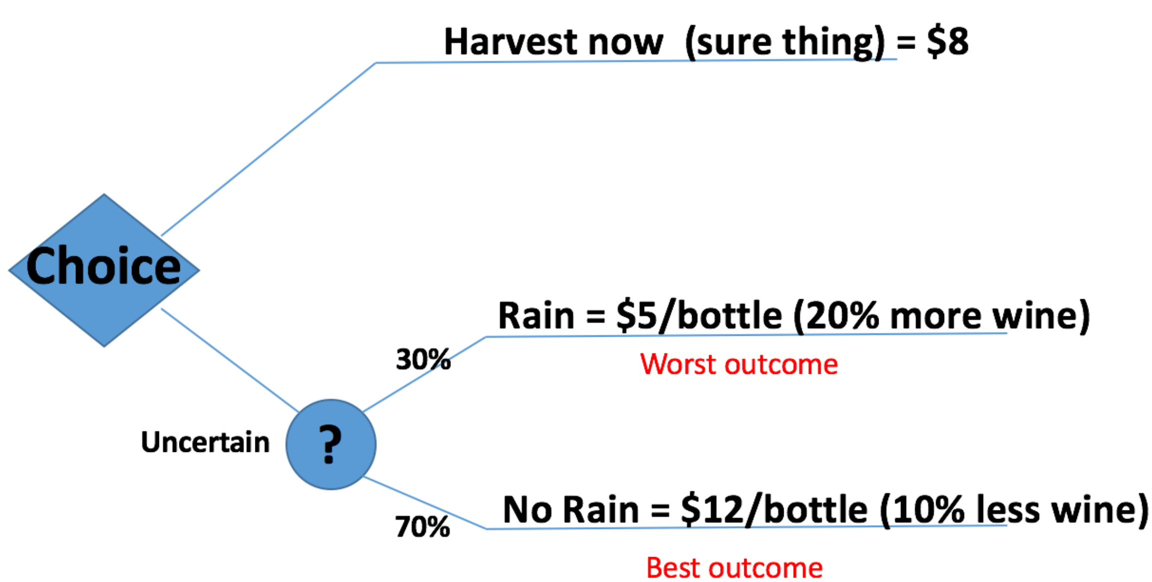
Wendy the winemaker is trying to decide whether to harvest her grapes today or wait another week. If she harvests today, she can make $8 per bottle of wine. If she waits another week and it doesn't rain, the grapes will firm up their sugar content and she can make $12 per bottle of wine, but the crop will produce 10% less wine. If she waits and it does rain, the grapes will get bloated – the crop will produce 20% more wine, but the wine will only be worth $5 per bottle. Forecasts suggest that the probability of rain next week is 30%.

Wendy is faced with a decision dilemma – a choice between a sure thing and an uncertainty. The sure thing is $8 per bottle for her wine. If she waits, there is a 70% chance of no rain, in which case the wine will be worth $12 per bottle but 10% less wine: 12 x .90 x .70 = 7.56
If she waits, there is a 30% chance of rain, in which case the wine will be worth $5 per bottle and 20% more wine: 5 x 1.20 x .30 = 1.8
So, the uncertain choice = 7.56 + 1.8 = 9.36. Since 9.36 > 8.00, **Wendy should wait to harvest her grapes.**



This “decision tree” illustrates this decision. This is a decision dilemma because it involves **a choice between a certain outcome** (harvest now = we know we will have an $8 bottle of wine) **versus an uncertain outcome** (harvest later, it might rain; if it rains the wine will be worse @ $5/bottle, if it doesn’t rain the wine will be better @ $12/bottle), where the uncertain outcome features one outcome BETTER than the certain outcome ($12/bottle), and one outcomes WORSE than the certain outcome ($5/bottle)..

To use decision analysis to help make this decision, you **add up the outcomes for each side of the decision.**

For the *certain* side of the decision, that’s easy: $8/bottle

For the *uncertain* side of the decision, you need to add up BOTH what happens if it rains and what happens if it doesn’t. If it rains, you get the $5 bottle of wine, but 20% more yield; the likelihood of that is 30%. If it doesn’t rain, you get the $12 bottle of wine, but 10% less yield. So you add up those two possibilities (30% chance of a $5 bottle of wine, but 20% more bottles + 70% chance of a $12 bottle of wine, but 10% fewer bottles). You don’t know which of these is going to occur, so you have to take both into account; you average them according to how likely each outcome is to occur.

You then compare the sum of all outcomes for each branch of the decision tree. In this case, that means comparing $8/bottle (certain branch of the decision tree) with 30% chance of a $5 bottle of wine, but 20% more bottles + 70% chance of a $12 bottle of wine, but 10% fewer bottles (uncertain branch of the decision tree). In this case, the certain branch yields an $8 bottle of wine, while the uncertain branch yields on the average a $9.36 bottle of wine. So Wendy should wait and hope it doesn’t rain!