1. Naïve Bayes
2. It is not likely to be true because they are most likely related in spam emails. If “viagra” is in the email, then the probability of “free” being in it increases; vice versa too. Mathematically, (whether and are independent or dependent), and because of what we said, so , where and are the existence of these two words.
3. . For every word of the words, we need to calculate two things – and , thus the . We also need to calculate , thus the .
4. . Not assuming independence requires us to keep track of both cases of for each of the words. This is possibilities. We need to do this for both spam and not spam. That’s We still need to compute once.
5. Naïve Bayes has a much smaller runtime and is often good enough.
6. because .

.

**Non-spam**

1. .
2. The intuition behind the in the denominator is that we start out as if all classes are equally likely, and there are such classes, spam and not spam.