Robot Fundamentals

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Robot, Lesson 1
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How Cars Steer

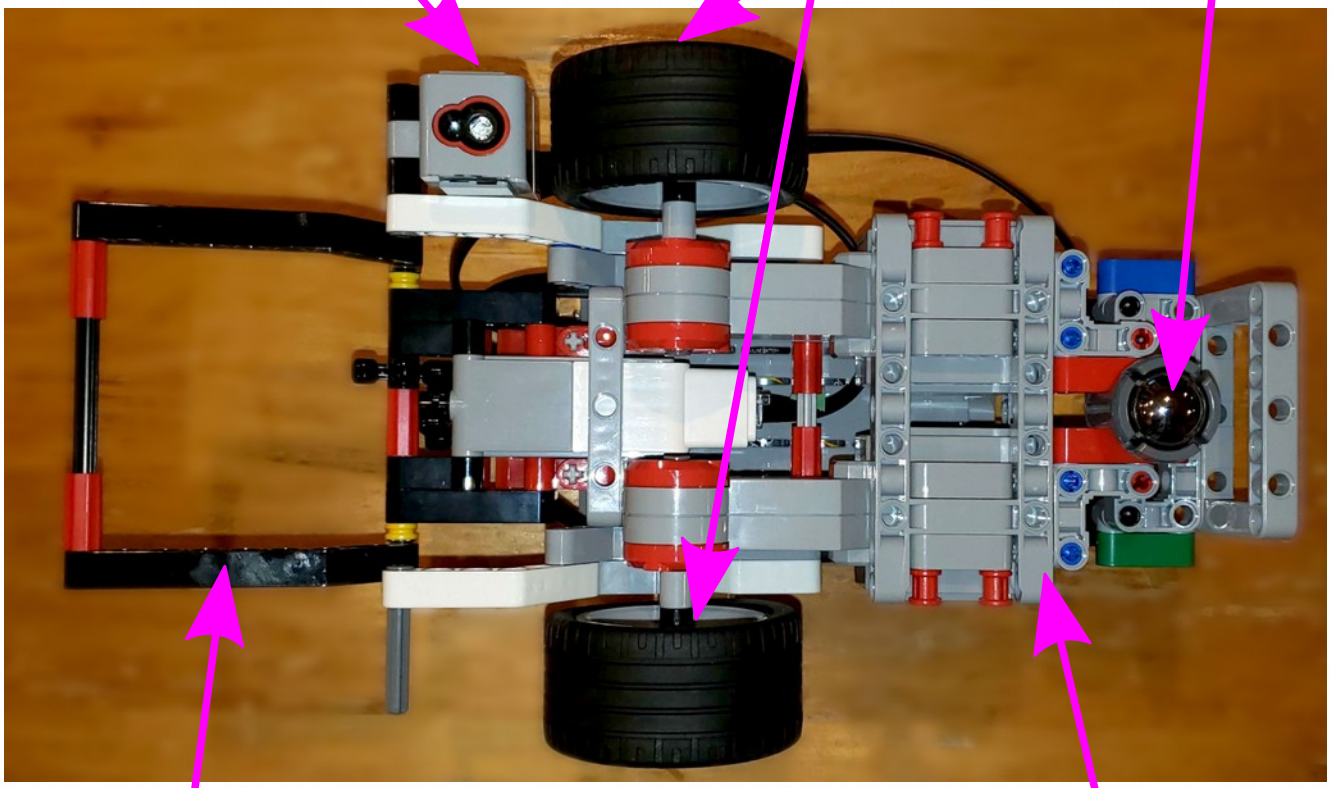
Most Teams Don’t Use This Approach

Bottom View of Example Robot

Light sensor (close to where robot turns around)

Pair of wheels driven directly by own motors (Close to center of weight of robot)

