Artificial Intelligence Laboratory

Task 6

AO* Algorithm

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1. Brief description of the domain:

The domain considered is a synthetic graph G(v,e) i.e
1> h(n) ∀ n ∈ G is manually input via stdin.
2> cost(e) = constant ∀ e ∈ G
3> h*(n) = optimal path cost [path length by BFS]
4> g(n) = cumulative edge cost >= g*(n)
5> Number of AND , OR nodes and their data[i.e h(n)] is input manually respectively for each $\{neighbours\}_{level = n}$ of $node_{level = n-1}$.

2. Heuristic functions considered:

i> Overestimate:

$$h(n) = level(n)*edge\_cost + \{ r \mid r \text{ is random } \& \ r \in [0,3] \}$$

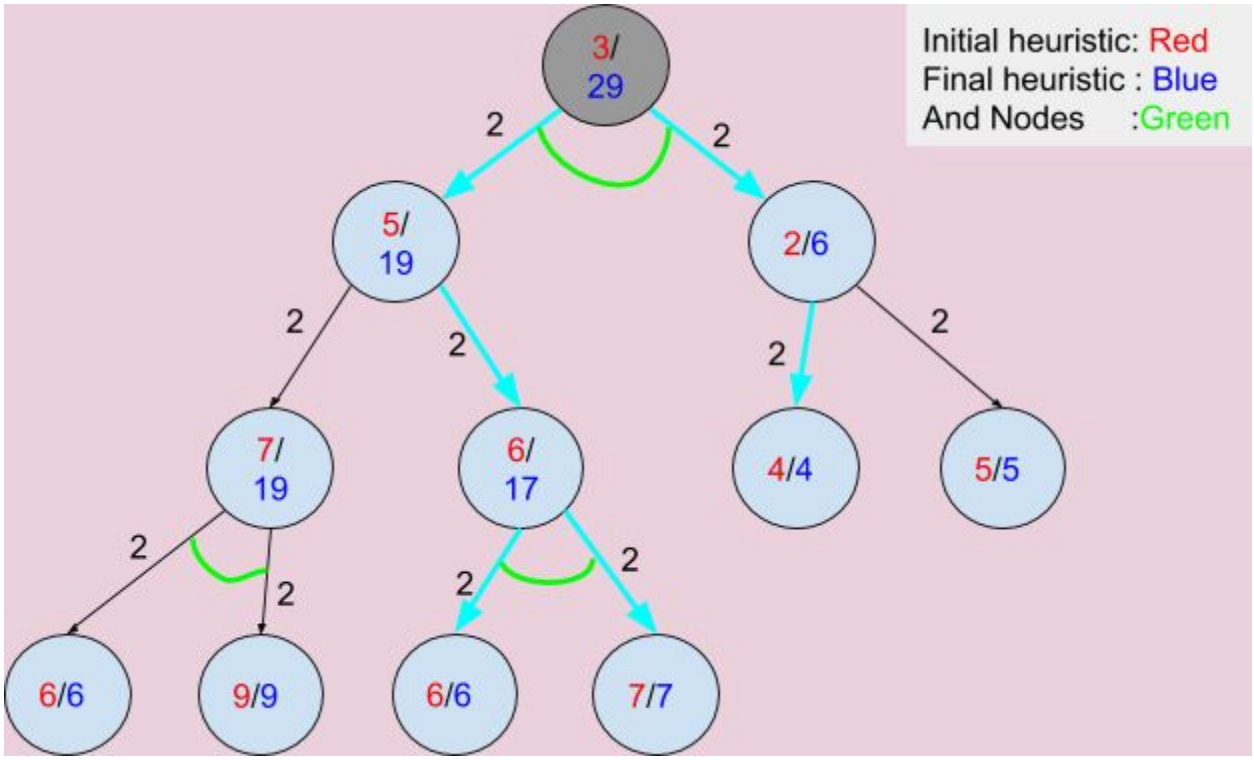
ii> Underestimate:

$$h(n) = level(n)*edge\_cost - \{ r \mid r \text{ is random } \& \ r \in [0,3] \}$$

