

Assignment No. - 2

Aim :

Assignment on Heuristic Search
Technique. Implement Best-First Search
(Best Solution but not always Optimal).

Objectives:

To study heuristic search technique.

Theory :

The idea of best first search is to use an evaluation function to decide which adjacent is most promising and then explore.

Best-First Search falls under the category of heuristic search or informed search.

Implementation of Best First Search :

Use a priority queue or heap to store the costs of nodes that have the lowest evaluation function value.

// Pseudocode for best first search

Best-First-Search (Graph g , Node, start)

1. Create an empty Priority Queue.
Priority Queue pq ;

2. Insert "start" in pq.

 pq.insert(start)

3. Until priority queue is empty

 u = priority Queue.Deletion(Min)

 If u is the goal

 Exit.

 Else

 For each neighbour v of u.

 If v = "Unvisited"

 Mark v = "Visited"

 pq.insert(v)

 Mark u = "Examined"

 End Procedure.

Analysis :

The worst-case time complexity for Best Search first is $O(n \log n)$ where n is number of nodes. In the worst case, we may have to visit to all nodes before we reach goal. Note that priority queue is implemented using Min (or Max) Heap & insert and for remove operations it take $O(\log n)$ time.

The performance of the algorithm depends on how well the cost or evaluation function is designed.