TACTILE MAPS

establishing a tactile vocabulary for conveying spatial configurations

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THE PROBLEM

Individuals with sight impairment rely on having a mental map of places before visiting them.

Spatial configurations are mostly mediated through two dimentional visualisations. Individuals with sight impairments can therefore not take advantage of any information mediated in this manner.

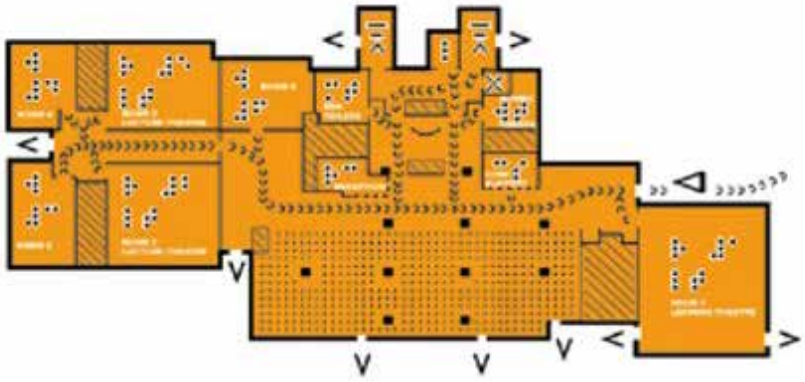
Tactile models are used to communicate the information needed to make a mental map of the place in question.

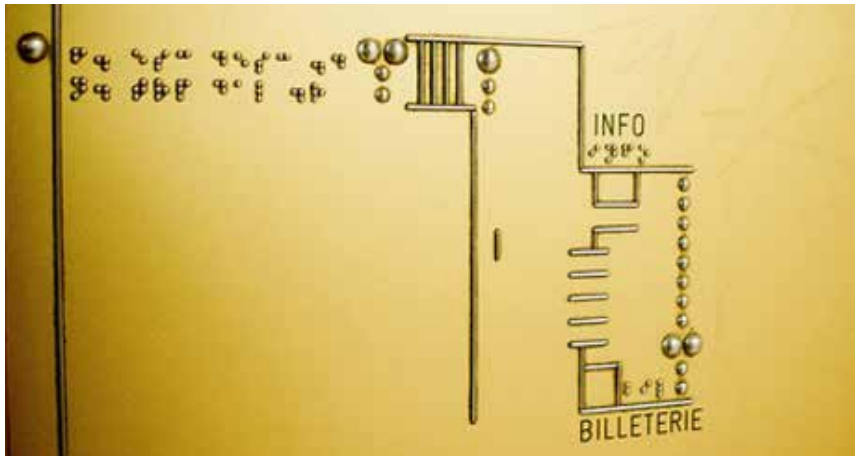
THE CURRENT SITUATION

Abstraction and symbolism is an important factor when deciding on how to depict spaces.

The tactile maps used today is either treated as extruded drawings of plans or minimalistic line drawings with a high amount of abstraction. Neither of these deal with aspects of scale, thresholds or light sources. They are also highly dependant on the symbolic language of the drawing.

Our research aims at rethinking the current level abstraction in relation to the use of these maps.





METHOD

The starting point for the project is a need created by a problem caused by decreased visual functionality.

1. Depict the premises of the problem.

2. Propose possible strategies for a solution.

3. Design a prototype using these strategies.

4. Propose experiments.

RESULT

The result can be used in the development of new products aimed at the sight-impaired.

The essay can be further developed by performing the experiments outlined in our discussion.

TACTILE MAPS / ABSTRACTION

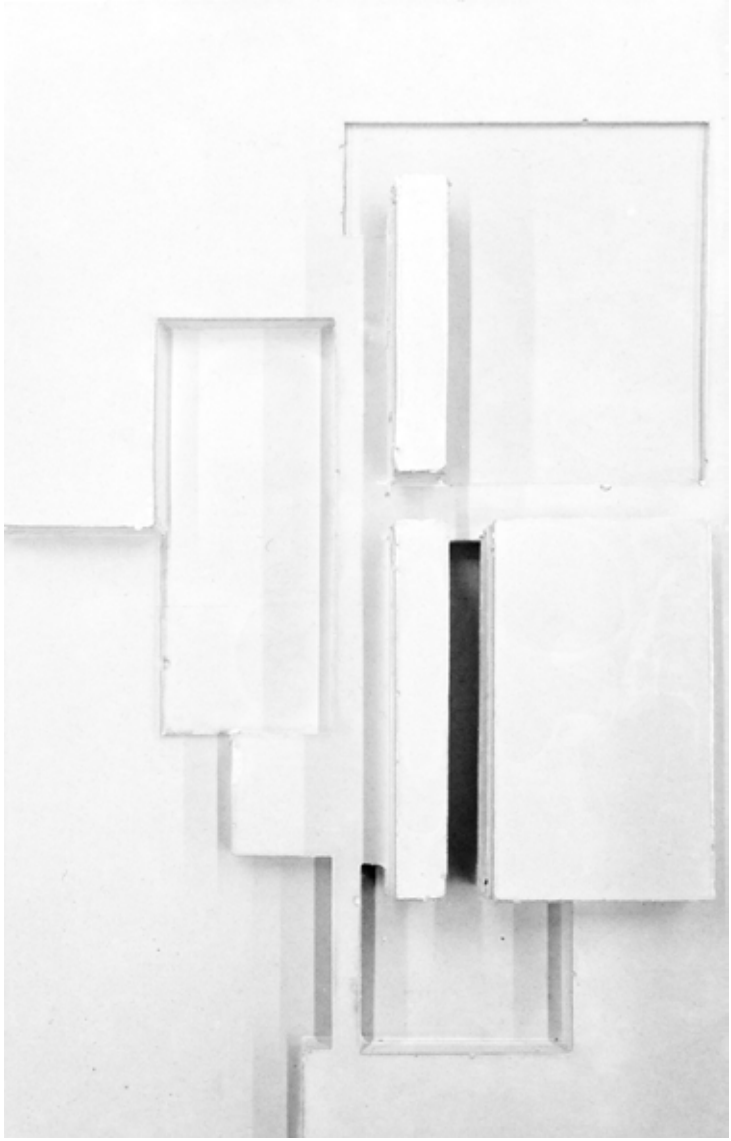
It seems that in some cases the abstraction is mediating both to much and to little. Unnecessary information is kept but in others information that could be crucial to the sight impaired is left out.

