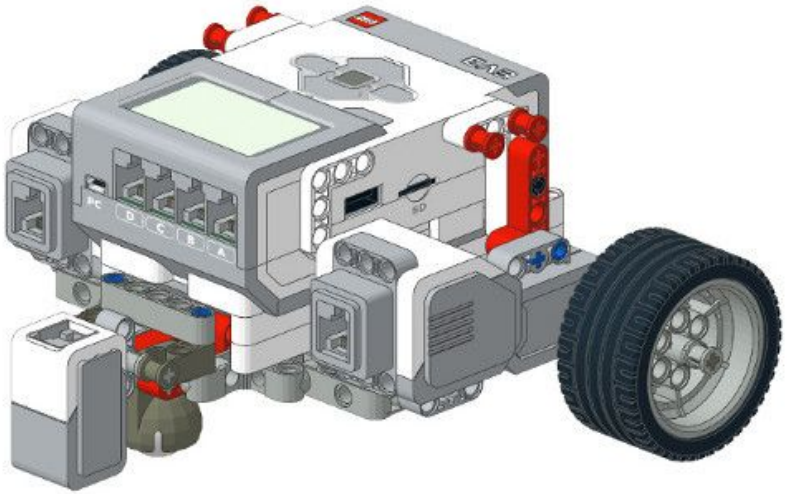
LEGO MINDSTORMS EV3

Modular Design



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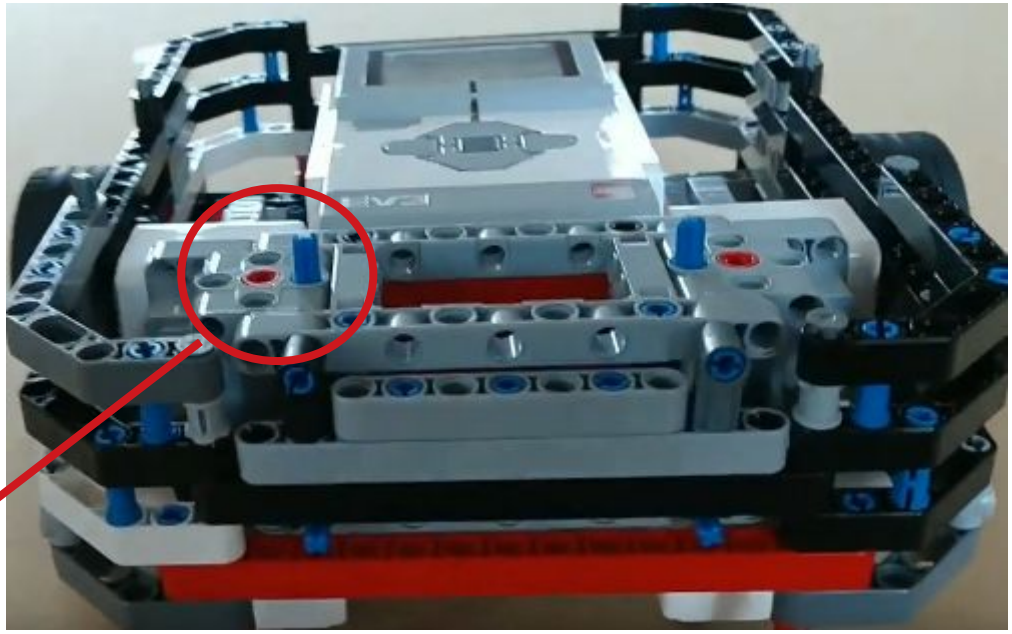
Why Use a Modular Design?

