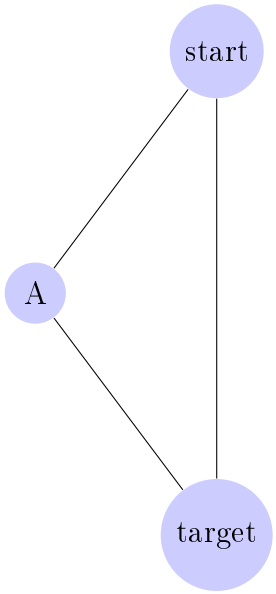
Kusterskiy Dmitriy
Lapin Andrew
Markeeva Larisa
Usvyatsov Mikhail

Theorem 1

If h(n) is consistent, A* using GRAPH-SEARCH is optimal

1) By definition the cost not decreases during all the path.

2) Let us imagine, that theorem doesn't work. So there is optimal path to target node and nonoptimal through the point A.



Imagine, that algorithm chooses nonoptimal path. But it cannot be because the cost is not decreasing and f(n) is consistent.

$f(start) = g(start) + h(start) \leqslant f(A) = g(A) + h(A)$

QED