LabActivity5 - Report

Problem Analysis

This exercise requires the implementation of a swarm behaviour based on aggregation. Each robot in the environment should autonomously decide whether to stop and form a group with its neighbors or continue moving

The arena includes the usual walls as boundaries and a configurable number of robots

My solution

The controller implements two main states:

- Moving: the robot performs random movements while avoiding obstacles
- Stopped: the robot remains still, waiting for others to aggregate

At each step, the robot senses the nearby stopped robots using sensor. Based on this number, two probabilities are computed → Ps (Probability to stop) and Pw (Probability to walk away)

On result, robots tend to form clusters in areas where more stopped robots are present, tipically two main groups and many little clusters.

For exercise 2 and 3, the behaviour is fundamentally the same, with the only difference being the update of the probabilities to stopping or restarting when the robot is on the black spot. In this case, it can be observed that clusters tend to form near or directly on the black spot.