



# **DESIGN PROPOSAL**

**Building healthy working status**



# Project Positioning

## Background

Many bad work habits have been affecting people's health. However, due to the accumulation of time, it is difficult for most people to break these bad habits.

## Objectives

The purpose of this project is to explore whether it is possible to design products or devices to help people build their healthy work habits in the process of using them

## Design Process

### 1 Research

Project Research  
User orientation



### 2 Define

Product orientation  
Clarify function



### 3 Ideate

Brainstorming  
Design stage



### 4 Prototype

Model testing

### 7 Project Development

Final Summary  
Extension of the subject



### 6 refinement

Summarising the pros/cons  
Perfecting the design



### 5 Deployment

User testing and feedback



## User Orientation

Office workers/Students

## Usage Scenarios

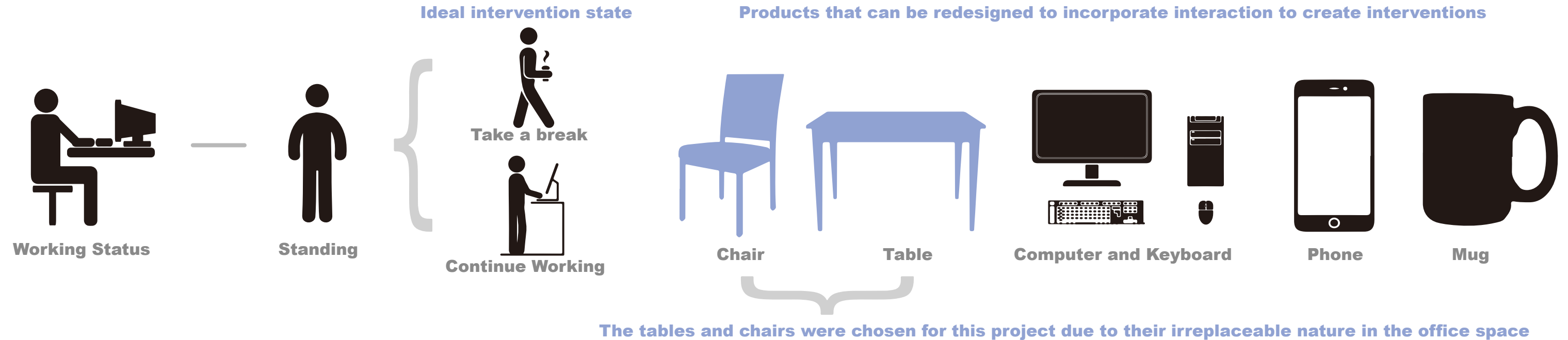
Office space/study rooms/Classrooms

## Pain Points

The health of the body is affected by long hours of sitting at work

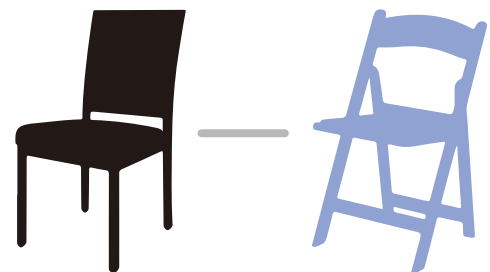
# Interventions

As the user works in a sitting position for long periods of time, the main intervention of the project is to take measures when the user works in a sitting position for a certain period of time



# Project Advancement

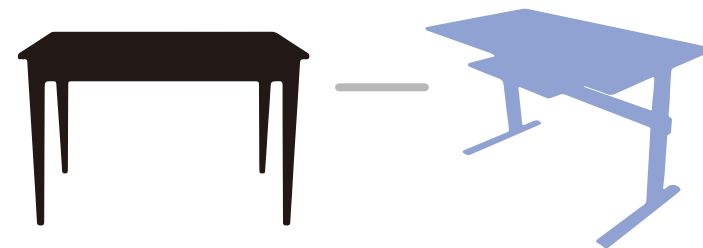
## Stage 1



### Automatic folding chair

My aim was to make the chair unusable in a fixed situation by some intervention. So I came up with the idea of folding the chair for testing and wanted to incorporate a mechanical device to control the folding of the chair.

