



STUDENT ROBOTICS 2019

KICKSTART

KICKSTART 2019

1. What is Student Robotics
2. Schedule for the year
3. Designing your robot
4. Building your robot
5. Developing your robot
6. Health and safety
7. The game
8. The rest of today

**WHAT IS STUDENT
ROBOTICS?**



The Volunteers

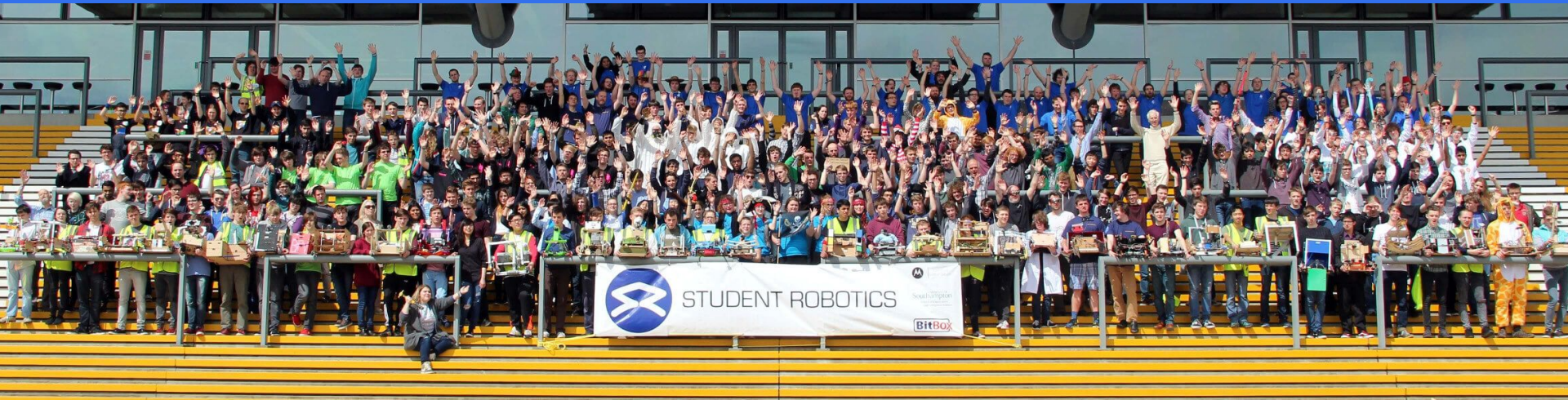
We may be nerds, but we aren't scary!

We're here to help!



The Teams

There's 36 of you!
(not all in this room)





