Programming Assignment Report

Assignment 06

Logical Agents, Theorem Problem

Solutions

1. Implement Theorem Proving by Inference Rules. Show how to prove “Sherlock Holmes solves the case” **S**  
   Knowledge Base (KB):

**R1: (W ∧ E) → S**“If Watson helps and there is evidence, Sherlock solves the case.”  
In **R3**, **W** is true and in **R2** **E** is true, therefore **S** is true.

**R2: M → E**“If Moriarty is involved, there is evidence.”  
Since **M** is true in **R4** therefore **E** is true

**R3: ¬M ∨ W**  
“If Moriarty is not involved, then Watson helps.”  
Since **M** is true in **R4**, **¬M** is false, therefore **W** must be true

**R4: M**“Moriarty is involved.”  
**M** is true

1. Solution

Only the Maid or the Butler could be guilty in 5  
If the Maid is guilty, the crime happened in the Conservatory in 7  
if the maid was in the conservatory then the method is gunshot. This goes against 4.  
The crime happened in either the Conservatory or the Kitchen in 9, since it didn’t happen in the conservatory**, it happened in the kitchen**.   
Bringing it back to 5, since the maid is not guilty that means **the Butler is guilty.**this also relates to 6 where one or the other are guilty not both.

Since the butler is guilty **the crime happened in the kitchen 8.**

going back to 1, the butler and in the kitchen are both true, therefore **the method was poison.**

The Butler committed the crime.  
The crime occurred in the kitchen.  
The method was poison.