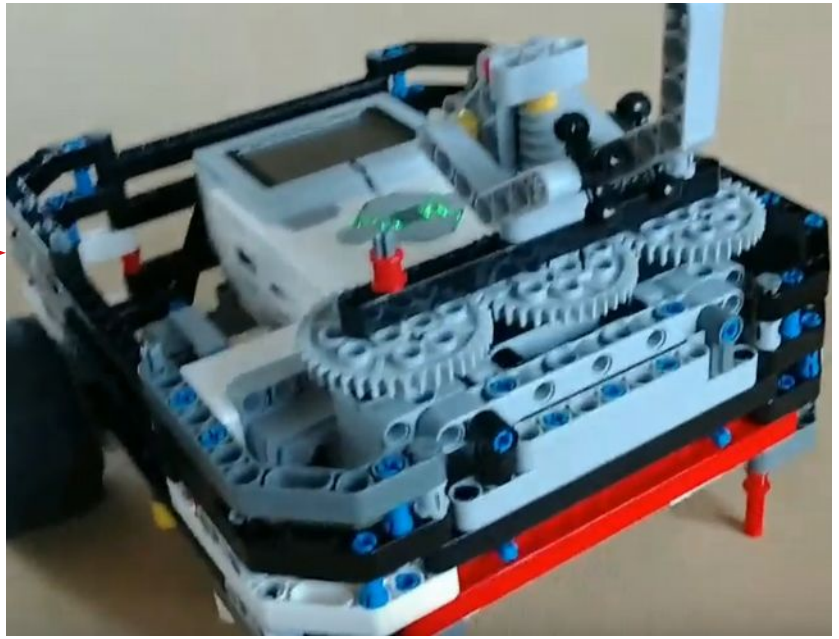
- Large number of missions
- Different mechanism for each mission
- Quick changing of parts
  - Only have 2.5mins
  - Barely have enough time to complete all missions

