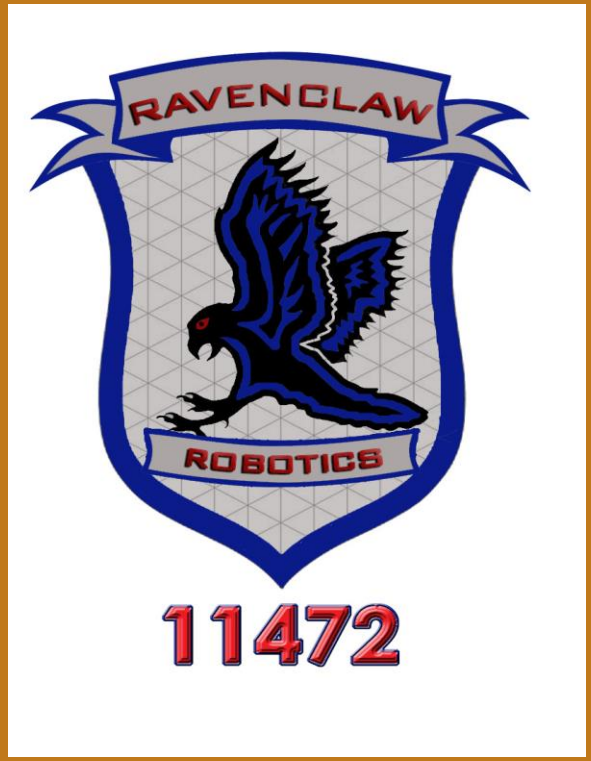
Morning Session - 11472
Rack Pinion and four Bar linkage

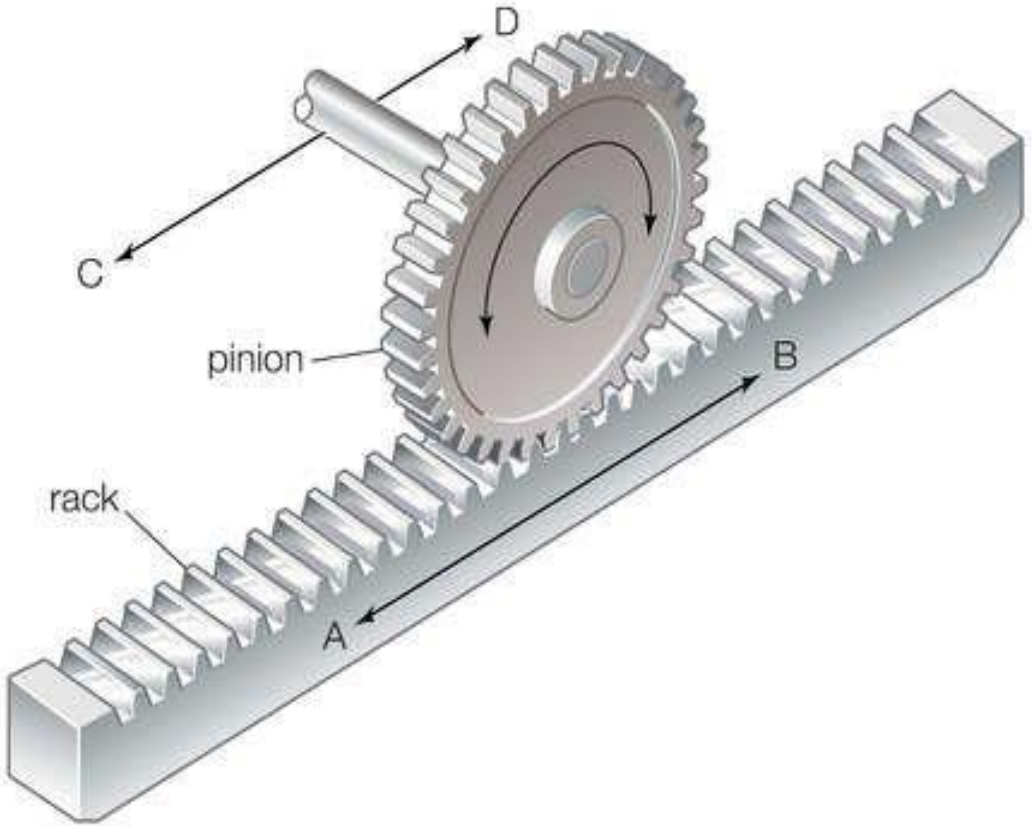
(15 minutes)



