Weekly Report

Week 12-13: 17/03/2025 – 28/03/2025

Mustafa TOPBAS

4A GPSE

Axel LEROY

4A GPSE

Cédric DA CRUZ

4A GPSE

Abigaïl BROCHARD

4A GPSE

Eloïse MESTRE

Project Tutor

1-Mustafa

Number of hours spent on the project this week: 2.5 + 4.25 + 4 + 2 = 12,75hours

Activity:

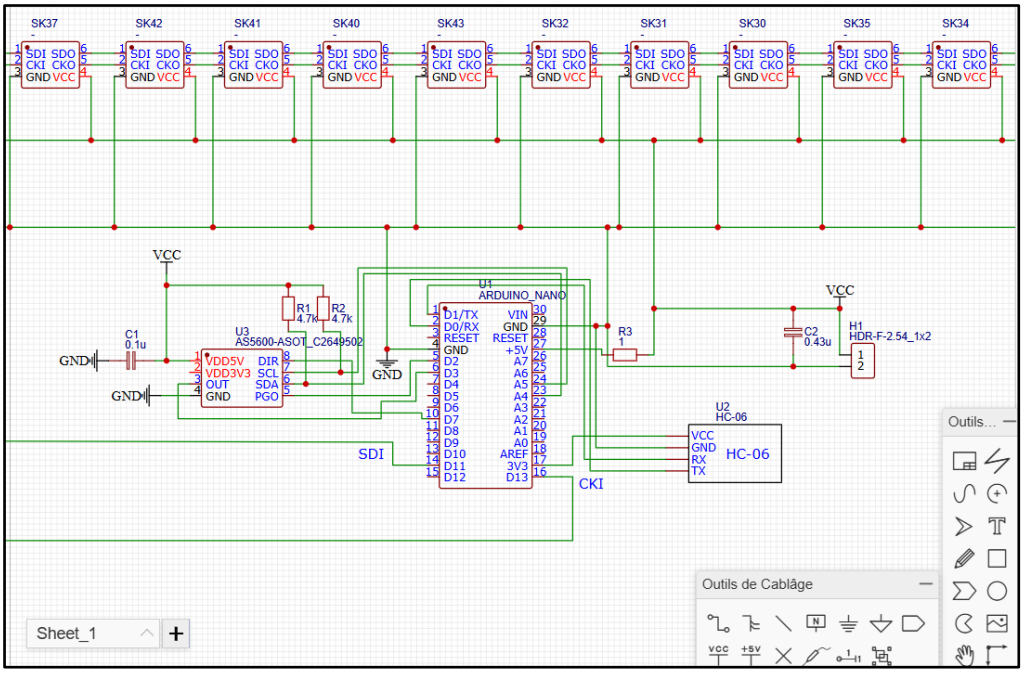
Until March 26th at 12:30, I worked on the PCB that I had almost finished. All that remained was to add the copper layers. But we received our LEDs which were deemed too small to be soldered, which makes all my work on the PCB useless. So I will have to start again from the electrical diagram. Also, the almost finished diagram had encountered problems that had canceled all my connections, so I had to start again from the rooting. It was rather difficult to believe that it was necessary to start all over again.

On the afternoon of March 26, I looked for the footprint, I found a similar one but I couldn't import it. Mr. Ladrouz improvised a course for me on how to make a footprint but I still didn't have all the keys to succeed.

I finally found a footprint that fit what I needed. I sent it to Abigail, who lined up the 60 LEDs for me. We reduced the number of LEDs because the new ones are wider and we have PCB size limitations.