Blackpool
Liverpool
Manchester
Nottingham
Leeds
Hull

Leicester
Peterborough
Norwich
Canterbury
Ipswich
Colchester

Cardiff
Bath
Swindon
Reading
Oxford
London
Southend-on-Sea
Brighton
Bournemouth

Guernsey
Jersey
Le Havre
Rouen
Caen
Paris
Versailles

Wildlife Park
Parc Naturel
Régional

Wildlife Park
Parc naturel
régional de
Lorraine

Troves

Leeuwarden
Groningen
Leer
Oldenburg
Amsterdam
The Hague
Rotterdam
Eindhoven

Brussels
Ghent
Antwerp
Lille
Arras
Amiens

Brussels
Ghent
Antwerp
Lille
Arras
Amiens

Reims
Paris
Versailles

Wildlife Park
Parc naturel
régional de
Lorraine

Troves

Troves

Cuxhaven
Bremerhaven
Hamburg
Lüneburg
Schwerin

Bremen
Hanover
Wolfsburg
Brunswick
Magdeburg

Münster
Bielefeld
Paderborn
Dortmund
Essen
Düsseldorf
Cologne
Bonn

Koblenz
Frankfurt
Mainz
Mannheim
Heidelberg
Karlsruhe
Stuttgart

Würzburg
Bamberg
Nuremberg
Regensburg

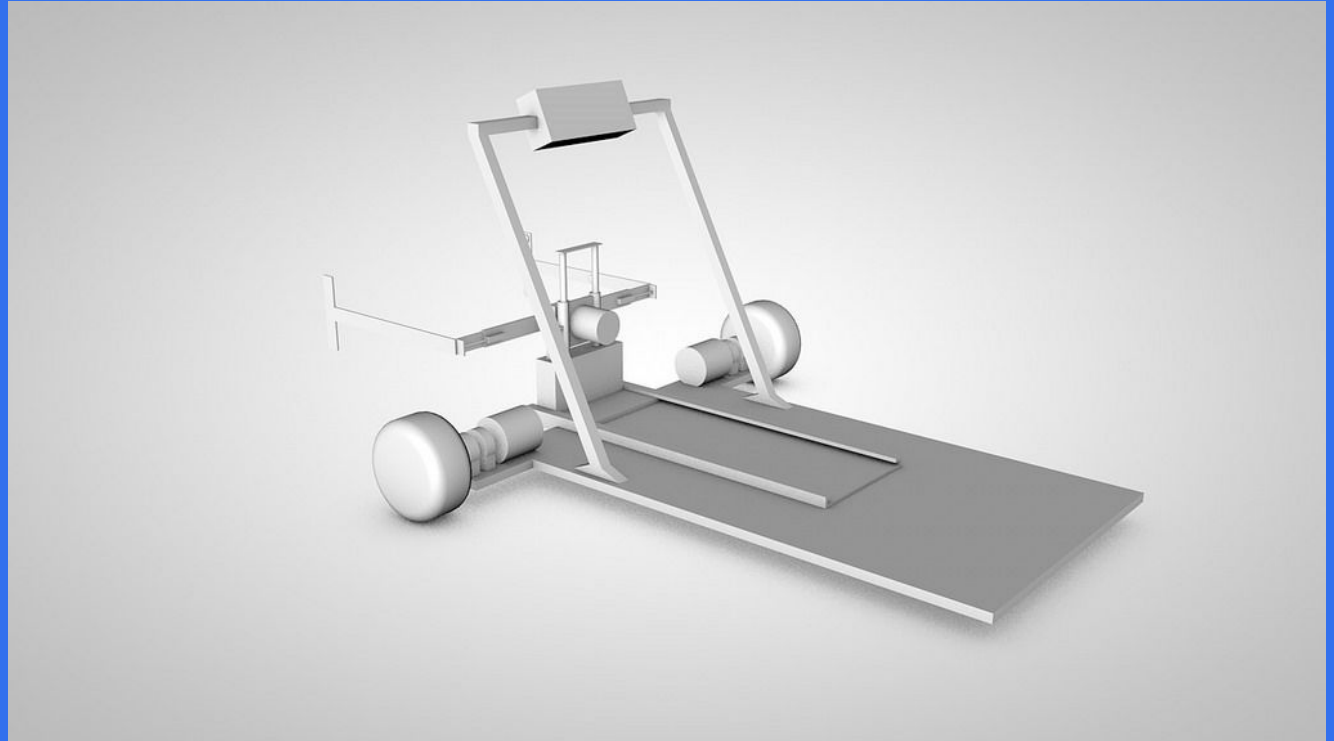
Ingolstadt

Ulm
Augsburg

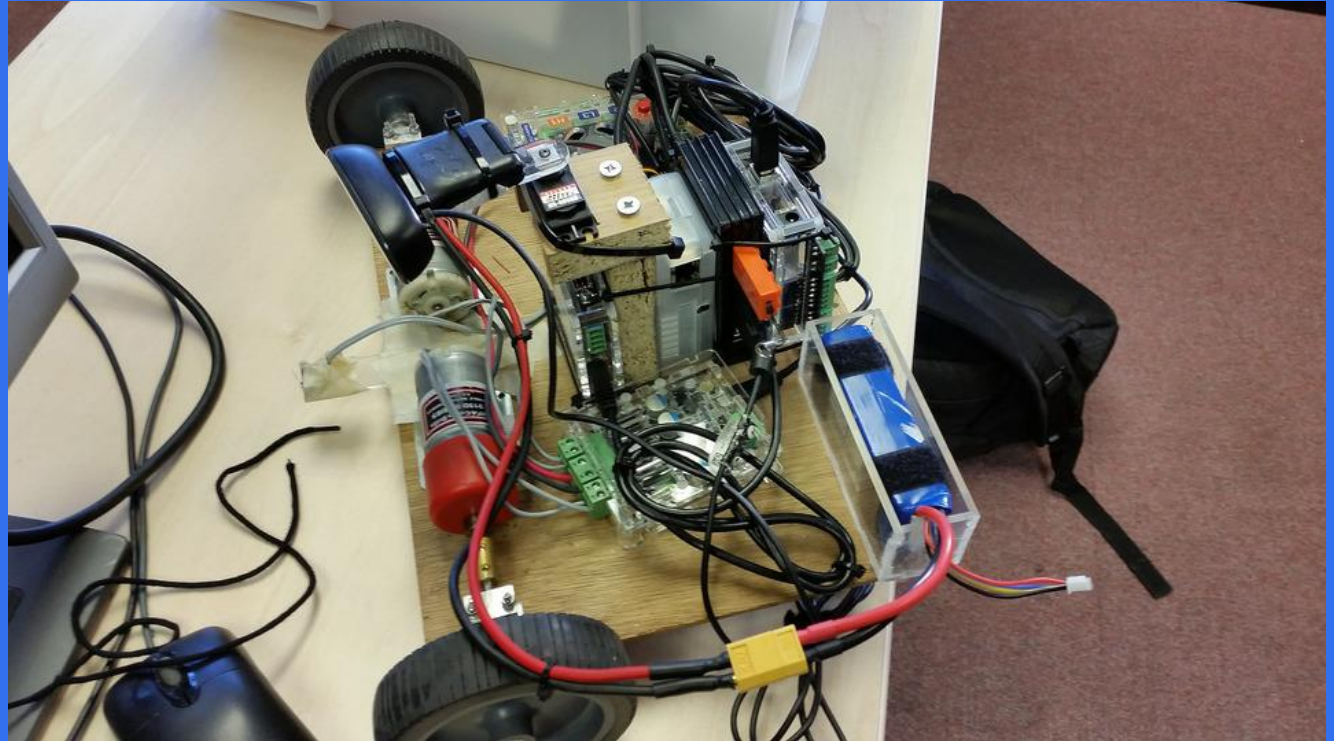
6 MONTHS

You have **ONLY** 6 months to...

