In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:

```
brain_df = pd.read_csv('datasets/headbrain.csv')
brain_df.head()
```

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 [3]:

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

# Cannot use Rank 1 matrix in scikit learn
X = X.reshape(len(X),1)
```

In [4]:

```
from sklearn.model_selection import train_test_split

X_train,X_test,Y_train,Y_test = train_test_split(X,Y, test_size = 0.30, random_state = 
42)
```

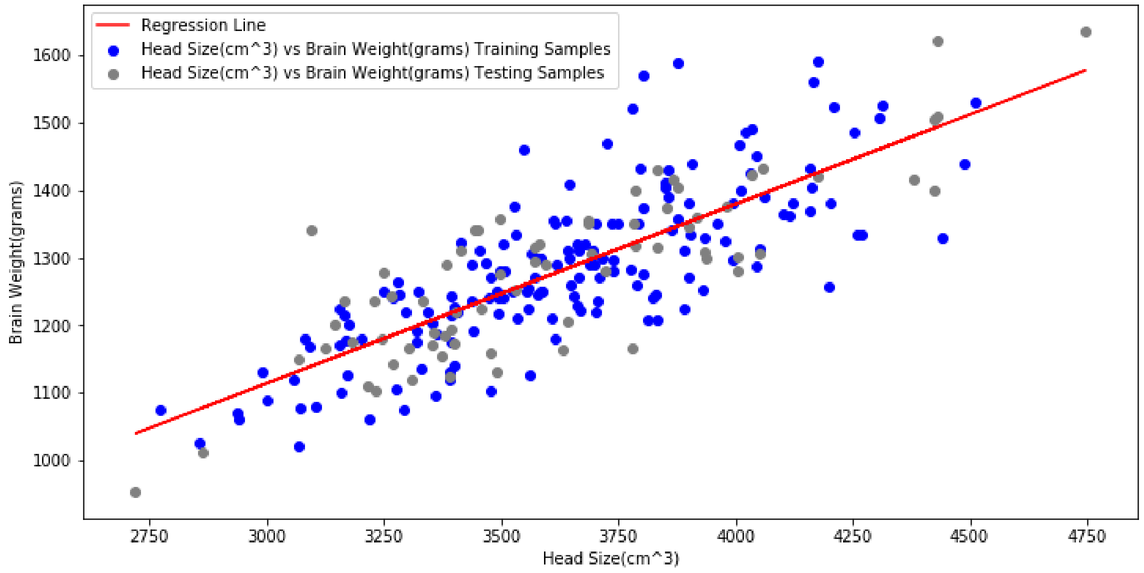
In [5]:

```
help(train_test_split)
```

```
Help on function train_test_split in module sklearn.model_selection._spli
t:

train_test_split(*arrays, **options)
    Split arrays or matrices into random train and test subsets

    Quick utility that wraps input validation and
    ``next(ShuffleSplit().split(X, y))`` and application to input data
    into a single call for splitting (and optionally subsampling) data in
a
    oneliner.

    Read more in the :ref:`User Guide <cross_validation>`.

    Parameters
    ----------
    *arrays : sequence of indexables with same length / shape[0]
        Allowed inputs are lists, numpy arrays, scipy-sparse
        matrices or pandas dataframes.

    test_size : float, int or None, optional (default=0.25)
        If float, should be between 0.0 and 1.0 and represent the proporti
on
        of the dataset to include in the test split. If int, represents th
e
        absolute number of test samples. If None, the value is set to the
        complement of the train size. By default, the value is set to 0.2
5.
        The default will change in version 0.21. It will remain 0.25 only
        if ``train_size`` is unspecified, otherwise it will complement
        the specified ``train_size``.

    train_size : float, int, or None, (default=None)
        If float, should be between 0.0 and 1.0 and represent the
        proportion of the dataset to include in the train split. If
        int, represents the absolute number of train samples. If None,
        the value is automatically set to the complement of the test size.

    random_state : int, RandomState instance or None, optional (default=No
ne)
        If int, random_state is the seed used by the random number generat
or;
        If RandomState instance, random_state is the random number generat
or;
        If None, the random number generator is the RandomState instance u
sed
        by `np.random`.

    shuffle : boolean, optional (default=True)
        Whether or not to shuffle the data before splitting. If shuffle=Fa
lse
        then stratify must be None.

    stratify : array-like or None (default=None)
        If not None, data is split in a stratified fashion, using this as
        the class labels.

    Returns
    -------
    splitting : list, length=2 * len(arrays)
        List containing train-test split of inputs.
        .. versionadded:: 0.16
            If the input is sparse, the output will be a
            ``scipy.sparse.csr_matrix``. Else, output type is the same as
the
            input type.

    Examples
    --------
    >>> import numpy as np
    >>> from sklearn.model_selection import train_test_split
    >>> X, y = np.arange(10).reshape((5, 2)), range(5)
    >>> X
    array([[0, 1],
           [2, 3],
           [4, 5],
           [6, 7],
           [8, 9]])
    >>> list(y)
    [0, 1, 2, 3, 4]

    >>> X_train, X_test, y_train, y_test = train_test_split(
    ...     X, y, test_size=0.33, random_state=42)
    ...
    >>> X_train
    array([[4, 5],
           [0, 1],
           [6, 7]])
    >>> y_train
    [2, 0, 3]
    >>> X_test
    array([[2, 3],
           [8, 9]])
    >>> y_test
    [1, 4]

    >>> train_test_split(y, shuffle=False)
    [[0, 1, 2], [3, 4]]
```

In [14]:

```
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error
# Creating Model
reg = LinearRegression()
# Fitting training data
reg = reg.fit(X_train, Y_train)
# Y Prediction
Y_pred = reg.predict(X_test)

plt.figure(figsize=(12,6))
# Plotting scatter plot
plt.scatter(X_train,Y_train,label = 'Head Size(cm^3) vs Brain Weight(grams) Training Samples',color = 'b')
# Plotting scatter plot
plt.scatter(X_test,Y_test,label = 'Head Size(cm^3) vs Brain Weight(grams) Testing Samples',color = 'grey',marker='o')
plt.plot(X_test,Y_pred,'r',label='Regression Line') # Plotting the Regressing by using X and predicted values
plt.xlabel('Head Size(cm^3)')
plt.ylabel('Brain Weight(grams)')
plt.legend()
plt.show()
```



In [7]:

```
# Calculating RMSE and R2 Score
mse = mean_squared_error(Y_test, Y_pred)
rmse = np.sqrt(mse)
print("Root mean Square Error (RMSE):",np.sqrt(mse))
```

```
Root mean Square Error (RMSE): 67.95527201634788
```

In [8]:

```
r2_score = reg.score(X_test, Y_test)
print("Coefficient of Determination R^2 Score:",r2_score)
```

```
Coefficient of Determination R^2 Score: 0.6993002108399291
```