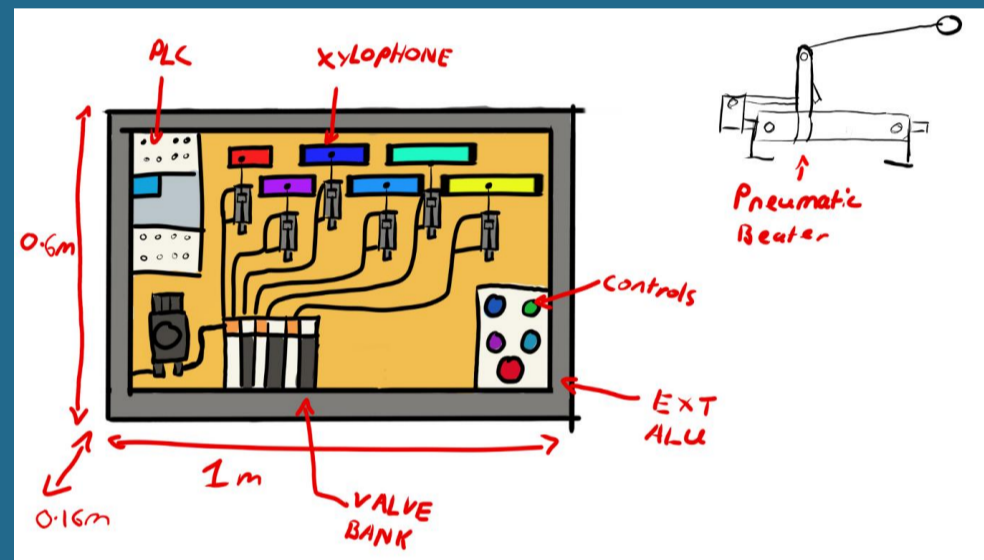


Aim of the Project

The aim of this group project is to design and build a pneumatics display. The display must be PLC controlled, have two operating cycles. The max dimensions of the frame are 1m x 0.6m.

Brainstorming ideas



Possible ideas

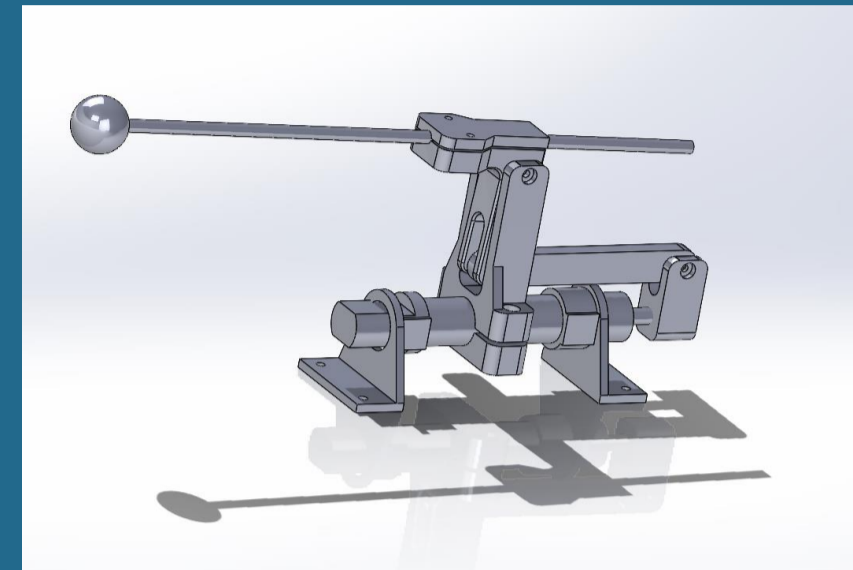
- Marble machine
- Pipe organ
- Self-playing xylophone

