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?

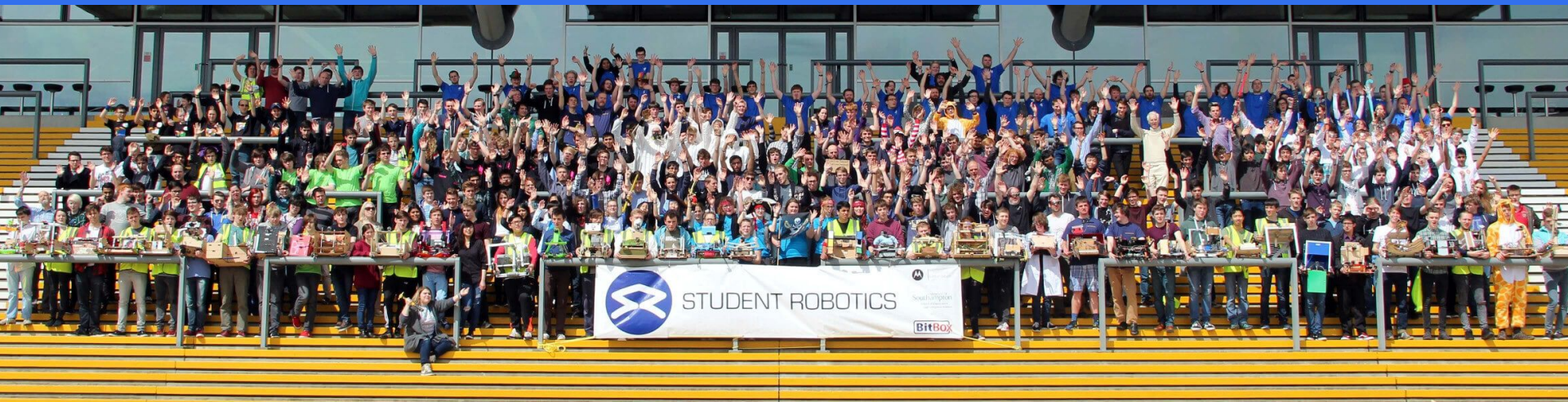
The Volunteers

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)

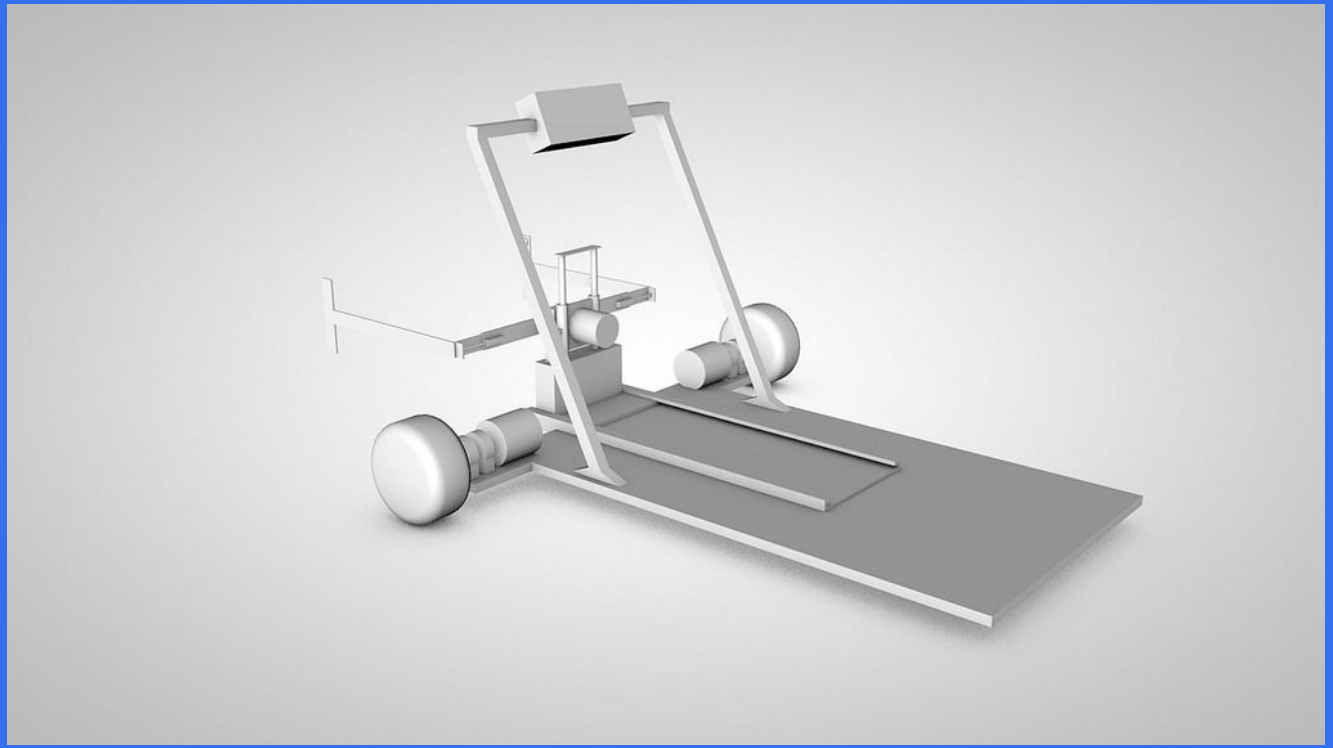


Blackpool
York
Great Britain
Hull
Liverpool
Manchester
Chester
Peak District National Park
Nottingham
Leicester
Peterborough
Norwich
Ipswich
Colchester
Cardiff
Bath
Southend-on-Sea
Canterbury
Brighton
Bournemouth
Exeter
Torquay
English Channel
Guernsey
Jersey
Le Havre
Caen
Rouen
Amiens
Dunkirk
Calais
Bruges
Ghent
Antwerp
Brussels
Lille
Arras
Charleroi
Liège
Belgium
Netherlands
Amsterdam
Alkmaar
The Hague
Rotterdam
Arnhem
Eindhoven
Luxembourg City
Trier
Reims
Metz
Nancy
Paris
Versailles
Wildlife Park
Parc naturel régional de Lorraine
Strasbourg
Cuxhaven
Bremerhaven
Wilhelmshaven
Leeuwarden
Groningen
Oldenburg
Bremen
Hamburg
Lübeck
Schwerin
Lüneburg
Celle
Hanover
Wolfsburg
Brunswick
Magdeburg
Osnabrück
Münster
Bielefeld
Paderborn
Dortmund
Essen
Düsseldorf
Cologne
Bonn
Aachen
Göttingen
Kassel
Fulda
Koblenz
Frankfurt
Mainz
Würzburg
Bamberg
Nuremberg
Bayreuth
Mannheim
Heidelberg
Saarbrücken
Karlsruhe
Stuttgart
Ingolstadt
Augsburg
Ulm
Germany