Our main goal is to pin point what information that is in relation to its use.

PLANES INSTEAD OF LINES

The tactile maps shown above depend on the symbolic language of the twodimensional drawing. It is a highly abstract, information-dense, way of representing a space.

We propose using the actual surfaces instead. A wall is a plane facing us, and so it will be represented. Differences in the horizontal plane, which are crucial for the sight-impaired to know about, are also shown as thus.



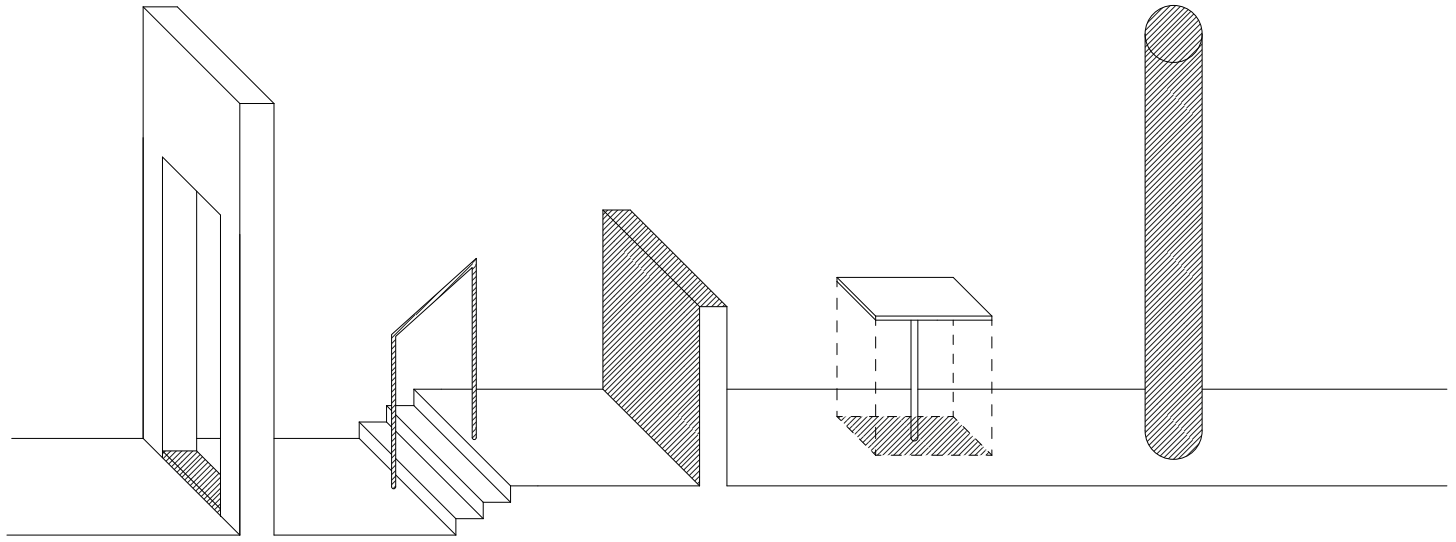
LIGHT SOURCE AS REFERENCE POINT

Most people with sight impairment, even suffering from severe lack of vision, are still able to detect light. When trying to orient oneself, windows can be used to understand our alignment in relation to other surfaces.

Lightsources, particularly windows, could therefore be more useful if marked in a map.

