# A-Star Search Algorithm

* A-star (also referred to as A\*) is one of the most successful search algorithms to find the shortest path between nodes or graphs.
* It is an informed search algorithm, as it uses information about path cost and also uses heuristics to find the solution.
* The reason to choose A-star algorithm for the makemytrip case scenario is , A\* achieve *optimality* and *completeness*, two valuable property of search algorithms.

A\* uses an admissible heuristic function, which essentially means that A\* is **optimal**, that is, it always finds the optimal path between the starting node and the goal node. A\* is also **complete** (unless there are infinitely many nodes to explore in the search space).

* The time complexity is O(bm).
* Each time A\* enters a node, it calculates the cost, f(n)(n being the neighboring node), to travel to all of the neighboring nodes, and then enters the node with the lowest value of f(n).

These values we calculate using the following formula:

**f(n) = g(n) + h(n)**

where g(n) — this represents the exact cost of the path from the starting node to any node n.

h(n) — this represents the heuristic estimated cost from node n to the goal node.

f(n) — lowest cost in the neighboring node n.

# Code Execution

Attached is the code Execution for the A-star (A\*) Algorithm.



PFB the output of the executed code.

