Driverless Vehicle

Stage 2 : Carbot Challenge

Rules and Regulations

1. GENERAL OVERVIEW

The Driverless CarBot Challenge is a robotics competition that requires teams to design and develop an autonomous vehicle (CarBot) capable of navigating a predefined track with multiple real-world driving scenarios.

All participating teams must comply with the specifications, rules, and operational requirements stated below. A commitment fee of RM 250 will be imposed before the competition. The money will be returned after the competition.

2. TEAM COMPOSITION

All work must be carried out by students and each team must consist of:

- 4 students
- Maximum of 2 supervisors (non-student)

3. CARBOT SPECIFICATIONS

Each CarBot must comply with ALL of the following:

3.1 Mechanical Requirements

1. Must have 4 wheels (mandatory)
2. Must include a steering mechanism (non-differential drive only)
3. Must physically resemble a car (requires casing/body)
4. Maximum height: 25 cm
5. Maximum length and width: as specified in Figure 1

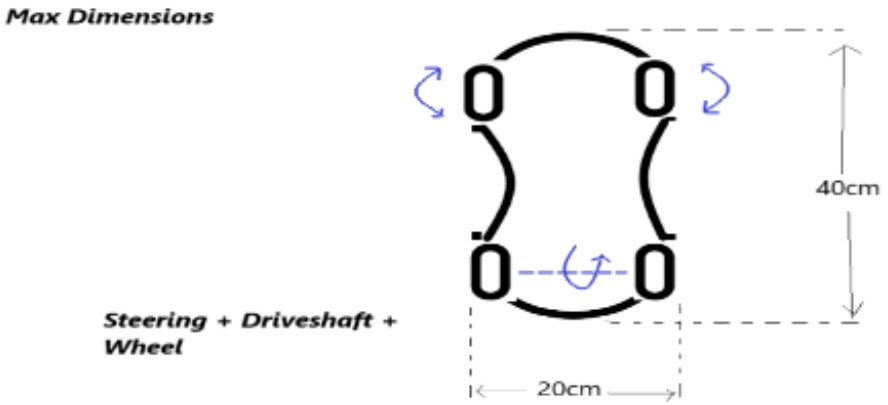


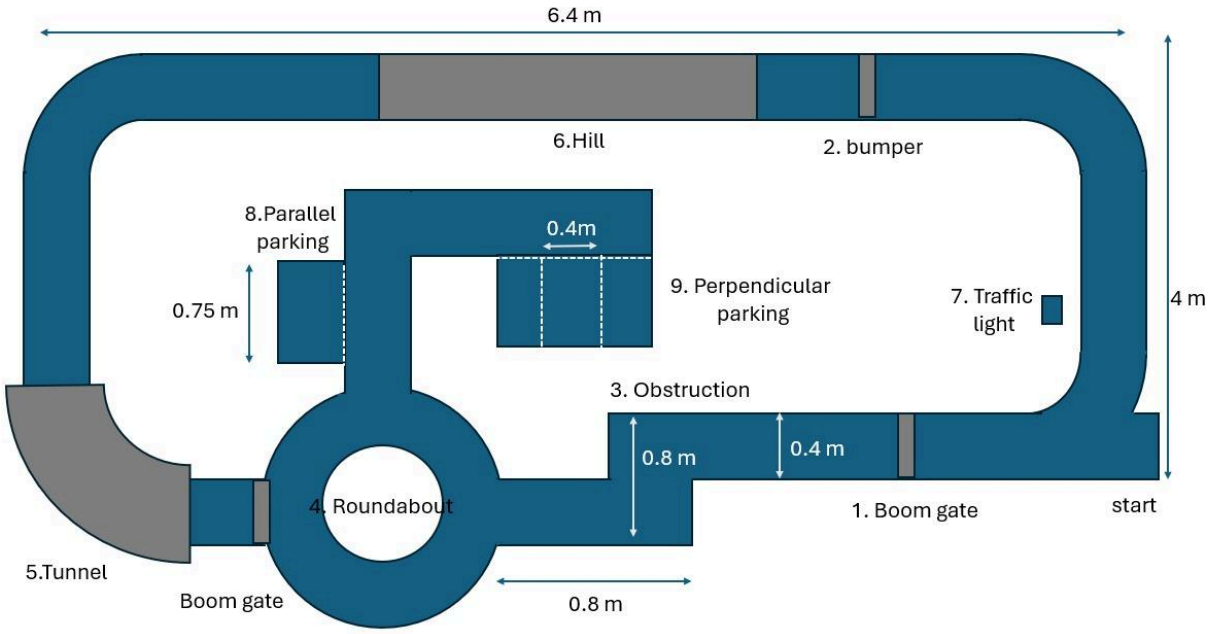
Figure 1: Maximum Carbot dimension.