Design analysis

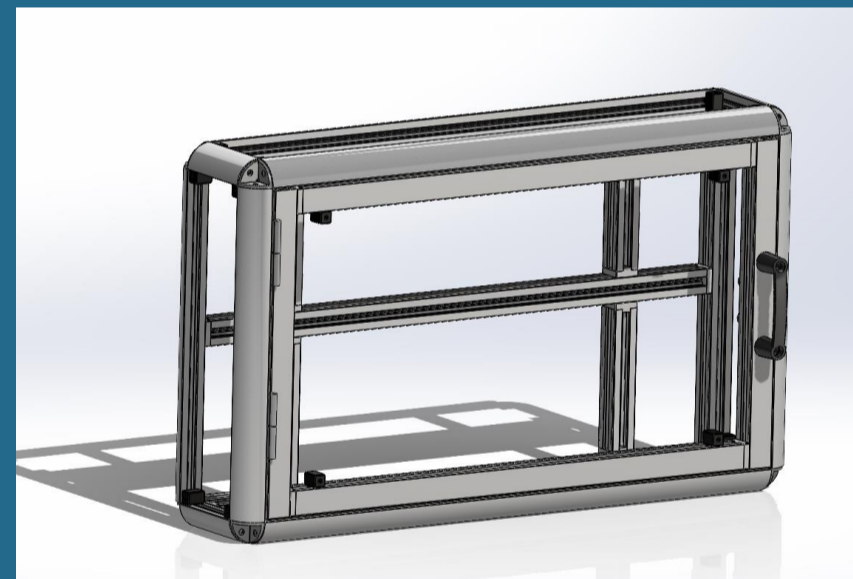
1 = bad 5 = good	Coding	Complexity	Visual appeal (x2)	Time constraint	Rank
Marble machine	2	3	4	3	16
Organ	3	4	3	4	17
Xylophone	4	2	5	2	18

The xylophone ranked the highest in the design analysis.

CAD Assembly



A beater mechanism is designed that uses a pneumatic cylinder to move a beater stick. The parts are designed to be 3D printed.



A frame is designed using Quantum 3 extruded aluminium and connectors.



The PLC, valve bank and xylophone are placed inside the frame.

Manufacture

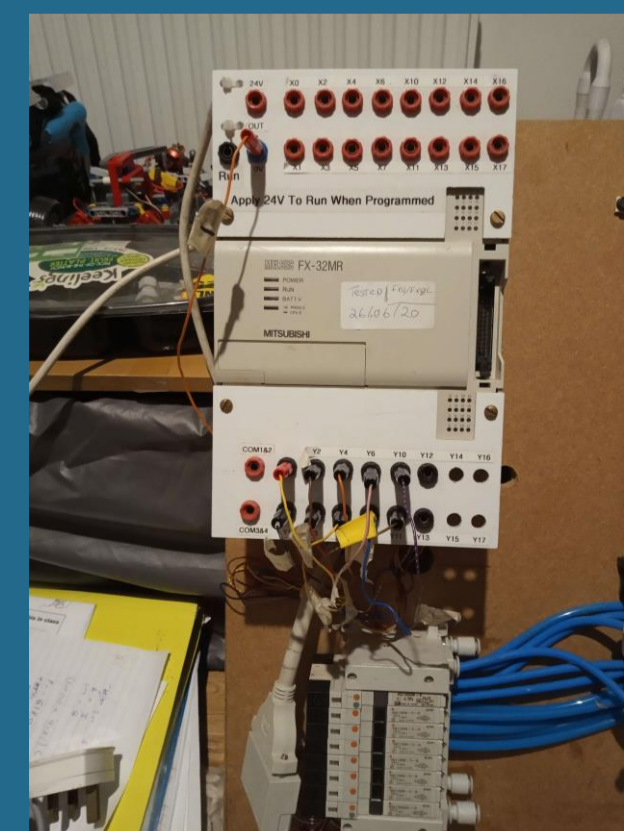


All of the 3D printed parts.