POTENTIAL DANGERS

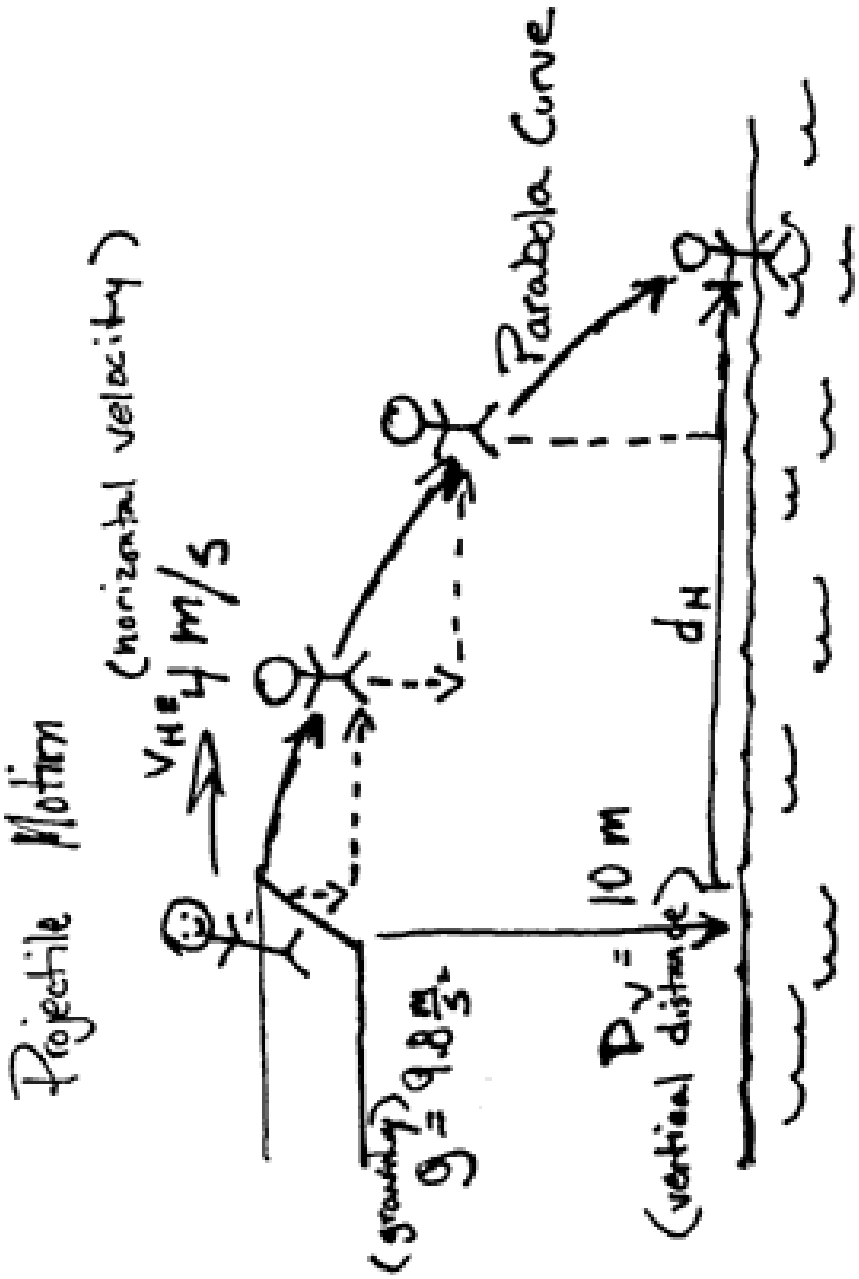
Potentially dangerous architectural elements must be highlighted. Such elements include changes in floor level, a handrail, pillars or a low partition wall. These might be indicated through a material distinction as well as their actual physical being.



GRID FOR STEP COUNTING

The act of orientation is dependant on relating oneself to the surroundings. Without sight helping us, we must depend on knowing how far we have travelled as well as the scale of the space. Distance is a usable quantity for the sight-impaired in the form of countable steps.

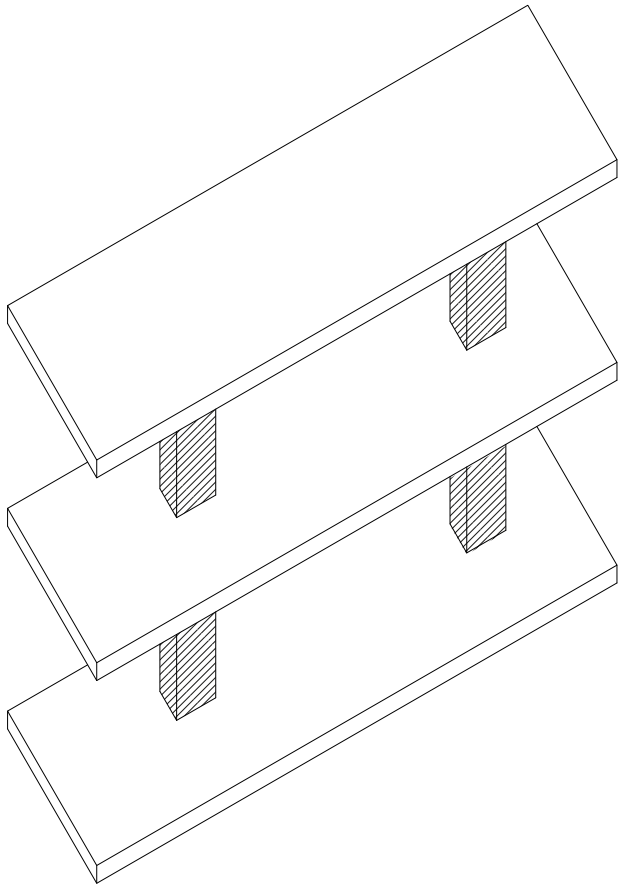
Consequently, the actual size of the room must be indicated. We propose that a meter-grid should be layered over the floor plan. This might take the form of a shallow relief, only sensible when scraping the nail along the floor surface.



