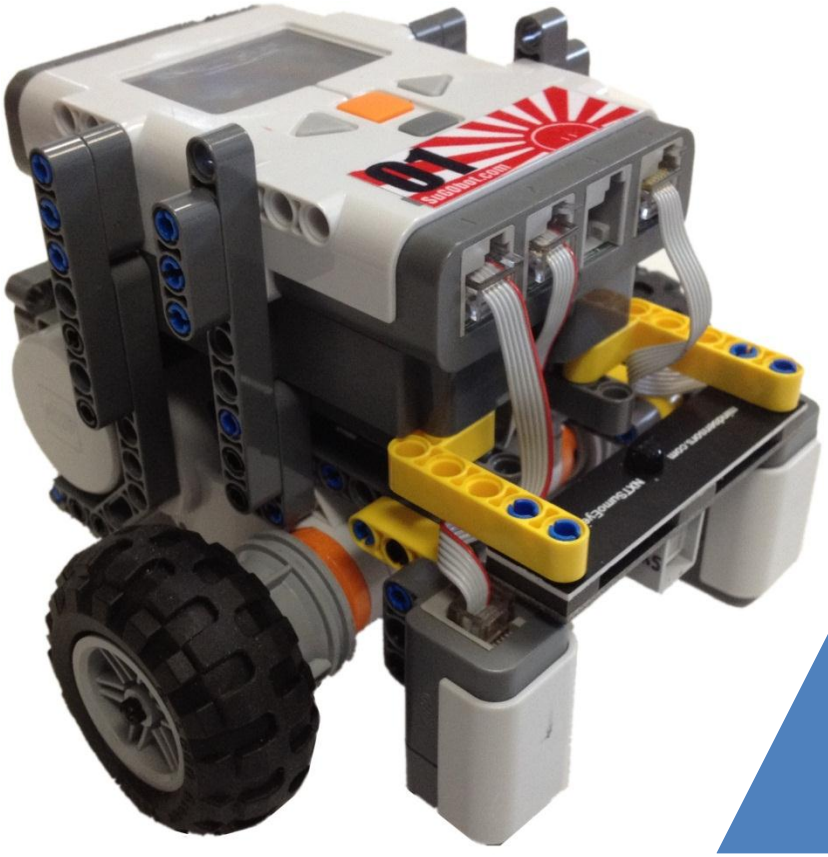
Robust Design

Make your SuGObot strong and resilient. It needs to "Keep it Together" to win a tough pushing match, or survive a fall.



- All parts should have at least two attachment points.
- Keep beams square to each other and keep everything compact.
- Use bushings to set the correct spacing on axles.
- Use Triple pegs wherever possible on multiple beams.
- Use L-Beams to brace square corners and prevent twisting.

Balance

Staying upright is important.
Get knocked over and you're a sitting duck.

- **Keep most of the weight near the ground for a LOW Center of Gravity**
- **Keep the Center of Gravity inside the wheel base.**
- **A wide Wheel Base stops the robot from tipping over sideways**
- **Large wheels at the rear can make the robot tip up when pushing.**

Torque

Torque is the turning force the motors apply to the wheels. The trick is putting it to the best use

Torque = Force X Radius
Force = Torque / Radius

The wheels convert Torque into pushing power. Size is everything! Small wheels provide more push.

You can change Torque using gears.

Gear down for more Torque.

Fully charged batteries help the motors generate more Torque.

Pushing Power

It's what SuGO is all about!
When the rubber meets the ring, you need to maximize the force you generate.

Force = Torque / Radius

Small wheels generate more Force.

Traction helps the wheels grip the ring. Soft rubber tires have more traction than plastic wheels.

Increase traction by having more weight centered over the wheels

4WD means all contact points provide traction.

