

# MEAM 620 Project 3A

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## 1 Description of Problem and Associated Algorithms

### 1.1 CAPT

The concurrent assignment and planning of trajectories problem, or CAPT, involves finding a method of assigning  $N$  homogeneous robots to  $M$  goals and generating collision-free paths in order to reach the goals. The linear assignment portion of this problem may be offloaded to the Hungarian Algorithm, which is of complexity order  $\mathcal{O}(N^3)$ .

### 1.2 C-CAPT

C-CAPT is a centralized solution to the CAPT problem, via which trajectories are minimized via a cost functional encompassing valid assignment, resource utilization (with respect to the assignment matrix), initial conditions, terminal conditions, robot capabilities (the dynamics of each robot, generally assumed to be first-order), and collision avoidance.

### 1.3 D-CAPT

## 2 Code and Runtimes

### 2.1 C-CAPT (2D)

### 2.2 C-CAPT (3D)

### 2.3 D-CAPT