Agenda

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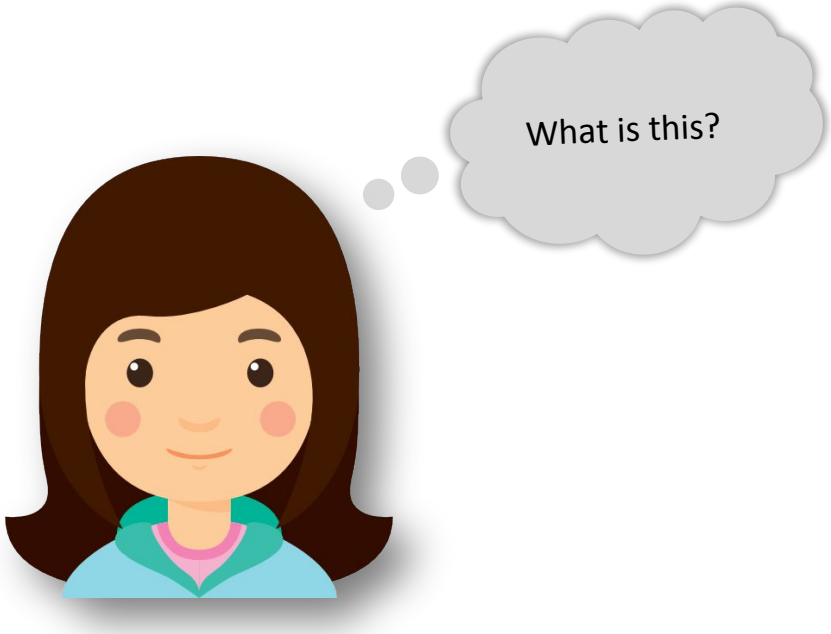
Learning for Life

1. Intro to Machine Learning
2. Linear Regression
3. Logistic Regression & Decision Tree
4. Fake News Detection

What is Machine Learning?



What is Machine Learning?

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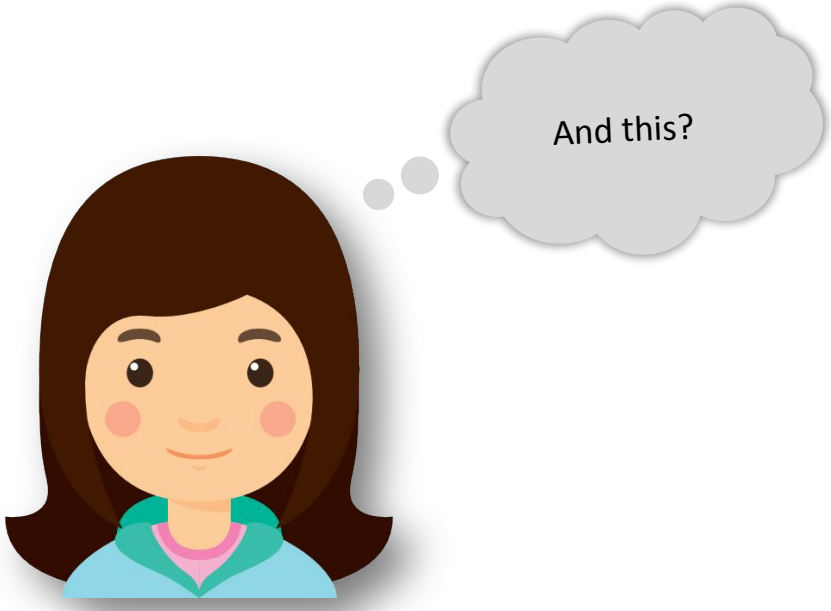
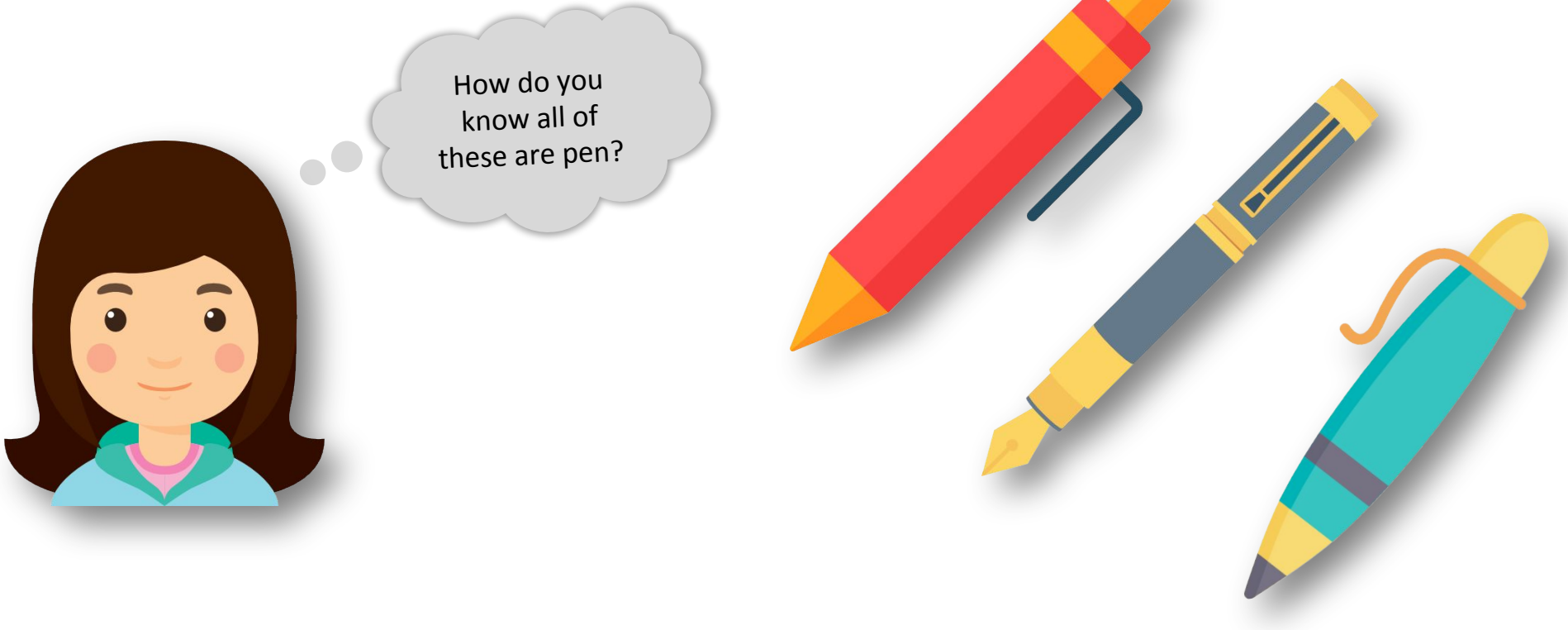
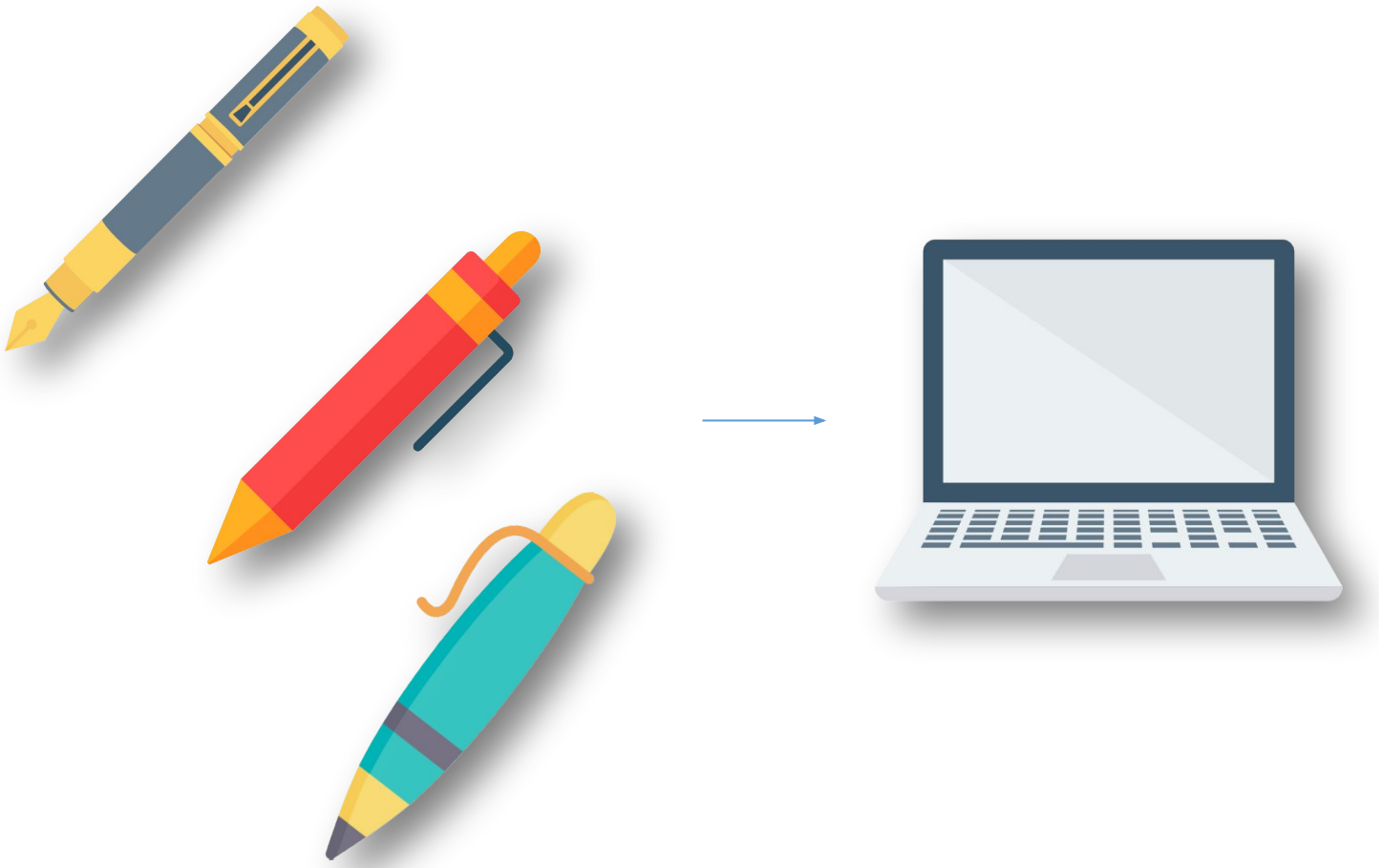


