

BEYOND THE BOUNDARY

Use Symbiotic Structures for the Diversity of the Existing Space

Master Thesis
Chalmers School of Architecture
Architecture and Urban Design
Spring 2017
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Examiner: Jonas Lundberg
Tutor: Kengo Skorick



CHALMERS

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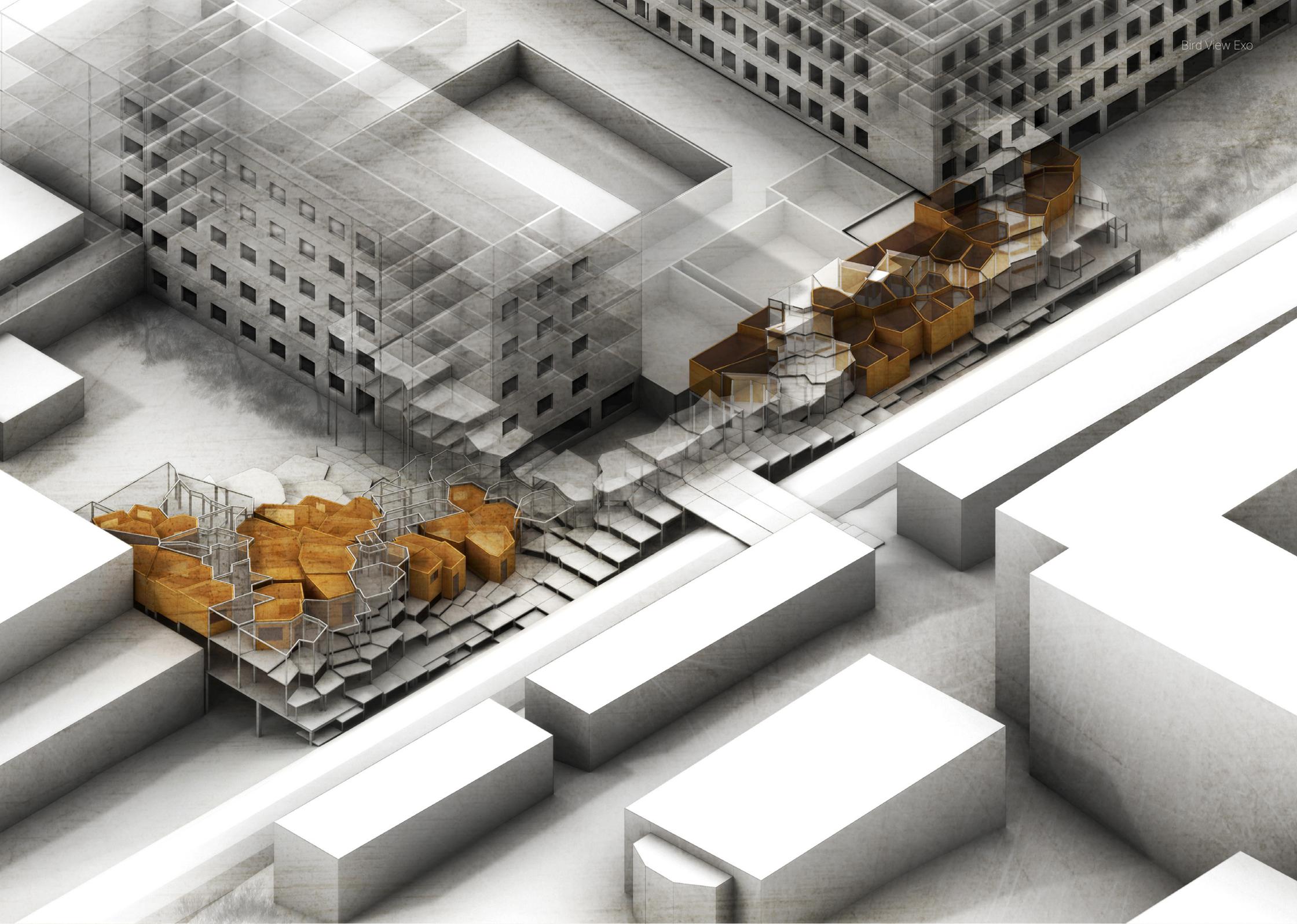
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INTRODUCTION

Abstract

The process of transforming a building is often seen as a process of its own transformation and renewal. Sometimes, the process will be accompanied by structural damage, material replacement, functional changes, which means a lot of time and manpower loss.

