A component is defective or not based on Voltage and Current
Using Logistic Regression

AIM:

To classify a component is defective or not based on Voltage and Current

PROGRAM:

```python
import numpy as np
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score

np.random.seed(0)

defective_data = np.random.normal(loc=[5, 2], scale=[1, 0.5], size=(100, 2))  # Defective components
normal_data = np.random.normal(loc=[8, 4], scale=[1, 0.5], size=(100, 2))  # Normal components

# Concatenate the data and create labels
X = np.concatenate([defective_data, normal_data])
y = np.concatenate([np.zeros(100), np.ones(100)])  # Defective: 0, Normal: 1

# Split the dataset into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=42)

# Create and train the logistic regression model
clf = LogisticRegression()
clf.fit(X_train, y_train)

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

# Calculate accuracy
accuracy = accuracy_score(y_test, y_pred)
print(f'Accuracy: {accuracy:.2f}')
```

OUTPUT:

```
Accuracy: 1.00
```

RESULT:

Hence the component is classified based on the voltage and current using Logistic Regression.