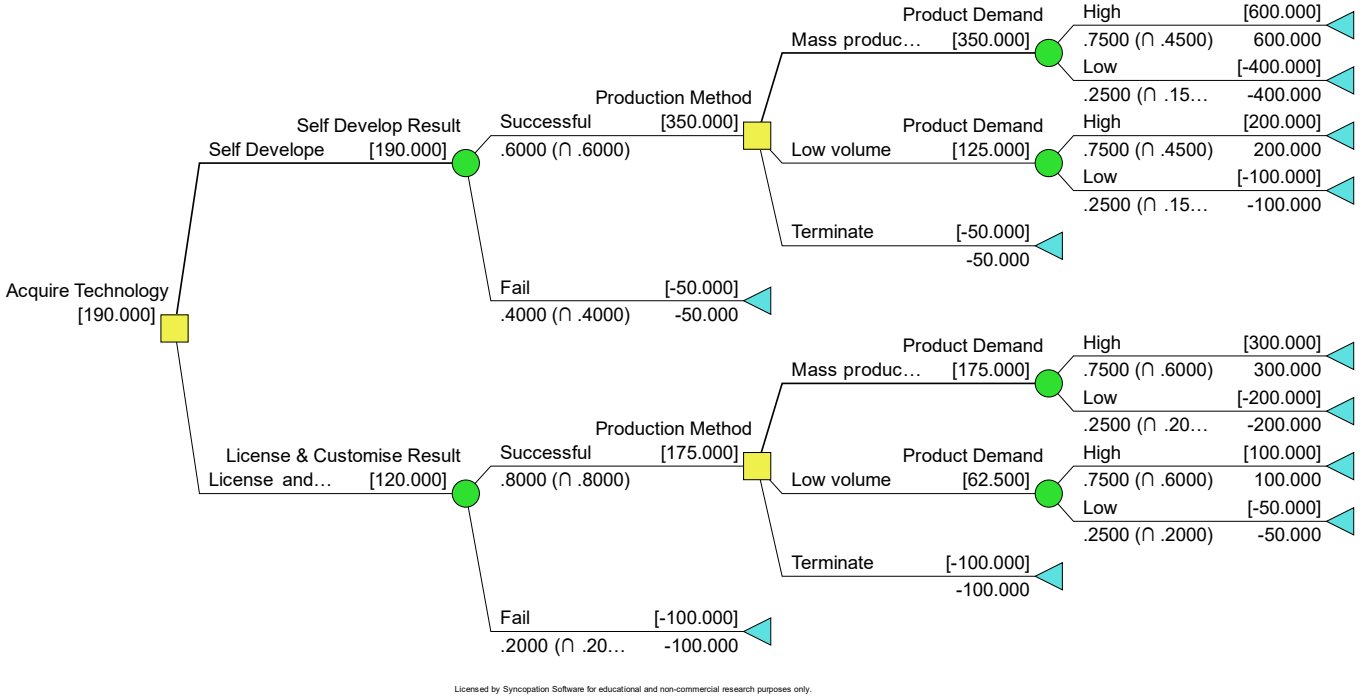
Decision Analysis
Solutions to Assignment 1

(*a*)

- The Decision Tree:



