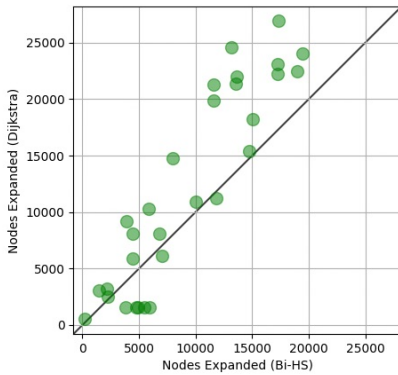


1.



This picture reflects the same starting goal, and the same goal (i.e. map) run the Dijkstra algorithm and the BiBs algorithm at the same time.

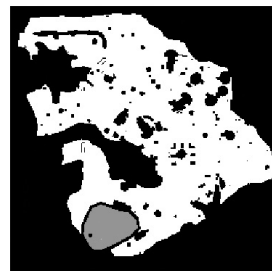
From this picture, we can see that the number of the nodes are same from the 2 algorithms we used before.

The points above the diagonal means the Dijkstra search less nodes to achieve from begin to end. Below diagonal means the BiBs have better searching time than Dijkstra. On the diagonal means Dijkstra and BiBs have the same searching nodes.

2.



BiBs



Dijkstra.

We can see from the 2 picture, the BiBs didn't find the results, because there exist black wall to avoid it searching the result. The Dijkstra also didn't search the result because of the black wall, and the algorithm was stopped. But the BiBs searching from both the start state and the goal state, so in the no solution situation, Dijkstra is better than BiBs.

The 2 picture below also illustrates what I said above.



Add: Also the dijkstra doesn't extent the target point, it only searches the starting point. It can be equivalent to a closed loop, so that's why we can't search and stop.

3.



BiBs.



Dijkstra.

From the 2 pictures above, BiBs search less area than the Dijkstra. Dijkstra start from the start state, it keep searching until find the goal state. So it will cost more.

Because BiBs finds from both of the start and goal, it will stop when there is a connect between the start and goal. Also, the BiBs search less than Dijkstra.

We can see the BiBs as  $2 \times b^{\frac{C}{2}}$ , the Dijkstra as  $O(b^*C)$ .

This is the explain above the main diagonal.