



PROGRAMMING PARADIGMS

Letter Blocks -- CA1



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Question 1:

Print_status(B) where B = [[b,c,f], [a,d,g], [h,e]]

The blocks B is the given list of lists which having three piles of list which is each stack of the blocks. The element on the left-hand side is in the ground of the stack and each pile.

So, I must print the block of piles in such a way that the all the stack should be print in the new line and the piles of block and the element of the block should be separated by the |.

I prolog to print the list we can used print and write method which help me to print the list. At first, I define the print_status whose having empty list then nothing will be display. After that If I have list having head H and tail T inside the print_status then the head will go to the sublist and tail will be going to print_status for the recursive call so that it will be repeated until the tail did not divide to head.

After that if my sublist(Lig_eza, 2011) is empty then the write method will execute with the '|' symbol and show in the new line. If the sublist have head and tail inside the list, then write method will execute with '|' and head part and the sublist will be recursive call.

To get the print_status (B), I must execute the code below:

print_status([[b, c, f], [a, d, g], [h, e]]).

Question 2:

height(B,X,H): In this predicate, B describes the three piles of blocks, X is a block and H is the height of the block from the ground. A block lies on the ground must have height equal to 0.

At first, I define the height with the empty list which is B. X and H are define as a Wildecard '_' so they can be anything and both the value will be different than other.

Then the cut and fail will be executed respectively to end the loop.

In the second predicate, The B have head and tail in the list then the X will be X and H will be N then the height_list will have H, X, N and height have T, X, N which I do in the Q1.

I made the heigh_list to like the List of length(Tutorials Point(India) Ltd., 2018) where if the list having head then the head will be equal to the block X and the height will be started from the 0. Then, If the height having tail in the list and block Y and height N then height_list will have tail as a B, Y as a X and N1 as a H and N1 will be always added to 1 until the height does not finished.

I will get the height of the block by using code below.

height ([[b,c,f],[a,d,g],[h,e]],c,H).

I will get the block present in the same height by using code below.

height ([[b,c,f],[a,d,g],[h,e]],X,2).

Question 3:

`all_same_height(B,H,L)`: In this predicate, B describes the three piles of blocks, H is the a height and L is a list of block that are at the height H.

For this I used the find all method where X will be the variable to assessed and I call the `height(B,X,N)` from the second part for the evaluate and L will be the new list. For the source I used the moodle slides and the lecture recorded videos.

The below code help me to run the predicates:

`all_same_height([[b,c,f],[a,d,g],[h,e]],0,L)`

Question 4:

`same_height(B,X,Y)`: In this predicate, B describes the three piles of blocks. This predicate is True if the blocks X and Y are at the same height.

If I have `same_height(B,X,Y)` then I called the height from the second part where B same as B in `same_height`, X is the X in `same_height` and H will be the height of the block X. For Y block I used the same process but at this time Y is the Y in `same_height` and then I used the and where I can compare the X and Y which will be true if the X and Y block present in the same height.

Below code help me to execute the predicates:

`same_height([[b,c,f],[a,d,g],[h,e]],b,h).`

Question 5:

`Move_block(B,X,S1,S2)`: to move a block from the stack S1 to the stack S2. S1 and S2 are integer numbers identifying one of the three stacks (1,2 or 3). A block can be moved only if it is at the top of a stack (otherwise it cannot be moved) and it can be only placed on top of another stack (or on the ground if the stack is empty). The predicate must print the status of the blocks before and after the move (only if the block can be moved!)

For the first I have the length of the list(Tutorials Point(India) Ltd., 2018) predicate which I get from this source. And Delete from the list predicate(Lig_eza, 2011) from this source.

Then I define the `move_block` predicate which have empty list and other value are wild card.

If the `move_block` have list head and tail and the value X and S1 and S2 integer of the stack then I introduced new method called `nth1(SWI-Prolog -- nth1/3, 2021)` which have index S1, list [H|T] and Element E1. Then, I will have to find the length of the stack which will be L1, and I called height from the second part and make that height and the length to be equal so that the top of the stack can be find out. Then, I must delete the block from the stack 2 which is top block and then I called second stack. Then, I used the append method to get the new stack of stack 1. At the end, the `print_status` is called and print on before method and inside the after method, I print the new and delete Stack 1 and stack 2 respectively with the Tail of the part.

But I got the problem that the tail still have the stack 2.

I used below code to run executed this predicate.

```
move_block([[b,c,f],[a,d,g],[h,e]],g,2,1)
```

References

Ligeza, A. (2011) 'Lists in PROLOG'. Available at:
file:///C:/Users/suren/OneDrive/Desktop/MSc%20in%20Software%20Development/Programming%20Paradigms/prolog-lists.pdf.

SWI-Prolog -- nth1/3 (2021) *SWING-Prolog*. Available at: <https://www.swi-prolog.org/pldoc/man?predicate=nth1/3> (Accessed: 11 April 2021).

Tutorials Point(India) Ltd. (2018) *Prolog - List Operations Length Calculation*. Available at: <https://www.youtube.com/watch?v=cdlWKuqdTIs&list=PLWPirh4EWFpFLjsd3IUqymnCVBaz1Yagg&index=20> (Accessed: 11 April 2021).