ENABLING REUSE WITH RELATIVE CONTRIBUTION VALUES IN GOAL MODELS

for Concern-Driven Development

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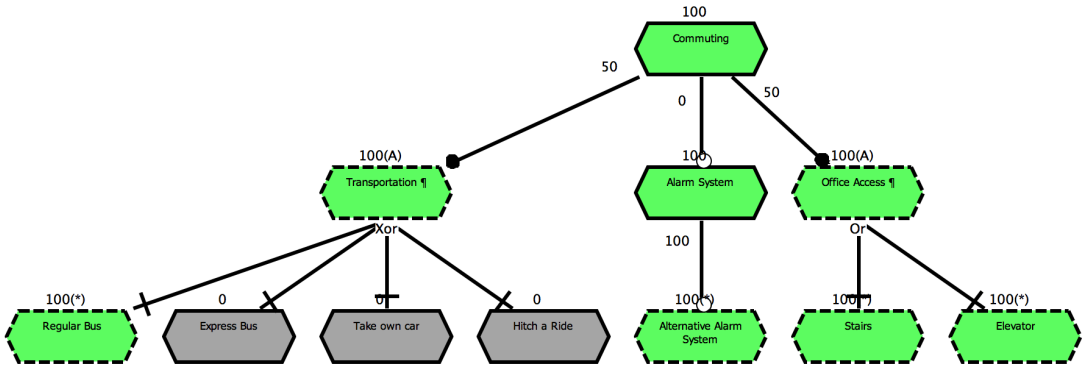
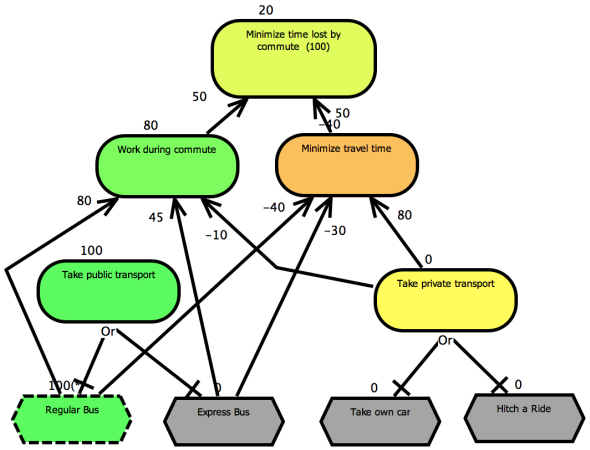
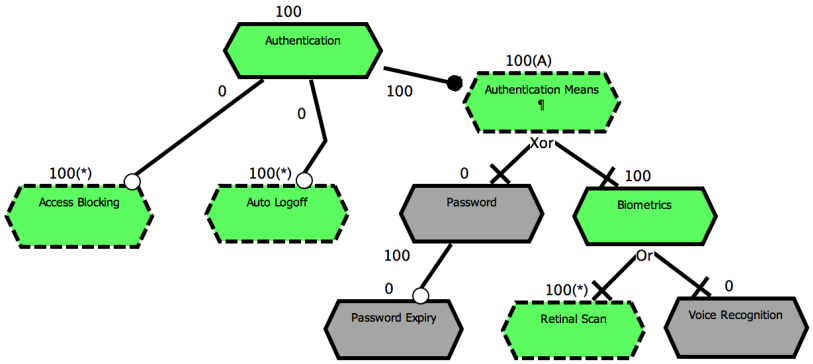
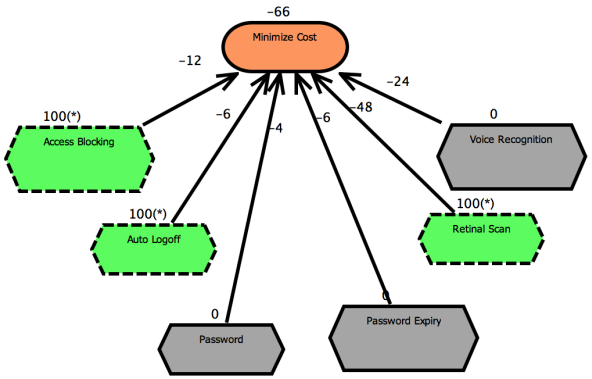
Introduction to Goal Modeling





Goal Models provide tradeoff analysis capability between feature configurations.