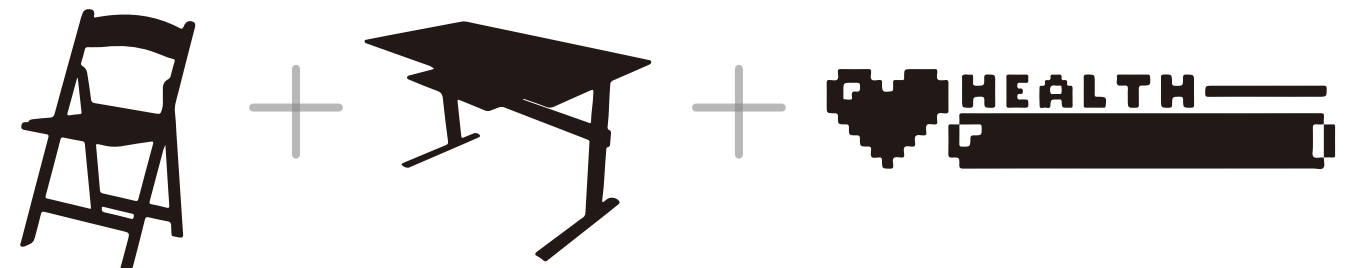
## Stage 2



### Automatic folding chair

As I found after phase 1 that the compulsory interruption of the user's working state would affect the progress of some users, I conceived the idea of an automatic lifting table to solve this problem

## Stage 3



### Full interactive experience

After the first two phases of testing, I found that perhaps I should combine the automatic lift chair with the automatic lift table to form a complete interactive system, and I came up with the idea of a trigger mechanism to remind people of the passage of time at work by displaying the stamina value.

# Deployments

Test one explores whether an automatic folding chair can complete the intervention. Test two explores the feasibility of the automatic lift table. Test three the impact of the whole interaction system on the user