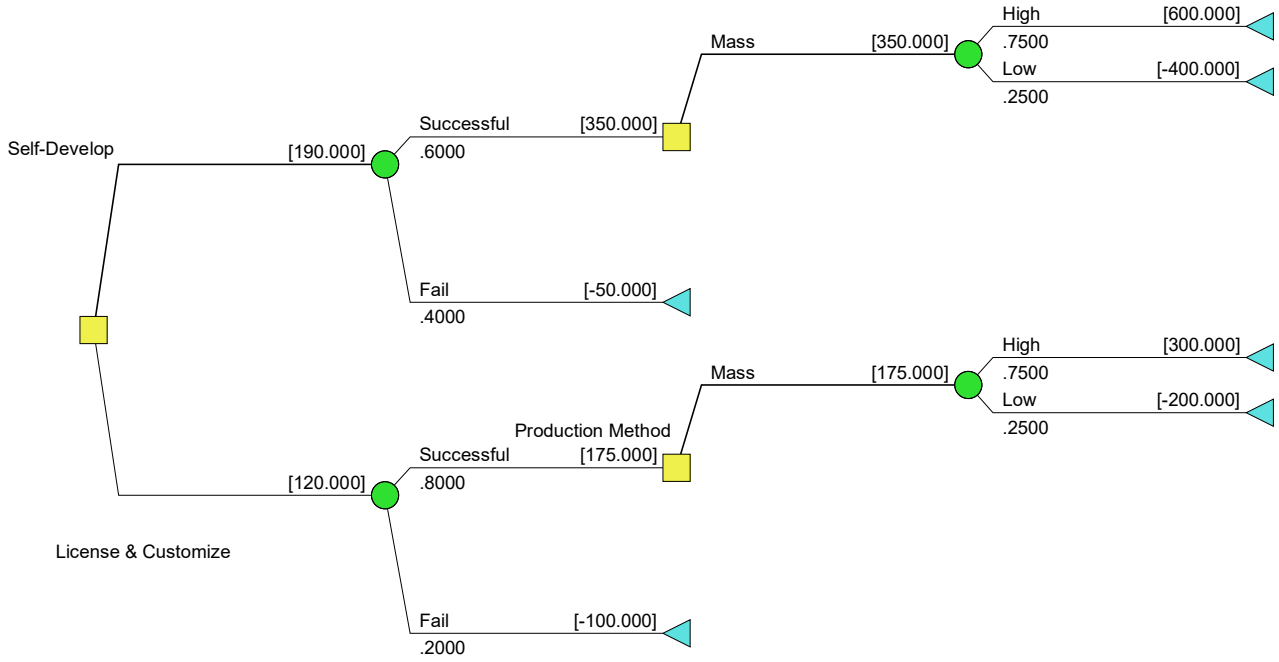
- The Optimal Decision Policy is

  Self-Develop Technology
  If Development is Successful then
  Do Mass production
  Else
  Terminate project

- Optimal Certainty Equivalent (Expected Value) = **$ <u>190,000</u>**

(*b*) Plotting Risk Profiles:

- Remove sub-optimal branches from decision policy tree:



- Joint Probabilities each end-point value (sorted):

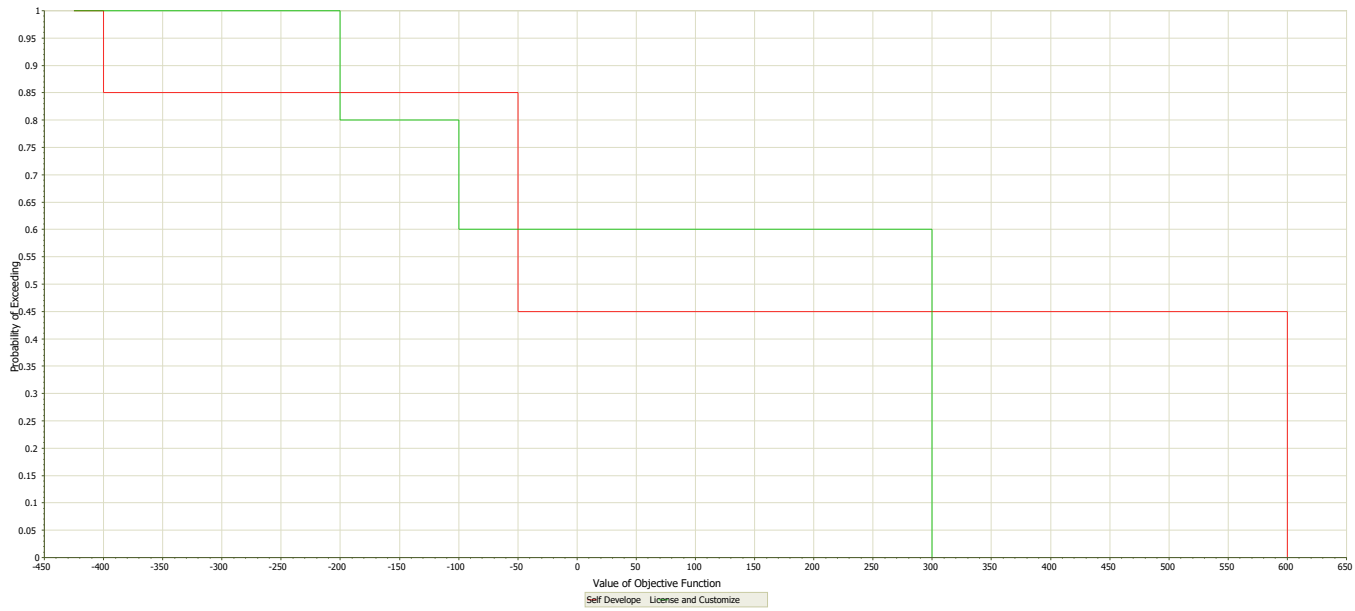
Alternative I: Self-Develop

End-point	Value $K	Probability
1	-400	0.6 x 0.25 = 0.15
2	-50	= 0.40
3	600	0.6 x 0.75 = 0.45