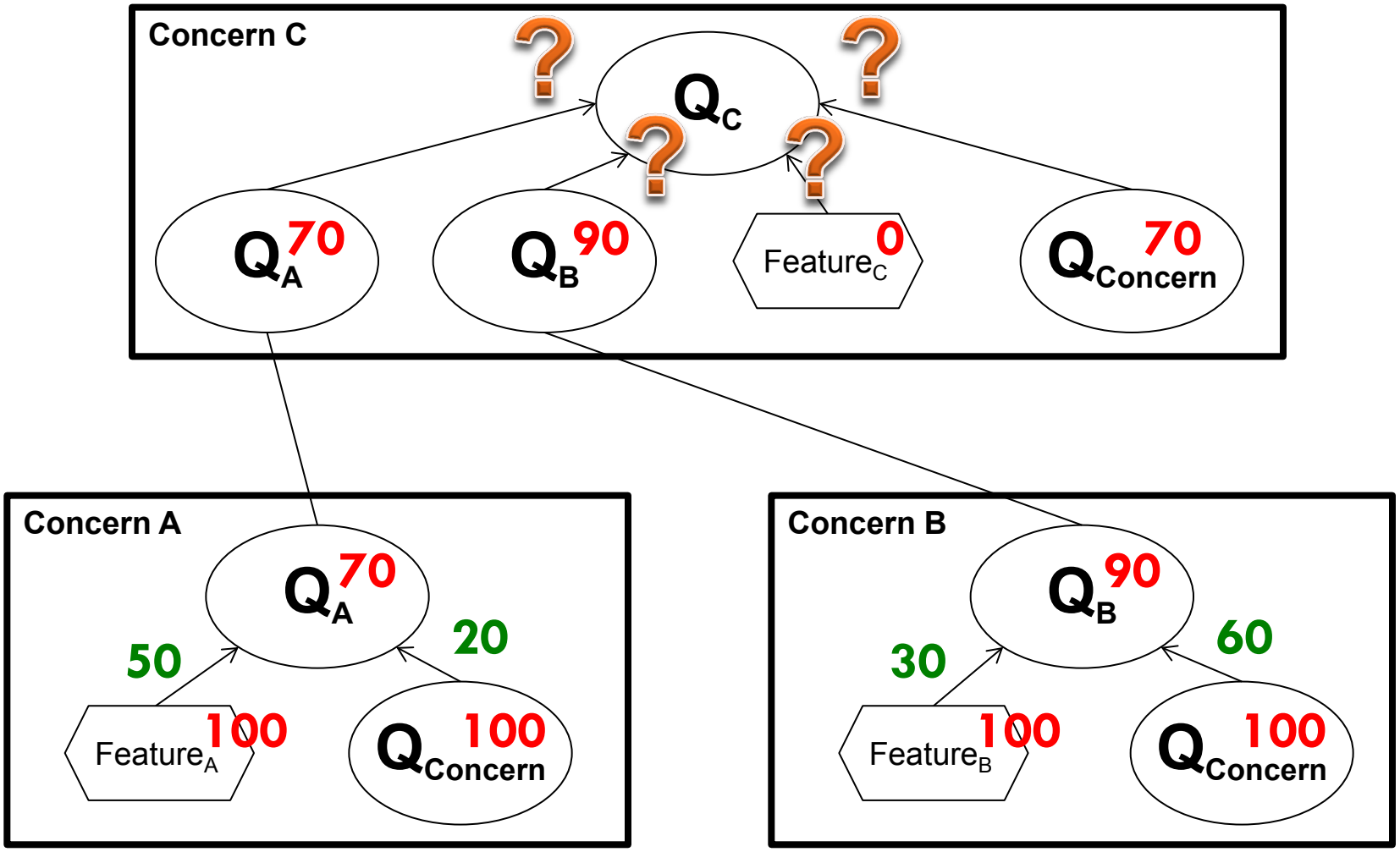




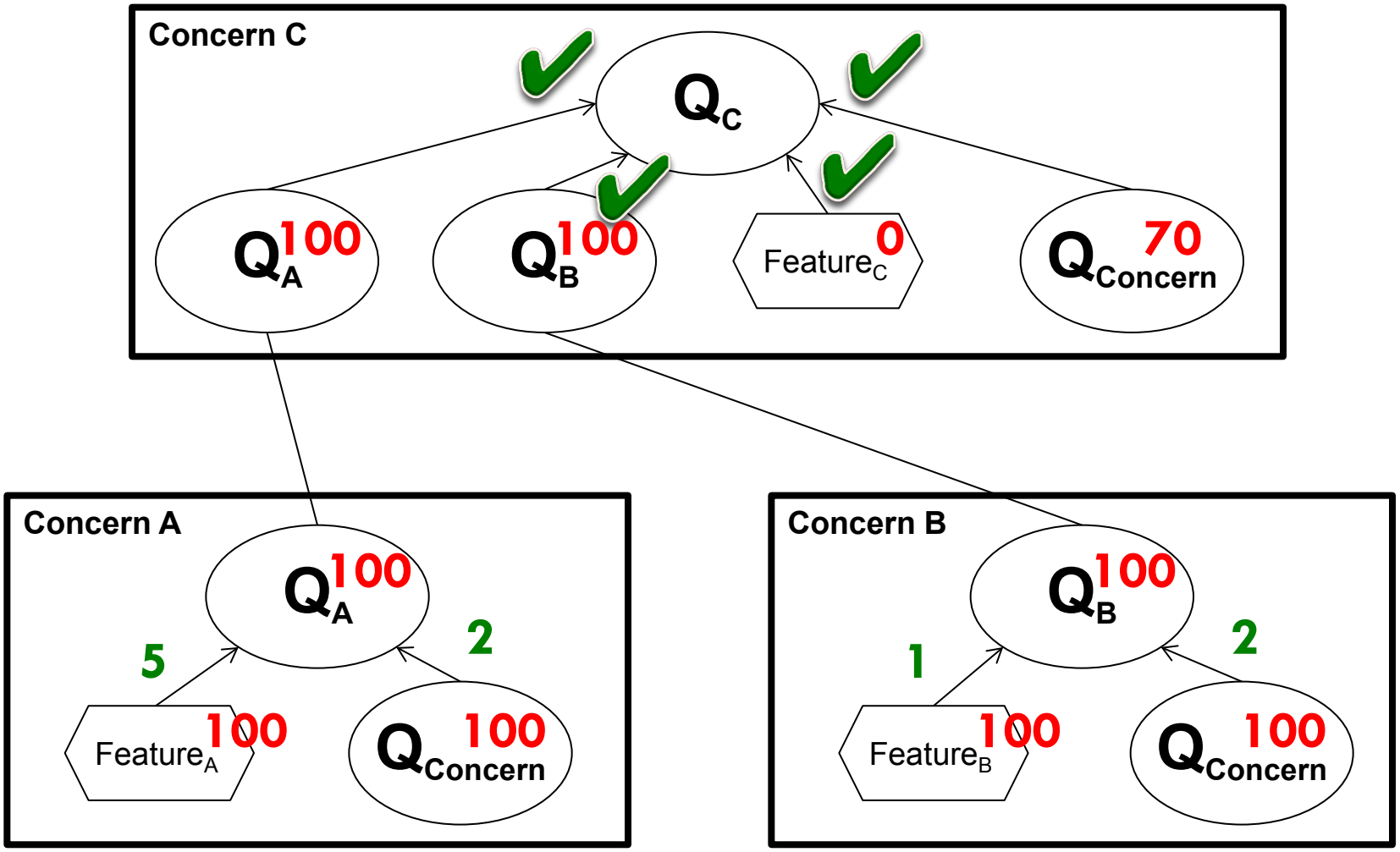
Contributions in Goal Modeling

- Qualitative values, i.e., labels
  - Low, medium, high → limited accuracy
- Quantitative values
  - Real-life values that use a specific unit (e.g., $ for cost)
    → must be able to clearly measure the quality
    → requires a function to aggregate measurements
    → typically a specific, unit-dependent function is needed
  - Unitless values within a specific range
    → generic aggregation function
    - Global values → must keep values consistent across all models
    - Relative values → must keep values consistent only for all children of a goal element

