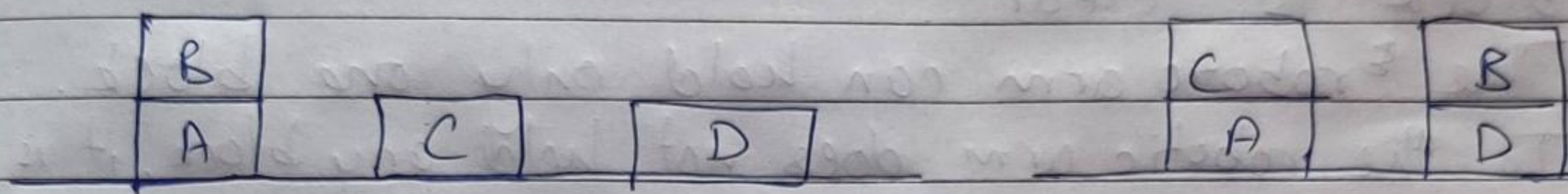


AIR ASSIGNMENT 3

TITLE: Goal Stack Planning

PROBLEM STATEMENT:

Implement goal stack planning for the following configuration from the blocks world.



Initial

Goal

OBJECTIVES:

To learn & implement goal stack planning.

OUTCOMES:

Be able to learn & successfully implement goal stack planning.

SW & HW REQUIREMENTS:

64 bit OS, python3, 4GB RAM, keyboard, mouse, monitor, i3 or higher processor.

THEORY:

* Blocks world Problem

- i) There are N blocks, a table & a robotic arm. Blocks are identified from $1 \dots N$.
- ii) Each block can sit on top of another block, or on the table.

- iii] There can be a stack of blocks of arbitrary lengths/height.
- iv] However, only one block can be directly on another block. No two blocks can be sitting directly on same block.
- v] The bottom most block of a stack must be on the table. The table can hold any number of blocks.
- vi] If there is no block on top of a block, then the block is 'Clear'.
- vii] The robotic arm can hold only one block.
- viii] If the robotic arm does not hold any block, it is 'Empty'.

* GOAL STACK PLANNER

- i] Goal stack planning integrates the advantages of both forward & backward planning.
- ii] An action is added to the plan only if its preconditions are satisfied.
- iii] If any condition is not satisfied, then we add a relevant action for that precondition, and push the preconditions on stack & repeat the same process.

ALGORITHM:

- 1] Push the goal state on stack.
- 2] Repeat until the stack is empty:
 - a] If stack top is a compound goal,
 - i] Push its subgoals on stack.
 - b] If stack top is a single unsatisfied goal,
 - i] Replace it by an action that makes it satisfied.
 - ii] Push the action's precondition on stack.
 - c] If stack top is an action,
 - i] Check for unsatisfied prerequisites.

ii] If all prerequisites are satisfied,

1] Pop action from stack.

2] Execute it.

3] Change the knowledge base by action's effects.

else

1] push unsatisfied preconditions on stack.

d] if stack top is a satisfied goal

i] pop from stack.

CONCLUSION:

Goal stack planning was understood and implemented successfully.