Overview
The Elkay Manufacturing Company has tasked our team to optimize the footprint of empty cabinet carts in order to reduce overall shipping costs between plants. The original size and function of the cart needed to be maintained, while the empty cart size needed to be updated to optimize the number of carts that could fit on a return shipment.

Objectives
Our team's objectives were to use an original cart model from Elkay and redesign it to reduce the floor space that it uses when it is empty. Our team's goals were to reduce the cart footprint by over 50%, while maintaining the original feel and function of the cart, and achieve a return on investment under two years.

Approach
- Received initial problem statement from Elkay.
- Visited project sponsor to visualize the problem and better understand possible solutions
- Communicated with project sponsor on a weekly basis to ask questions and receive project feedback.
- Performed concept selection and scoring of several potential solutions.
- Utilized SolidWorks to model and compare the two top concepts.
- Organized the shipment of a current Elkay cart to Penn State for rework and modification.
- Purchased additional materials needed for redesign such as smaller caster wheels, square steel tube, and securing latches.
- Modified the original cart and maintained the original design of the cart, while reducing the footprint of the empty carts by nearly 60%.
- Listed the project outcomes on the Final Design Report and summarized the benefits within the project poster.

Outcomes
- Increased the number of carts on return shipments from 16 to over 50.
- Decrease the number of return shipments by nearly 70%.
- Achieved a return on investment of under 5 months.
- Reduced annual shipping costs by 67%.