

(Un)Informed Search Report

- Which heuristics did you use for the A* algorithm?

For the A* Algorithm our heuristic was defined by the number of stacks that the container has to travel.

For example, if we have the following problem: (A); (B); (C) and the goal state is: (A, C); (B); () then container C has to travel 2 stacks.

- Test your program with a couple of different problems. Increase the size of the problem to test the limits of your program. Make a table comparing **how many nodes are searched** to find the answer for each problem. For this table, you should compare a number of different problems (at least 3) to avoid a statistical bias.

Test1:

2
(A); (B); (C)
(A, C); X; X

Test2:

3
(A); (B); (C); (); (); ()
(); (); (); (A); (B); (C)

Test3:

2
(A); (B); ()
(A, B); X; X

	Test1	Test2	Test3
DFS	3	275	3
BFS	6	317	4
A* consistent	2	106	2
A* inconsistent	3	1753	2

- Which of the four algorithms searches the least nodes and which one take the most?

The one that takes the most nodes is A* inconsistent and the algorithm that searches the least nodes is A* consistent.

- Why does this happen?

Because the consistent heuristic gets as close as possible to the solution without overestimating the actual cost. This helps to find the solution by searching less

nodes, unlike the inconsistent heuristic which overestimates the path cost and therefore causes the search algorithm to try the wrong way through the search .

- Which algorithms are optimal? Why?

A* is optimal because the heuristic helps to find the right path, so the search tree will not grow in an expensive direction.

While BFS will find the shortest solution, it may not necessarily be the least costly solution in this case, because not all steps cost the same (they depend on distance travelled). DFS will take a branch and do an exhaustive search there even if it gets very expensive, so it is not optimal either.

- In your opinion, what are the benefits of simpler algorithms versus more complex ones?

In our opinion the benefits of simpler algorithms is that you can get an answer faster, but it might not be the most optimal answer. The heuristic function is an important fact that determines the efficiency of the algorithm.