Overview
VorTic 1 was working with a local student start-up company to create a gear system for an adjustable watch. As one would turn the bezel of the watch the internals of the watch would be responsible for collecting and storing the string. The system had to be small, affordable, and able to be manufactured on a large scale.

Objectives
The gear system being designed must be able to store enough string to have the accompanying band be able to fit over one's hand, and tighten around their wrist. It was calculated to be between 5 to 7 inches in string contraction.

Approach
- Customer needs and specifications were gathered using online surveys. These surveys included what different demographics would like to see in the watch being designed.
- There were three different designs that were considered potential at the end of our concept generation.
- Out of the three designs, the planetary gear system was chosen to be the best approach to complete our goals.
- Our design was submitted to the U.S patent office to be reviewed. VorTic currently has 2 patents pending.
- Weekly meeting with our sponsor took place at the learning factory. We could not only talk to our sponsor about the progression of our project, but also work hand and hand with them during these meetings.
- All ideas were modelled using Solid Works. Solid Works was also used to conduct finite element and fatigue tests on our final design.
- Multiple prototypes were created using the 3-D printers in the learning factory. This made it easy to adjust iterations and remove flaws in early designs.
- 3-D printing was a good way to test the design, but not the right approach if mass production were to take place. The design team gathered prices from outside companies to have parts machined on a large production scale.

Outcomes
- VorTic was happy with the final products we presented to them.
- The next step for VorTic is to continue to refine our design, and to create a kick-starter video to showcase our design.
- At the senior design showcase our team was awarded with 2\textsuperscript{nd} place best project, and 3\textsuperscript{rd} place best poster.
- The team has decided to stay in contact with VorTic and to help them in any ways possible to further their ideas.