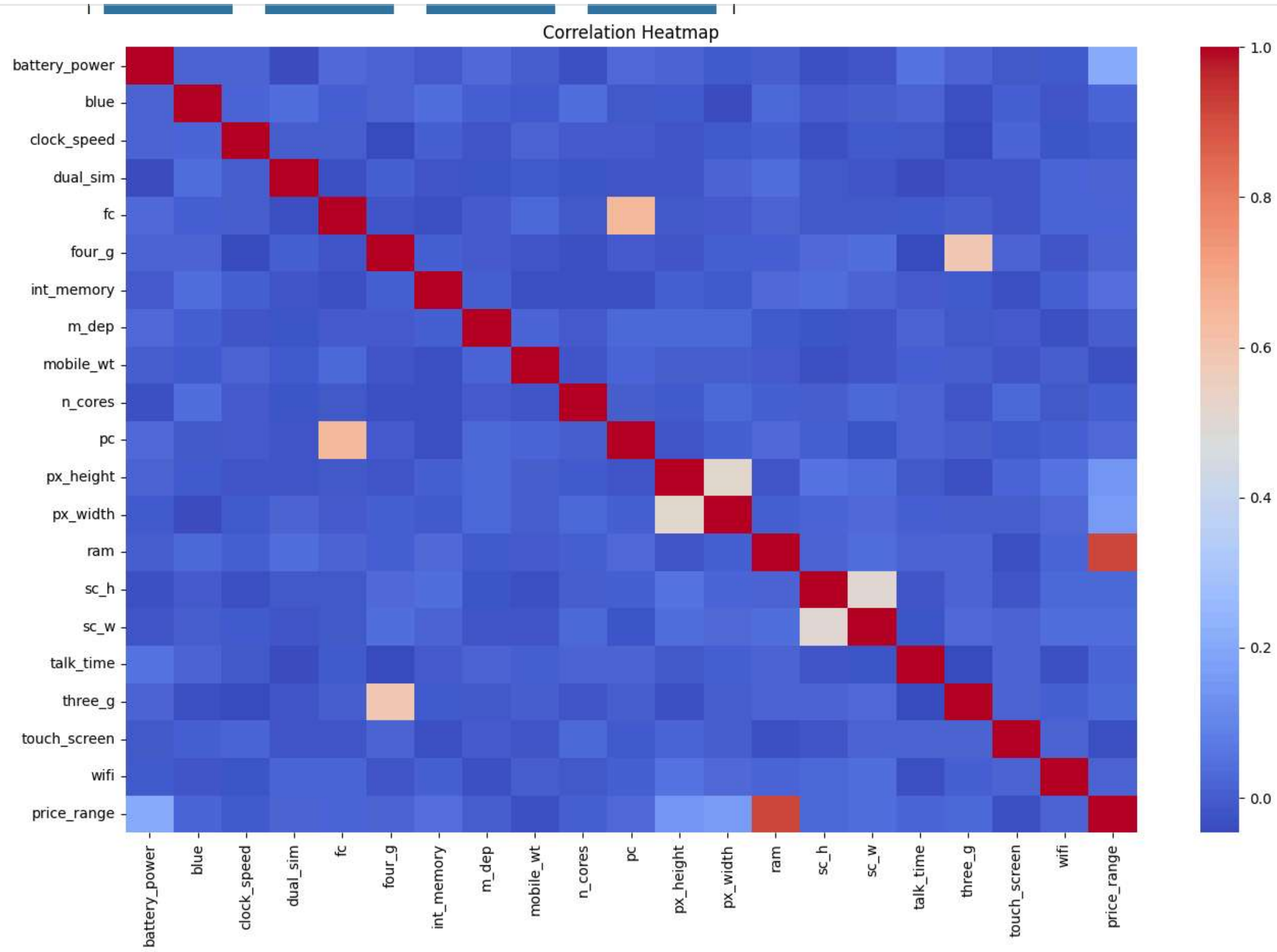
	0
battery_power	0
blue	0
clock_speed	0
dual_sim	0
fc	0
four_g	0
int_memory	0
m_dep	0
mobile_wt	0
n_cores	0
pc	0
px_height	0
px_width	0
ram	0
sc_h	0
sc_w	0
talk_time	0
three_g	0
touch_screen	0
wifi	0
price_range	0

dtype: int64

```
sns.countplot(x='price_range', data=df)
plt.title("Price Range Distribution")
plt.show()
```

