

```
import numpy as np

import matplotlib.pyplot as plt

from sklearn.linear_model import LogisticRegression

from sklearn.metrics import (
    confusion_matrix,
    accuracy_score,
    precision_score,
    recall_score,
    mean_squared_error,
    classification_report,
)

from sklearn.model_selection import train_test_split


# Step 1: Create univariate dataset (score vs admission)
X = np.array([30, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95]).reshape(-1, 1)
y = np.array([0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1]) # 0: Not Admitted, 1: Admitted


# Step 2: Split dataset
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=1)


# Step 3: Train model
model = LogisticRegression()
model.fit(X_train, y_train)


# Step 4: Predictions
y_pred = model.predict(X_test)


# Step 5: Evaluation Metrics
conf = confusion_matrix(y_test, y_pred)
acc = accuracy_score(y_test, y_pred)
prec = precision_score(y_test, y_pred)
```

```

rec = recall_score(y_test, y_pred)
mse = mean_squared_error(y_test, y_pred)
rmse = np.sqrt(mse)

print("Confusion Matrix:\n", conf)
print(f"Accuracy: {acc:.4f}")
print(f"Precision: {prec:.4f}")
print(f"Recall: {rec:.4f}")
print(f"MSE: {mse:.4f}")
print(f"RMSE: {rmse:.4f}")

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

# Step 6: Predict for new data
new_scores = np.array([[58], [72], [85]])
new_predictions = model.predict(new_scores)

print("\nNew Predictions:")
for score, pred in zip(new_scores.flatten(), new_predictions):
    status = "Admitted" if pred == 1 else "Not Admitted"
    print(f"Score: {score} => {status}")

# Step 7: Visualize the logistic curve
X_range = np.linspace(30, 100, 300).reshape(-1, 1)
y_prob = model.predict_proba(X_range)[: , 1]

plt.scatter(X, y, color='blue', label='Actual Data')
plt.plot(X_range, y_prob, color='red', label='Logistic Curve')
plt.xlabel("Exam Score")
plt.ylabel("Probability of Admission")
plt.title("Logistic Regression (Univariate)")

```

```
plt.legend()
```

```
plt.grid(True)
```

```
plt.show()
```