

Assignment 1

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Assume we have 3 inheritances $apple \rightarrow fruit < 1,0.9 >$, $fruit \rightarrow plant < 1,0.9 >$, $plant \rightarrow edible < 1,0.9 >$, in which the first value in the brackets is the frequency, and the second is the confidence (assume $k = 1$). Answer the following questions, **don't just show the values, show a detailed process**, and include as many possible ways of calculation as you can. Make sure your calculation includes the rules used (which premise, which condition, which rule) and the evidential base. In total, this assignment has 100 points.

1. What is the truth-value of $apple \rightarrow plant$, $apple \rightarrow edible$, $fruit \rightarrow edible$? (40 points)

To make things simple, I will give each judgment a number. Correspondingly, f_i, c_i are the frequency and confidence of J_i .

To help you start, here is a sample how to solve the truth-value of $apple \rightarrow fruit$.

$$J_1 := apple \rightarrow fruit < 1,0.9 >$$

$$J_2 := fruit \rightarrow plant < 1,0.9 >$$

$$J_3 := plant \rightarrow edible < 1,0.9 >$$

By J_2, J_1 (pay attention to the order), and since $f_2 > 0.5$, by the deduction rule, we have:

$$J_4 := apple \rightarrow plant < 1,0.81 >$$

with evidential base $\{J_1, J_2\}$.

Then you need to do it yourself, good luck!

2. If I further add $apple \rightarrow food < 1,0.9 >$, what is the truth-value of $fruit \rightarrow food$, $plant \rightarrow food$, $edible \rightarrow food$? What's your comments on their confidences? (40 points)
3. If I further add $apple \rightarrow edible < 0,0.9 >$ (imagine I am snow-white, I know the apple is not edible), what is the truth-value of $apple \rightarrow edible$, $apple \rightarrow plant$, $apple \rightarrow fruit$, $fruit \rightarrow edible$, $plant \rightarrow edible$, $fruit \rightarrow plant$? (20 points)