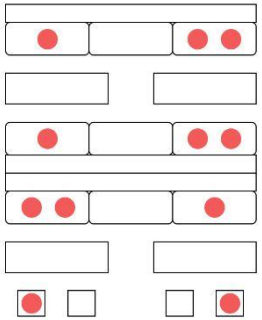
Midterm

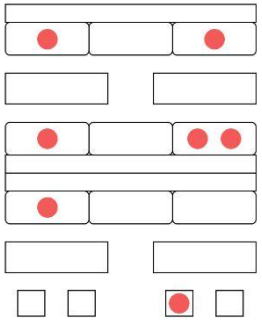
Oliver J. Post | Jiacheng Xu | Jiahui Shi

Analysis

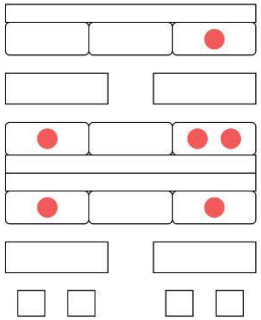
Seat arrangement



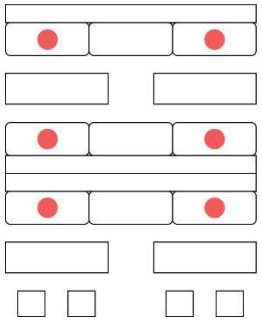
Working Days
10:00 am



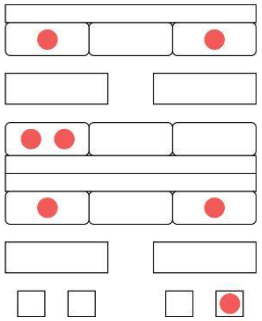
Working Days
4:00 pm



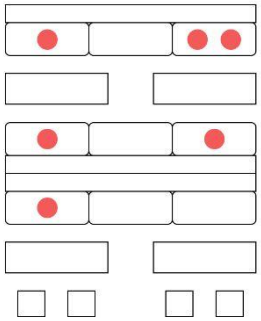
Working Days
10:00 pm



Weekends
10:00 am

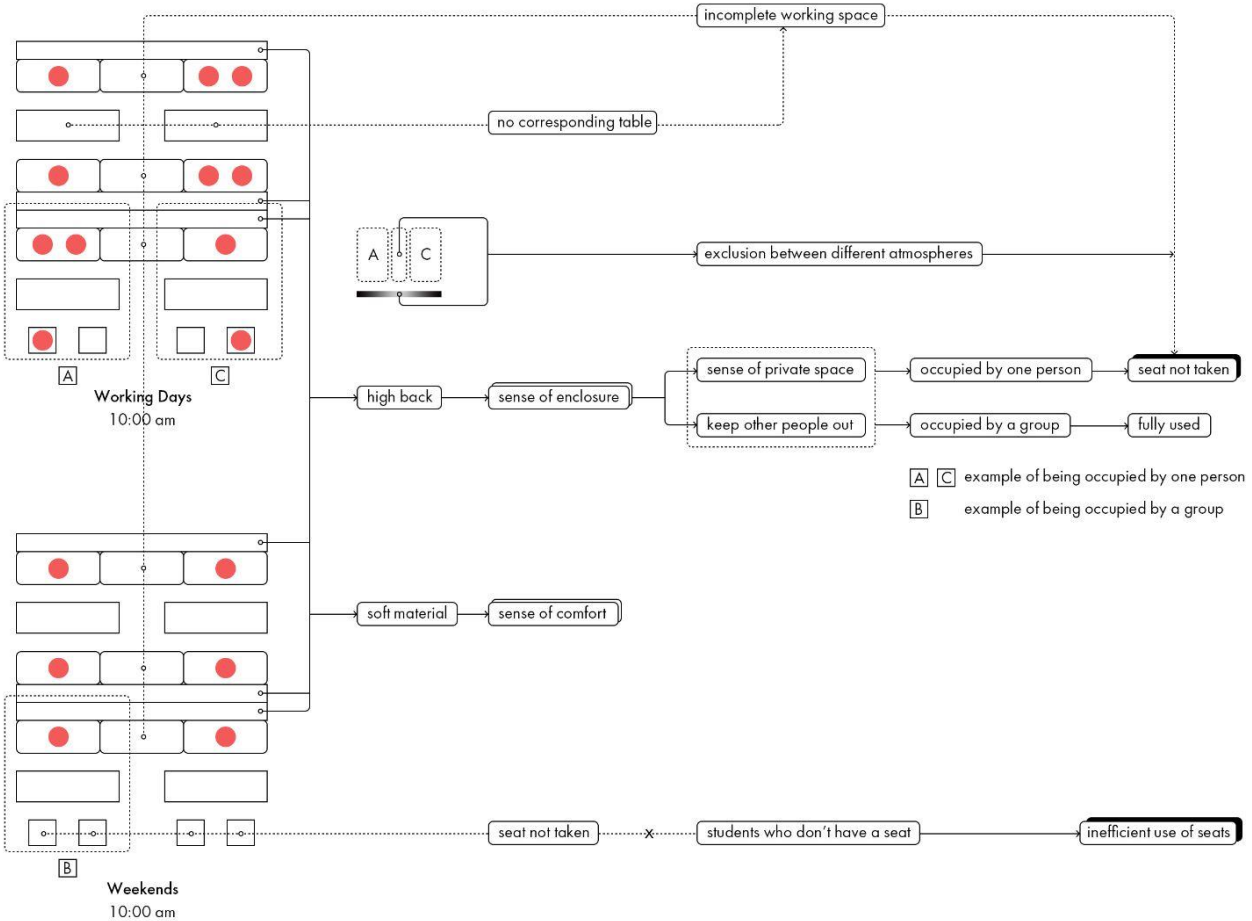


Weekends
4:00 pm

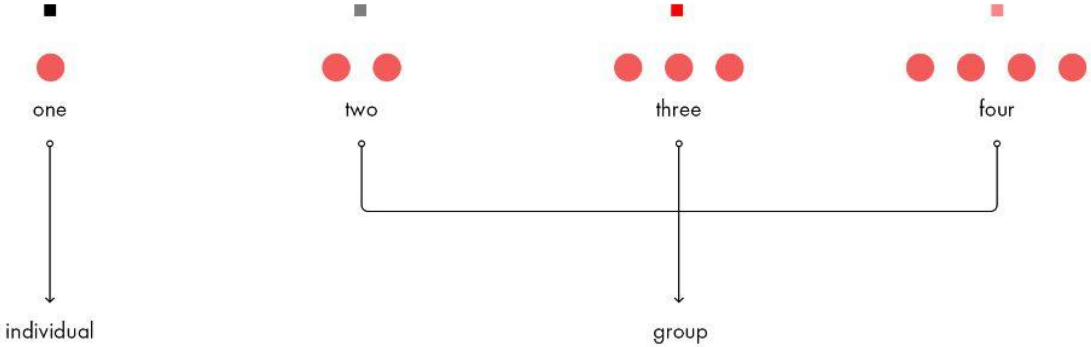


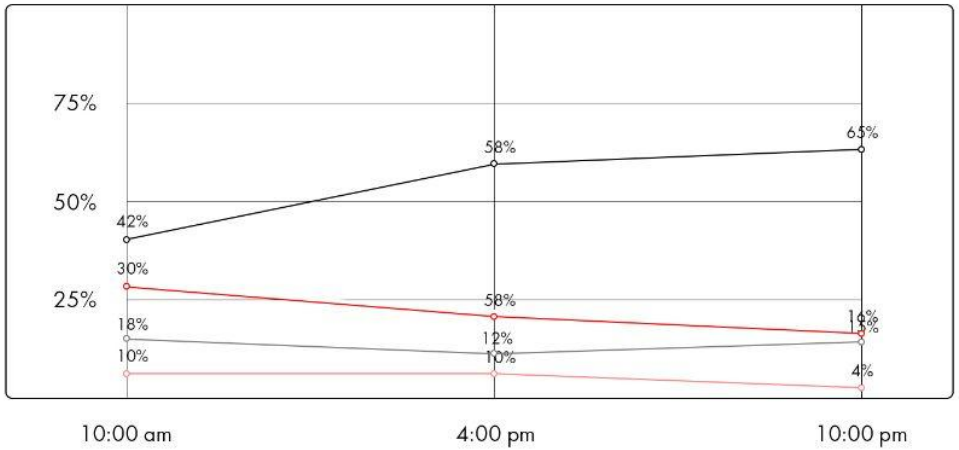
Weekends
10:00 pm

Advantage and defect



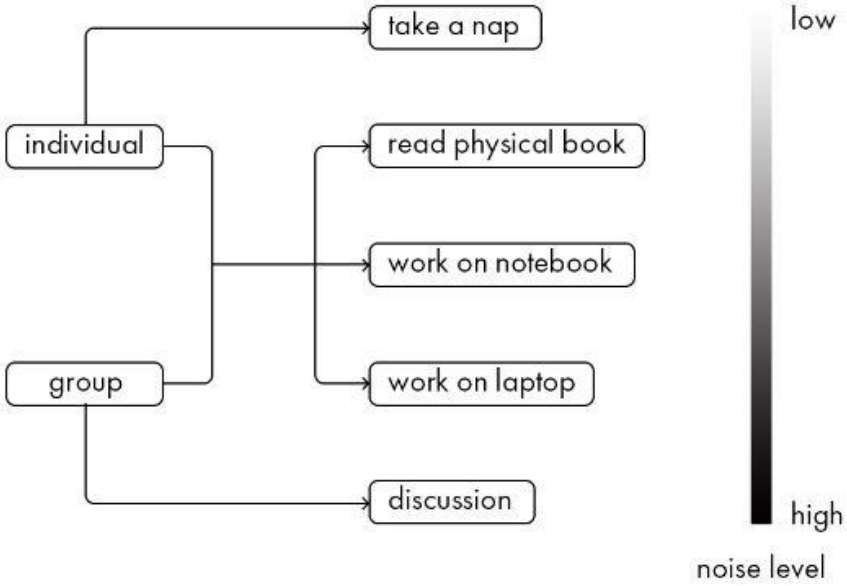
Time