Extension Mechanism – 11472
Rack and Pinion Linear Slide

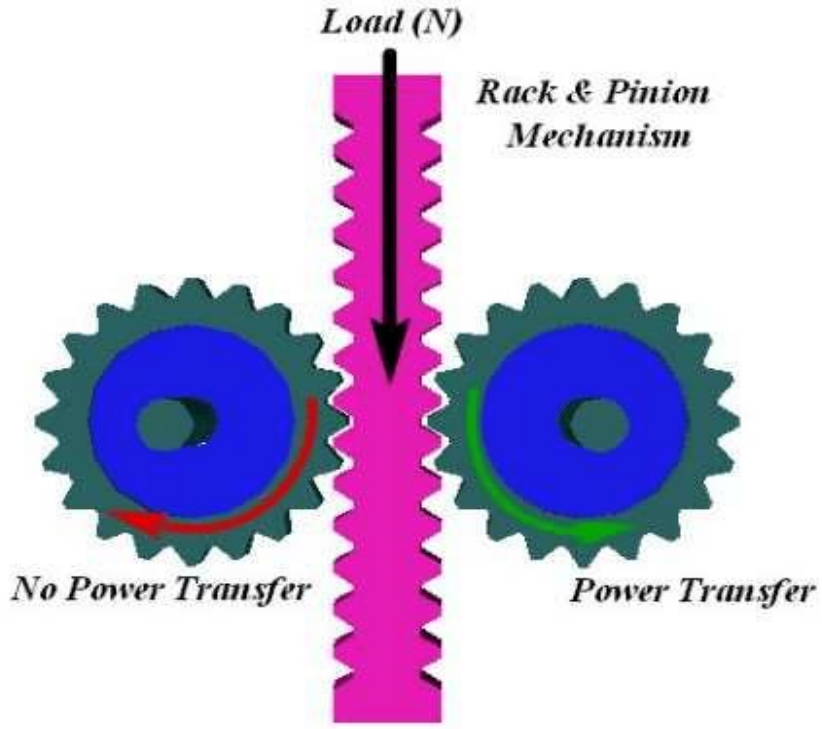
-Uses rotary motion to translate to linear motion

-pinion gear is typically small to provide necessary torque



Extension Mechanism – 11472
Rack and Pinion Linear Slide

- For added stability, rack can be built with pinion gears on each side
- Only one pinion gear should be powered by a motor



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Extension Mechanism – 11472
Rack and Pinion Linear Slide

Tetrix Basic Parts

Threaded plastic allows slide blocks and rack to be mounted to C-Channels using 6-32, 5/15 socket head cap screws

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Extension Mechanism – 11472
Rack and Pinion Linear Slide

- **Advantages**
- Diversity of Tetrix parts allows for numerous variations of linear slide mechanism that can be tailored to each team's needs.

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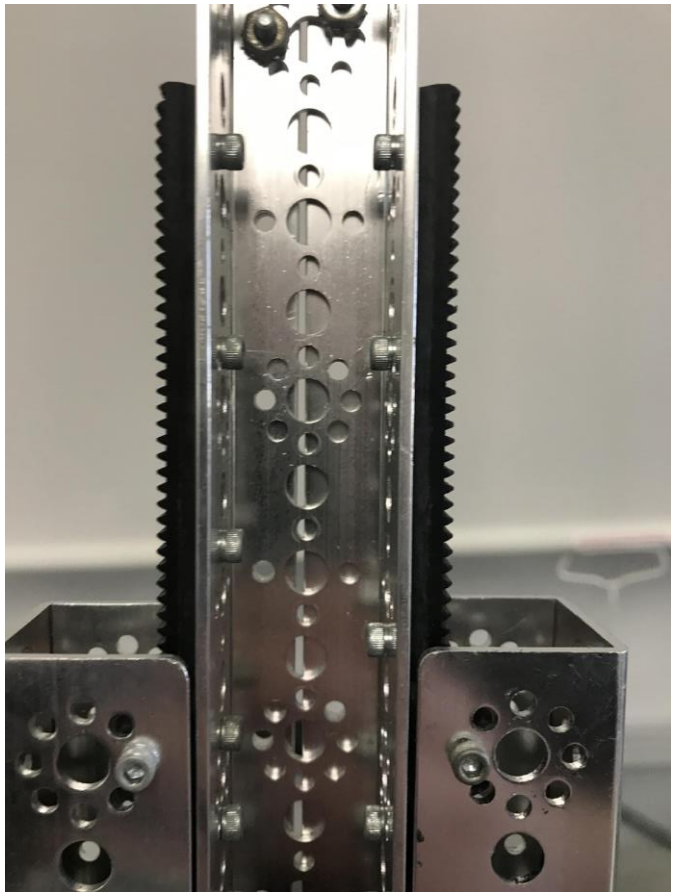
Extension Mechanism – 11472
Rack and Pinion Linear Slide

- **Advantages**
- Two points of contact on the rack gear will support heavier loads than single rack and pinion system.
- Less likely to pinch or bind during motion



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Extension Mechanism – 11472
Rack and Pinion Linear Slide

- <u>Disadvantages</u>
- Plastic teeth have been know to wear down under heavy loads.

