Hello everyone

I will be presenting my integrated test, I tried to made a pinball machine

At first I didn’t knew what to make, after some brainstorming I had lots of ideas but couldn’t decide. I did want to learn how RFID technology worked and I wanted something that has electronics, code and some hardware. In the end, the hardware and all the moving parts where to a bit to much, I should’ve just made a sensor communication system. Xx

It consists out of 2 parts, the actual pinball machine, and a “payment module”

This module Is used to put Credits on this RFID badge, everyone has his own badge and could be used to pay so that you can play with the pinball machine or other things at an arcade centre or a theme park etc.

The user operates the flippers by pressing these buttons on the side of the case.

The user can choose different gamemodes and can look at the current highscore on the LCD screen using the joystick to navigate.

I didn’t have an external partner or company that I contacted to make this.

Using 3D printing I was able to quickly test pieces and changed designs if I saw they had flaws. First I made some sketches on paper, then designed them in a 3D drawing software called Solid Edge.

I made the pinball machine from wood, well, my grandfather made it. I did make the marble tracks myself, these are steel wires soldered together. This spiral is driven by a stepper motor and is used to bring the balls up. The pinball machine is 30cm wide, 45cm long and 25cm high.

When a player presses one of the buttons, the Arduino controls a MOSFET that switches the solanoid. If a current goes through the solanoid, the solanoid will retract. If that happens the flippers move.

For the electronics I first made sketches on how I would connect everything to the main component, the Arduino Mega for the pinball machine and the Arduino Uno for the payment module . This is how it looks when its all connected.

To make it all work together, I coded everything in the Arduino IDE. Everything is written in C++.

Now for any issues I had whilst building this. First of all, my timing, I started good and did a lot in the beginning of the year, but then it slowd down and I really had to speed up in the end. And yet im still not completely finished. Then I also made a small design mistake. There is a hole behind the keyboard, but it had to be a lot lower, so with a soldering iron I made another hole.

I also used a wrong MOSFET to control my Solanoids. So I had to order new ones.

I also did some testing on playing sound effects thrue a speaker when a player scored or lost, but in the end it wasn’t loud enough and to fix this I would have to buy a amplifier.

First I also asked someone from this school to make the case of the pinball machine from wood, but this was also a mistake as it wasn’t made properly. And I had to ask my grandad to do it instead.