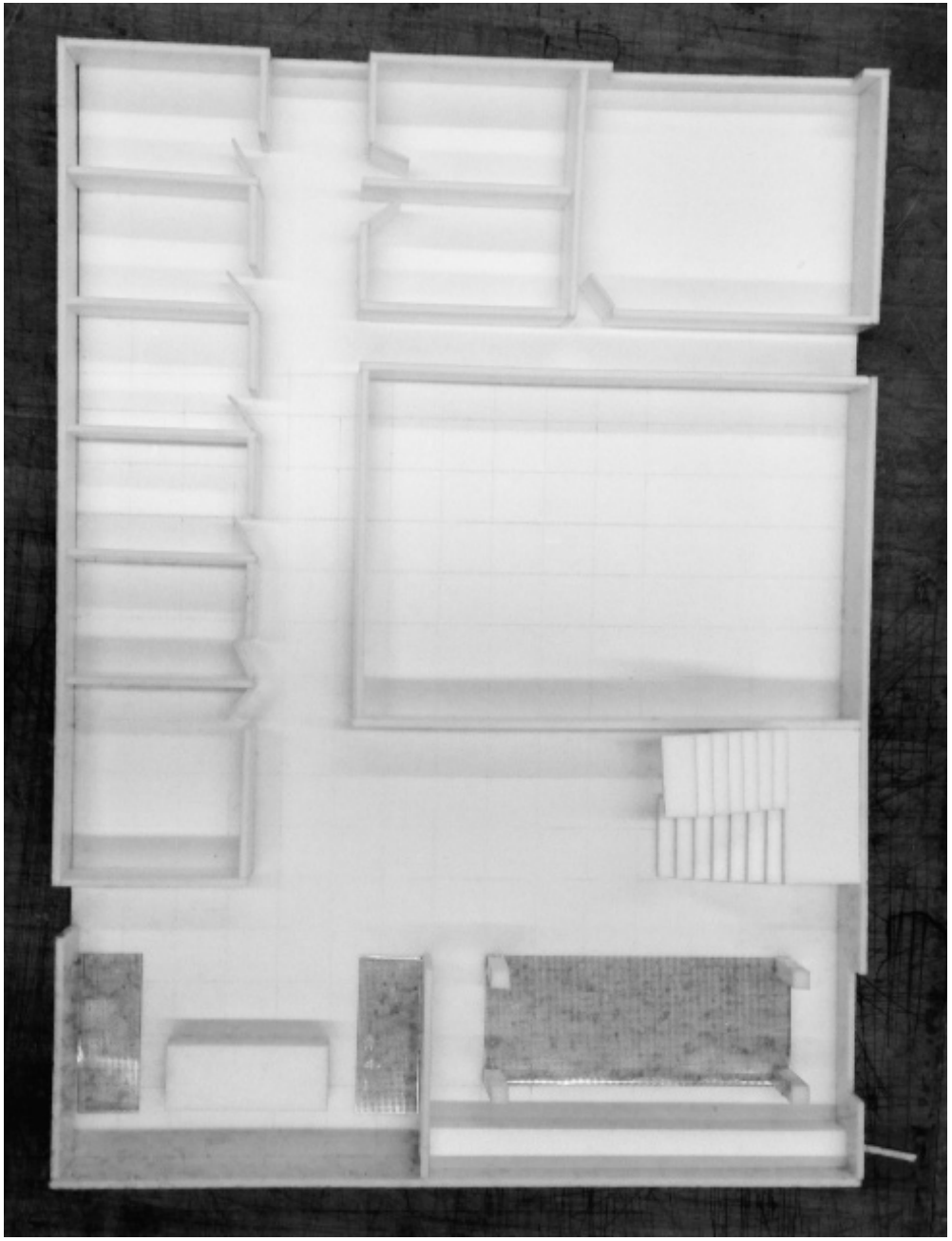
CONNECTIONS

How can a a building with two or more floors be represented? More specifically, how can we show the connection between two points in two plans, in the form of stairs or elevators?

Since the maps will not be viewed, they can be stacked above each other, as long as the distance between are enough to comfortably fit the hands inbetween.



STUDY



Subjects were told the following instructions:

This is a tactile map displaying a building you´re supposed to visit. Please try to memorize the layout and different features such as windows and exits. After you have done this, you will draw it as a plan diagram.