Goal Modeling for Concern Reuse

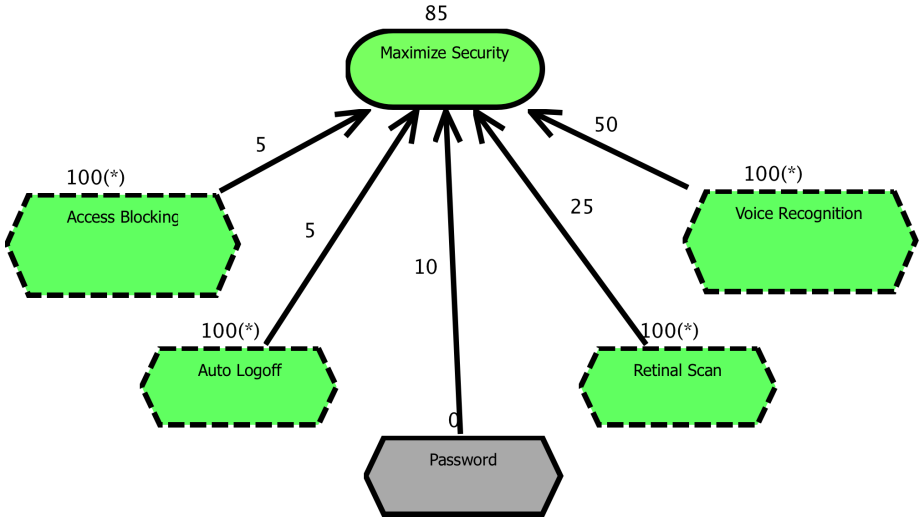


Goal Modeling for Concern Reuse



Motivation

- Modeler's focus should be on assigning contribution values relatively (i.e., one option is twice as good as another option)
- For composability and reusability reasons, the possible range of values for the each parent element must always be in the same range (i.e., between 0 and 100)

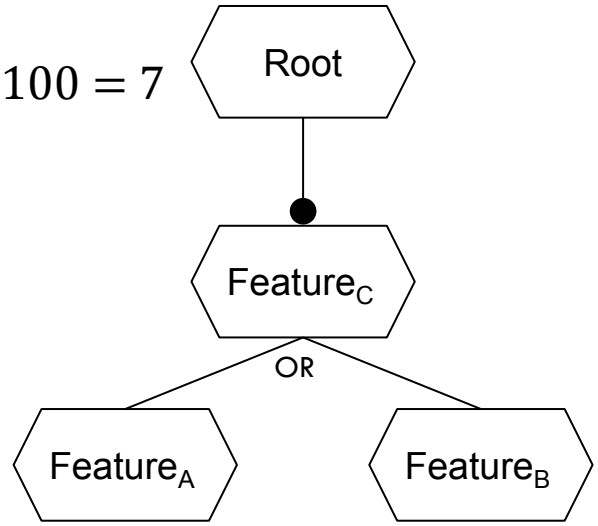


Approach

$Relative\ Maximum = (5*100 + 2*100)/100 = 7$

$Relative\ Minimum = 2*100/100 = 2$

$Range = [2, 7]$

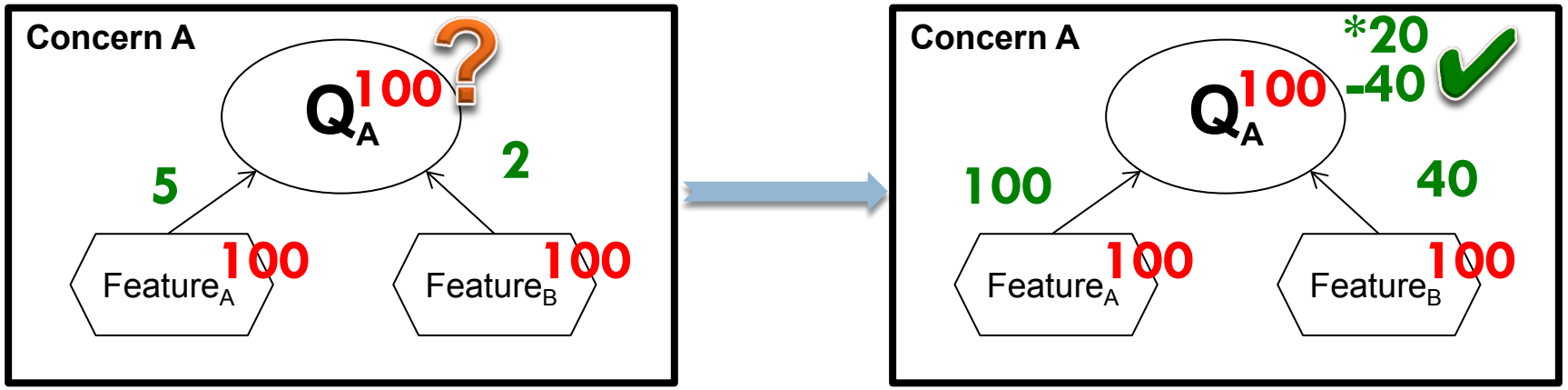


$Scale = 100/(7-2)$

$5*100/5 \rightarrow 100$

$2*100/5 \rightarrow 40$

$Offset = -40$



Approach

We need to ensure that it is always theoretically possible for a parent element to reach the maximum and minimum values of the [0, 100] range.

→ scale the relative contribution values and offset the weighted sum!

The question is:

How do we find the relative maximum and minimum values that can be achieved with the relative contribution values?