Exercise 16.2

Question

16.2 Money Bags, Take 2
Welcome back (see Problem 15.1) to the “Money Bags” TV show. You have won $600. Then Monty, the MC, offers you, for your $600, a wallet in which there are either ten $100 bills (making $1000) or one $20 bill and three $100 bills (making $320). He also gives you the option, for a cost of $100, to pull one of the bills out of the wallet before choosing whether or not to take the contents (which will be either $1000 or $320) at the additional cost of $600.

(a) Structure the decision tree for determining whether you should keep your $600, take the wallet without pulling a bill (at a cost of $600), or look at a bill before deciding whether or not you should buy the wallet. Calculate the appropriate consequences and probabilities for the tree.

(b) What is the strategy that maximizes the expected monetary value?

Solution from Manual

16.2 Money Bags, Take 2

a) See Figure S16.2

Prior probabilities:

\[
P(1000) = P(320) = 0.5 \\
P(20/320) = 0.25 \\
P(100/320) = 0.75 \\
P(100/320) = 1.0
\]

\[
P(20) = P(20/320) P(320) + P(20/1000) P(1000) = 0.125 \\
P(20) = 1 - P(20) = 1 - 0.125 = 0.875
\]

\[
P(1000/100) = [P(1000/100) P(1000)]/ P(100) = 1.0 (0.5)/ 0.875 = 0.57 \\
P(320/100) = [P(100/320) P(320)]/ P(100) = 0.75 (0.5)/ 0.875 = 0.43
\]

b) Take the wallet.
### Additional Notes

**Money Box Puzzle**

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<th>$20</th>
<th>Total</th>
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</tr>
<tr>
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<tr>
<td>Total</td>
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</table>

**Equation:**

(a) $P(100) = P(100|1000)P(1000) = \frac{1}{4} \cdot \frac{1}{2} = 0.125$

(b) The EV of the wallet bet is $-500.

**EV:**

- Take the wallet bet: refuse to draw our bill for $-500.

**EV:** $\$ -500

**Ev:** $\$ 7.6