IDE SERIES

2022 SINGAPORE

ROBOTICS

(Secondary Schools)
Competition Manual

Event Organiser:

[ ] NULLSPACE

Education Partner:

[ ] THINKCRATE

PREFACE

In the land of Pythagorea, transport is becoming more efficient. People are opting not to drive, but are instead taking public transport, and this has made the land's transport network far more environmentally sustainable.

One problem still remains. People with disabilities still find it difficult to get around, especially on public transport. This is because transferring from bus to train, or transferring between trains is difficult especially when it is congested.

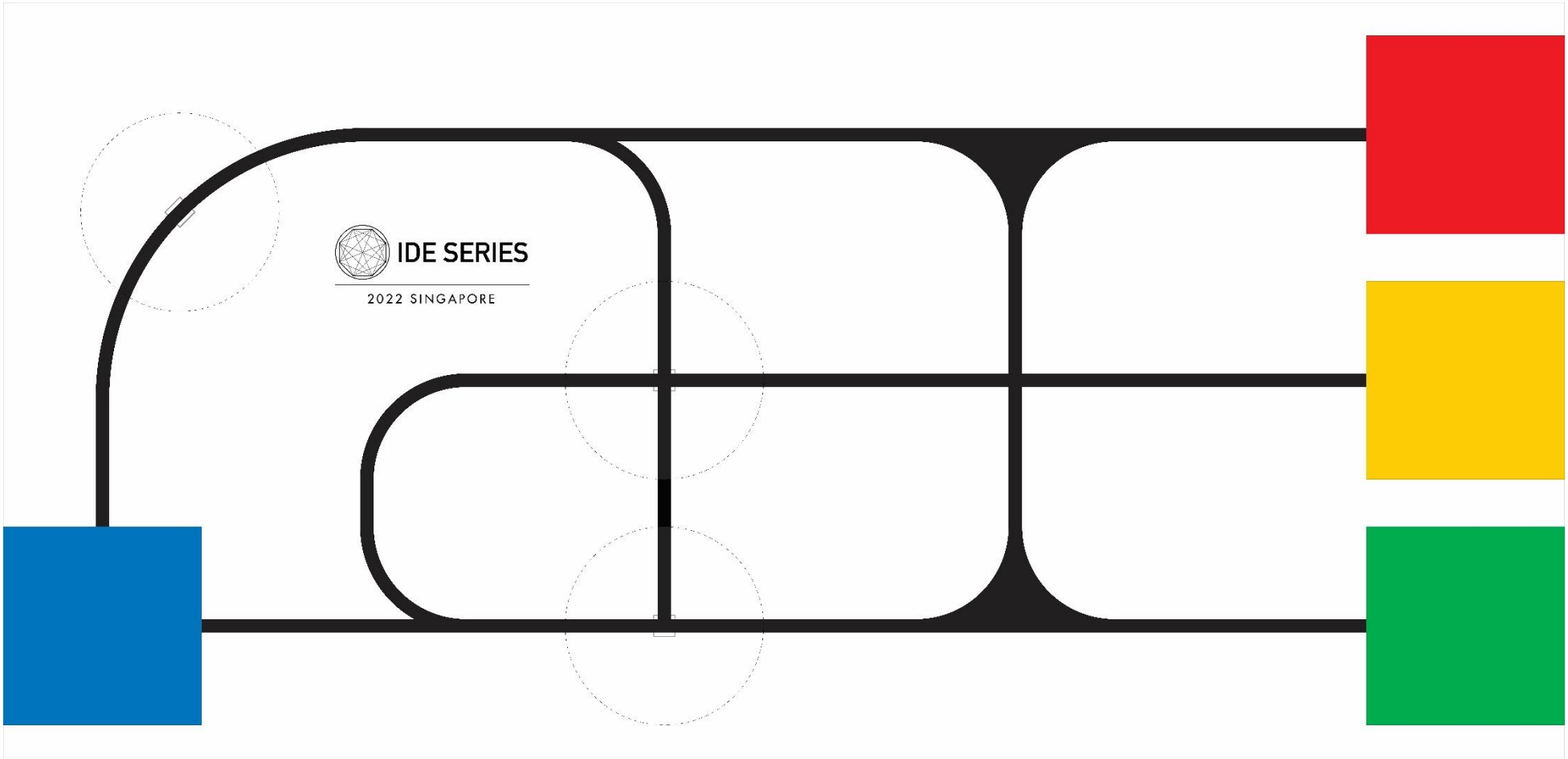
The Government has ordered an initiative where people with disabilities can be transported automatically using robots, and these people can be automatically moved from bus stop to train station and vice versa. However, building and programming such a perfect robot seems like a daunting task. There is zero space for error. Robots need to be precise enough to deliver the people safely, whilst also going to the correct place. Will the young robotics engineers in Pythagorea succeed? Or will the experiment end up as a waste of resources?