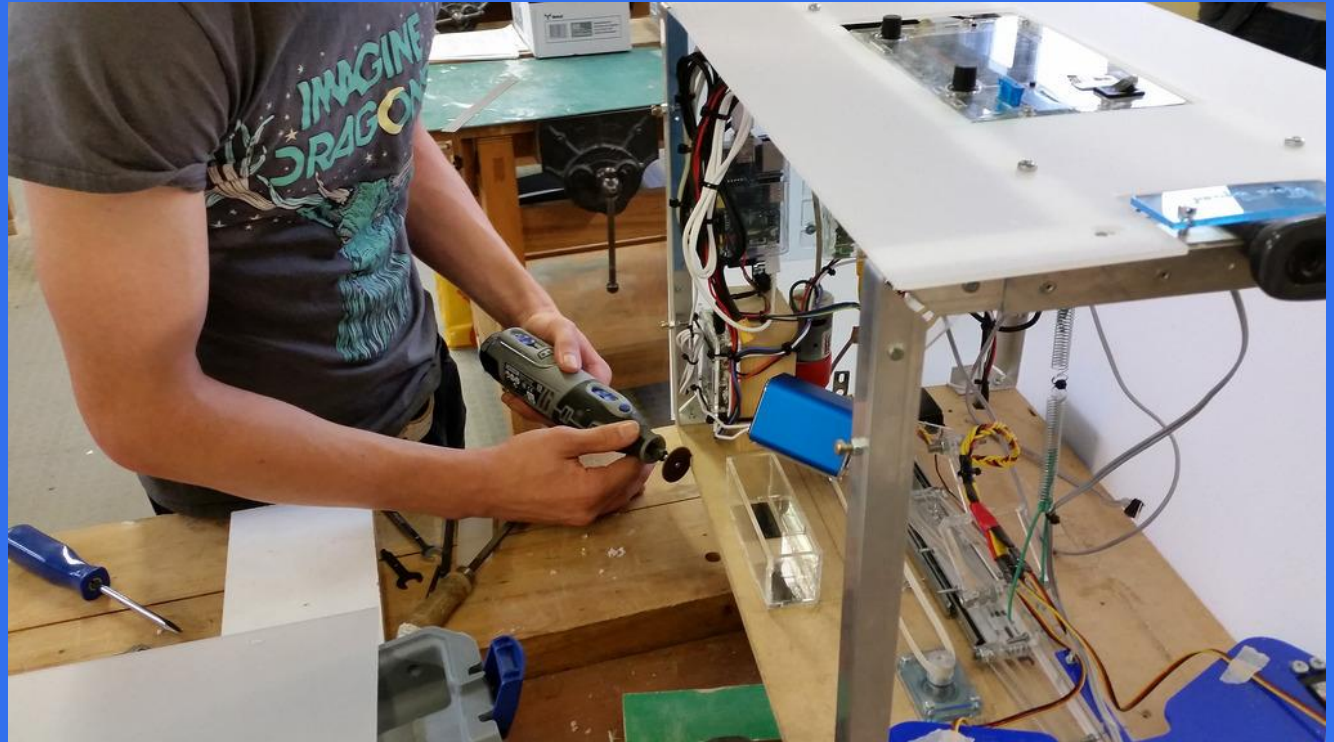
Design



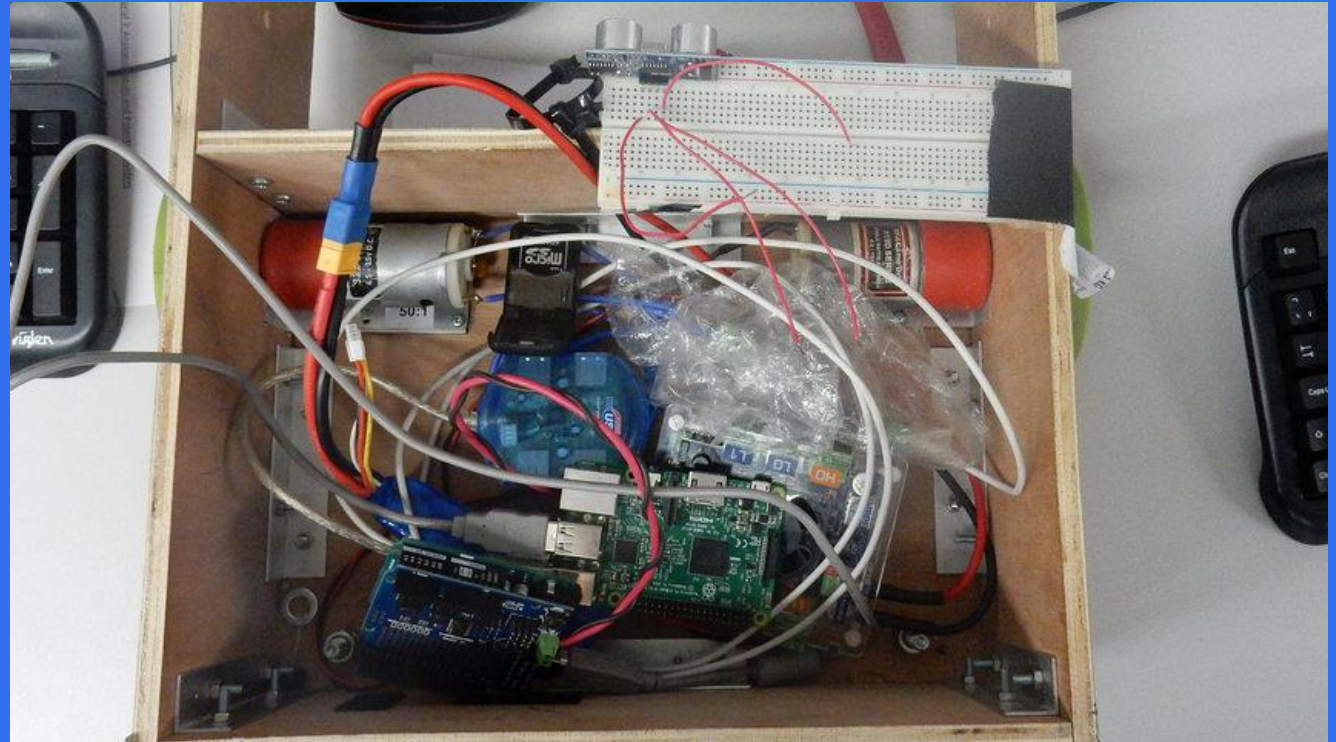
Prototype



Build



Do all the electronics (Hopefully better than this)