3.2 Design Constraints

1. Differential drive robots (e.g., skid steering) are NOT allowed
2. The vehicle must use front steering similar to real cars
3. The design must be stable and safe for track operation
4. Only one motor is allowed for propulsion

4. TRACK SPECIFICATIONS

Overall Track (Top View)



Width of road : 30 cm
Max height : 25 cm

Challenges Details

Here are the descriptions of each challenge for the robotics competition

1

Boom Gate

Vehicle must:

- Stop when the gate is lowered
- Proceed when the gate is raised

2

Lane Changing/Obstacle Avoidance

Vehicle must:

- Detect obstacle (will be placed on the right track)
- Perform a smooth lane change to the left

3

Roundabout

Vehicle must:

- Enter roundabout
- Select the correct exit (2 exits available: one to the tunnel and another to the parking)
- Follow the correct trajectory
- A boom gate is placed to assist entry control

4

Tunnel

Vehicle must:

- Operate in low-light/dark conditions
- Follow lane markings inside the tunnel
- Handle curved path

5

Speed Bump

Vehicle must:

- Slow down before the bump by detecting the road sign
- Pass over the bump smoothly
- Maintain control and stability

6

Hill (slope)

Vehicle must:

- Climb and descend the slope
- Maintain speed and traction control.

7

Traffic Light

Vehicle must:

- Stop at RED
- Move at GREEN
- Reaction must be automatic and accurate

8

Parallel Parking

Vehicle must:

- Detect parking sign
- Perform parallel parking correctly
- Stop within the designated area

9

Perpendicular parking

Vehicle must:

- Perform perpendicular parking
- Stop completely inside the parking zone

5. SAE MALAYSIA BOOT CAMP

There will be a two-day boot camp for the Driverless Challenge held for every team to assess the progress. These sessions aim to ensure that each Carbot is built and functioning correctly according to the required standards. The organiser will also provide constructive feedback for improvement and answer any questions regarding the competition.

Date : Around July 2026 (will be confirmed later)
Time given : 8.30 am - 5.30 pm
Venue : Cute Training Room E3, Kulliyah of Engineering, IIUM

Important notice:
Accommodation and travel expenses are self-funded.

6. COMPETITION SESSION

Date : Around October 2026 (will be confirmed later)
Time given : 9.00 am - 5.00 pm
Venue : PROTON COE Subang (subject to change)

Details of session:

Day 1

- Morning: 20 min testing for each team
- Open track: all teams can use the track
- Preliminary evaluation
- Open track: all teams can use the track

Day 2

- Morning: 20 min testing & adjustment
- Open track: all teams can use the track
- Afternoon: Final competition
- The top 5 teams will proceed to the next phase and receive a grant to develop a hybrid go kart for the final phase.

7. COMPETITION SESSION

The evaluation will be based on:

- Task completion
- Accuracy of response (e.g., traffic light, parking)
- Smoothness of motion
- Stability and control
- Overall completion time
- System robustness

8. GENERAL RULES

- All systems must operate fully autonomously (No pre-programming)
- No external control during run
- Manual intervention = penalty/disqualification
- Vehicles must not damage the track
- Any unsafe design may be rejected

9. PENALTIES

- Failure to complete the task may lead to a score deduction
- Penalty will be imposed for any collision or unstable behaviour

- Manual override will lead to a heavy penalty or disqualification
- Organisers reserve the right to inspect vehicles

10. ADMINISTRATIVE NOTES

- Accommodation and travel: self-funded
- Teams must arrive on time
- Late participation may be disqualified
- Teams that fail to attend the competition (no-show) will forfeit their commitment fee, which will be used to cover expenses such as food and other logistical arrangements.

11. FINAL DECISION

- The judges' decision is final and no disputes or appeals will be entertained.
- Top 5 teams will received a grant to develop Driverless Hybrid GoKart for the next stage

12. CONTACT FOR ENQUIRIES

Teams may contact organisers Muhammad bin Abdullah (NxGV Driverless Challenge Coordinator): https://wa.me/60192634800 for:

- Technical clarification
- Rule interpretation
- Event logistics