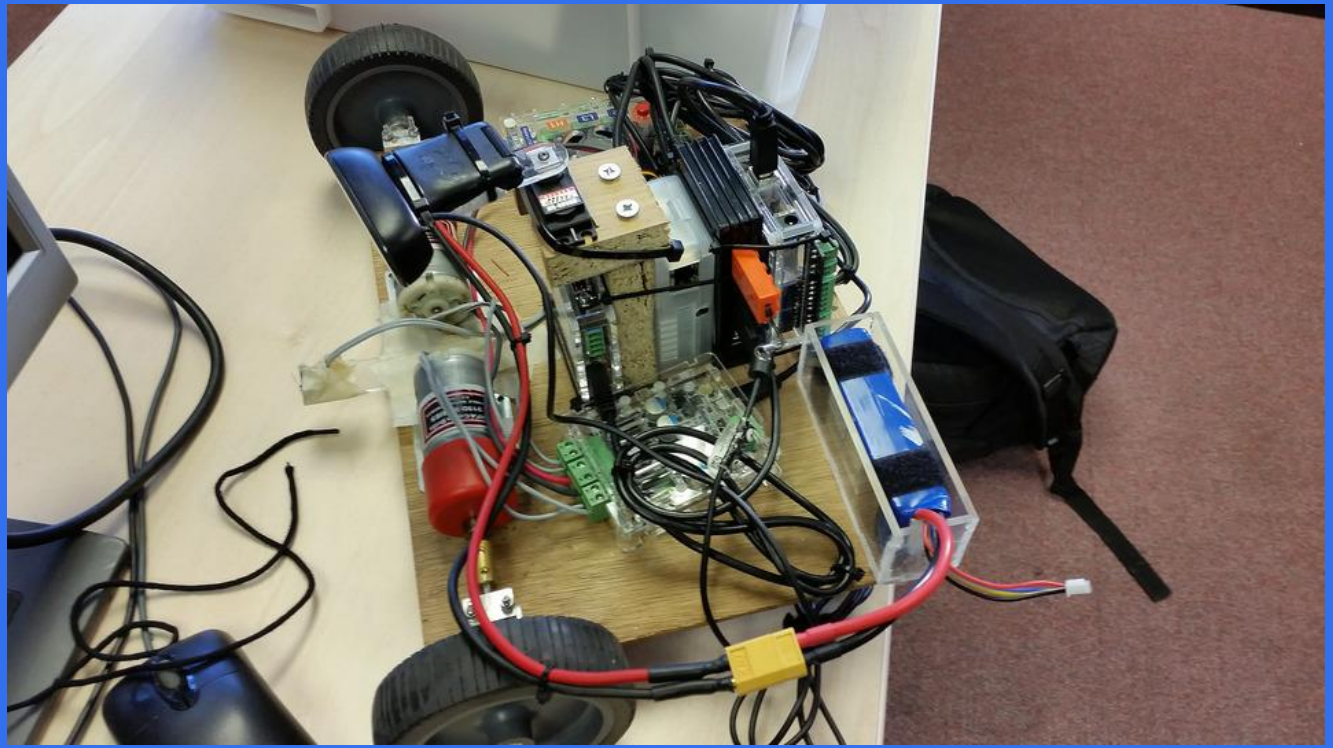
6 MONTHS

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

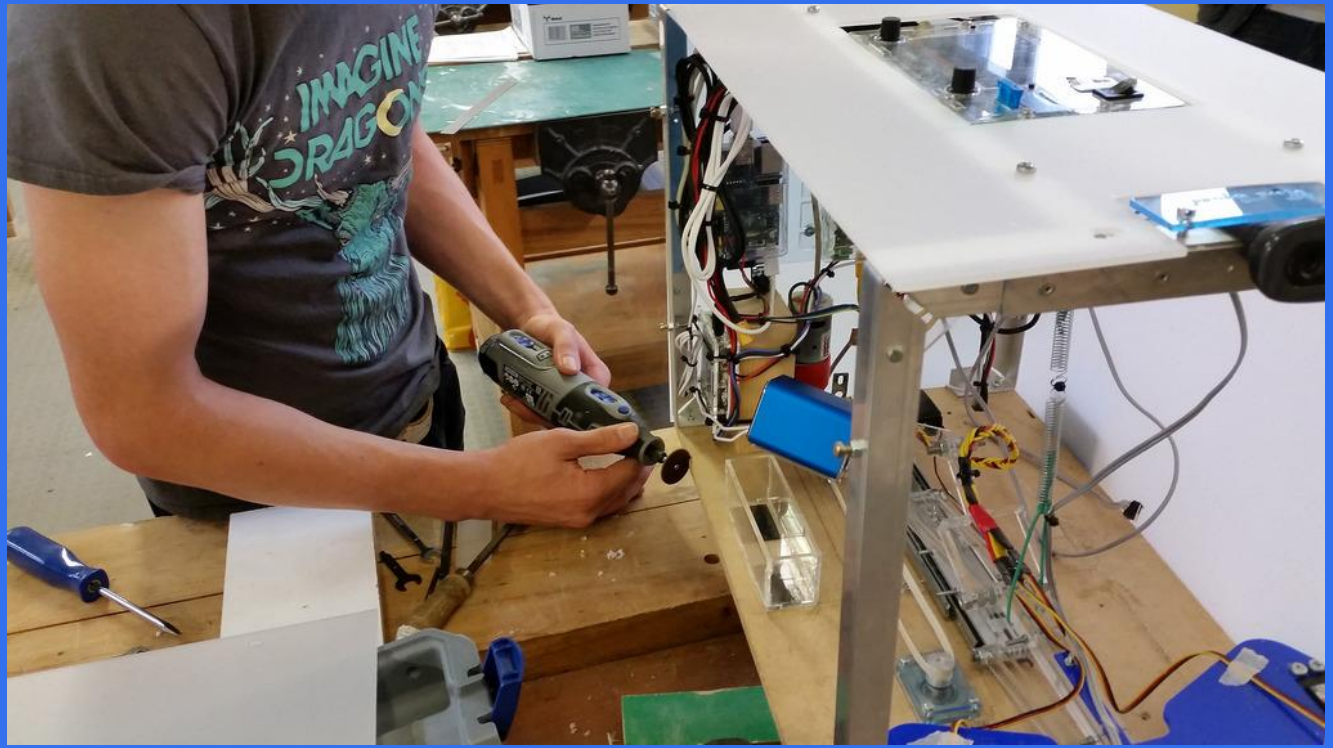
Design



