



SOURCEBOTS 2018

PIRATE ISLANDS: RULES

APRIL 2018

1 Game Rules

1. The game, called *Pirate Islands*, is played in the arena defined in [Specification 2](#). The objective is to collect tokens, and to bring them to one's scoring zone in addition to removing opponents tokens from your zone.
2. The arena contains 20 tokens. The layout is detailed in [Specification 2](#).
3. At the end of the game, tokens within the scoring zone of a robot (see [Rule 5](#)) score as follows:
 - (a) 3 points for each token matching the colour of the zone
 - (b) -1 point for each token not matching the colour of the scoring zone

For example: if the red zone contains a red token and a blue token, then that zone would score 2 points (+3 for the red token, but -1 for the blue token).
4. An additional 1 bonus point is awarded if a robot moves out of its starting zone.
5. A token is in a scoring zone if, and only if, it has three corners in contact with the floor in the zone.
6. Participating teams must present their robots to match officials at least one minute before the start of each match.
7. There will be up to 4 robots in each match.
8. SourceBots may have any number of match officials within the arena, including during the course of matches.
9. At the start of each match, robots must be entirely within their starting zones.
10. At the start of each match, teams will be permitted to lean into the arena and start their robots.
11. Each match lasts 150 seconds.
12. During matches teams must not touch or interfere with any part of the inside of the arena (including robots and tokens), except to start their robot under the direction of match officials.
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) SourceBots staff may reinspect your robot and invalidate previous inspections at any time.
3. Any assistance from SourceBots staff 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 must not enter the arena during match times, including in the spaces between individual matches.
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. Additional batteries or other energy storage must be explicitly and individually approved by SourceBots before use.
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 robots must have mountings for the removable identifying flags provided by SourceBots, as described in [Specification 15](#). A mounting must firmly hold a flag in an upright position. Flags are not counted when considering the starting size of the robot.

13. All electronics on a robot must be:

- (a) securely held in place;
- (b) easily removable.

14. A robot must not have any devices designed to make sound, other than where provided directly by SourceBots.

3 Specifications

3.1 Markers

The arena and tokens in the game 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
Columns	28 – 43	250
Tokens belonging to the robot in zone 0	44 – 48	100
Tokens belonging to the robot in zone 1	49 – 53	100
Tokens belonging to the robot in zone 2	54 – 58	100
Tokens belonging to the robot in zone 3	59 – 63	100

All markers are oriented vertically such that the human-readable text is under the marker.

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. Starting zones are numbered 0,1,2,3 clockwise starting at the north west corner.
8. In the arena there are 4 fixed square columns with a height greater than or equal to 370 mm, and a width of 370 mm.
9. Columns will have 4 different markers on each face, as given in [Figure 2](#).
10. Markers will be placed on columns such that there is a 120 mm gap at the bottom.
11. The scoring zones are squares with sides $2815\text{mm} \pm 50$ mm positioned with the columns separating them.
12. The starting and scoring zones is visually delineated on the floor of the arena by coloured tape. The outer edge of the tape indicates the outer edge of the zone. This tape is for visual reference only.

13. Tokens will be placed in undisclosed layouts within an inner 2m square of each scoring zone. The inner square is positioned such that two of its edges are the inside edges of the scoring zones. Tokens will start at least 150mm from columns or other tokens and their layouts will be rotationally symmetric to that of other zones.
14. Tokens will be placed in the scoring zone on the opposite side to their matching coloured scoring zone.
15. Flags will be cylinders with a diameter of 15mm, and a length of 200mm or longer. There will be a decoration attached 100mm from the top, with a height of 100mm and a width of 150mm, as described in [Figure 3](#). The cloth part of the flag must be visible when attached to the mount.

3.3 Tokens

1. Tokens are cubic corrugated cardboard boxes, with sides of length $110\text{mm} \pm 10\text{mm}$.
2. Tokens will be coloured to match the colour of a scoring zone.
3. Each face of each token has a fiducial marker attached.
4. The initial layout of tokens in the arena is defined in [Specification 2.13](#).

