# Part 1

Question 1:

1. The breadth-first search algorithm uses a queue structure which means that the first node in is the first one out (FIFO). The depth-first search algorithm uses a stack structure so that the last one in is the first one out (LIFO).

Advantages of BFS are:

* It is complete, it is guaranteed that if a solution exists, it will find it.
* If multiple solutions exist, the most optimal one is found.

Disadvantages of BSF are:

* BFS is more time consuming compared to DFS
* If the solution is at the end of the map, it will search all the cells before reaching it
* Consumes more memory since it stores all the cells and its neighbours that need to be visited.

Advantages of DFS are:

* Memory requirement is dependant on the number of nodes and is less compared to BFS.

Disadvantages of DFS are:

* It isn’t complete, it may not find a solution even if one exists.
* May get stuck on an infinite loop.
* Not always optimal, it may not always find the shortest path.

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| Planner | Sum of all path costs | Sum of all cells visited |
| Breadth-first search | 580.47 | 13050 |
| Depth-first search | 7538.8 | 32296 |



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| Dijkstra’s | 1374.1 | 19062 |