POLS 360, Dr. Belt
Cost-Benefit Practice Problem

You are the director of the County of Hawai‘i Organized Meal Programs (CHOMP). You are planning an event to raise funds for meals for the homeless. The event will take place on Saturday There is a 60 percent chance of rain on Saturday. You have three options: cancel the event, hold the event as scheduler, or hold the event and rent a rain canopy to cover a portion of the seats at the event. It costs $100 to hold the event. A rain canopy costs $200 to rent.

If it does not rain, you expect to raise $900 in donations, whether you have a canopy or not. If it rains and you have a canopy, you expect to raise $500. If it rains and you do not have a canopy, you can expect to raise only $100. If it does not rain, there is a 50 percent chance that Harry the Hobo will come to the event and generate an additional $300 in donations.

What will you do?

Table Method

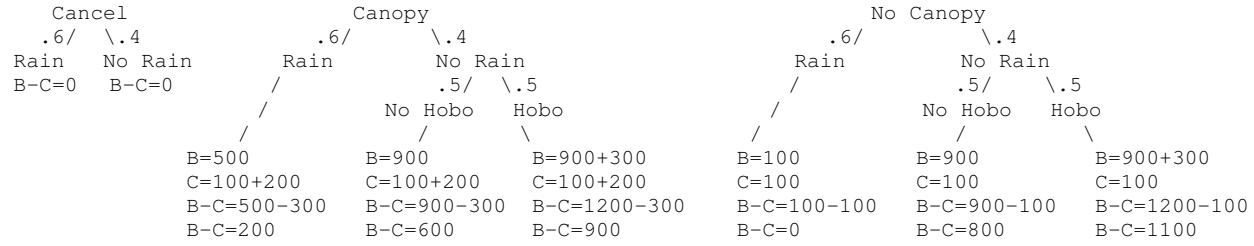
Create a table with outcomes in rows and decisions in columns (you can reverse the tables and columns if you wish, in that case your totals will add across instead of down). Calculate the predicted benefits and the costs for each cell in the table (which may have probabilities of their own), then subtract the costs from the benefits. Next, compute the decision results by adding the benefits and costs for each column (decision option), weighted by (multiplied by the probability of) each outcome.

	Decision Option		
Outcome	*Cancel*	*Rent Canopy*	*Do not Rent Canopy*
Rain (60% chance)	B = 0 C = 0 B-C = 0	B = 500 C = 100+200 B-C = 500-300 = 200	B = 100 C = 100 B-C = 100-100 = 0
No Rain (40% chance)	B = 0 C = 0 B-C = 0	B = 900+.5(300) C = 100+200 B-C = 1050-300 = 750	B = 900+.5(300) C = 100 B-C = 1050-100 = 950
Total Decision Result	.6(0)+.4(0) = 0	.6(200)+.4(750) = 120 + 300 = 420	.6(0)+.4(950) = 0+380 = 380

The expected costs – benefits for canceling is 0, for renting a canopy it is $420, for not renting a canopy is $380. Therefore, you hold the event and rent the canopy.

Decision Tree Method

Do a separate tree for each option, and make the branches each possible outcome and sub-outcome (Hobo sighting). Then, figure out the Benefits-Cost for each branch. Then, multiply all of the probabilities associated with each branch and add them up for each decision option.

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Cancel = (P rain)(B-C) + (P norain)(B-C)
Cancel = .6(0)         + .4(0)
Cancel = 0
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Canopy = (P rain)(B-C) + [(P norain)(P no hobo)(B-C)] + [(P norain)(P hobo)(B-C)]
Canopy = .6(200)       + [(.4)(.5)(600)]              + (.4)(.5)(900)]
Canopy = 120+120+180
Canopy = 420
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No Canopy = (P rain)(B-C) + [(P norain)(P no hobo)(B-C)] + [(P norain)(P hobo)(B-C)]
No Canopy = .6(0)         + [(.4)(.5)(800)]              + (.4)(.5)(1100)]
No Canopy = 0+160+220
No Canopy = 380
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