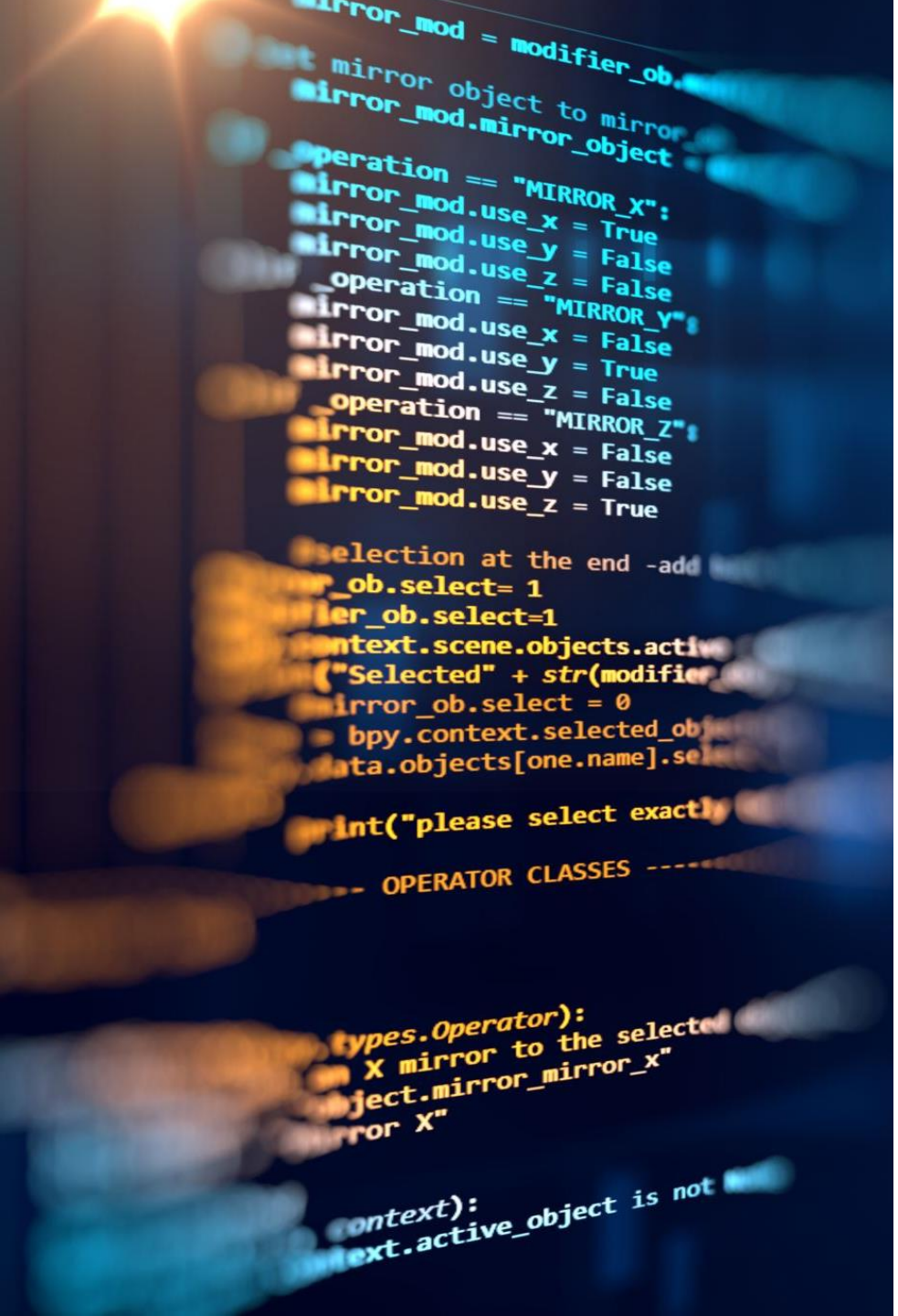
Graphic Era Deemed to be University DEHRADUN