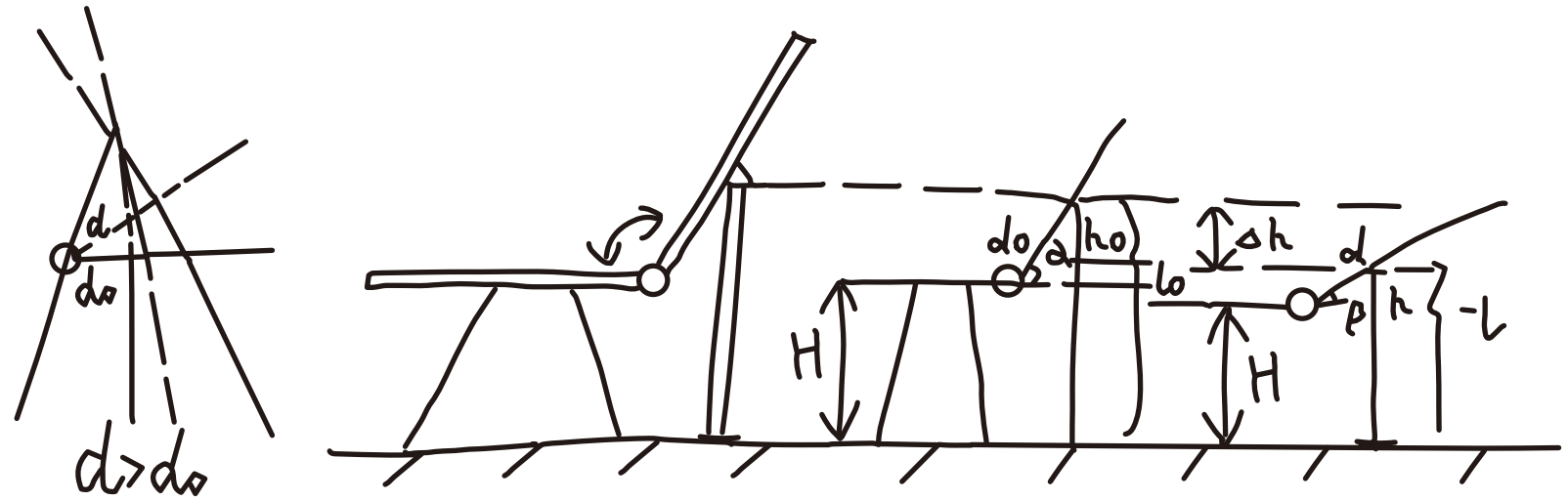


# Automatic Folding Chair Production Process

## Simulating the folding process



## Calculating the feasibility of the programme



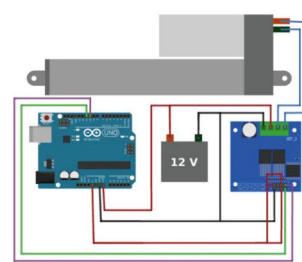
## Linear Actuator Test

Select Linear actuators to push the chair to fold

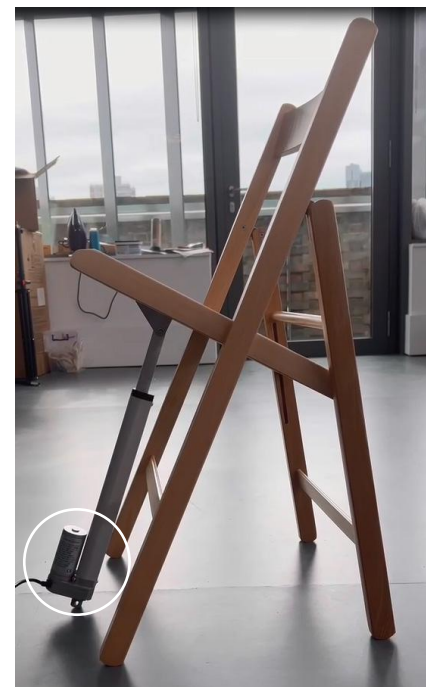
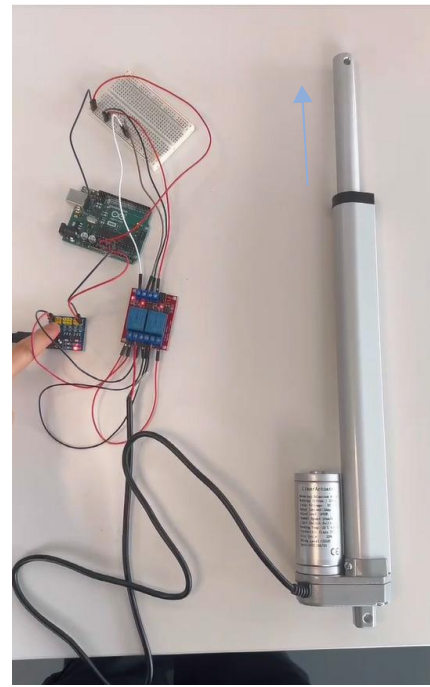
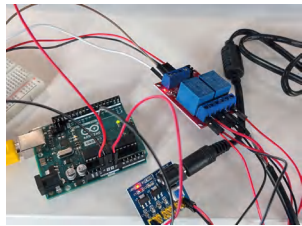
Connecting arduino

Linear Actuator Test

Installation and Telescoping Test



```
void setup() {
  pinMode(rc_pin, INPUT);
  pinMode(Extend_pin, OUTPUT);
  pinMode(Retract_pin, OUTPUT);
  digitalWrite(Extend_pin, LOW);
  digitalWrite(Retract_pin, LOW);
}
```



Actuator : not fixed  
Stability : poor

Since there is no connecting part between the chair and the linear controller, the linear controller is not stable enough during the stretching process, so it is necessary to add a connecting part to keep the linear controller perpendicular to the ground when stretching, thus forming a stable structure

## Add support structure



Actuator:fixed  
Stability: Basic stability

By adding connecting parts, it was found that the automatic chair lift basically formed a stable structure after testing



# Deployment 1

The first user is a student at the university, she is a graphic designer and due to her profession she spends a lot of time on the computer every day for study and work, according to the description of this project she participated in this test



## Feedback

"This one combines the linear controller with the chair in such an unusual way that there was no way for me to remain seated when the chair was folded to a certain point. But since I sometimes need to work continuously, forcing me not to sit might disrupt my work schedule."

## Reflection and improvement

1 Manual control of linear controllers is not applicable in practice. 2 Simply folding the chair and leaving the user unable to work may affect the progress of the work and solutions need to be provided that will not affect the continuity of the work.



