

In computer science, A\* (pronounced as “A star”) is a computer algorithm that is widely used in pathfinding and graph traversal. It enjoys widespread use due to its performance and accuracy.

A\* is an informed search algorithm, or a best-first search: starting from a specific starting node of a graph, it aims to find a path to the given goal node having the smallest cost (least distance travelled, shortest time, etc.). It does this by maintaining a tree of paths originating at the start node and extending those paths one edge at a time until its termination criterion is satisfied.

Among the paths available, A\* selects the path that minimizes:  $f() = g() + h()$  where  $g()$  is the cost of the path from the start node, and  $h()$  is a heuristic function that estimates the cost of the cheapest path to the goal. The heuristic function is problem-specific. If the heuristic function is admissible, meaning that it never overestimates the actual cost to get to the goal, A\* is guaranteed to return a least-cost path from start to goal.

Typical implementations of A\* use a priority queue to perform the repeated selection of minimum (estimated) cost nodes to expand. This priority queue is known as the fringe. At each step of the algorithm, the node with the lowest  $f()$  value is removed from the priority queue.