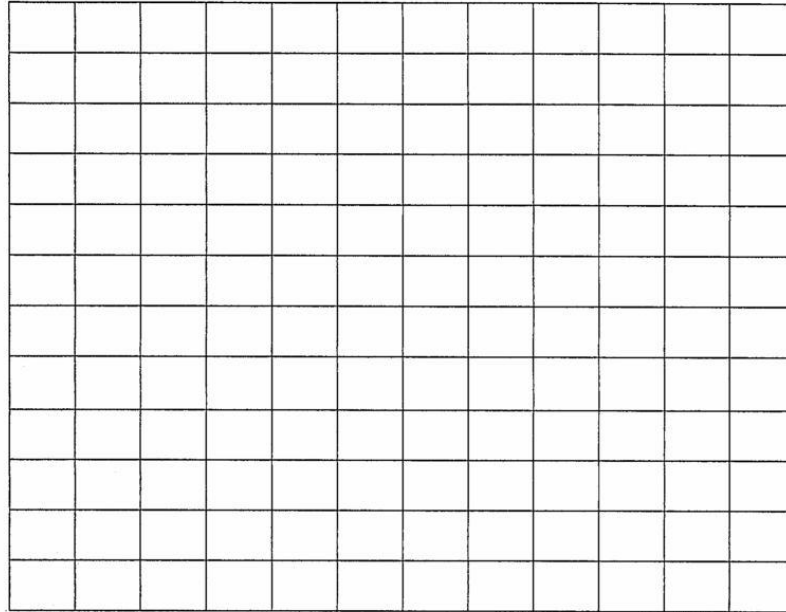# Confusion Matrix

Confusion Matrix : Intuition

Confusion Matrix : Intuition
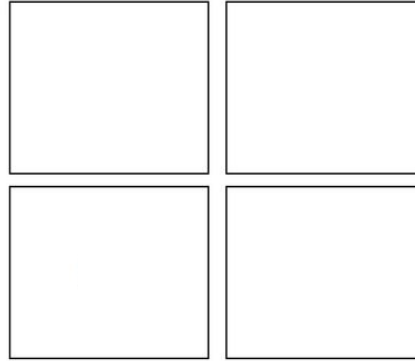
Confusion Matrix : Intuition

PassengerId	Survived	Pclass
1	0	3
2	1	1
3	1	3
4	1	1
5	0	3

Confusion Matrix : Intuition

Survived
0
1
1
1
0

Confusion Matrix : Intuition

Prediction outcome

Actual
value

Confusion Matrix : Intuition

Confusion Matrix : Intuition

Prediction outcome

	positive	negative

Confusion Matrix : Intuition

Prediction outcome

	positive	negative
	P	
	P	

Confusion Matrix : Intuition

Confusion Matrix : Intuition

Prediction outcome

		positive	negative
Actual value	positive	P	N
	negative	P	N

Are the values we predicted as positive actually positive in the dataset?

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Confusion Matrix : Intuition

Prediction outcome

		positive	negative
Actual value	positive	TP	N
	negative	P	N

Are the values we predicted as positive actually positive in the dataset?

Confusion Matrix : Intuition

	Prediction outcome	
	positive	negative
positive	TP	N
negative	FP	N

Actual value

Are the values we predicted as negative actually negative?

Confusion Matrix : Intuition

Prediction outcome

	positive	negative
positive	TP	N
negative	FP	TN

Actual value

Are the values we predicted as negative actually negative?