# Automatic Lifting Table Production Process

## Preliminary preparation

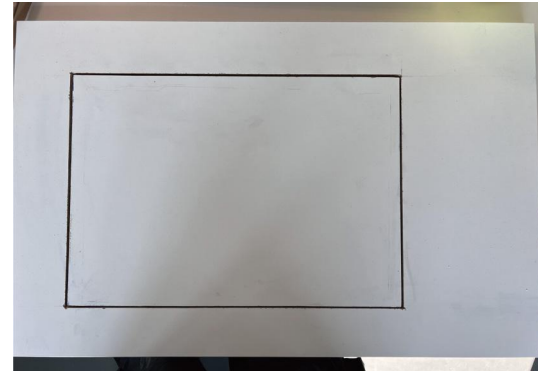
Defining the lifting platform area



Cutting designated areas with a saw



Reasonableness of the remaining space in the test area



Reasonableness of the remaining space in the test area

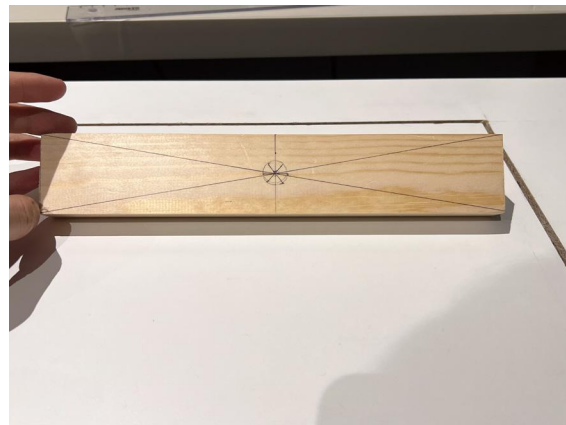


Simulated usage scenarios



## Making structural parts

Planning out drilling areas



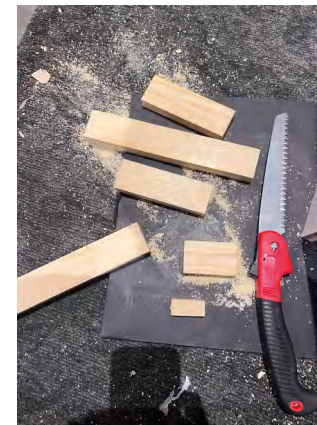
Drilling with tools



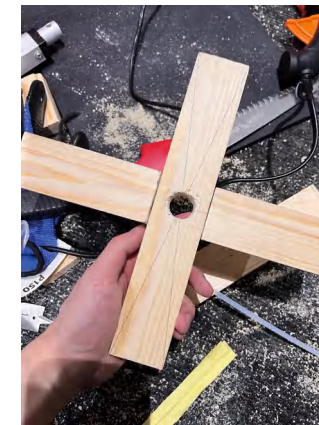
Sawing out other structural parts



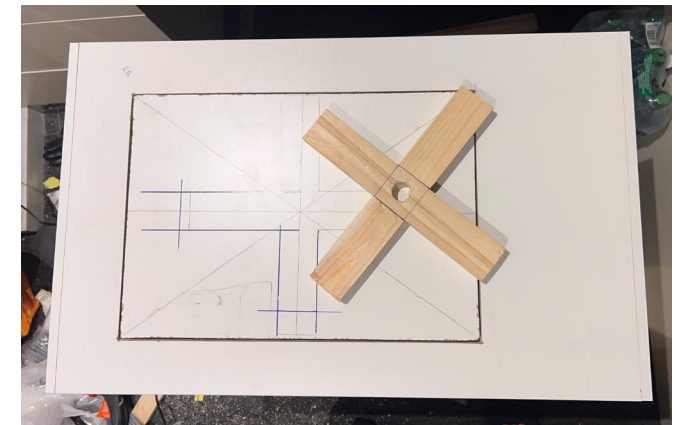
Sawing out other structural parts



Bonded together



Draw the positions where the structural elements are fixed



## Adding stable structures and testing

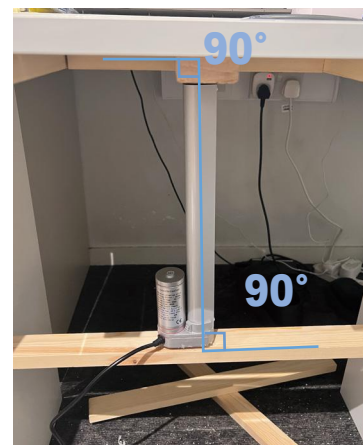
Bonded structural elements 1



Testing stability



Add structural element 2



Testing stability



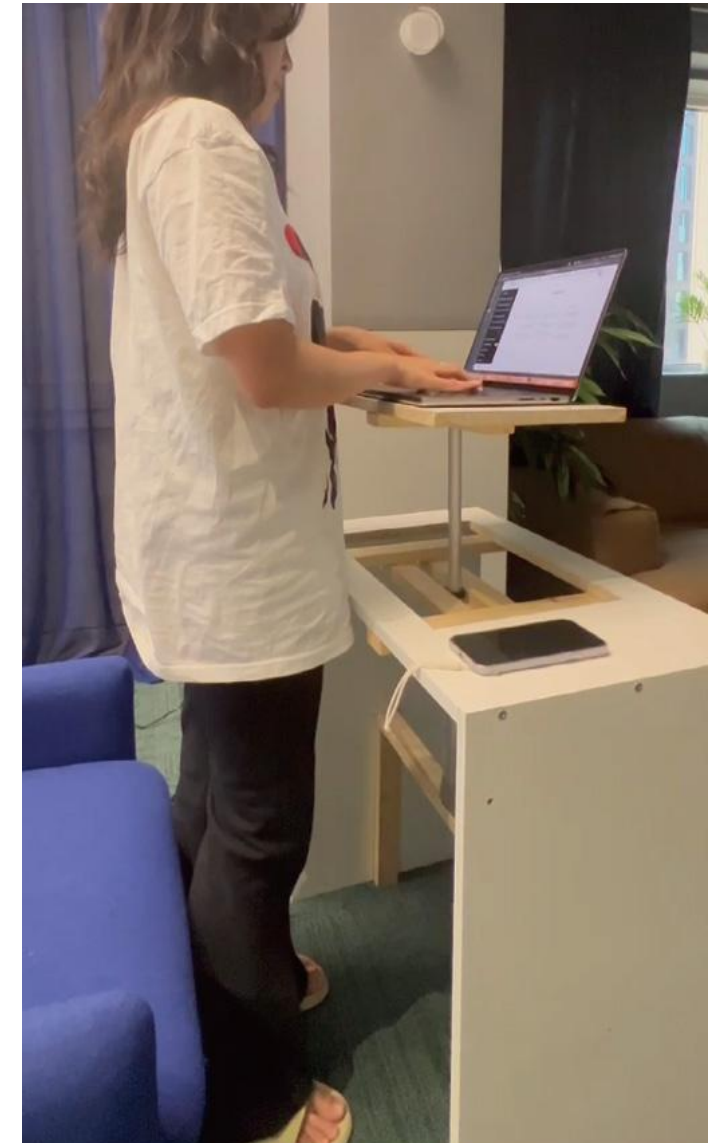
Testing the stability and viability of automatic lifting tables