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Extension Mechanism – 11472
Rack and Pinion Linear Slide

- Disadvantages
- Tetrix materials are often heavier, bulkier, and take up more space than other cascading linear slides
- Set screw in pinion gear can loosen or strip and needs to be tightened regularly

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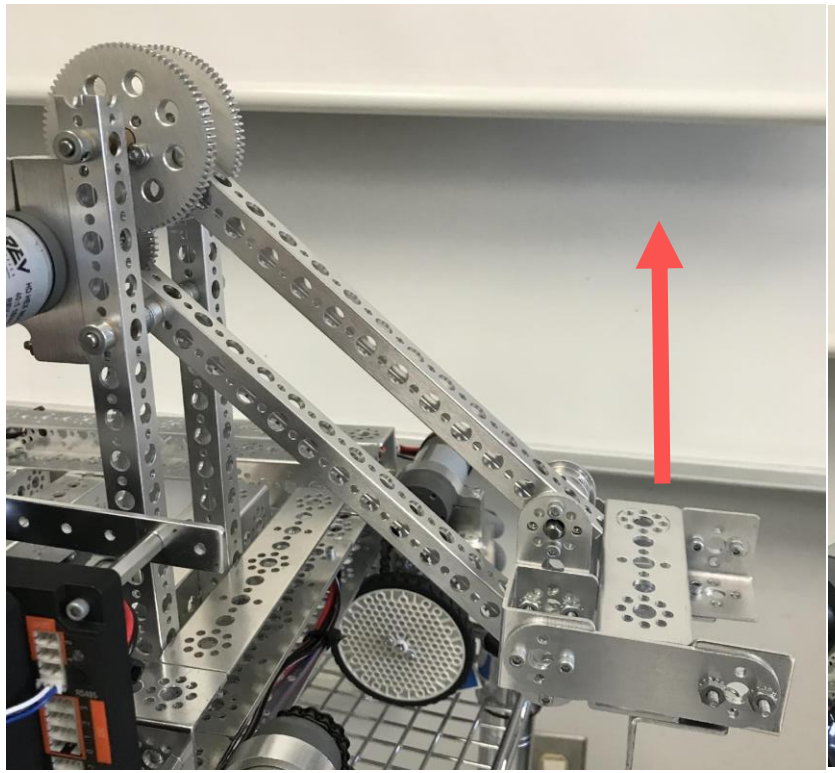
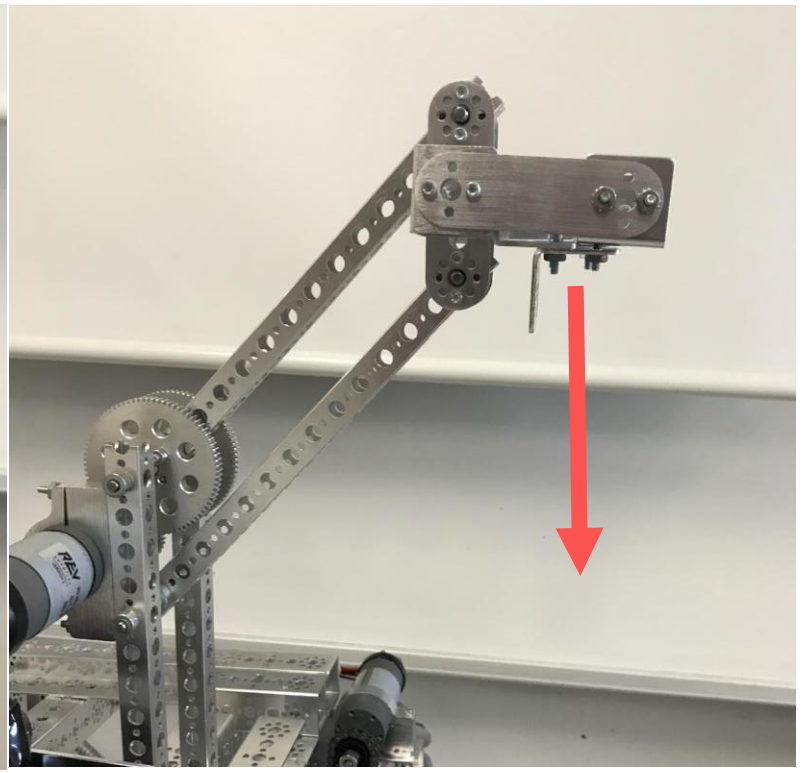
Extension Mechanism – 11472
Rack and Pinion Linear Slide

Questions?