TCS 421

INTRODUCTION TO COURSE – FUNDAMENTAL OF STATISTICS AND AI



Topics Covered

- Depth-Limited Search Algorithm
- Iterative deepening depth-first Search

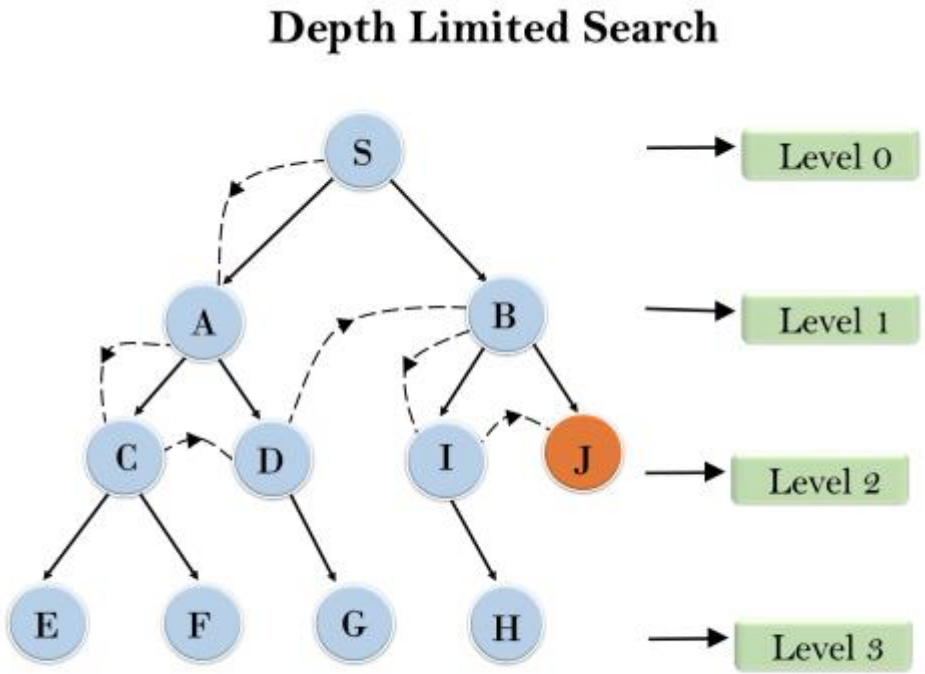
Depth-Limited Search Algorithm

- A depth-limited search algorithm is similar to depth-first search with a predetermined limit. Depth-limited search can solve the drawback of the infinite path in the Depth-first search. In this algorithm, the node at the depth limit will treat as it has no successor nodes further.

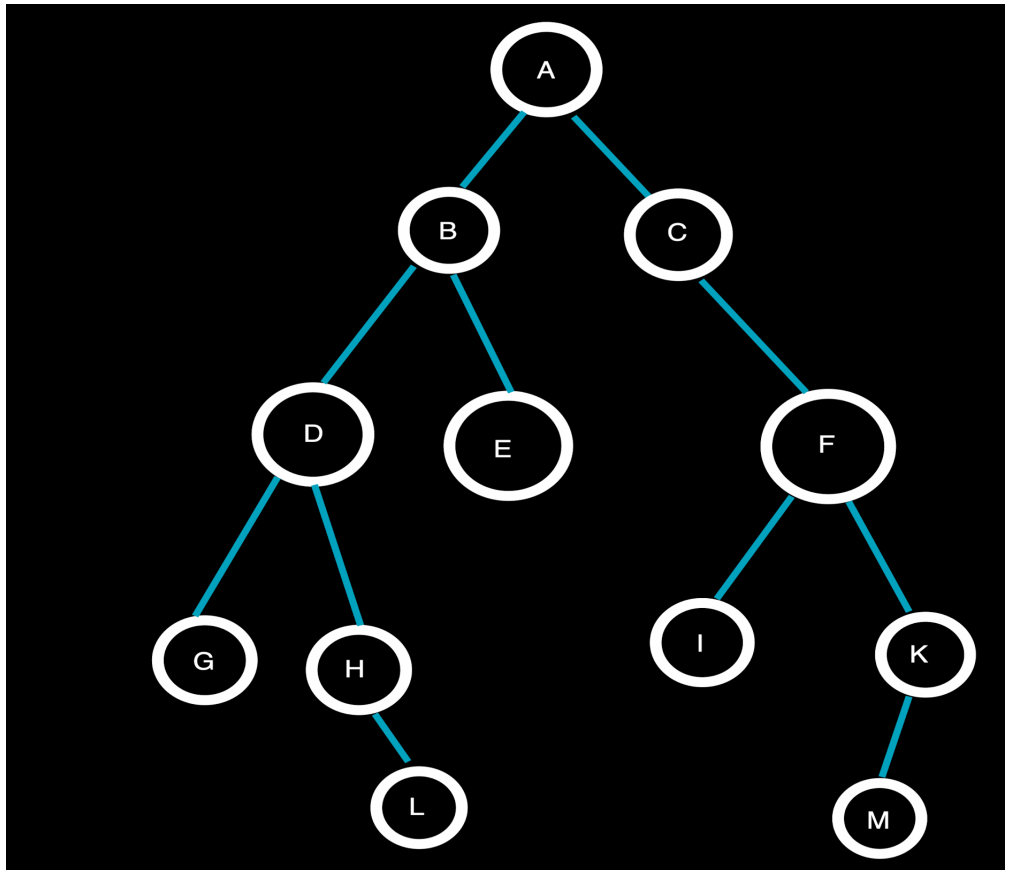
Depth-limited search can be terminated with two Conditions of failure:

- Standard failure value: It indicates that problem does not have any solution.
- Cutoff failure value: It defines no solution for the problem within a given depth limit.

Depth-Limited Search Algorithm



Depth-Limited Search Algorithm



Depth-Limited Search Algorithm

Advantages:

- Depth-limited search is Memory efficient.

Disadvantages:

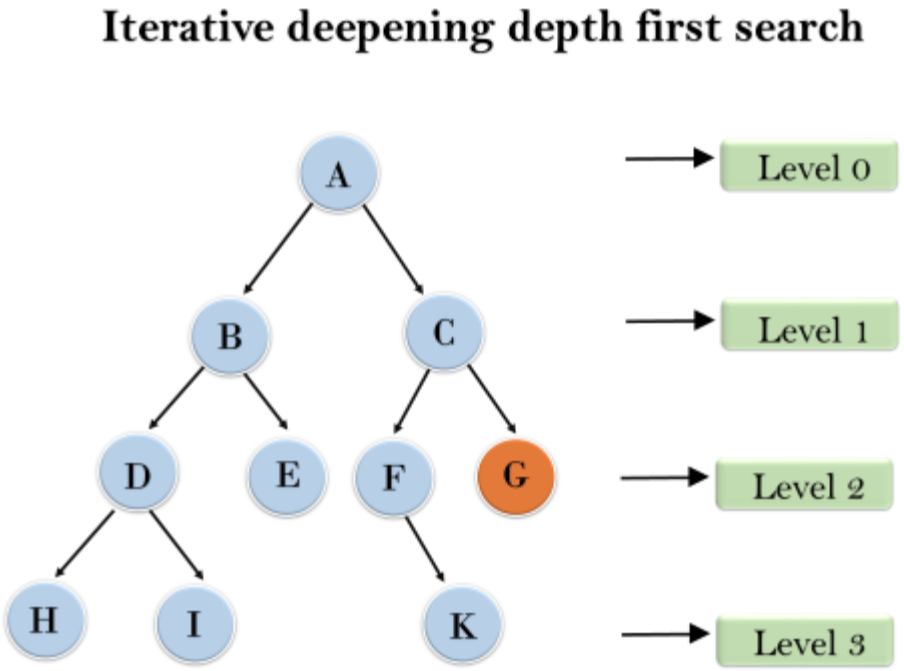
- Depth-limited search also has a disadvantage of incompleteness.
- It may not be optimal if the problem has more than one solution.

Optimal: Depth-limited search can be viewed as a special case of DFS, and it is also not optimal even if $\ell > d$.

Iterative deepening depth-first Search

- The iterative deepening algorithm is a combination of DFS and BFS algorithms. This search algorithm finds out the best depth limit and does it by gradually increasing the limit until a goal is found.
- This algorithm performs depth-first search up to a certain "depth limit", and it keeps increasing the depth limit after each iteration until the goal node is found.
- This Search algorithm combines the benefits of Breadth-first search's fast search and depth-first search's memory efficiency.
- The iterative search algorithm is useful uninformed search when search space is large, and depth of goal node is unknown.