Time given: five minutes each for touching the model and the drawing the diagram.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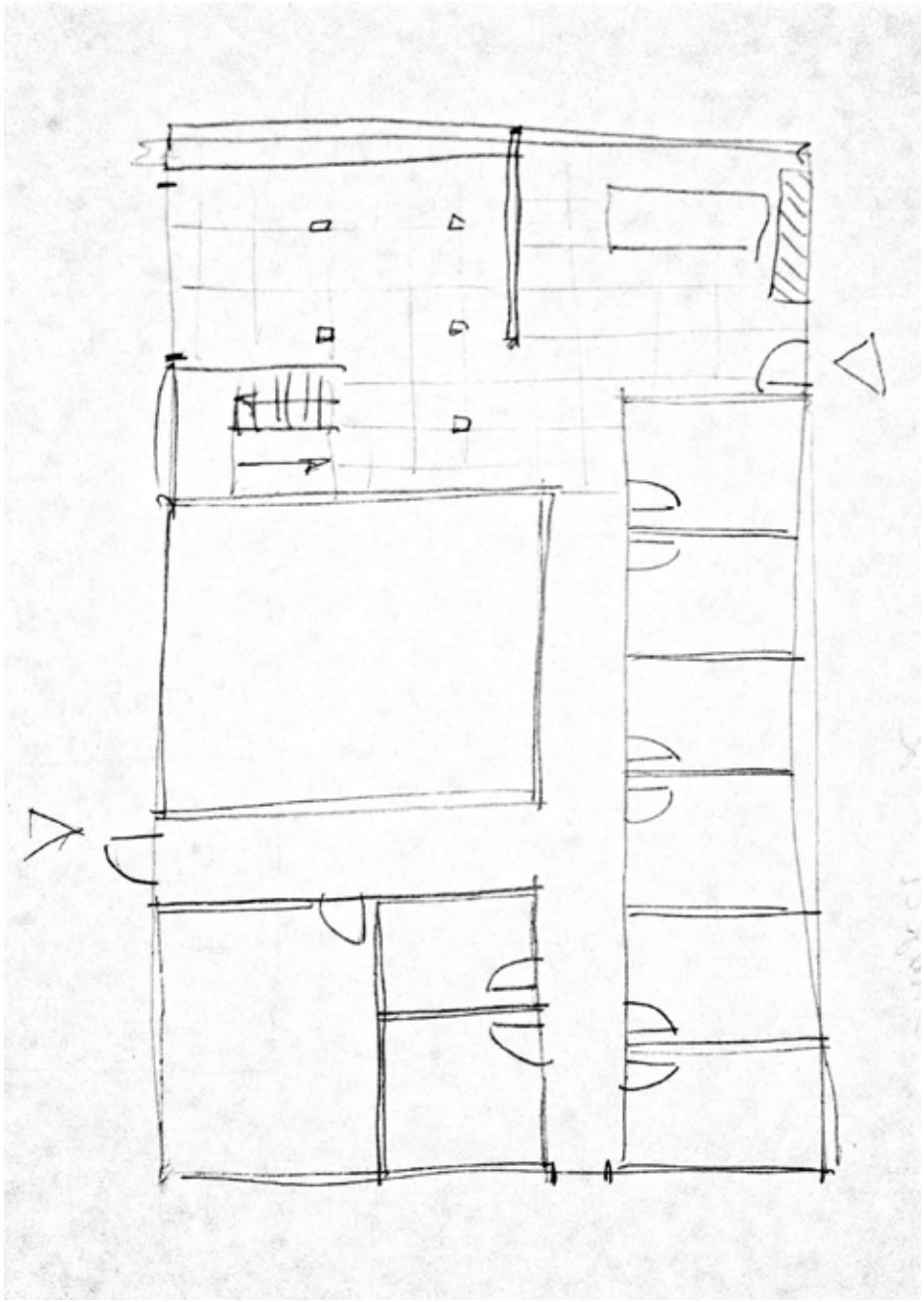
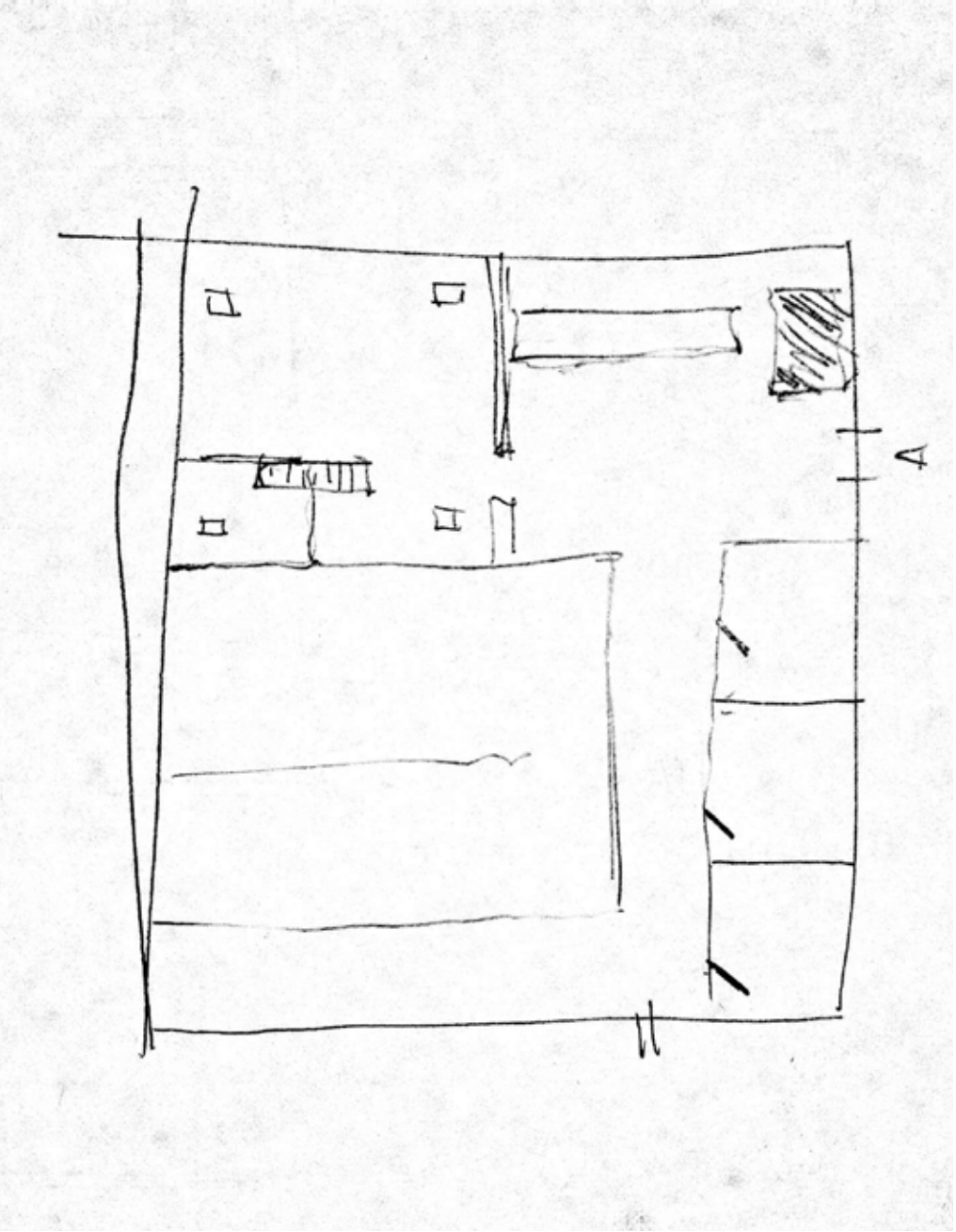
SUBJECT 1



