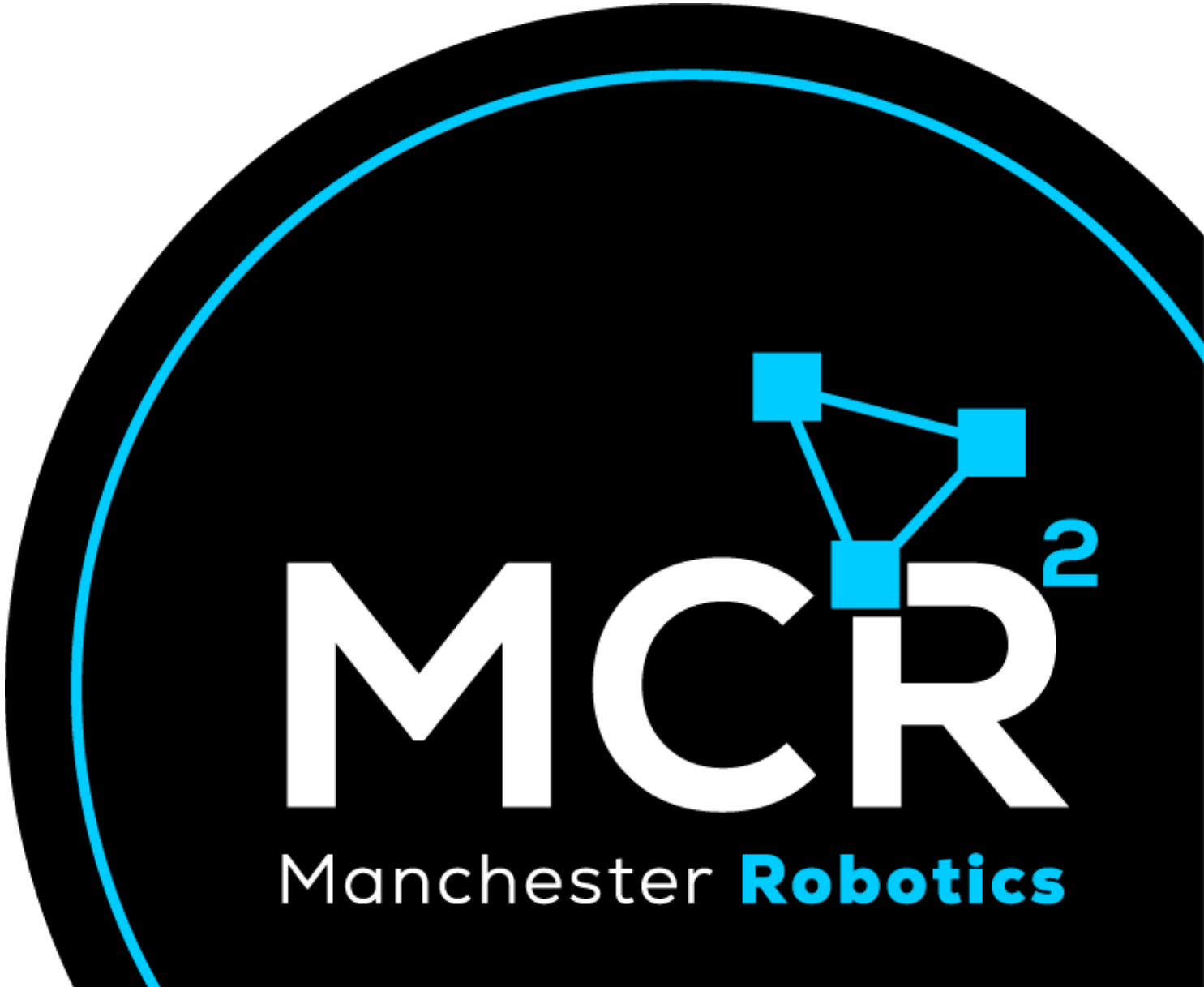
{Learn, Create, Innovate};

