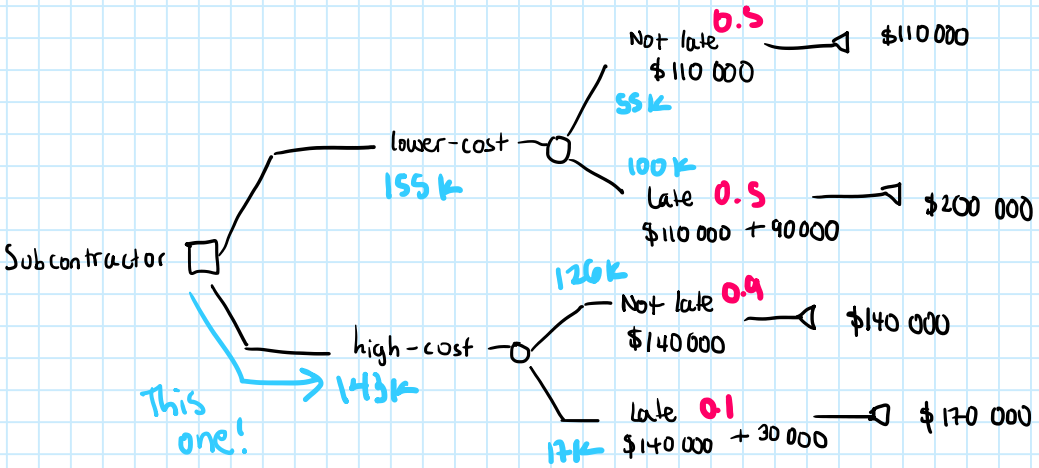
Trees

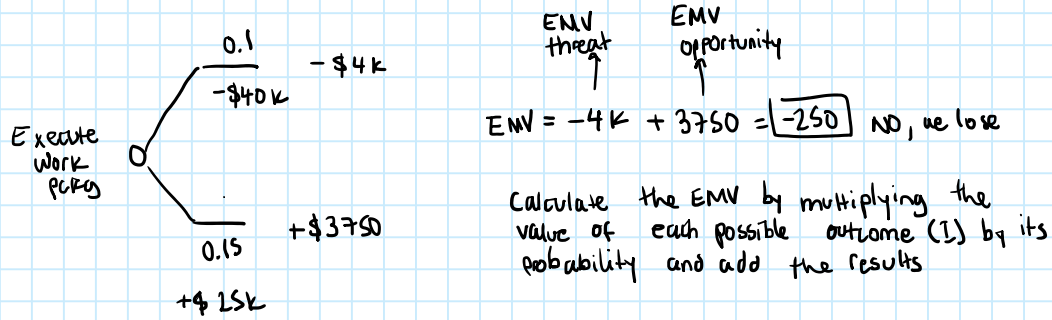
Saturday, March 18, 2023 8:55 AM

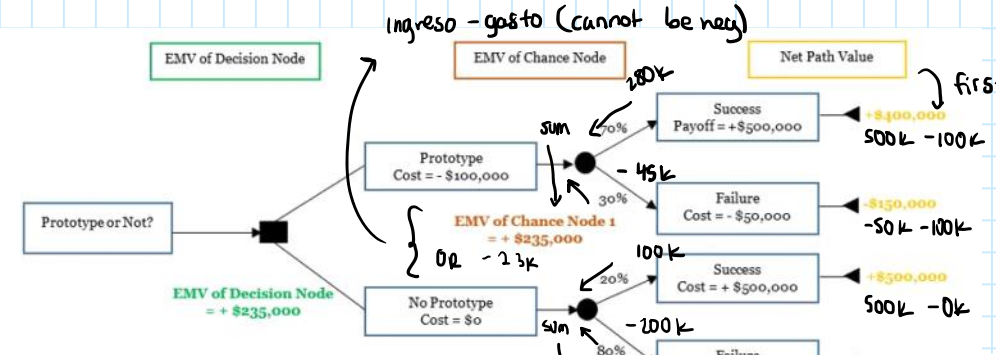
project. We are the prime contractor and there is a penalty in our contract with the main client for every day we deliver late. We need to decide which sub-contractor to use for a critical activity. Our aim is to minimize our expected cost. It is often difficult to argue for using the higher-priced sub-contractor, even if that one is known to be reliable. The lower-bidding sub-contractor also promises a successful delivery, although we suspect that he cannot do so reliably. A rigorous analysis of this decision using a simplified decision tree structure that minimizes our expected cost is shown below:

