Tutorial 8: Proposition and Inference

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Exercise 8.2: CSI Stellingen

- Assumables:
  Gardener has been working in the garden all day: g_garden
  Butler has been fixing the car in the garage all day: b_garage

- Oberservations:
  Gardener has no dirt on his hands: $\neg g\_dirt$
  Butler has dirt on his hands: b_dirt

- Rules:
  If the gardener worked in the garden all day, he will have dirt on his hands: $g\_dirt \leftarrow g\_garden$
  If the butler worked in the garage all day, he will have dirt on his hands: $b\_dirt \leftarrow b\_garage$

- Integrity Constraints:
  The gardener has either dirt on his hands or he has no dirt on his hands: $false \leftarrow g\_dirt \wedge \neg g\_dirt$
  The butler either has dirt on his hands or he has no dirt on his hands: $false \leftarrow b\_dirt \wedge \neg b\_dirt$

Since there are only two suspects, one of them must be lying. This is the minimal conflict: $\{g\_garden, b\_garage\}$.
Thus follows: $KB \models \neg g\_garden \vee \neg b\_garage$
By applying the rules, we know that the person without dirt on their hands is lying: $KB \models \neg g\_dirt \vee \neg b\_dirt$
The integrity constraints define that each person has either clean or dirty

hands. The obsevations tell us that the gardener has clean hands. Considering this knowledge, we can conclude that the gardener has to be the murderer.