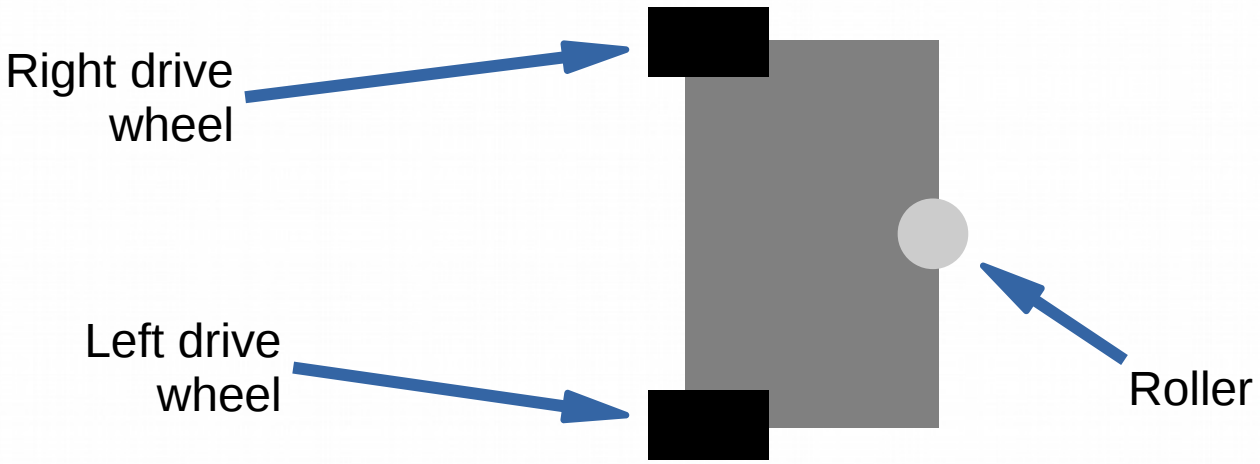
Roller ball or swivel wheel to balance robot



Attachments to complete missions

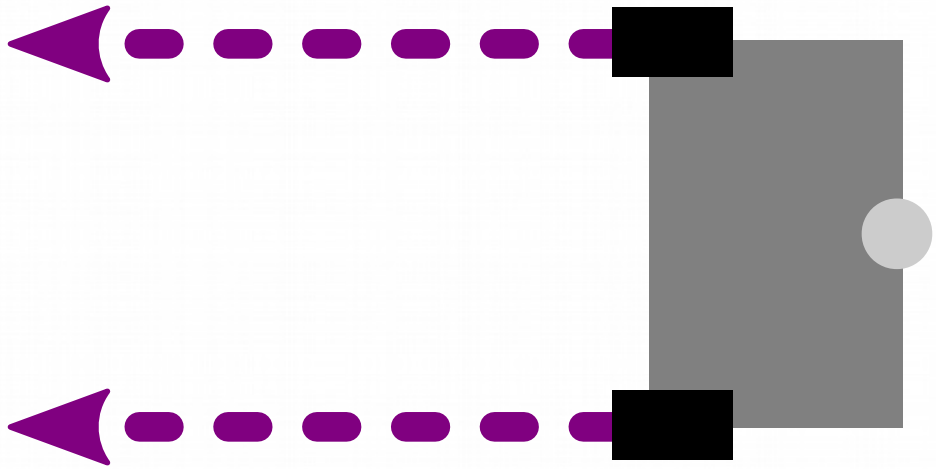
Lots of structure to keep robot stiff

Differential Steering (Top View)



