

$$\text{recall} = \frac{\text{true positives}}{\text{true positives} + \text{false negatives}}$$

$$\text{precision} = \frac{\text{true positives}}{\text{true positives} + \text{false positives}}$$

$$\text{recall} = \frac{\text{true positives}}{\text{true positives} + \text{false negatives}} = \frac{\text{terrorists correctly identified}}{\text{terrorists correctly identified} + \text{terrorists incorrectly labeled as not terrorists}}$$

$$\text{precision} = \frac{\text{true positives}}{\text{true positives} + \text{false positives}} = \frac{\text{terrorists correctly identified}}{\text{terrorists correctly identified} + \text{individuals incorrectly labeled as terrorists}}$$

$$F_1 = 2 * \frac{\text{precision} * \text{recall}}{\text{precision} + \text{recall}}$$

$$\text{true positive rate} = \frac{\text{true positives}}{\text{true positives} + \text{false negatives}}$$

$$\text{false positive rate} = \frac{\text{false positives}}{\text{false positives} + \text{true negatives}}$$

		Actual	
		Positive	Negative
Predicted	Positive	True Positive	False Positive
	Negative	False Negative	True Negative

Threshold	TP	FP	TN	FN
0.0	50	50	0	0
0.1	48	47	3	2
0.2	47	40	9	4
0.3	45	31	16	8
0.4	44	23	22	11
0.5	42	16	29	13
0.6	36	12	34	18
0.7	30	11	38	21
0.8	20	4	43	33
0.9	12	3	45	40
1.0	0	0	50	50

Threshold =0.5	Actual Positives	Actual Negatives
Predicted Positives	42 (TP)	16 (FP)
Predicted Negatives	13 (FN)	29 (TN)

$$recall = \frac{TP}{TP+FN} = \frac{42}{42+13} = 0.76 \quad precision = \frac{TP}{TP+FP} = \frac{42}{42+16} = 0.724 \quad F1 \text{ Score} = 2 * \frac{precision * recall}{precision+recall} = 0.74$$

$$true \text{ positive rate} = \frac{TP}{TP+FN} = \frac{42}{42+13} = 0.76 \quad false \text{ positive rate} = \frac{FP}{FP+TN} = \frac{16}{16+29} = 0.36$$

Threshold =0.5	Actual Positives	Actual Negatives
Predicted Positives	20 (TP)	17 (FP)
Predicted Negatives	0 (FN)	63 (TN)

$$recall = \frac{TP}{TP+FN} = \frac{20}{20+0} = 1.0 \quad precision = \frac{TP}{TP+FP} = \frac{20}{20+17} = 0.54 \quad F1 \text{ Score} = 2 * \frac{precision * recall}{precision+recall} = 2 * \frac{1.0 * 0.1}{1.0+0.1} = 0.70$$

$$true \text{ positive rate} = \frac{TP}{TP+FN} = \frac{20}{20+0} = 1.0 \quad false \text{ positive rate} = \frac{FP}{FP+TN} = \frac{17}{17+63} = 0.0$$