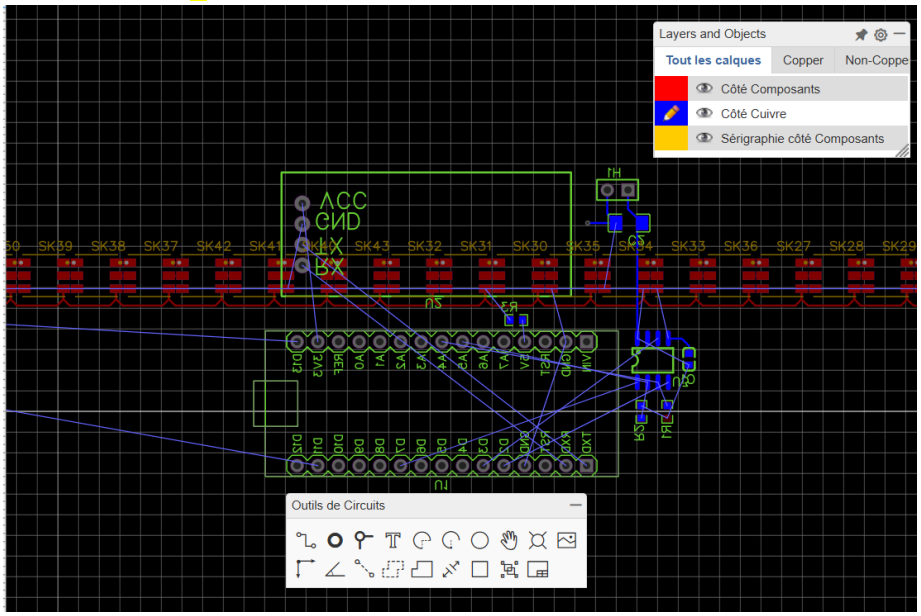
On Friday, March 28, I took Abigail's aligned LEDs to make the electrical diagram of the project once again. This time, I added the Hall effect sensor, the datasheet for which I had to read. I also added the Bluetooth module. I did some research on the size of the tracks, for that I took a book that we had to read as part of our courses. I ended up adding decoupling capacitors.

I talked to Loann, a classmate, who warned me to power my Arduino board with its 5V output rather than its Vin input, which requires 6V in real applications. The 5V output has been tested as a power supply and works.I now have to make the new PCB.



Electrical diagram of the project

Friday afternoon, I started the PCB. I aligned the LEDs and placed the components on both sides of the PCB. I also made some connections.



2-Axel

Number of hours spent on the project this week: 13h45

Activity:

Last week, I used 3h45 to work on a way to move the image within the picturebox. I had the idea to use a Graphics type object which "tells" how manage the display of anything graphic (images, drawings, etc). On this object I used the function *FromImage(Image)* to specify which image the Graphics object applies to. Then, I used the function *DrawImage(Image, Point)*, which draws the image to the location specified by the point. However, this function still isn't enough to move the image within the picturebox because we need to set the *picturebox.Image* (parameter to access the image of the picturebox) to this new image. To do so I created a Bitmap object that copies the "new image" and then I set the *picturebox.Image* to the Bitmap object. Beforehand, I also set the interpolation mode of the Graphics object.

This week, I tried to crop the image once the user is satisfied with its size. To do so, I

