---**What is linear regression?**---

--Linear regression is a linear approach to modeling the relationship between a scalar response and one or more explanatory variables. The case of one explanatory variable is called simple linear regression.

--It is the easiest alogrithm among all machine learning agorithm.

--Its quite simple to implement.

----**About Dataset**----

Here is a simple dataset from kaggle which is Weights and Heights dataset tried to apply linear regression algorithm.

The data contains the variables

---Gender

---Height (Inches)

---Weight (Pound)

---**Goal**---

- Predict the height or weight of a person.

Step 1--Data Preprocessing

In [1]:
```
#Importing libraries.
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

In [2]:
```
#Read the datasets
dataset=pd.read_csv("weight-height.csv")
```

In [3]:
```
#Check the dataset
dataset.head()
```

Out[3]:

	Gender	Height	Weight
0	Male	73.847017	241.893563
1	Male	68.781904	162.310473
2	Male	74.110105	212.740856
3	Male	71.730978	220.042470
4	Male	69.881796	206.349801

In [4]:
```
#check if null values is present in dataset or not.....
dataset.isnull().sum()
```

Out[4]:
```
Gender    0
Height    0
Weight    0
dtype: int64
```

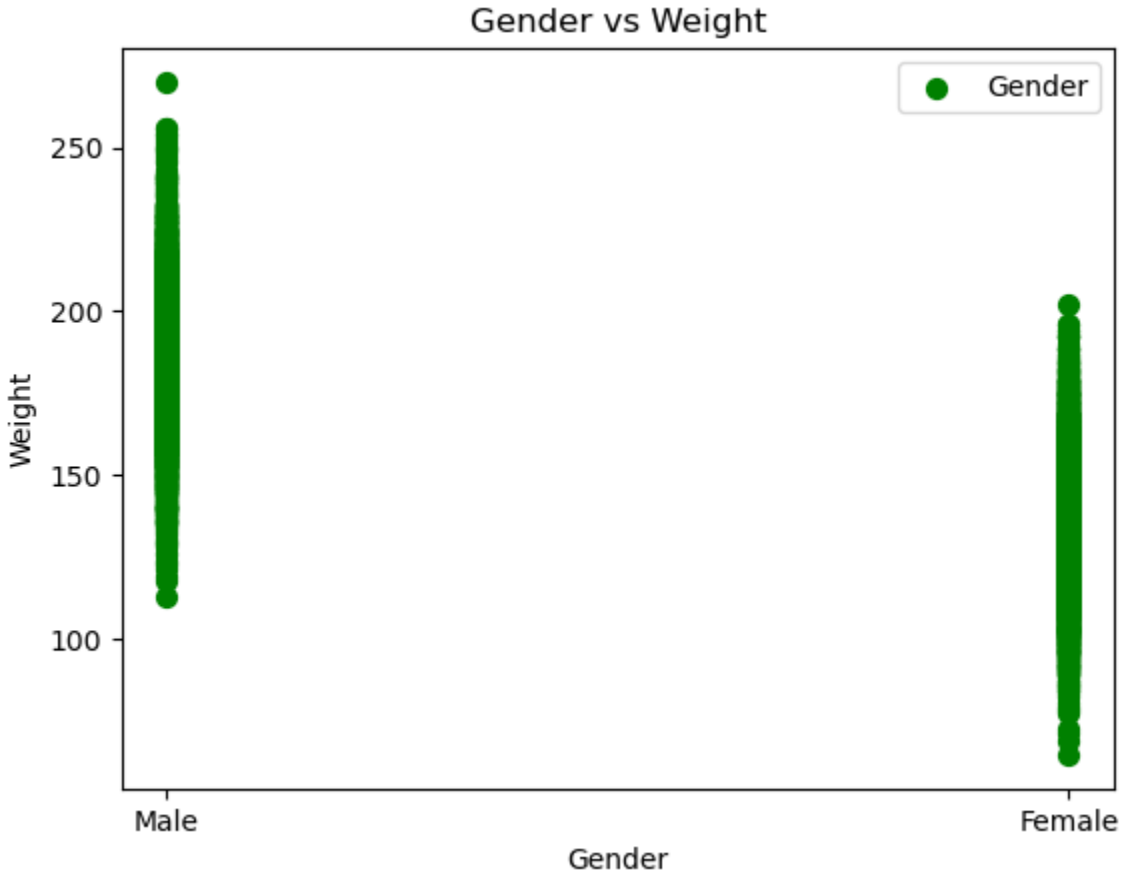
In [ ]:

In [5]:
```
#Checking the dimensions of the dataset
dataset.shape
```

Out[5]:
```
(10000, 3)
```

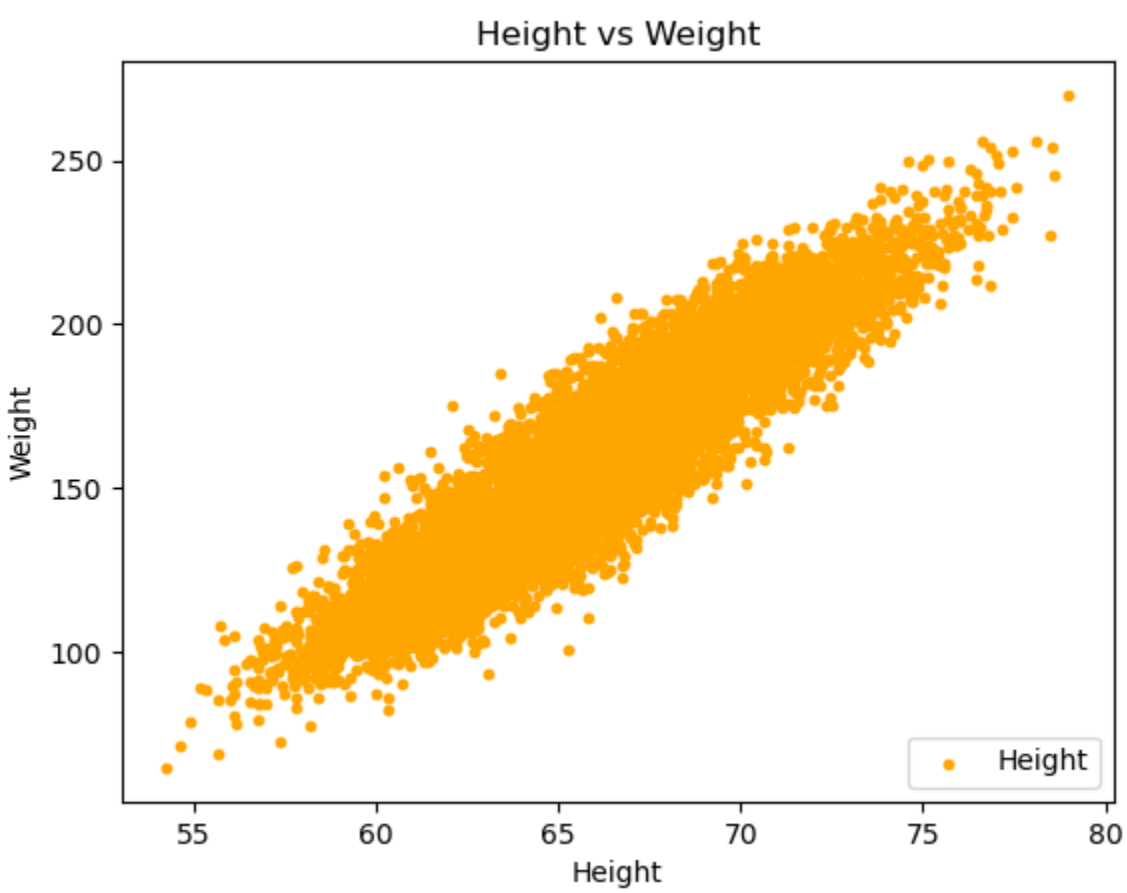
Lets check the correlation between each variables

In [6]:
```
#Plot Gender vs Weight.....
x1 = dataset.iloc[:, 0].values
y1 = dataset.iloc[:, 2].values
plt.scatter(x1,y1,label='Gender',color='Green',s=50)
plt.xlabel('Gender')
plt.ylabel('Weight')
plt.title('Gender vs Weight')
plt.legend()
plt.show()
```



Here in the above plot, we can see **weight is not atall dependent on Gender**. So,Gender variable **is not useful** for our prediction.

In [7]:
```
#Plot Height vs Weight.....
x2 = dataset.iloc[:, 1].values
y2 = dataset.iloc[:, 2].values
plt.scatter(x2,y2,label='Height',color='Orange',s=10)
plt.xlabel('Height')
plt.ylabel('Weight')
plt.title('Height vs Weight')
plt.legend(loc="lower right")
plt.show()
```



From the above plot can have idea that **weight and height are highly dependent** on each other.In other words,we can say that as **height increases ,weight also increases**.

In [8]:
```
#separating the dependent and independent values....
#X-Independent variable
X = dataset.iloc[:, 1:2].values
print(X)
```