Iterative deepening depth-first Search



Iteration 1 : A

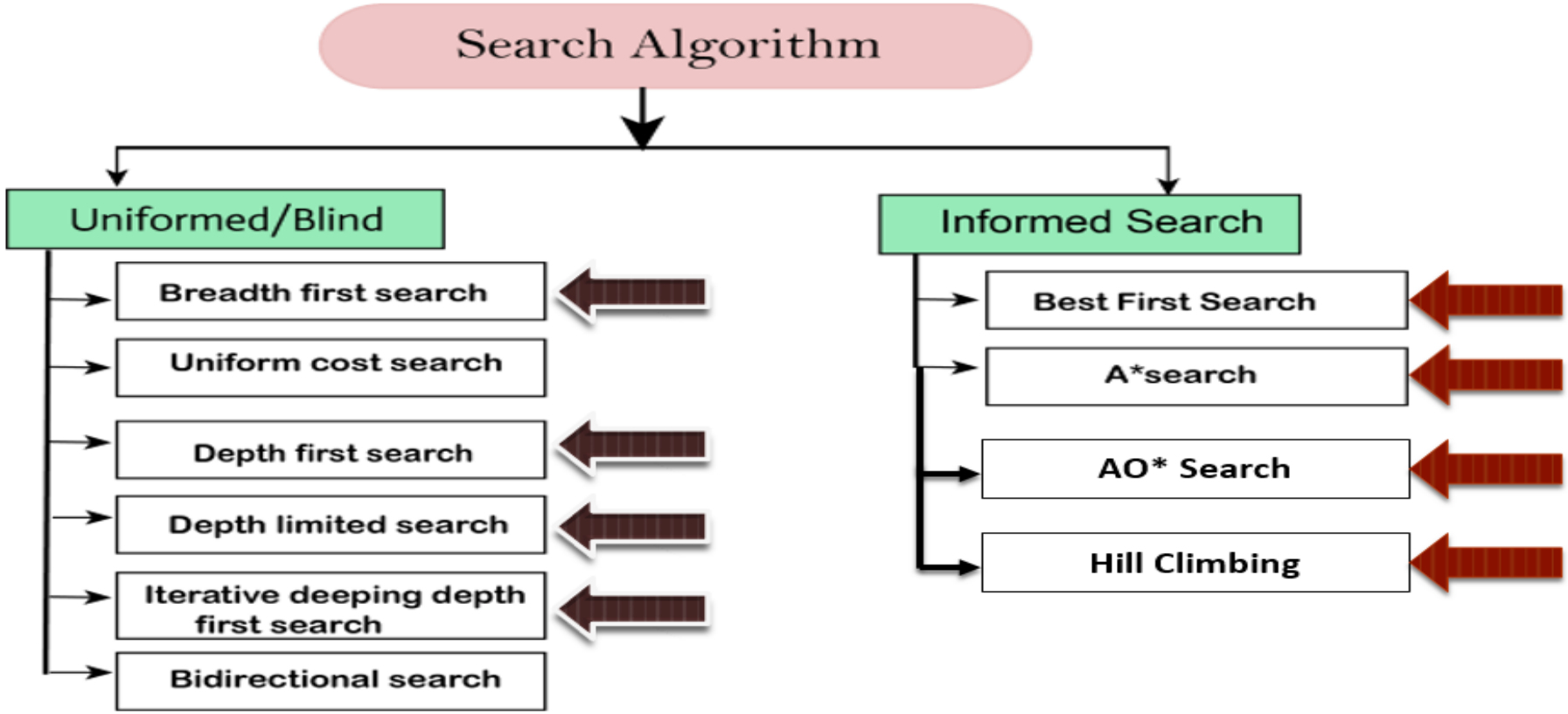
Iteration 2 : A, B, C

Iteration 3 : A, B, D, E, C, F, G

Iteration 4 : A, B, D, H, I, E, C, F, K, G

After iteration 4, the algorithm will find the goal node.

Searching


Search Algorithm
Uniformed/Blind
Breadth first search
Uniform cost search
Depth first search
Depth limited search
Iterative deeping depth first search
Bidirectional search
Informed Search
Best First Search
A*search
AO* Search
Hill Climbing