Write lots of code



Work as a team



* Work as a team



Test it a Bajillion times



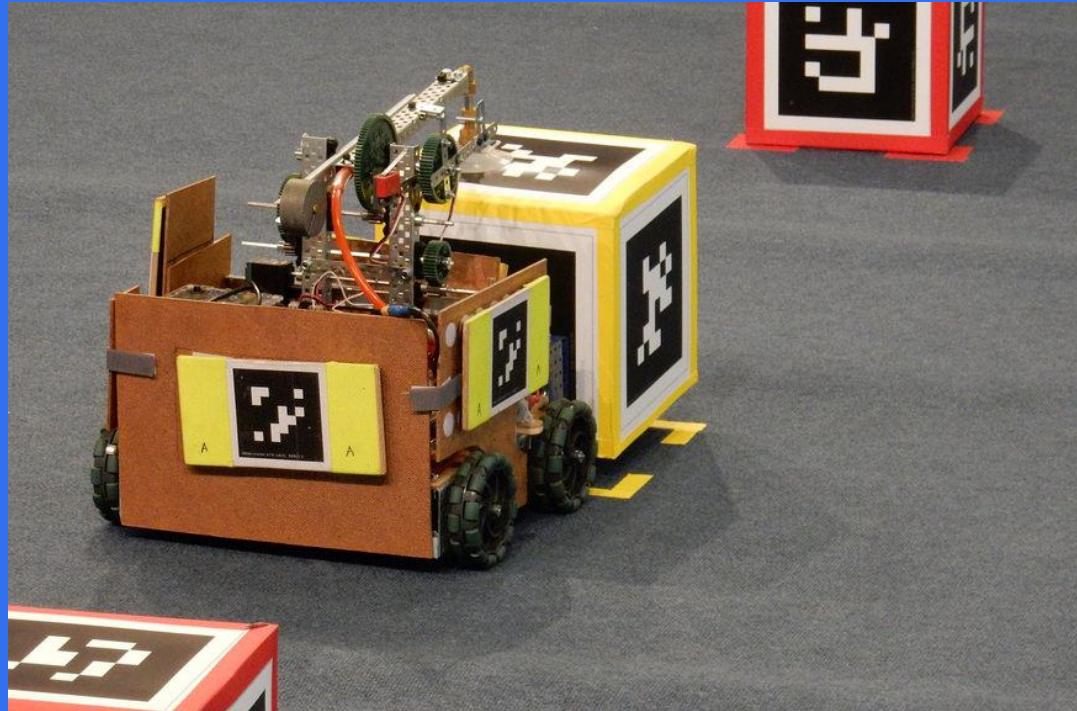
Get your robot inspected



Compete



Score some points



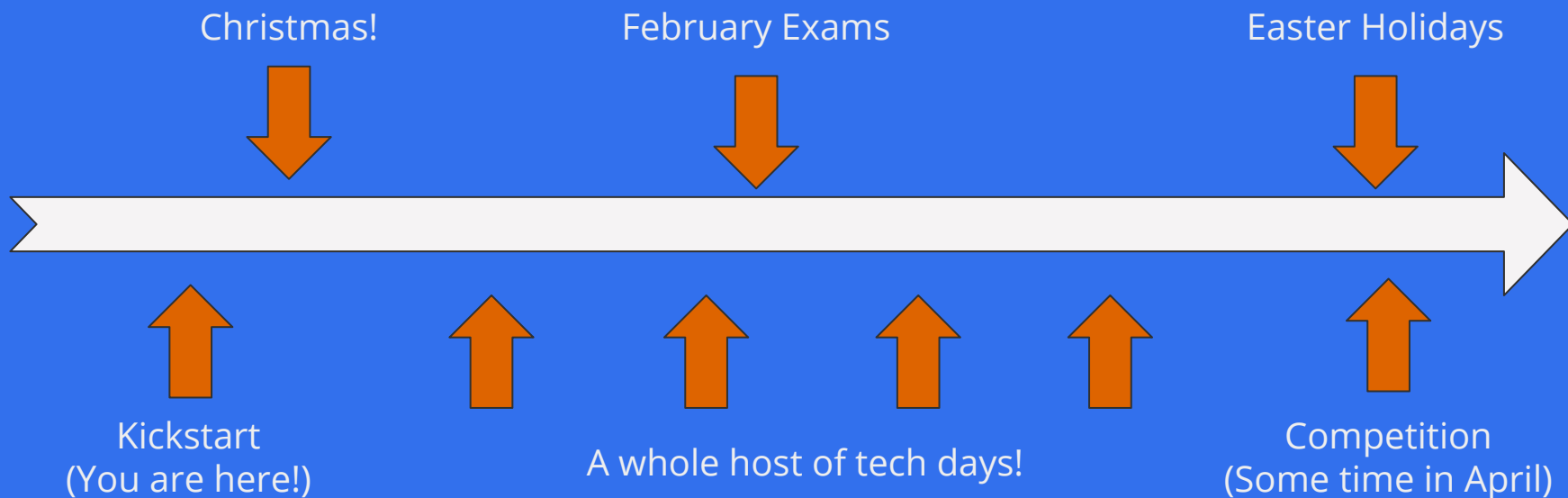
Win some prizes



Go home so we can rest!