In this case, the symbiotic building offers a variety of possibilities. It could create new built volumes in already-urbanized areas preventing the creation of new infrastructure, allowing to allocate resources to the redevelopment of existing ones. This master thesis will try to explore the diverse space possibility of the symbiotic structure.

The strategy of the design derives from landform architecture. It starts with the subdivision of the site which results in the network circulation. Then establish the landform according to the 3d circulation which is the logic of the variety height difference of each platform. In this way to activate the space and students could have the possibility to explore their own way to use the space.

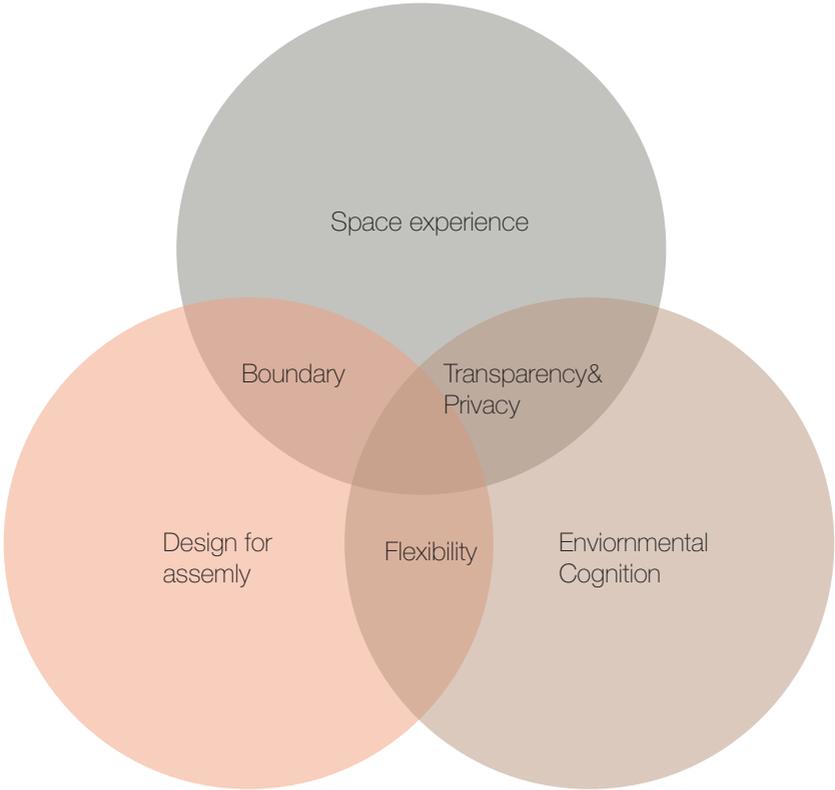
The project is developed through site analysis, literature and case studies. Starting from the rereading of critical issues of urban fabric, upgrading and retrofitting the low-quality social buildings that was obtained through articulated interventions of volumetric addition. How to add new structures to the original buildings, how to reduce the destruction of the original building, how to achieve the unity of old and new buildings. To solve this problem will be the main line and guidance of the design.

By using the way of symbiotic structures, this project wants to find a way to establish new circulation between new and old buildings according to the three-dimension landform. In other word, try to find a flexible way to form the building system.

Examiner: Jonas Lundberg
Supervisor: Kengo Skorick

Claim

Use the form of symbiotic building to interfere the existing space. In this case, the aim will be trying to active a district in campus.



RESEARCH

REFERENCE 1

Space experience through repetition and superimposition

House NA

Architects: Sou Fujimoto Architects

Location : Tokyo, Japan

Designed for a young couple in a quiet Tokyo neighborhood, the 914 square-foot transparent house contrasts the typical concrete block walls seen in most of Japan's dense residential areas. Associated with the concept of living within a tree, the spacious interior is comprised of 21 individual floor plates, all situated at various heights, that satisfy the clients desire to live as nomads within their own home.



