EXPERIMENT -2

A python program to implement Simple linear regression using Least Square Method

AIM:

A python program to implement Simple linear regression using Least Square Method

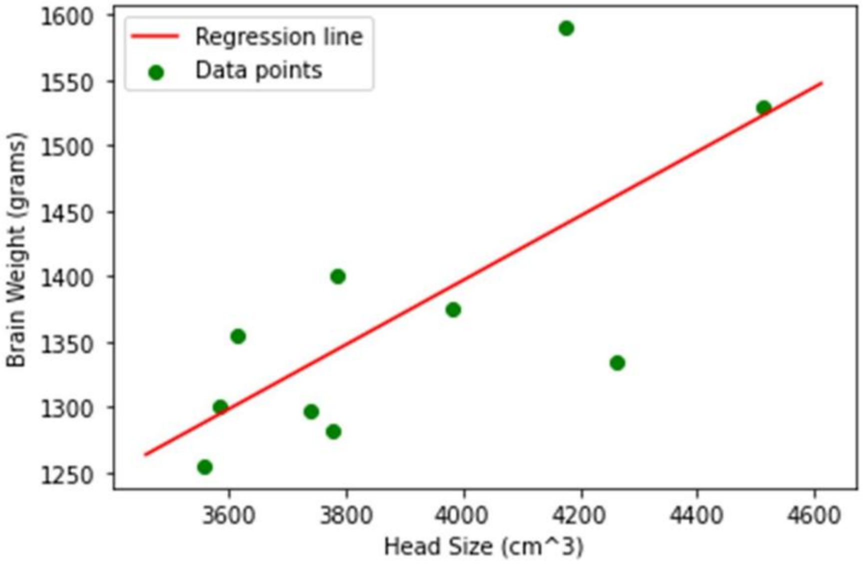
CODE:

```
# Import required libraries import
pandas as pd import
matplotlib.pyplot as plt import
numpy as np
from sklearn.linear_model import LinearRegression

# Load the dataset
data = pd.read_csv('headbrain.csv') x =
np.array(list(data['Head Size(cm^3)']))
y = np.array(list(data['Brain Weight(grams)']))

# Display first few rows
print(x[:5], y[:5])
```

```
# Function to get regression line
def get_line(x, y):
    x_m, y_m = np.mean(x), np.mean(y)
print("Mean of X:", x_m, " Mean of Y:", y_m)
x_d, y_d = x - x_m, y - y_m     m = np.sum(x_d
* y_d) / np.sum(x_d ** 2)     c = y_m - (m *
x_m)
    print("Slope (m):", m, "Intercept (c):", c)     return
lambda x: m * x + c

# Generate regression line lin =
get_line(x, y)

# Plot
X = np.linspace(np.min(x) - 100, np.max(x) + 100, 1000) Y
= np.array([lin(val) for val in X]) plt.plot(X, Y, color='red',
label='Regression line') plt.scatter(x, y, color='green',
label='Data points') plt.xlabel('Head Size (cm^3)')
plt.ylabel('Brain Weight (grams)') plt.legend()
plt.show()

# Calculate R² manually def
get_error(line_func, x, y):
y_m = np.mean(y)
    y_pred = np.array([line_func(val) for val in x])
ss_t = np.sum((y - y_m) ** 2)     ss_r = np.sum((y -
y_pred) ** 2)     return 1 - (ss_r / ss_t)

print("Manual R²:", get_error(lin, x, y))

# Using sklearn x =
x.reshape((len(x), 1))
```

```
reg = LinearRegression() reg.fit(x,
y)
print("Sklearn R²:", reg.score(x, y))
```

OUTPUT:



RESULT:

Thus a python program to implement Simple linear regression using Least Square Method is written and the output is verified successfully.