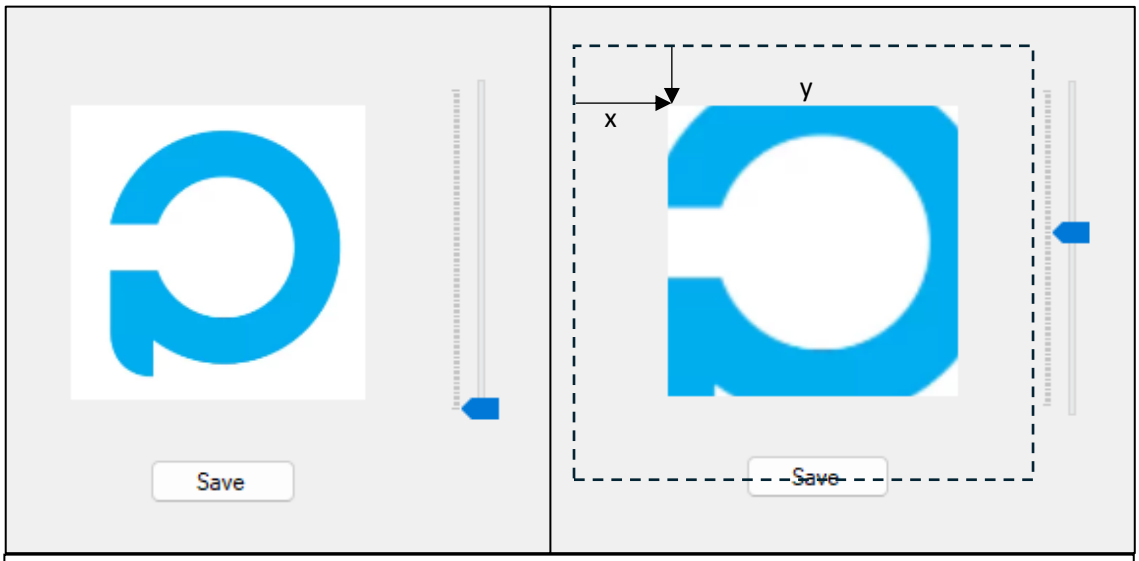
```
2 références
void x_translation(Image img, int dx)
{
    Graphics g = Graphics.FromImage(img);
    g.DrawImage(img, new Point (dx, 0));
    g.InterpolationMode = System.Drawing.Drawing2D.InterpolationMode.HighQualityBicubic;
    Bitmap bmp = new Bitmap(img);
    pictureBox1.Image = null;
    pictureBox1.Image = bmp;
    coord_translation.X += dx;
    coord_pictureBox.X = (int)(img.Width / 2 - 150 / 2 - coord_translation.X);
}
```

X_translation function, exists also for Y_translation

found the function `Bitmap.Clone(Rectangle rect, System.Drawing.Imaging.PixelFormat format)`.

This function creates a copy of a section of a Bitmap. I could the same *PixelFormat* as the original image, however I had to know what section I wanted to copy. To create a rectangle,

we need a point to set the coordinates and a size. The size being set by the numbers of LEDs on the fan. The biggest issue was the coordinates. Most of the 10 hours I spent on this part of the project were related to these coordinates. It was easy to set a coordinates variable that changes with the *X and Y_translation* functions, yet with the *zoom* function. So, I had to create one point for *X and Y_translation* and one that always knows where the picturebox is within the image (when the image is zoomed in, it theoretically is bigger than the picturebox, even if we can only see the part inside the picturebox).



Coordinates changing when zooming in/out

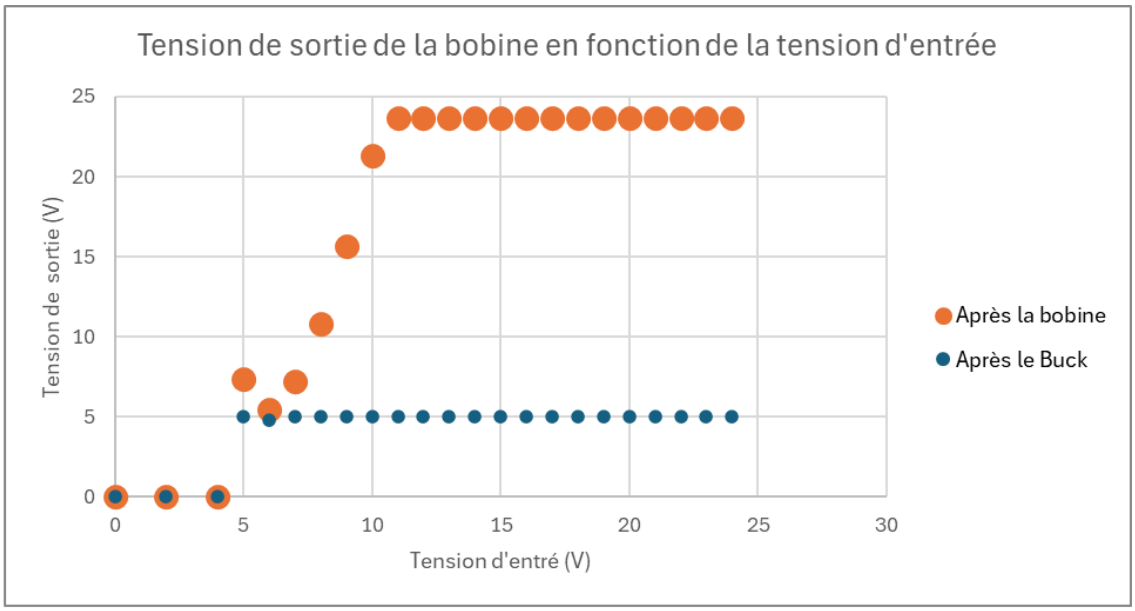
I also used these coordinates to manage the border limits of the image (not being able to move outside of the image, nor to zoom out of the image when on one side).

