Analysis of the influence of graph characteristics on MAPFW algorithm performance

Author: **Timon Bestebreur**
Supervisors: **Jesse Mulderij** & **Mathijs de Weerdt**
CSE3000 Research Project
21 June 2020

1. Background

- **Multi-Agent Pathfinding with Waypoints (MAPFW)** is the problem of calculating routes from a start location along some waypoints to an end location
- Maps have certain characteristics which influence algorithm performance
- Each characteristic is represented by **five maps** with increasing difficulty
- Data is based on the **average runtime** per characteristic

2. Research Question:

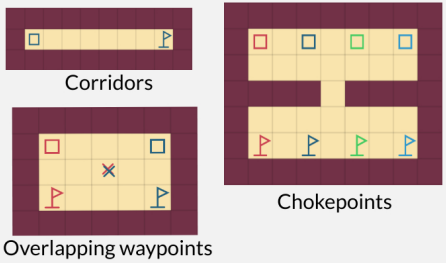
Which algorithm works best for which characteristic?

3. Algorithms

Optimal - Non-Optimal

- CBSW
- A* + OD + ID
- BCP-MAPFW
- WM*
- EMLA

4. Characteristics



Average degree (#edges / node)

5. Results

Optimal and Non-Optimal Algorithms with the lowest average runtime per characteristic

Corridors

CBSW | WM*

Chokepoints

CBSW | EMLA

Overlapping Waypoints

CBSW | EMLA

Average degree

CBSW | WM*

TU Delft