# Deployment 2

The users of the second test were all postgraduate students who suffered from back pain due to their sedentary lifestyle and took part in the test according to the project description



## Feedback1

"As I am usually used to sitting all the time for work, I may choose to remain seated in actual use scenarios, I am lazy and **may need some kind of mandatory intervention to keep me from sitting continuously.**"

## Feedback2

"I don't think the lift table as a standalone design may be novel as there are similar products on the market, but **I think this may be a unique experience when combined with the automatic folding chair I first experienced.**"

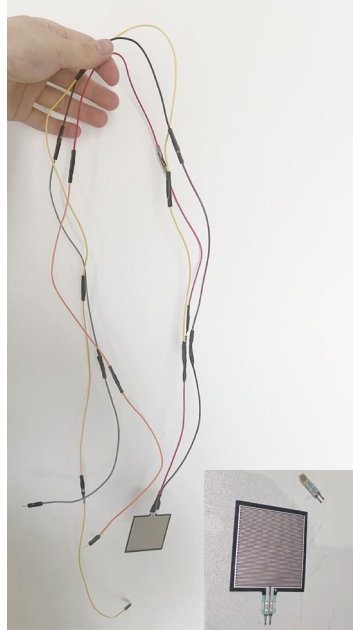
## Reflection and improvement

**1** Linking lift tables and automatic folding chairs. **2** As the interaction sensory mobilisation designed for tests 1 and 2 only involved the sense of touch, the visual sensory mobilisation needs to be added during the third phase of the interaction linkage.