What is Machine Learning?

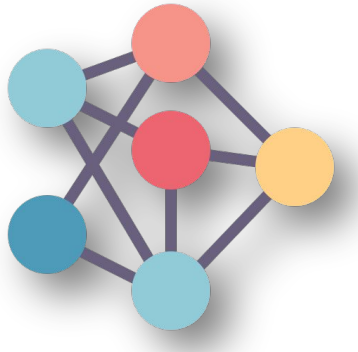


What is Machine Learning?



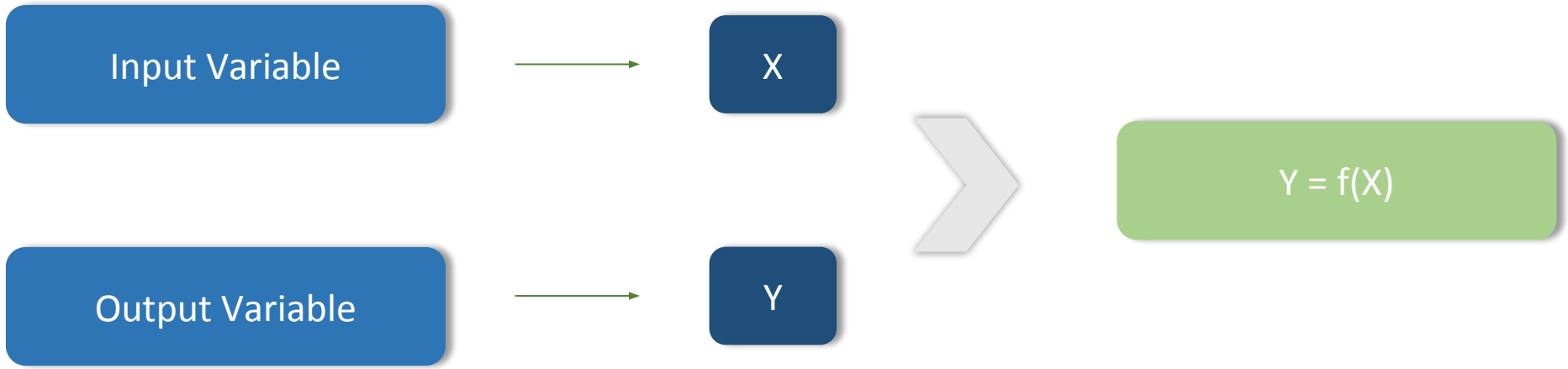
What is Machine Learning?

Categories of Machine Learning

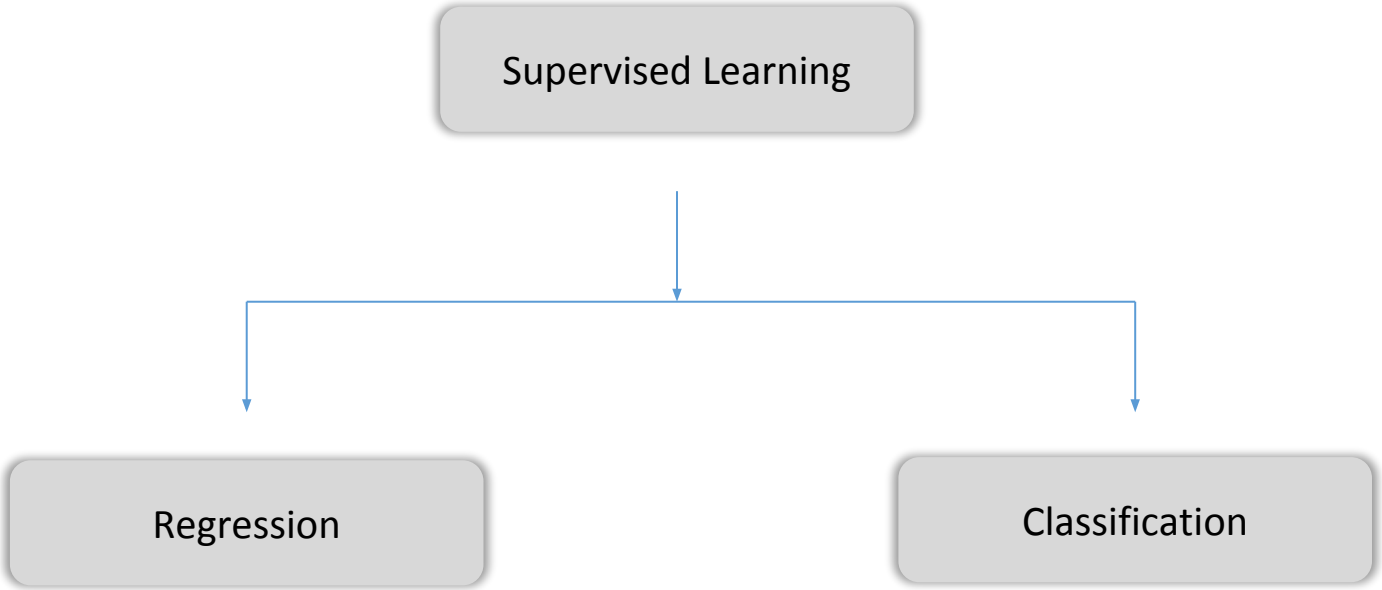


- Supervised Learning
- Unsupervised Learning

Supervised Learning

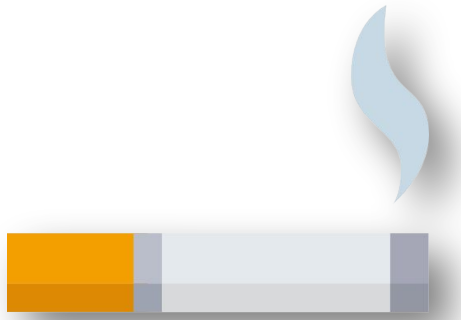


Categories of Supervised Learning



Classification

Classification is the process of predicting the class of a new variable



Smoke(Yes/No)

