

UNIVERSITY OF
Southampton

ELECTRONICS AND COMPUTER SCIENCE
FACULTY OF PHYSICAL SCIENCES AND ENGINEERING
UNIVERSITY OF SOUTHAMPTON



THE SMALLPEICE TRUST

TIN CAN RALLY: RULES

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COMPUTING AND MICROELECTRONICS

1 Game Rules

1. The game, called *Tin Can Rally*, is played in the arena defined in Specification 2. The objective is to race around a track, picking up cans along the way.
2. A point is awarded each time a robot crosses a track boundary in the anticlockwise direction.
3. Robots can pick up tokens which are in the track. Each time a robot crosses a track boundary and is awarded a track boundary point, it is awarded 1 bonus point for each token it is carrying.
4. At the end of a match, each robot is awarded one additional point for each token it is carrying.
5. A robot is deemed to have passed a track boundary when the back of the robot passes the line.
6. Cases of a robot passing backwards over a line are offset against future crossings forward of a line. That is, if a robot crosses two track boundaries backwards, it will need to cross two track boundaries forwards before it can gain any more track boundary points.
7. Participating teams must present their robots to match officials at least one minute before the start of each match.
8. There will be 2 robots in each match.
9. The Smallpeice Trust may have any number of match officials within the arena, including during the course of matches.
10. At the start of each match, robots must be entirely within their starting zones.
11. At the start of each match, teams will be permitted to lean into the arena and start their robots.
12. Each match lasts 120 seconds.
13. Teams may be disqualified from one or all matches by match officials, for non-compliance with regulations, lateness to the match, or any other reason at the discretion of the judge. Teams disqualified before the start time of a match will not be permitted to enter a robot.

2 Regulations

1. The Judge's decision is final.
2. All robots must be safe.
 - (a) This is defined considering safety concerns including, but not limited to:
 - i. sharp edges;
 - ii. the effects of impact at speed;
 - iii. fire risks from the battery (see Regulation 9).
 - (b) No robots will be permitted to compete without passing a safety and compliance inspection.
 - (c) Smallpeice Trust staff and volunteers may reinspect your robot and invalidate previous inspections at any time.
3. Any assistance from The Smallpeice Trust staff and volunteers is provided without guarantees.
4. Competitors are expected to behave within the spirit of good sportsmanship.
5. Competitors must take reasonable measures to avoid their robot damaging the arena, or anything within it, including other robots. This is a non-contact sport.
6. Competitors are not permitted in the arena during the competition, except to lean in to start robots or where directed by match officials.
7. All robots must be fully autonomous once started. No remote control systems are permitted.
8. At the start of each match, all competing robots must fit within a cube with edges of length 500 mm. Expansion beyond this limit during the course of a match is permitted.
9. The Lithium-Polymer battery is the most dangerous part of the electronics kit and must be treated accordingly. Whenever a robot is in operation its battery must be:
 - (a) securely held in place;
 - (b) adequately protected from damage even in the presence of damage to the rest of the robot;
 - (c) connected only to the main input of the power board.
10. A robot's main power switch must be easily accessible and on the top of the robot whenever the robot is powered.
11. All electronics on a robot must be:
 - (a) securely held in place;
 - (b) easily removable.
12. A robot must not have any devices designed to make sound, other than where provided directly by The Smallpeice Trust.

3 Specifications

3.1 Markers

The arena, and tokens, are labelled with fiducial markers. Each marker number is associated with a particular feature in the arena, and also has an associated size. The marker numbers and sizes are as follows:

Item	Marker Number	Marker Size (mm)
Arena boundary	0 – 27	250
Central reservation	28 – 39	250
Tokens	100 – 199	100

3.2 Arena

1. The arena floor is an 8 m × 8 m square. The tolerance of these two dimensions is ± 250 mm.
2. The floor of the arena is carpeted.
3. The layout of the arena is given in Figure 2.
4. The outer walls of the arena are at least 600 mm high, and the interior surface is white plastic-coated hardboard.
5. Each wall of the arena features seven 250 mm fiducial markers. The positions of these markers is given in Figure 1. The marker numbering is given in Figure 2.
6. The robot starting zones are squares which share corners with the arena itself. Their sides are of length 1m.
7. In the centre of the arena is a central reservation raised by at least 250 mm above the arena floor. It is square, and sized such that the width of the track is 2 m.
8. The track boundaries are visually delineated on the floor of the arena by tape. The actual boundary is on the trailing edge of the tape – that is, a robot has passed the boundary when the back of the robot is past the tape.

3.3 Tin Cans

1. The tokens are 100 mm × 100 mm (± 10 mm) corrugated cardboard boxes, with fiducial markers on each face.
2. The initial layout of tokens in the arena is given in Figure 2.