Read on to find out more…….

Note that this manual is not the final competition rules – those will be released only on the actual competition day itself. This manual is meant to give you enough details to design and plan how to execute the mission.

During the actual competition day itself, you will be expected to adapt your robot build and code to the new rules/requirements accordingly, but you may design, build and pre-program a robot based upon the details outlined in this document.

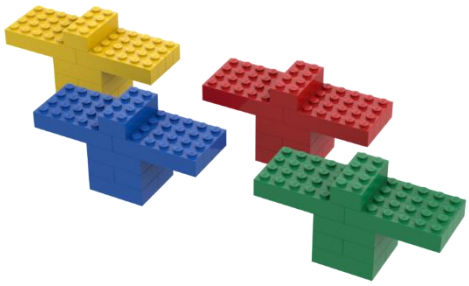
IDE ROBOTICS 2022 PLAYFIELD



Download printable playfield design from: https://ideseries.org/ide2022/

GAME PLAY

Crucial Skills necessary



1) Robot will need to build an attachment which is able to lift LEGO Props that look like this:
2) Robot will need to be able to navigate the playfield by following lines on the playfield.
3) Robot will need to scan the colour of the bricks and take different actions based on the colour.

Released Objectives

Based on the Playfield Map released thus far, the robot should be able to accomplish the following:

1) Navigate the black lines to move to each of the coloured zones.
2) Use a lifting mechanism to collect and lift each of the LEGO Props
3) Scan the colour of the LEGO Props and take different actions depending on the colour.

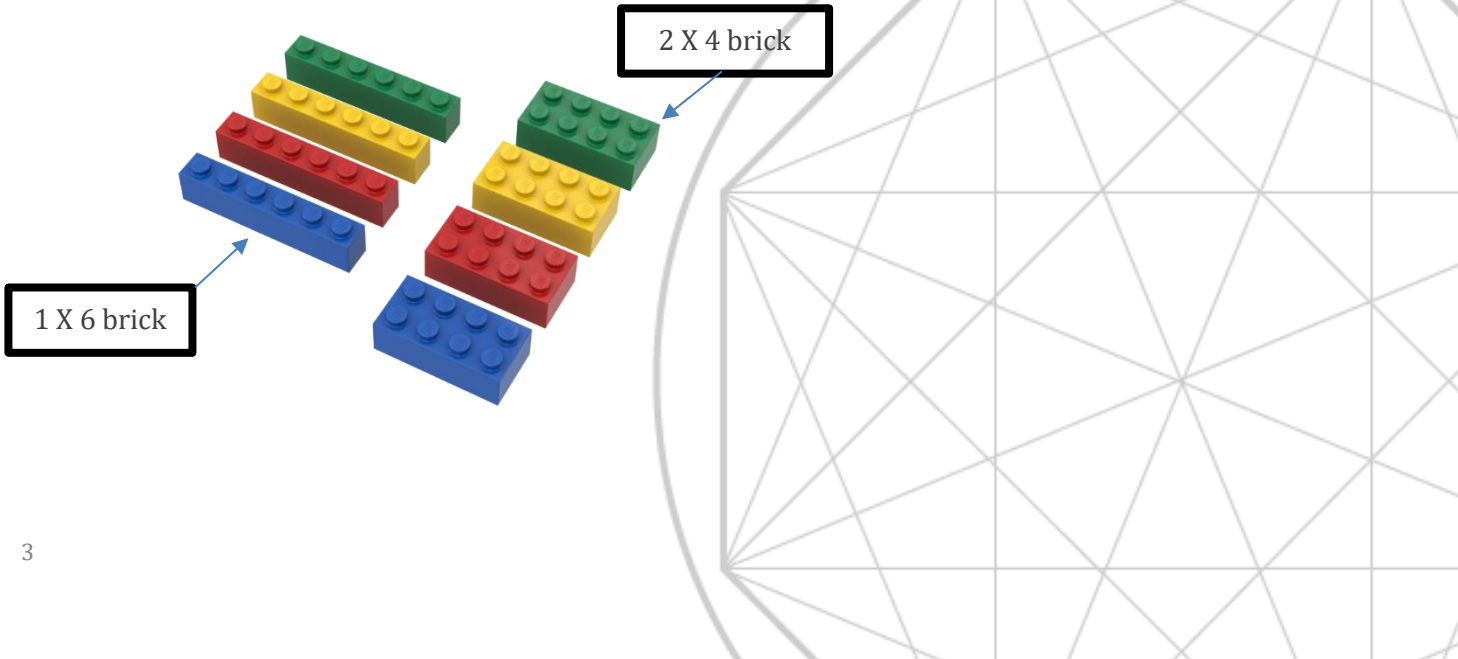
Note: These are not the full details of the competition. The full details will only be released during the competition itself.