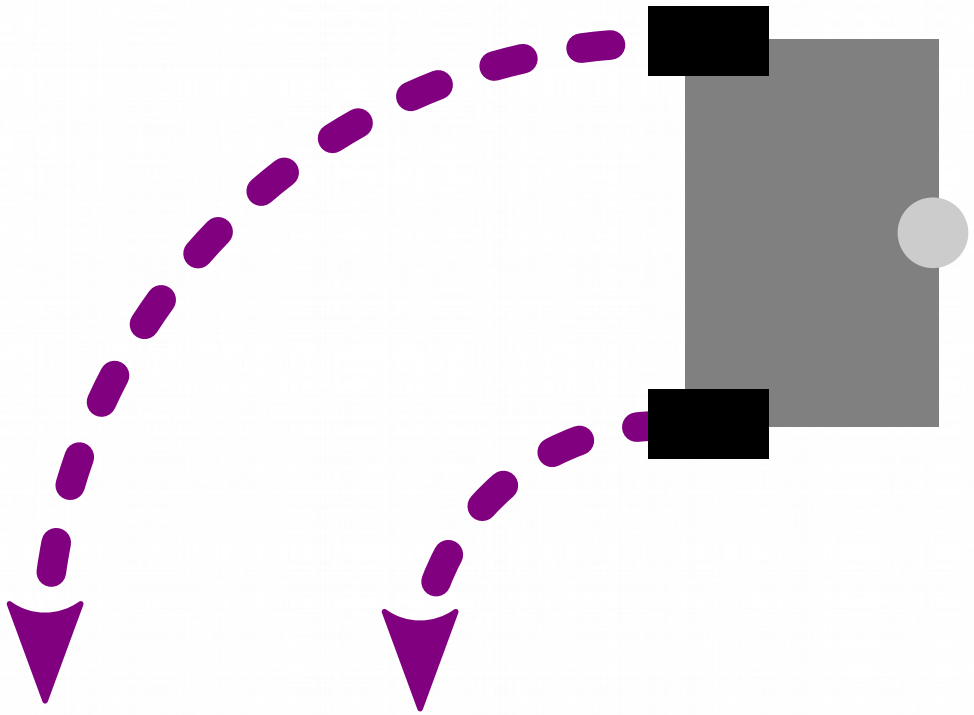
This is how tanks and many tractors steer: by controlling the speed of the wheels.

Differential Steering: Straight



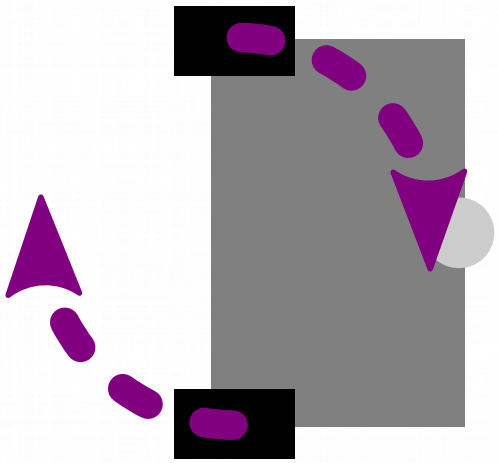
If motors turn at the same speed, each wheel goes the same distance, and the robot goes straight (*hopefully*).

Differential Steering: Left Turn



If the right motor turns faster than the left motor, the right wheel goes **FURTHER**, and the robot turns left.

Differential Steering: Turn in Place



If the left wheel goes forward, and the right wheel goes backwards, the robot **turns in place** to the right.

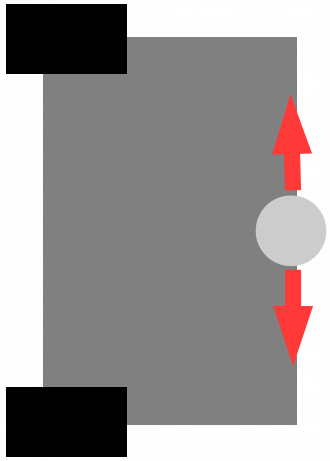
Differential Steering: Rear Roller

When the robot turns, it turns around the drive wheels.

This means the back of the robot slides to the side.

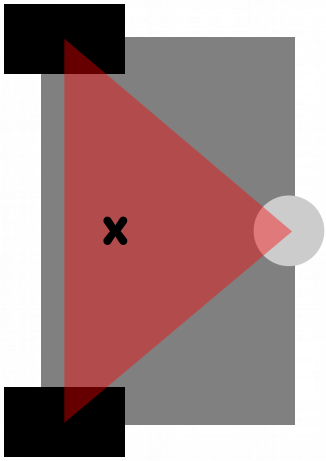
It's important to use a roller or wheels that can swivel in the back.

