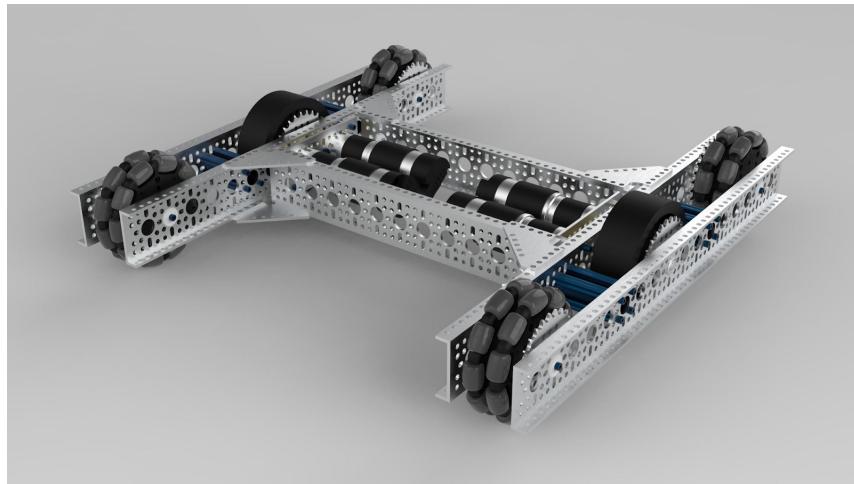


## General Breakdown of Robot:

Drive Train, Frame, Electronics, Shooter, Ball Delivery and Ball Collection, Optional Vision System, Coding

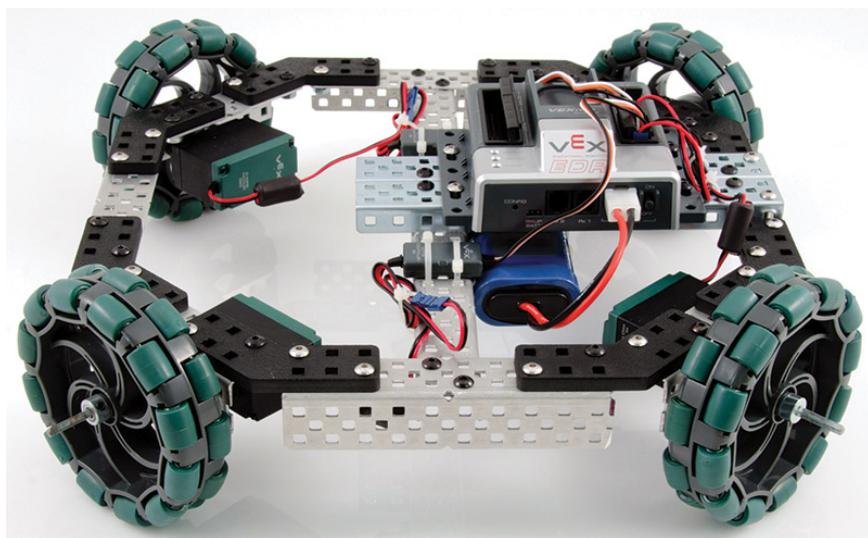
DriveTrain - This is likely the most expensive part of the robot, given the \$200 limit it is important that the drive train cost is minimized. Each motor is gonna cost us about \$30-40.

- Tank - 2 motors controlling 4 wheels



- This is likely the cheapest option but it comes at the cost of having to optimize the gears and belt which can take a long time
- Spinning may cause skidding if not using omni wheels.
  - Using omni wheels is the move

- Omni wheel 4 - 4 motors controlling 4 omni wheels



- Awesome but expensive, provides movement in any direction

- Every wheel needs a motor, also omni wheels aren't cheap. 4 wheels x (\$30 per motor + \$6 per omniwheel) = \$144. Leaving \$56 for the rest of the project.
- Omni wheel 3 - 3 motors controlling 3 omni wheels



- Similar to 4 wheel omni wheel but with 3 motors
- Movement in any direction
- Still somewhat expensive
- Coding is more difficult than 4, moving forward and backward is easy but moving left and right may be difficult.
  - However you could just code the robot to have a front face and spin then move forward. This way coding is still simple because all you must do is spin, drive forward, spin back.
- Omni wheel 2 - 2 motor controlling 2 omni wheels with a Ball Bearing for stability
  - Super cheap option
  - Not sure how exact the movement would be

Frame - The structure that connects everything in the system.

- 3d printed
  - Gives flexibility and fast prototype and troubleshooting.
  - Essentially zero cost
  - Provides a weaker frame, but there wont be any collisions to worry about
  - Make sure to fillet things and use proper fill and it will work fine
  
- Metal Frame



- Not many options out there
- Strong
- Costs a bit more and my required fasteners

[https://www.amazon.com/SZDoit-Absorption-Raspberry-Education-Platform/dp/B096D694FW/ref=sr\\_1\\_16?dchild=1&keywords=vehicle%2Bfor%2Barduin&qid=1634496908&sr=8-16&th=1](https://www.amazon.com/SZDoit-Absorption-Raspberry-Education-Platform/dp/B096D694FW/ref=sr_1_16?dchild=1&keywords=vehicle%2Bfor%2Barduin&qid=1634496908&sr=8-16&th=1)



Roll over image to zoom in

## SZDoit Smart Shock Absorption Robot Tank Car Chassis Kit Suspension System for Arduino Raspberry Pi DIY STEAM Education Platform Tracked Vehicle (Gold Frame + Gold Wheel)

Brand: SZDoit

★★★★★ 13 ratings | 4 answered questions

Save 10% Lowest price in 30 days

Was: \$89.99 Details

Price: \$79.99 & FREE Returns

You Save: \$9.01 (10%)

Get a \$150 Gift Card: Pay \$0.00 \$79.99 upon approval for the Amazon Prime Rewards Visa Card. No annual fee.

