Planning and Approximate Reasoning. MIA, MESIIA. URV

Exercises on Dempster-Shaffer method.

1. Important documents were stolen from a safe-deposit box. There are 3 suspects: A, B and C.

After an investigation we come with the following two clues:

- Examination of the safe suggests, with a 70% degree of certainty, that the safecracker was left-handed (and with 30% we don't know). A and B are left-handed.

- Since the door giving entrance to the room with the safe has not been forced, it can be concluded, with a certainty of 80%, that it was an inside job. A works in this company.

What is the belief function for each of the 3 suspects?

Later on, we discover that C was also inside the building. How do the beliefs change with this new information? Can we now decide who is the thief?

2. Our neighbour, Mr. Jones, receives each early morning a bottle of milk, which is left in front of his door. However, when he opens the door the bottle is usually open and empty. Mr. Jones thinks that the cause of not finding milk is one of the following animals: a cat, a dog or an owl. He asks other neighbours in order to find more evidences:

    - On Monday, Mrs. Pink says that it must be the dog or the cat, with a confidence of 80%.
    - On Tuesday, Mr. Black thinks that it is the cat or the owl, with 70%.
    - On Wednesday, Ms. Brown believes that it is a bird (thus, the owl) with 60%.

Indicate which is the frame of discernment and model the mass functions of these three clues.
After that, calculate the belief and plausibility of the facts for each of the three days.
At the end, is there any animal free of suspect? And which animal is the cause of drinking the milk?