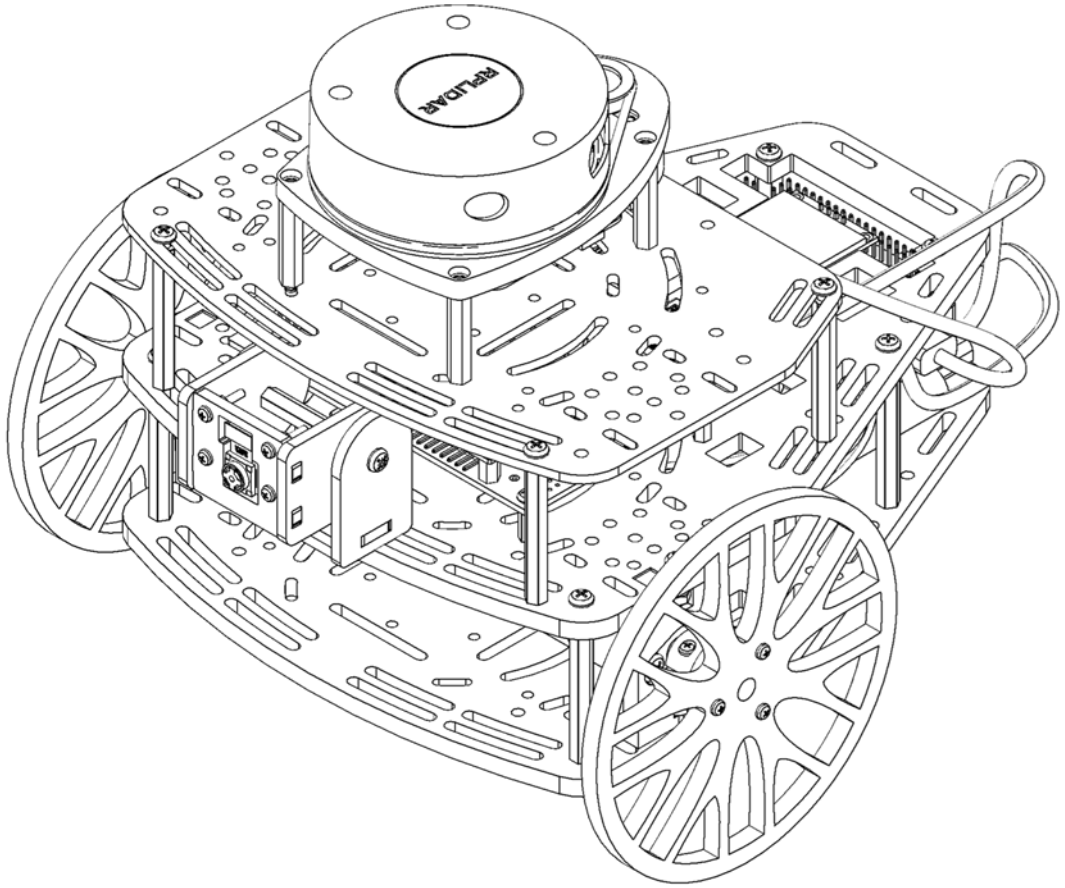
Challenges

Mini challenge 3



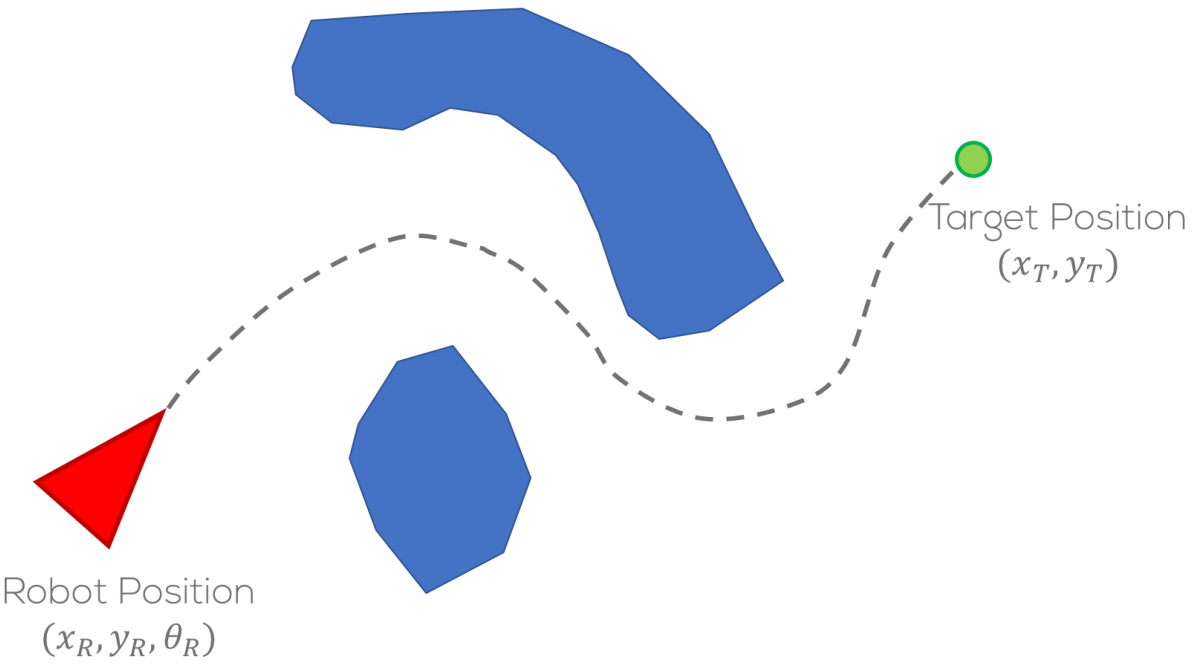
Mini challenge 3: Reactive Navigation.

- This challenge is intended for the student to review the concepts introduced in this week.
- This challenge aims to show the students different reactive navigation algorithms for mobile robots.