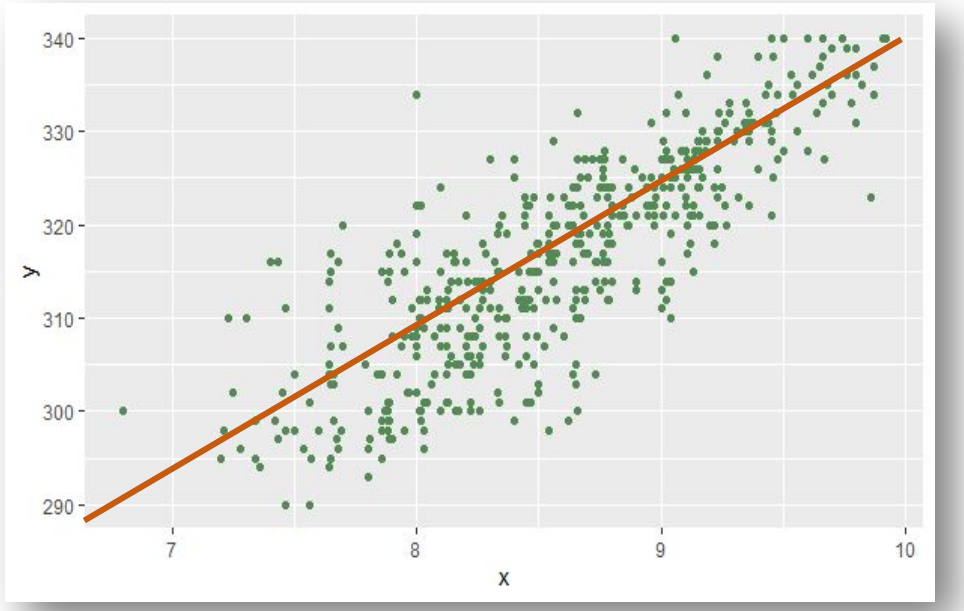
Cancer(Yes/No)

Regression

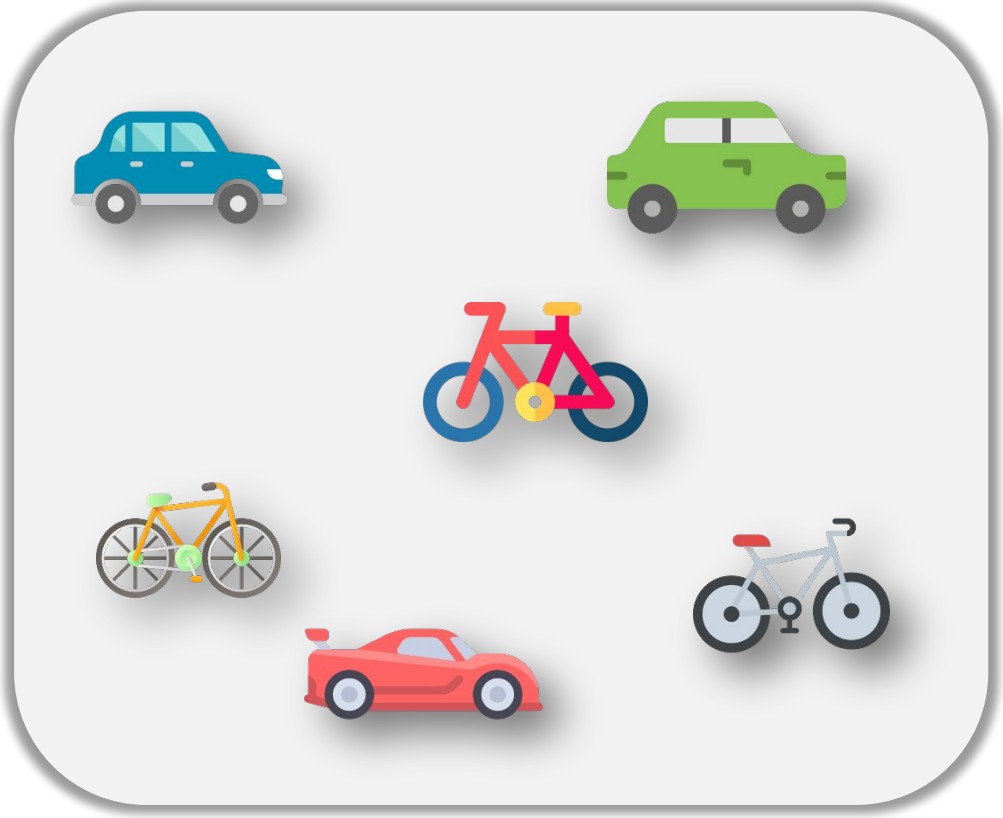
This method is used to estimate the relationship between different entities

Dependent Variable ← → Independent Variable

$$Y=f(x)$$

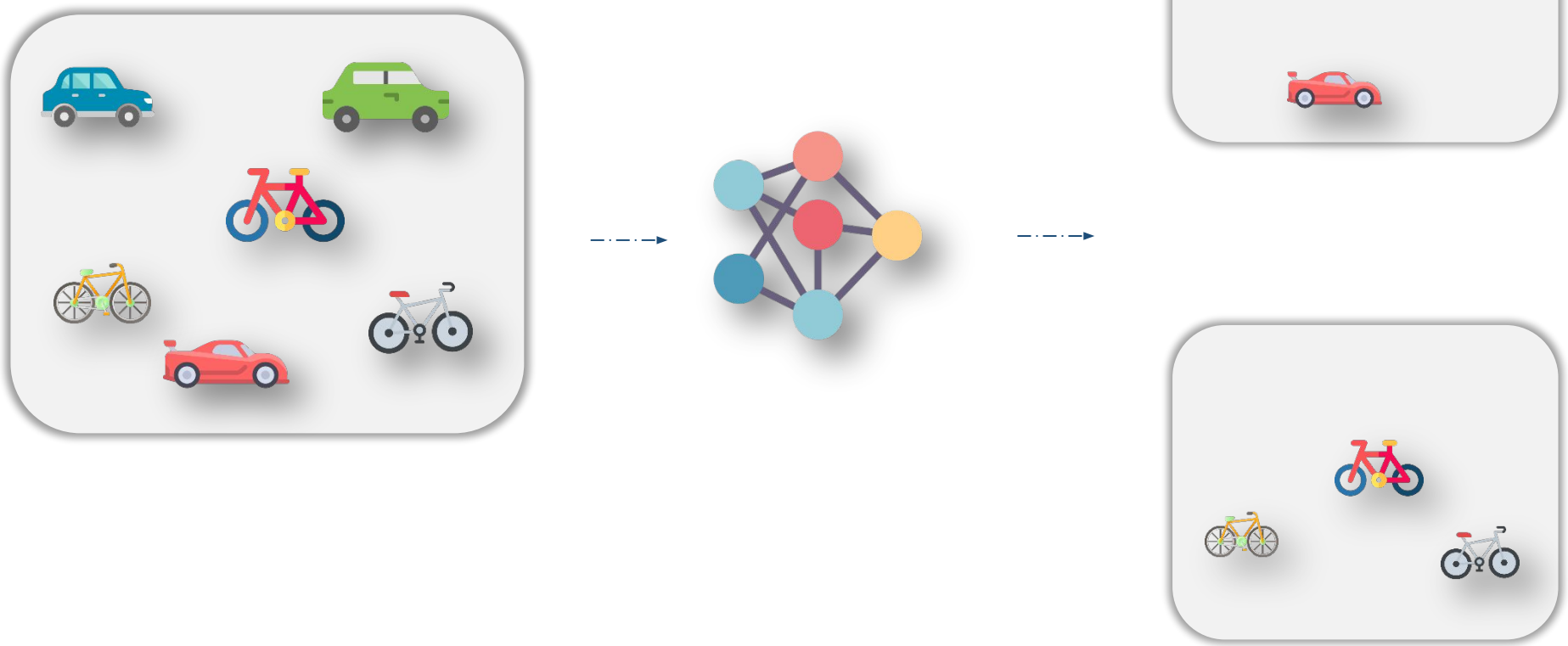


Unsupervised Learning (Clustering)

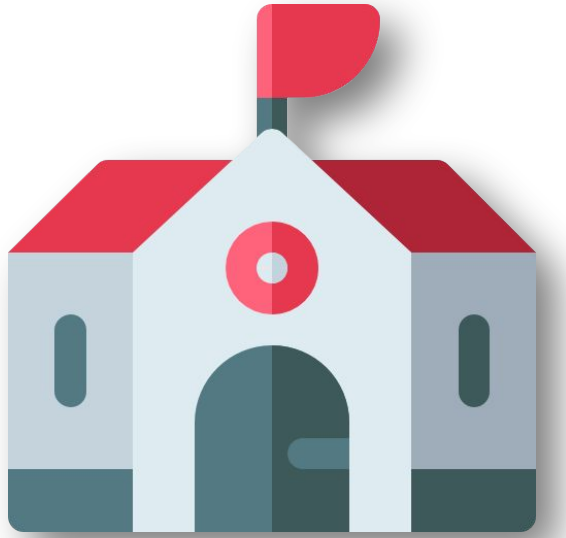


Input Data with no class labels

Unsupervised Learning (Clustering)



