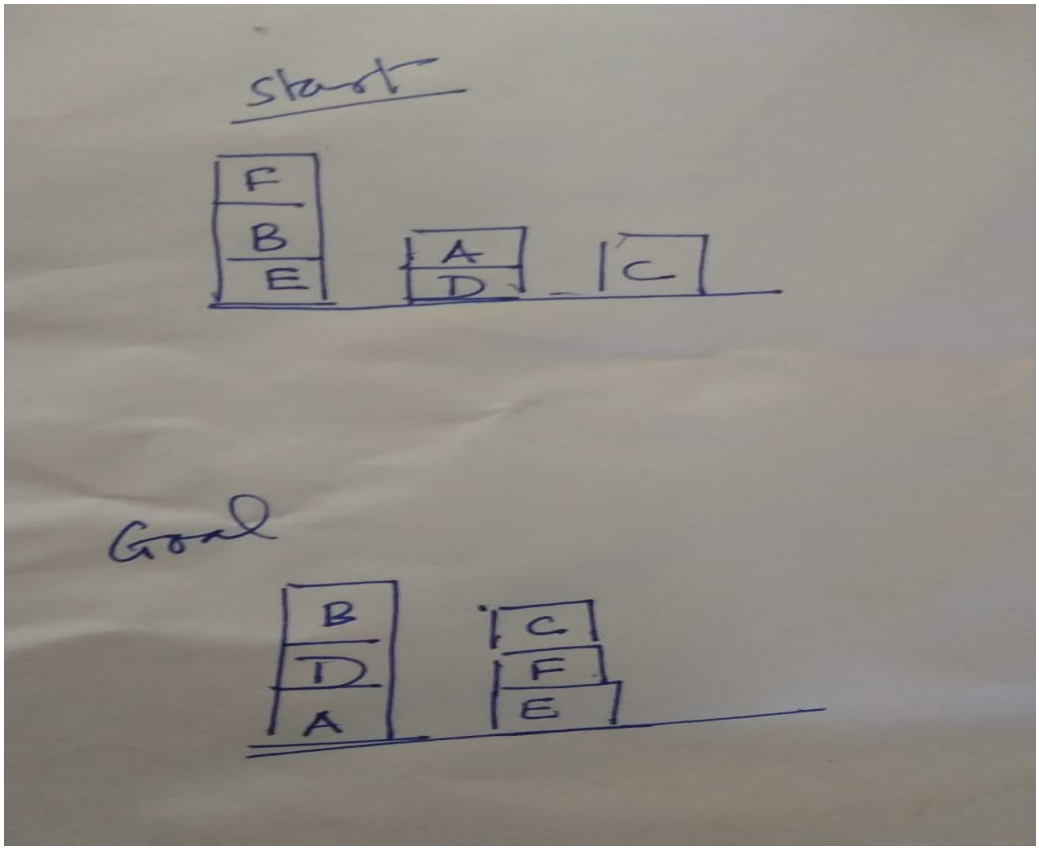
CS 312: Artificial Intelligence
Assignment 2

Heuristic Search Algorithms

Domain for this assignment is : Blocks World Domain -

Blocks World Domain Game starts with an initial state consisting of a fixed number of blocks arranged in 3 stacks and we can move only top blocks of the stacks and we have to achieve a goal state that is a particular arrangement of blocks by moving these blocks. Blocks World is a planning problem where we know the goal state beforehand and the path to the Goal state is more important.



For the above domain implement the following search algorithms:

1. Best First Search :

   Try out a minimum of 3 different heuristic functions and compare the results with valid reasoning. Use a priority queue for the OPEN list to make it computationally efficient.

2. Hill Climbing :

   With a slight modification of code, implement Hill Climbing for the domain. Compare the performance of the two in terms of time and space.

Evaluation Criteria: Total : 20 Points

Correctness: 10

Report: 5

Code Quality: 5

NOTE:

1. Due date for Assignment is ***11:59 PM 2 Jan 2022***.
2. Submit the following files named with your group number.
    a. Code: ***<group_number>***.py
    b. Input file if there ***(input.txt)***
    c. Report: ***<group_number>.pdf***
    d. ***Readme.txt*** (How to execute your program)
3. Mode of submission is moodle.
4. We will run a plagiarism check for all the submissions, If found copied, 0% score will be awarded.
5. Penalty of 10% will be issued per day if the deadline is not met.

Report Format :

1. Brief description about the domain:
    a. State space
    b. Start node and goal node
    c. MOVEGEN and GOALTEST algorithm
2. Heuristic functions considered (minimum of 2)
3. Best First search analysis and observation
4. Hill Climbing and Best First search comparison in terms of:
    a. States explored
    b. Time taken
    c. Reaching the optimal solution.