

# APSC 200 P2: Week 3 Outline

Department of Mathematics and Engineering  
Queen's University

June 5, 2019

# 1 Objectives

The general objectives of this week are listed below. Algorithm specific objectives can be found in the appropriate subsections

1. Begin translating mathematics derived for application into MATLAB code to be used in simulation apps. Depending on the algorithm choice selected, different functions will need to be written.
2. Continue working on the design process building up to your final report
  - (a) Establish metrics to evaluate design choices.
  - (b) Begin thinking about the Triple Bottom Line of your project.
3. Complete **Progress Report 1**: a one page document outlining where your group's current position with the project. Highlight areas you are having difficulty with and area that you were able to resolve previous difficulties.

## 1.1 Formation Algorithm

1. Use *MatrixEditorFormation* app to enter adjacency matrices constructed from Week 2 for your application.
2. Complete the *getA.m* function that will select an adjacency matrix based on the current iteration of the simulation.
3. Write code for *calcL.m* function that calculates the Laplacian Matrix given a specified adjacency matrix.

## 1.2 Flocking Algorithm

1. Use *MatrixEditorFlocking* app to enter leader path, parameters, and initial agent data
2. Write code for the *calcA.m* function that calculates the adjacency matrix design parameters used for the algorithm and the current distance between agents.
3. Write code for the *calcL.m* function that calculates the Laplacian matrix given some adjacency matrix.

## 1.3 Opinion Algorithm

1. Use *MatrixEditorOpinion* app to enter initial agent data
2. Write code for the *calcA.m* function that calculates the adjacency matrix using the radius of communication and the distance between agents.
3. Write code for the *calcL.m* function that calculates the Laplacian matrix given some adjacency matrix.

## 1.4 Lloyd's Algorithm

1. Use *MatrixEditorLloyd* app to input density functions/matrices constructed in Week 2 and initial agent positions
2. Complete the *communication.m* function to determine which agents are in communication
3. Complete the *assignAgentPoints.m* function to determine the observed region of each agent

# 2 Lectures and Workshops

There is one lecture and two workshops scheduled for this week. This week's lecture is first of two lectures teaching skills that will be required to effectively translate the various deployment algorithms into MATLAB code. The two workshops are work periods to continue working on your project and an opportunity to ask the TAs questions you may have regarding the project.

### **3 Deliverables**

This weeks deliverables are:

1. Progress Report 1 (due ...)