In [2]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
plt.rcParams["figure.figsize"]=(20.0,10.0)
#reading data
data=pd.read_csv('headbrain.csv')
print(data.shape)
data.head()
```

```
(237, 4)
```

Out[2]:

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

In [7]:
```
#collecting X and Y
X = data['Head Size(cm^3)'].values
Y = data['Brain Weight(grams)'].values
```

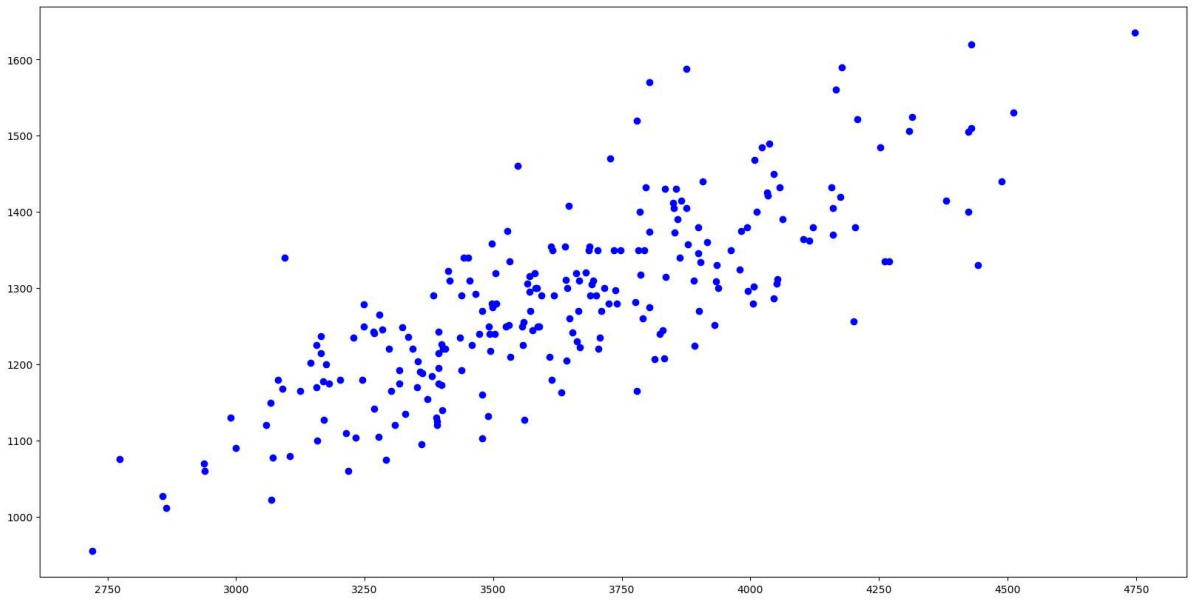
In [9]:
```
#mean X and Y
mean_x=np.mean(X)
mean_y=np.mean(Y)
#total of values
n=len(X)
```

In [10]:
```
#using the formula to calculate b1 and b0
numer=0
denom=0
for i in range(n):
    numer+=(X[i]-mean_x)*(Y[i]-mean_y)
    denom+=(X[i]-mean_x)**2
b1=numer/denom
b0=mean_y-(b1*mean_x)
#print coefficient
print('b1=',b1)
print('b0=',b0)
```

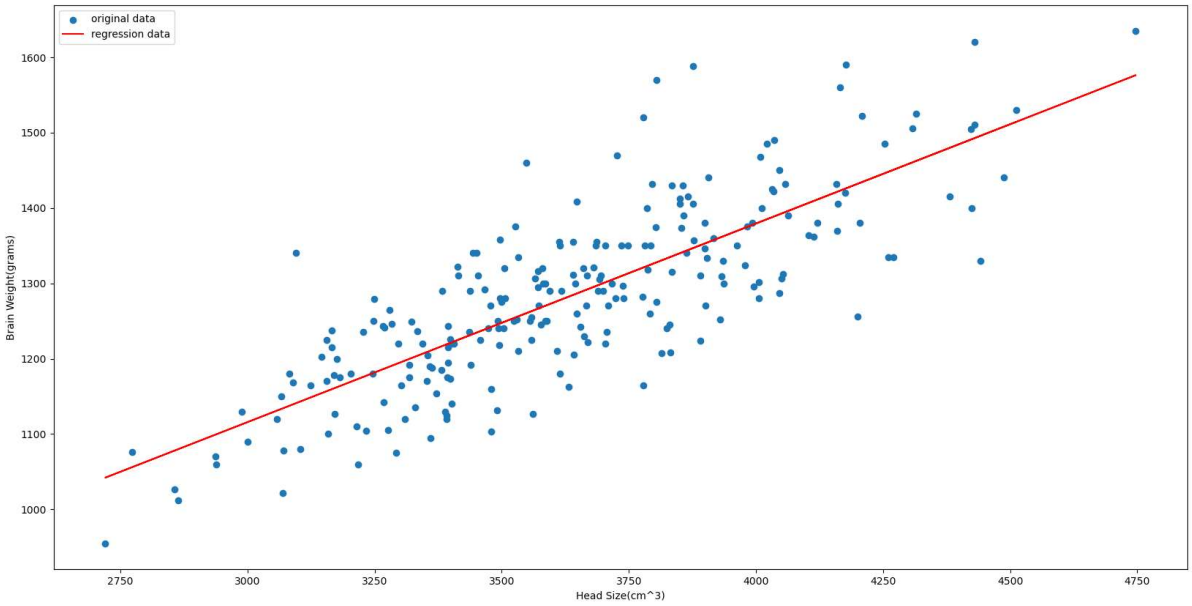
```
b1= 0.26342933948939945
b0= 325.57342104944223
```

In [12]:
```
#to plot actual point
plt.scatter(X,Y,color= "b",marker= "o")
```

Out[12]:
```
<matplotlib.collections.PathCollection at 0x1b5d8703580>
```



In [14]:
```
# to predict response vector
response_vec=b0+b1*X
#placing labels
plt.scatter(X,Y,label='original data')
plt.plot(X,response_vec,"r",label='regression data')
plt.xlabel('Head Size(cm^3)')
plt.ylabel('Brain Weight(grams)')
#to display plot
plt.legend()
plt.show()
```



In [20]:
```
#R^2 coefficient calculator
ss_t=0
ss_r=0
for i in range(n):
    y_pred = b0+b1*X[i]
    ss_t += (Y[i]-mean_y)**2
    ss_r += (Y[i]-y_pred)**2
r2=1-(ss_r/ss_t)
print(r2)
```

```
0.6393117199570003
```

In [21]:
```
#prediction of brain weight
x1=int(input("Enter the value:"))
y1= b0 + b1*x1
print(y1,"grams")
```

```
Enter the value:4000
1379.29077900704 grams
```

In [ ]: