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) = .25 P(20/1000) = 0
P(100/320) = .75 P(100/1000) = 1.0

P(20) = P(20/320) P(320) + P(20/1000) P(1000) = 0.125
P(100) = 1 - P(20) = 1 - .125 = .875

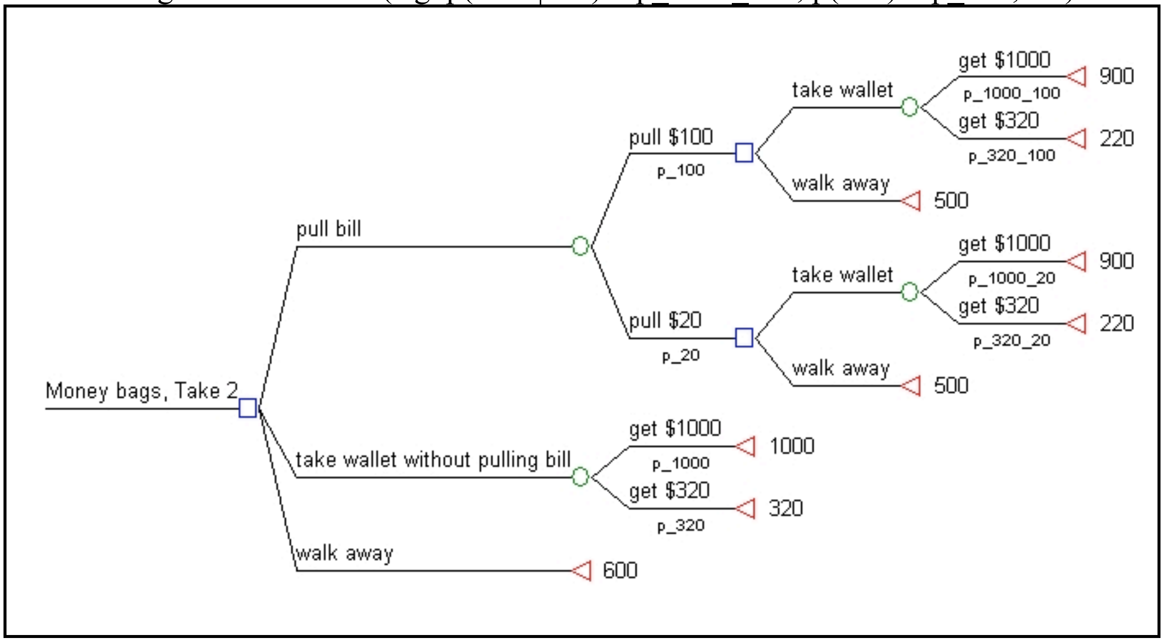
P(1000/100) = [P(100/1000) P(1000)]/ P(100) = 1.0 (0.5)/.875 = .57
P(320/100) = [P(100/320) P(320)]/ P(100) = 0.75 (0.5) / 0.875 = 0.43

b) Take the wallet.

Additional Notes

Recall Bayes' Theorem: p(A|B) = p(A)p(B|A)/p(B)

The resulting decision tree is (e.g. p(1000|100) = p_1000_100, p(100) = p_100, etc):



The folding back analysis gives: