CMPT 417 Final Project Proposal

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In our final project, we are going to study on the Multiple-Agent Path Finding (MAPF) problem with an Enhanced Conflict-Based Search (ECBS) algorithm, which is improved from the traditional CBS algorithm by adding another evaluation function:

$\widehat{h}\ (s)$ = *the number of conflicts happened with other agents in state s*

The CBS algorithm is relatively blind when performing path planning search at the lower layer. It only needs to find the shortest path that satisfies the current constraint tree. This kind of blind search will easily lead to a new path with a lot of conflicts with other agents. Therefore, ECBS is implemented on the base of the CBS with the upper and lower layers' search being improved. This improvement will greatly reduce the frequency of conflict, improve search efficiency, and reduce the algorithm space spent.

Our test prototype is a MacBook Pro. In individual project 1, it takes about 15 minutes to use the traditional version of CBS. After introducing the new evaluation equation, we estimate that memory usage and time efficiency will be improved to some extent.