EXPERIMENT 2

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A PYTHON PROGRAM TO IMPLEMENT SIMPLE LINEAR REGRESSION USING LEAST SQUARE METHOD

AIM:

TO IMPLEMENT A PYTHON PROGRAM WITH SIMPLE LINEAR REGRESSION USING LEAST SQUARE METHOD

CODE:

```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
data = pd.read_csv('/content/headbrain.csv')
x, y = np.array(list(data['Head Size(cm^3)'])), np.array(list(data['Brain
Weight(grams)']))
print(x[:5], y[:5])

def get_line(x, y):
  x_m, y_m = np.mean(x), np.mean(y)
  print(x_m, 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(m, c)
  return lambda x : m*x+c

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

```
plt.legend()
plt.show()

def get_error(line_fuc, x, y):
   y_m = np.mean(y)
   y_pred = np.array([line_fuc(_) for _ in x])
   ss_t = np.sum((y-y_m)**2)
   ss_r = np.sum((y-y_pred)**2)
   return 1-(ss_r/ss_t)
get_error(lin, x, y)

from sklearn.linear_model import LinearRegression
x = x.reshape((len(x),1))
reg=LinearRegression()
reg=reg.fit(x, y)
print(reg.score(x, y))
```

OUTPUT:

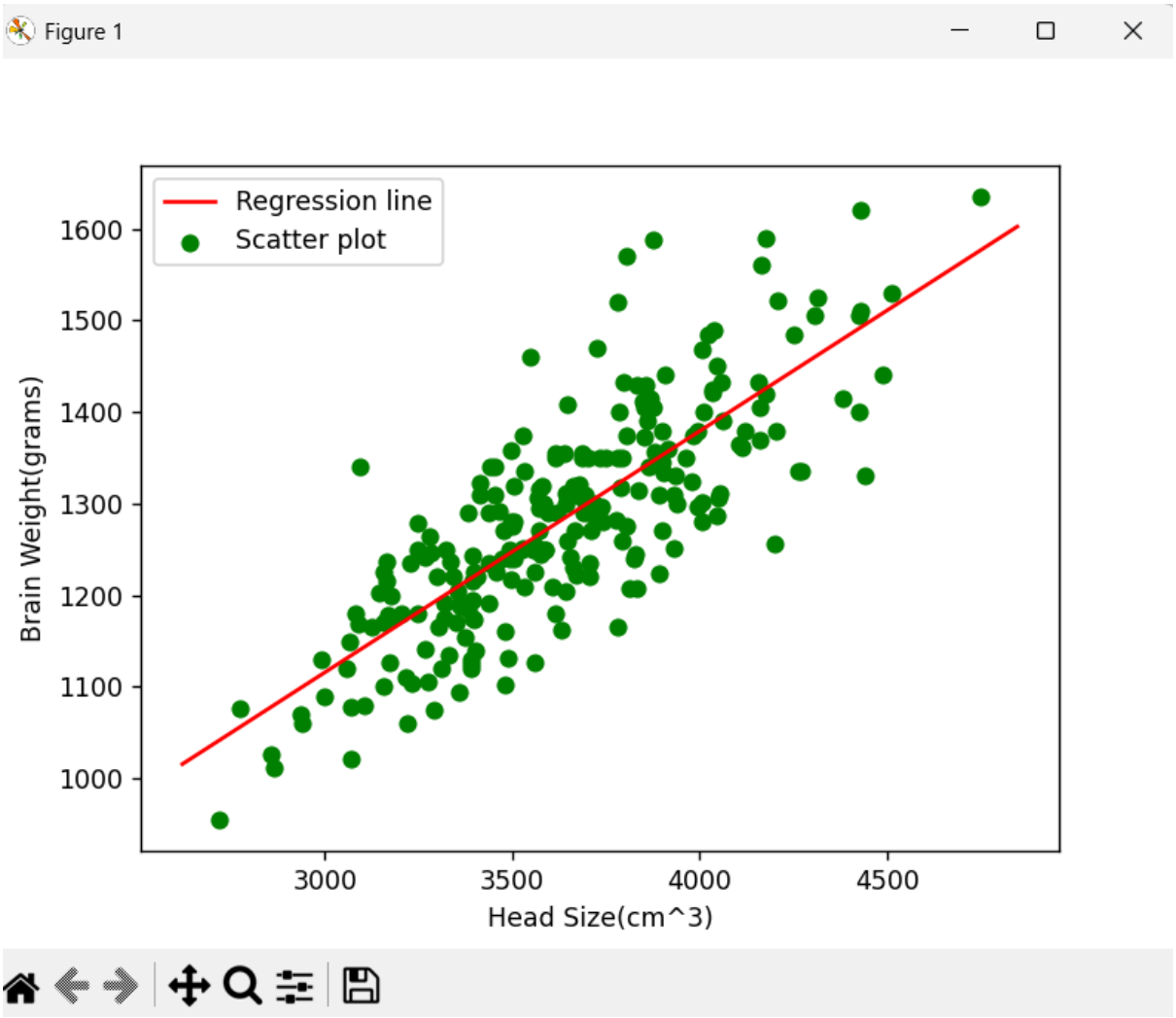
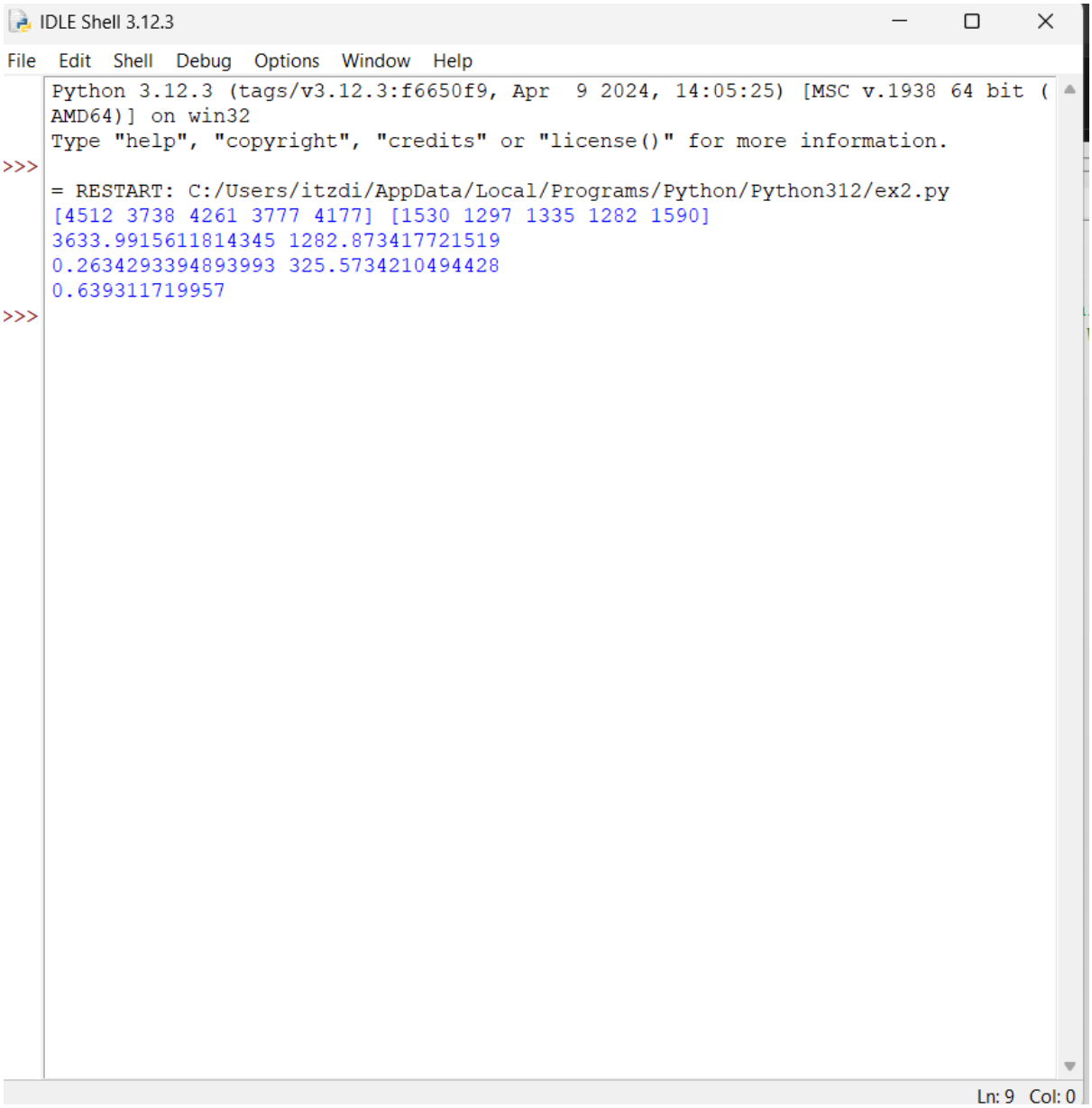


Figure 1
Regression line
Scatter plot
Brain Weight(grams)
1600
1500
1400
1300
1200
1100
1000
3000
3500
4000
4500
Head Size(cm^3)



RESULT:

A PYTHON PROGRAM TO IMPLEMENT SIMPLE LINEAR REGRESSION USING LEAST SQUARE METHOD AS BEEN ANALYSED AND VERIFIED