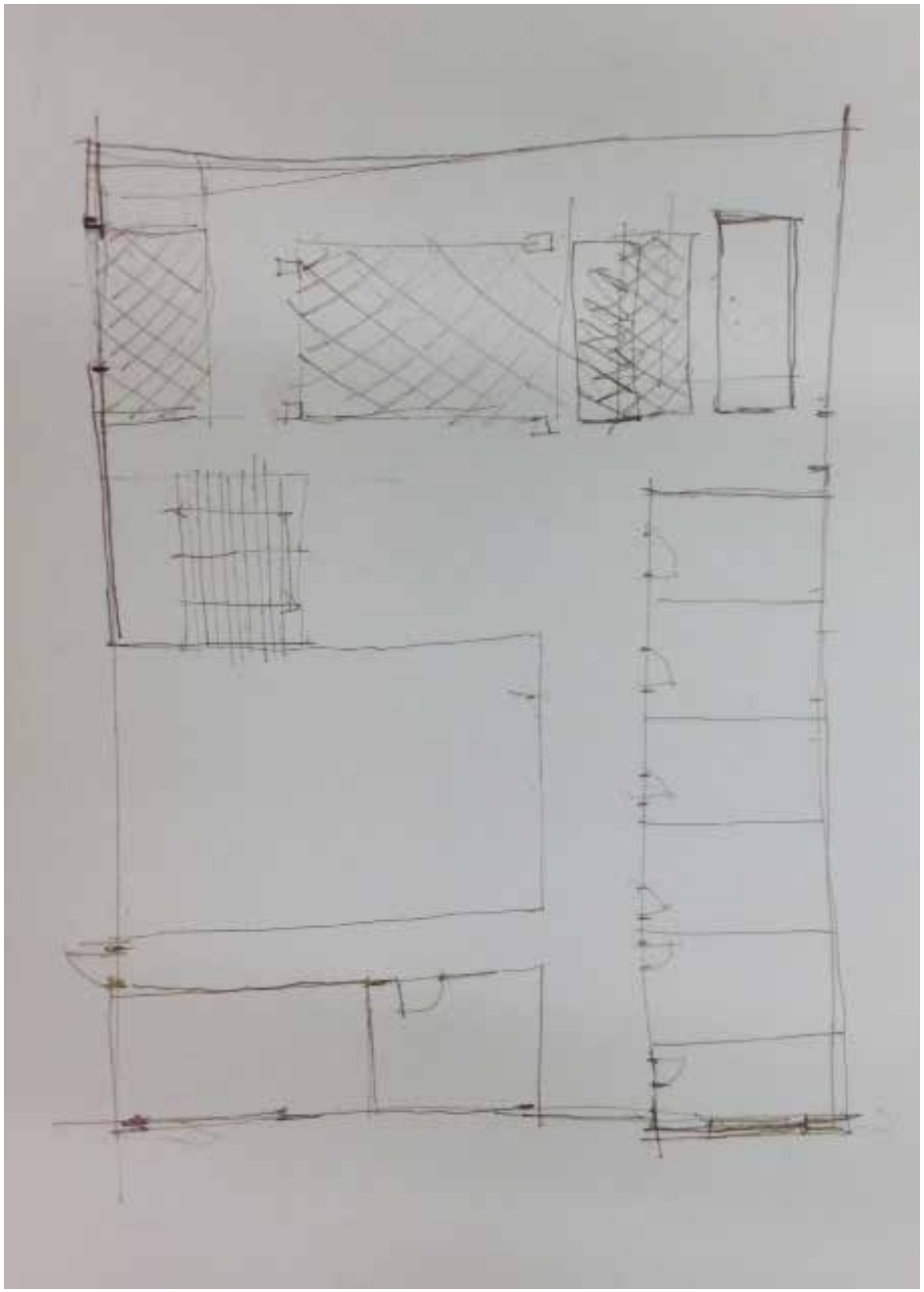
- Basic layout correct
- Windows in right places
- Reception desk and kitchen in right places
- All rooms in right order
- Added a pillar
- Noticed changes in texture
- Noticed the grid

