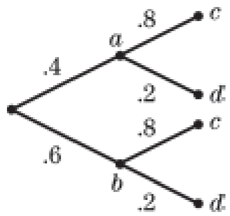
1.



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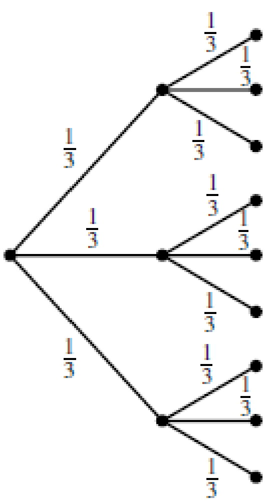

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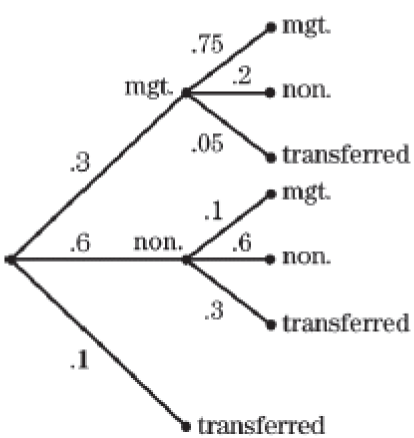

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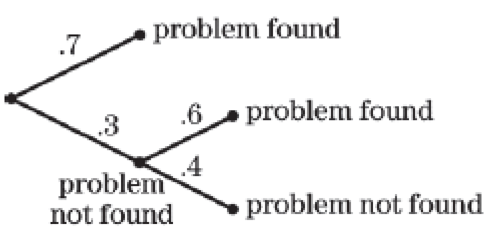


5. $0.30 \times 0.75 + 0.60 \times 0.10 = 0.285$

6. $0.2 \times 0.4 = 0.08$

7. $0.10 + 0.30 \times 0.05 + 0.60 \times 0.30 = 0.295$

8. $0.3 \times (0.2 + 0.05) = 0.075$

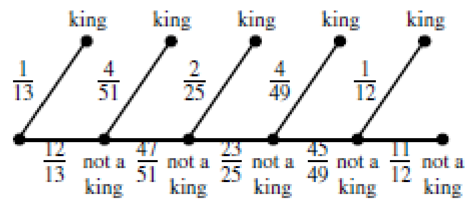
9. Pr(white, then red) + Pr(red, then red)

$$= \frac{2}{3} \times \frac{1}{2} + \frac{1}{3} \times \frac{3}{4} = \frac{7}{12}$$

10. Pr(6 on die) $= \frac{40}{52} \times \frac{1}{6} = \frac{5}{39}$;

Pr(head on coin)$= \frac{12}{52} \times \frac{1}{2} = \frac{3}{26}$

11.



Pr(king on 1st draw) + Pr(king on 2nd draw)
+ Pr(king on 3rd draw)
= 1 – Pr(not a king on 3rd draw)

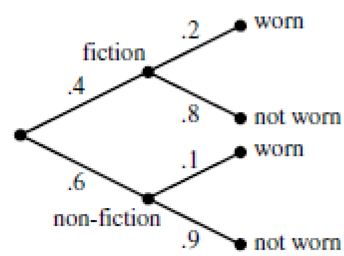
$$= 1 - \frac{12}{13} \times \frac{47}{51} \times \frac{23}{25} = 1 - \frac{4324}{5525} = \frac{1201}{5525} \approx 0.22$$

12. a. $\text{Pr(white)} = \frac{6}{8} = \frac{3}{4} = 0.75$

b. $\text{Pr(red and white)} = \frac{2}{8} \cdot \frac{6}{7} = \frac{3}{14}$

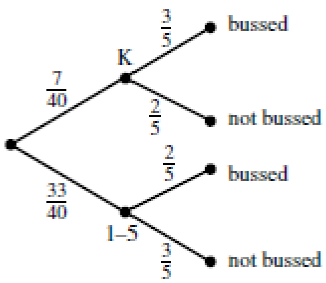
c. $\text{Pr(red and red and white)} = \frac{2}{8} \cdot \frac{1}{7} \cdot \frac{6}{6} = \frac{1}{28}$

13.



$0.40 \times 0.20 + 0.60 \times 0.10 = 0.14$

14.