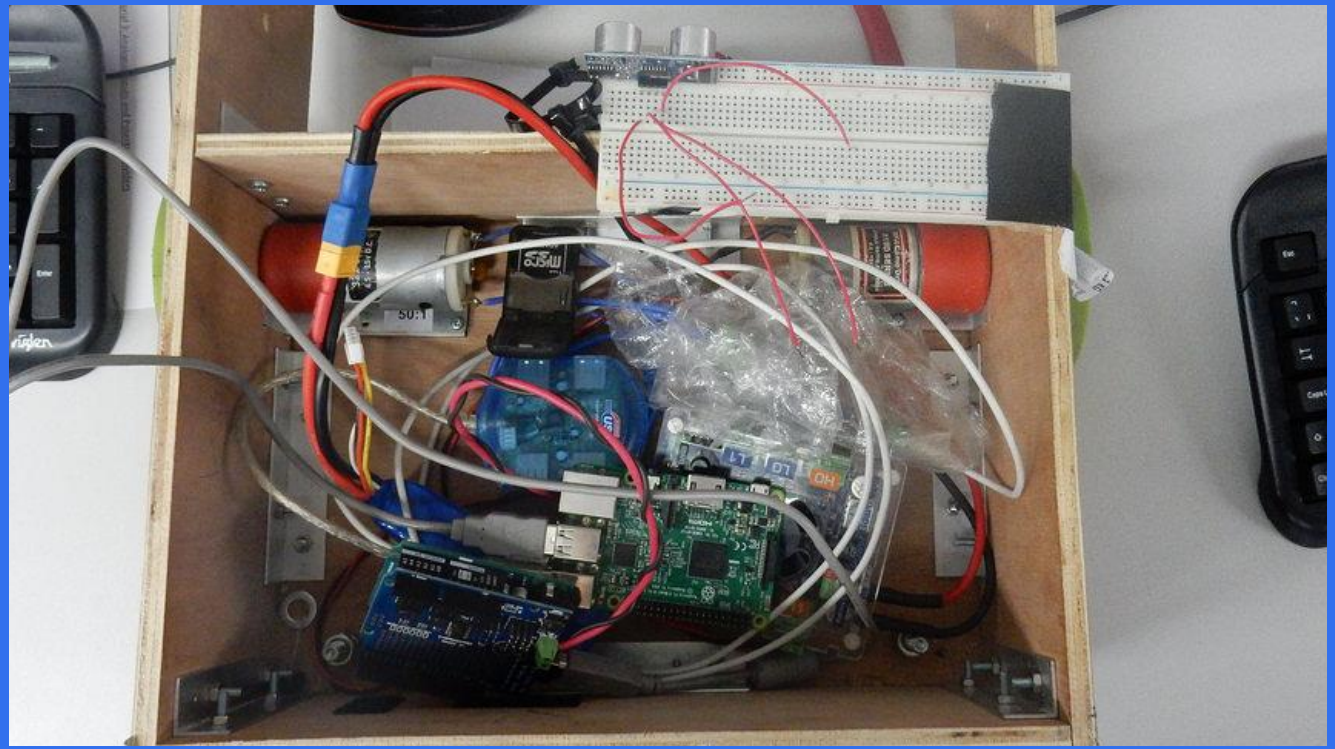
Prototype



Build

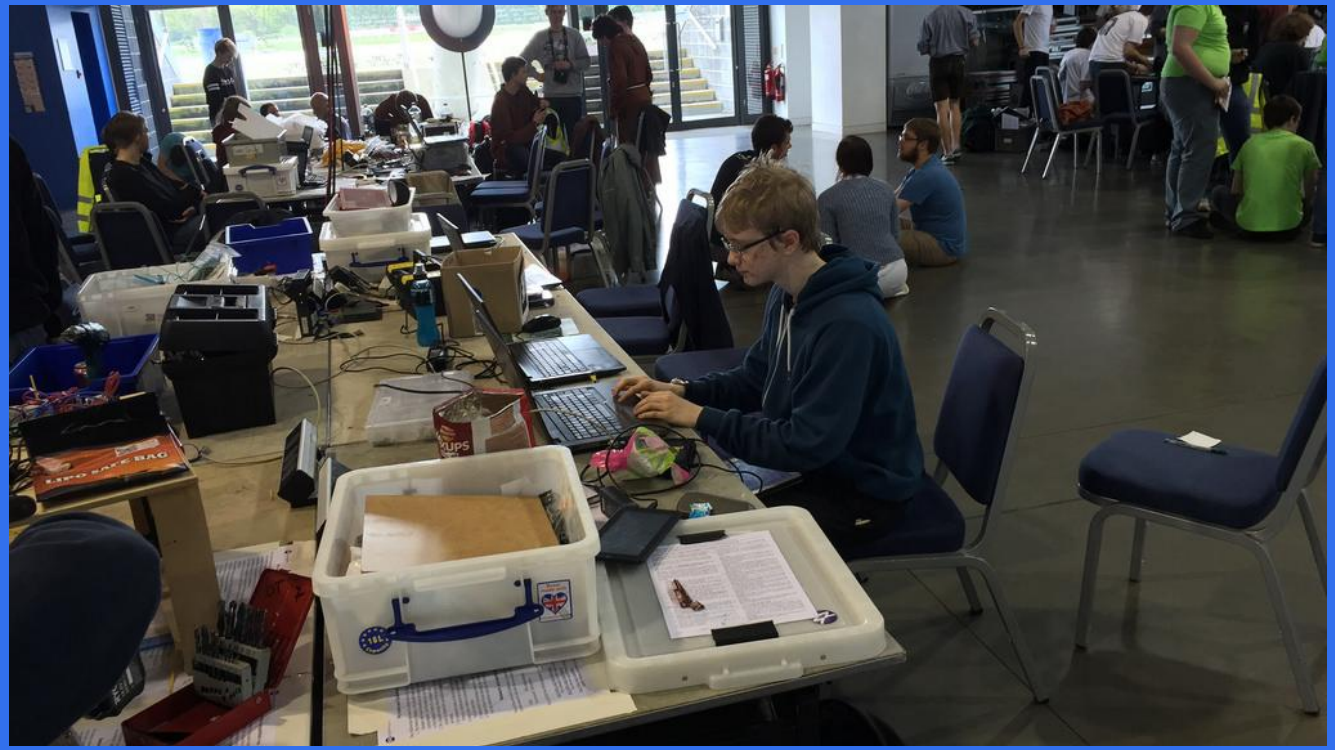


Do all the electronics (Hopefully better than this)



