AIK Home Assignment I: The Gallivare Shooting Scenario

Solutions to Lars Karlsson

Axiomatize the scenario below in BTK, STL and SitCalc, including properly defined vocabularies. You need not bother about frame axioms, qualification axioms or $Ab()$. For SitCalc, call the situations corresponding to the time-points $S0$, $S1, \ldots$, and use an action $Wait$ for times when nothing happens.

> *I smelled an elk somewhere in the vicinity. I have a very sensitive nose and can easily discover an elk at a distance of 1000 yards, if the winds are right. This was definitely a twelve-tiner, and it was coming in my direction. I quickly loaded my rifle. "Welcome to my living room wall", I whispered as the mighty animal burst out of the dense forest and I pulled the trigger...*

Here follows a more structured version of the same scenario:

1. *If one loads a rifle, the rifle becomes loaded.*
2. *If the rifle is loaded and one fires the rifle at somebody, he/she/it becomes dead and the rifle becomes unloaded.*
3. *The rifle is not loaded and the elk is alive at time 0.*
4. *The hunter loads the rifle at time 1.*
5. *The hunter fires the rifle at the elk at time 2.*

For one of the formalisms, prove that the elk is dead at time 3.
Consider the following changes to the scenario.

5. *The elk takes the rifle from the hunter at time 2.*
6. *The elk fires the rifle at the hunter at time 3.*

You will have to add an additional property specifying who has the gun. At time-point 0, it is the hunter.
In the second scenario, the hunter is lucky. We cannot prove that he is dead at time 4. Explain why. Also discuss what can be logically inferred about the condition of the elk at times 1 and 2 in the original scenario.
You will probably find the lecture notes about BTK, STL and SitCalc quite useful for this exercise.