one
two
three
four
individual
group

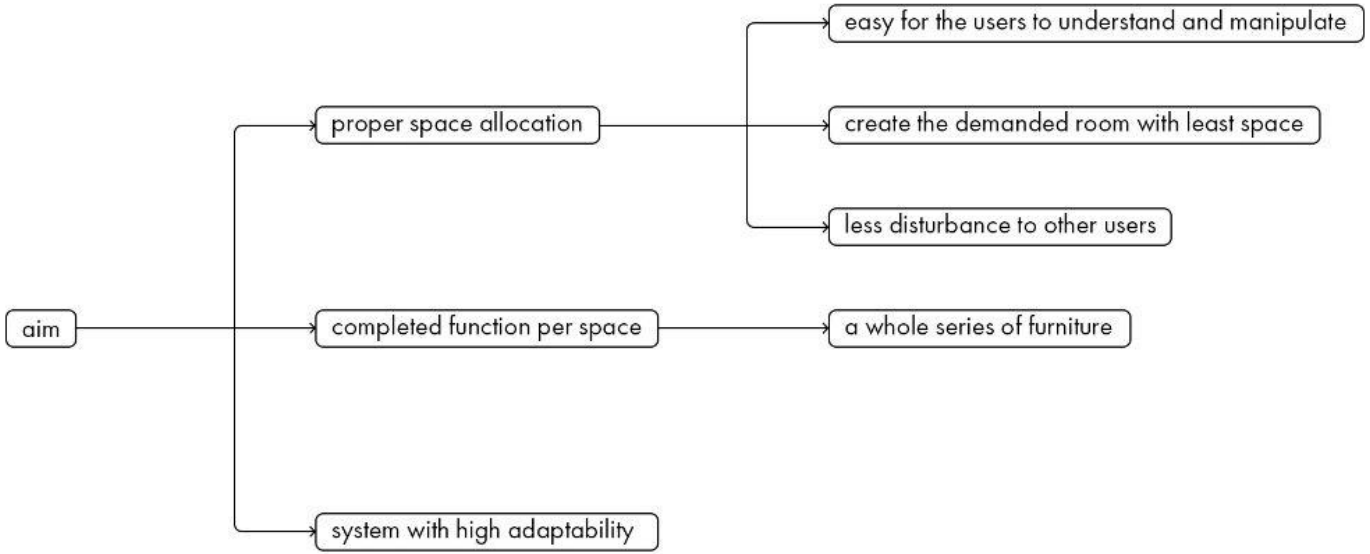

75%
50%
25%
42%
58%
65%
30%
58%
18%
12%
10%
10%
4%
10:00 am
4:00 pm
10:00 pm

Time

Activity


take a nap
individual
read physical book
work on notebook
work on laptop
group
discussion
low
high
noise level

Aim

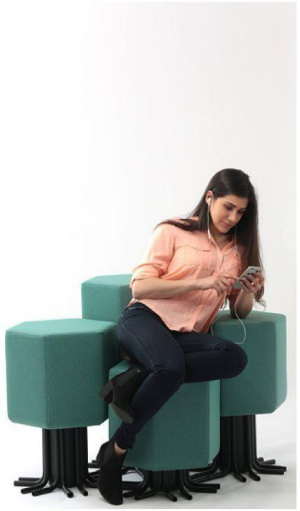
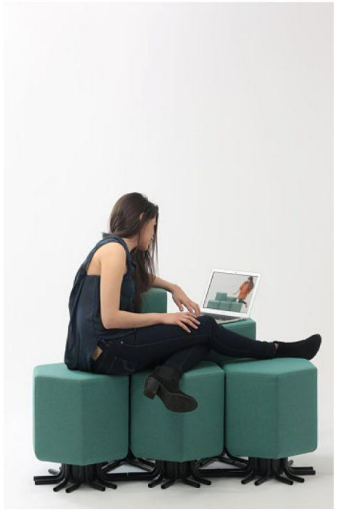
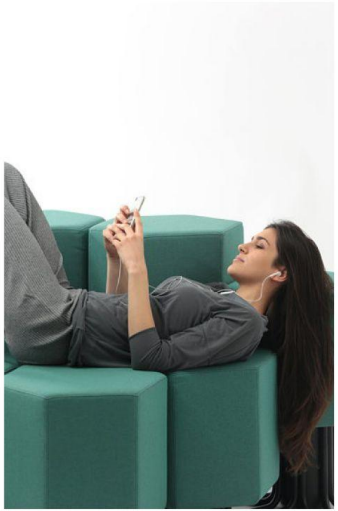

aim
proper space allocation
completed function per space
system with high adaptability
easy for the users to understand and manipulate
create the demanded room with least space
less disturbance to other users
a whole series of furniture