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Confusion Matrix : Intuition

Confusion Matrix : Intuition

Prediction outcome

	positive	negative	
positive	TP	FN	$TP + FN$ Total Actual positive
negative	FP	TN	

Actual value

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Confusion Matrix : Intuition

Prediction outcome

	positive	negative	
positive	TP	FN	$TP + FN$ Total Actual positive
negative	FP	TN	$FP + TN$ Total Actual negative

Actual value

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Confusion Matrix : Intuition

Confusion Matrix : Intuition

PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	S
2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C
3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	S
4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	S
5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN	S

Confusion Matrix : Intuition

ID	Actual Survived?	Predicted Survived?
ID1	1	
ID2	1	
ID3	1	
ID4	0	
ID5	1	
ID6	1	
ID7	0	
ID8	0	

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Confusion Matrix : Intuition

ID	Actual Survived?	Predicted Survived?
ID1	1	0
ID2	1	1
ID3	1	0
ID4	0	0
ID5	1	1
ID6	1	1
ID7	0	1
ID8	0	0

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Confusion Matrix : Intuition

ID	Actual Survived?	Predicted Survived?	Notation
ID1	1	0	
ID2	1	1	
ID3	1	0	
ID4	0	0	
ID5	1	1	
ID6	1	1	
ID7	0	1	
ID8	0	0	

Prediction outcome

	positive	negative
positive	TP	FN
negative	FP	TN

Actual value

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Confusion Matrix : Intuition

ID	Actual Survived?	Predicted Survived?	Notation
ID1	1	0	FN
ID2	1	1	TP
ID3	1	0	FN
ID4	0	0	TN
ID5	1	1	TP
ID6	1	1	TP
ID7	0	1	FP
ID8	0	0	TN

Prediction outcome

	positive	negative
Actual value — positive	TP	FN
Actual value — negative	FP	TN

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Confusion Matrix : Intuition

ID	Actual Survived?	Predicted Survived?	Notation
ID1	1	0	FN
ID2	1	1	TP
ID3	1	0	FN
ID4	0	0	TN
ID5	1	1	TP
ID6	1	1	TP
ID7	0	1	FP
ID8	0	0	TN

Prediction outcome

	positive	negative
Actual value — positive	TP 3	FN
negative	FP	TN

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Confusion Matrix : Intuition

ID	Actual Survived?	Predicted Survived?	Notation
ID1	1	0	FN
ID2	1	1	TP
ID3	1	0	FN
ID4	0	0	TN
ID5	1	1	TP
ID6	1	1	TP
ID7	0	1	FP
ID8	0	0	TN

Prediction outcome

	positive	negative
positive	TP 3	FN 2
negative	FP	TN

Actual value

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Confusion Matrix : Intuition

ID	Actual Survived?	Predicted Survived?	Notation
ID1	1	0	FN
ID2	1	1	TP
ID3	1	0	FN
ID4	0	0	TN
ID5	1	1	TP
ID6	1	1	TP
ID7	0	1	FP
ID8	0	0	TN

Prediction outcome

	positive	negative
Actual value positive	TP 3	FN 2
negative	FP 1	TN

Confusion Matrix : Intuition

ID	Actual Survived?	Predicted Survived?	Notation
ID1	1	0	FN
ID2	1	1	TP
ID3	1	0	FN
ID4	0	0	TN
ID5	1	1	TP
ID6	1	1	TP
ID7	0	1	FP
ID8	0	0	TN

Prediction outcome

	positive	negative
Actual value positive	TP 3	FN 2
negative	FP 1	TN 2

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Confusion Matrix Summary

- Representing Predicted values against Actual values

Prediction outcome

		positive	negative
Actual value	positive	TP	FN
	negative	FP	TN

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Confusion Matrix Summary

- Representing Predicted values against Actual values

- Meaning of Notations in the confusion Matrix

Prediction outcome

	positive	negative
Actual value positive	TP	FN
Actual value negative	FP	TN

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Confusion Matrix Summary

- Representing Predicted values against Actual values

- Meaning of Notations in the confusion Matrix

- Denoting observation using predicted label and the actual label

ID	Actual Survived?	Predicted Survived?	Notation
ID1	1	0	FN
ID2	1	1	TP
ID3	1	0	FN
ID4	0	0	TN
ID5	1	1	TP
ID6	1	1	TP
ID7	0	1	FP
ID8	0	0	TN

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