**INTRO TO CATAPULT**

*The catapult serves as another core component of the robot, enabling it to launch the triball directly into our offensive zone while loading. This eliminates the need to place the triball beside the robot and manually guide it into our zone for scoring.*

*Additionally, it proves to be effective when the enemies attempt to obstruct our scoring efforts. By simply using the empty space beyond the field, the catapult becomes a strategic asset in overcoming defensive challenges.*

Before we start building the catapult, let’s consider one thing: what do we need it to do? Simply out, it’s to give the robot the ability to launch the triball. So, what are the steps of launching a triball? Apparently, we want it to:

1. spin to and hold at the ready position;
2. after a button is pressed, immediately launch the triball;
3. spin back to the initial position, ready for the next launch.

And this naturally leads to our solutions.

**PART I: General Design**

The first and the most crucial question is: How can we just throw the 6.18” tall ball, with a weight of 120g across the whole field, to our own zone? With what kind of energy can we achieve this goal?

At the very first, our idea was to use a high-pressure gas cylinder with a piston to give out an immediate and strong impulse. There is a pvc board attached on the top of the piston, when the piston is inflated, the board moves up quickly,