Techniques for Attachments

- Blue Axle Pins
- Slots in and out easily
- Not very strong

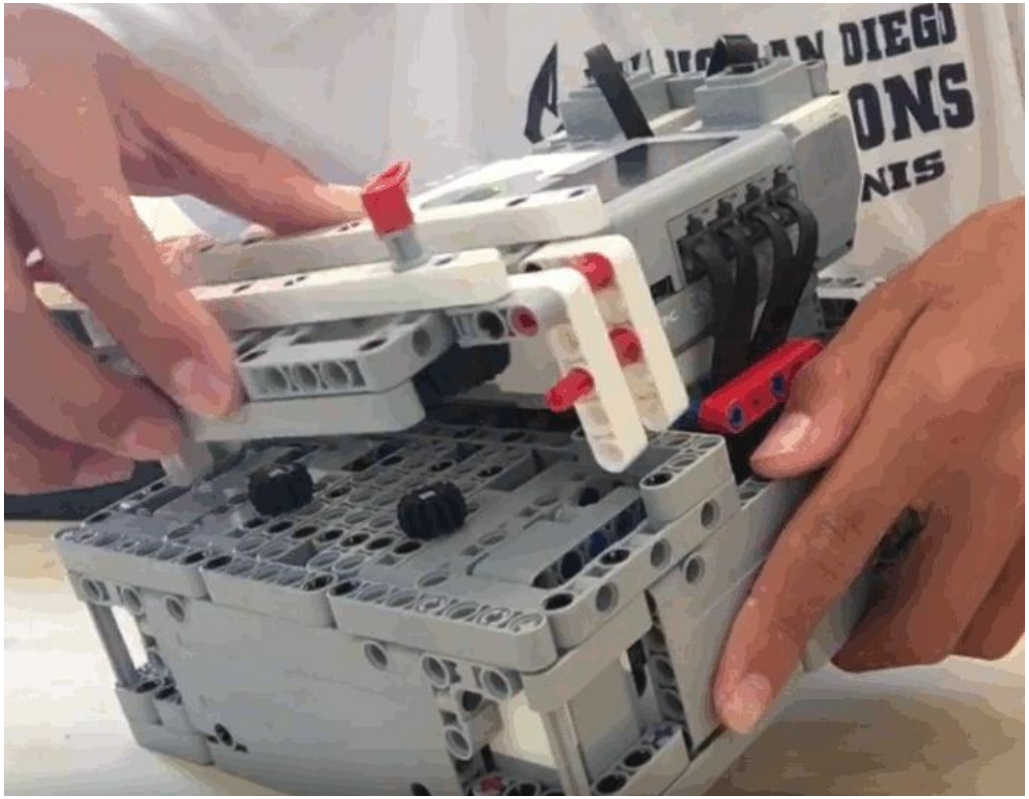


with attachment mounted



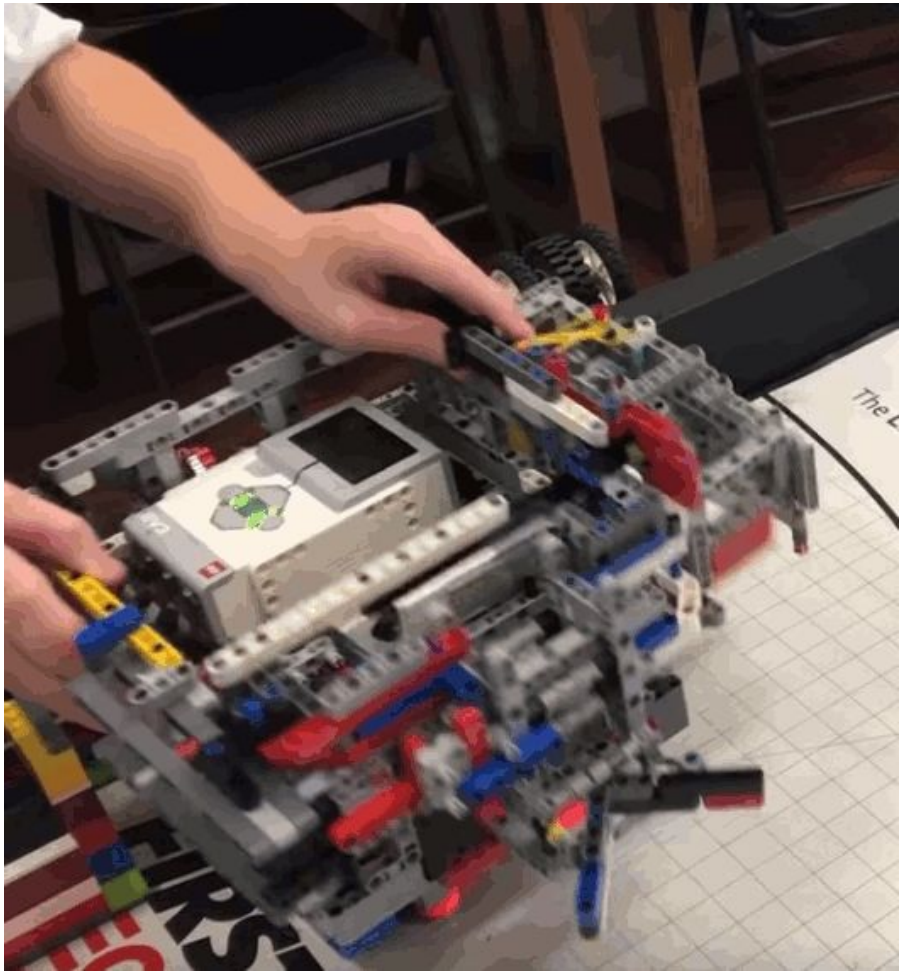
Techniques for Attachments

- Built slots
- More parts
- Stronger and more stable



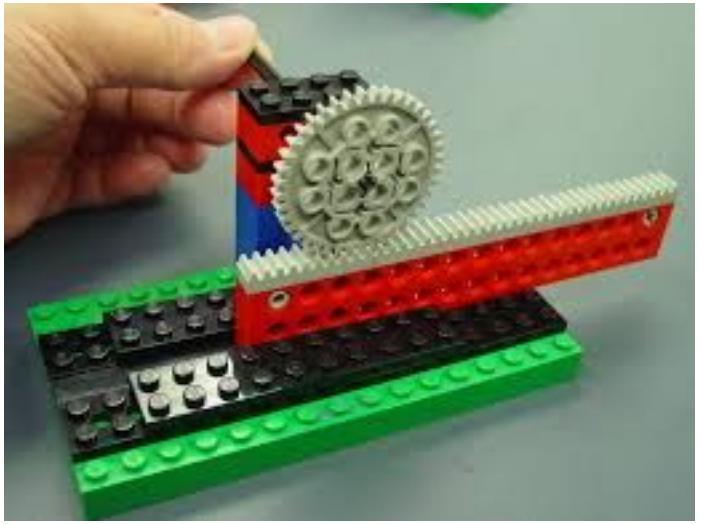
Techniques for Attachments

- Build a “Box”
  - Stable and fast
  - Can attach mechanisms on all sides
  - Use a lot of space and parts
- Use normal pins
  - Takes a few more seconds to attach and remove