REFERENCE 1

The diversity of space experience

A Thousand Yards

Architects: Penda

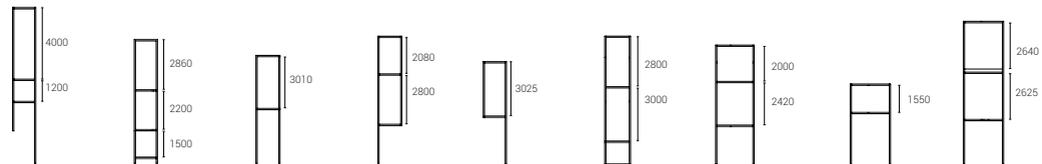
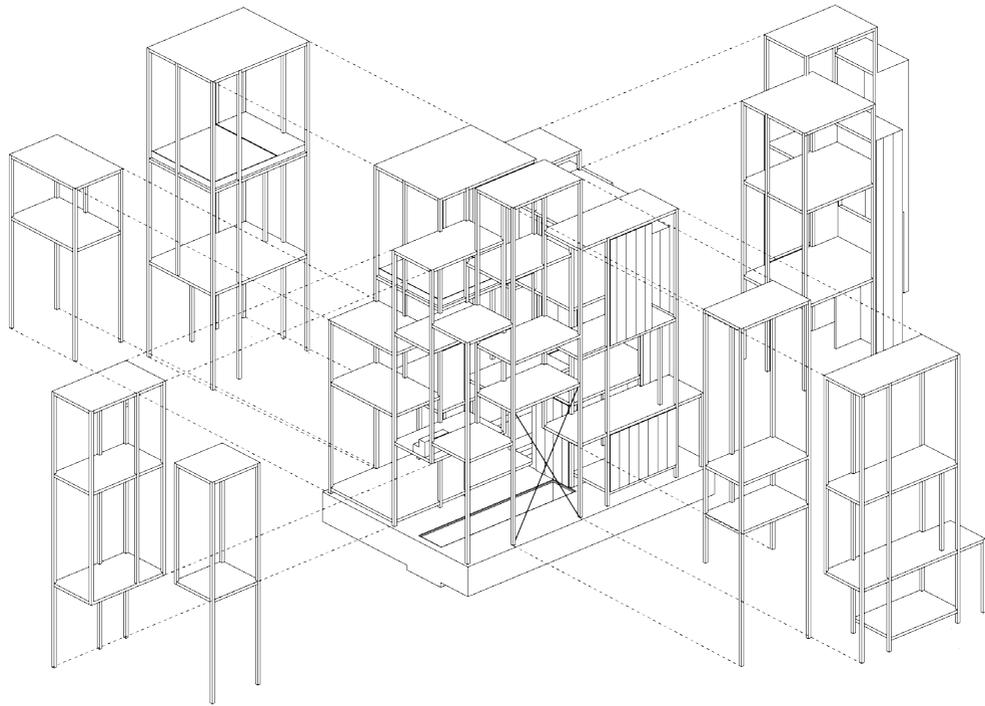
Location : Beijing, China

Multiple repetitive unit spaces may result in the feeling of lost.



