Adtech Week 7

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Sunflower

I. System Analysis

1. The Base

The Base is probably the most basic but most essential subsystem in the assembly. It is a subsystem that gives support to the entire assembly. It specifically gives support to the Uprights, another subsystem of the assembly, by serving as its base. The Uprights are glued to each side of the base and supports for the Uprights are later added.

Also, to be clear, the Base is not a part of the Uprights because even if they both provide support to the assembly, they both have different purposes. The Base serves as the, well, the base of the assembly while the Uprights serve another purpose. Without the base, the entire assembly wouldn't work. There would be no base for the Uprights to be glued on and the entire assembly would just be a throwing arm attached to some Uprights that are laying on the ground and not up right.

2. The Uprights

Speaking of the Uprights, they are a subsystem that has the purpose of holding and suspending the throwing arm. The throwing arm is put between the 2 Uprights and then a nail is then put through one of the holes on the throwing arm and then both ends of the nail are then glued on to the Uprights. This specific purpose of the Uprights is also what separates it from the Base and the Throwing Arm. Without the Uprights, the entire assembly would not work since it would only consist of the Throwing Arm and the base and there would be no way to connect the 2 subsystems.

3. The Throwing Arm

The Throwing Arm is an important subsystem that serves multiple purposes. Basically, a lever consists of a beam and a fulcrum in which the beam can pivot on. The Throwing Arm, in this case, is our beam and the hole in which the nail passes through the Throwing Arm is our fulcrum.

The Throwing Arm also serves as a sort of base in which other subsystems like the Pin can be attached to the Throwing Arm. On the end of the Throwing Arm that's closer to the fulcrum, the Counter Weights of our lever added. On the other end of the Throwing Arm, the Pin and the Sling are attached. Also, to be clear, the subsystems that are attached to the Throwing Arm are not part of the Throwing Arm because although they all work together with the Throwing Arm to form the firing mechanism of the assembly, they all have different purposes from the Throwing Arm and each other.

4. The Sling

The Sling is a subsystem that simply holds the projectile until the projectile is launched. The 2 string on each end of the Sling is different. The first string is just a normal string and is attached to the Throwing Arm normally. The second string is a string that has a loop at the end of it which is put through the Pin. When launching a projectile, the second string of the Sling is release from the Pin which, in turn, opens the Sling and releases the projectile inside of it.

It is also important to note that the Sling is different from the Pin because, although they are both involved with storing and launching the projectile, the Sling holds the projectile while the Pin has a different purpose that I will be talking about now.

5. The Pin

The Pin is a subsystem that holds the second string of the Sling. It holds the string until the time is right for the pin to release the second string of the Sling and the Sling to release the projectile at the right time for it to travel a large distance. Because of this, the shape of the Pin can really affect the distance the projectile travels. The Pin, depending on its shape, can either release the Sling too early, launching the projectile too high, or too late, launching the projectile too low.

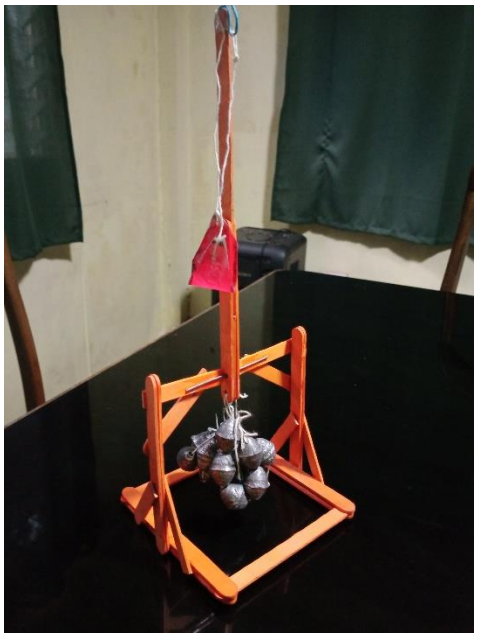
6. The Counter Weights

The Counter Weights are a subsystem that act as the, well, counter weights for our lever. The Counter Weights are tied on to the end of the Throwing Arm that's nearer to the fulcrum. Because of the Counter Weights, that end of the Throwing Arm will always be heavier than the other end of the Throwing Arm where the projectile is stored. This makes it so that when we pull the other side of the Throwing Arm back and then release it, the Throwing Arm will always spring back to a position where the Counter Weights are at the bottom of the Throwing Arm and the other side of the Throwing Arm

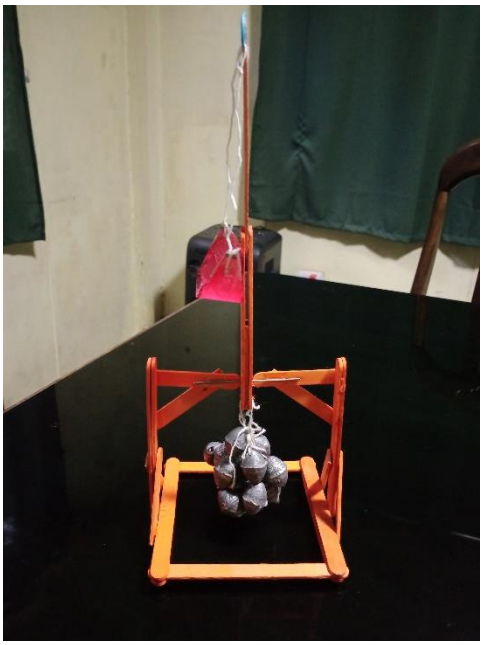
is at the top. It is good to note that while this happens, the Sling is released from the Pin due to the force this produces and in turn, the projectile is launched.

It is also good to note that the number of Counter Weights you use can affect the performance of the assembly.

II. High-Quality Pictures and Improvisations



Different Angles



Front Angle

Side Angle

Selfie with my Trebuchet

Improvisations

1. The Nail

As you might have seen from the pictures above, I did not use a nail to suspend and attach the Throwing Arm to the Uprights but instead, I used a thin but rigid and strong metal wire. This was because we couldn't find a nail that could fit through the hole in the Throwing Arm. The nails we had were either too large in which the Throwing Arm could barely even pivot or just too large to even fit through the hole. So, we instead used a metal wire that we found in our garage. Using the thin metal wire instead of those thick nails he had was significantly better because it allowed the Throwing Arm to be looser and pivot more freely and thus, increasing the force of the projectile when it was launched.

2. Hook for the Counterweights

If you observe the pictures closely, you can see that there is a hook near the counterweights that does hold up some counterweights. You see, before we added the hook, the weight of the counterweights we're distributed in a way that didn't allow the Throwing Arm to be dormant in a completely vertical position. Instead, whenever it was dormant, it would be in a slanted position. We figured that this might affect the performance of our trebuchet. Depending on the direction it was slanting in, the slanted position of our Throwing Arm could either cause our trebuchet to fire the projectile with less force or fire the projectile with too much force where it would just hit the ground.

To fix this, we first removed a few counterweights. Then we added a hook (that was a metal wire the we bent into a shape of a hook) to the end of the Throwing Arm. The hook had to be "facing" the direction in which we needed to add more weights. Then, we just simply added to the counterweights we removed earlier onto the hook. Because of this, the trebuchet was able to apply more force when it launched the projectile.