- This challenge will be divided in different sections.



Mini challenge 3: Reactive Navigation.

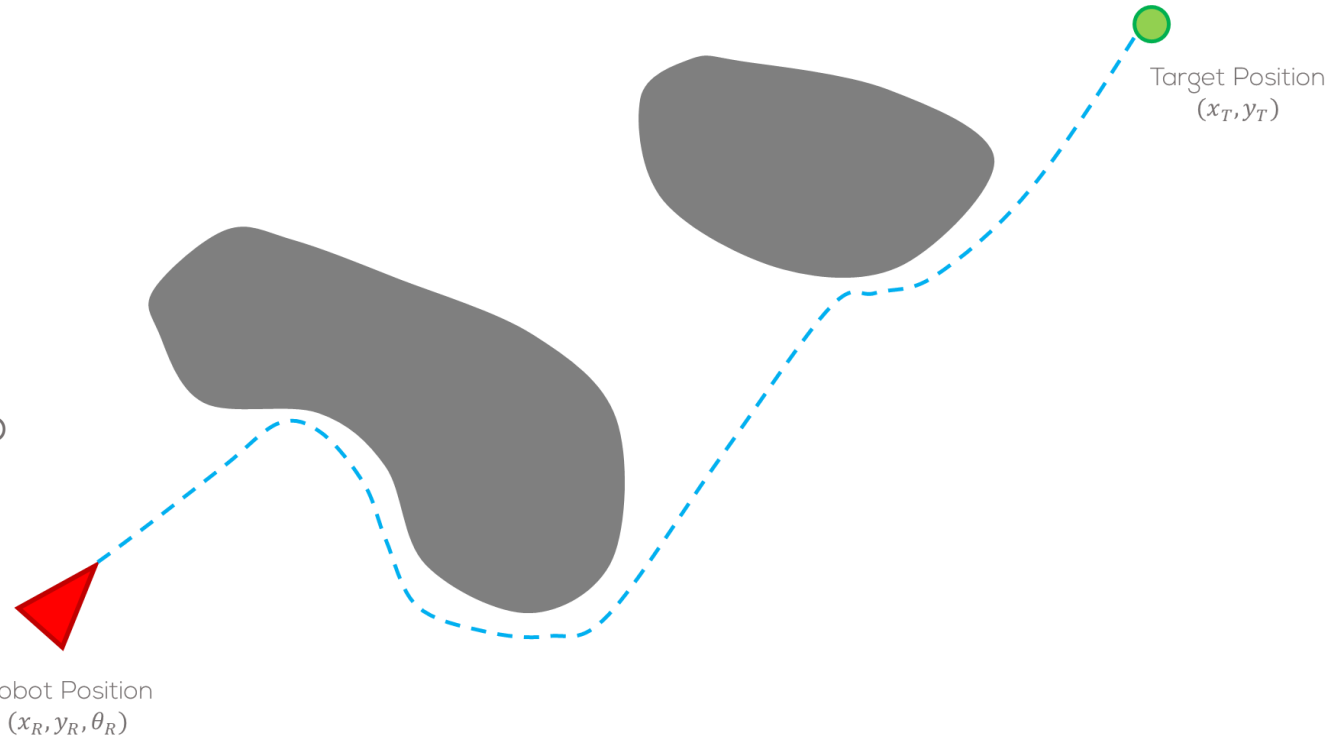
- This task requires the previously developed multi-point position control strategy for the Puzzlebot.
- Using the Gazebo simulator, developed by MCR2, test the behaviour of different reactive navigation algorithms.
- Test your algorithms in different scenarios.