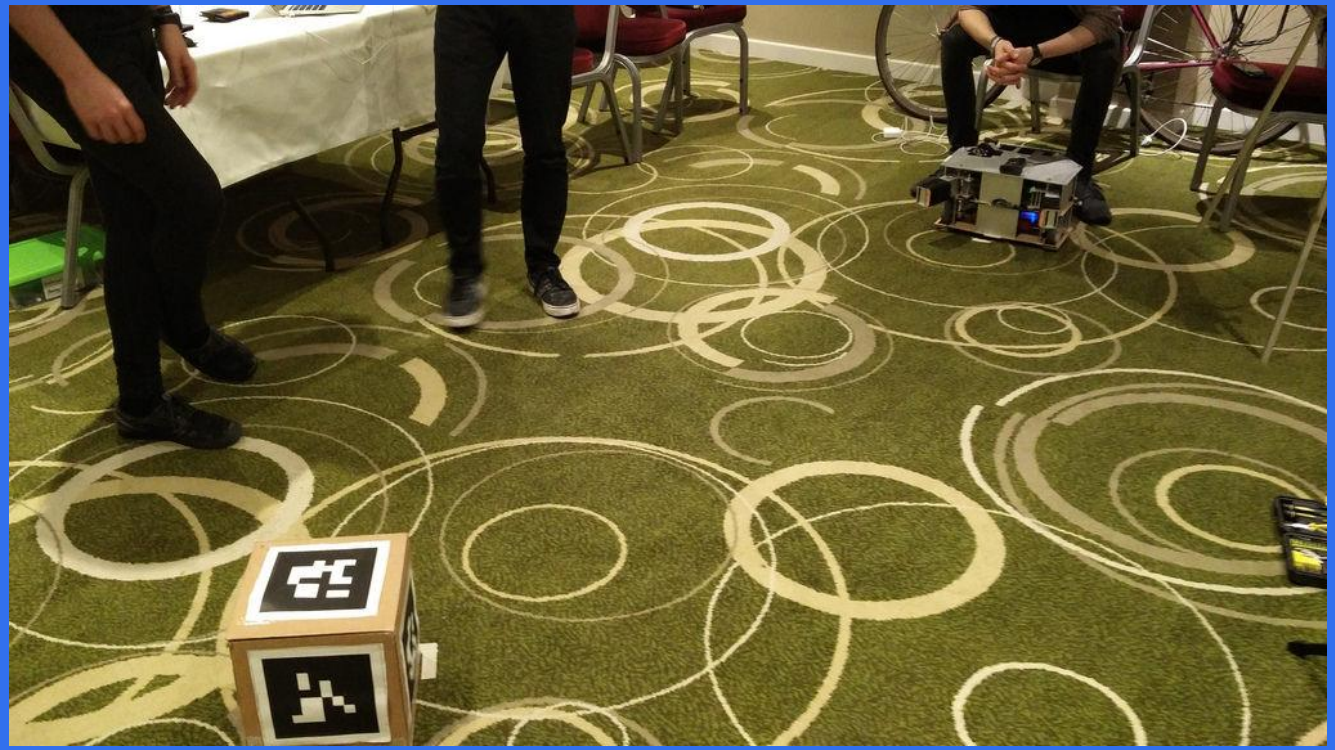
Write lots of code

Work as a team



* Work as a team

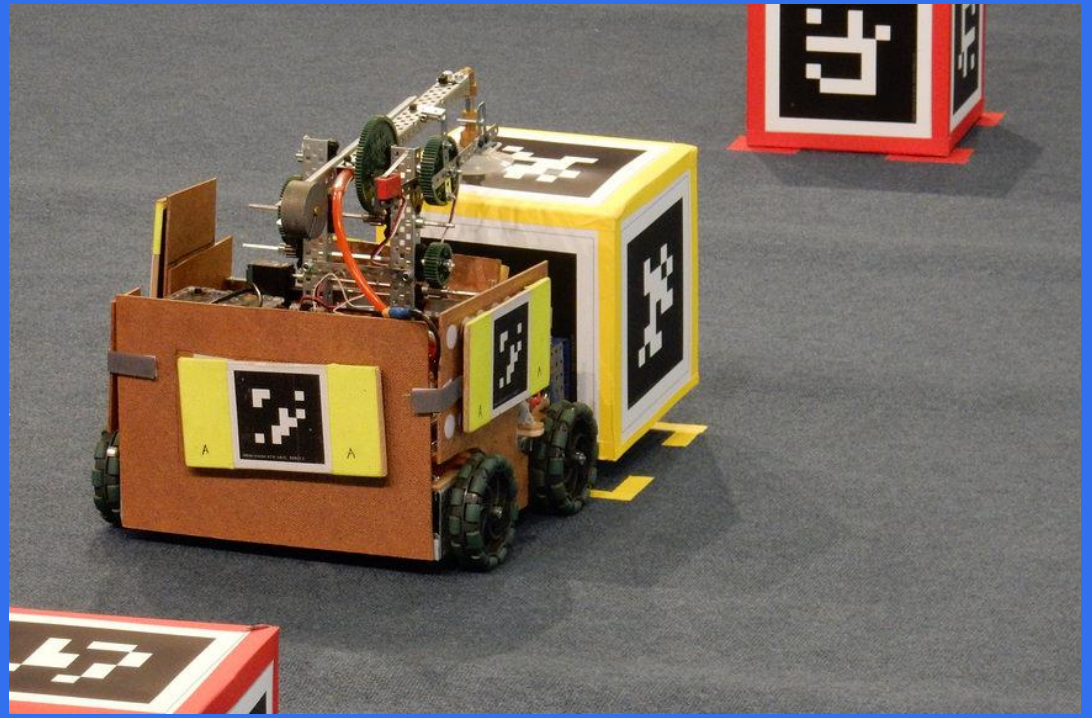
Test it a Bajillion times



Get your robot inspected

Compete

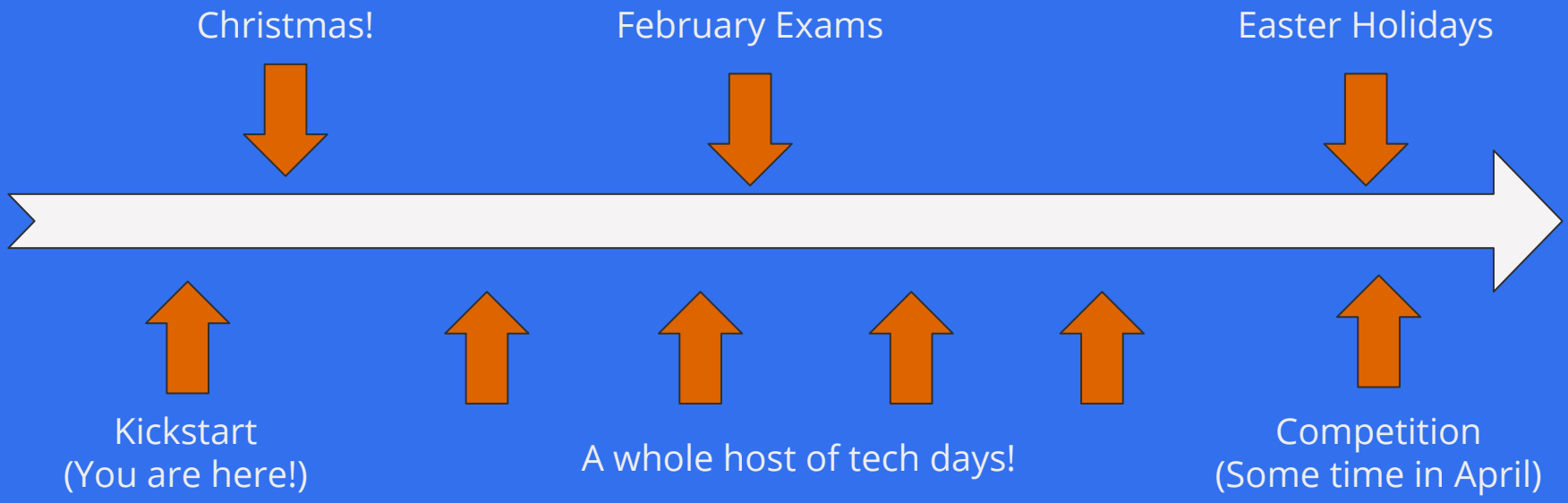
Score some points



