

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

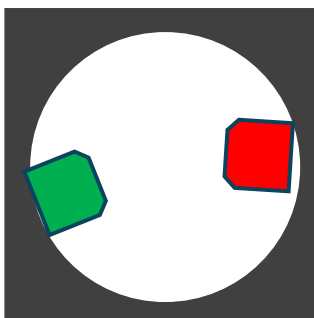
- Must use the provided TTGO ESP32 controller for controlling the vehicle.
- Must build their own chassis from scratch (cannot use published designs)
- Cannot use commercial boards, except for sensors and motor controller
- Must indicate detected opponent on display or with dedicated LED
- Must clearly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

HINTS

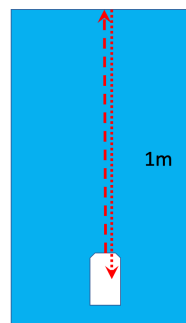
- Angled front helps in pushing/flipping
- Sticky tires improve pushing force

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 about 1m forward, stop, about 1m backward, stop. (No need to drive exact distances.)
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