**The problem**

Tuning a guitar can be annoying and time consuming for all skill levels of guitar players. We came up with an idea to fix this problem; an automatic guitar tuner called GUITO.

* The GUITO is a portable, Bluetooth, battery powered tuner.
* It clamps on to the guitar knob to turn it in the required direction.
* It is powered by a small servo motor; and along with the code algorithms, can create a very precise tuning on any guitar string.

**How it works**

The GUITO can tune a guitar with minimal user assistance.

* Once a tuning is selected from the phone application and the string is plucked, the GUITO will tune it for them.
* Attached to the tuner, there is a motor that rotates the guitar knob in either direction, depending on if the frequency.
* The components used in this tuner include
  + an Arduino
  + a Bluetooth receiver
  + a servo motor
  + a battery
  + an Android phone.
* The following flow chart shows how these parts all work together.

**Design expectations**

When we planned out this project, we had in mind to make the tuner small and compact, with casing to hide the electronic components. We also hoped that by using the YIN algorithm, the tuner would have a near perfect accuracy.

**Current state**

At the moment, the product works; however, it is still unmarketable to the public due to its appearance and size. If we had access to better resources, we would be able to manufacture a more compact and desirable product.

**Future Considerations**

What features could we add in production?

* Improve the ergonomics, aesthetics, and the interface of the app.
* This would be very important for mass production, but we did not put much stock into it in this setting.
* Make it smaller, cheaper, lighter, and above all, more accurate, maybe a more silent motor.
* Works on multiple stringed instruments, such as bass guitars, ukuleles, banjos, violins, and cellos.
  + The slot for the peg would be made more universal.
  + The software would be able to select between different tunings based on the instrument.
* Make it work on all operating systems.
* Make it work without a phone.
  + Include a microphone that would attach to the guitar and feed signals to the tuner.
  + This would make it less hands-intensive and easier to use/more portable.
  + We would incorporate a screen on the actual tuner in this case

**Competition**

How do we compete with other similar products?

* No other products have support for multiple types of instruments, such as ukuleles, banjos, and basses.
* On top of this, things that would make this product competitive and successful are global attributes:
  + Aesthetics
  + Ergonomics
  + Ease of use
  + Cost
  + Accuracy and functionality

The GUITO can benefit guitarists in many ways; however, players should still learn to tune manually. This way they won’t be limited to having to tune it themselves in every situation, but still have the option to use this automatic tuner if they need it.