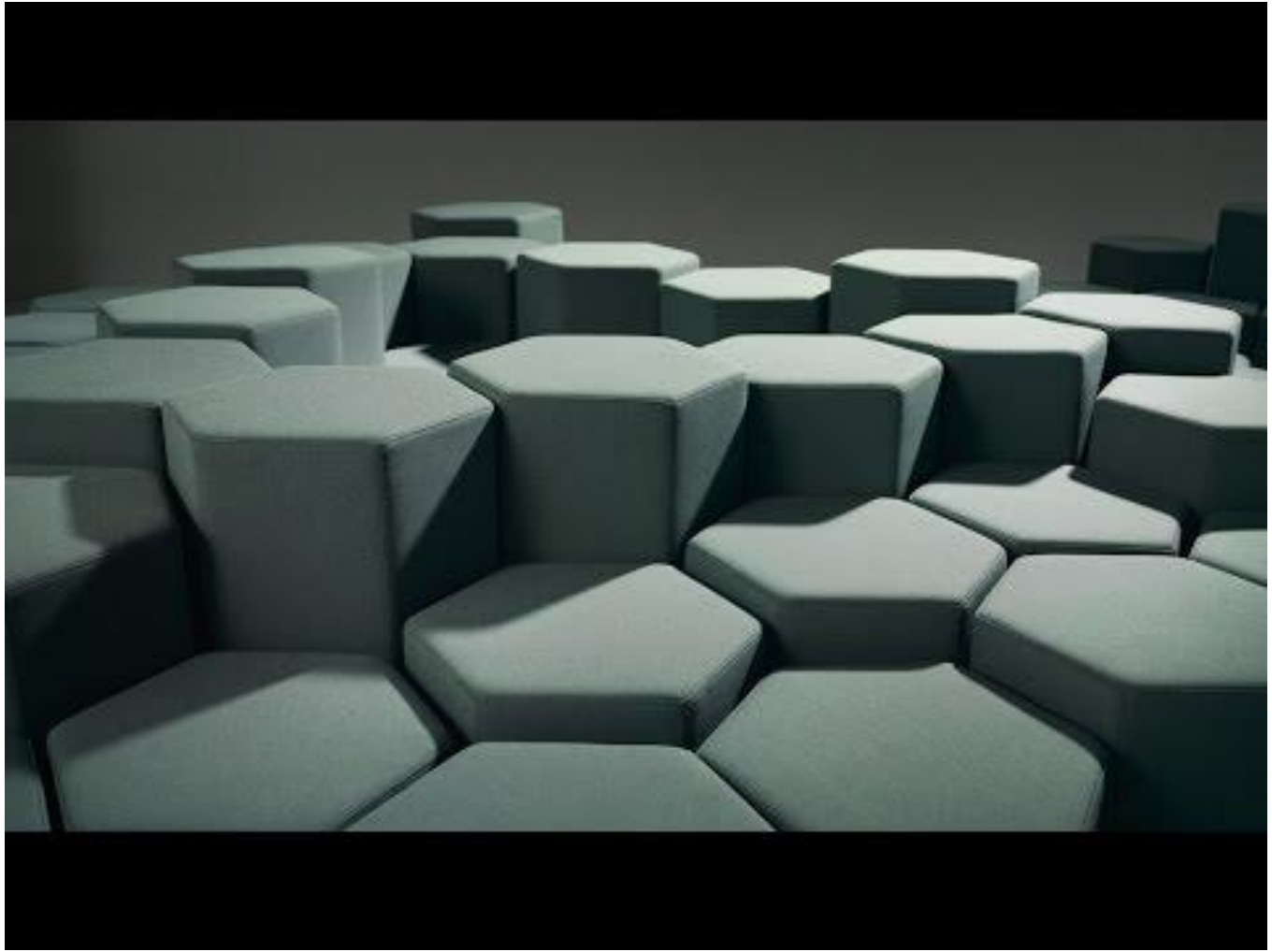
Design

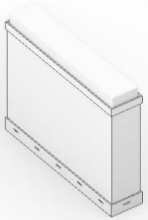
Lift-Bit

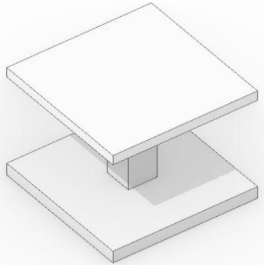
Lift-Bit is a modular, digitally-reconfigurable furniture system that allows a sofa to seamlessly turn into a chair, a chaise longue, a bed, a lounge room, and myriad of other configurations. The system is composed of a series of individual, upholstered stools. Each element is motorized using a linear actuator, enabling it to be raised or lowered

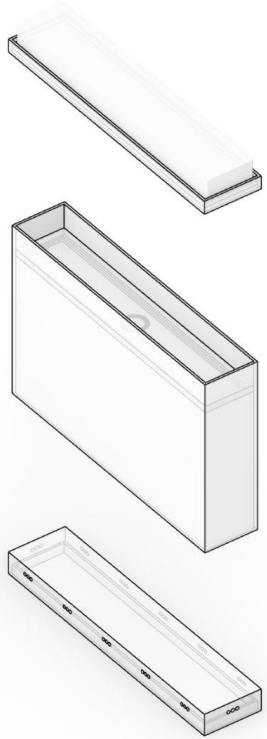
Lift-Bit can be controlled in person, via a simple gesture (just hovering your hand in the air over the seat), or from a distance, through the use of a mobile app. The app includes both a series of predetermined three-dimensional shapes and a tool to create new, dynamic combinations. The Lift-Bit system can even become 'bored': when not used for a long time, it will start shape-shifting on its own to engage users.





