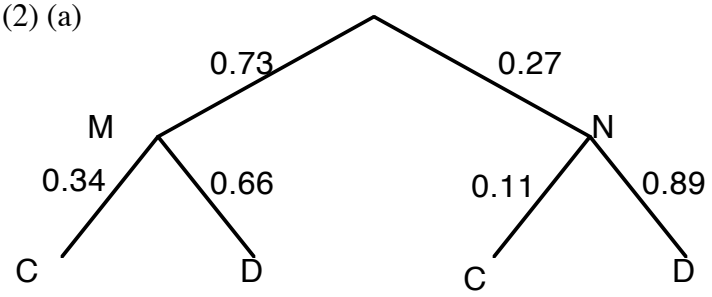
Practice Quiz 4 Solutions

(1) An experiment is run consisting of randomly picking a consonant and a vowel from the sentence "Math is fun!"

(a) How many elements are in the sample space? The sample space is
{ma, mi, mu, ta, ti, tu, ha, hi, hu, sa, si, su, fa, fi, fu, na, ni, nu},
so there are 18 elements.

(b) Find the probability that the letters picked include "t" or "h" but not "u". Explain how you obtained your answer. The probability is: 4/18 since 4 of the elements of the sample space have "t" or "h" but not "u".

(2) (a)



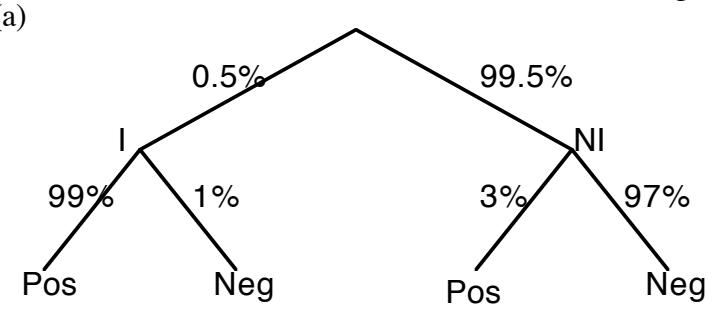
(b) $P(M \cap C) = (0.73)(0.34) = 0.2482$
$P(M \cap D) = (0.73)(0.66) = 0.4818$
$P(M) = 0.73 = P(M \cap C) + P(M \cap D)$

(c) $P(M \cap C) = (0.73)(0.34) = 0.2482$
$P(N \cap C) = (0.27)(0.11) = 0.0297$
$P(C) = P(M \cap C) + P(N \cap C) = 0.2779$

(d) P(C | N) is the probability that C occurs if we know that N has occurred; i.e., it is 0.11, shown in the table.

(e) P(N | C) is the probability that N occurs if we know that C has occurred. It is $P(N \cap C)/P(C) = 0.0297/0.2779 = 0.1069$.

(3) NI = Not Infected; I = Infected; Pos = Positive; Neg = Negative
(a)



(b) P(I) = 0.5%

(c) P(Pos | NI) = 3%

(d) P(NI | Pos) = P(NI∩Pos)/P(Pos)

= .995(.03)/(.995(.03)+.99(.005)) =

= 85.78%

(4) (a) The expected value is (1*200 + 4*50 + 10*10 + 20*5 + 965*0)/1000 = 0.60. Thus on average a ticket buyer can expect to win 60 cents. (But since it costs you $3 to play, you lose $2.40 on average easch time you play, and the church earns $2.40 on average for each ticket.)