Playfield and Logistics

All participating organisations must possess 1 playfield in order to participate. You may purchase the playfield from us. Alternatively, the playfield will be uploaded to the IDE website, and you may engage your own printing services to have the playfield printed.

All participating organisations must possess the LEGO® brick props necessary for the mission as stated below. If your organisation possesses one standard WRO Brick set, you will have sufficient bricks in the set. Alternatively, you may purchase the LEGO props required for $25.

	2 X 4 Brick	1 X 6 Brick
Red	7 pieces	8 pieces
Blue	7 pieces	8 pieces
Green	7 pieces	8 pieces
Yellow	7 pieces	8 pieces



COMPETITION RULES

General:

1. No external help is to be rendered in this competition. This includes receiving direction, contribution, construction of any kind from the team mentor or any party or person not registered as a member of the team. Failure to comply with this rule will be dealt seriously and may result in the team's disqualification.
2. Teams should prepare and bring all the equipment, software and portable computers they need during the tournament.
3. Testing playfields will be set up for practice prior to the competition. Teams will queue up in an orderly manner and to refrain from hogging the playfields.
4. All decisions by the competition officials and organising parties are final.

Parts and Size Restrictions

1. Teams are expected to use their own LEGO® Spike Prime, EV3 or NXT sets, batteries and laptops.
2. The robots must use parts solely from LEGO® Sets. Teams are allowed to use only one controller (SPIKE Prime, EV3 or NXT). The number of motors or sensors is restricted only by the number which the controller/hub can handle (e.g., 4 Motors and 4 Sensors for EV3, or 6 motors/sensors for SPIKE Prime). Multiplexers will not be allowed. The number of parts is not limited as long as they are LEGO® parts.
3. Mixing of parts from all 3 platforms (NXT / EV3 / SPIKE Prime) is allowed.
4. Robots will be inspected before each run. Teams with parts which do not comply to the rules will be disqualified.
5. The size of the robot and its extension as a whole will be strictly limited to **250mm x 250mm x 250mm**.
6. No form of remote control or wireless programming is allowed during the course of the run of the robot.
7. Only NI Labview, Robolab™, LEGO® Mindstorms® EV3, NXT, EV3 Classroom or Spike Prime programming platforms are accepted.

Operational Rules

1. A total of 120 minutes will be given for robot preparation and testing, as well as video – taking. The team may take the video at any point during the 120 minutes. No additional time will be given for video-taking. During this time limit, teams may take as many videos as they wish.
2. At the end of the 120 minutes, no additional robot runs will be allowed. Teams will be given up to 20 minutes to submit their unedited robot run videos. Edited videos will be disqualified.
3. It is strongly recommended that a maximum of 3 teams are allocated to 1 playing field. No additional time will be given if there are more than 3 teams at a playing field. It is also strongly recommended for a teacher/coach or non-participating student leader to enforce safe distancing by enforcing a queue system. This person is only strictly allowed to perform crowd control/safe distancing duties and may not offer suggestions or guidance to participating teams.
4. During a video-taking run, only the designated robot operators may operate the robot. Robot operators may only touch the robot inside the designated START or END zone.
5. After the robot leaves the START or END zone, no participant or other person may touch the robot or otherwise physically interfere with the run. If the submitted video displays any such occurrence, the participating team's video may be disqualified.
6. Robot program must be activated manually via NXT/EV3/SPIKE Prime screen options. No form of wireless programming or operation is allowed during the competition run.
7. A stopwatch timer shown on a laptop or tablet must be clearly displayed in the background. One teammate may be the designated timer operator.
8. Robot operator must count down 3 – 2 – 1 – START. Timer operator will click the 'START TIME' button at the same time.
9. Robot run is limited to 2 minutes. When the robot run has hit the 2-minute mark, judges will pause the video and calculate the score from there.

Violations

1. The Referee(s) have the ultimate authority during the competition. Their decisions are final. Referees will not review recorded replays after a match is completed.
2. No modifications may be made to the playfield or LEGO® props, or LEGO® pieces from which the robot is made. Violations to these will result in disqualification.
3. Team members must not interfere or assist the robot in any way during its run. No wireless robot communication is allowed during the 2 competition runs. Teams found in violation will be immediately disqualified.