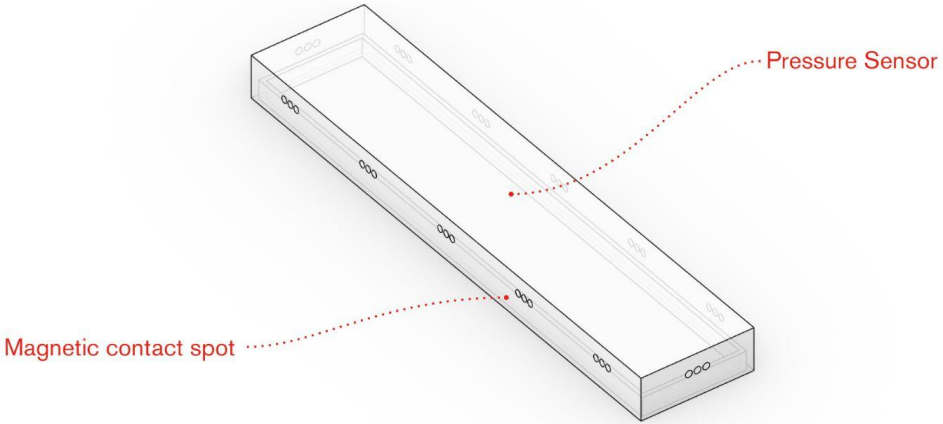




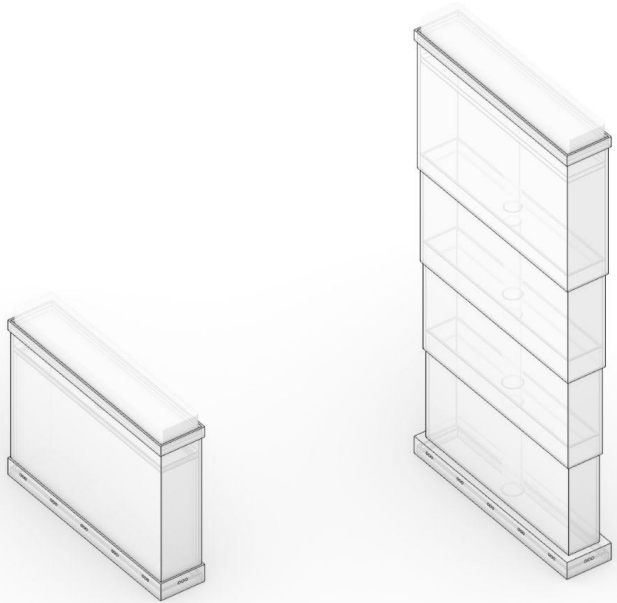
cap

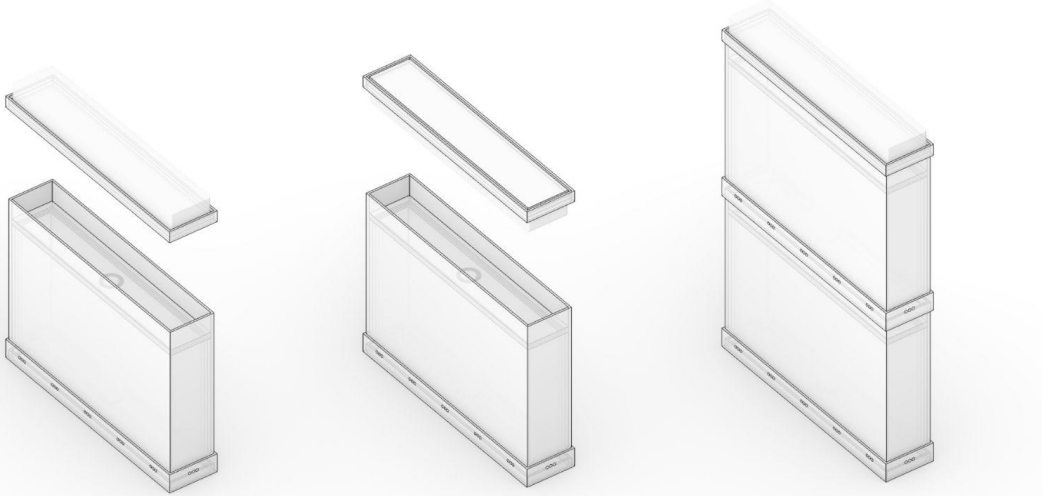
body

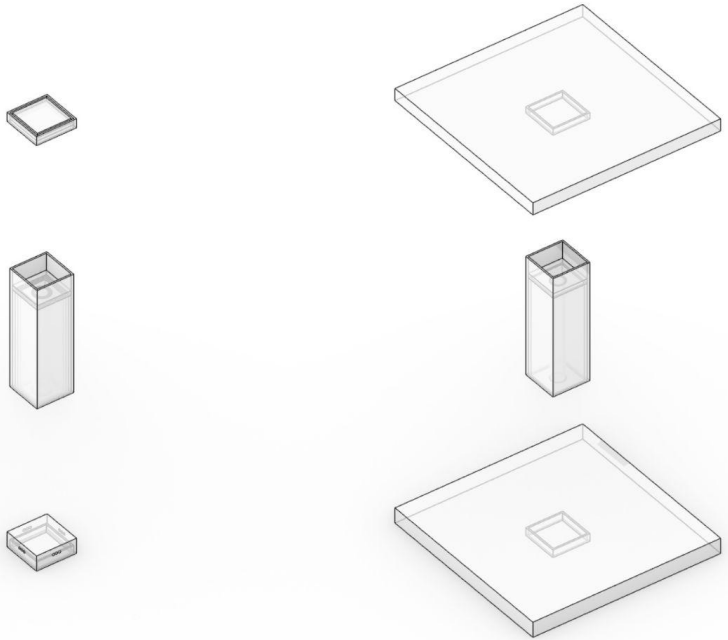
pedestal

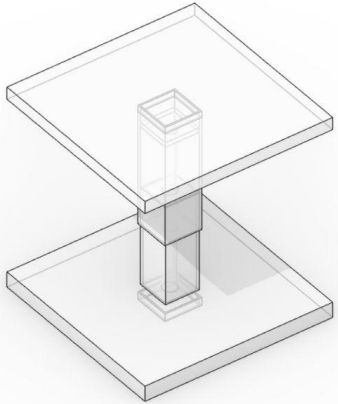

Pressure Sensor
Magnetic contact spot

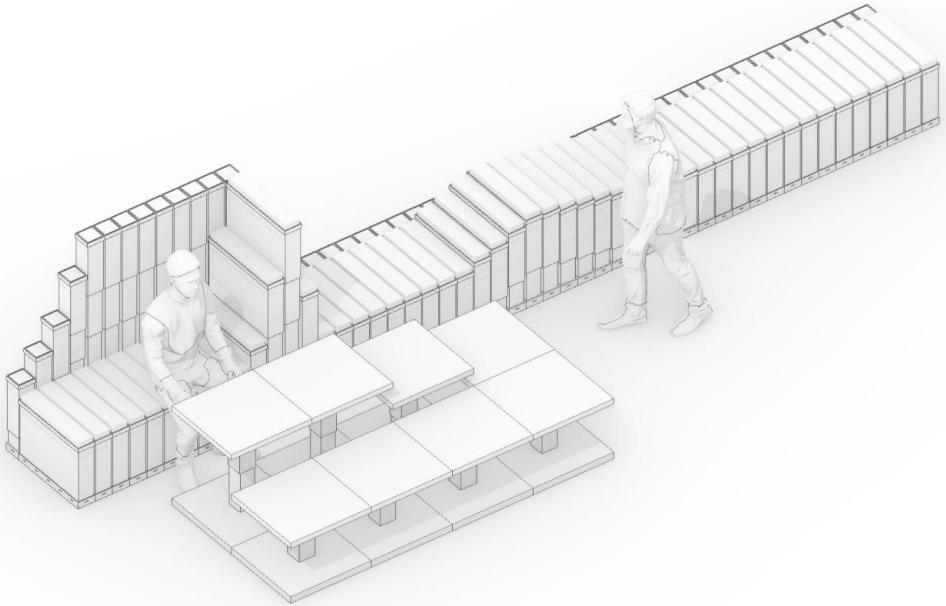
Telescopic structure

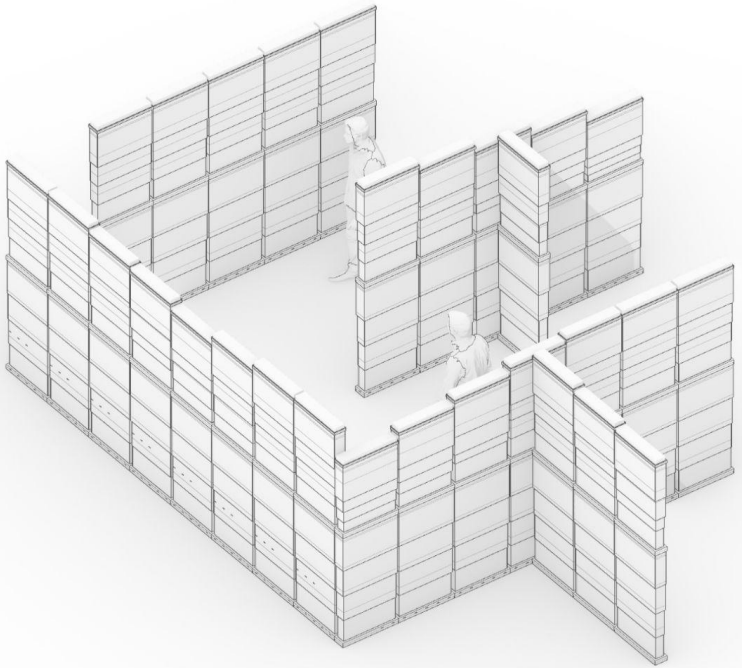


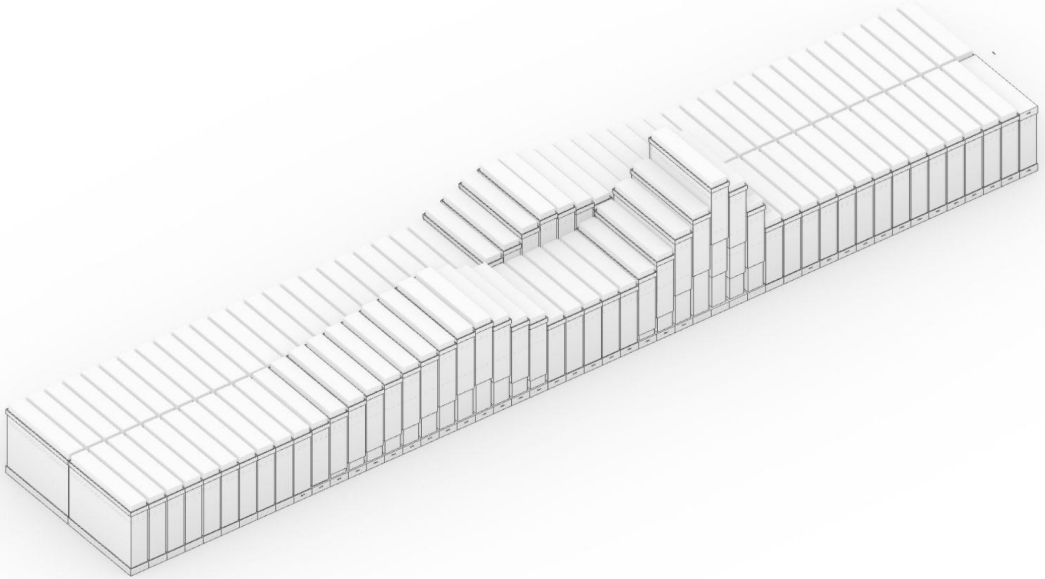


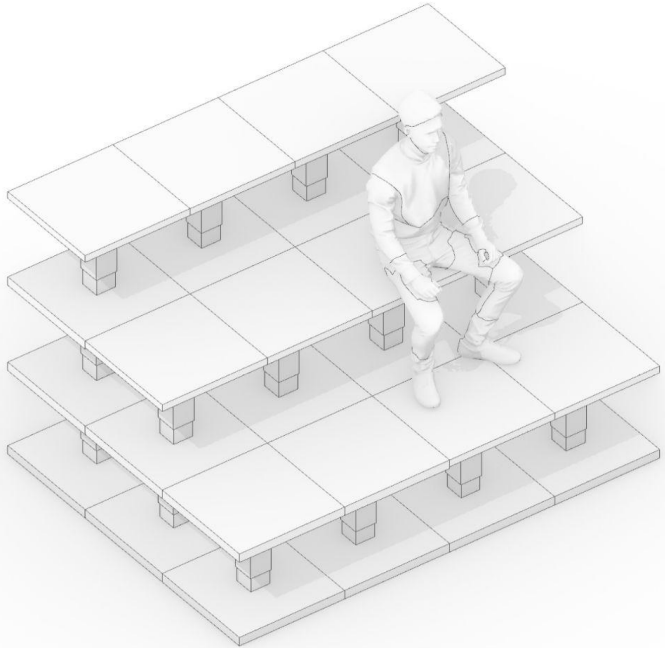