Mini challenge 3

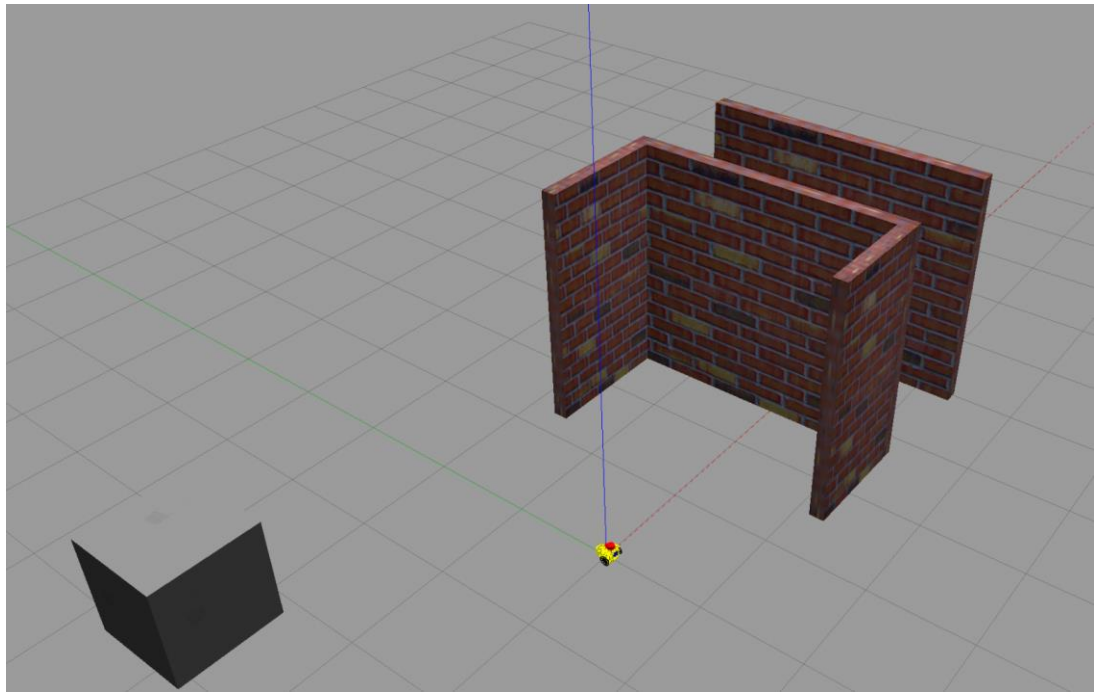
Task 1:

- Using the Gazebo simulator, developed by MCR2, create a reactive navigation algorithm.
- The algorithm must be based on the Bug 0 algorithms to avoid obstacles and reach a target position.
- The student must create different scenarios, to test their algorithms.
- To start, the student can test their own algorithm in the worlds defined by MCR2.