Pr(elev. lead levels) =
$0.77 \cdot 0.06 + 0.23 \cdot 0.11 = 0.0715$

15. Pr(male|color-blind) $= \dfrac{\frac{1}{2}\times 0.08}{\frac{1}{2}\times 0.08 + \frac{1}{2}\times 0.005} = \dfrac{16}{17} \approx 0.9412$

16. **a.** $0.60 \times 0.03 + 0.40 \times 0.02 = 0.026$

b. Pr(machine I|defective) $= \dfrac{0.60\times 0.03}{0.026} = \dfrac{9}{13}$

17. $0.5 \times 0.9 + 0.5 \times 0.7 = 0.8$

18. $(0.5)(0.9)(0.9) + (0.5)(0.1)(0.7) + (0.5)(0.7)(0.9) + (0.5)(0.3)(0.7) = 0.86$

19. $\Pr(\text{fake} \mid \text{HH}) = \dfrac{\frac{1}{4}\times 1}{\frac{3}{4}\times\frac{1}{4}+\frac{1}{4}\times 1} = \dfrac{4}{7}$

20. Note that if the bag originally contains a white ball, then a white ball is always selected.

Pr(bag originally contains a white ball) $= \dfrac{1}{2}$

Pr(white ball is selected) $= \dfrac{1}{2}\times 1 + \dfrac{1}{2}\times\dfrac{1}{2} = \dfrac{3}{4}$

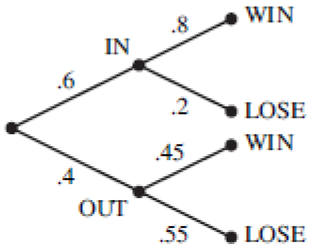
$\Pr(\text{bag originally contains a white ball} \mid \text{white ball is selected}) = \dfrac{\frac{1}{2}}{\frac{3}{4}} = \dfrac{2}{3}$

21. **a.** Pr(wins the point) $= 0.60 \times 0.75 + 0.40 \times 0.75 \times 0.50 = 0.60$

b. Pr(first serve good|wins service point) $= \dfrac{\Pr(\text{first serve good and wins service point})}{\Pr(\text{wins service point})} = \dfrac{0.60\times 0.75}{0.60}$

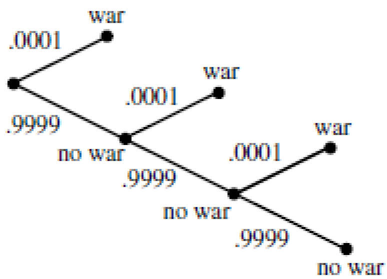
$= 0.75$

22.



$\Pr(\text{WIN}) = 0.6 \times 0.8 + 0.4 \times 0.45 = 0.66$

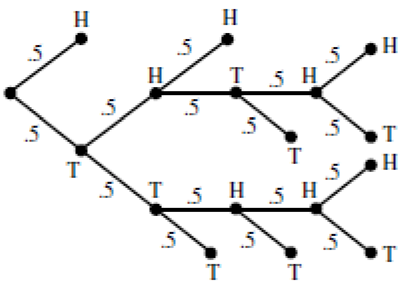
23.



$0.0001 + 0.9999 \times 0.0001 + 0.9999^2 \times 0.0001$ or $1 - (0.9999)^3 \approx 0.00029997$

24. $1 - (0.9999)^n$

25.



$.5 + (.5)^3 + 2(.5)^5 = \dfrac{11}{16}$

26. Same shape

$\Pr(\text{winning}) = \frac{3}{6} + \frac{3}{6}\times\frac{3}{5}\times\frac{2}{4} + \frac{3}{6}\times\frac{3}{5}\times\frac{2}{4}\times\frac{2}{3}\times\frac{1}{2} + \frac{3}{6}\times\frac{2}{5}\times\frac{3}{4}\times\frac{2}{3}\times\frac{1}{2} = \frac{3}{4}$

Probability of winning card game is greater.