You are conducting a case-study on a set of college students to understand if students with high CGPA also get a high GRE score



Linear Regression

GRE Score	CGPA
337	9.65
324	8.87
316	8.00
322	8.67
314	8.21
330	9.34
321	8.20
308	7.90
302	8.00
323	8.60

Case Study

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GRE.Score	CGPA
337	9.65
324	8.87
316	8.00
322	8.67
314	8.21
330	9.34
321	8.20
308	7.90
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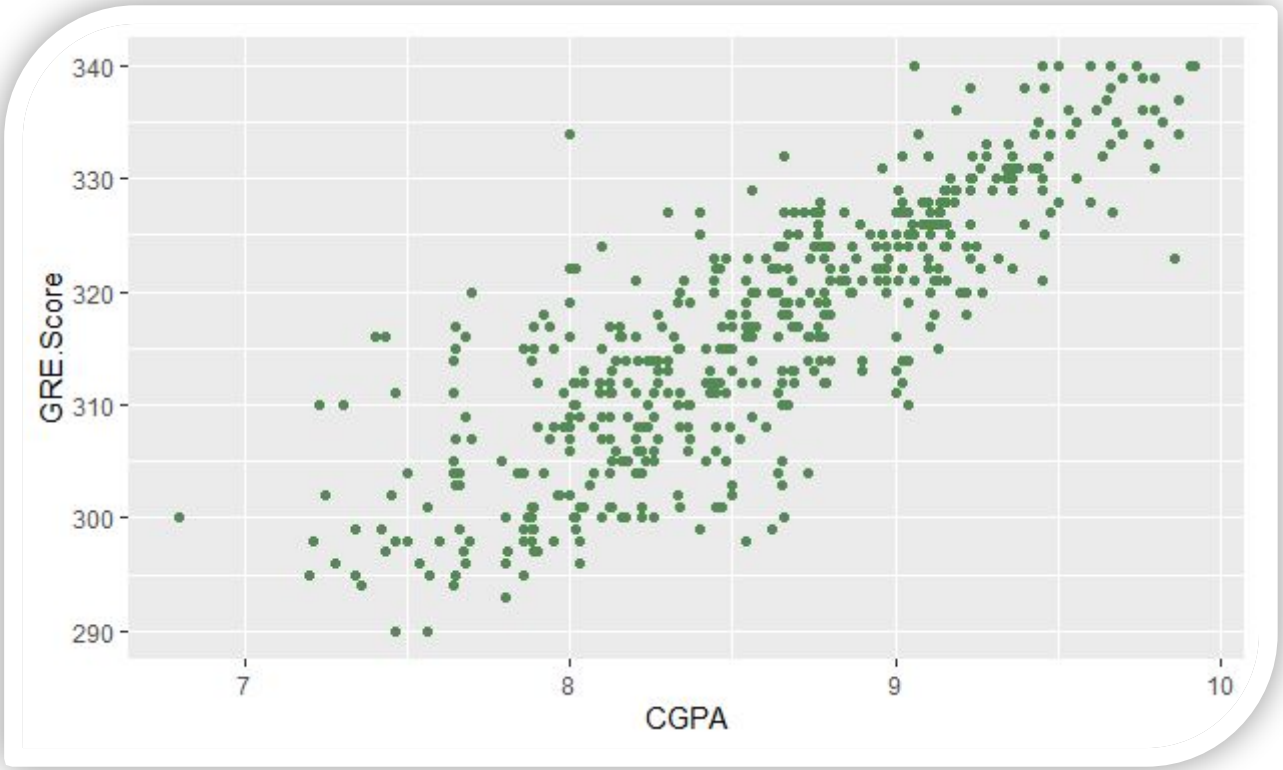
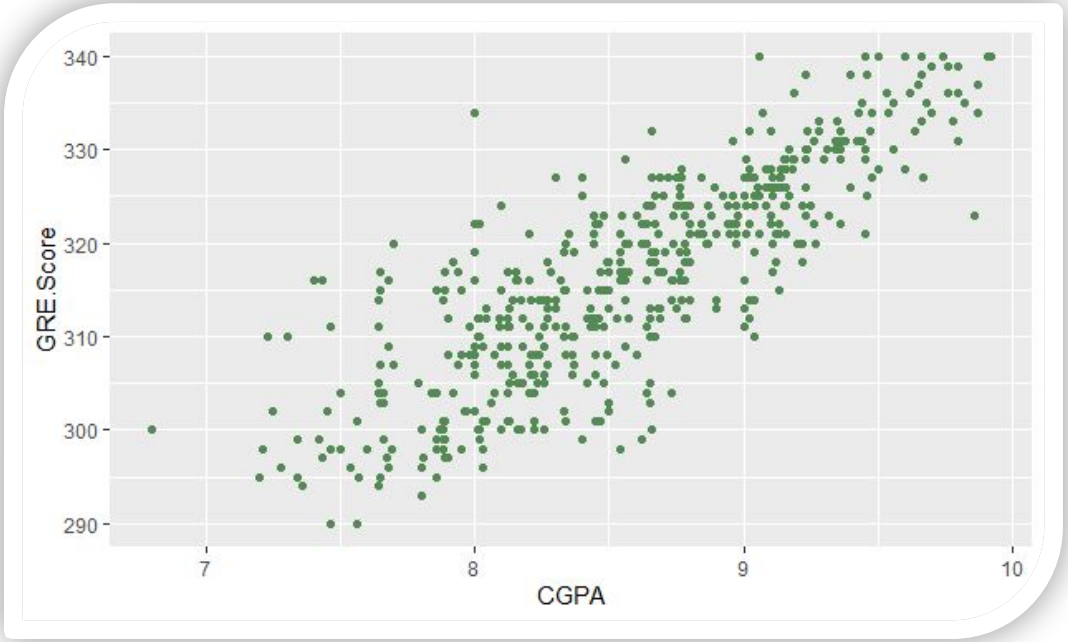
323	8.60