Mini challenge 3

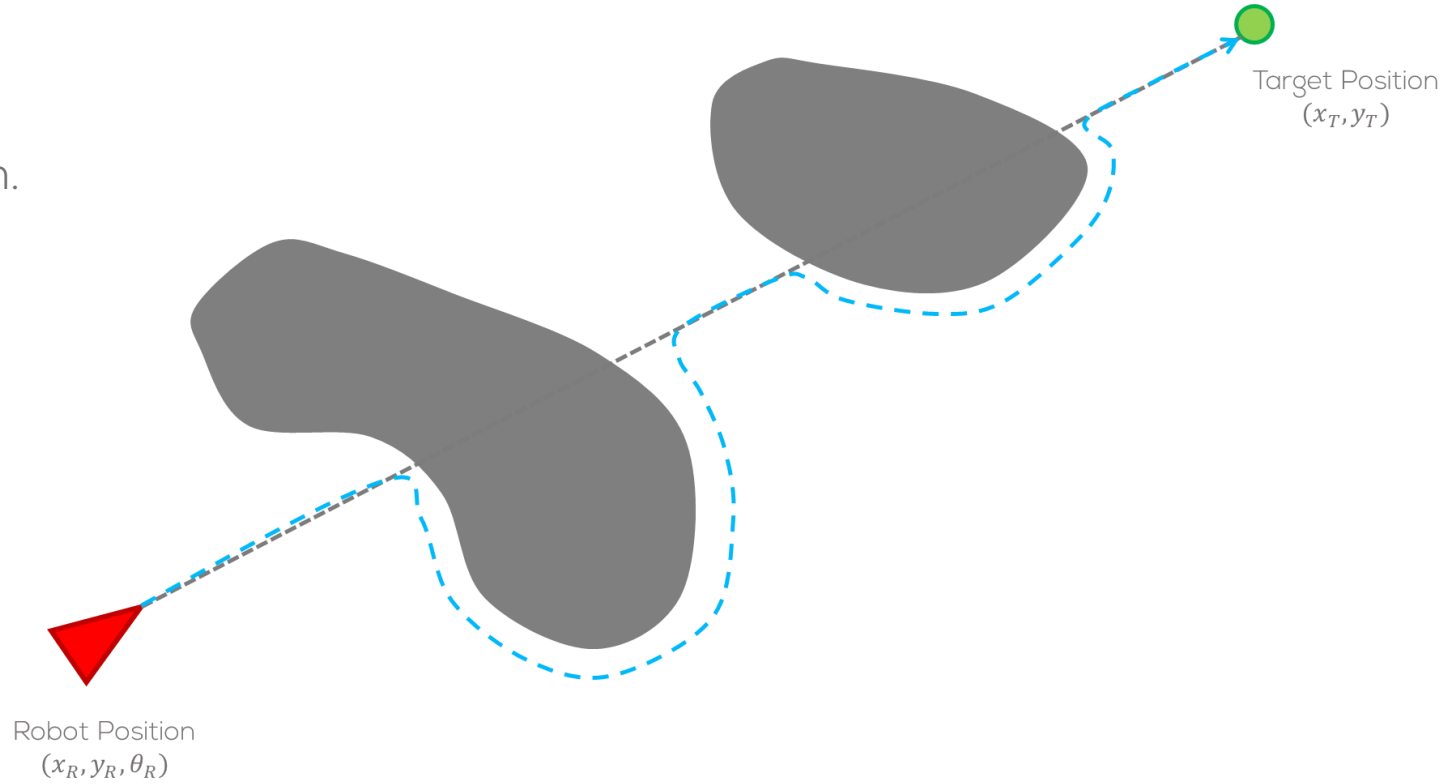
- As per mini challenge 2, the student must define the controller, and the map to be used.
- The student must analyse and take into consideration the growing covariance around the pose of the robot.
- The students must define the required launch files for this activity.
- The simulation must be tested under different scenarios, i.e., different worlds in gazebo.
- The students must define a correct sampling time for the simulation .
- The usage of any library is strictly **forbidden**.