SUBJECT 2



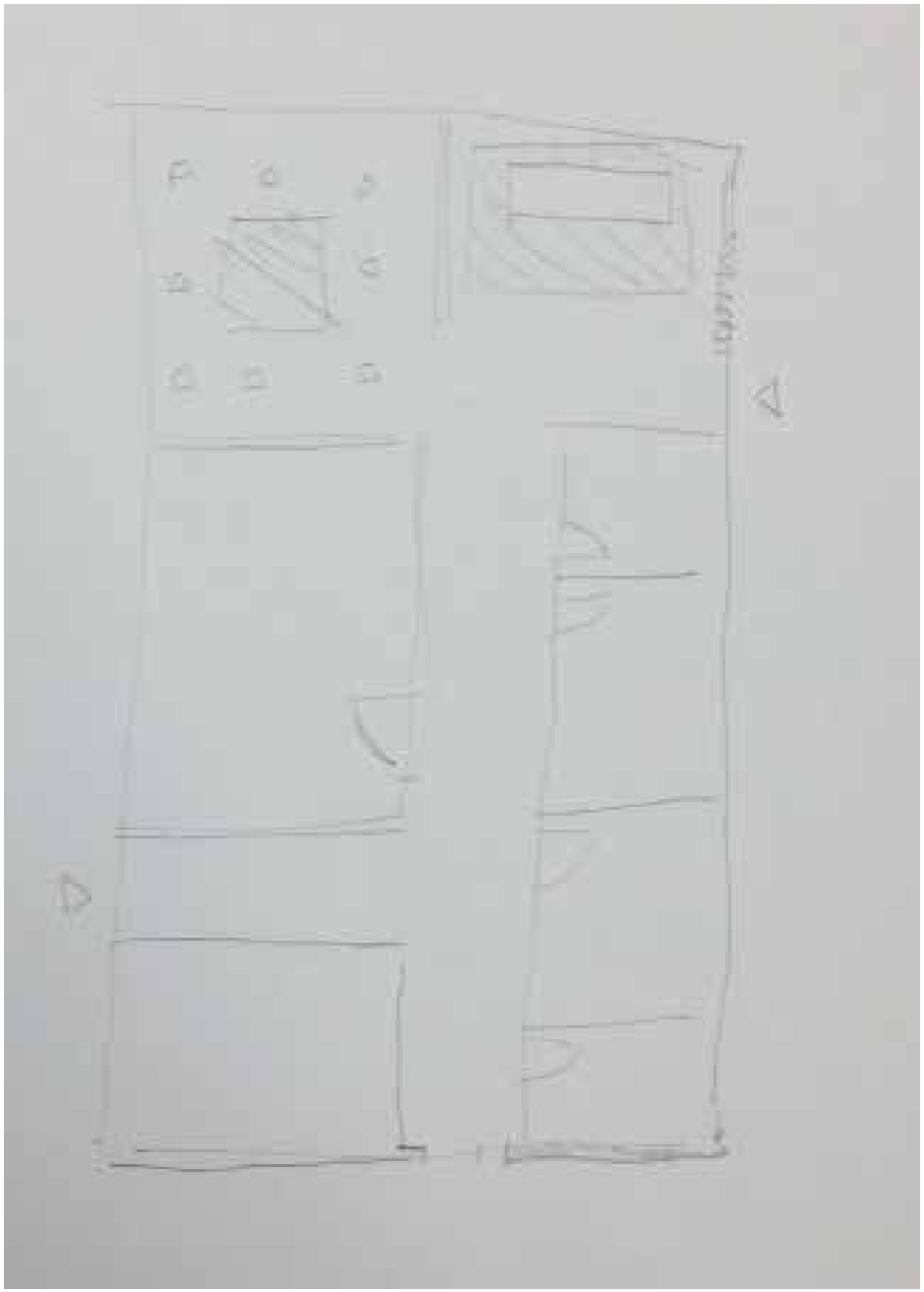
- Basic layout wrong
- Mistook window for an exit
- Staircase misplaced
- Rooms missing
- Reception in right place
- Right number of pillars
- Noticed changes in texture

