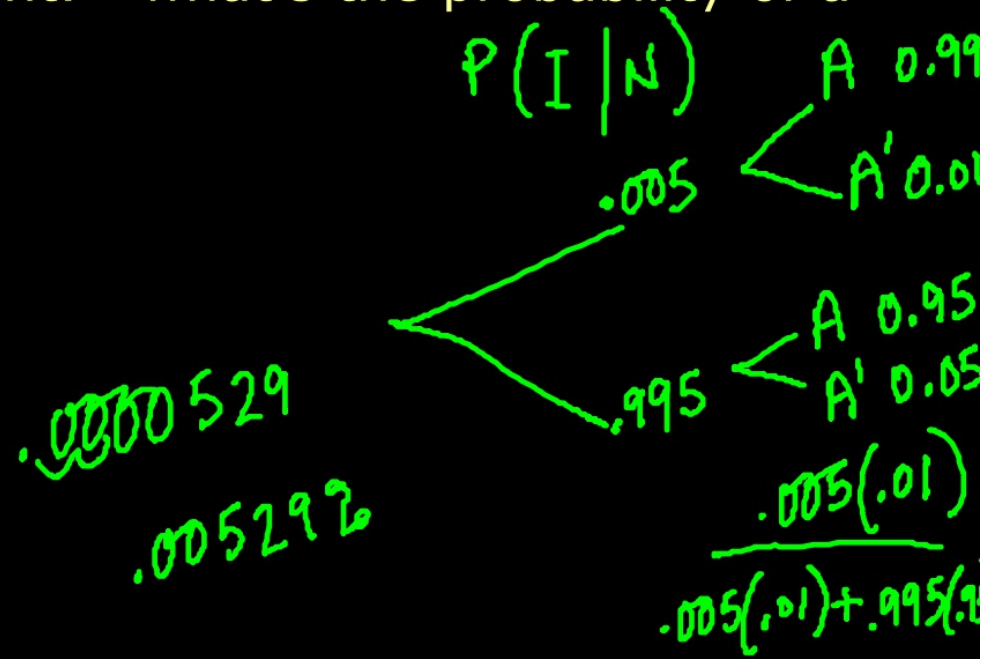
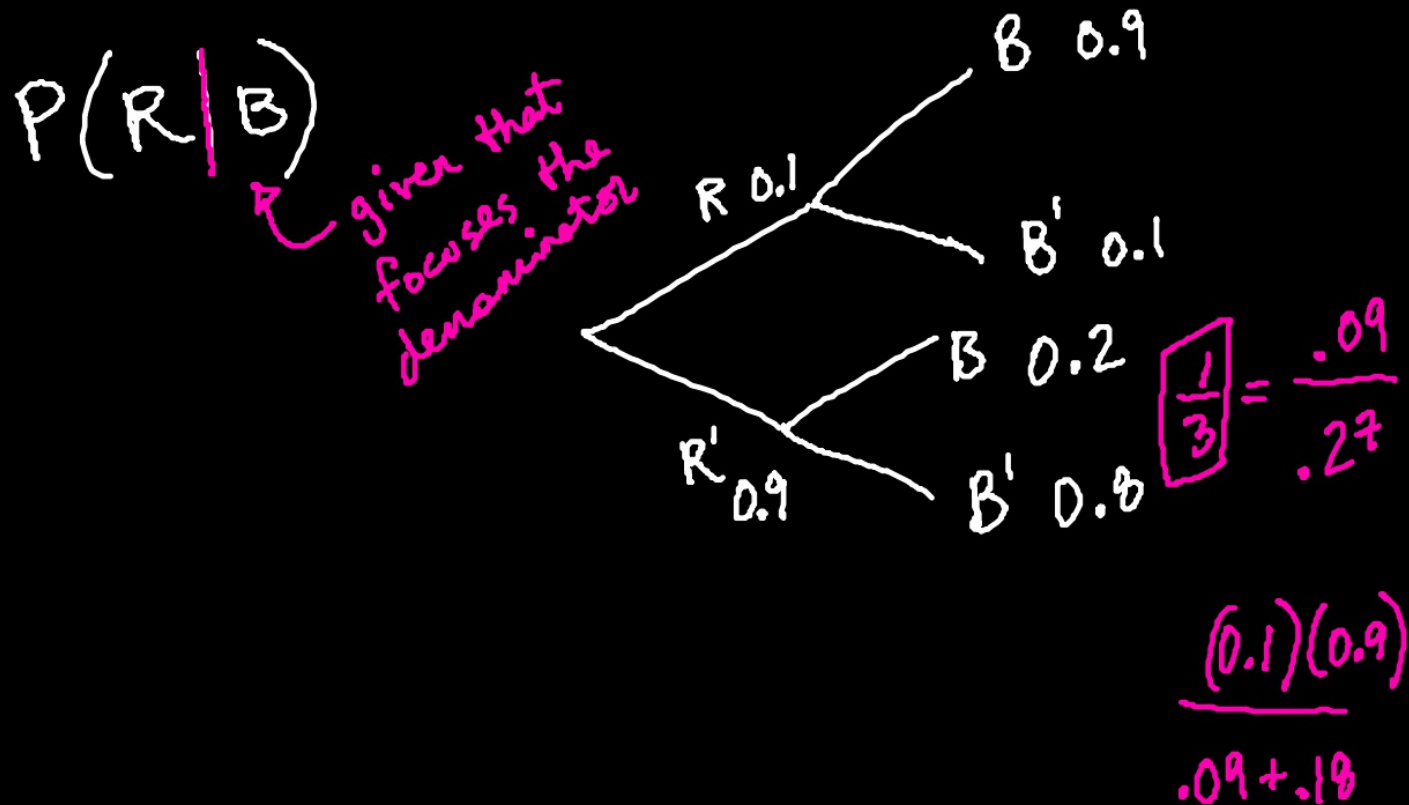