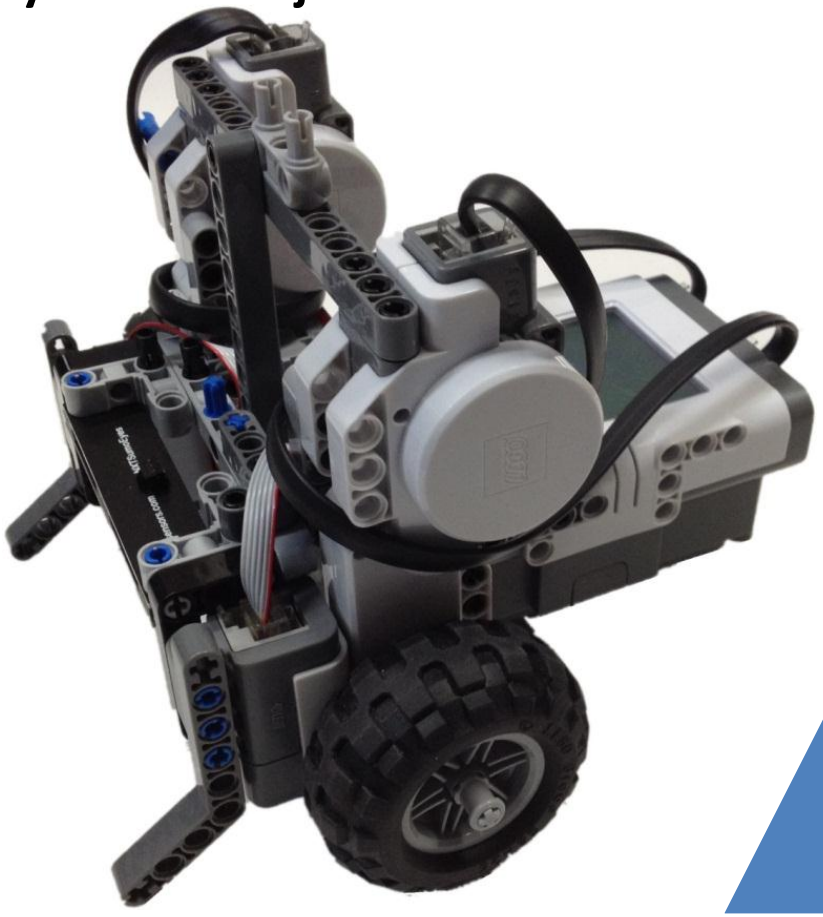
Agility

Quick turns let you find your opponent, or avoid disaster. If you can't turn, you're an easy target.

- **Wide Wheelbase makes turns slower, but stronger.**
- **Narrow Wheelbase makes turns fast if there is no other side drag.**
- **Double tires (on each motor) fight against each other on turns and reduce mobility.**
- **More than 2 wheels with tires make skid-steering difficult.**

Sensors

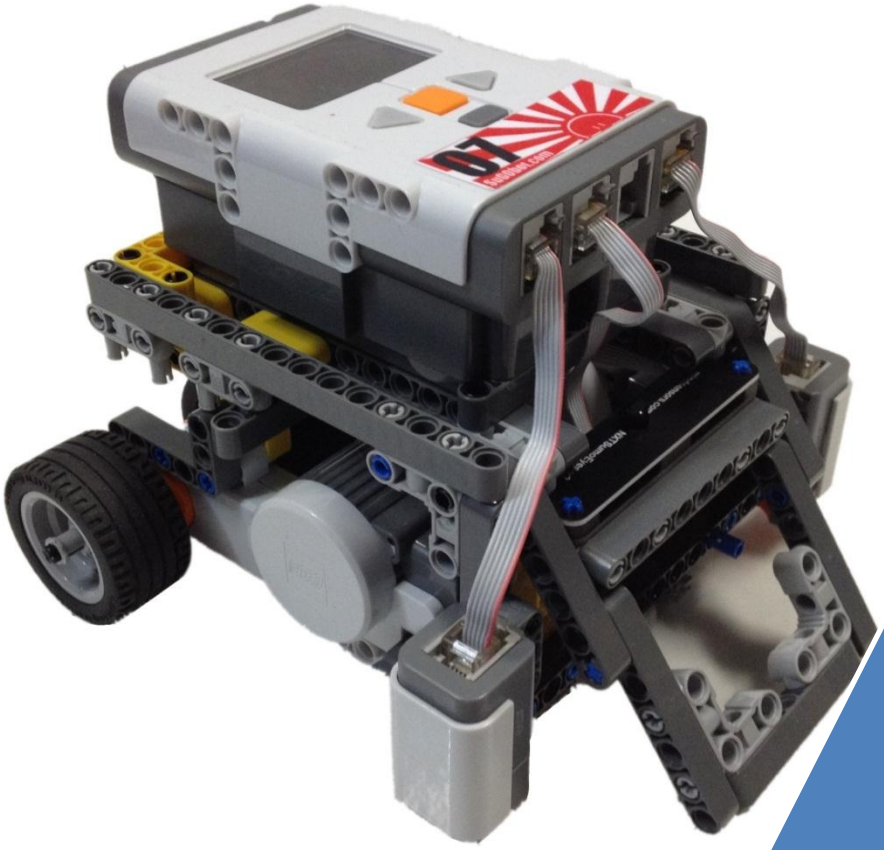
Sensors help you find your opponent and stay on the ring. Without sensors, you robot is just a born loser.



- SuGO eyes work best near the ground and laying flat.
- Make sure no cables or attachments are in the sensor's Field of View.
- Line Sensors need about 0.5" of ground clearance to work best
- ALWAYS use the Mechanic program to check your sensor wiring.

Strategy

Sometimes, strategy trumps Strength. Having a plan, and being adaptable is a powerful tool.



- A low ramp at the front can lift an opponent's wheels off the ground.
- A black bumper can convince an opponent to back away.
- If a frontal attack fails, try bouncing off the side to get behind a foe.
- A super low profile can escape below an opponent's line of sight.

Mechanisms

An extra motor can be useful.
Add a flipper or a slapper to throw your opponent a new offensive twist.

- Mechanisms are activated when an opponent is directly in front.
- An active lifter can pick your opponent's wheels off the ring.
- Make sure your Sumo Eyes don't see your mechanism.
- A mechanism can be used to store energy for a flip.