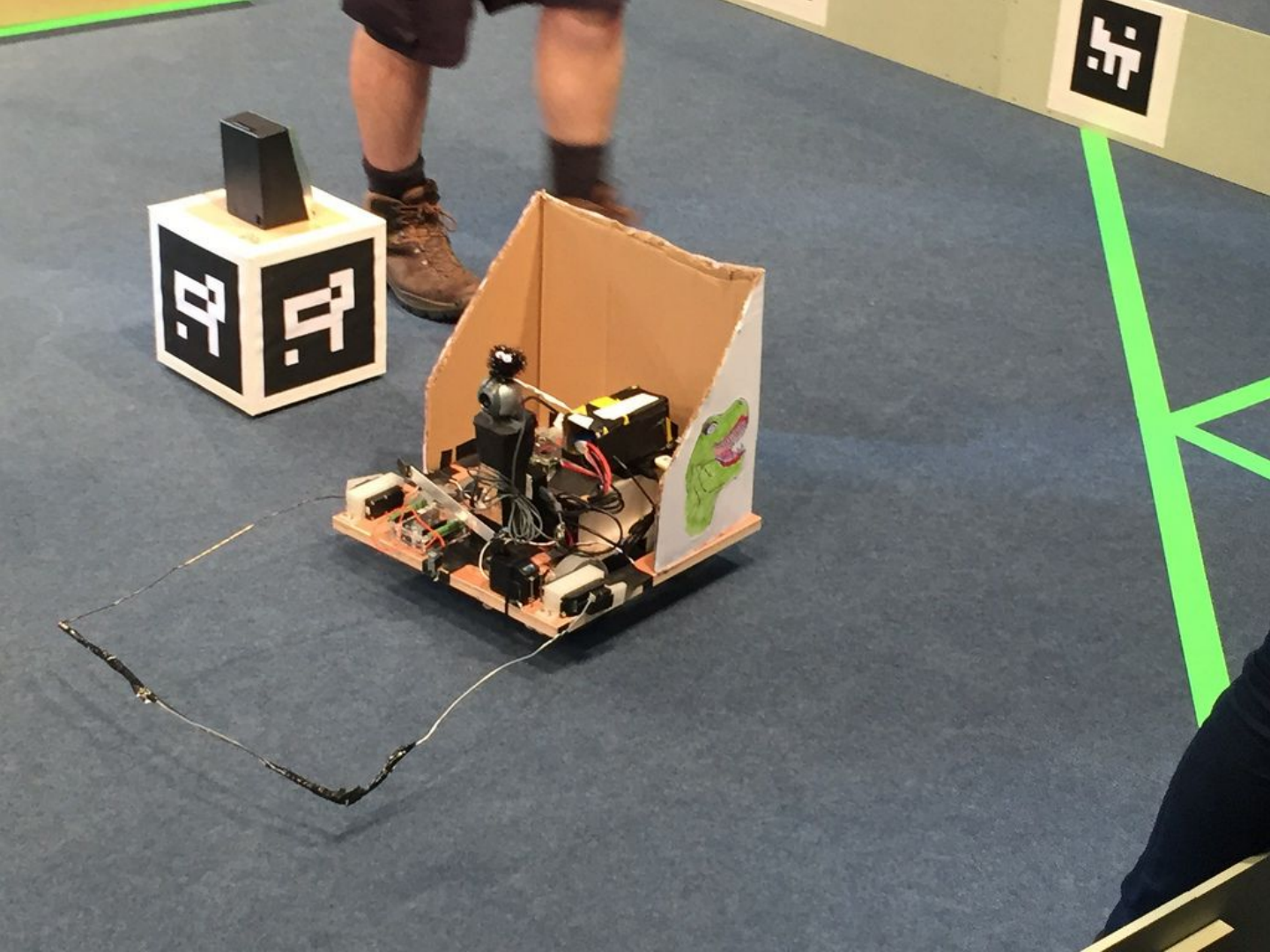


Schedule for the year

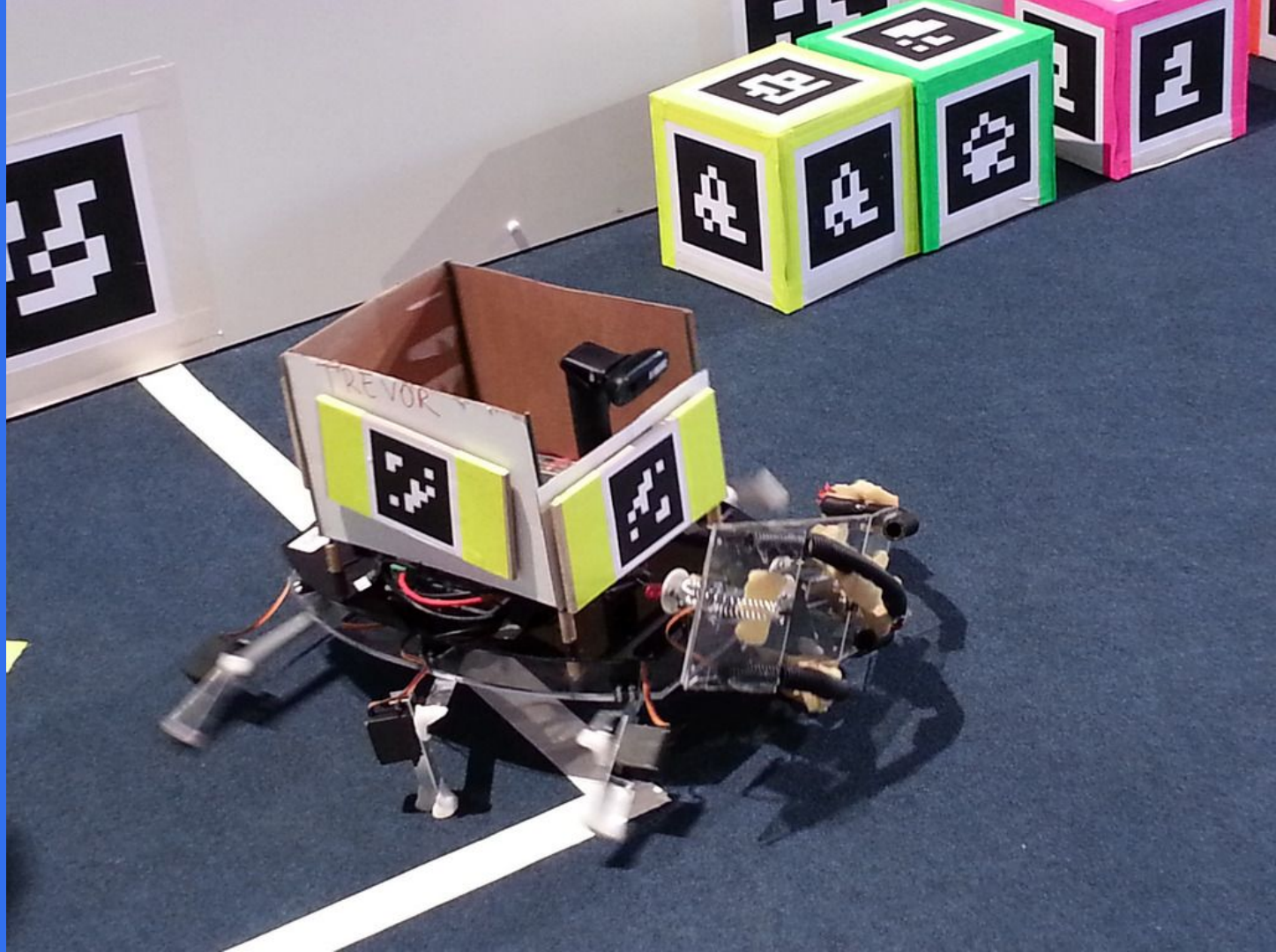


ROBOT TIPS









Design Tips

Read the rules first!

- Movement
- Exposed Mechanisms
- Servos
- Couplings
- Sensors
- Size
- Tooling

Recommended Procedure

- Start simple
- Get movement ASAP
- Think about
 - Game strategy
 - Sensors
 - Mechanics
- Small improvements
 - All the time
 - Keep it working
- Testing, lots and lots of testing



Boston Dynamics



General Tips

Need some help?

- Blue Shirts
- Tech Days
- Bus factor
- Keep it simple
- Prototype early, and often

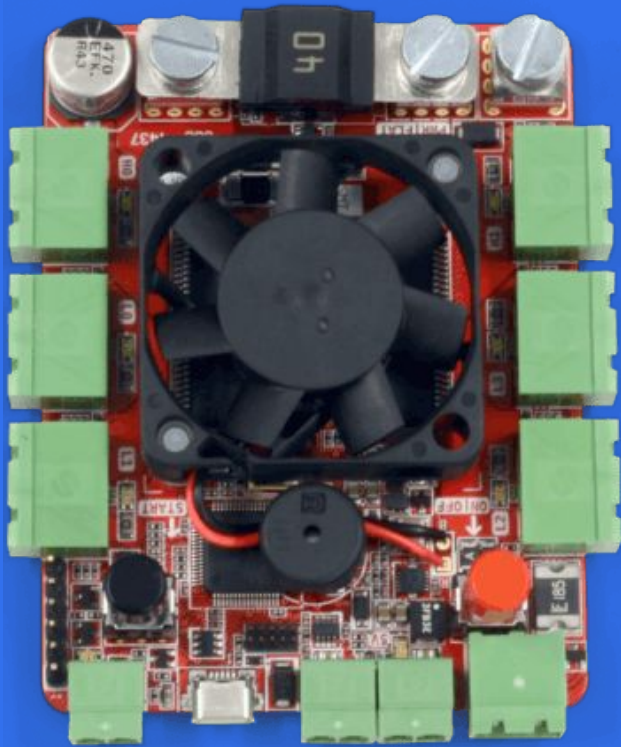
THE KIT

Brain Board



- *The brains of the operation*
- Controls boards
- Code runs here

Power Board



- Power distribution
- On | Off button
- Start button
- Colour code your wiring!

