Miguel Angel Montoya Zaragoza
A01226045

Documentation "Monkey and Banana Problem"
File: monkey.pl

This problem is based on the ability of being able to move from one initial state to a final (Accepted) state. This is possible using intermediate states, and the "force" necessary to move through one state to another is called an action/movement.

The state schema is defined as follows:
state(Monkey, Level, Box, Banana) where
       Monkey – Position of the monkey. Can be anything.
       Level – Must be 'onFloor' or 'onBox', else wil definitely fail. (Reason explained below)
       Box – Initial positionof the box. Can be anything.
       Banana – Must be 'has' or 'hasNot', else wil definitely fail. (Reason explained below)

The problem defines some specific, valid, actions: grab, climb, push(P1, P2) and walk(P1, P2). The last two start from an initial point P1, and move to the final point P2.
The problem also defines the relative initial state (The state that will cause the action) for this actions to be valid:
       Grab – The initial state must be state(middle, onBox, middle, hasNot).
            It will return state(middle, onBox, middle, has).
       Climb – The initial state must be state(P, onFloor, P, Banana).
            It will return state(P, onBox, P, Banana).
       Push(P1, P2) – The initial state must be state(P1, onFloor, P2, Banana).
               It will return state(P2, onFloor, P2, Banana).
       Walk(P1, P2) – The initial state must be state(P1, onFloor, Box, Banana).
               It will return state(P2, onFloor, Box, Banana).

Given this set of rules, the problem just reduces to simply go to the next step of the recursion with the returned state of the current one, until the program reaches a state where an action (grab) will return a state where the monkey has the banana.
There are a set of cases where the monkey will definitely not can't get the banana, and those are:
- The 'Level' of the monkey isn't 'onBox' or 'onFloor'. This is because if the monkey isn't located in any of these levels, there isn't a valid action that will make the monkey get on a state where he can execute the action grab.
  Remember that if the state 'onBox' is given, and the monkey isn't already in the 'middle', he will not be able to reach the banana, as there isn't an action to get down the box and then execute other valid actions.
- The Banana Status isn't 'has' or 'hasNot'. Because, as the logic also stated above, there isn't a valid action that changes any other status to 'has' or 'hasNot'. Making impossible the task to reach the banana.