Price Range Distribution
500
400
300

```
plt.figure(figsize=(16,10))
sns.heatmap(df.corr(), cmap='coolwarm')
plt.title("Correlation Heatmap")
plt.show()
```



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

```
X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.2, random_state=42
)
```

```
scaler = StandardScaler()

X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)
```

```
lr = LogisticRegression(max_iter=2000)
lr.fit(X_train, y_train)

y_pred_lr = lr.predict(X_test)

print("Logistic Regression Accuracy:", accuracy_score(y_test, y_pred_lr))
print(classification_report(y_test, y_pred_lr))
```

```
Logistic Regression Accuracy: 0.975
              precision    recall  f1-score   support

           0       1.00      0.96      0.98       105
           1       0.94      1.00      0.97        91
           2       0.99      0.95      0.97        92
           3       0.97      0.99      0.98       112

    accuracy                           0.97       400
   macro avg       0.98      0.97      0.97       400
weighted avg       0.98      0.97      0.98       400
```

```
dt = DecisionTreeClassifier(random_state=42)
dt.fit(X_train, y_train)

y_pred_dt = dt.predict(X_test)

print("Decision Tree Accuracy:", accuracy_score(y_test, y_pred_dt))
print(classification_report(y_test, y_pred_dt))
```

```
Decision Tree Accuracy: 0.835
              precision    recall  f1-score   support

           0       0.90      0.88      0.89       105
           1       0.75      0.84      0.79        91
           2       0.80      0.71      0.75        92
           3       0.87      0.90      0.89       112

    accuracy                           0.83       400
   macro avg       0.83      0.83      0.83       400
weighted avg       0.84      0.83      0.83       400
```

```
rf = RandomForestClassifier(
    n_estimators=200,
    random_state=42
)

rf.fit(X_train, y_train)

y_pred_rf = rf.predict(X_test)

print("Random Forest Accuracy:", accuracy_score(y_test, y_pred_rf))
print(classification_report(y_test, y_pred_rf))
```

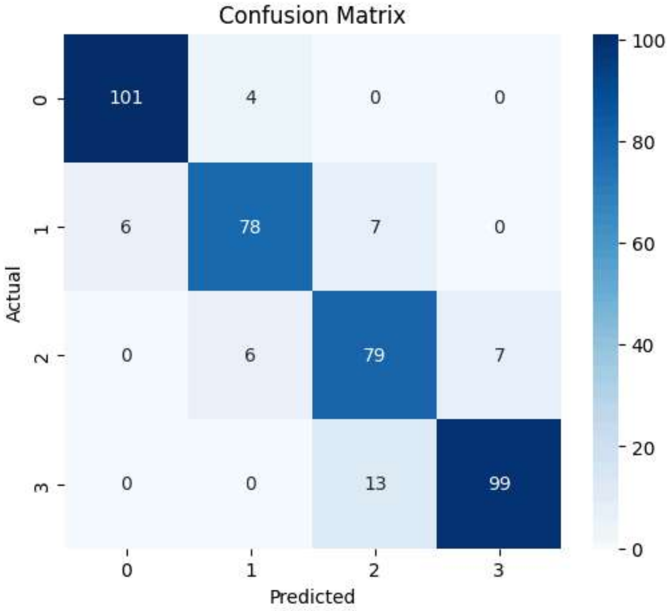
```
Random Forest Accuracy: 0.8925
              precision    recall  f1-score   support

           0       0.94      0.96      0.95       105
           1       0.89      0.86      0.87        91
           2       0.80      0.86      0.83        92
           3       0.93      0.88      0.91       112

    accuracy                           0.89       400
   macro avg       0.89      0.89      0.89       400
weighted avg       0.89      0.89      0.89       400
```

```
cm = confusion_matrix(y_test, y_pred_rf)
```

```
plt.figure(figsize=(6,5))
sns.heatmap(cm, annot=True, fmt='d', cmap='Blues')
plt.xlabel("Predicted")
plt.ylabel("Actual")
plt.title("Confusion Matrix")
plt.show()
```