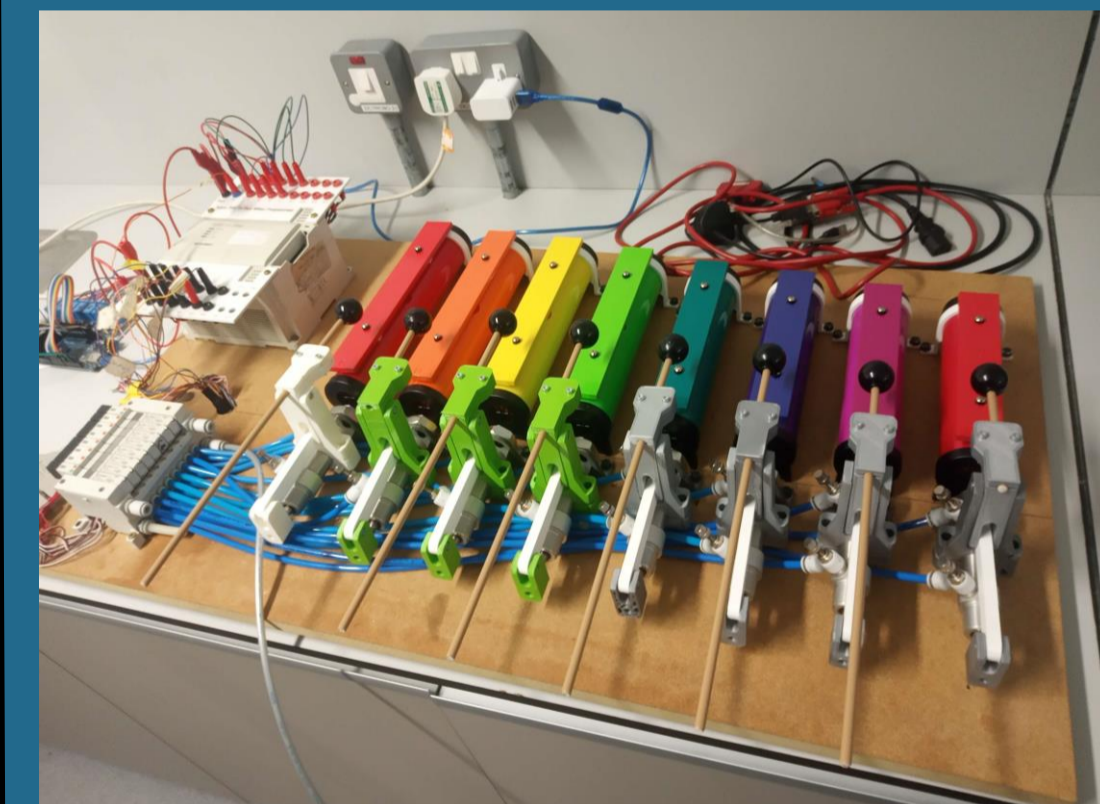
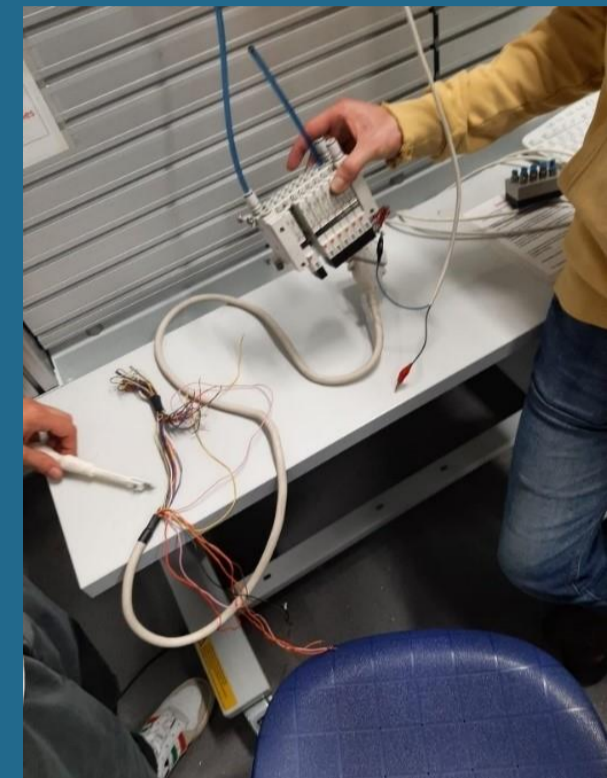
The 3D printed parts are clamped and threaded onto a pneumatic cylinders.

Banana connectors are soldered onto the valve bank cables. Pneumatic 6mm hose is cut to length and attached to each cylinder.



Testing Components

Each component is tested. The cables for the valve bank are labelled with what valve they activate. Two of the valves had to be replaced.



A mock demo is rigged up to test all the components at once.

Conclusions

- Background is conducted on parts that are used.
- A CAD model is created, and parts are 3D printed.
- All the parts are screwed onto a MDF backing board and connected.
- A different MIDI songs were uploaded and tested on the xylophone.
- All components work without any problems.