COMP4431 Artificial Intelligence
Quiz 02 Solution

I. Knowledge-based Agent and Expert System

1.

a) Perform Forward Chaining as below:
Given Facts:

- The car won't start.
- The headlights are dim.

Step 1
Since the headlights are dim, **Rule 3** is triggered: i.e. "IF the headlights are dim THEN the battery is dead."
New fact derived:

- "The battery is dead."

Step 2
With the facts "The car won't start" and "The battery is dead," **Rule 1** is triggered: i.e. "IF the car won't start AND the battery is dead THEN the issue is a dead battery."
New fact derived:
The issue is a dead battery

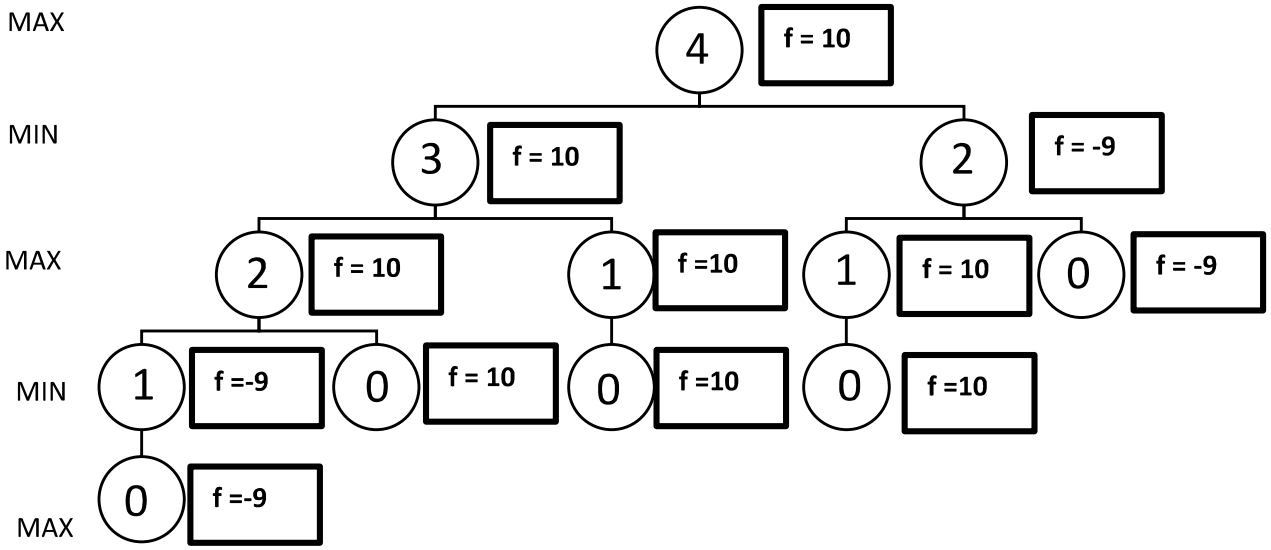
As no further rule can be triggered, we conclude that: The issue is a dead battery.

b) Another reasoning method used in expert systems is **backward chaining**.

Backward Chaining is a goal-driven approach which is the major difference to forward chaining. It **starts with a specific goal and works backward to determine if there is evidence to support it**. It works from the "top down," starting with the goal and searching for supporting facts. (or similar answer)

II. Game

2. **a)** The completed search tree of minimax algorithm is as follow:



The final decision is to <u>take 1 stone</u> on the first move.

c) Yes, the Minimax algorithm can still be used.
The major change is redefininig the objective/utility function to reflect the new win/loss condition:

f = -9 if starting player takes the last stone and wins the game,
f = 10 if starting player does not take the last stone and loses the game

(or other acceptable answers)