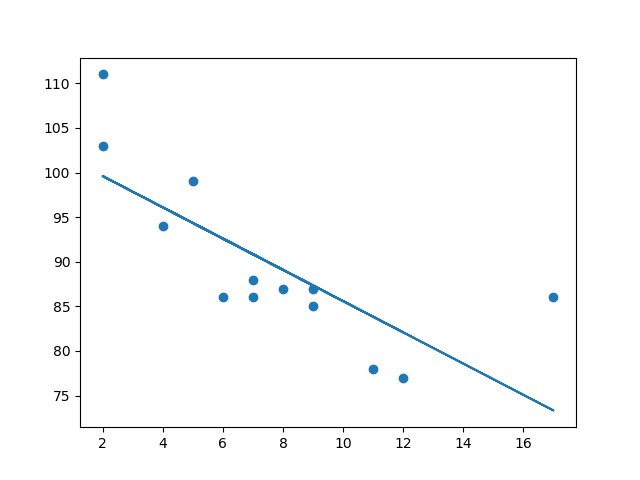
# Simple Linear Regression

The term regression is used when you try to find the relationship between variables. In Machine Learning, and in statistical modeling, that relationship is used to predict the outcome of future events.

Linear regression uses the relationship between the data-points to draw a straight line through all them.

This line can be used to predict future values.



**Linear regression** is also a type of [**supervised machine-learning algorithm**](https://www.geeksforgeeks.org/supervised-machine-learning/) that learns from the labelled datasets and maps the data points with most optimized linear functions which can be used for prediction on new datasets. It computes the linear relationship between the dependent variable and one or more independent features by fitting a linear equation with observed data.

The model’s equation offers **clear coefficients** that illustrate the **influence of each independent variable on the dependent variable**, enhancing our understanding of the underlying relationships. Its simplicity is a significant advantage; linear regression is transparent, easy to implement.

Our primary objective while using linear regression is to locate the best-fit line, which implies that the error between the predicted and actual values should be kept to a minimum.

The best Fit Line equation provides a straight line that represents the relationship between the dependent and independent variables. The slope of the line indicates how much the dependent variable changes for a unit change in the independent variable(s).



Linear regression performs the task to predict a dependent variable value (y) based on a given independent variable (x)).

The model gets the best regression fit line by finding the best θ1 and θ2 values.

* **θ1:** intercept
* **θ2:** coefficient of x (also known as slope)

Once we find the best θ1 and θ2 values, we get the best-fit line.

Simple Linear Regression

[Simple linear regression](https://www.geeksforgeeks.org/simple-linear-regression-in-python/) is the simplest form of linear regression and it involves only one independent variable and one dependent variable. The equation for simple linear regression is:  
y=β0+β1X*y*=*β*0​+*β*1​*X*  
where:

* Y is the dependent variable
* X is the independent variable
* β0 is the intercept
* β1 is the slope

Multiple Linear Regression

[Multiple linear regression](https://www.geeksforgeeks.org/ml-multiple-linear-regression-using-python/) involves more than one independent variable and one dependent variable. The equation for multiple linear regression is:  
y=β0+β1X1+β2X2+………βnXn*y*=*β*0​+*β*1​*X*1+*β*2​*X*2+………*βn*​*Xn*  
where:

* Y is the dependent variable
* X1, X2, …, Xn are the independent variables
* β0 is the intercept
* β1, β2, …, βn are the slopes

**The goal of the algorithm is to find the best Fit Line equation that can predict the values based on the independent variables.**

In regression set of records are present with X and Y values and these values are used to learn a function so if you want to predict Y from an unknown X this learned function can be used. In regression we have to find the value of Y, So, a function is required that predicts continuous Y in the case of regression given X as independent features.