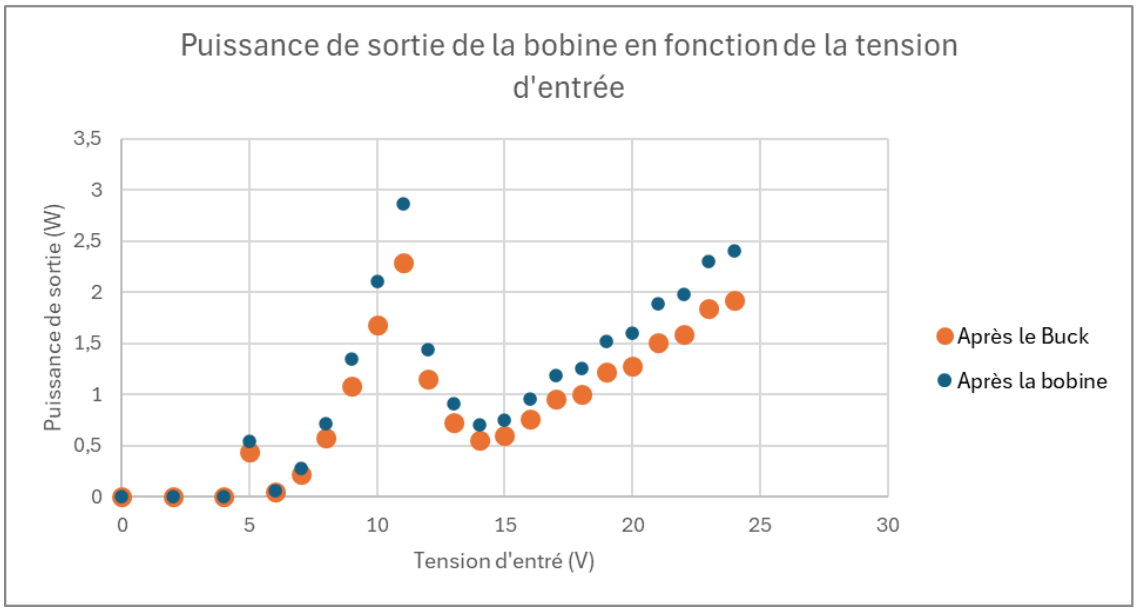
3-Cédric

Number of hours spent on the project this week: 10

Activity:

Last week I finished the different test on the component we received





This week with Abigaïl we had a meeting with Ms NOVELLO, we discussed over the base on which the motor will be fixed and who will contain the different electronic components. We decided to go with 8mm thick composite wood and 10mm thick transparent plexiglass for the materials. We have a meeting Friday next week to start the cutting and building process