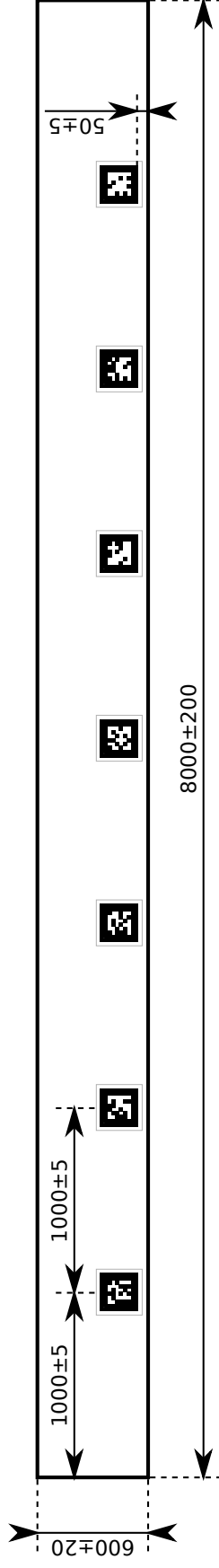


Figure 1: Layout of markers along each arena wall.

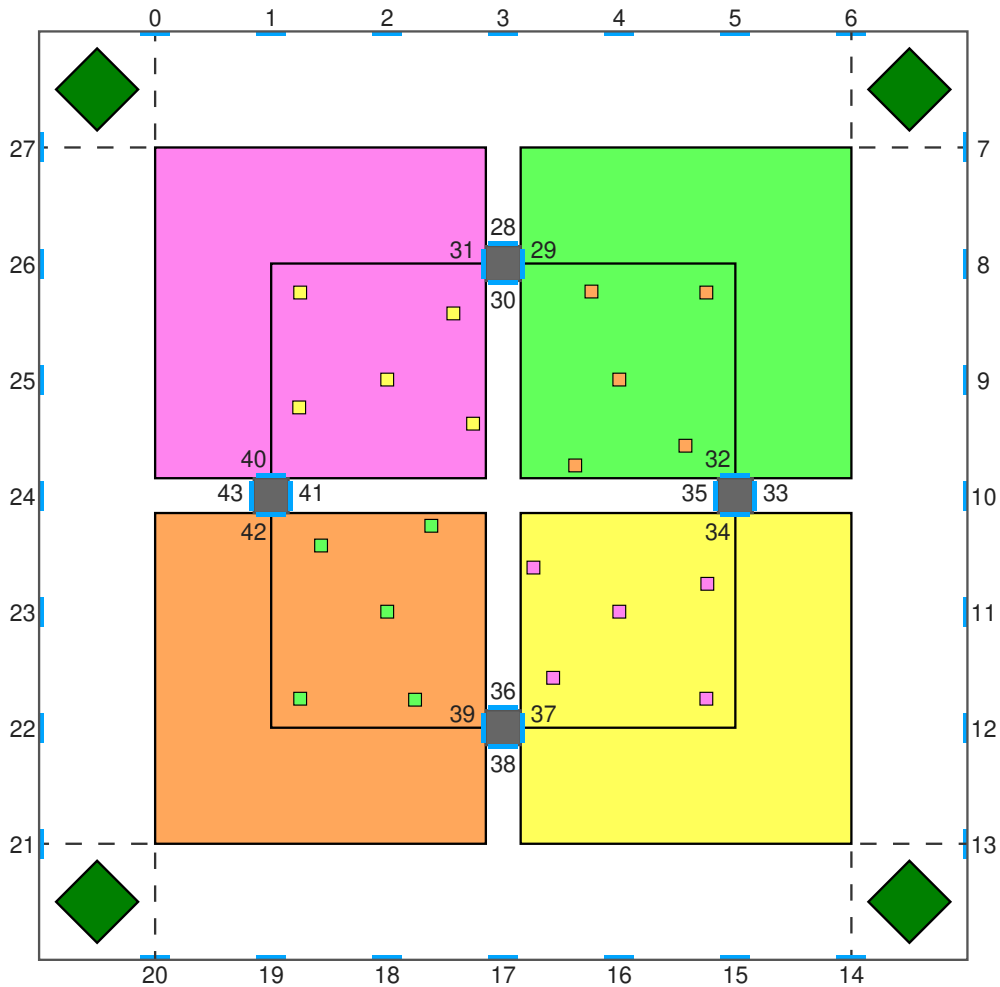


Figure 2: Layout zones and tokens in the arena. Please note that tokens will be placed randomly but rotationally symmetrically within the respective scoring zones.