Y X

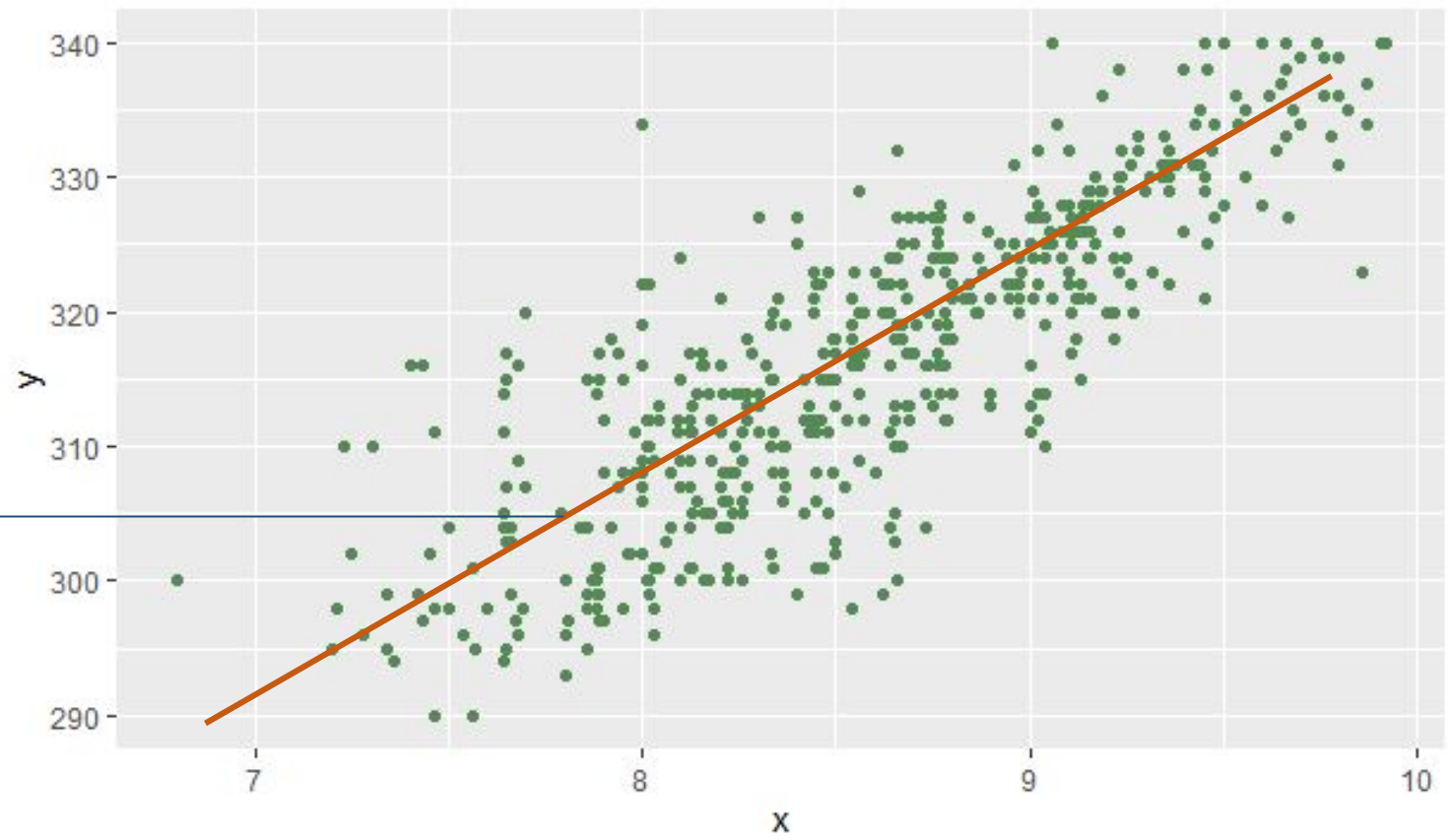
Need of Regression Analysis

What would be the GRE Score of a student if his CGPA is 8.32?