Bayes' theorem describes the relationships that exist within an array of simple and conditional probabilities. For example: Suppose there is a certain disease randomly found in one-half of one percent (.005) of the general population. A certain clinical blood test is 99 percent (.99) effective in detecting the presence of this disease; that is, it will yield an accurate positive result in 99 percent of the cases where the disease is actually present. But it also yields false-positive results in 5 percent (.05) of the cases where the disease is not present. - what's the probability of a false negative?

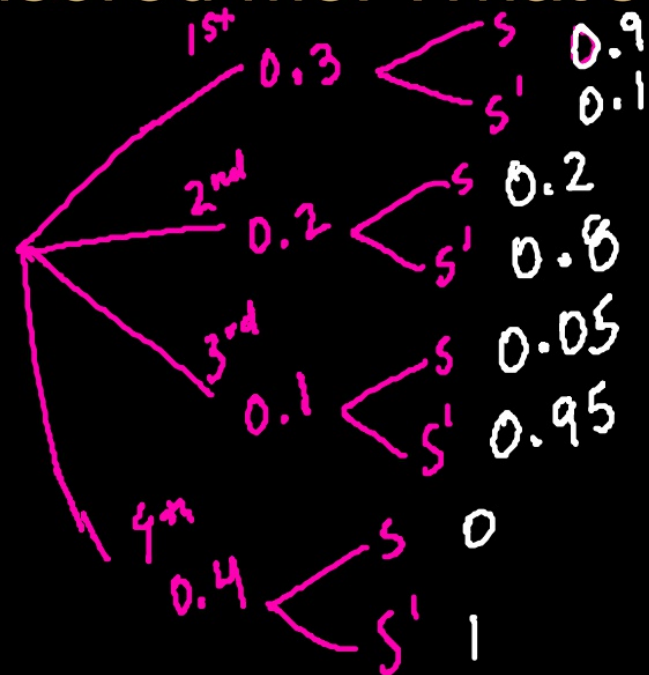


If it's raining, there's a 90% chance I carry an umbrella. If it is not raining, there is only a 1/5 chance I have my umbrella. On any given morning, the probability of rain is 0.1. If you see me with my broly, what's the probability it was raining.



If I come in first place in the swim meet, there's a 90% chance Speedo will sponsor me. If I come in second, it's 20%, and for third, it's 5%. There's a 30% chance that I'll win, 20% chance I come in second, and 10% chance I come in third.

Speedo sponsored me! What's the probability I won?



$$P(1^{st} | S) = \frac{.27}{.27 + .04 + .005}$$

Focused denominator

$$85.7\% = \frac{.27}{.315}$$

Bayes' theorem

$$P(B|A) = \frac{P(B)P(A|B)}{P(B)P(A|B) + P(B')P(A|B')}$$