Batteries



= =

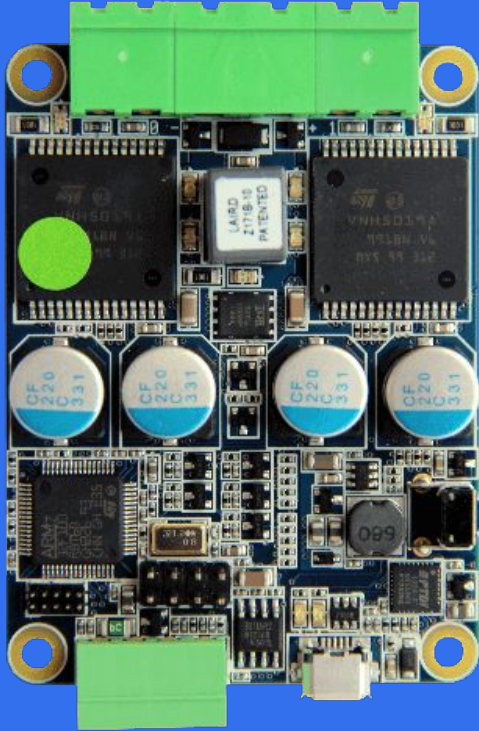


Batteries



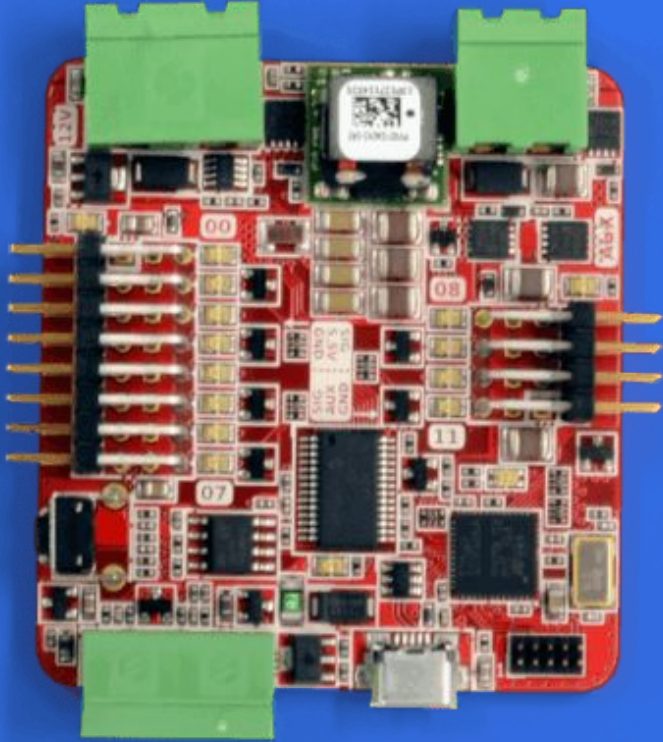
- Should be respected
- Follow battery charging procedure to the letter, every time (one of the microgames)
- Only ever connect to:
 - power board
 - Supplied battery charger
- Protect it from mechanical damage
- Do not over-discharge
- If you're unsure, **read the docs!**

Motor Board



- **12V DC** motors, up to **10A**
- ⚡ motors not included

Servo Board



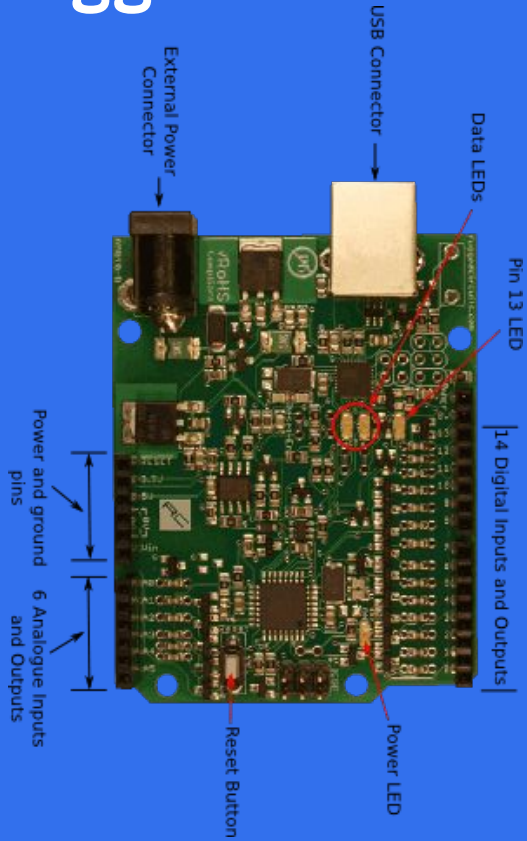
- Up to 12 RC servo motors
- Careful how you load them, though!
- ⚠ servos not included

Vision



- Arena walls, tokens, other robots
- Properties:
 - Type
 - Number
 - Distance from webcam
 - Position relative to webcam
 - Rotation

Ruggeduino



- Bump switches (Have I hit something?)
- Pressure sensors (How hard have I hit it?)
- Light gates (Have I captured something?)
- Ultrasound (How far away is something?)
- \pm sensors not included

YOUR CODE

Your Code

- Python
 - Python 2 🐍
- The IDE
 - Collaborative development
 - History of changes
- `robot.zip`

DOCUMENTATION

Read The Docs!

They're really useful!

[Introduction](#)[IDE](#)

- [Code Checking](#)
- [Code a Project](#)
- [Finding Things](#)
- [Getting Code on the Robot](#)
- [Good Commit Messages](#)
- [Shortcuts Menu](#)
- [Version Control](#)

[Kits](#)

- [Assembly](#)
- [Batteries](#)
 - [HKE4 Charger](#)
 - [IMAX B6 Charger](#)
- [Brain Board](#)
- [Motor Board](#)
- [Power Board](#)
- [Ruggeduino](#)
- [Servo Board](#)
- [WiFi](#)

[Programming](#)

- [Python](#)
 - [Functions](#)
 - [Libraries](#)
- [sr](#)
- [Motors](#)
- [Power](#)
- [Ruggeduinos](#)
 - [Custom Firmware](#)
- [Servos](#)
- [Vision](#)
 - [Markers](#)
- [Git Repositories](#)
- [Simulator](#)

[Rules](#)[Troubleshooting](#)

- [Python](#)
- [Interactive Troubleshooter](#)

[Tutorials](#)

- [Basic Motor Control](#)
- [Python](#)

[Team Admin](#)

- [User Accounts](#)
- [Kit Shipping](#)

INTRODUCTION

There are a number of sections in the documentation, offering help for the [IDE](#), the [kit](#) and [programming](#). Under the [tutorials](#) section, a number of these things are combined to help you understand what you can, or need, to do. Navigation of the documentation can be done using the column to the left, where everything is arranged alphabetically in the aforementioned sub-sections.