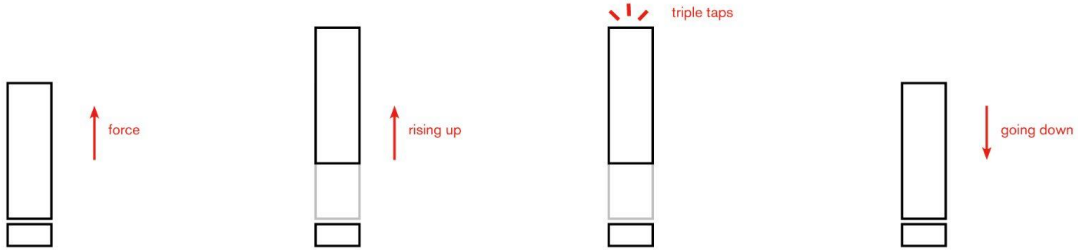


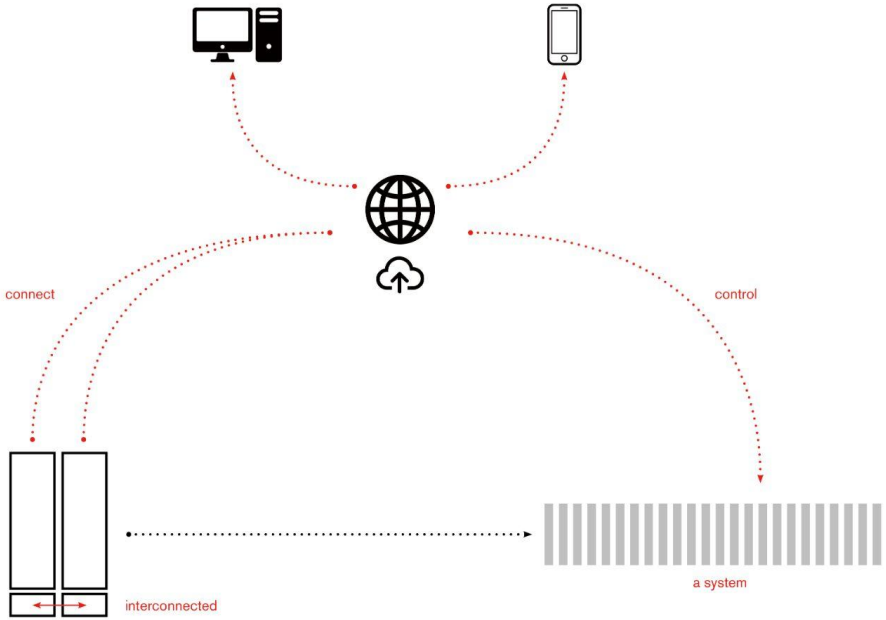


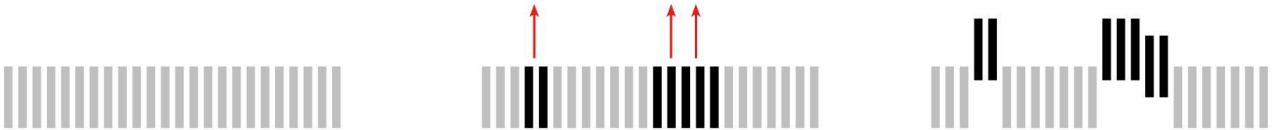


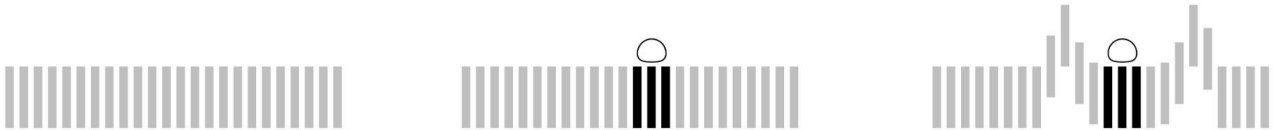


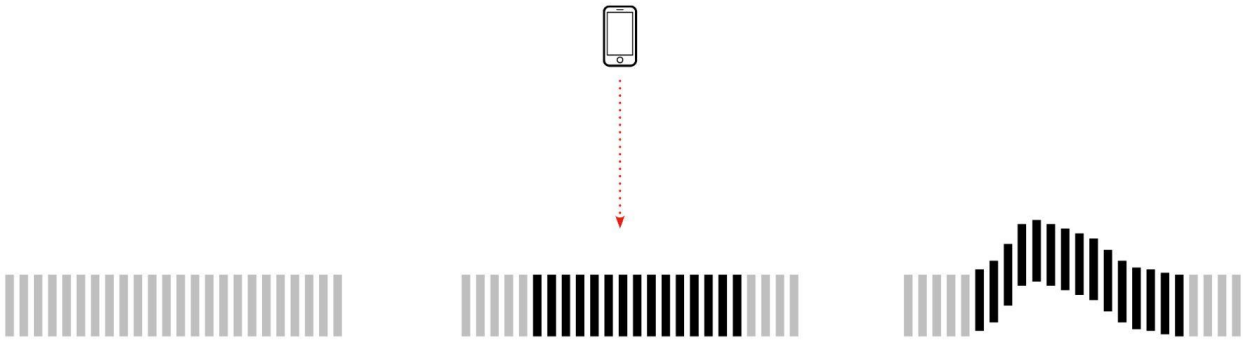


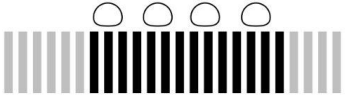

force
rising up
triple taps
going down

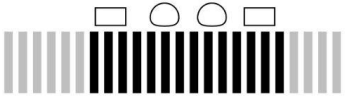

connect
control
interconnected
a system

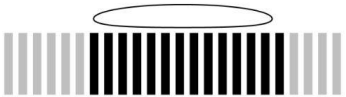






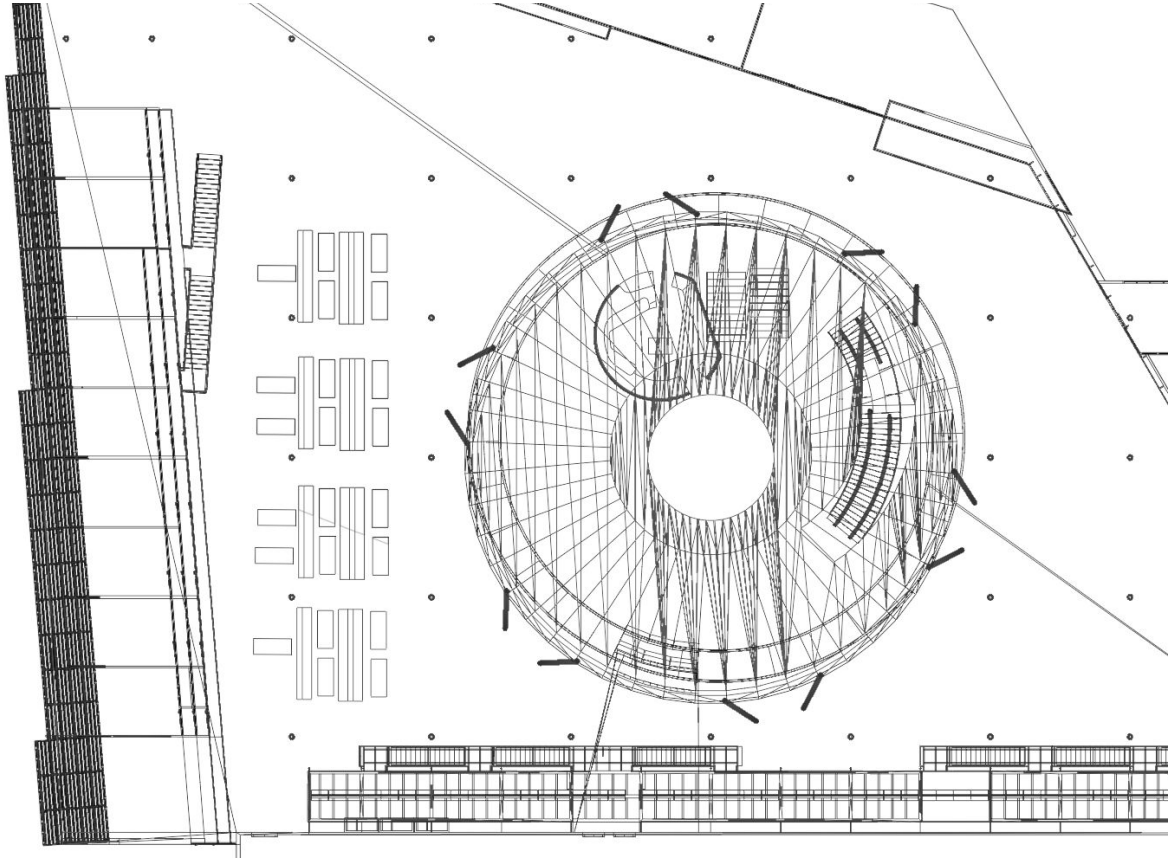




