A STAR - A GUIDE
V1.1

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1 DEFINITIONS

1. $G(n)$ the cost to reach the node n.
2. $H(n)$ the cost to reach the goal from the node n (heuristic).
3. $F(n) = G(n) + H(n)$
4. Key is just an identifier.
5. Node is a structure with:
   5.1. Key
   5.2. G
   5.3. H

2 THE HEURISTIC

2.1 ADMISSIBLE

$H(n)$ <= Optimal Cost

2.2 CONSISTENCY OR MONOTONICITY

$H(n)$ <= H(successor of n) + Cost to reach the goal from the sucessor of n.

3 THE GUIDE

1. Create:
   1.1. The list **Open**.
   1.2. The list **Closed**.
   1.3. The flag **notOpen**.
   1.4. The flag **notClosed**.
   1.5. Node **lowestCost**.
2. Create a node for origin (Key=Origin, G=0, H=h(Origin)).
3. Add the node with the origin in **Open**
4. While do not find the goal and **Open** is not empty.
   4.1. Remove the node with the lowest F from **Open** and save to **lowestCost**.
   4.2. Add **lowestCost** to **Closed**.
   4.3. For each node successor of **lowestCost**.
      4.3.1. **notClosed** and **notOpen** are true.
      4.3.2. If exists in **Closed** and is not best **notClosed** is false.
      4.3.3. If exists in **Closed** and is best, remove from **Close**.
      4.3.4. If **notClosed** is true and exists in **Open** and is not best, **notOpen** is false.
      4.3.5. If **notClosed** is true and exists in **Open** and is best, remove from **Open**.
      4.3.6. If **notClosed** and **notOpen** are true, add to **Open**.
5. If there is a solution (**lowestCost** is the goal), the solution is the **Close** in queue order.