4-Abigaïl

Number of hours spent on the project this week: 2,5 (Wednesday March 26th morning) + 2,5 (Wednesday March 26th afternoon) + 2 (Thursday March 27th evening) + 3,5 (Friday March 278h morning) -> 10,5

Activity :

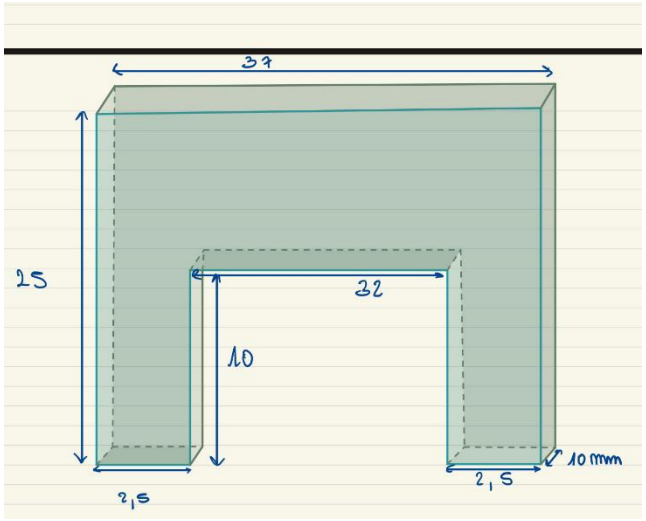
When we received our LEDs, we realized that they were really too small to solder ourselves. It might have worked if we'd been able to subcontract, but it's not possible. So, I went to see Kamel to try and find a solution, and we found a new reference of LEDs that would work.

We had to get away from the theory I had studied, which was that we needed small LEDs to get the maximum number and exceptional synchronization.

The LED reference is SK9822. These are LEDs with the same communication protocol as the old ones (APA-102), but their synchronization is slower than the others. They also have a more unstable frequency starting at 4 MHz (compared with 20 MHz for the others). These are details that would count for a very professional rendering for a company, but we'll have to make do. The LEDs are therefore larger. They're 5 mm in size, which means we'll have to use fewer of them, and therefore get poorer quality. If we keep the 30 cm length for our pall, that gives us 60 LEDs.

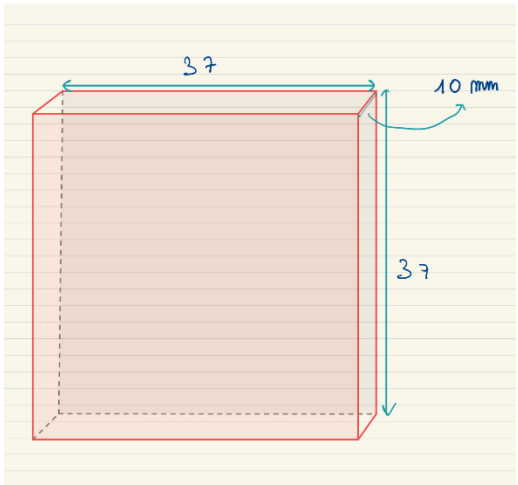
So, I drew up the LED diagram with the new reference as quickly as possible, so that Mustafa could start on the PCB on Friday morning. Fortunately, the SK9822s and APA-102s aren't that far apart in terms of wiring, as this enabled me to go faster than if I'd had to start from scratch.

On Friday morning, Cédric and I went to the FABLAB to talk with Clarisse Novello about how we're going to create the box that will hold our connectors and the Plexiglas protection. The aim is to be able to fit the plexiglass and the wooden box together. Cédric can explain it better than I can. Personally, I'll be modeling the plexiglass part in CREO with the following plans:



The drawing above is a side-by-side representation of the Plexiglas shape with measurements (in cm overall and in mm where specified).

and below is the top view with measurements



The aim is to finish all the modelling before next Friday, so that we can move on to laser cutting during next week's slot, as we have made an appointment with Clarisse to get this done.