Extension Mechanism – 11472
Parallel Four Bar Linkage

- The simplest movable closed-chain linkage
- Consists of four bars connected in a loop by four joints
- Generally joints are configured so the bars move in parallel planes





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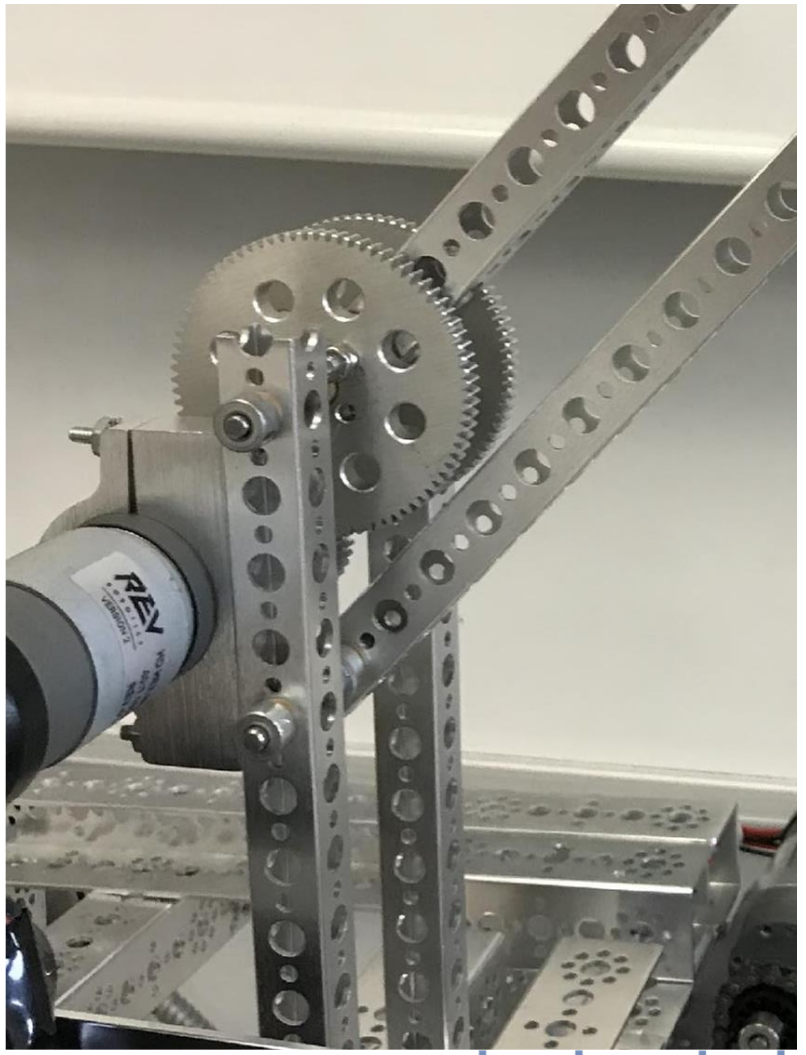
Extension Mechanism – 11472
Parallel Four Bar Linkage

- Most often powered by sprocket or gear attached to arm rotating around either pivot point
- Springs or rubber bands can be used to reduce strain on motor from being front-heavy



