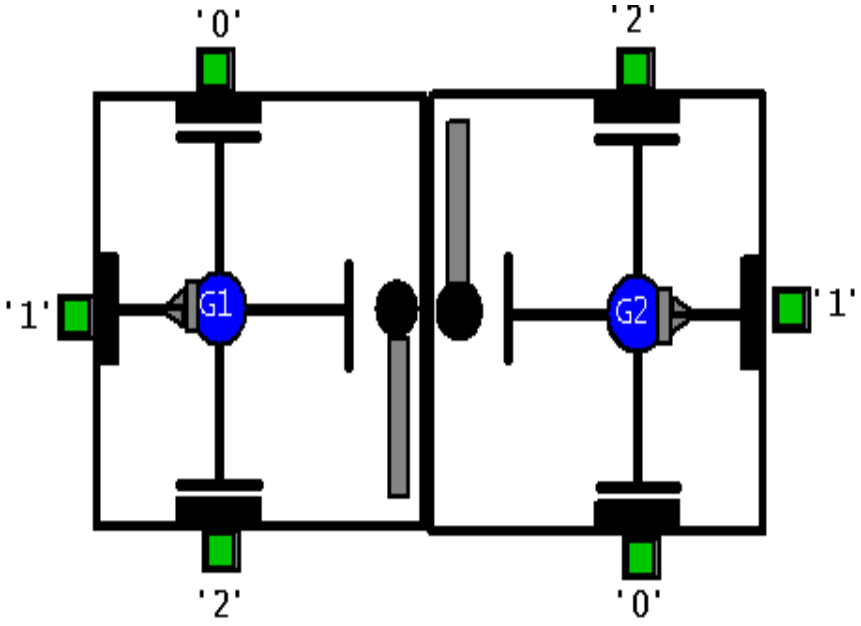
Queen's University
Department of Electrical & Computer Engineering

ELEC299 Q2WD Robot Project

Competition Rules

The "Auto-roBot Dunk" Tournament is a three-stage double-elimination contest to determine the overall top three finishers. Double-elimination means that you are eliminated from further competition after your *second loss*.



The back-to-back playfields are shown in the figure to the left. Your Bot must begin from a stationary position at the central intersection, and facing away from the goal, as shown.

The IR beacons transmit their fixed geographic position numbers (ASCII '0', '1', or '2') approximately 10 times per second when enabled by their toggle switch (**these geographic position numbers never change**). Additional information on the beacons are further below after competition rules.

You will be manually placing the ball, one at a time, and then enabling the beacon to transmit its location (*once your Bot has picked up the ball, you should turn off the beacon*).

For the current match, after the competing teams finish setting up and placed their Bot at the starting positions, the **teams will be handed a slip of paper that lists a random order of consecutive ball placement** – this order will be the same for both teams. Any time after your Bot has picked up a ball, you are allowed to place the next ball, and its beacon can be turned on at any time after the ball is placed.

To start the match, the Starter will say "Ready…Set…Go". You may start your Bot manually or remotely by using any Bot feature you choose. Your objective is to score as many goals as possible in the allotted time. **Remember you are allowed to use any strategy you choose, and any combination of Robot features or sensors. Any duplication of components is restrict and NO additional external components are allowed.**

REQUIREMENT **Your robot MUST start by searching for the 1st ball (beacon) using IR communication**. Subsequent ball locations can continue to use either the beacons or other means to input ball location (i.e. Bluetooth – but keep in mind, Bluetooth is very finicky and connections can drop unexpectedly). **If you choose to not search for the beacons or use IR communication, AS PLENATLY, your robot must complete 3 (TRHEE) FULL ROTATIONS before you can input a ball location by another means.**

The timed match will last at most 2 minutes (120 seconds), with a fixed supply of 7 balls per team. The team that scored the most goals by the end of 2 minutes, or the first to score 7 goals, or the team last in the lead (if a tie), will be declared "the winner" of the match. If neither team scores, the judges will declare the team coming closest to scoring as the winner.

If your Bot knocks or fumbles a ball onto the playfield, you are allowed to pick the ball up with your hand and place it back on the shelf it came from, or you have the option to completely remove the ball from play and skip ahead to the next ball. However, the removed ball is "lost".

You are not allowed to touch your robot during the match unless you then immediately place it back at the start position, and restart it (you are allowed to do this as many times as necessary to recover from unanticipated circumstances). **You will be disqualified, if it is clear that you are using this as a strategy for saving time under normal operation (for example, if your Bot stops after a goal is scored to wait for you to move it back to the start position). This is intended to be used only to allow you to recover from an anomalous position or program behaviour that you had not anticipated.**

You are not allowed to "remote control" your robot using the Bluetooth communication. Bluetooth can be used to start your, indicated ball location (see Requirement above), recover from problems to a default state, or nudge/correct the path of your robot. **You will be disqualified, if it is clear that you are using remote communication to control different robot actions, for instance to pick up a ball, drop a ball, stopping, steering, etc. Your goal is to design an autonomously programmed robot to play the game.**

When building the robot, you can use the IR transmitting circuit as the IR beacons.

Grading:
1. The performance during the courts weights 25%.
2. Grading will be based on ability to locate balls, accuracy and smoothness of driving motion, accuracy and smoothness of gripper assembly manipulation, ability to score a goal, overall speed of operation, etc.
3. It also will depends on your ranking in your section.
4. Top 3 of each section will get extra marks: 7%, 5% and 4% respectively.
5. The quality of the code and the report weight the other 20%. The guidance on when and how to submit it will be posted later.