DATE:

EXPERIMENT 6

AIM:

Program to implement the logistic regression for the given dataset and compute the accuracy.

REQUIREMENTS:

1.Dataset : The dataset we are taking must be genuine , with negligible outliers for better and accurate prediction.

2.Sklearn library:It has train_test_split , LogisticRegression,accuracy_score functions for making the regression analysis.

3.Libraries for statistics and exploration - numpy,pandas,matplotlib,seaborn

PROCEDURE:

STEP 1: Import required libraries: Use ‘import’ keyword form making the libraries accessible.

STEP 2: Load the data:We are taking a csv file for predictions.Use ‘read_csv()’ function to load the data.

STEP 3: Exploring the data scatter:Make a scatter plot using lmplot() function from seaborn library.

STEP 4: Data cleansing:This is the process of clearing outliers and null values.For this we use fillna() method.

STEP 5: Split the data into training set and testing set: Data can be split using train_test_split() method from sklearn.model_selection

STEP 6: Train model : Train the data with LogisticRegression() method from sklearn.linear_model

STEP 7: Evaluate the model accuracy/Explore results:Trained model can be tested with predict() method from LogisticRegression()

STEP 8: Evaluate accuracy score:Useaccuracy_score,Confusion_matrix,
classification_report for evaluating accuracy of the model.

CODE:

```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score, confusion_matrix, classification_report

# Load the data
df = pd.read_csv('bottle.csv', low_memory=False)
df_binary = df[['Salnty', 'T_degC']]
df_binary.columns = ['Sal', 'Temp']

# Display the first 5 rows
print(df_binary.head())

# Plot the Scatter plot to check the relationship between Sal and Temp
sns.lmplot(x="Sal", y="Temp", data=df_binary, order=2, ci=None)
plt.show()

# Eliminate NaN or missing input numbers
df_binary_copy = df_binary.copy()
df_binary_copy.fillna(method='pad', inplace=True)

# Define the temperature threshold for 'hot' and 'cold' classes
threshold = 15

# Create a new column 'TempClass' to represent the classes 'cold' and 'hot'
df_binary_copy['TempClass'] = np.where(df_binary_copy['Temp'] < threshold, 'cold', 'hot')

# Map 'cold' and 'hot' classes to numerical labels (0 and 1)
class_mapping = {'cold': 0, 'hot': 1}
```

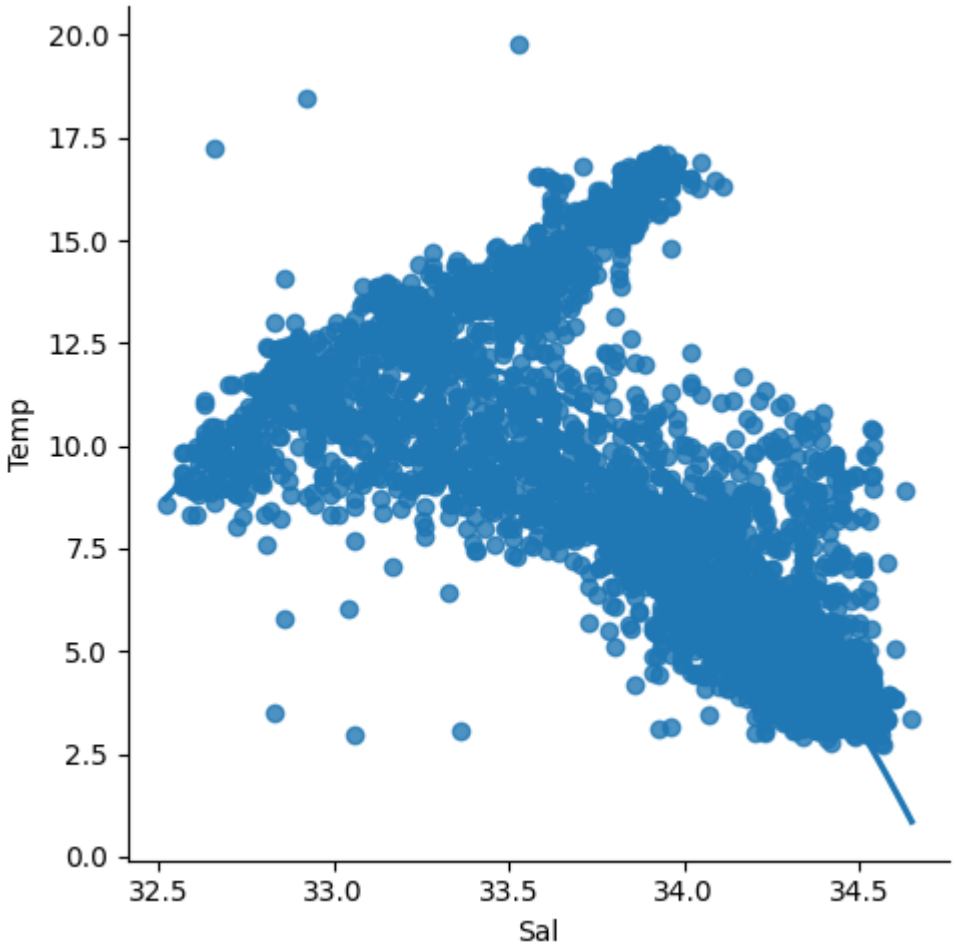
```
df_binary_copy['TempClass'] = df_binary_copy['TempClass'].map(class_mapping)

# Extract the feature and target data
X = df_binary_copy['Sal'].values.reshape(-1, 1)
y = df_binary_copy['TempClass'].values

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.25, random_state=42)

# Initialize the LogisticRegression model
regr = LogisticRegression()

# Fit the model on the training data
regr.fit(X_train, y_train)

# Make predictions on the test data
y_pred = regr.predict(X_test)

# Compute accuracy
accuracy = accuracy_score(y_test, y_pred)
print("Accuracy:", accuracy)

# Display the confusion matrix and classification report
conf_matrix = confusion_matrix(y_test, y_pred)
print("Confusion Matrix:")
print(conf_matrix)

classification_rep = classification_report(y_test, y_pred)
print("Classification Report:")
print(classification_rep)
```

OUTPUT:

//Data sample

	Sal	Temp
0	33.440	10.50
1	33.440	10.46
2	33.437	10.46
3	33.420	10.45
4	33.421	10.45

//Data scatter



//Predicted value

0.9324452901998097

//Accuracy of the model

Accuracy: 0.9324452901998097

Confusion Matrix:

[[980 0]

[71 0]]

Classification Report:

	precision	recall	f1-score	support
0	0.93	1.00	0.97	980
1	0.00	0.00	0.00	71
accuracy			0.93	1051
macro avg	0.47	0.50	0.48	1051
weighted avg	0.87	0.93	0.90	1051

RESULT:

Logistic regression for dataset is successfully implemented and accuracy of classifier is evaluated