Transmitting Power

- Mechanism often needs to be powered
- Besides just transmitting power:
  - Direction of rotation may need to be changed
  - May need to change from rotary to linear motion
  - Uses gears



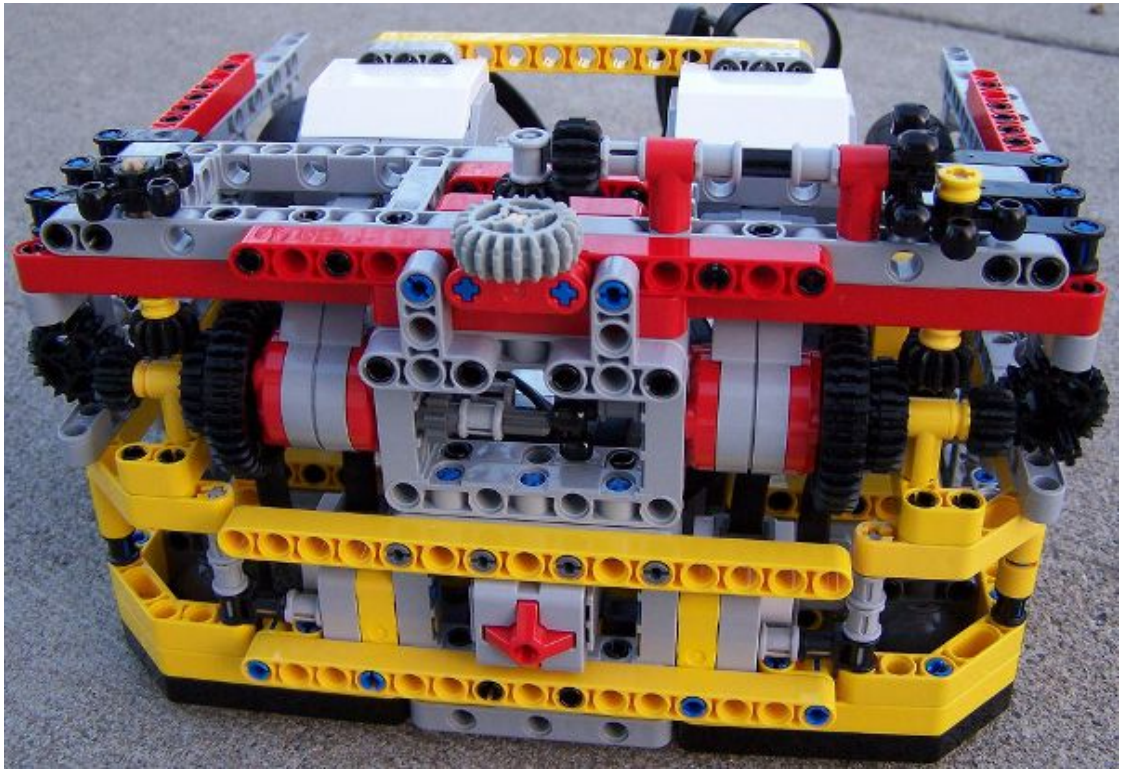
Transmitting Power

- Directly plug into motor
  - Axles may get stuck in motor
  - Attachment responsible for gears (if required)

- Use gears
  - Easier on and off
  - Increased backlash

Transmitting Power

- Multiple outputs
  - Each motor connected to multiple output gears in different directions
  - Less gears required on attachments



Tips

- Think ahead:
  - Work on one mission at a time...
  - ...but plan for all of them in advance
- Don’t fall prey to this...
  - Work on mission 1... Success!
  - Work on mission 2... Need to change robot
  - Succeed on mission 2!
  - Now the robot don’t work on mission 1 due to the changes...

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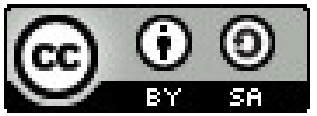

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