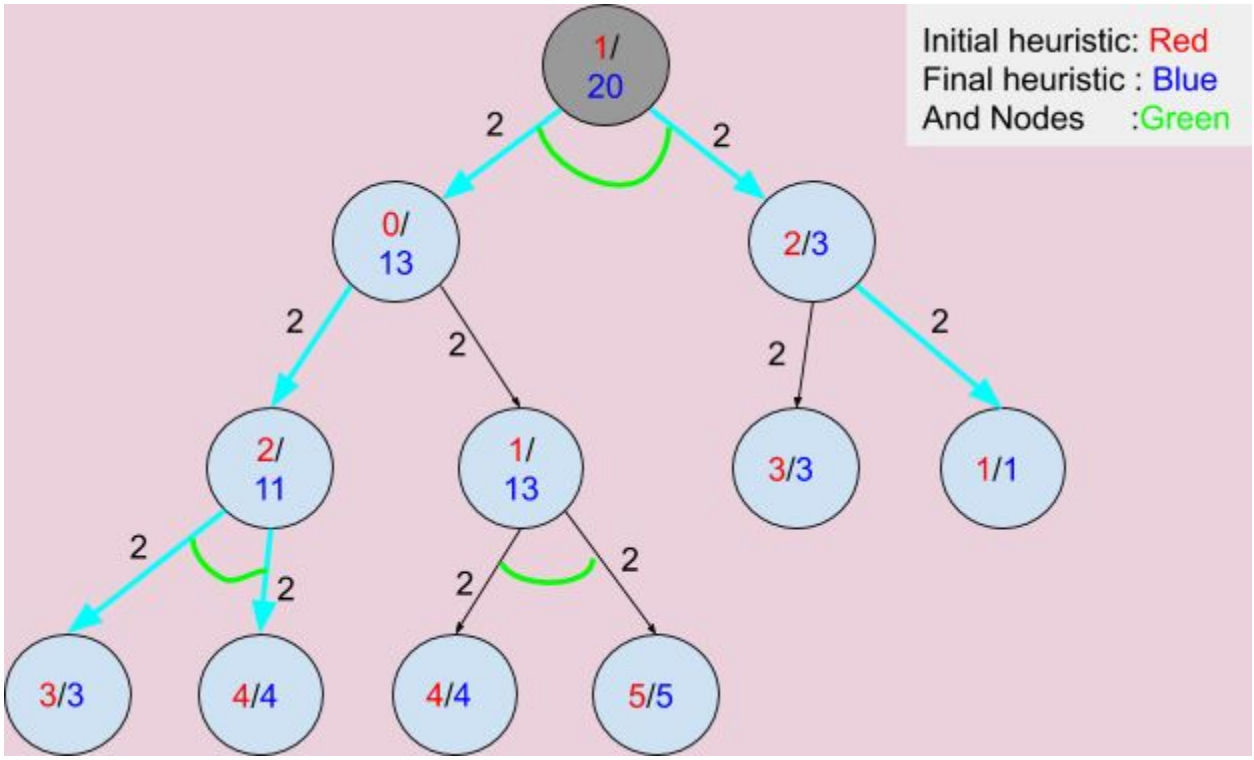
3. AO* algorithm analysis and observation:

An And–or tree is a graphical representation of the reduction of problems (or goals) to conjunctions and disjunctions of subproblems. The and-or tree represents the search space for solving the problem, using the goal-reduction methods. An and-or tree specifies only the search space for solving a problem. Different search strategies for searching the space are possible. These include searching the tree depth-first, breadth-first, or best-first using some measure of desirability of solutions. The search strategy can be sequential, searching or generating one node at a time, or parallel, searching or generating several nodes in parallel.

Overestimate:



Underestimates:



We observe that the graph search may choose different paths depending on heuristic cost. Underestimates heuristic give best results (least heuristic cost).