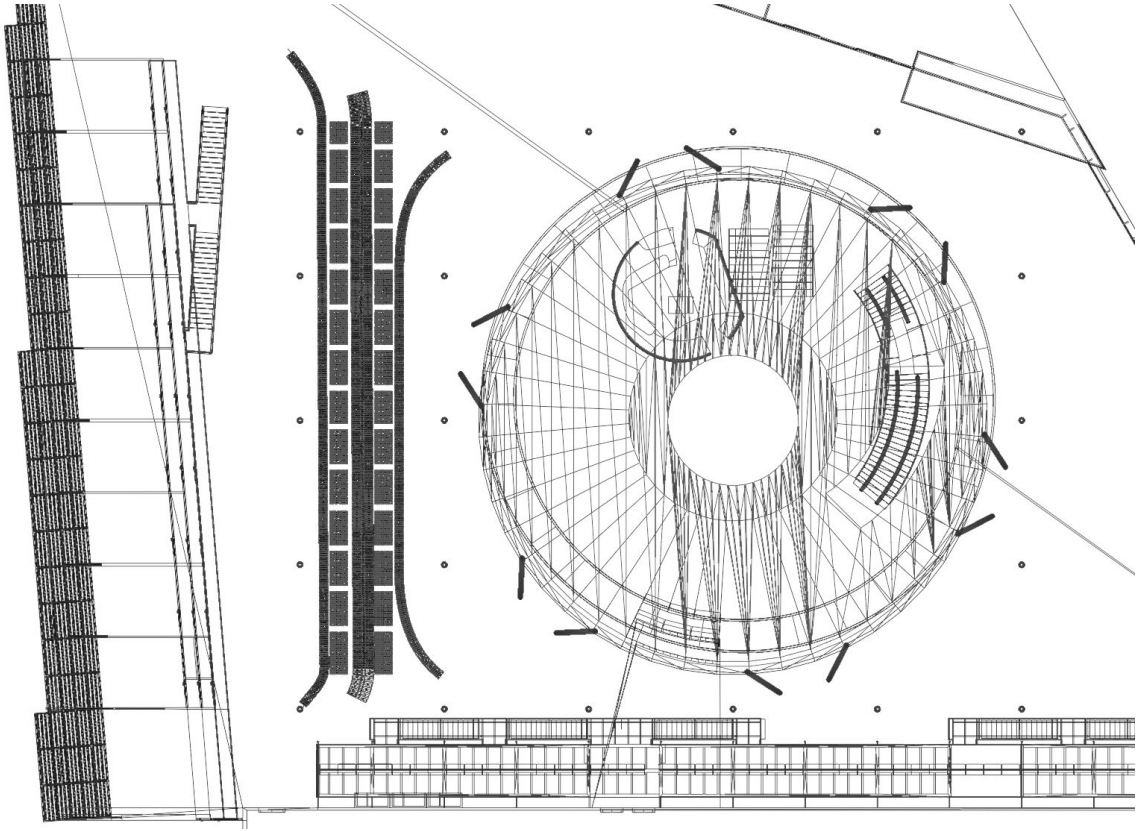


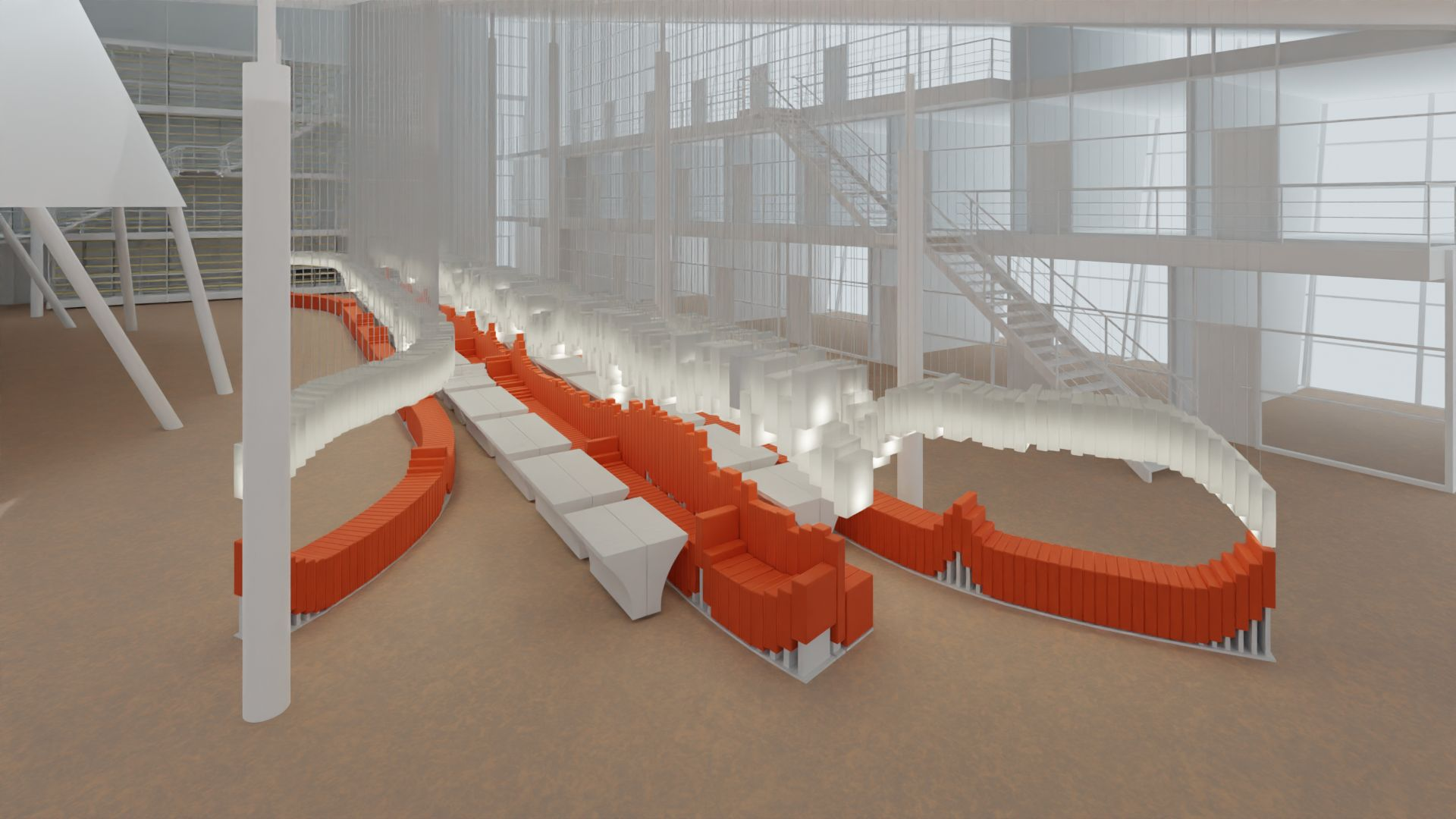
Reconfiguration

Current configuration

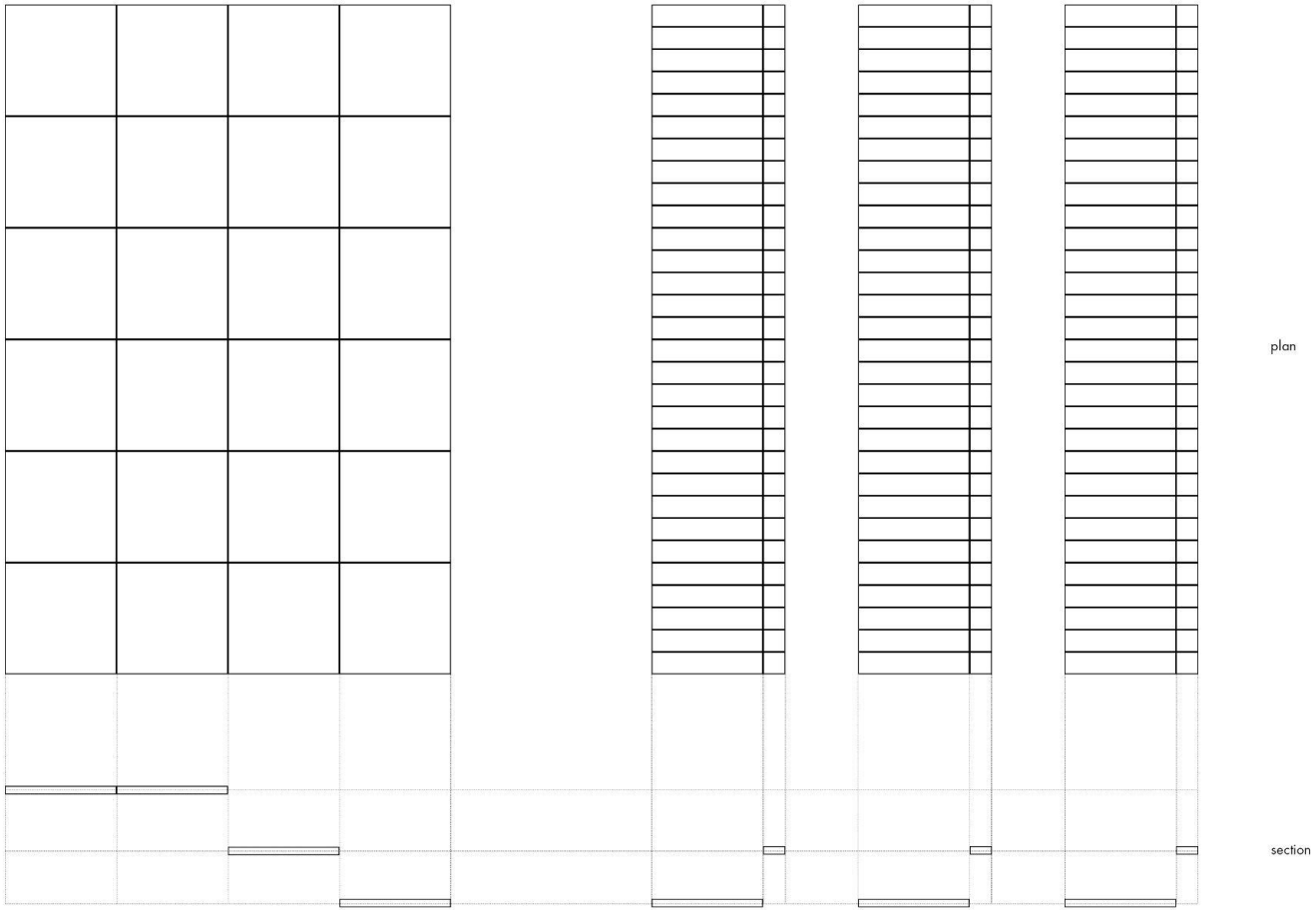


New configuration





Layout for lecture



Computer Vision

Two CV interactions

Arriving

Determine suitable arrangement

Leaving

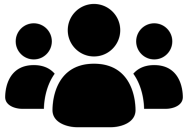
Determine availibility

Arriving - Goal and Indicator

Goal

Automatically decide optimal vertical arrangement

CV Indicator



Group or individual

