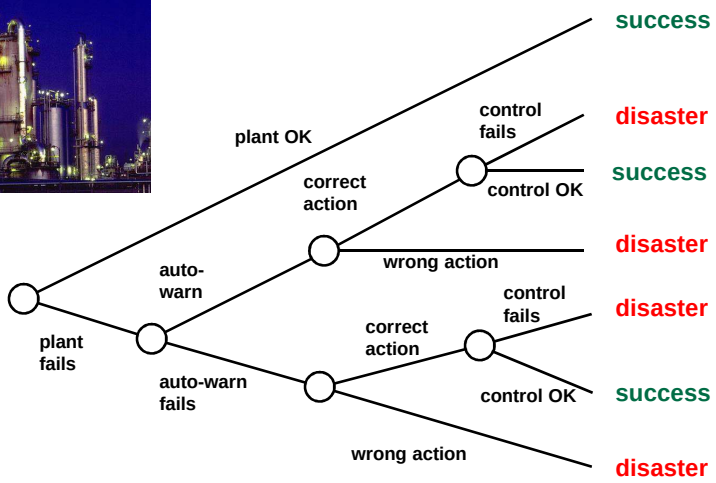
UNIVERSITY of STIRLING
Management School

Decisions in an uncertain world

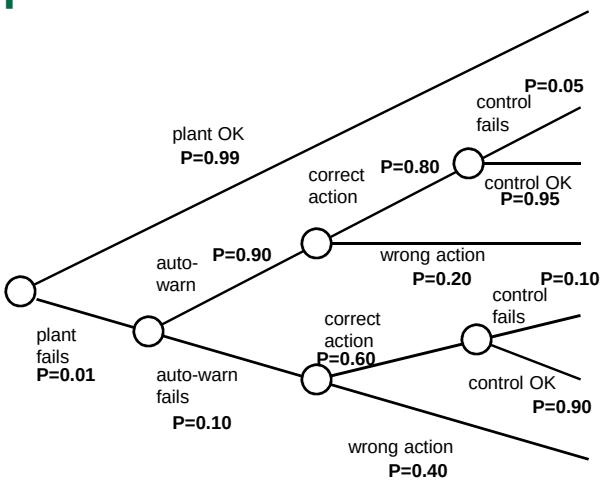
decision trees & expected values

UNIVERSITY of STIRLING
Management School

Tree diagrams: plotting the outcomes



Tree diagrams: including probabilities



success	0.99000
disaster	0.00036
success	0.00684
disaster	0.00180
disaster	0.00006
success	0.00054
disaster	0.00040

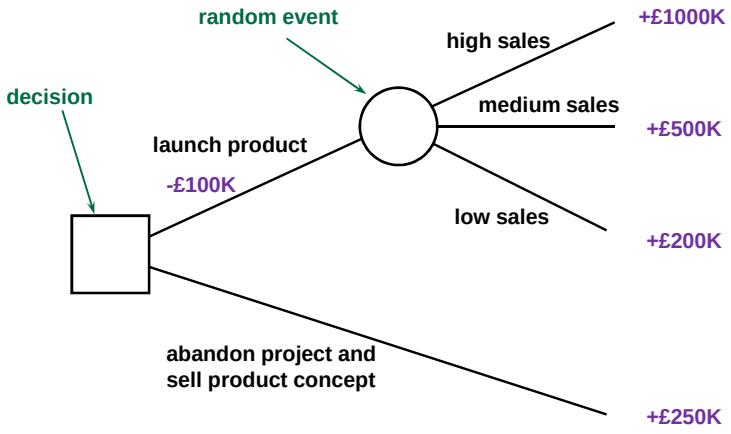
P(success) = 0.99000+0.00684+0.00054 = 0.99738

P(disaster) = 0.00036+0.00180+0.00006+0.00040 = 0.00262

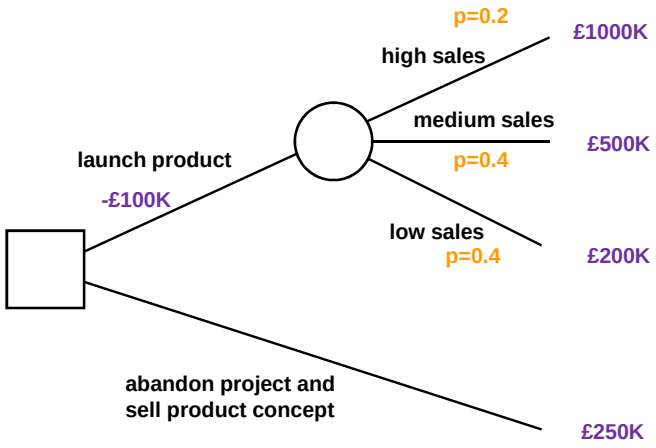
Decision trees: including finance & options