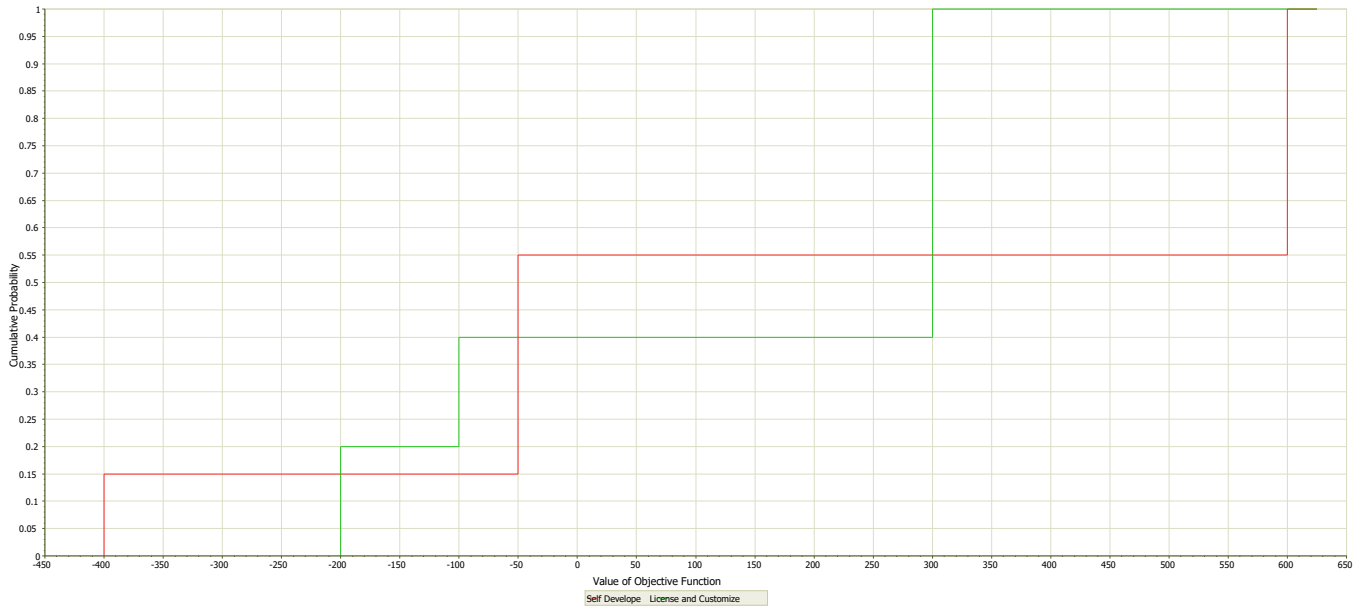
Alternative II: License and Adopt Alternative:

End-point	Value $K	Probability
1	-200	0.8 x 0.25 = 0.20
2	-100	= 0.20
3	300	0.8 x 0.75 = 0.60

- Risk Profiles in Excess Probabilities:



- Risk Profiles in Cumulative Probabilities:

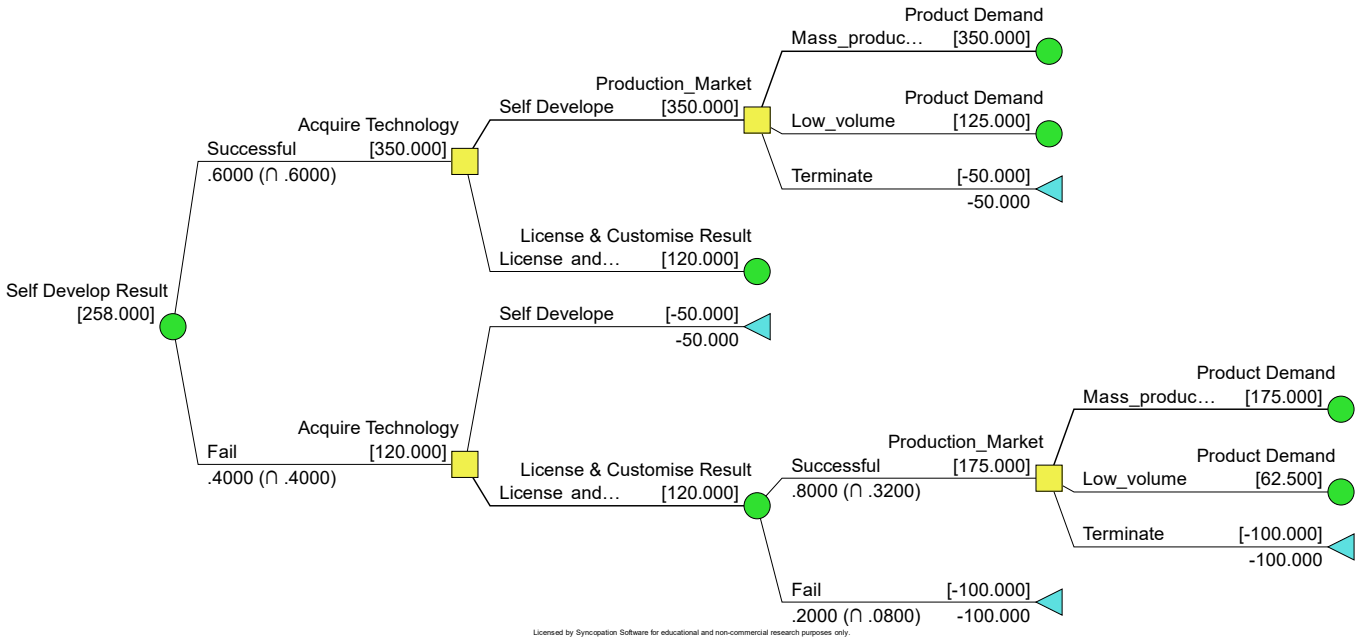


(*c*) Stochastic dominance analysis

- There is no first-order stochastic dominance between the two alternatives as their risk profiles intersect.

(*d*)

- Decision model with free perfect information on Self-Develop Technology result:

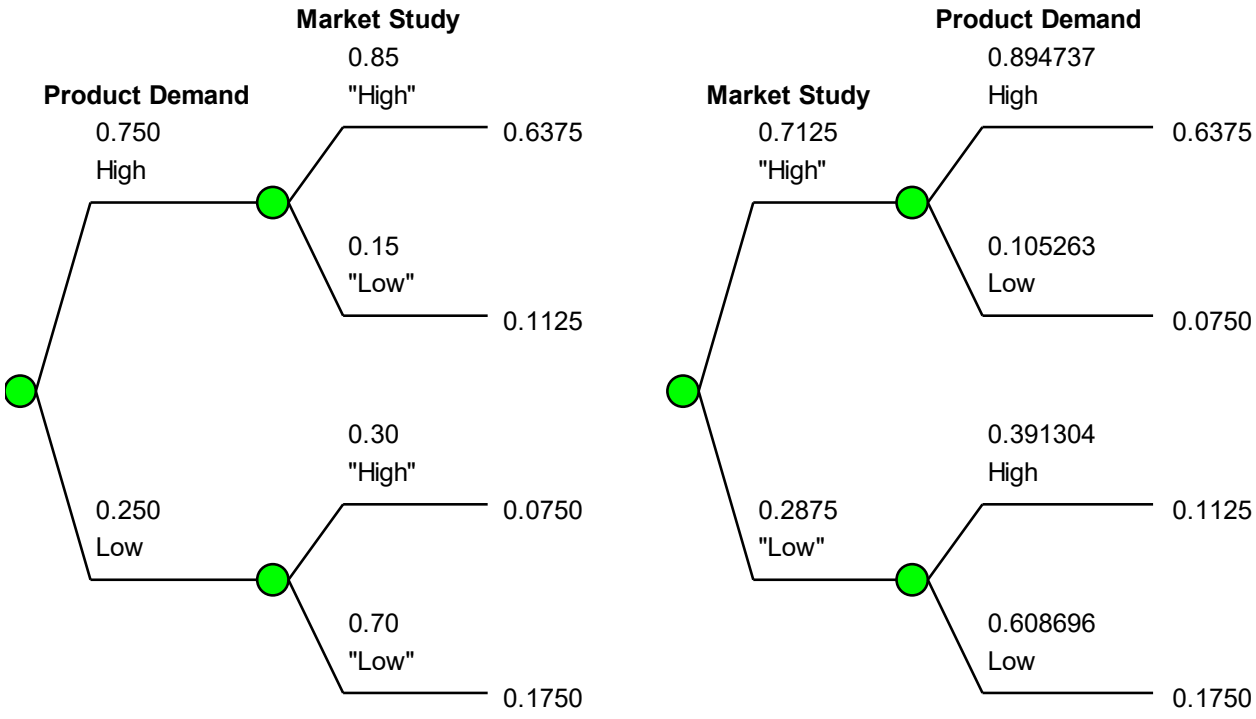


- Expected value with free perfect information on Self-Develop Technology result = $258,000
- Expected value with no information = $190,000
- Expected value of perfect information on self-developing the technology result