Win some prizes

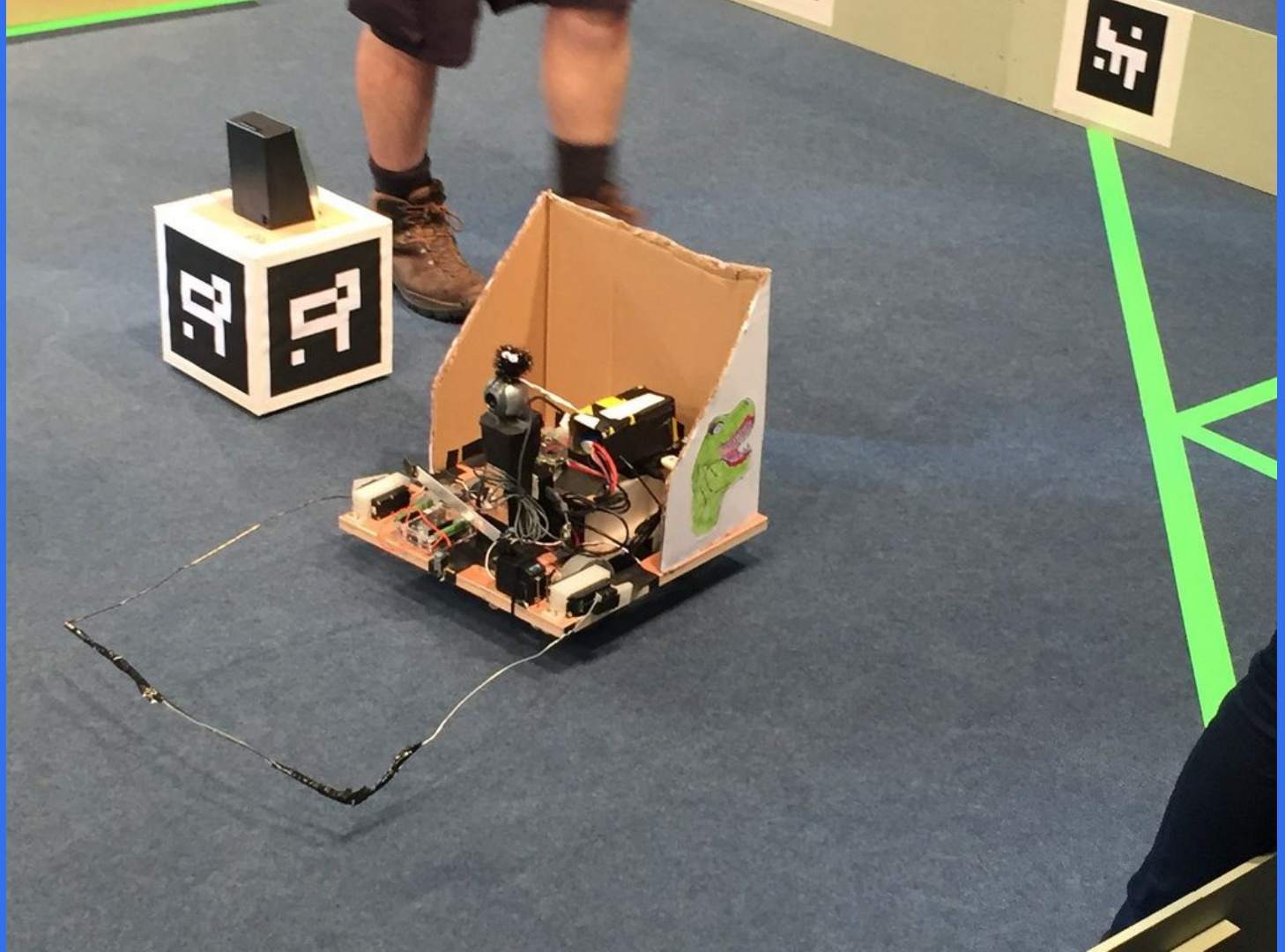
Go home so we can rest!

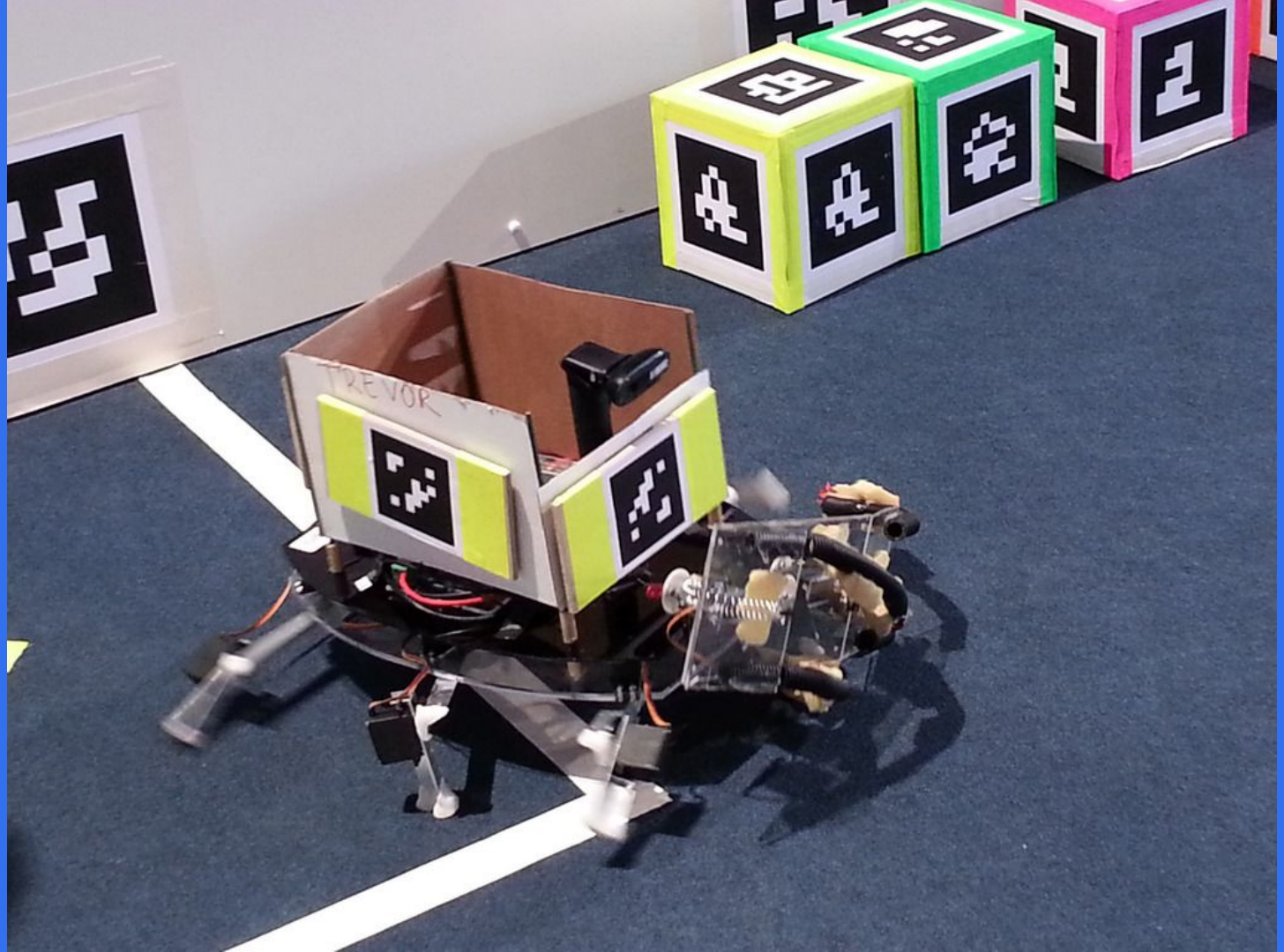
Schedule for the year



ROBOT TIPS

PELCO




TREVOR

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

Dynamics

General Tips

Need some help?

