1. A spam filter is designed by looking at commonly occurring phrases in spam. Suppose that 80% of email is spam. In 10% of the spam emails, the phrase “free money” is used, whereas this phrase is only used in 1% of non-spam emails. A new email has just arrived, which does mention “free money”. What is the probability that it is spam?

A: This event is a spam and the event of email has free memory space

P(A|B) = P(B|A) \* P(A)/P(B) = 0.1/0.8/(0.1\*0.8)+(0.01\*0.2) =80/82 = 0.97