SUBJECT 3



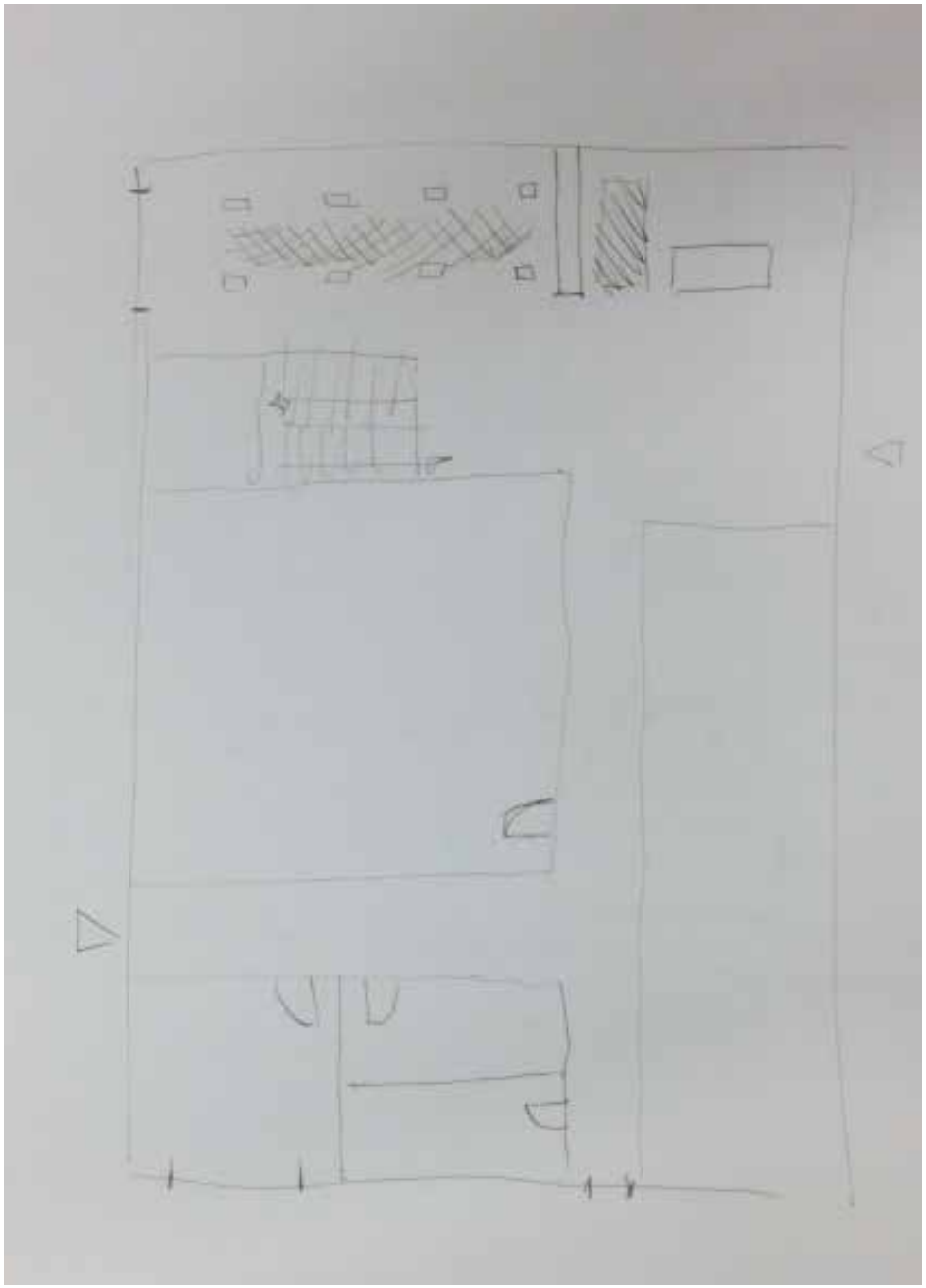
- Basic layout almost correct
- No windows drawn
- Reception desk wrong
- Food court missing
- Right number of pillars
- Noticed changes in texture

SUBJECT 4



- Basic layout correct
- Missed one window
- Added pillars
- Food court missing
- Noticed changes in texture

SUBJECT 5



- Basic layout correct
- Windows in place
- Reception right
- Food court missing
- Added pillars
- Noticed changes in texture

OBSERVATIONS FROM SUBJECTS

"It's hard to understand what I sense without more verbal information given. I'd like a better explanation beforehand."

"Is it possible to use the relief in the floor for something else? For example, to draw lines between different exits or important features in the building?"

Several of the subjects commented on the fact that the large space in the middle doesn't have a door. One subject thought that it was outdoors, another that we had missed adding an opening.

Two subjects commented on the size of the model as being a bit to large.

One subject raised the need to use both hands to explore the model. This, according to him, helped with understanding the more complex objects such as the stairs.

OBSERVATIONS FROM AUTHORS

Three of the subjects only used one hand to explore the model. This can directly be related to the amount of detail in the plans. Plan #1 and #3 are both done by subjects using both hands, and the rest of subjects using one hand. In the case of #2, we noticed that, while using only one hand, he couldn't touch the extents of the stairs, and thus failed to recognise it as such.

The large size of the model might have a detrimental effect on understanding the relations. For example, only two subjects got the amount of pillars correct. This might be explained as an effect of them being placed at to large a distance apart from each other to be felt at the same time. Another quality which must be related to the size is the amount of detailing. The lower right area, where there's quite a lot of details, are wrongly described in four of the five cases.

The orientation of the model is a factor that must be considered. Even thought the left side is less detailed, none of the subjects got the walls or doors placed correctly. During the experiment, we noticed that all of the subjects spent considerably more time touching the lower right corner, moving diagonally upwards as the experiment progressed.

The added texture on the floor were only noticed as a relief, contrary to our intention that its materiality would mark the change. There must be sufficient sensory difference to demarcate the area. Our proposed material weren't as noticeable as we had hoped.
The lower left offices were considered problematic due to their identical nature. Only one of the subjects got the amount right. Although this must be considered a problem, we have no feasible idea to ease this.

CONCLUSION

Concidering that none of the subjects had prior experiance with tactile mapping before participating in the study we concider this method to be feasible. The three dimentionality seems to help users get a grasp of the space in a quick and clear manner. Four out of fve subjects got the basic layout and shape of the plan almost completely right using the map without any prior experiance using tactile mapping.
There are still some obsticles that need to be worked out. Only one subject noticed the grid system. From that we draw the conclusion that it might be a factor that would need explanation beforehand - it is not a part of a universal understanding. To much abstraction can mislead users since all of them commented on the lack of door to one of the rooms. Two of the subjects even added a door to the room. Windows need to be better distinguished from entrances/ exits. It would have been helpful to indicate routes through the building. More noticeble material for "danger zones" would be needed to make them prominent.