27. **a.** $\Pr(\text{white}) = \frac{1}{2}\times\frac{1}{2} = \frac{1}{4}$

$\Pr(\text{red}) = 1 - \frac{1}{4} = \frac{3}{4}$

b. $\Pr(\text{red}) = 0.6 \times 0.5 + 0.4 \times 1 = 0.7$

28. **a.** $\Pr(\text{white}) = \frac{1}{3}\times 0 + \frac{1}{3}\times\frac{1}{2} + \frac{1}{3}\times 1 = \frac{1}{2}$

b. $\Pr(\text{Cc} \mid \text{red}) = \frac{1}{6} \div \frac{1}{2} = \frac{1}{6}\times\frac{2}{1} = \frac{1}{3}$

29. $\Pr(\text{night}|\text{part-timer}) = \dfrac{0.60\times 2}{0.40\times 5 + .60\times 2} = \dfrac{3}{8} = 0.375$

30. We want

$\Pr(\text{light is actually defective}|\text{found defective})$

$$= \frac{\Pr(\text{actually def and found def})}{\Pr(\text{found def})}$$

$$= \frac{\Pr(\text{actually def and found def})}{\Pr(\text{def} \cap \text{found def}) + \Pr(\text{not def} \cap \text{found def})}$$

$$= \frac{0.0005 \cdot 0.99}{0.0005 \cdot 0.99 + 0.9995 \cdot 0.01}$$

≈ 0.04719

31. $pr(W_2) = pr(R_1 \cap W_2) + pr(W_1 \cap W_2)$

$$= pr(R_1)pr(W_2|R_1) + pr(W_1)p(W_2|W_1)$$

$$= \left(\frac{5}{10}\right)\cdot\left(\frac{12}{13}\right) + \left(\frac{5}{10}\right)\cdot 1$$

$$= \frac{25}{26}$$

32. Pr(Green on second)

$$= pr(R_1)pr(G_2|R_1) + pr(G_1)\cdot pr(G_2|G_1)$$

$$= \frac{5}{8}\cdot\frac{4}{8} + \frac{3}{8}\cdot\frac{2}{8} = \frac{13}{32}$$

33. Pr(get same number of heads)

= Pr(2 heads) + Pr(1 head) + Pr(0 heads)

$$= \frac{1}{4}\cdot\frac{1}{4} + \frac{1}{2}\cdot\frac{1}{2} + \frac{1}{4}\cdot\frac{1}{4} = \frac{3}{8}$$

34. **a.** $\text{Pr(both red)} = \frac{4}{7}\cdot\frac{3}{6} = \frac{2}{7}$

$\text{Pr(both green)} = \frac{3}{7}\cdot\frac{2}{6} = \frac{1}{7}$

b. $\text{Pr(exactly 1 red)} = \frac{4}{7}\cdot\frac{3}{6} + \frac{3}{7}\cdot\frac{4}{6} = \frac{4}{7}$

35. **a.** Since printer B produces 201 models 99 out of 100 weeks, Pr (printer B produces more models than printer A) = 0.99.

b. For printer A to produce more than printer B, printer B would have to break down. Since this only occurs 1% of the time, the probability that printer B produces more models than printer A is $0.99^{200} \approx 0.1340$.

36. **a.** Lou's average score is 0.70(3) + 0.30(6) = 3.9, while Bud's average score is always a 4. Based upon long run averages, Lou will do better on a single par 3 course.

b. Summarize the outcomes of Lou in the table. The table represents Lou's possible scores on two consecutive par three holes:

3	3
3	6
6	3
6	6

Since Bud always scores a 4, his outcomes are

4	4
4	4
4	4
4	4

Lou only wins in the first case when he scores a 3 and a 3 on two consecutive holes. The probability he will do this is $(0.7)^2 = 0.49$, so Lou has a 0.49 chance of winning and Bud has a 0.51 chance of winning on two consecutive holes.

37. a. $\text{Pr(red die > blue die)} = \frac{1}{2} + \frac{1}{2}\cdot\frac{5}{6}$

$$= \frac{1}{2} + \frac{1}{12} = \frac{7}{12}$$

b. $\text{Pr(blue die > green die)} = \frac{1}{6} + \frac{5}{6}\cdot\frac{1}{2}$

$$= \frac{1}{6} + \frac{5}{12} = \frac{7}{12}$$

c. $\text{Pr(green die > red die)} = 0 + \frac{5}{6}\cdot\frac{5}{6}$

$$= 0 + \frac{25}{36} = \frac{25}{36}$$

d. Since the red die beats the blue die more than half the time and the blue die beats the green die more than half the time, the red die appears to be the strongest of the three dice and the green appears to be the weakest. However, the green die beats the red die more than half the time.