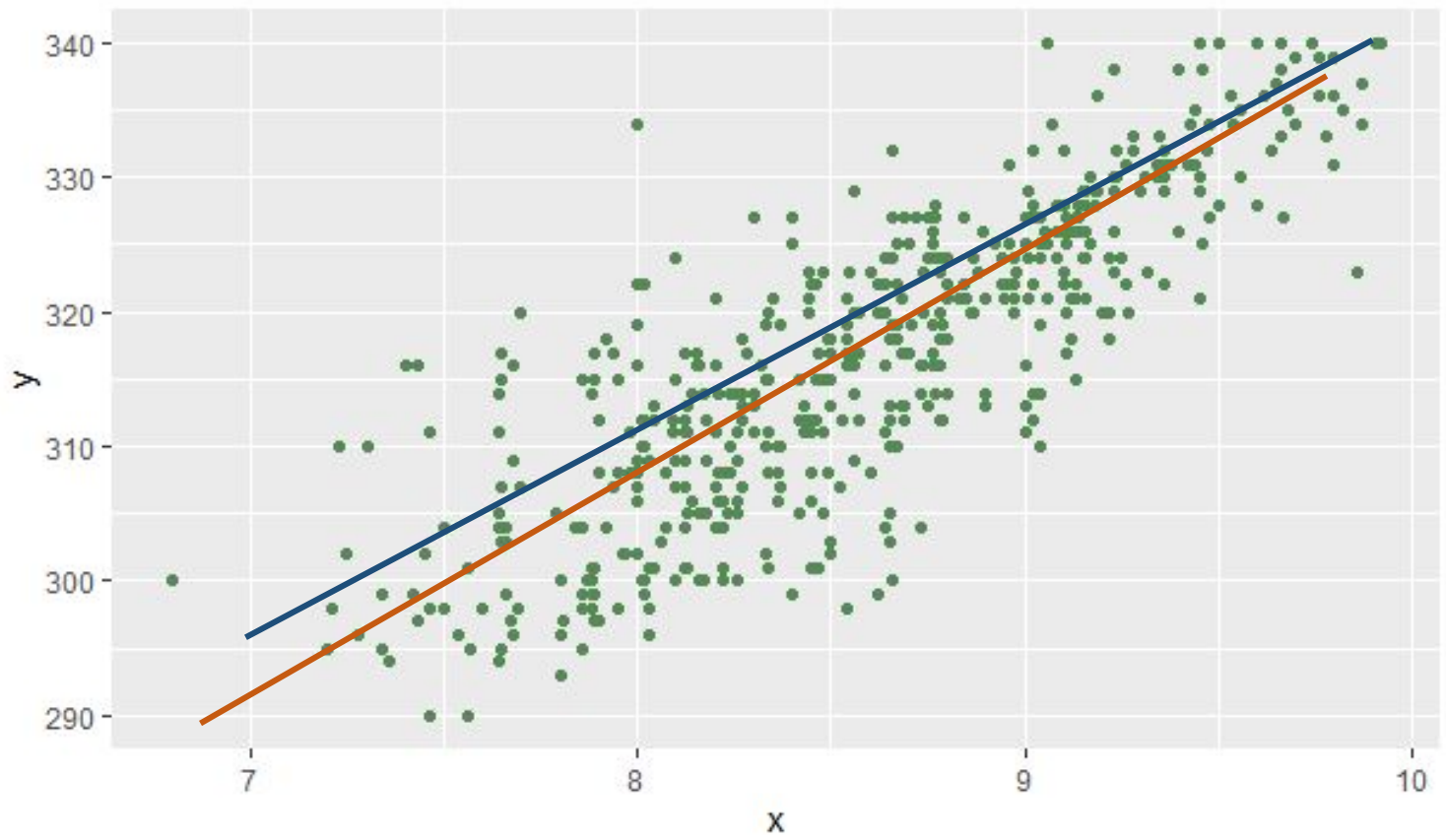


Best Fit Line

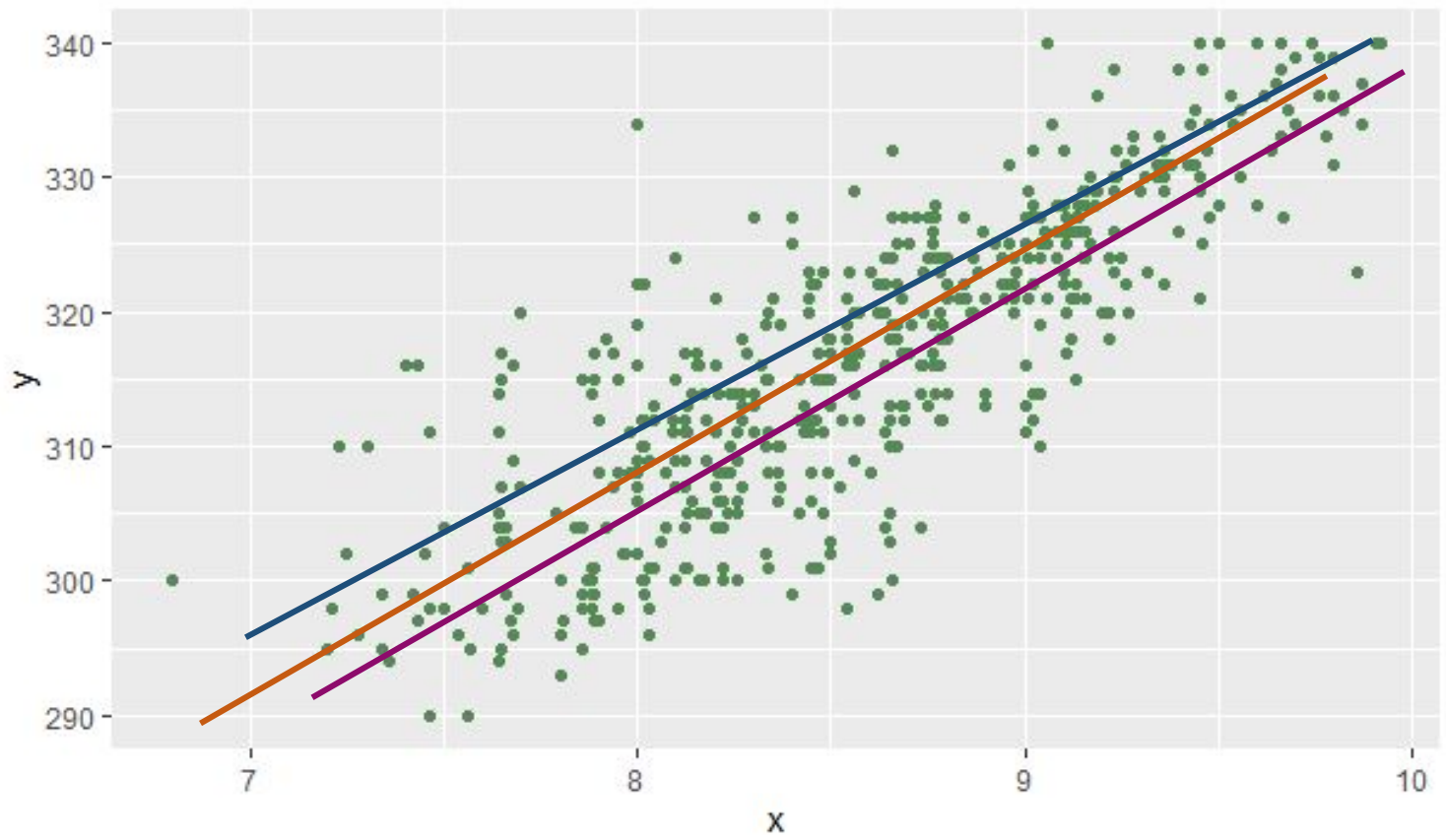
$Y = a + bx$



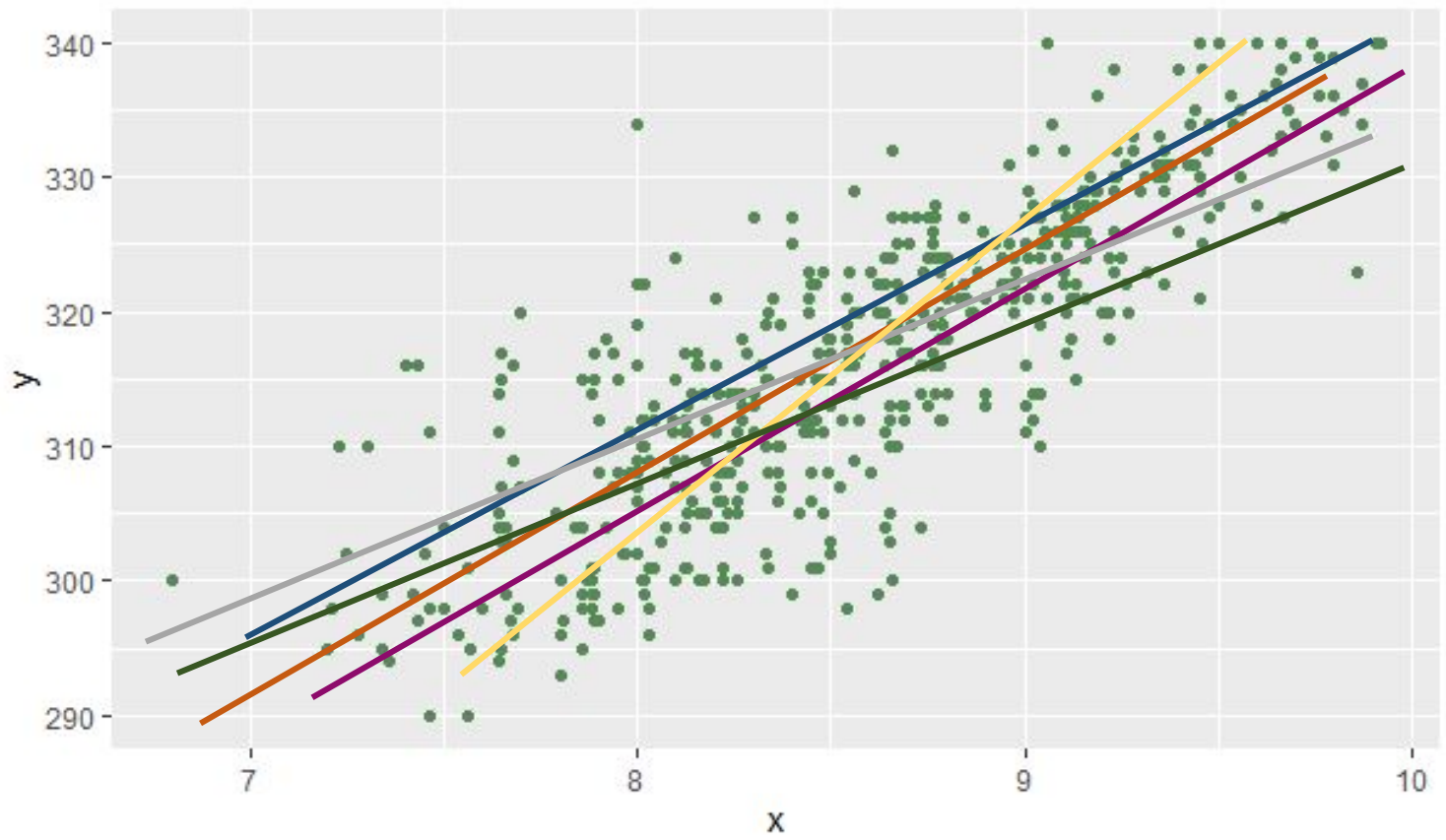
Best Fit Line



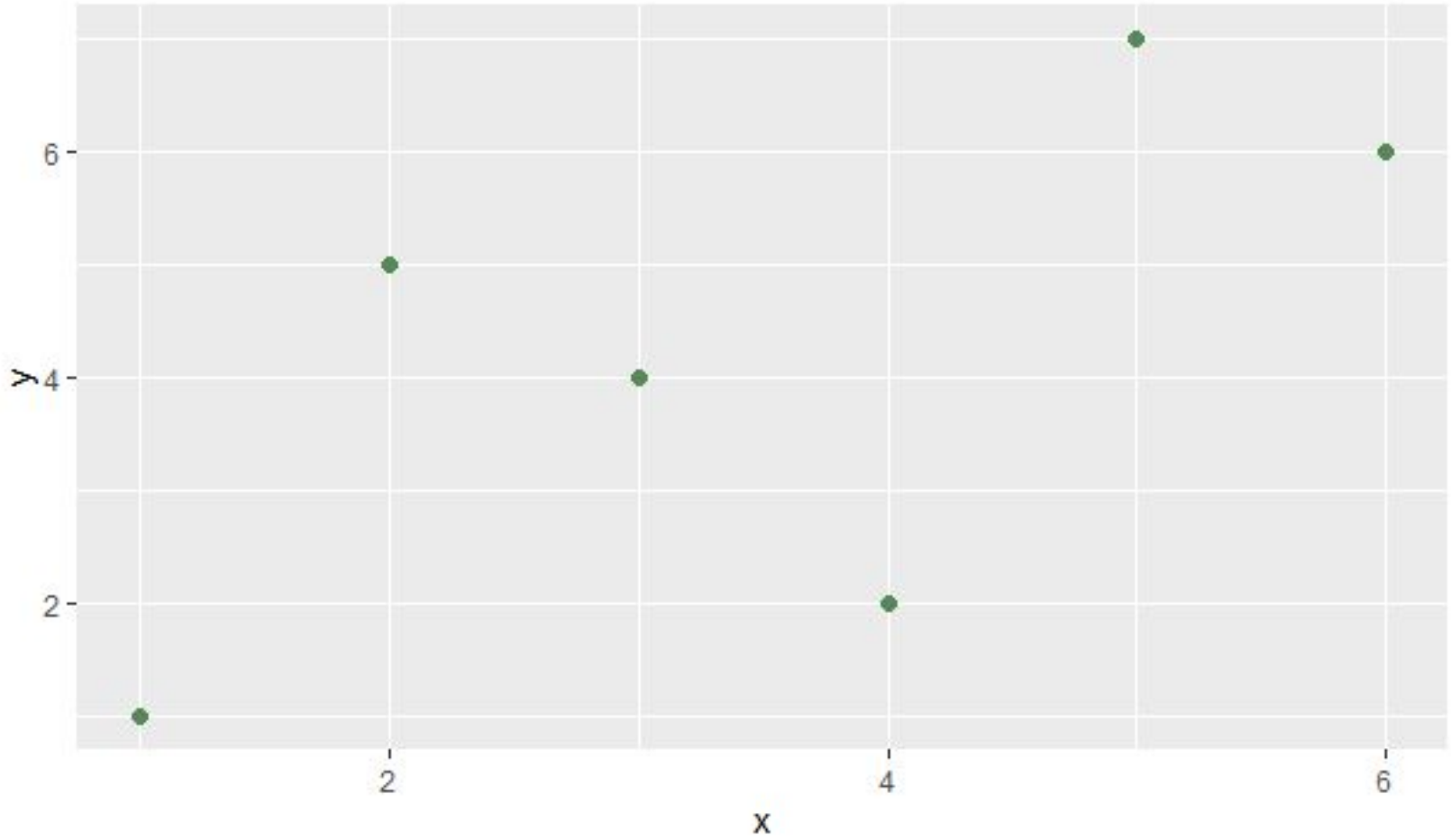
Best Fit Line



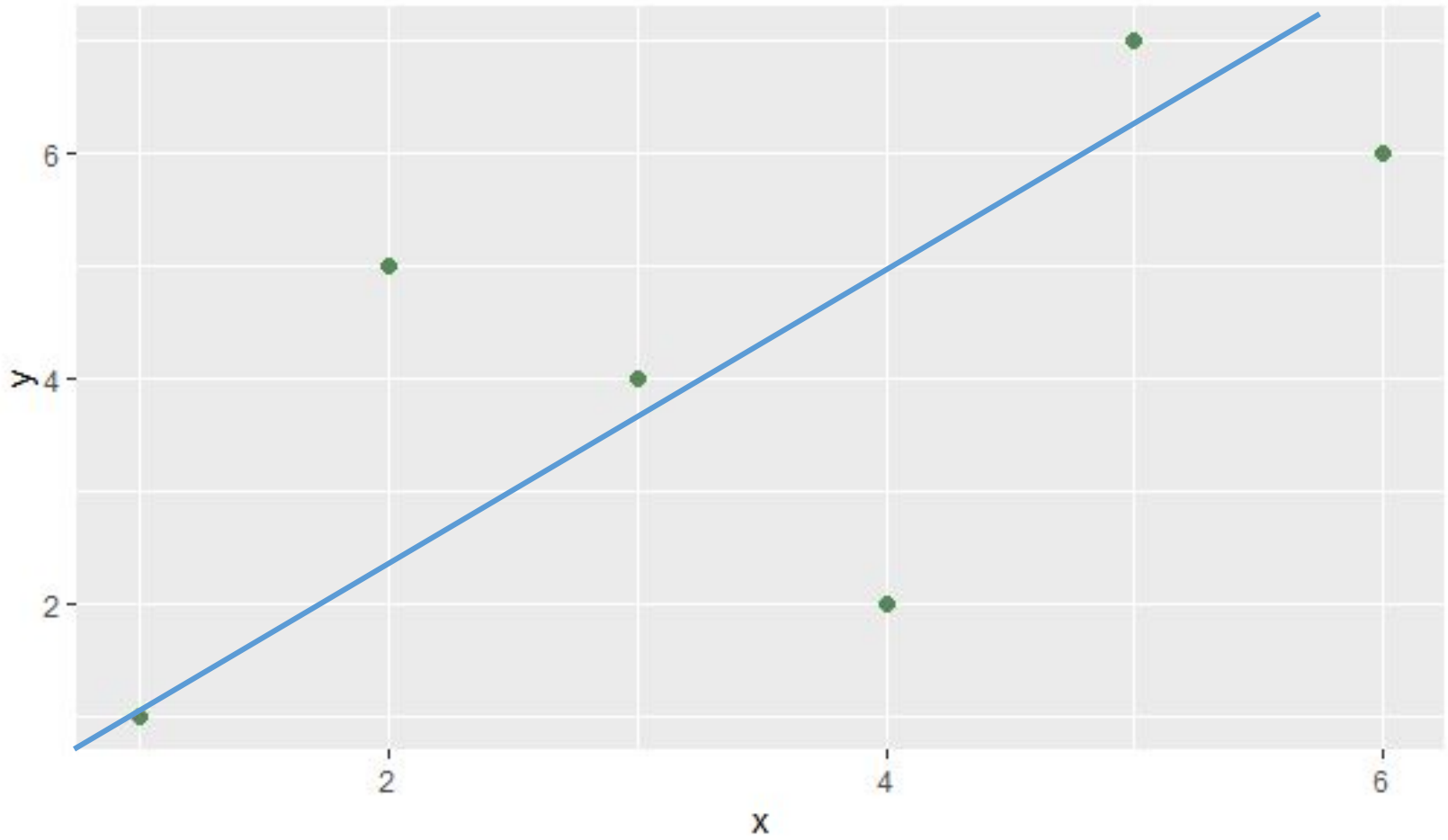
Best Fit Line



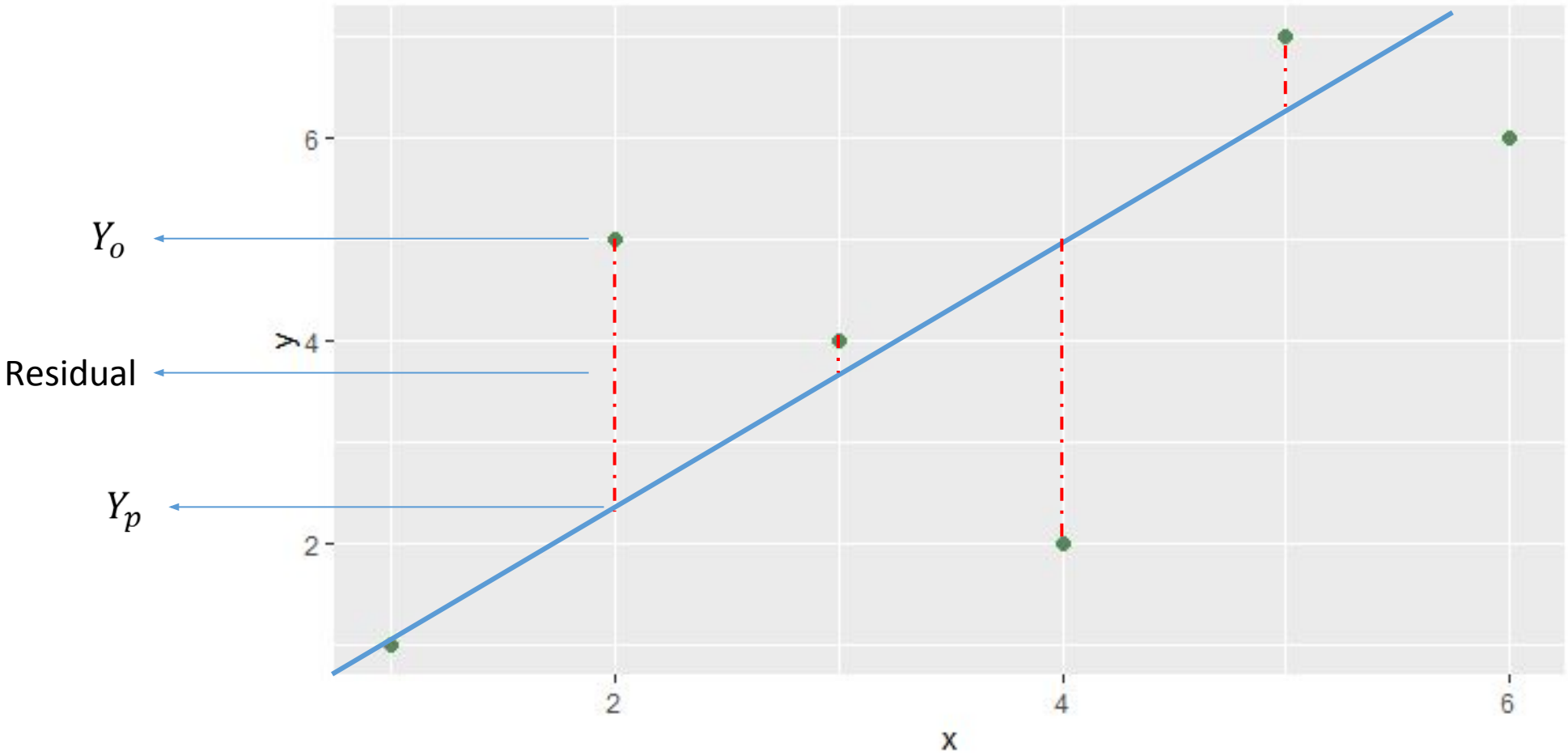
Measure of Good Fit