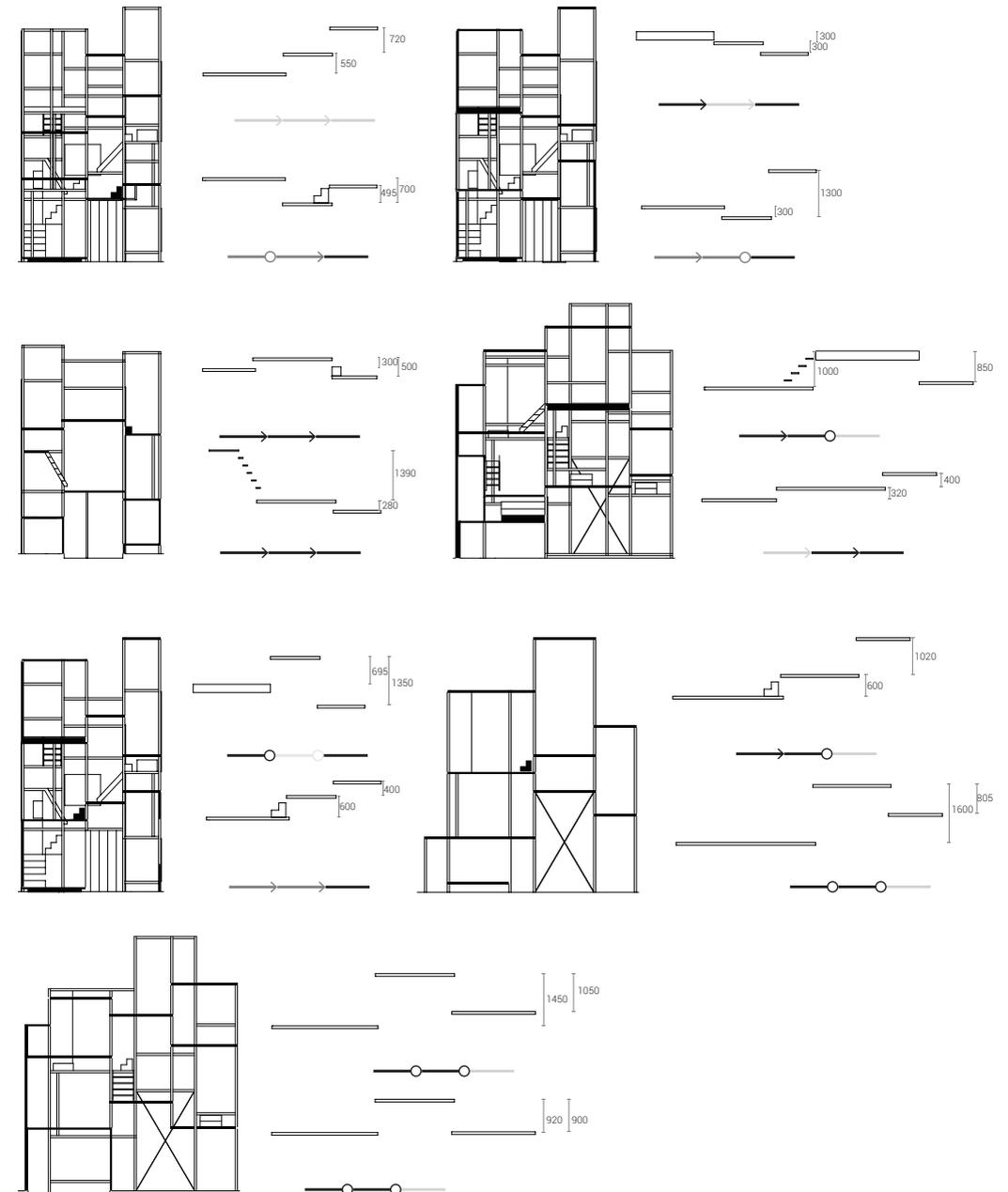
Base Architectural System

Relationship between height difference and spatial boundary



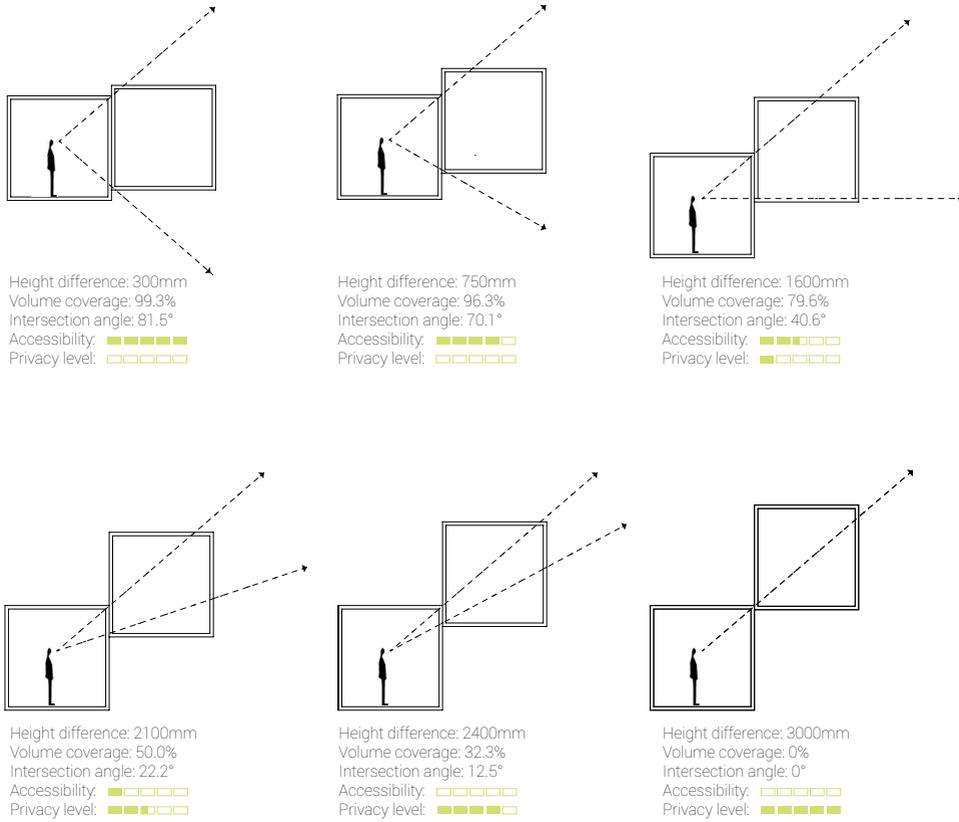
Base Architectural System

Relationship between height difference and spatial boundary