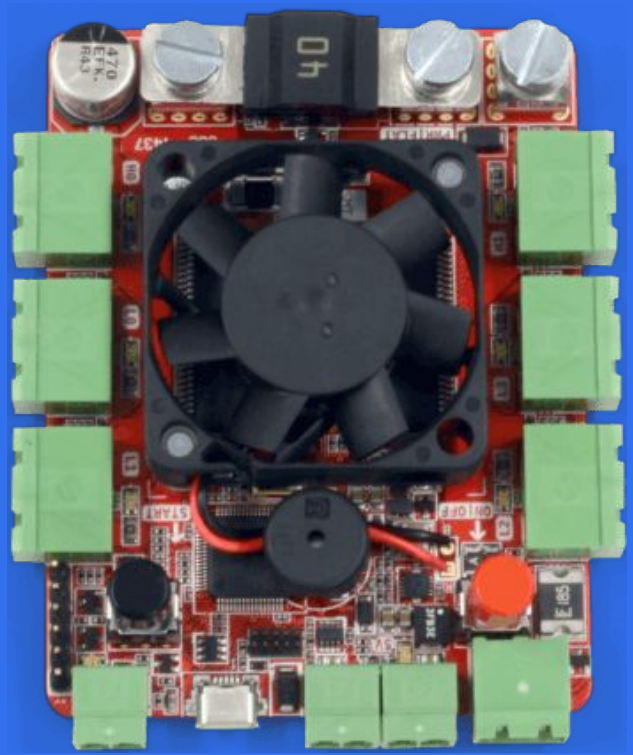
- Blue Shirts
- Tech Days
- Bus factor
- Keep it simple
- Prototype early, and often

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

TURNIGY
2200 mAh
HIGH DISCHARGE LI-PO BATTERY
2.2

==

SAMSUNG
SAMSUNG
SAMSUNG

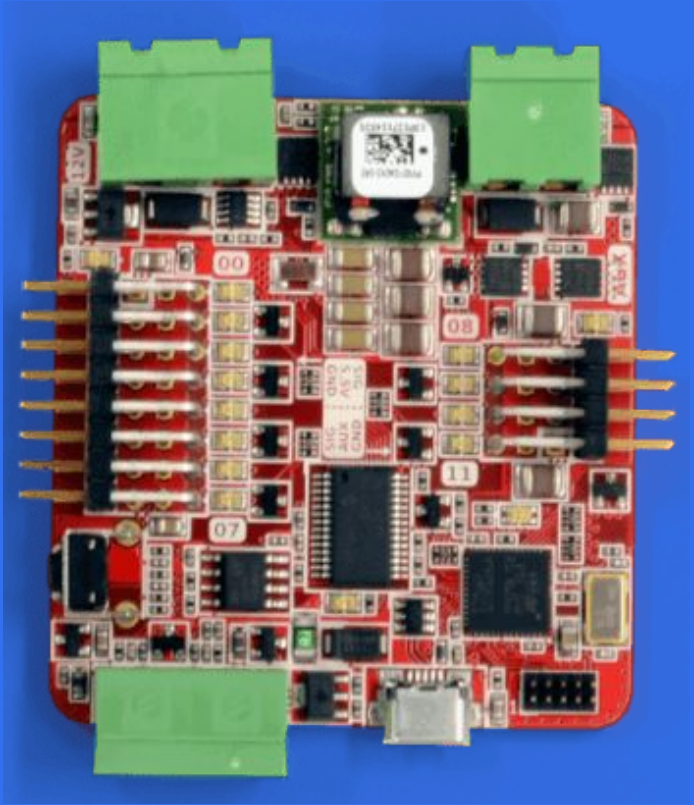
Batteries

- 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

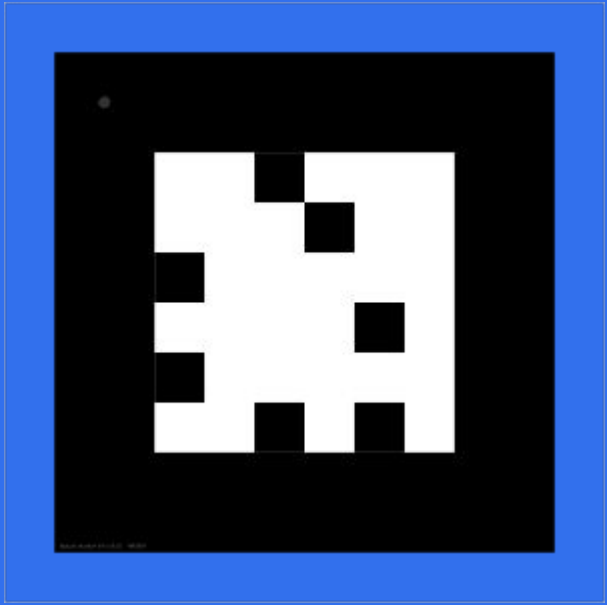
- **12V DC** motors, up to **10A**
- ⌶ motors not included

Servo Board



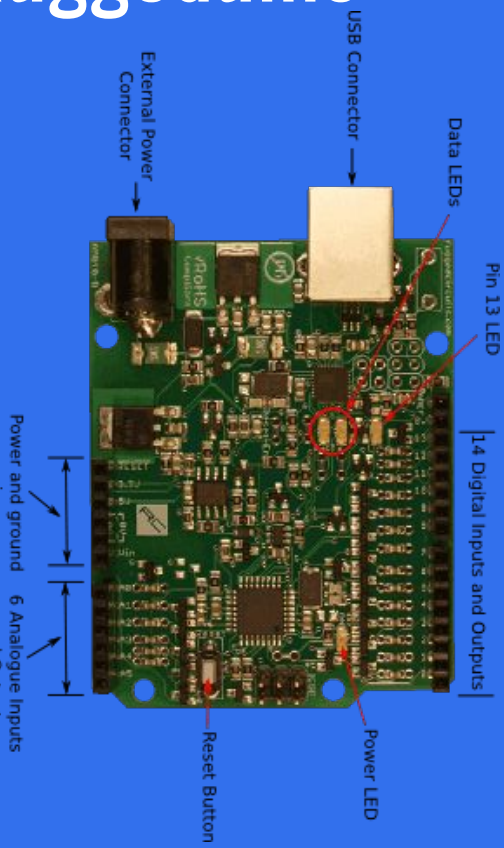
- Up to 12 RC servo motors
- Careful how you load them, though!
- ☩ servos not included

