In this project, there are 3 planning problems. The project has been setup with 3 stages:

1. Represent the planning problems using propositional logic. Planning and domain definition language is used to represent the planning problems
2. Define the domain independent heuristics. The heuristic functions will add the intelligence component to the search algorithm
3. Experiment different search algorithms to reach the solution state

**Air Cargo Problem 1**

The table below provides the results of applying various search algorithms to first planning problem.



**Key Takeaways**

1. Optimal plans have length of 6 in the table above
2. Except for depth\_first\_graph\_search and depth\_limited\_search, all other search algorithms generates and optimal plan with path length of 6
3. Of all the optimal plans, uniform\_cost\_search has the least execution time and the recursive\_best\_first\_search has the maximum execution time
4. For this problem, uniformed search algorithm ‘uniform\_cost\_search’ and informed search algorithm ‘astart\_search\_with\_h\_ignore\_preconditions’ are the best candidates for search algorithm

**Air Cargo Problem 2**

The table below provides the results of applying various search algorithms to first planning problem.



**Key Takeaways**

1. Optimal plans have length of 9 in the table above
2. Only 4 search algorithms yields a result to problem with optimal length. The 4 algorithms are breadth\_first\_search, uniform\_cost\_search, astar\_search\_search\_h\_1 and astar\_search\_with\_h\_ignore\_preconditions
3. Although greedy\_best\_first\_graph\_search has lowest execution time, the algorithm does not provide and optimal plan in terms of plan length
4. For this problem, informed search algorithm ‘astart\_search\_with\_h\_ignore\_preconditions’ is the best candidates for search algorithmin terms of optimal length and execution time

**Air Cargo Problem 3**

The table below provides the results of applying various search algorithms to first planning problem.



**Key Takeaways**

1. Optimal plans have length of 12 in the table above
2. Only 4 search algorithms yields a result to problem with optimal length. The 4 algorithms are breadth\_first\_search, uniform\_cost\_search, astar\_search\_search\_h\_1 and astar\_search\_with\_h\_ignore\_preconditions
3. Although depth\_first\_graph\_search has lowest execution time, the algorithm does not provide and optimal plan in terms of plan length
4. For this problem, informed search algorithm ‘astart\_search\_with\_h\_ignore\_preconditions’ is the best candidates for search algorithmin terms of optimal length and execution time