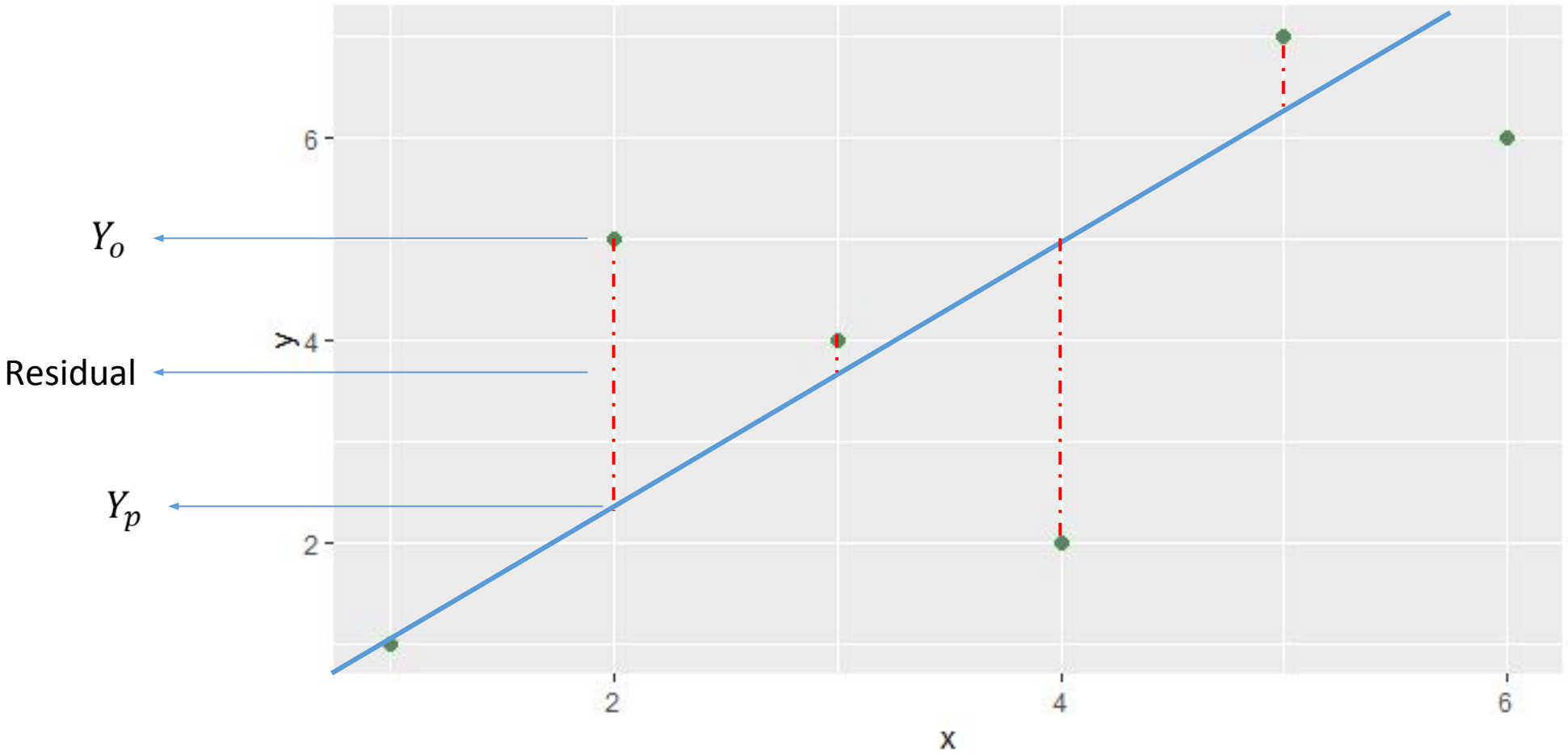
Measure of Good Fit



Measure of Good Fit

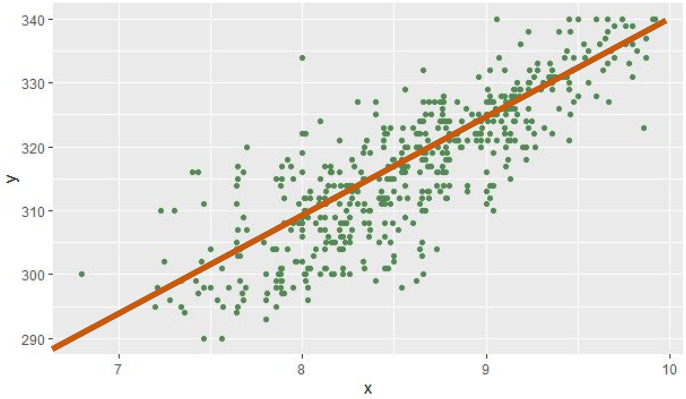


Measure of Good Fit

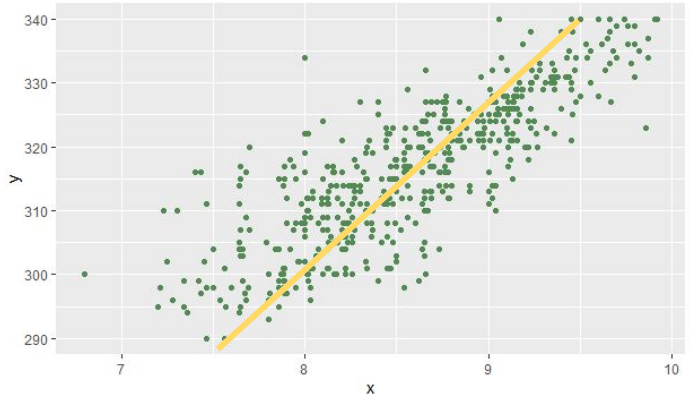


$$\sum (Y_0 - Y_P)^2$$

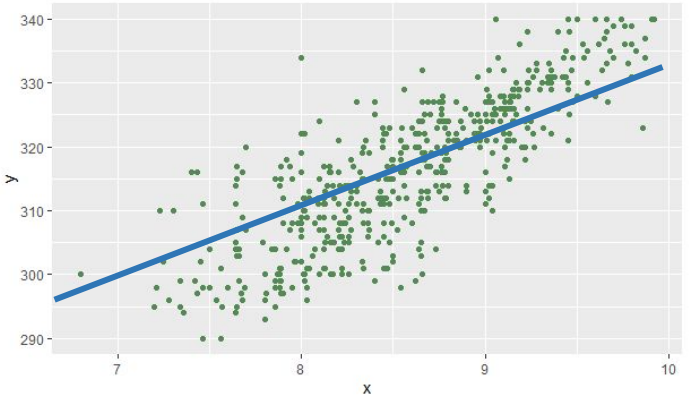
Measure of Good Fit



$\sum(Y_0 - Y_P)^2 = 28$



$\sum(Y_0 - Y_P)^2 = 22$

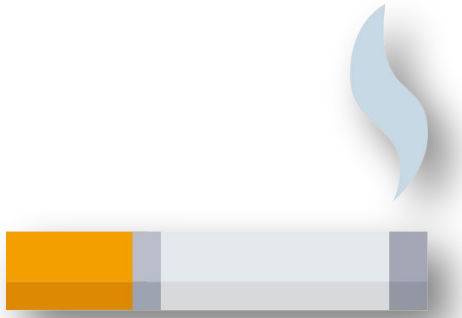


$\sum(Y_0 - Y_P)^2 = 24$