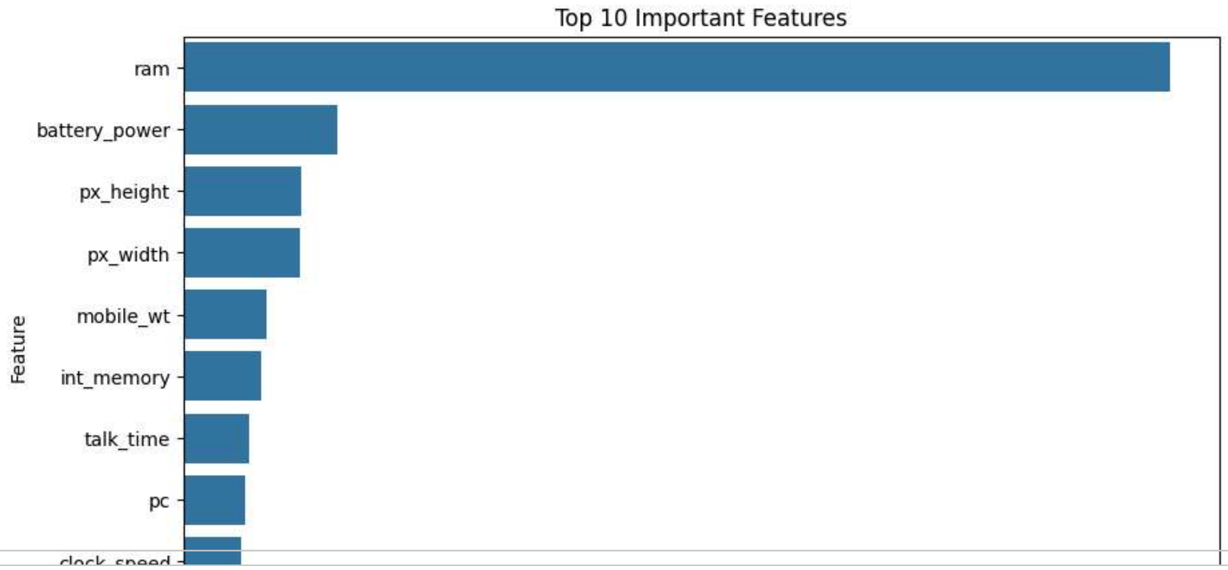
```
importance = pd.DataFrame({
    'Feature': X.columns,
    'Importance': rf.feature_importances_
}).sort_values(by='Importance', ascending=False)

importance.head(10)
```

	Feature	Importance
13	ram	0.479937
0	battery_power	0.074861
11	px_height	0.056969
12	px_width	0.056587
8	mobile_wt	0.039979
6	int_memory	0.037550
16	talk_time	0.031625
10	pc	0.029687
2	clock_speed	0.027740
14	sc_h	0.027684

Next steps: Generate code with `importance` New interactive sheet

```
plt.figure(figsize=(10,6))
sns.barplot(x='Importance', y='Feature', data=importance.head(10))
plt.title("Top 10 Important Features")
plt.show()
```



```
sample = X_test[0].reshape(1, -1)
pred = rf.predict(sample)

print("Predicted Price Range:", pred)
```

```
Predicted Price Range: [0]
```