Color: Gold Frame + Gold Wheel



\$89.99



\$120.99



\$79.99



\$99.99

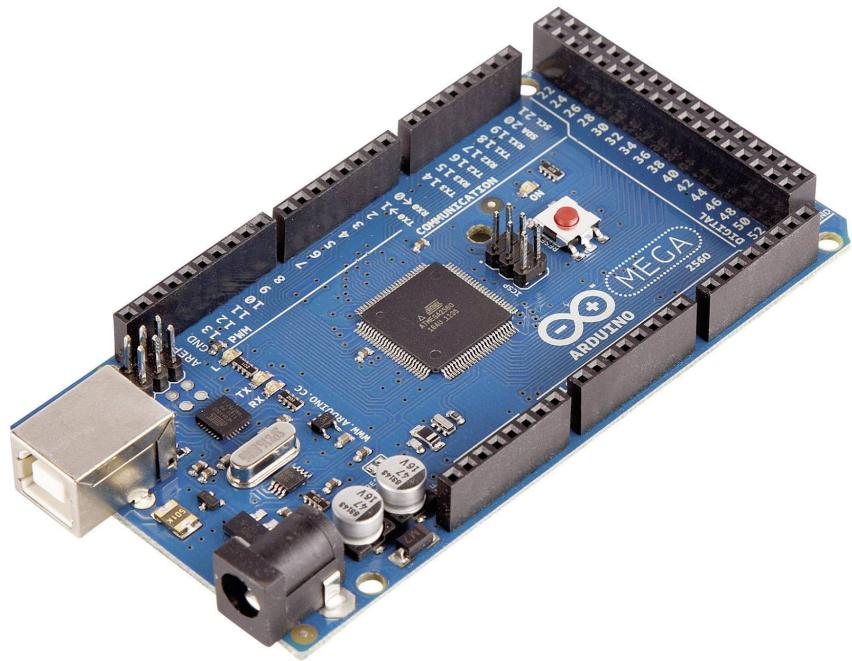
- [Learning Helper]: When you learn the robotics, embedded system, ros system, this chassis platform will be a good help for you. You can learn stm32, arduino, raspberry pie, and also robot assemble, i programming.
- [Learn Robotics]: You can learn the robotic element unite, like dc encoder motor, caterpillar, shock suspension system, bearing, load, wheel, and know the assembling ability.
- [Variable Track]: The plastic track can be changed the length. Since this car chassis has many assembly ways, and the length is different along with the different assembling. So, we will provide the longer for the suitable robot chassis.
- [DC Encoder Motor]: This encode motor can be used for the speed measurement. For example, if you

## Electronics - Not really brainstorming but listing options

- Arduino - microcontroller



- Contains all logic for communicating with motor and state machine
- Majority of information goes through here
- Mega Arduino - microcontroller



- Raspberry Pi - microcomputer



- Only necessary if dealing with vision control and even then it might not be
- Used for more computational projects
- It does most everything the arduino does but with a bit more complication
  - Its overkill for this project
- Motor w/ Encoder

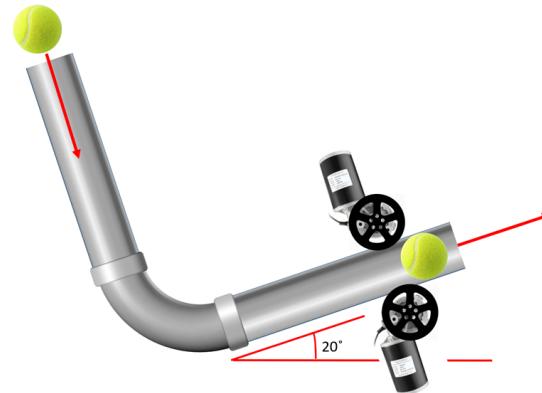


- Brushed DC motor with encoder from Polulu
- Allows for more accurate control
  - Apply encoder values to PID
- There is a large selection of motors on Polulu
  - 25D vs 37D
  - Gear Ratios

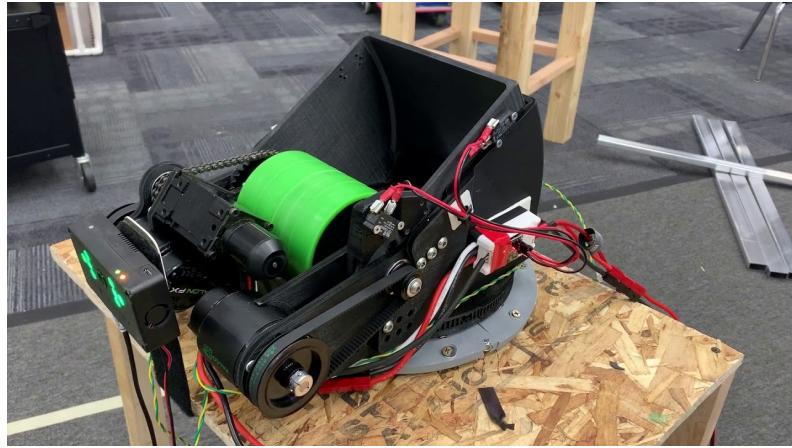
- Motor Drivers - <https://www.pololu.com/category/11/brushed-dc-motor-drivers>
  - Lots of options but are pretty specific to the type of motors we get
- Sensors - dependent on the direction we go

## Shooters

- Linear shooter - two wheel spinning in opposite directions



- Arc shooter - spinning wheels leading into an arc



- Catapult - self explanatory



- Spring Loaded

Ball Delivery and Collection - This is probably where the most innovation will come into play. If an accurate shooter is made the most important thing is how fast we can deliver balls to it.