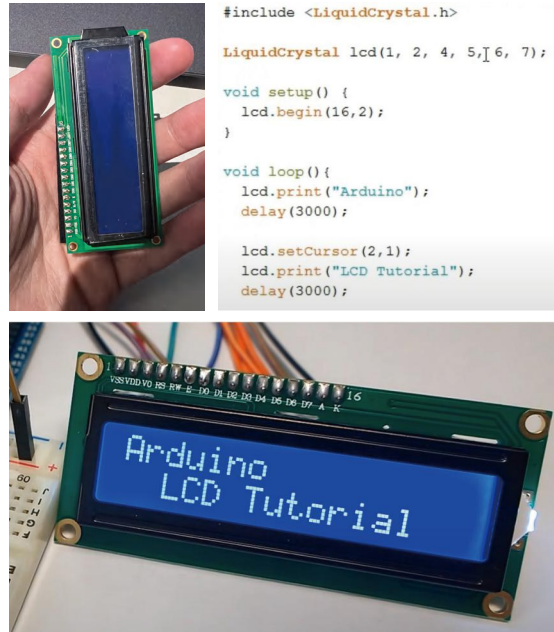


# The Final Interaction Builds

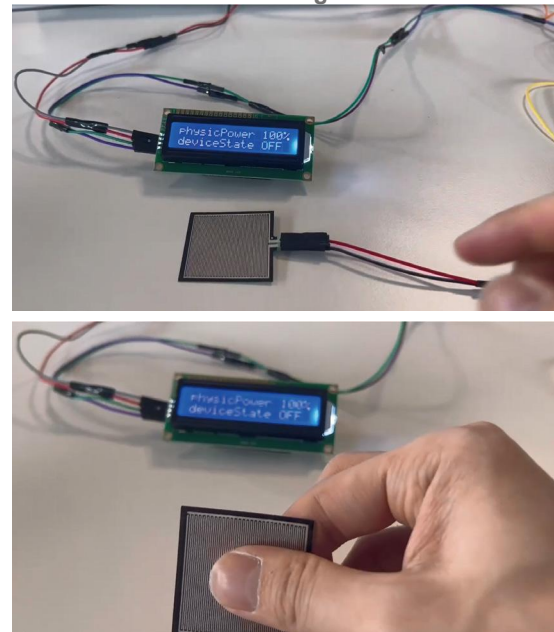
Connection sensor (mounted on the automatic folding chair)



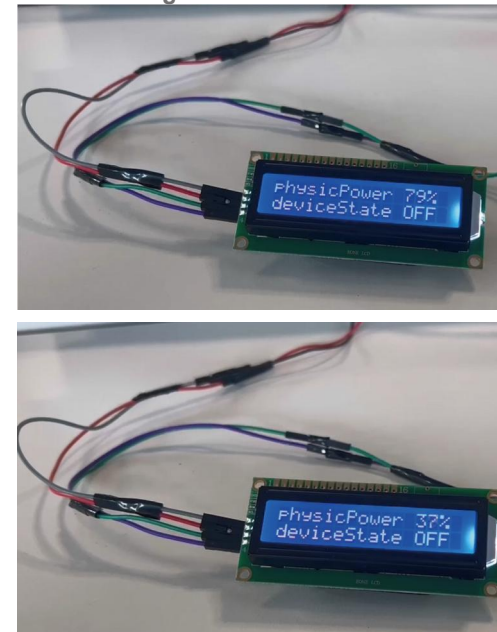
Connecting arduino(Display screens)



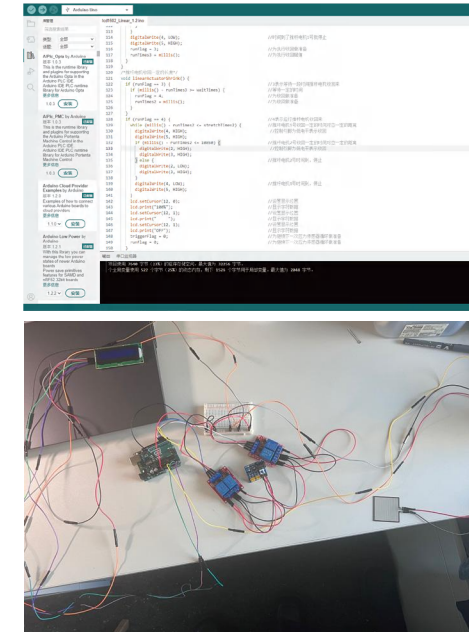
Press sensor simulates the user sitting in a chair



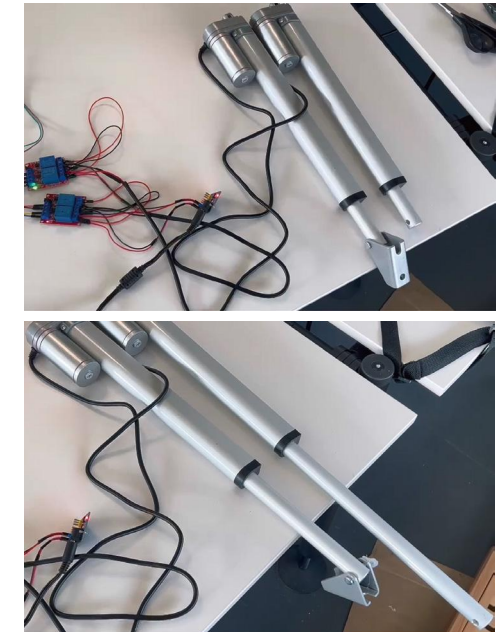
Stamina decreases with the length of time the user sits



