

Uninformed and Informed Search
Artificial Intelligence(CS5100) - HW2

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1. Search Techniques Implemented:

A. Uninformed Search:

i. Depth First Search:

a. Algorithm:

1. *Initialize Stack*
2. *Push Start Node into Stack*
3. *Mark Start Node as Visited*
- loop*
4. *Get Top*
5. *Get Children of Top*
6. *If Child Node Unvisited*
7. *Mark Unvisited child as visited*
8. *Push Unvisited child onto Stack*
9. *If no child nodes - Retract Move*
- end loop*

- b. Complexity: b-branching factor, m: Max depth from start, d: Goal depth or solution depth

Time Complexity	Space Complexity
$O(b^m)$ – May visit all nodes- $b+b^2+\dots+b^m$	$O(bm)$ – $m(b-1)$ -Entire Space Storage

- c. Environment: Partially Observable

B. Informed Search:

ii. Greedy Best First Search

a. Algorithm:

1. *Retrieve all Node Indices of Targets*
2. *Initialize Visited, HashMap to store heuristics and their corresponding Node Indices*
3. *The heuristics- Manhattan Distance are sorted in ascending order.*
4. *The HashMap consists of successors of current Node arranged in increasing orders*
5. *Return the Node with the best heuristic as the target node*

- b. Complexity: b -branching factor, m : Max depth from start, d : Goal depth or solution depth. $h(n)$ - Heuristic Function

Time Complexity	Space Complexity
$O(b^m)$ – May visit all nodes- $b+b^2+\dots+b^m$ but due to the heuristic function $h(n)$ -Manhattan Distance – It might be almost $O(b^d)$	$O(bm)$ – $m(b-1)$ -Entire Space Storage

- c. Environment: Fully Observable

2. References:

- a. <http://www.codeproject.com/Articles/32212/Introduction-to-Graph-with-Breadth-First-Search-BF>
- b. Stuart Russell and Peter Norvig. Artificial Intelligence: A Modern Approach.