Within this documentation, you will come across a number of boxes like this:

```
# code example
```

These are code examples provided to help you.

From time to time, you may come across some warnings such as the following:

Charge Your Batteries!

It would be advisable to take note of these, especially that one! You will also come across some blue boxes providing information, similar to the following:

Some useful information... like the information given in the information box above.

srobo.org/docs

Our documentation

The Forum

- Communicate with us and your fellow teams
- Get support
- Share tricks
- Brag about how good your team is!

HEALTH AND SAFETY



Health and Safety

- How easy is it to turn off
- If we pick it up, can it hurt us?
- Is the wiring messy or loose?
- Is the kit loose?
- Is the battery protected?



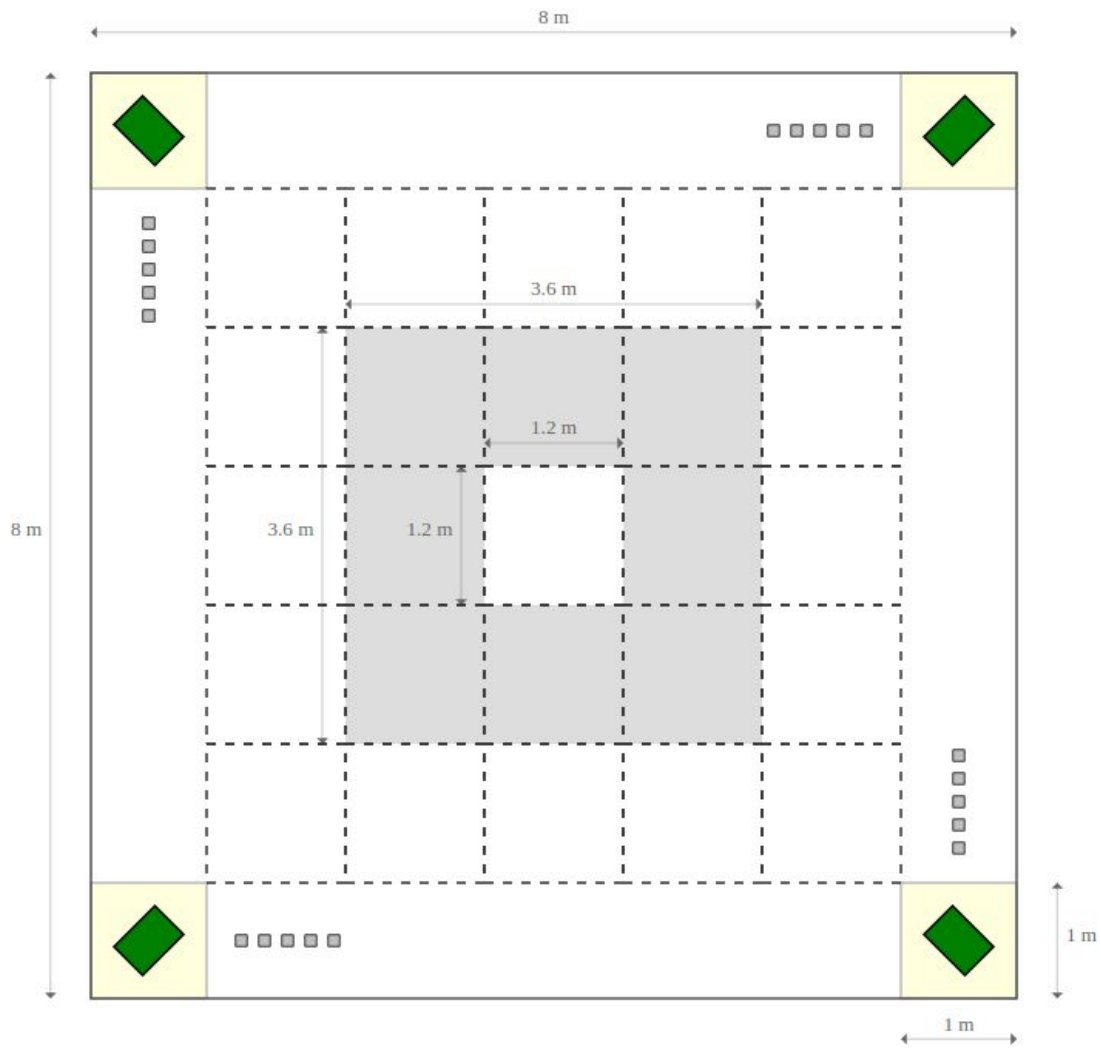
Any questions so far?