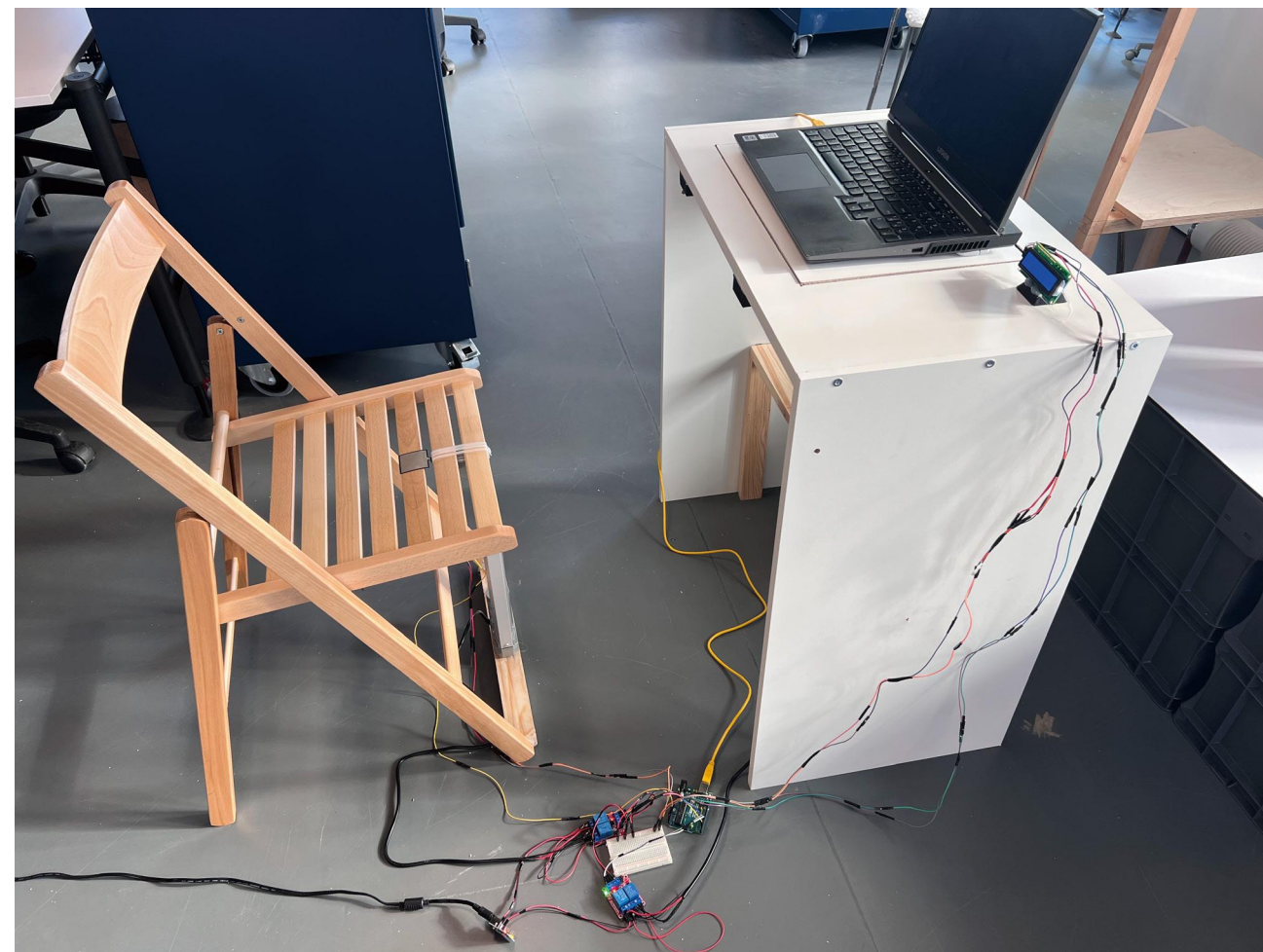
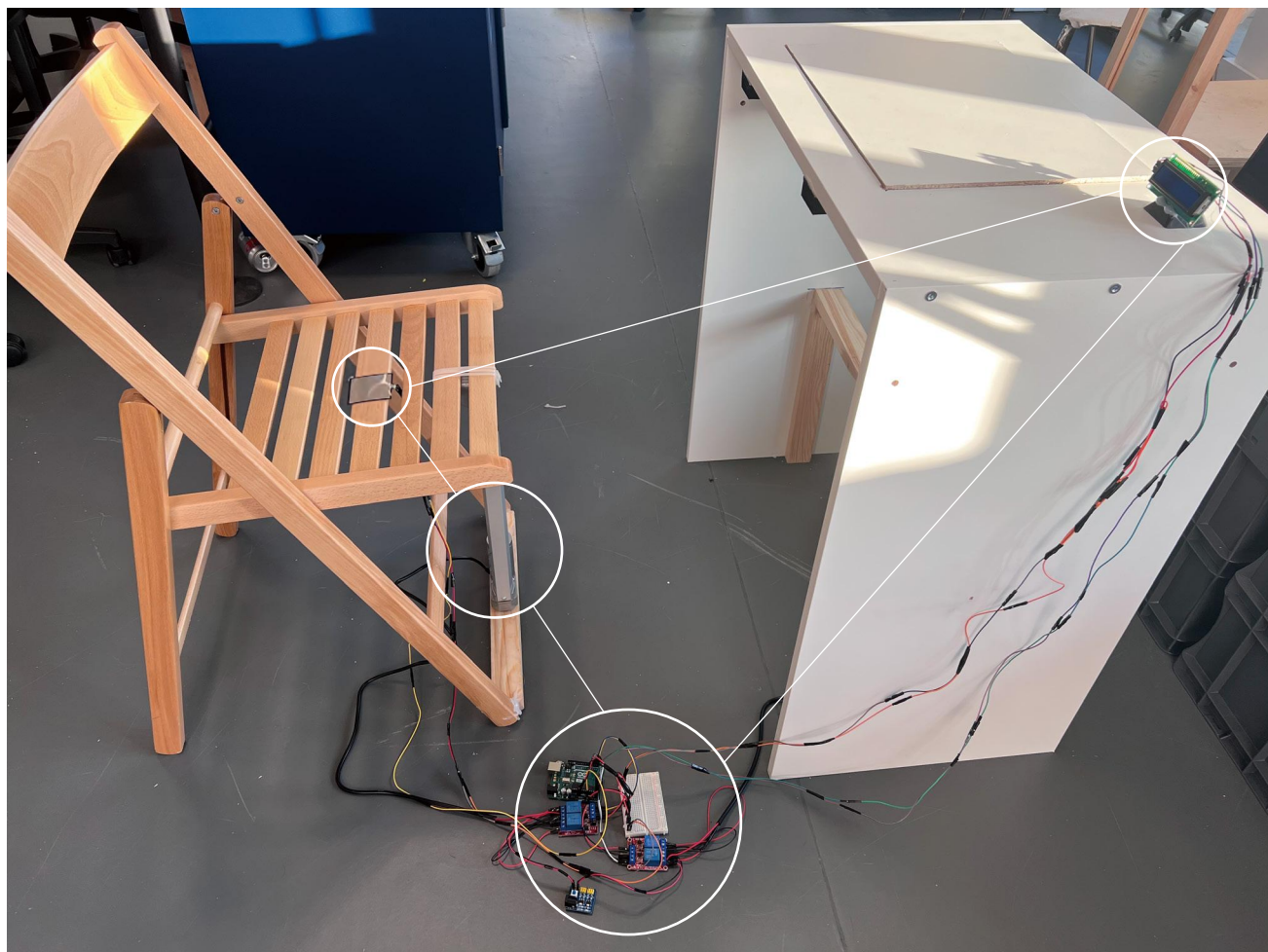
Control of the sensor display and linear actuator via arduino connectionactuator