Best Fit Line

Logistic Regression

Logistic regression is used for classification

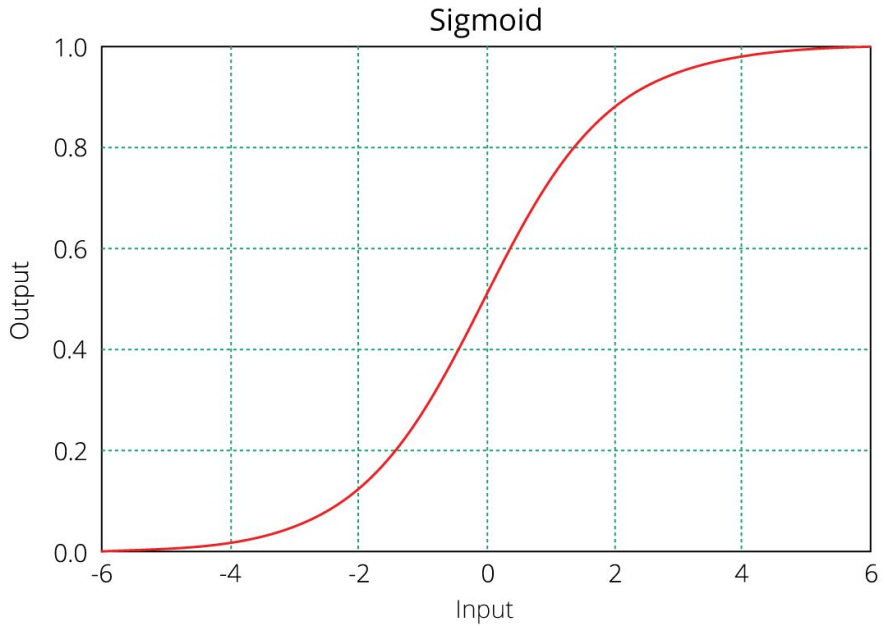


Smoke(Yes/No)

Cancer(Yes/No)

Logistic Regression

This link function follows a sigmoid function which limits its range of probabilities between 0 and 1.



Decision Tree

Decision Tree is used for both classification and Regression