- consider an example:
  - –initial development of a new product completed
- options:
  1. finance the final stage & launch the product in the market
     - –could result in high, medium or low sales
  2. or sell the concept, guaranteeing some income

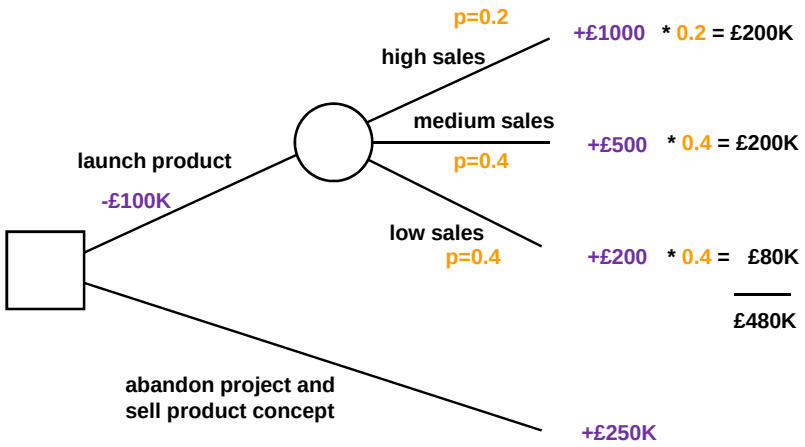
A decision tree: including the finances



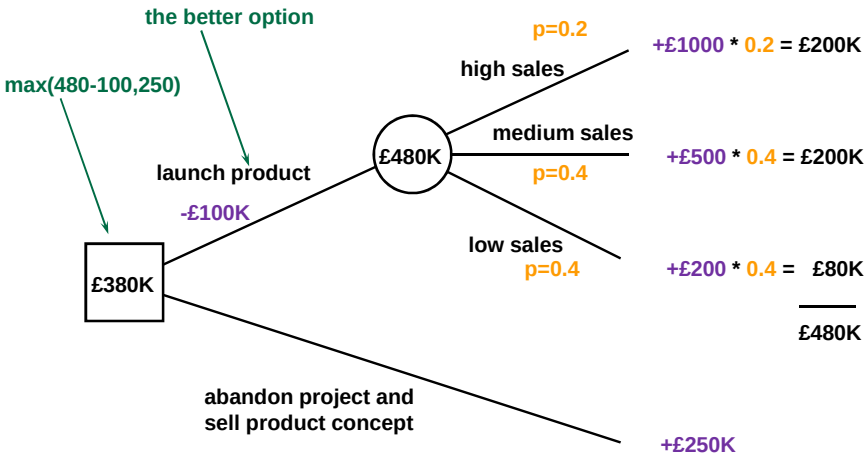
Estimating the probabilities



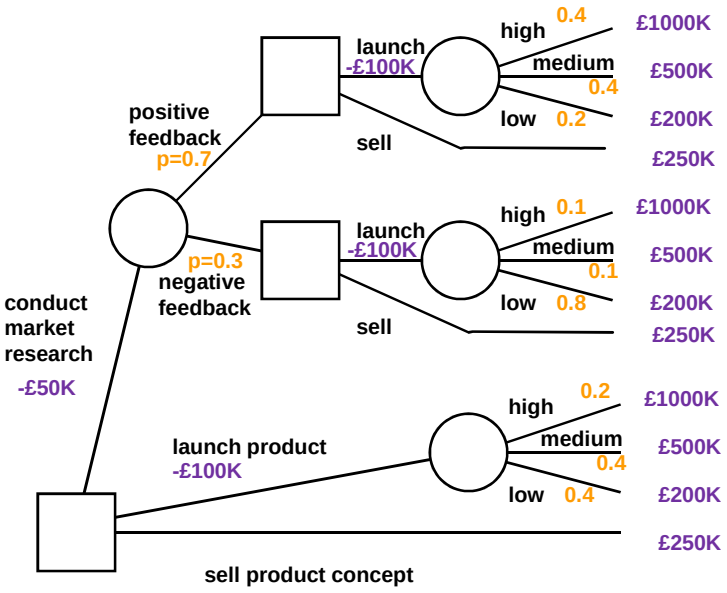
Calculating expected values



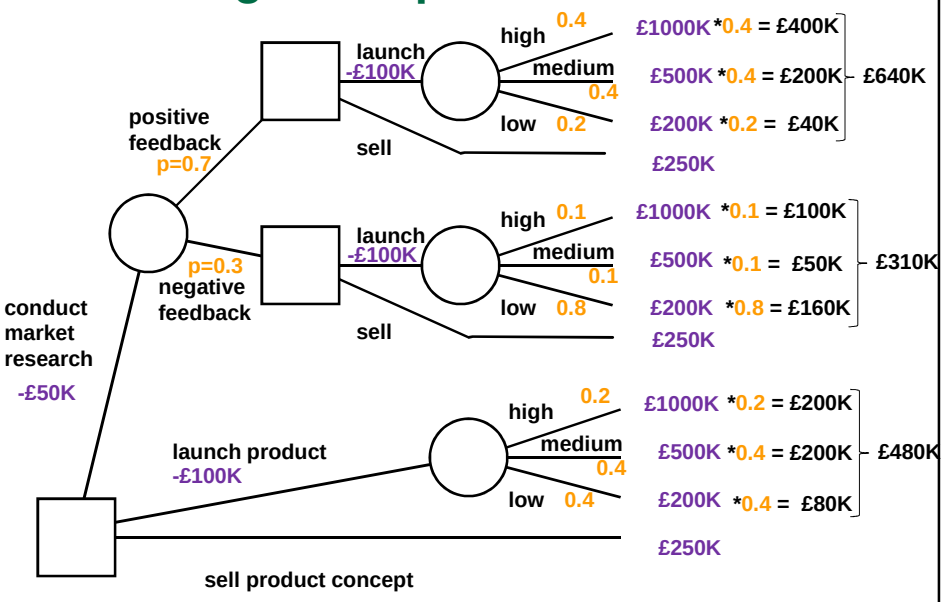
Comparing expected values



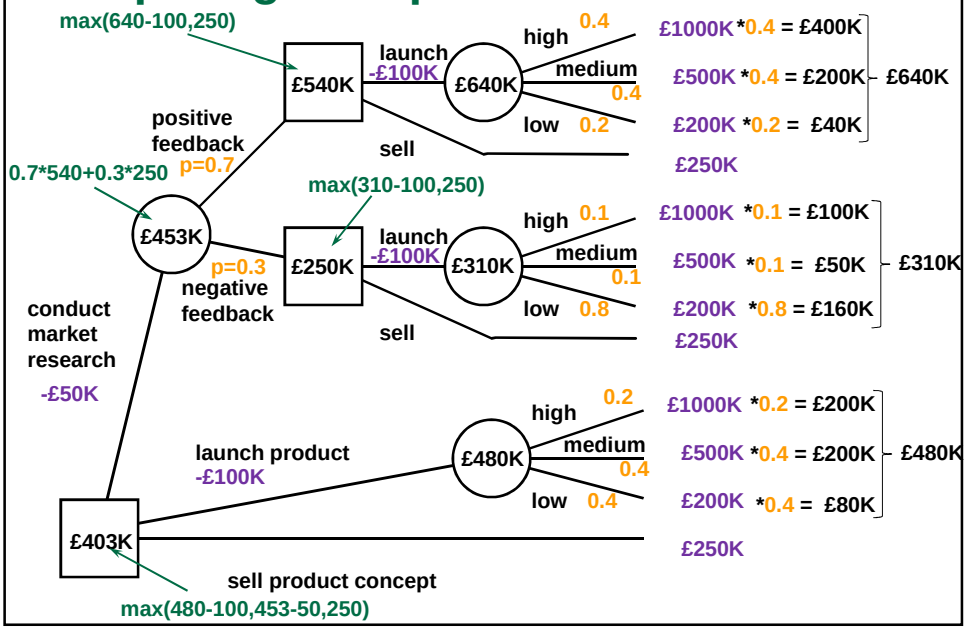
Further option: market research



Calculating the expected values



Comparing the options



The value of information

- if the cost of market research increases, would it still be worthwhile?
- if the market research cost £73,000
  - expected value associated with “market research” option = £453000 - £73000 = £380000
  - which is the same as the “launch product (without market research” option
- hence the “value of information” = £73000; while the market research costs less than this, it is worthwhile

UNIVERSITY of STIRLING
Management School

A Rock Climbing Injury – a decision model example from the medical field.