Al-Hamdaniya University

College of Education

Computer Science

Stage: 3rd

Informed search algorithm

Greedy Best first search algorithm

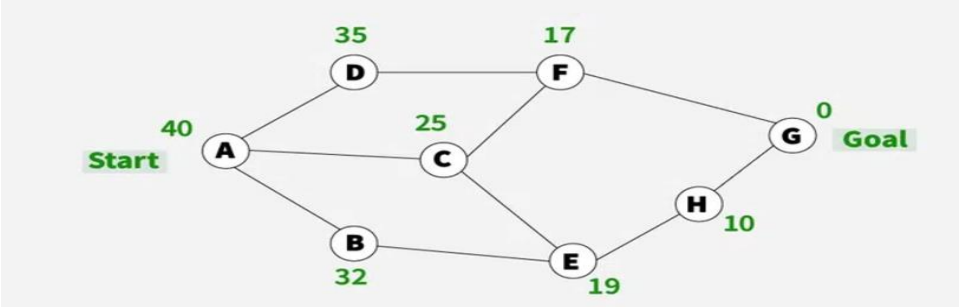
Greedy Best-First Search is an AI search algorithm that attempts to find the most promising path from a given starting point to a goal.

The algorithm works by evaluating the cost of each possible path and then expanding the path with the lowest cost. This process is repeated until the goal is reached.

The algorithm works by using a heuristic function to determine which path is the most promising. The heuristic function takes into account the cost of the current path and the estimated cost of the remaining paths. If the cost of the current path is lower than the estimated cost of the remaining paths, then the current path is chosen.

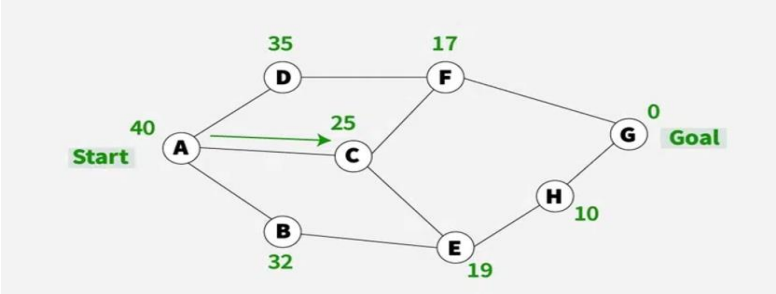
Example:

An example of the best-first search algorithm is below graph, suppose we have to find the path from A to G

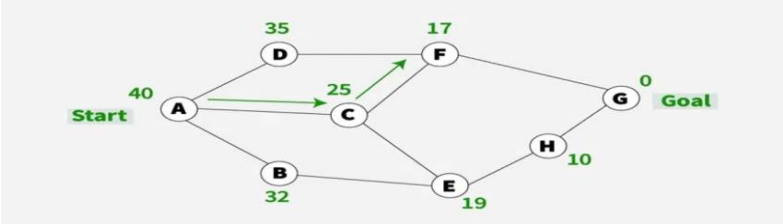


1) We are starting from A , so from A there are direct path to node B(with heuristics value of 32) , from A to C (with heuristics value of 25) and from A to D(with heuristics value of 35) .

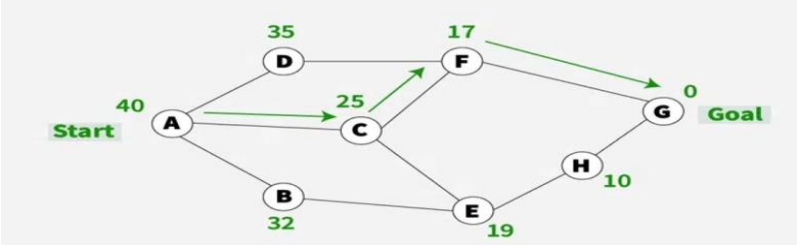
2) So as per best first search algorithm choose the path with lowest heuristics value , currently C has lowest value among above node . So we will go from A to C.



3) Now from C we have direct paths as C to F(with heuristics value of 17) and C to E(with heuristics value of 19) , so we will go from C to F



4) Now from F we have direct path to go to the goal node G (with heuristics value of 0) , so we will go from F to G.



5) So now the goal node G has been reached and the path we will follow is A->C->F->G .

Advantages of Greedy Best-First Search:

Simple and Easy to Implement: Greedy Best-First Search is a relatively straightforward algorithm, making it easy to implement.

Fast and Efficient: Greedy Best-First Search is a very fast algorithm, making it ideal for applications where speed is essential.

Low Memory Requirements: Greedy Best-First Search requires only a small amount of memory, making it suitable for applications with limited memory.

Disadvantages of Greedy Best-First Search:

Inaccurate Results: Greedy Best-First Search is not always guaranteed to find the optimal solution, as it is only concerned with finding the most promising path.

Local Optima: Greedy Best-First Search can get stuck in local optima, meaning that the path chosen may not be the best possible path.

Heuristic Function: Greedy Best-First Search requires a heuristic function in order to work, which adds complexity to the algorithm.