

## Project Ideation



**Project name:** *CNC Machine*

**Team name:** *Plantastic*

**Author(s):**

*Lisa Curvers*

*Dylan Loers*

*Tevin Sanchez*

*Marco Jacobs*

*Nadia Spapens*

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## 2 Introduction

For this project we were tasked to design a product using virtual tracking. We chose to make a CNC machine because it makes good use of multiple actuators that we can track. This can be displayed virtually for easy observation. One of our main goals while making this project is making it affordable for hobbyists and small businesses. For the start of the project, we want to be able to draw a picture. And if we have time left, we can make an actual carving CNC machine.

## 3 Project description

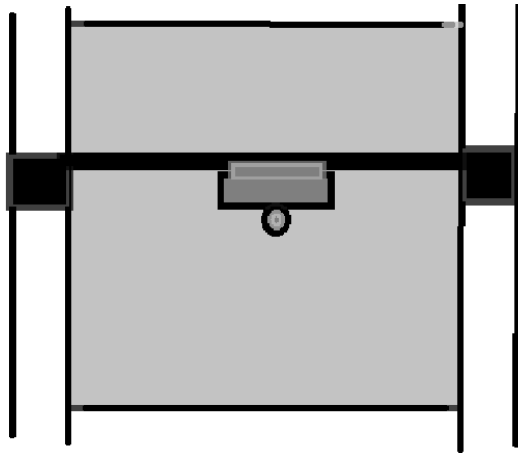
The problem we want to solve with our project is that because CNC machines are really expensive, not a lot of people have the means to get one. We want to make CNC machines affordable mainly for small businesses or hobbyists who want to use a CNC machine to make developing products faster/cheaper.

But what is a CNC machine? CNC stands for Computer Numerical Control; it is a machine that is controlled by a computer to perform certain tasks. In most cases these tasks are the carving of materials like for instance wood. The CNC machine uses CAD designs to know where to carve. With a CNC machine you can carve a lot of material very quickly.

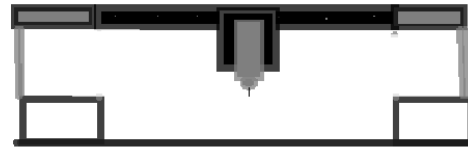
However, most CNC machines are quite bulky and cost thousands of dollars, we want to use affordable components to make the CNC machine available for more people. Because our CNC machine will be smaller than most, it is also easier to store than most CNC machines. You don't need, for example, a whole room dedicated to the CNC machine, you can just have it in the office. Below, a picture of a regular CNC machine.



The CNC we want to make is a flat structure, with 3 rails that the head slides on, to cover the x and y axis. Below is an illustration of how this would look.



top down look of  
the machine.



front look of the  
machine

At first, we want to make a CNC machine that can draw pictures on paper, just to make sure everything works as it should. If we have time left after that works as intended, we would like to attach a Dremel of some kind to the machine so we can carve out material. If all is safe of course.

The motors to operate the CNC machine will be powered by an Arduino. This Arduino will be supported by another Arduino to run the sensors. We want to have a temperature sensor on the CNC machine so we can make sure that no components overheat and break. To keep everything as safe as possible.

With our C# application we would keep track of the drawing/carving head. So that one can virtually, perhaps via an app, keep an eye on the machine. This is the way we would be implementing virtual tracking.

We would also like to add a camera to our machine, if we have time, so that in our C# application we can also track the progress of the machine with the live camera feed. This would however most likely need to be powered by a raspberry pi instead of an Arduino, since the Arduino is not powerful enough for a camera signal. So, if we have enough time, we'd probably run all the sensors and the camera off a raspberry pi.