



SOURCEBOTS

UNIVERSITY OF  
**Southampton**

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



THE SMALLPEICE TRUST

## **SCAVENGERS: RULES**

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COMPUTING, ELECTRONICS, AND ROBOTICS

# 1 Game Rules

1. The game, called *Scavengers*, is played in the arena defined in Specification 1. The objective is to collect tokens and deposit them in the teams scoring zone.
2. The arena contains 16 tokens.
3. There are four scoring zones in the arena, arranged in a  $2 \times 2$  grid, with each robot being allocated a single scoring zone. The centre of the arena (approximately a quarter of each scoring zone) is raised.
4. At the end of a match, tokens earn points as follows:
  - (a) 1 point for tokens 'in the control of' a robot.
  - (b) 2 points for tokens 'in' a team's scoring zone and not on the raised area.
  - (c) 5 points for tokens 'on' the raised area in a team's scoring zone.
5. Tokens are considered to be 'in the control of' a robot if and only if:
  - (a) fewer than 3 corners are in contact with the floor, and
  - (b) when the robot is lifted, the token remains held by the robot.
6. A token is considered to be 'in' a zone if the vertical projection of token is entirely within the scoring zone.
7. A token is not in any scoring zone if it is in the control of a robot.
8. A token is considered to be 'on' a raised area if it is in contact with the top surface of the raised area.
9. During a match, a robot may move or interact with any token in the arena.
10. Participating teams must present their robots to match officials before the start of matches, as regulated by the match officials. Non-compliant teams may be disallowed from participating.
11. There will be up to 4 robots in each match.
12. SourceBots may have any number of match officials within the arena, including during the course of matches.
13. At the start of each match, robots must be entirely within their starting areas.
14. At the start of each match, teams will be permitted to lean into the arena and start their robots.
15. Each match lasts 120 seconds.
16. 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 10).
  - (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 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. If you request your robot be turned off by marshals, you will be disqualified from that match.
9. 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.
10. 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.
11. A robot's main power switch must be easily accessible and on the top of the robot whenever the robot is powered.
12. All electronics on a robot must be:
  - (a) securely held in place;
  - (b) easily removable.
13. A robot must not have any devices designed to make sound, other than where provided directly by SourceBots.

## 3 Specifications

### 3.1 Arena

1. The arena floor is an  $8.4\text{ m} \times 8.4\text{ m}$  rectangle. The tolerance of these two dimensions is  $\pm 250\text{ mm}$ .
2. The floor of the arena is carpeted.
3. The layout of the arena is given in Figure 1. This figure is to scale.
4. The outer walls of the arena are at least  $600\text{ mm}$  high, and the interior surface is white plastic-coated hardboard.
5. Each scoring zone is  $2.4\text{ m} \times 2.4\text{ m} \pm 100\text{ mm}$ , resulting in a total size of  $4.8\text{ m} \times 4.8\text{ m} \pm 200\text{ mm}$  for the four scoring zones.
6. Scoring zones are bounded by metallic tape around the perimeter and internal boundaries on the floor. The inside edge of the tape marks the outside edge of the scoring zone.
7. The raised area in the centre of the arena is  $2.4\text{ m} \times 2.4\text{ m} \pm 100\text{ mm}$ , with a height of  $180\text{ mm} \pm 10\text{ mm}$ .
8. At the cardinal points of the arena are  $1.2\text{ m} \times 1.2\text{ m} \pm 100\text{ mm}$  walls, at least  $180\text{ mm} \pm 10\text{ mm}$  tall.
9. Scoring zones for teams are offset  $90^\circ$  anti-clockwise, such that a team isn't directly in front of their own scoring zone.
10. Each robot will be assigned a corner at the start of every match to indicate its starting area. Corner starting areas are  $1000\text{ mm} \pm 20\text{ mm}$  square and will be marked by tape.

### 3.2 Tokens

1. Tokens are cuboids with side length  $260\text{ mm} \pm 15\text{ mm}$ .
2. The exterior surface of the tokens is conductive and fully connected.
3. There are 20 possible starting positions for tokens in the arena. These are arranged as indicated in Figure 1.
4. At the start of each match, four of the starting positions in each quadrant will be occupied. The position nearest the starting area of each quadrant will always be occupied.
5. The pattern of which starting positions are occupied in a match is rotationally symmetrical.

