CS-208:Artificial Intelligence
Lectures-07
Properties of Search Methods

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

- Complexity (Time N Space)
- Completeness (guarenteed 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.