

Embedded Systems

ELEC3020

Semester Group Project

Sumo Bot

weeks 6-12

GROUPS: Form groups of 4 students
EQUIPMENT: Purchase your own equipment,
up to \$50 will be reimbursed
(receipts required)

GET STARTED

- Form a group of **4** students
- Register your group members with your lab demonstrator, who will give you a **group number**.

SUMO BOTS

- Drive in a black circular area of about 1m diameter, limited by a white line.
- Must find any other robot in the area and either push it outside or flip it over.
- Must not drive outside the line.
- Max size is 25cm x 25cm x 25cm; max weight is 1kg; **these will be checked!**

IMPLEMENTATION

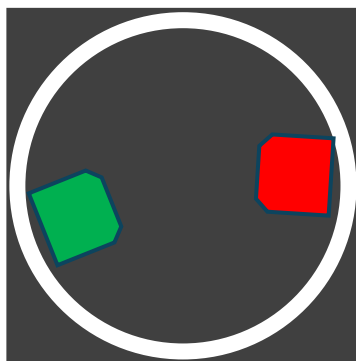
- Must use the provided TTGO ESP32 controller for controlling the vehicle.
- Must build their own chassis from scratch (cannot use published designs)
- Cannot use commercial boards, except motor controller
- Must indicate detected opponent on display or with dedicated LED
- Must clearly show **group number** on robot

HINTS

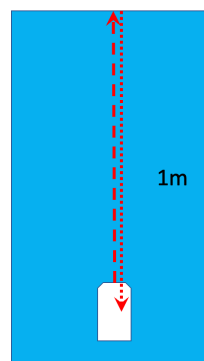
- Angled front helps in pushing/flipping
- Sticky tires improve pushing force

PROGRESS MARK

Each team has to demonstrate their project progress during their **week 9** lab session. They have to demonstrate a platform with motors and wheels that is being driven from their ESP32 controller. The robot should drive 1m forward, stop, 1m backward, stop. The progress mark will be 10% of the project mark.



Sumo



Progress

DEMONSTRATION & COMPETITION

Practical performance and competition for all groups will be in **week 12**. This includes answering questions from the lab demonstrators.

- *Each robots will first have to demonstrate its ability by pushing out a passive (stationary) object. This will be marked.*
- *All robots will then compete against each other in competition mode. Competition results will also contribute to the project mark.*
- Competition will be random tournament style.
Robots will start from opposite sides.

SUBMISSION

1. **One-minute video** of your project journey
To be submitted no later than **Mon. 9am of week 12**.
*The video will **not** be marked, but serves as an insurance against any last-minute disaster happening in week 12.*
2. **Documentation** to be submitted on **Wed. 12noon of week 12** as a *single PDF document* via LMS, incl. cover sheet signed by all group members:
 - 2.1. Project design report, which includes:
 - Report on which team member did what
 - Hardware circuit diagram with explanations
 - Software design description and diagram
 - Include photos, screenshots, etc.
 - Include page numbers
 - Max 10 pages including title page**Do not include:**
 - Program code
 - Table of contents, etc.
 - Half-empty pages
 - 2.2. Project budget with “bill of material” in Excel format:
 - Part numbers and names
 - Part quantity
 - Price per part
 - Source (where purchased)
 - 2.3. User Manual:
 - As if it was sold to a customer
 - Max. 3 pages, no separate title page
 - 2.4. Marketing and sales document:
 - 1 page incl. photo and brief system description as if selling it on eBay

MARKING

- 10% Progress Mark
- 30% Functional Performance
- 25% Competition Score
- 20% Project Design Report
- 5% User Manual
- 5% Budget
- 5% Marketing Documents