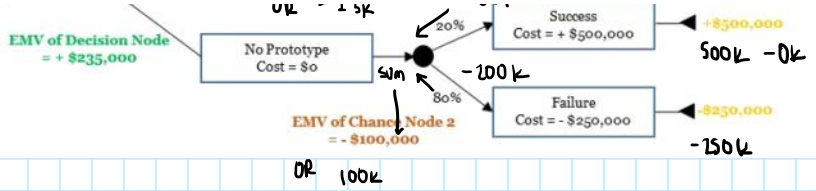
- One sub-contractor is lower-cost ($110,000 bid). We estimate however that there is a 50% chance that this contractor will be 90 days late and our contract with the main client specifies that we must pay a delay penalty of $1,000 per calendar day for every day we deliver late.
- The higher-cost sub-contractor bids $140,000. We know this contractor and assess that it poses a low 10% chance of being late, and only 30 days late at that. Of course, our customer will impose on us the same $1,000 delay penalty per day for late delivery.



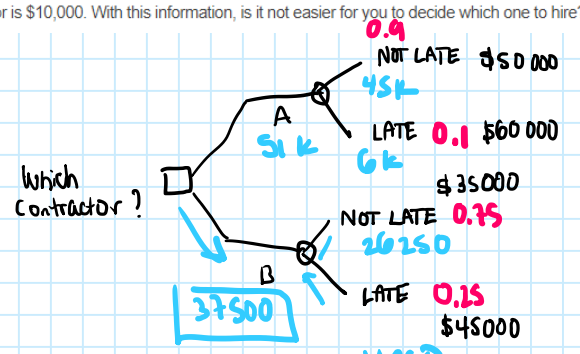
Example: There's a negative risk (or threat) with a 10 percent probability of prohibiting the execution of a work package. If that risk happens, the impact of not executing the package is estimated at $40,000. For the same work package, there's a positive risk with a 15 percent probability and impact estimated at a positive $25,000. Should you execute the work package?







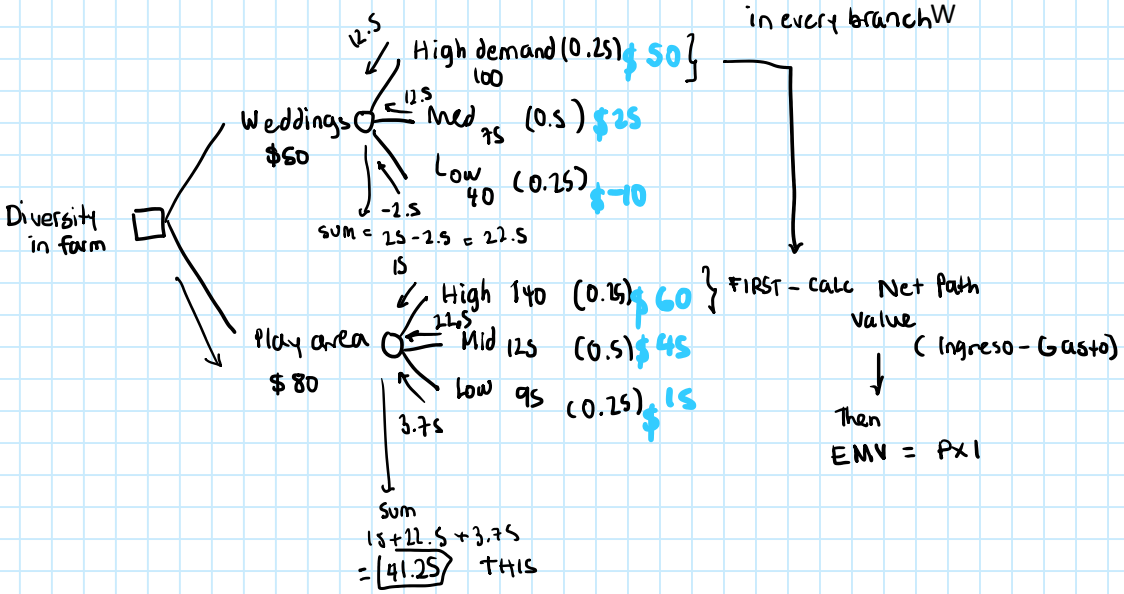
Let's take the second situation and quantify it. Let's say that Contractor A will cost you $50,000 and has a 10 percent chance of coming in late whereas Contractor B will cost you far less — $35,000 — but with a 25 percent chance of being late. For being late, the penalty on either contractor is $10,000. With this information, is it not easier for you to decide which one to hire?



If ◇ you can calc (chance)

If □ you take the smallest (choice)

∴ you can finish a tree that doesn't have P(x) in every branch



FIRST - calc Net Path value
(Ingreso - Gasto)

Then
EMV = PxI