Testing linear actuators



# The Final Test Scenario



## Sedentary reminder interactive device

Test population: people in public office spaces

The final complete integration of the interactive device into the office product is divided into three parts: a display showing the user's physical strength, sensors mounted on the chair, two linear controllers for folding the chair and the lifting table, and an arduino to complete the connection control.



# Deployment 3

Both testers in Test 3 were simply told that they needed to work in a given position for a certain period of time, so that they could get a more intuitive and natural picture of how they interacted with the whole interactive device, with different testers choosing different ways of handling it due to their individual working habits

## Feedback1

"When I sat down to work, I noticed that the display on my desk showed stamina values and that they would drop after a while, I had no idea what this meant. When the stamina reached 0 the chair started to lift me upwards, which made it impossible for me to continue sitting, so I chose to take a break for a few minutes until the table was lowered and the chair was level again, then came back with a bottle of water and continued working."

## Feedback2

"After I had been working for a while I was forced to stand up in order to continue working, as I have been quite busy recently I chose to stand until the lift dropped down a few minutes later, this interactive device was quite interesting and did not interfere with my continuing work."

## Reflection and improvement

Through test three I feel that the interactive device has achieved my desired intervention goals. However, my goal this time was only to focus on the relatively small topic of sedentary reminders, as there are many other effects in people's lives caused by long periods of bad habits.