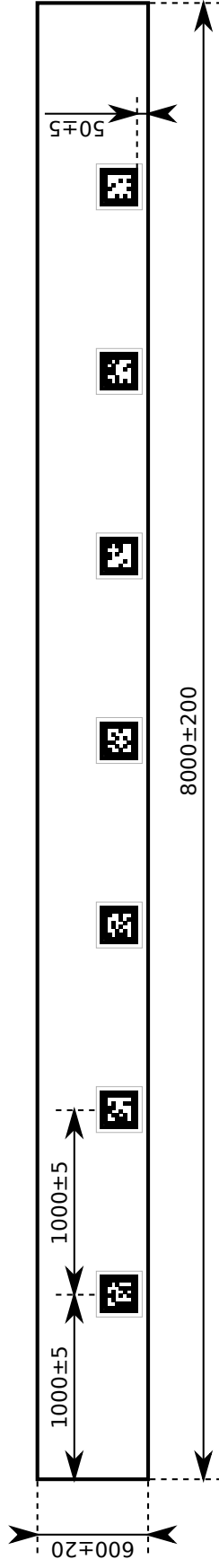


Figure 1: Layout of markers along each arena wall.

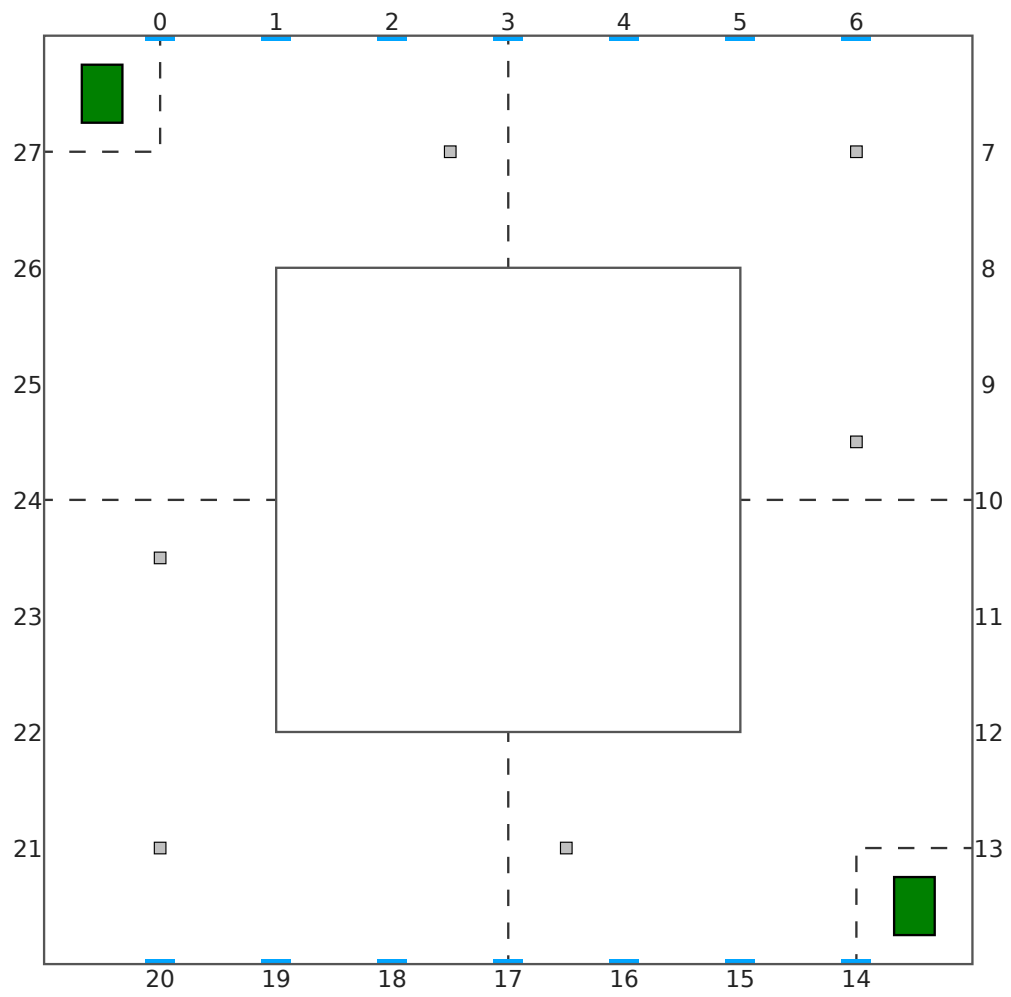


Figure 2: Layout zones and cans in the arena.