

```
from google.colab import drive
drive.mount('/content/drive')

Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).
```

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error
```

```
file_path='/content/drive/My Drive/headbrain dataset/headbrain (1).csv'
```

```
df = pd.read_csv(file_path)
print(df.head())
```

	Gender	Age	Range	Head Size(cm ³)	Brain Weight(grams)
0	1	1	1	4512	1530
1	1	1	1	3738	1297
2	1	1	1	4261	1335
3	1	1	1	3777	1282
4	1	1	1	4177	1590

```
X = df["Head Size(cm^3)"].values
Y = df["Brain Weight(grams)"].values
```

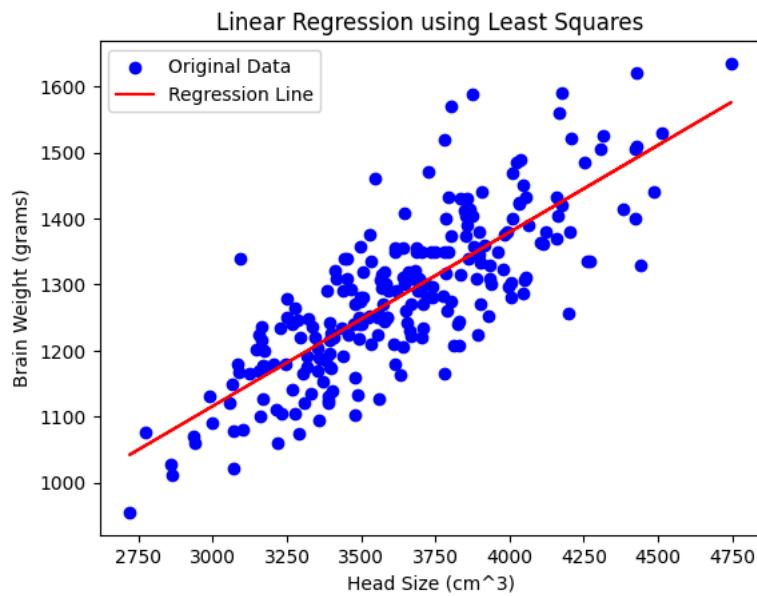
```
X = np.array(X)
Y = np.array(Y)
mean_x = np.mean(X)
mean_y = np.mean(Y)
n = len(X)
```

```
numer = 0
denom = 0
for i in range(n):
    numer += (X[i] - mean_x) * (Y[i] - mean_y)
    denom += (X[i] - mean_x) ** 2
w1 = numer / denom
w0 = mean_y - (w1 * mean_x)
print(f"Calculated coefficients:\n w0 (Intercept) = {w0:.2f}, w1 (Slope) = {w1:.2f}")
```

```
Calculated coefficients:
w0 (Intercept) = 325.57, w1 (Slope) = 0.26
```

```
Y_pred = w0 + w1 * X
```

```
plt.scatter(X, Y, color="blue", label="Original Data")
plt.plot(X, Y_pred, color="red", label="Regression Line")
plt.xlabel("Head Size (cm3)")
plt.ylabel("Brain Weight (grams)")
plt.legend()
plt.title("Linear Regression using Least Squares")
plt.show()
```



```
mse = np.mean((Y - Y_pred) ** 2)
print(f"MSE: {mse:.2f}")
```

```
MSE: 5201.38
```

```
X_reshaped = X.reshape(-1, 1)
reg = LinearRegression()
reg.fit(X_reshaped, Y)
print(f"Scikit-learn coefficients:\n w0 (Intercept) = {reg.intercept_:.2f}, w1 (Slope) = {reg.coef_[0]:.2f}")
```

```
Scikit-learn coefficients:
w0 (Intercept) = 325.57, w1 (Slope) = 0.26
```

```
Y_pred_sklearn = reg.predict(X_reshaped)
plt.scatter(X, Y, color="green", label="Original Data")
plt.plot(X, Y_pred_sklearn, color="orange", label="Sklearn Regression Line")
plt.xlabel("Head Size (cm3)")
plt.ylabel("Brain Weight (grams)")
plt.legend()
plt.title("Linear Regression using Scikit-learn")
plt.show()
```

