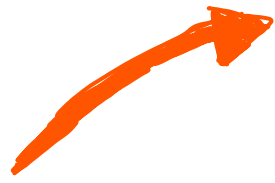


CS-208: Artificial Intelligence

Lectures-07

Properties of Search Methods

Note: BFS: Complete
DFS: Not-Complete
(In terms of Completeness)



- Complexity (Time & Space)
- Completeness (guaranteed to find optimal path)
- Optimality (best sol in least no of steps)
- Admissibility (best sol in quickest time)
- Irrevocability (Once decision is made it cannot be undone i.e. cannot be backtracked!)

Ex: Hill Climbing

Properties of Search Methods (Important)

Five Important Properties of Search Methods:

- a. Complexity: It is useful to describe how efficient that a search method is over time and space.

Time Complexity of a search method is related to the length of time the search method would take to find a goal node

Space Complexity of a search method is related to the amount of memory need to use

BFS time complexity $O(b^d)$ where, b is the Branching factor and d is the depth in which the goal node appears in the problem tree

b. Completeness: A search method is described as being complete, if it is guaranteed to find a goal state if one exist.

BFS is complete and where as DFS is not complete

c. Optimality: A search method is optimal if it is guaranteed to find the best solution that exist that is it will find a path to a good solution by taking the least number of steps

d. Admissibility: A search method is admissible if it is guaranteed to find the best solution in the quickest possible time.

e. Irrevocability:

- ❖ A search method that use backtracking are described as tentative for example DFS
- ❖ A search method that do not use backtracking and which examine just one path are described as irrevocable for example Hill climbing.