Mini challenge 3

Task 2:

- Using the Gazebo simulator, developed by MCR2, create a reactive navigation algorithm.
- The algorithm must be based on the Bug 2 algorithm to avoid obstacles and reach a target position.
- The student must create different scenarios, to test their algorithms.
- To start, the student can test their own algorithm in the worlds defined by MCR2.



Mini challenge 3

- As per mini challenge 2, the student must define the controller, and the map to be used.
- The student must analyse and take into consideration the growing covariance around the pose of the robot.
- The students must define the required launch files for this activity.
- The simulation must be tested under different scenarios, i.e., different worlds in gazebo.
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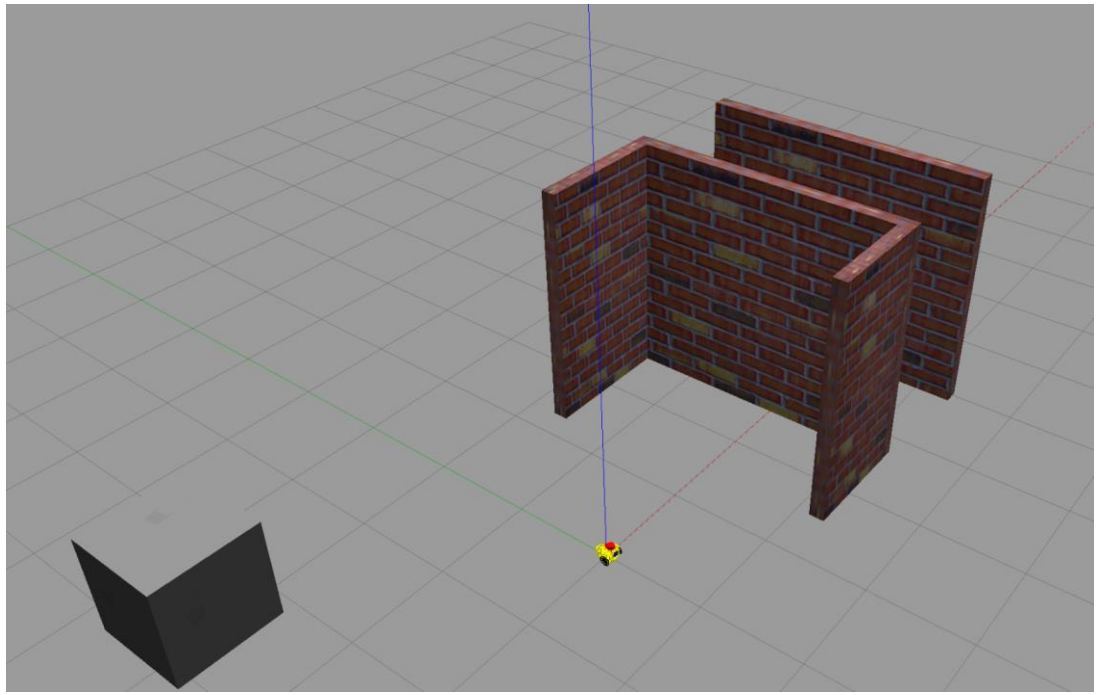

Rules

- This is challenge **not** a class. The students are encouraged to research, improve tune explain their algorithms by themselves.
- MCR2(Manchester Robotics) Reserves the right to answer a question if it is determined that the questions contains partially or totally an answer.
- The students are welcomed to ask only about the theoretical aspect of the classed.
- No remote control or any other form of human interaction with the simulator or ROS is allowed (except at the start when launching the files).
- It is **forbidden** to use any other internet libraires with the exception of standard libraires or NumPy.
- If in doubt about libraires please ask any teaching assistant.
- Improvements to the algorithms are encouraged and may be used as long as the students provide the reasons and a detailed explanation on the improvements.
- All the students must be respectful towards each other and abide by the previously defined rules.
- Manchester robotics reserves the right to provide any form of grading. Grading and grading methodology are done by the professor in charge of the unit.