# Precision and Recall simplified

[Adapted as it is from a [Quora answer](https://www.quora.com/What-is-the-best-way-to-understand-the-terms-precision-and-recall) by user `Supasate`

Imagine that, your girlfriend gave you a birthday surprise every year in last 10years. (Sorry, I didn’t intend to depress you if you don’t have one.)

However, one day, your girlfriend asks you: *‘Sweetie, do you remember all birthday surprises from me?’*

This simple question makes your life in danger. To extend your life, you need to recall all 10 surprising events from your memory.

So, recall is the ratio of a number of events you can correctly recall to a number of all correct events.

If you can recall all 10 events correctly, then, your recall ratio is 1.0 (100%). If you can recall 7 events correctly, your recall ratio is 0.7 (70%).

Now, it’s easier to map the word recall to real life usage of that word.

However, you might be wrong in some answers. For example, you answer 15 times, 10 events are correct and 5 events are wrong. This means you can recall all events but it’s not so precise.

So, precision is the ratio of a number of events you can correctly recall to a number all events you recall (mix of correct and wrong recalls). In other words, it is how precise of your recall.

From the previous example (10 real events, 15 answers: 10 correct answers, 5 wrong answers), you get 100% recall but your precision is only 66.67% (10 / 15).

Yes, you can guess what I’m going to say next. If a machine learning algorithm is good at recall, it doesn’t mean that algorithm is good at precision. That’s why we also need F1 score which is the (harmonic) mean of recall and precision to evaluate an algorithm.

Hope that this way of conceptualization could be an alternative way to help you understand and remember the difference between recall and precision.

F-measure is simply the harmonic mean of precision and recall. It’s given as

NOTE:

A number of events you can correctly recall = True positive (they’re correct and you recall them)

A number of all correct events = True positive (they’re correct and you recall them) + False negative (they’re correct but you don’t recall them)

A number of all events you recall = True positive (they’re correct and you recall them) + False positive (they’re not correct but you recall them)

recall = True positive / (True positive + False negative)

precision = True positive / (True positive + False positive)

Reference

For more details, see this Wikipedia [link](https://en.wikipedia.org/wiki/Precision_and_recall)

See this Kaggle discussion about [precision, recall, f-measure and AUC curve](https://www.kaggle.com/general/7517)

See this guide from data school on [precision, recall](http://www.dataschool.io/simple-guide-to-confusion-matrix-terminology/) and on [ROC curves and AUC](http://www.dataschool.io/roc-curves-and-auc-explained/)