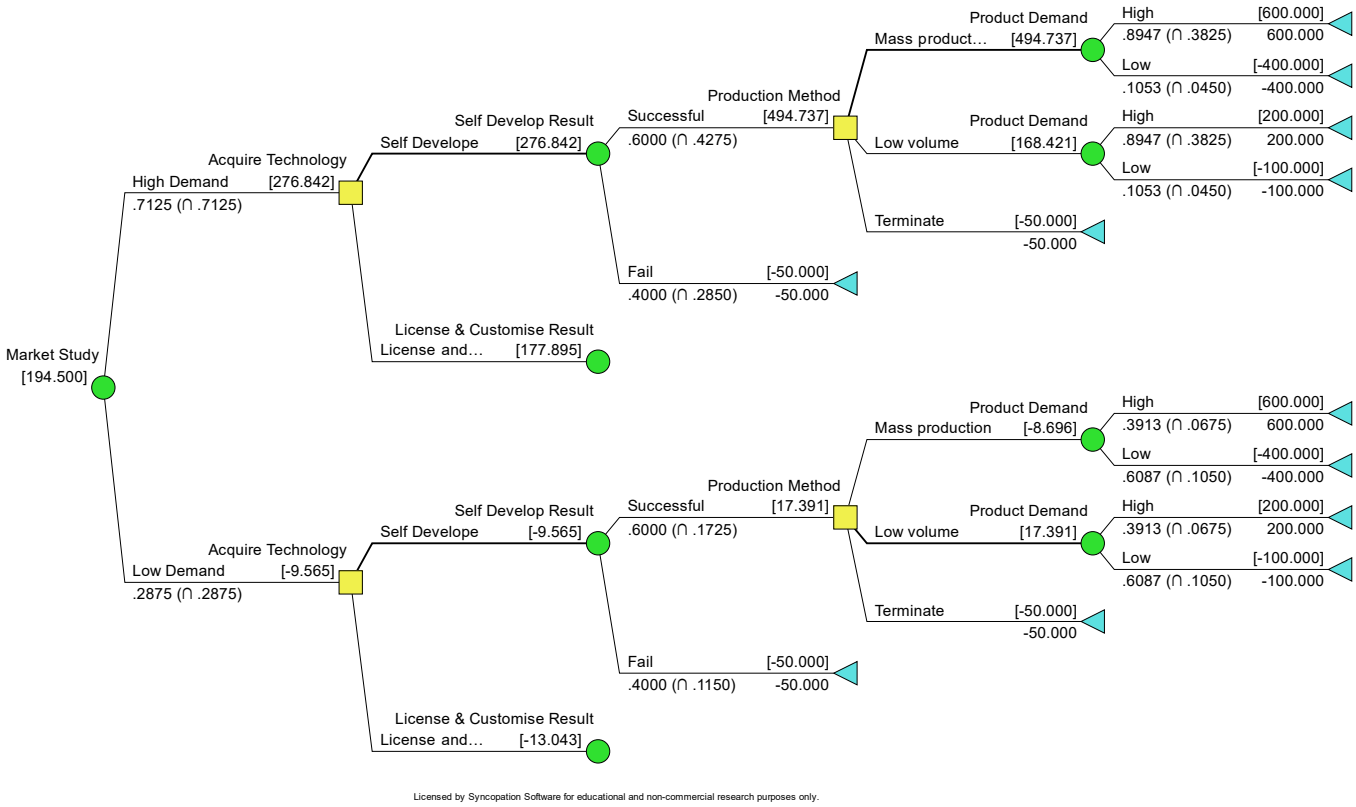
  = 258,000 – 190,000 = **$68,000**

(*e*)

- Flipping the tree:



- Decision model free market study on product demand:



- Expected value with free market study = $194,500
- Expected value with no market study = $190,000
- Hence expected value of imperfect market study = $194,500 - $190,000 = $4,500.
- Hence the company should spend only up to a maximum of $4,500 for the market study.