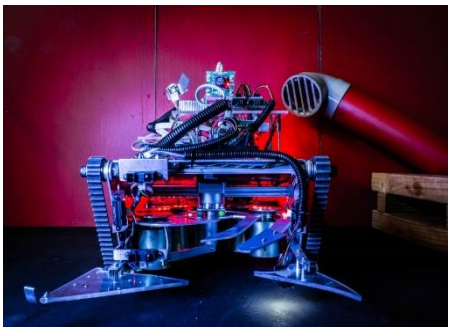

2019 Robocup Functional Assessment Details:

Date: Mon/Tues 29/30 July during lab session

Location: Mechatronics Design Lab

I will put a sign-up sheet in the lab before 22 July so that you can sign your group up for a time-slot. As we have 27 groups, each group will have up to 10 mins for their demonstration. At 10 mins, you will be asked to stop and will only be awarded points for the tasks you have completed up to that point. In past years, we have managed to get ahead of schedule, so if you hang around in the lab during the assessment, we might be able to squeeze you in earlier than planned.

Functional assessment requirements:

There are 11 core tasks (see table) we will be assessing you on for this functional assessment, and one bonus task. They are not weighted equally – For example, task 10 is quite advanced for this stage of the project and is something to aspire towards, so will not be worth a lot of marks in this assessment, but if you can already achieve this, then you should get some recognition.

Many of the tasks are designed to be progressive – e.g. Task 5 builds on tasks 3 and 4, which build on earlier tasks. Thus, if you can demonstrate task 5, we assume you can do tasks 1-3, so don't need to explicitly show those (you can if you want) – in this example, you may need to demonstrate an extra sensor to satisfy task 4, if your autonomous manoeuvring only uses a single sensor modality.

At the beginning of your demonstration, your group needs to explain to the judges what you are going to demonstrate and how we will know that your robot is doing what you say, e.g. LEDs turn green when colour sensor detects green.

I am not putting the weighting of each task on this document as I want you to try and complete as much as you can without cherry-picking. However, the more 'aspirational,' advanced tasks are worth less than important building-blocks, like task 5.

Task	Description
1	Robot can move forwards with variable speed. When placed in the arena it can be made to drive forwards and the speed can be varied (doesn't have to be autonomous – can be via wired connection, buttons etc)
2	Robot can manoeuvre. Can turn left + right, move forwards + backwards (doesn't have to be autonomous – can be via wired connection, buttons etc)
3	Robot can manoeuvre autonomously (not necessarily with intelligence, ie a pre-programmed path/algorithm of your choice – eg. 2s forward, turn left 90 deg, 2s forward…)
4	Two or more <u>different</u> sensors (different modalities, e.g. IR and ultrasonic) connected to the Arduino with some detectable output that is a function of the sensor output, e.g. LED flashing at a rate dependent on distance to an object.
5	Robot can manoeuvre autonomously with some intelligence – reacts to environment based on sensors, e.g. avoids obstacles, can follow walls
6	Control of non-drive motors, e.g. servos for collection mechanism, stepper motors etc (doesn't have to be intelligent control, so can be when you press a button)
7	Robot can specifically detect/identify pre-defined targets such as coloured HQ or weights and reject others. Some <u>detectable</u> output that demonstrates that it has identified a specific target (you must specify the target to the assessors). For example, your robot can differentiate between an HQ and the rest of the arena, or between a target weight and a dummy weight. Note: Using a magnet to attach/not attach to a weight/dummy does not count.
8	Robot can collect a weight (bring it onboard, or move it around in a controlled manner). The weight can be placed in a specific position relative to the robot for this test, i.e. the robot does not have to manoeuvre to pick up the weight.
9	Confirmation of successful weight collection - Your robot knows when a weight has been collected and is onboard/under control. For this task, you will need to have some way of demonstrating the successful collection (e.g. an LED, sound, dance...)
10	While under autonomous control, the robot can recognise/identify a weight in the arena that was not placed directly in front of it and steer towards it. For example, identify a weight from a distance and home-in on it.
11	Tasks 1-10 are completed with a single piece of software. You may have different modes that are selected by buttons or switches, but you are not required to load different code onto the Arduino to complete the tasks.
bonus	Random special ability (or superpower) <u>not necessary for the competition</u>, but makes your robot interesting, unique, funny (i.e. entertains the judges) e.g. Music, wheelie, invisibility cloak…