Class: Getting to know Search Algorithms - Ramón Romero - A01700318

Go through the search space you represented in your last homework assignment using at least 3 types of uninformed searches (correct or finish previous homework if necessary). Write down the complete path made by each search. Compare the searches you choose by using the properties for search strategies.

Hanoi Tower Game (3 disk, 3 stacks)

- Characteristics:
    - Discrete
    - Fully Observable
    - Known
    - Static
    - Deterministic
    - Single Agent
- States:
    - Initial State -> First Stack Sorted, all the others empty ([1,2,3],[ ],[ ])
    - Goal State / Test -> Last Stack Sorted, all the others empty ([ ],[ ],[1,2,3])
    - States:
        - State is a Valid State: if stacks in state are in descending order or empty
- Actions
    - moveTopFromStack(X,Z):
        - Takes the top of stack X, and place it on top of stack Z
- Transition model:
    - moveTopFromStack(X,Z):
        - grabbed=X.pop()
        - Z.push(grabbed)
- Path cost:
    - Time (mins, seconds, ...)
    - Distance Between Stacks

From "Graph Theory of Tower Tasks" [1] , I have found that the Hanoi Tower problem, can be described as with the following graph.

It is bidirectional and "multi-edge", it may imply a loopy path and infinite search according to the algorithm, for my quick implementations and added the attribute of "visited" node.
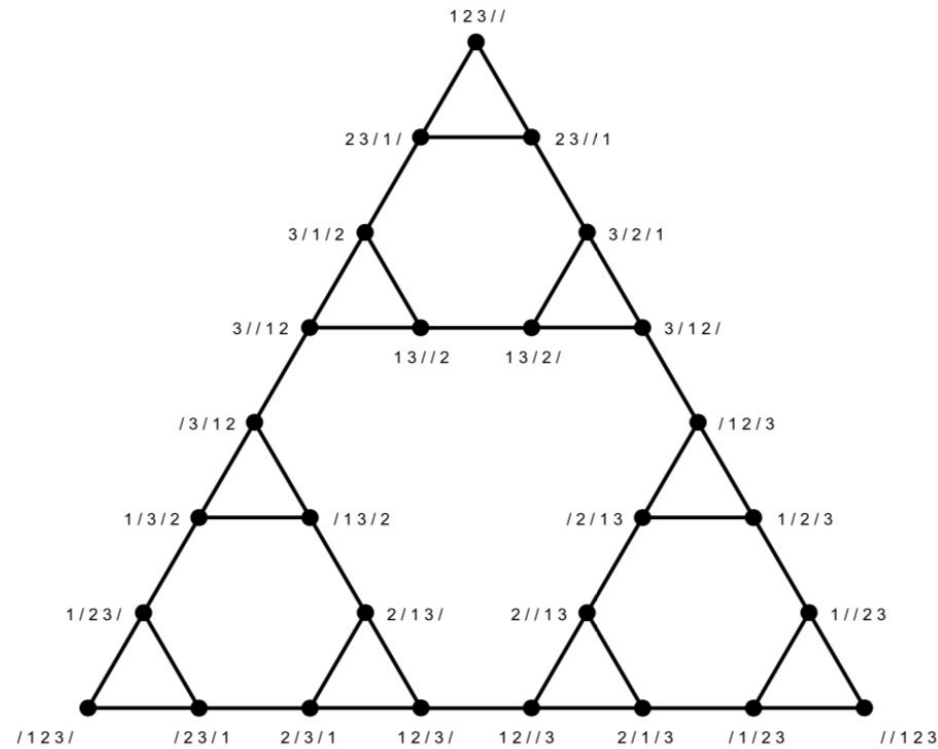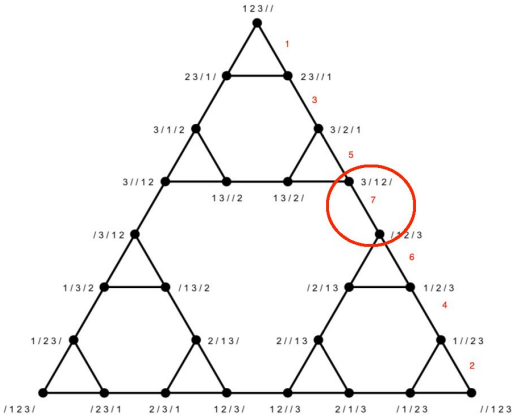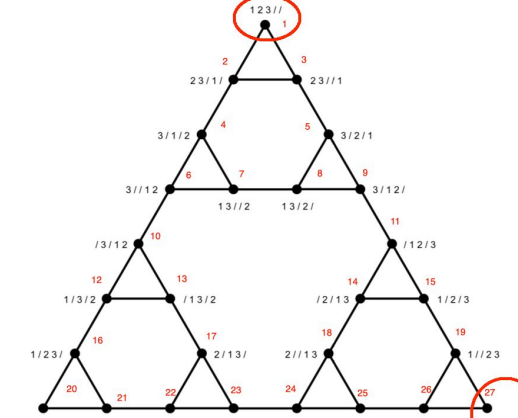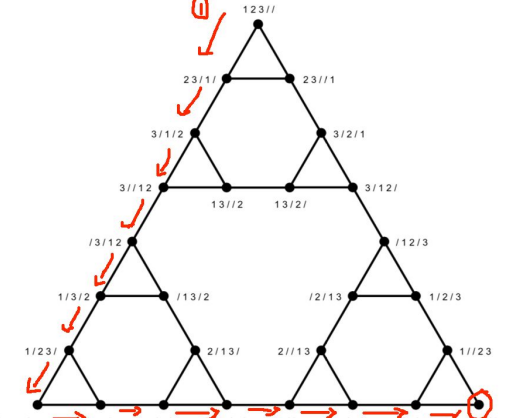
A.M. Hinz / Graph theory of tower tasks

Fig. 3. Hanoi graph H_3^3.

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Bidirectional search	**Breadth-first search**	**Depth-first search**
We start looking for the solution by the initial state to the final state and by the final to the first.	Using a queue, when a node is visited, its child nodes are added to the queue, which is the order to search.	Using a stack, keep looking while it is possible to move to a child node. Stack sometimes is used with recursion.

References:

[1] Hinz, Andreas. (2012). Graph Theory of Tower Tasks. Behavioural neurology. 25. 13-22. 10.3233/BEN-2012-0345.

[x] S. Russell and P. Norvig, Artificial intelligence, 3rd ed. 2010: Pearson Education,Inc., 2010.