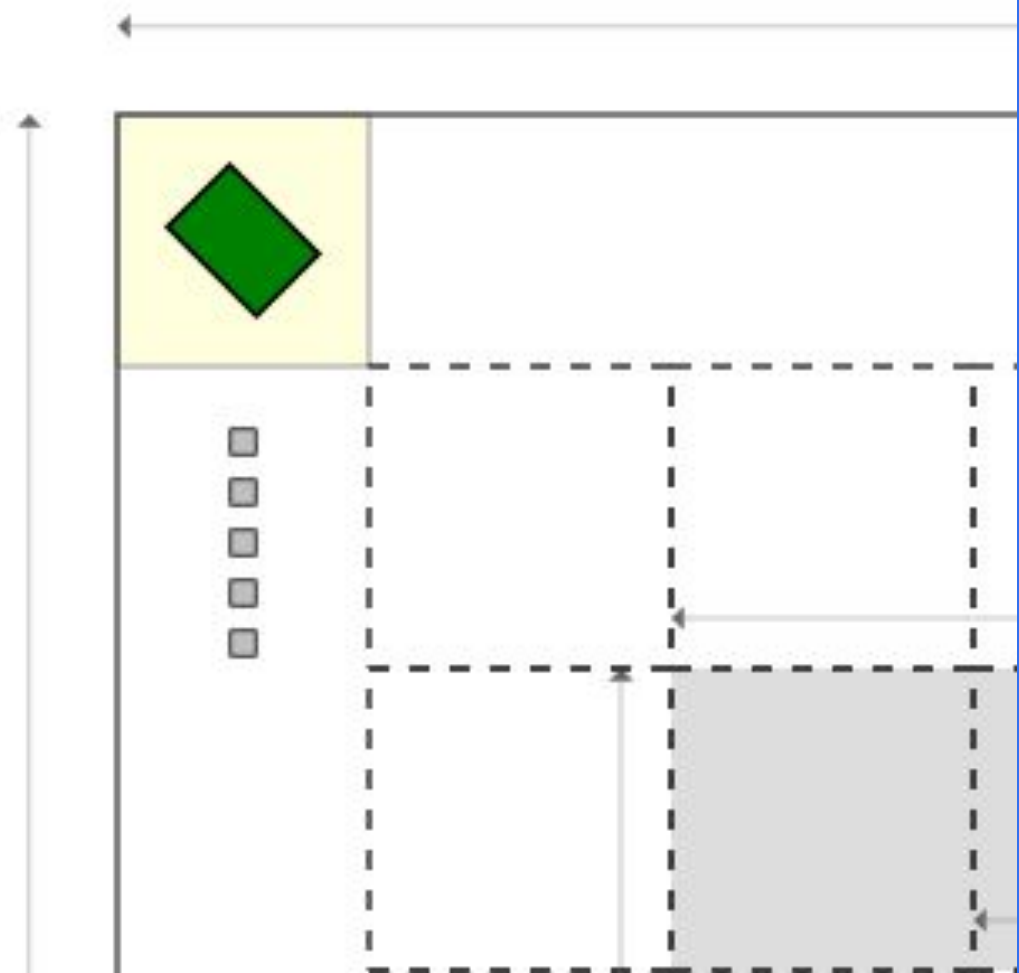
Before we get onto the main event...

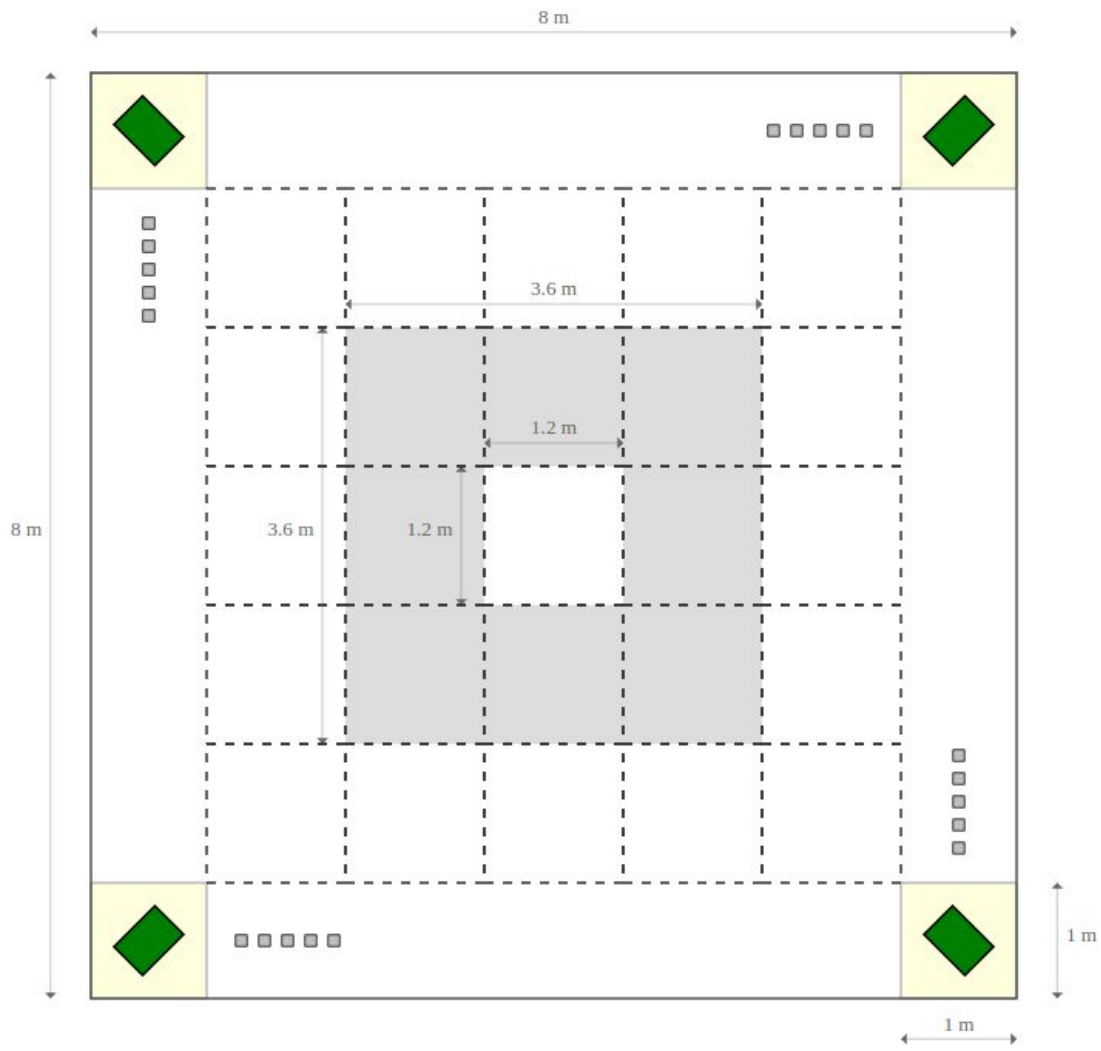
THE GAME

The moment you've all been waiting for!

CALDERA







“Where are the rules?”

PRIZES

You're here to win something!



First Place
Second Place
Third Place

Obviously!

Rookie Award

For those who haven't competed before

Robot and Team Image

For those robots who are looking *sharp*!

Online Presence

For those teams who are active online

Committee Award

For ingenuity & elegance in robot design

THE REST OF TODAY

NOW	Kit handout
NEXT	Introduction to Micro Games
THEN	Micro Games
12:30 - 13:00	Lunch + Robot Brainstorming
13:00 - 17:00	Micro Games (Continued)



GOOD LUCK!