Fallback

Manual override of decision

Arriving - Reference

Xovis Group Counting - From: https://www.xovis.com/technology/sensor/ai-extensions/group-counting

Arriving - Challenges & Feedback

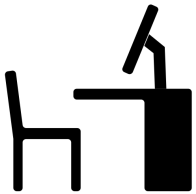
- What if one person joins later?
  - Privacy concerns

Model feedback

Manual overrides

Leaving - Goal and Indicator

Goal



Reset spaces that are no longer occupied

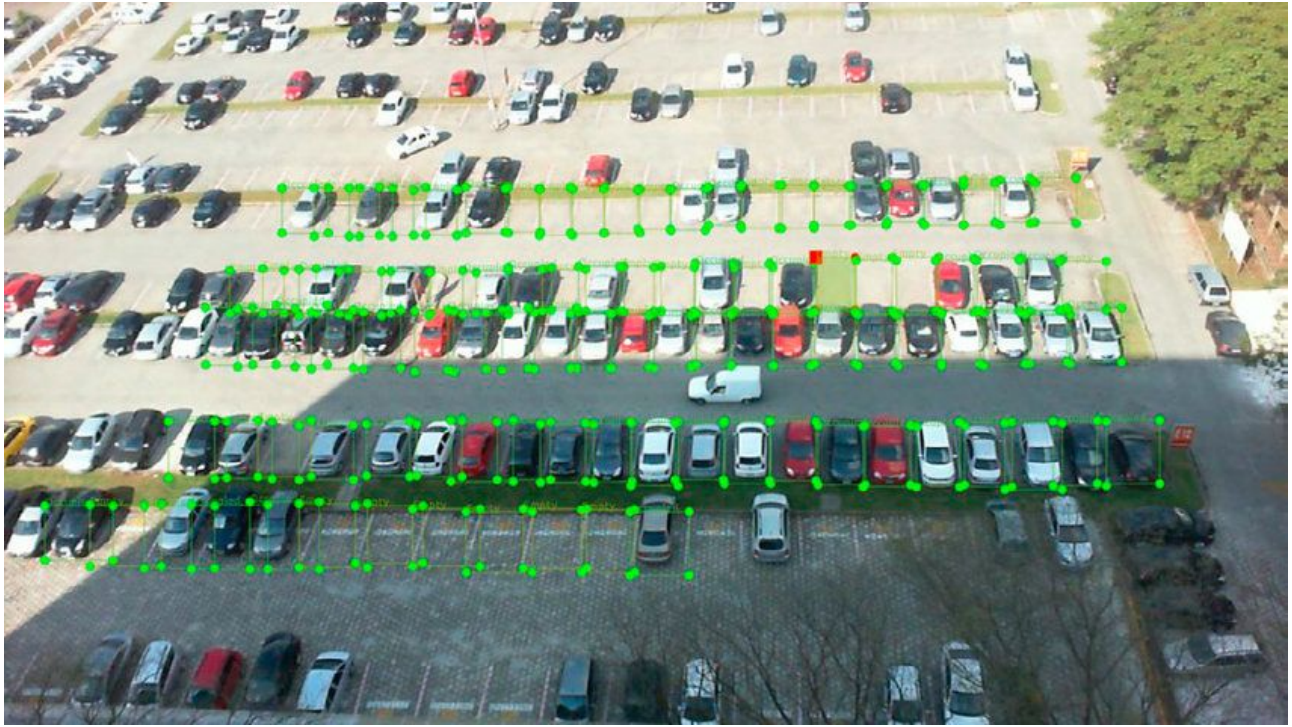
CV Indicator

Empty chair and table

Fallback

Feedback to user that furniture is about to reset with manual override

Leaving - Reference



Source: https://www.researchgate.net/figure/In-PKLot-only-some-of-the-cars-spaces-are-annotated_fig1_334775942

Leaving - Challenges

- Different lighting scenarios throughout the day
- Flexible configuration and height, has to detect location of tables
- Objects of the same color as table
- Something might obstruct view

Feedback

User override after alert