```
[[73.84701702]
 [68.78190405]
 [74.11010539]
 ...
 [63.86799221]
 [69.03424313]
 [61.94424588]]
```

In [9]:
```
#y-dependent or target variable
y = dataset.iloc[:, 2].values
print(y)
```

```
[241.89356318 162.31047252 212.74085556 ... 128.47531878 163.85246135
 113.64910268]
```

Step 2-Splitting the dataset into training and testing set

In [10]:
```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=12
```

Step 3-Build a linear model

In [11]:
```
#Creating linear regression model
from sklearn.linear_model import LinearRegression
regressor = LinearRegression()
regressor.fit(X_train, y_train)
```

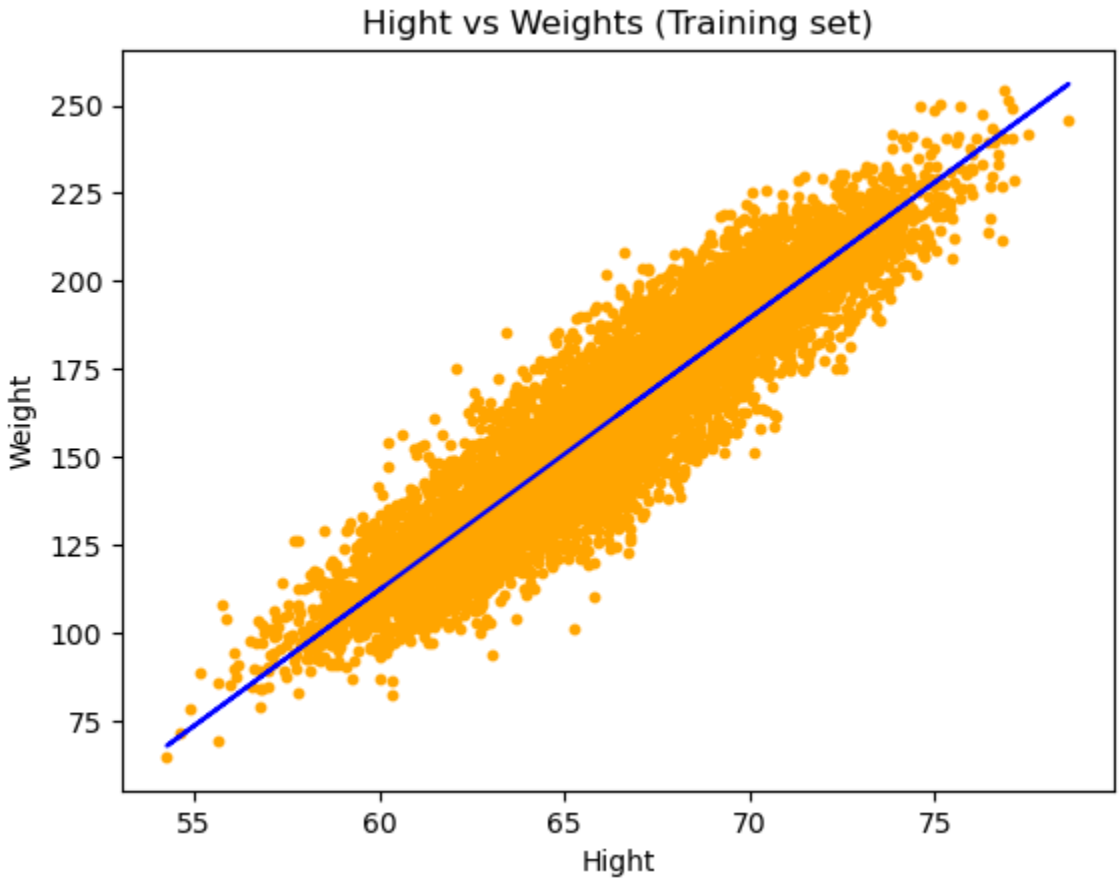
Out[11]:
```
LinearRegression
LinearRegression()
```

In [12]:
```
#predicting the test set
y_pred = regressor.predict(X_test)
```

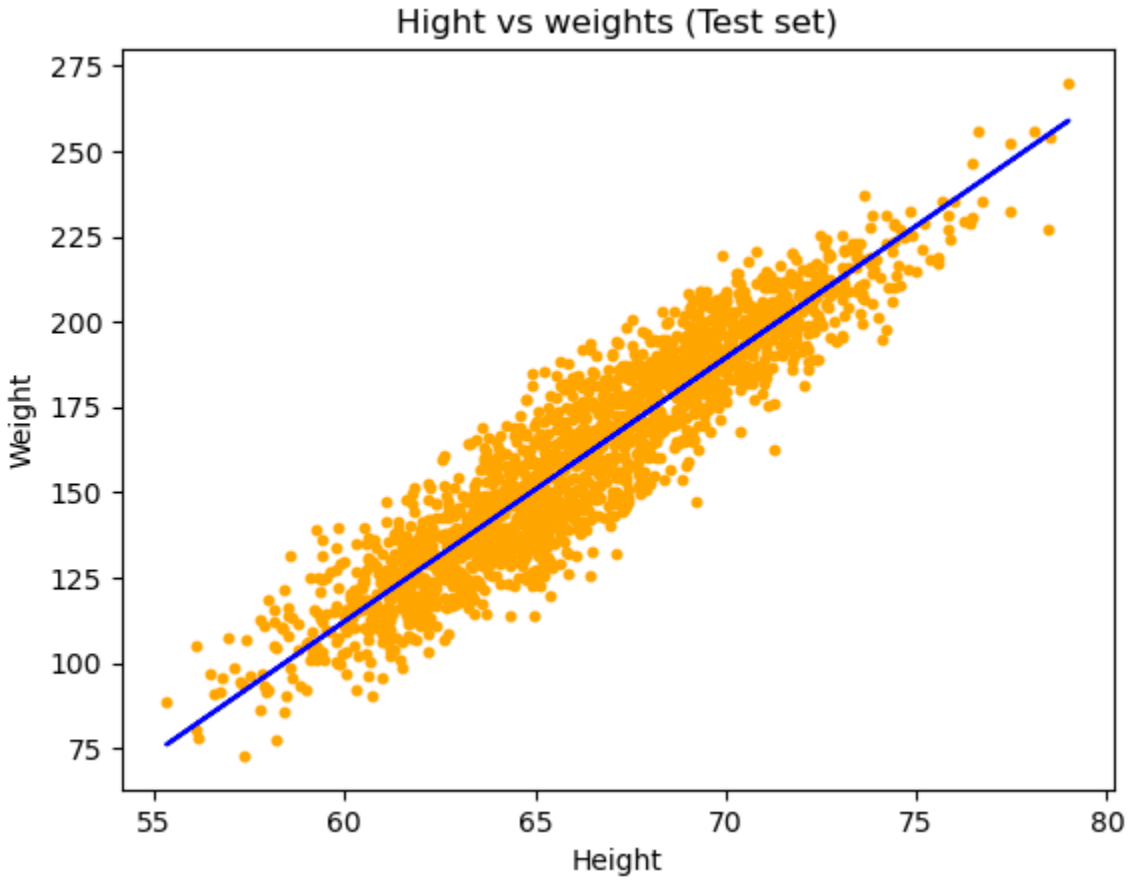
Step 4-Now fun part

---Visualize the result.

In [13]:
```
# Visualising the Training set results
plt.scatter(X_train, y_train, color = 'orange',s=10)
plt.plot(X_train, regressor.predict(X_train), color = 'blue')
plt.title('Hight vs Weights (Training set)')
plt.xlabel('Hight')
plt.ylabel('Weight')
plt.show()
```



In [14]:
```
# Visualising the Test set results
plt.scatter(X_test, y_test, color = 'orange',s=10)
plt.plot(X_test, regressor.predict(X_test), color = 'blue')
plt.title('Hight vs weights (Test set)')
plt.xlabel('Height')
plt.ylabel('Weight')
plt.show()
```



Step 5-Checking the accuracy

In [15]:
```
# Mean absolute error
from sklearn.metrics import mean_absolute_error
print("Mean absolute error: %.2f" % mean_absolute_error(y_test, y_pred))
```

```
Mean absolute error: 9.69
```

In [16]:
```
# Mean squared error
from sklearn.metrics import mean_squared_error
print("Mean squared error: %.2f" % mean_squared_error(y_test, y_pred))
```

```
Mean squared error: 143.23
```

In [ ]:
```

```