

Mechanical Design

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- At times you may have noticed that you solved problems not through modifying your code but rather by making changes to the mechanical design of your robot(s).
- The next couple slides provide some examples
- Additional resources may be found on the team home base and online

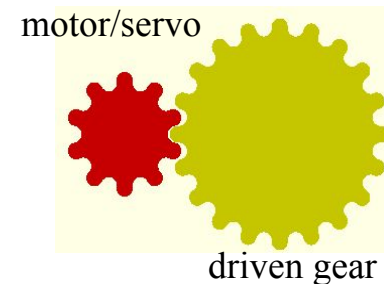
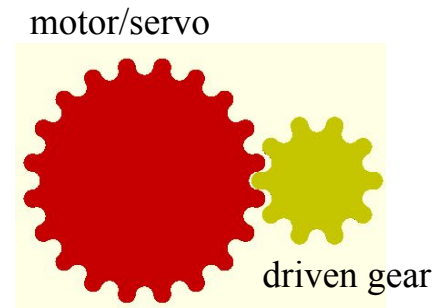
- Motors and servos have limited power
- Struggling to lift a structure?
 - Use coins as a counterbalance



Gearing and Gear Trains

By “combining” gears into a “gear train”, using gears of varying sizes you can INCREASE or DECREASE the speed and power (torque) of the end effectors connected to your motors!

- If your motor gear is **larger** than the next gear in the “gear train” the “driven gear” spins FASTER but at the expense of LESS torque (power).
- If your motor gear is **smaller** than your next gear in the “gear train” the “driven gear” spins SLOWER but with MORE torque (power).



Gears to Increase Servo Range

- If you attach a larger gear to your servo spline and the next gear in the “gear train” is smaller the range of the servo is increased
 - If the driven gear has $\frac{1}{2}$ # of teeth as the servo gear you double (x2) the range of the servo (now 360 degrees instead of 180 degrees) but with less torque.

