Deliverable Lab Work 1 - Group 3E1

My rule design:

Global variable ?*nod-gen*: Stores the number of nodes generated to do the search
Facts bot: Includes all the facts needed to do the search(excep the max level, introduced by the user in the start)

Init: Ask the user for the max level to solve the bot
Right, left, up, down: Checks if we already reached the max level and if the movement is possible, if true then it moves the bot to the rule's name
Load: Checks if we already reached the max level and if the bot is in a warehouse position and it can carry more bulls it loads bulls from it
Replace: Checks if we already reached the max level and if the bot is in a lamp position that needs replacement and it has enough bulls he replaces them
Solution: Checks if we already reached the max level and there are no lamps no be fixed
Nosolution: Checks if we already reached the max level if so it stop the execution, the bot failed

Evaluation of breadth, depth and heuristic search:

	Breadth	Depth	Heuristic
1 lamp	114 nodes 5 movements	145 nodes 5 movements	7 nodes 5 movements
2 lamps	935 nodes 12 movements	1037 nodes 12 movements	20 nodes 12 movements
3 lamps	4159 nodes 21 movements	4260 nodes 21 movements	39 nodes 21 movements
4 lamps	11157 nodes 25 movements	11290 nodes 25 movements	43 nodes 25 movements
5 lamps	28829 nodes 29 movements	28872 nodes 29 movements	71 nodes 29 movements

As we can see Breadth and Depth searching are mostly equal when using bot.clp(no heuristic).Their number of facts for each number of nodes generated are very similar(depth is always with a few more).If we enter the exact level where the solution is the depth would be more efficient.

Heuristic search is nothing similar to Breadth and Depth in terms of execution cost, it reduces tremendously the number of facts needed to solve the problem, it uses the same number of movements(level reached) but with a dramatically less number of nodes generated, even with a not admissible heuristic it has the best execution

Concluding we can say that the Heuristic search is the best option to choose , all the search strategies find the solution and have a similar level (Breadth and Heuristic) but the Heuristic reduces dramatically the number of nodes generated, making the execution faster.

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