Statistics 12, Homework 5

Michael Wu
UID: 404751542

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Chapter 14, Problem 2

Let A be "likes to cook" and B be "likes to shop". Then we have the following.

$$P(A) \cup P(B) = P(A) + P(B) - P(A \cap B) = 0.45 + 0.59 - 0.23 = 0.81$$

Chapter 14, Problem 4

$$\frac{38}{38 + 22} \approx 0.633$$

Chapter 14, Problem 6

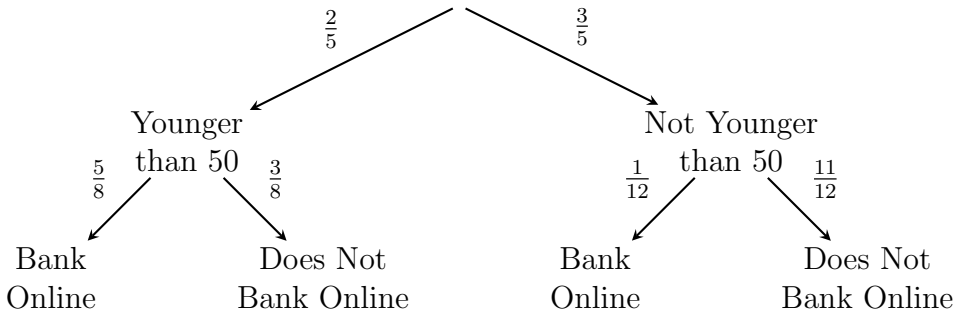
$$0.7 \times 0.9 = 0.63$$

Chapter 14, Problem 10

	Bank Online	Does Not Bank Online	Total
Younger than 50	0.25	0.15	0.4
Not Younger than 50	0.05	0.55	0.6
Total	0.3	0.7	1

A table is better than a tree here because it requires less calculation to use. Instead of having to multiply probabilities to arrive at the given percentages, the table presents the data in the same way that it's given to us.

Chapter 14, Problem 12



A tree is better than a table in this case because we are given conditional probabilities. So it is easier to express the probabilities in a way that matches the given data using a tree. The joint probabilities are found by multiplying the conditional probabilities as you travel down a path in the tree.

Chapter 14, Problem 14

$$\frac{\frac{2}{5} \times \frac{5}{8}}{\frac{2}{5} \times \frac{5}{8} + \frac{3}{5} \times \frac{1}{12}} \approx 0.8333$$

Chapter 15, Problem 6

I assume the mean score and standard deviation that is given applies to a single hole, and his total score is the sum of the scores on each of the eighteen holes. His mean total score will then be

$$18 \times 85 = 1530$$

and the standard deviation of his total score will be

$$\sqrt{18 \times 11^2} \approx 46.669$$

Chapter 15, Problem 8

This is the probability that a bottle of ketchup will have a z-score less than -2. Using a calculator, I obtain a probability of 0.0228.

Chapter 15, Problem 12

a) The probability of winning \$100 is $\frac{1}{6}$. The probability of winning \$50 is $\frac{5}{36}$. The probability of losing is $\frac{25}{36}$.

b) I assume that I do not lose any money when I lose. Then the expected value of playing the game is the following.

$$100 \times \frac{1}{6} + 50 \times \frac{5}{36} + 0 \times \frac{25}{36} \approx 23.61$$

c) I would be willing to play this game since I would expect to win \$23.61 on average.

Chapter 16, Problem 4

$$\binom{15}{2} 0.08^2 \times 0.92^{13} \approx 0.2273$$

Chapter 16, Problem 6

$$\sum_{n=23}^{200} \binom{200}{n} 0.08^n \times 0.92^{200-n} \approx 0.05066$$

Chapter 16, Problem 28

a) The expected value of the number of times the ball winds up in a green slot is 2 times.

b) The ball has a $\frac{2}{38}$ chance of landing in a green slot on each spin. Thus the expected value of the number of times the ball winds up in a green slot after 38 spins is the following.

$$38 \times \frac{2}{38} = 2$$