If you use a wheel that cannot freely slide sideways, it will resist the turn.



Differential Steering: Stability

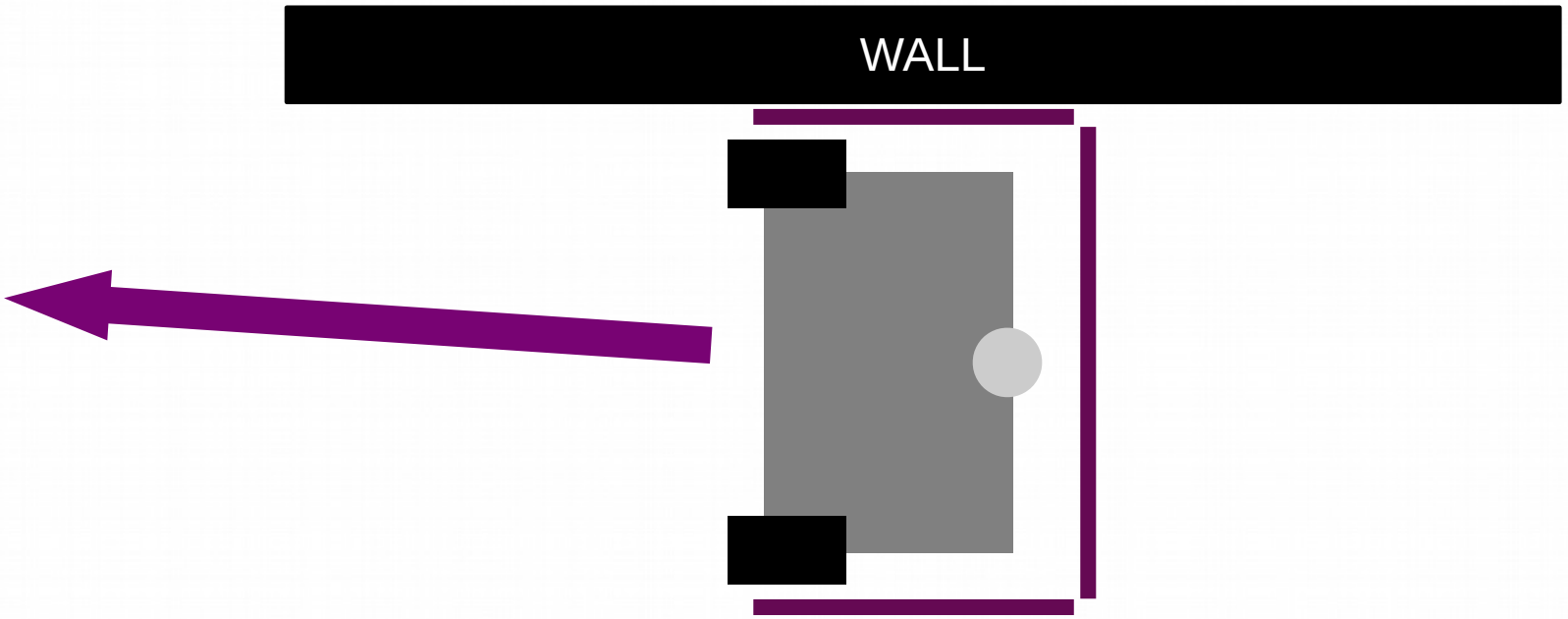
The robot's weight, **including attachments and cargo**, must be supported by the wheels. This means the center of mass must be **inside the red triangle**, or the robot may tip over.



It should be close to between the drive wheels, too, to help the robot turn more precisely.

BUT: If it is too close to the edge of the triangle, the robot may tip when speeding up or slowing down.

Bumpers Are Useful



Flat surfaces on side and back of robot are nice.
You can use them to align against walls.