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?)
- ⌖ sensors not included

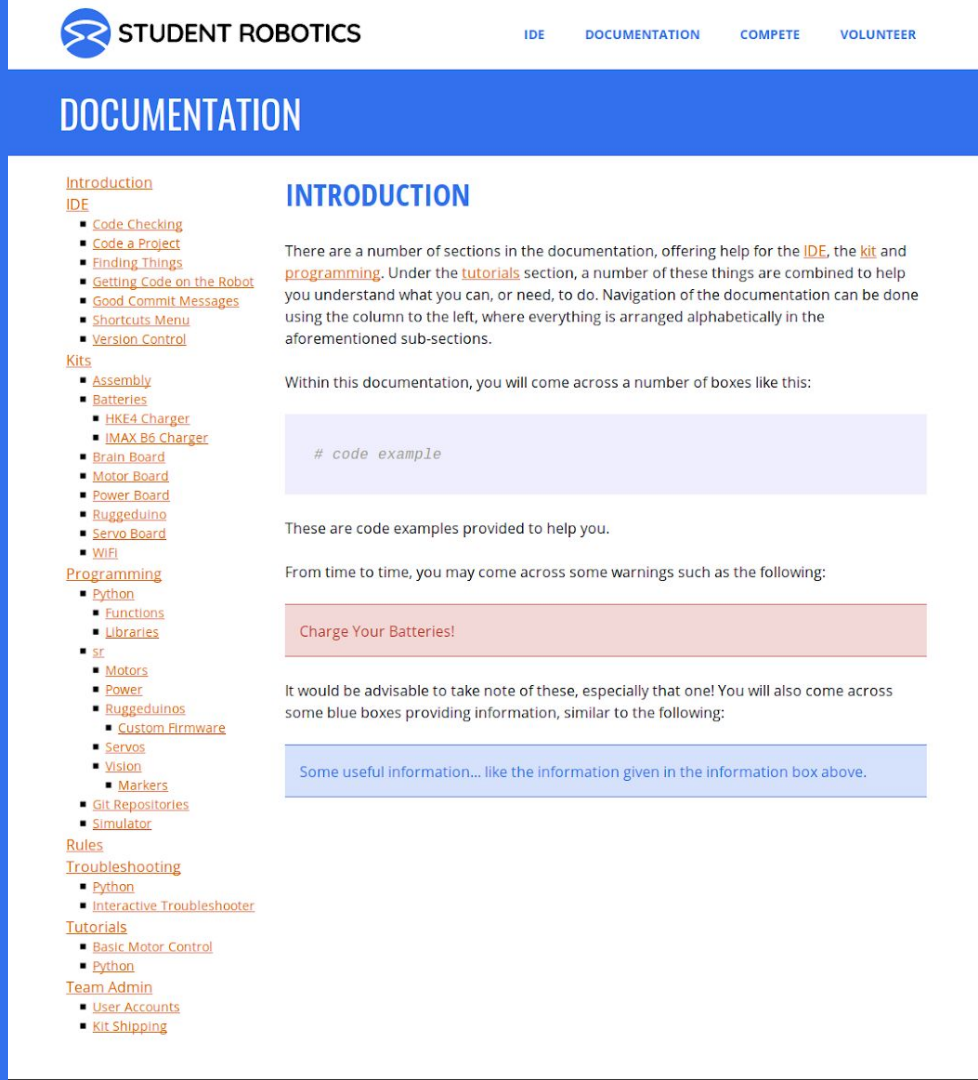
YOUR CODE

Your Code

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

Read The Docs!

They're really useful!



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?

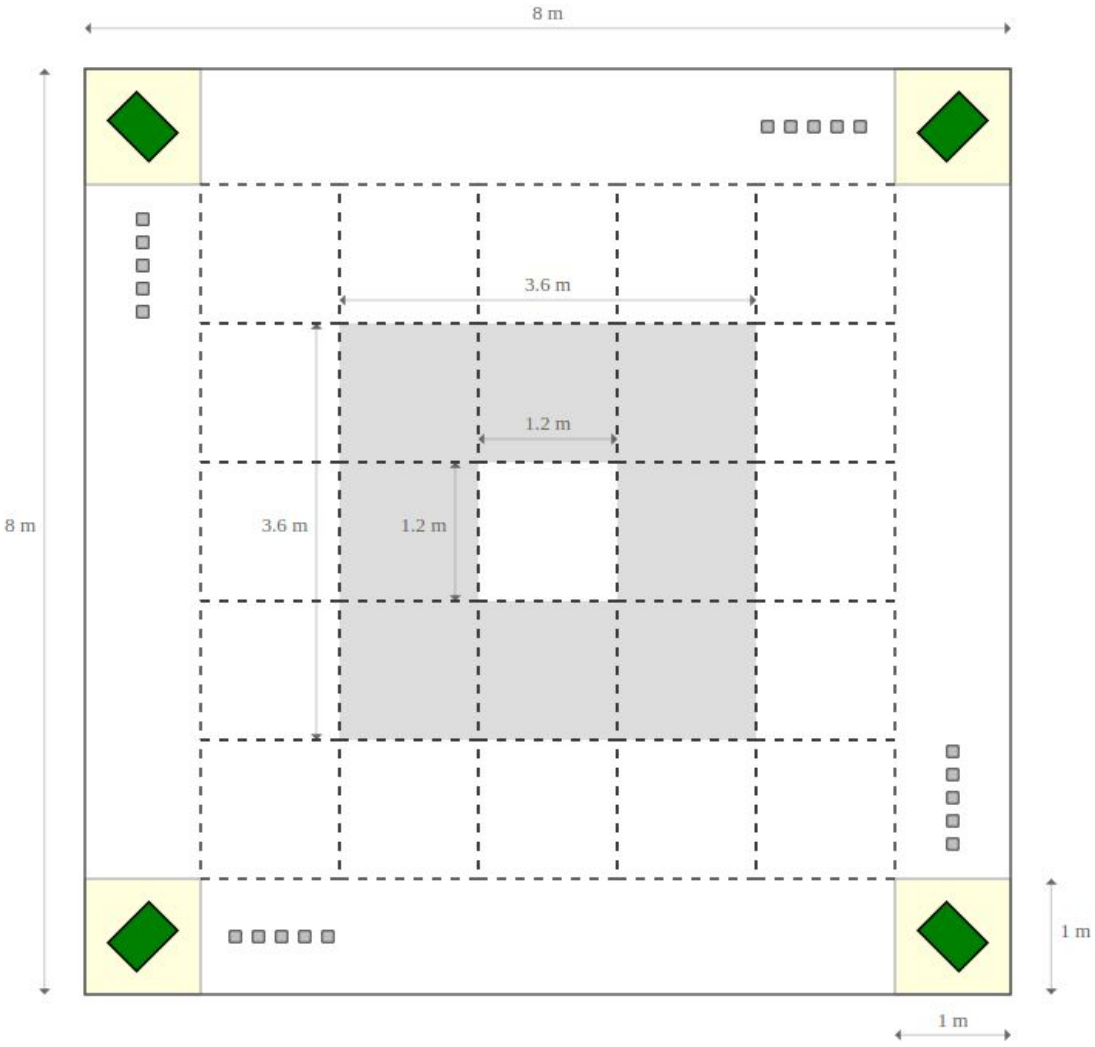
Any questions so far?