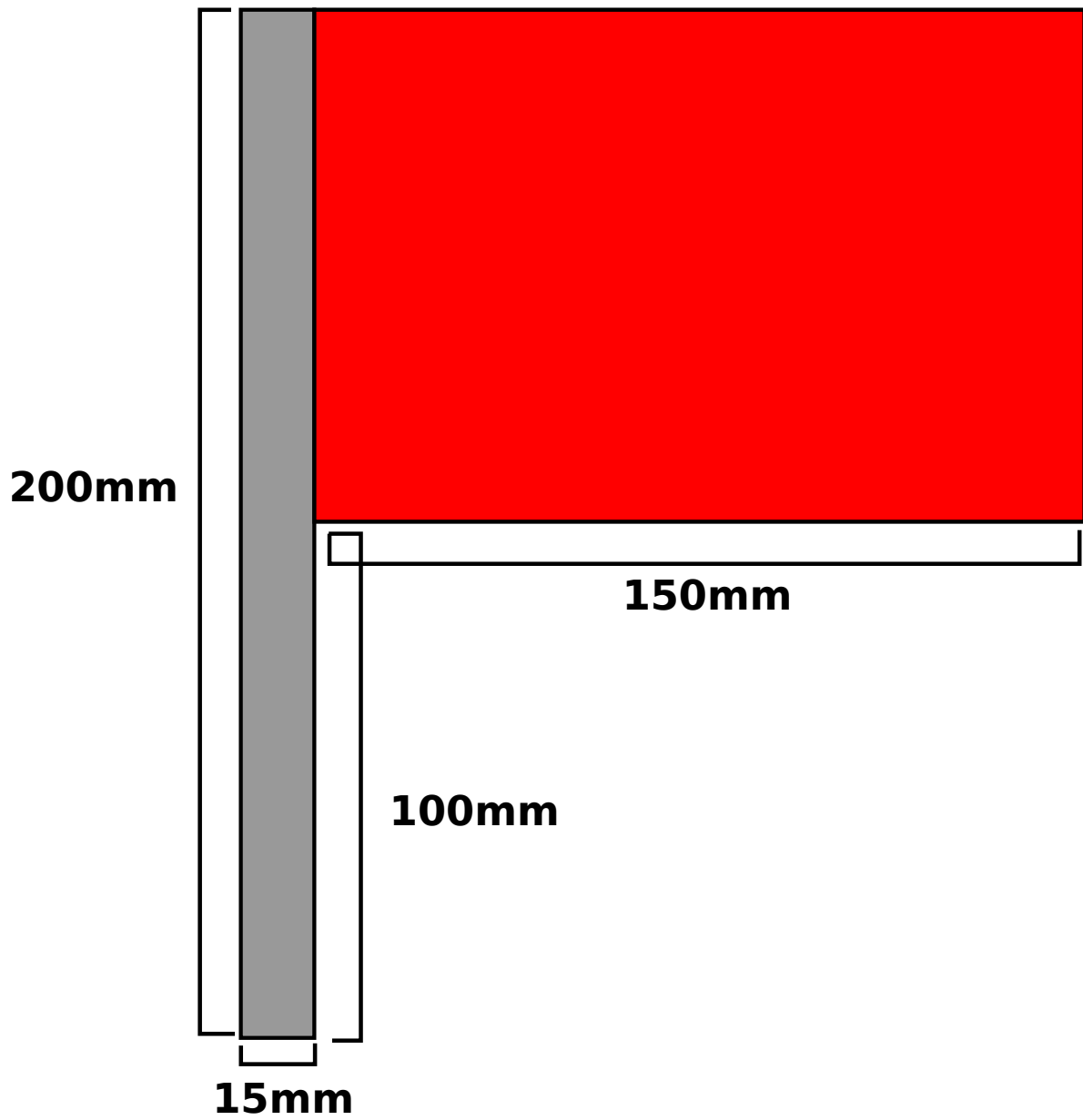


Figure 3: Specification of a robot flag

4 Amendments

Since first publication, this document has had the following changes made:

- 11th April 2018:
 - The specified size of the scoring zones are now slightly smaller, to allow for the pillars to be between the zones without overlap. The diagram of this was already correct and is unchanged.
 - The marker numbers used on tokens have been changed so that each robot has a consistent number of markers. The API and example markers in the docs were already correct and have not changed.
 - Robots are now required to have a mount for flags solidly attached. Flags will be provided by SourceBots.