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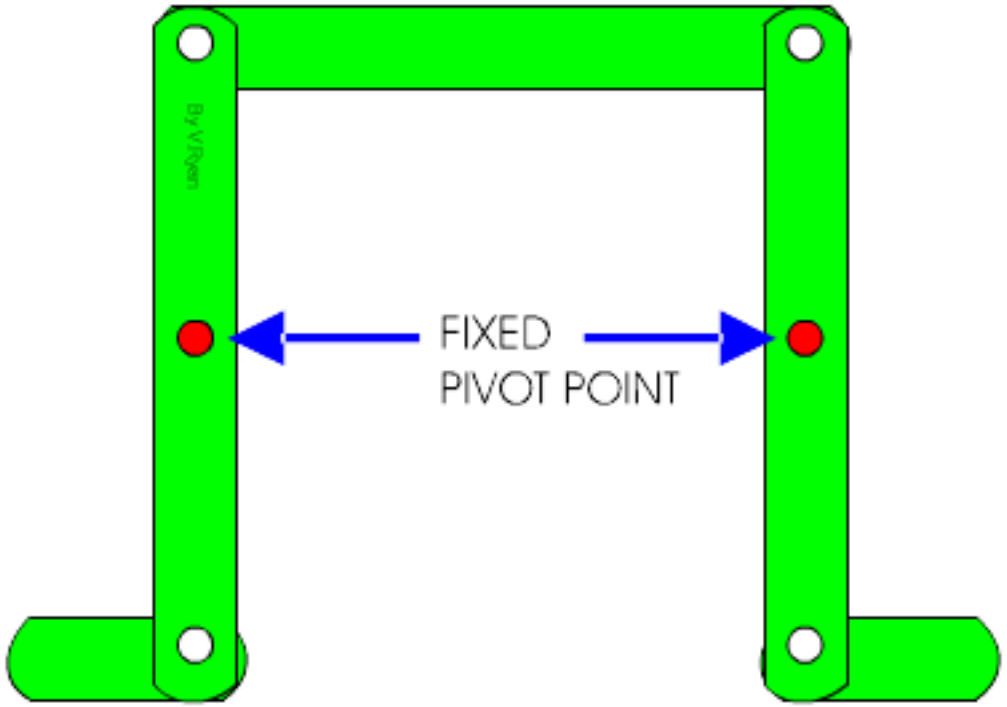
Extension Mechanism – 11472
Parallel Four Bar Linkage

Advantages

- Stable in all directions of force
- Maintains level Carriage
- Simple to build



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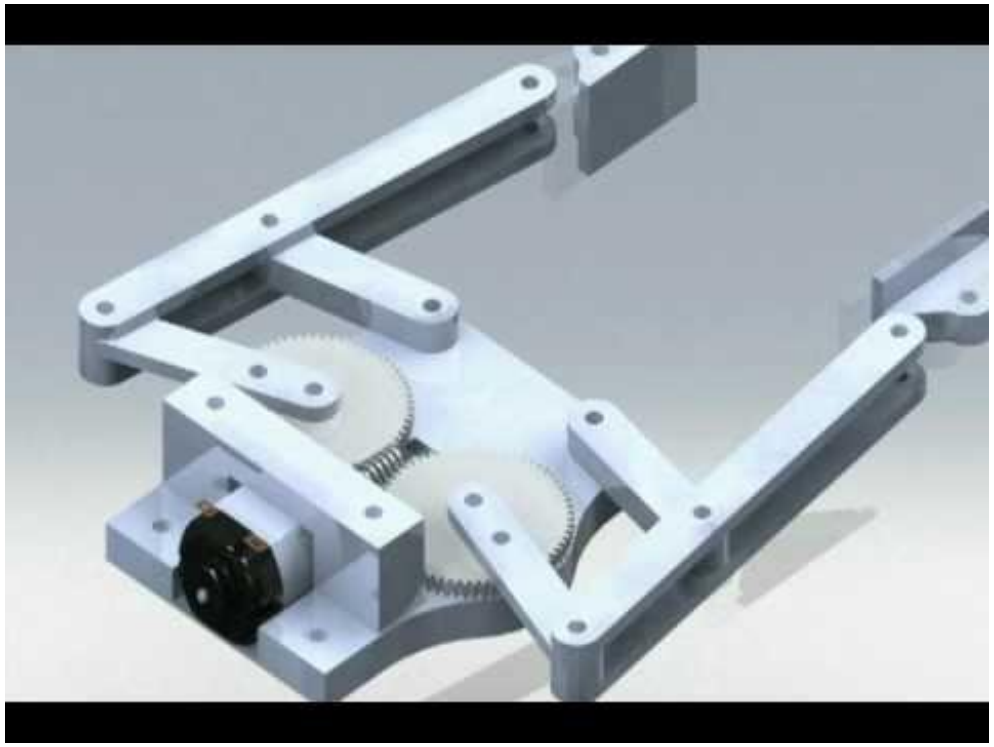
Extension Mechanism – 11472
Parallel Four Bar Linkage

Disadvantages

- Occupies up significant amount of space on the robot

- Limited degrees of rotation 130-180 degrees (depending on distance between joints type of materials used, and build method)

Becomes less stable when wider range of motion is attempted



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Extension Mechanism – 11472
Parallel Four Bar Linkage

Questions?

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