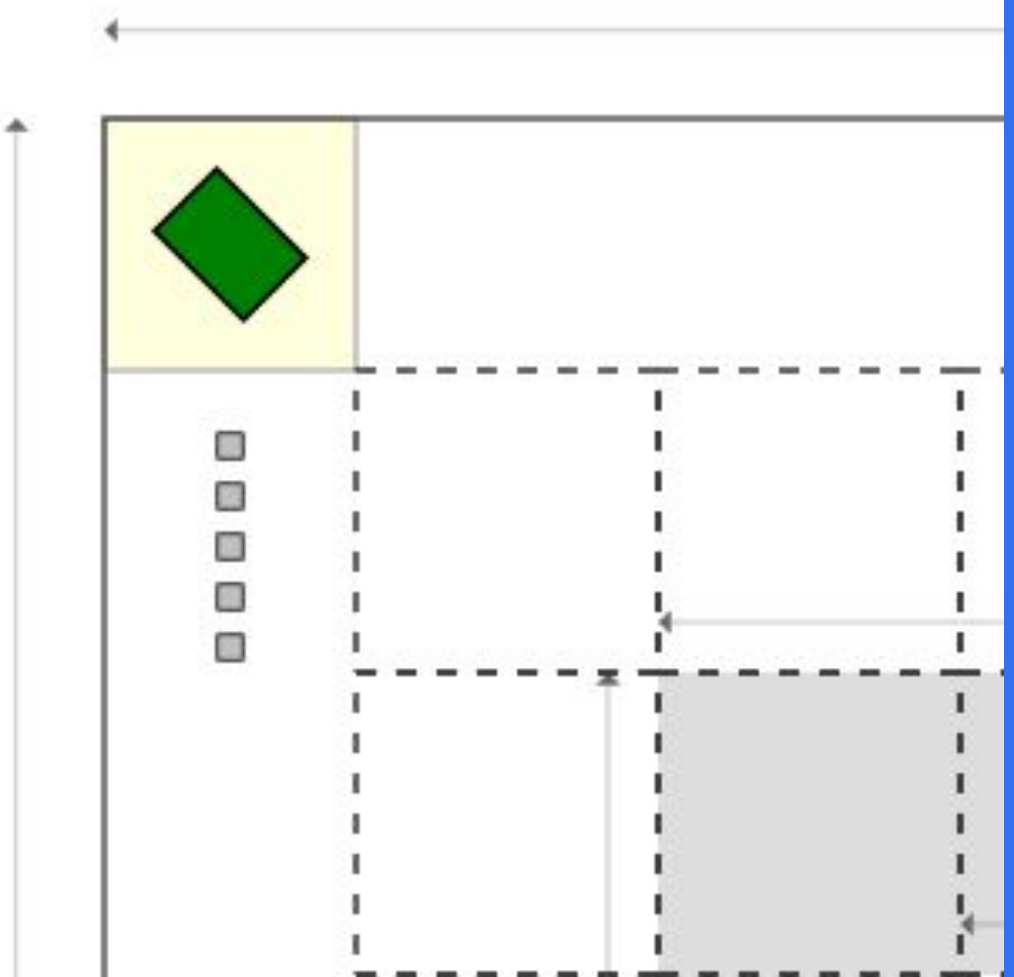
Before we get onto the main event...

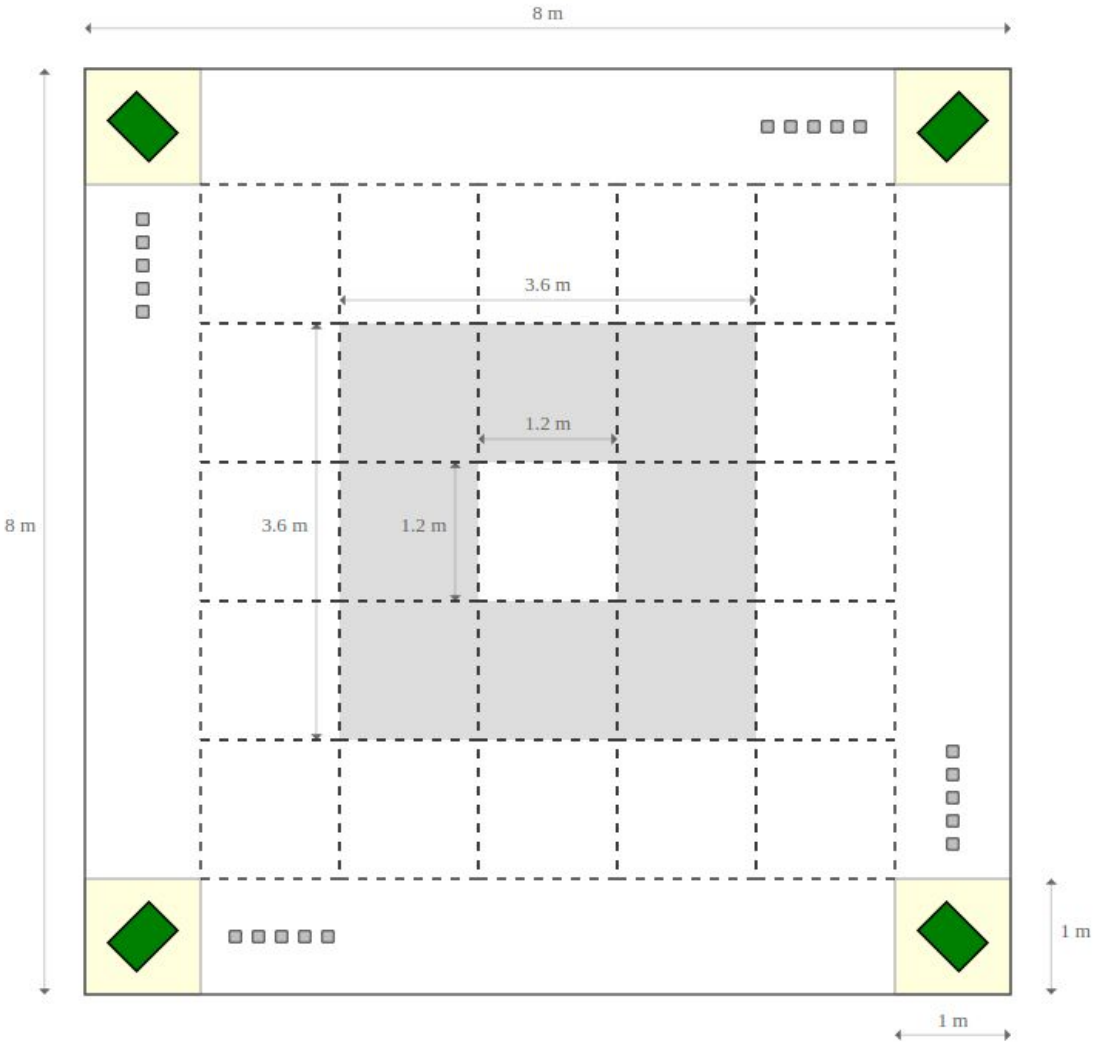
THE GAME

The moment you've all been waiting for!

CALDERA


8 m
8 m
3.6 m
1.2 m
3.6 m
1.2 m
1 m
1 m




8 m
8 m
3.6 m
1.2 m
3.6 m
1.2 m
1 m
1 m

“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!