Confusion matrix.

1) Table shows the output y, and the probability of the predicted output $y\text{-pred}$. find the predicted output class for threshold 0.6.

Predicted \ Actual value	P	N
P	560	60
N	50	330

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1) confusion matrix components.
True positives (TP) = 560
True Negatives (TN) = 330
false positives (FP) = 60
false Negatives (FN) = 50.

2) a) Accuracy = $\frac{TP+TN}{TP+TN+FP+FN} = \frac{560+330}{560+330+60+50} = \frac{890}{1000} = 0.89$.

b) Precision = $\frac{TP}{TP+FP} = \frac{560}{560+60} = \frac{560}{620} \approx 0.903$.

c) Recall = $\frac{TP}{TP+FN} = \frac{560}{560+50} = 0.918$.

d) F1 score = $2 \times \frac{\text{Precision} \times \text{Recall}}{\text{precision} + \text{Recall}} = 2 \times \frac{0.903 \times 0.918}{0.903+0.918} = 0.91$

3) when to prefer each metric.
* Accuracy: use when both classes equally important & the data is balanced.
* precision: use when the cost of false positive is high.
* Recall: use when the cost of false negative is high.
* F1 score: use when there is an uneven class distribution and a balance btw precision & recall is desired.

If the probability of the predicted output y-pred is greater than or equal to 0.6 classify it as positive.

If the probability of y-pred is less than 0.6 classify it as negative.

Here the predicted probabilities of 0.6 or higher are classified as positive that are 560 (true positives and 60 false positives).

Here the predicted probabilities of below 0.6 are classified as negative (330 true negatives and 50 false negatives).

based on scenario that we can chose different models with there accuracy or precision or recall or f-1 score we can make use of f-1 score to compare two models performance.

and other metrics can also be used based on different use cases and scenarios.