Lab report 2

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The program follows the subsumption architecture and is based on three levels. Each level has a corresponding function. The first level corresponds to obstacle avoidance behavior, followed by phototaxis behavior, and finally the exploring behavior. This enables the robot to give higher priority to the obstacle avoidance task, if there are no obstacles in sight the robot can perform phototaxis and move freely towards the light. If no obstacle and no light are detected, the robot explores by moving randomly.

- `step()` : It is the core function of the program. At each step, it increments the step count, calls the obstacle avoidance function, and resets movement if the step count exceeds the predefined limit.
- `obstacle_avoidance()` : The function iterates through all the proximity sensor readings and searches for the highest proximity reading. If an obstacle is detected, the wheels velocities are modified in order for the robot to either steer left or right, depending on which side the obstacle was sensed. If no obstacle is detected, the function delegates control to the `photo_taxis()` function, allowing the robot to respond to light sources.
- `photo_taxis()` : The function is responsible for guiding the robot's movement towards light sources detected by its light sensors. The function iterates through all the light sensor readings and searches for the highest reading.
  - If a light source is detected, the robot responds accordingly. If the maximum light intensity value exceeds or equals the defined threshold (`LIGHT_THRESHOLD`), the robot stops by setting the velocity of both wheels to 0.
  - If the maximum light intensity value is low, the robot adjusts its movement to move towards the detected light source, according to the index of the sensor that detected the highest light value.
  - If no light source is detected, the function delegates control to the `explore()` function, allowing the robot to continue exploring the environment.
- `explore()` : Sets random velocities (between 0 and `MAX_VELOCITY`) for both wheels to steer to a random direction.

The implemented behavior was tested with multiple light sources and multiple robots and no deviation to the intended behavior was observed, as the robots avoid each other as obstacles and still reach a single source of light.