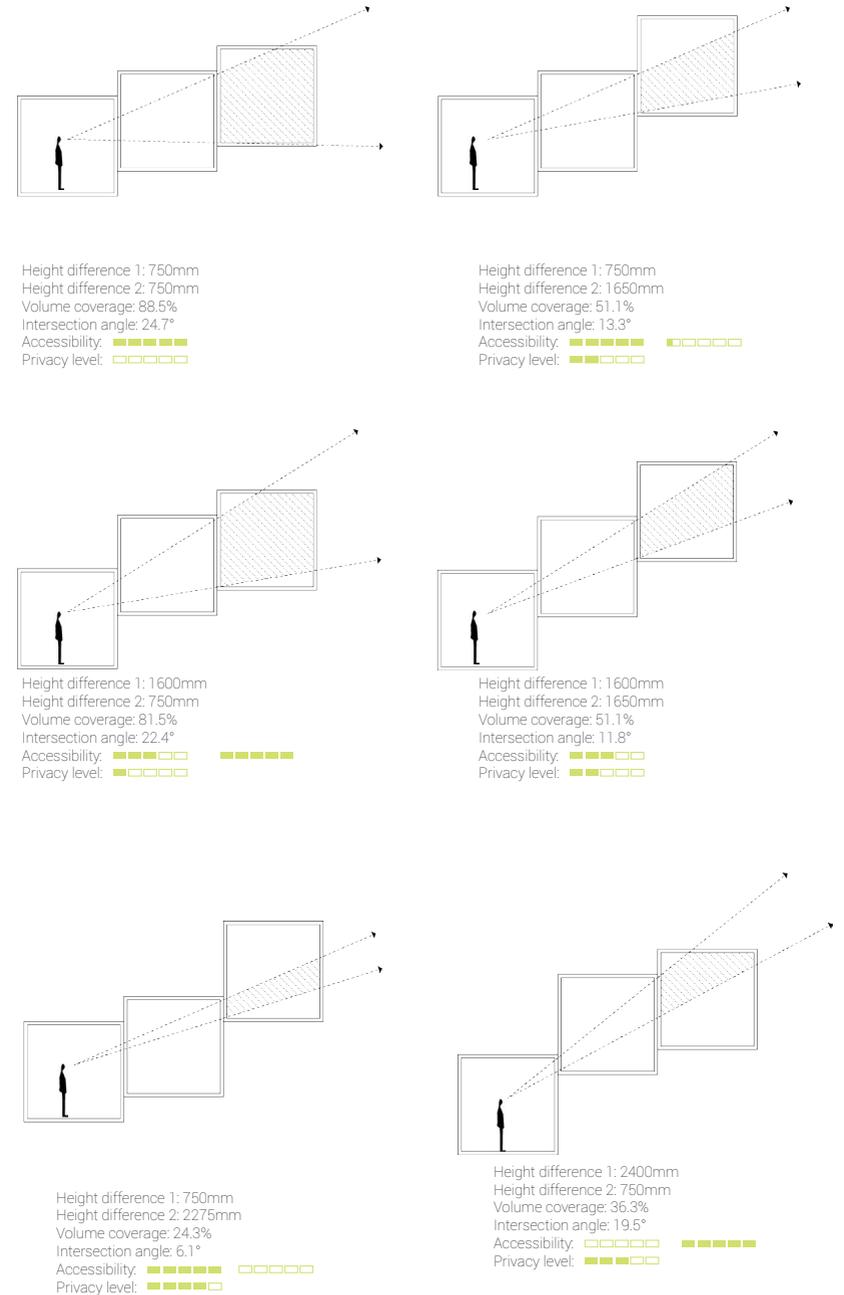
Prototype 1

The range of sight view corresponding to a single height difference



Prototype 1

The range of sight view corresponding to height difference



Prototype 1

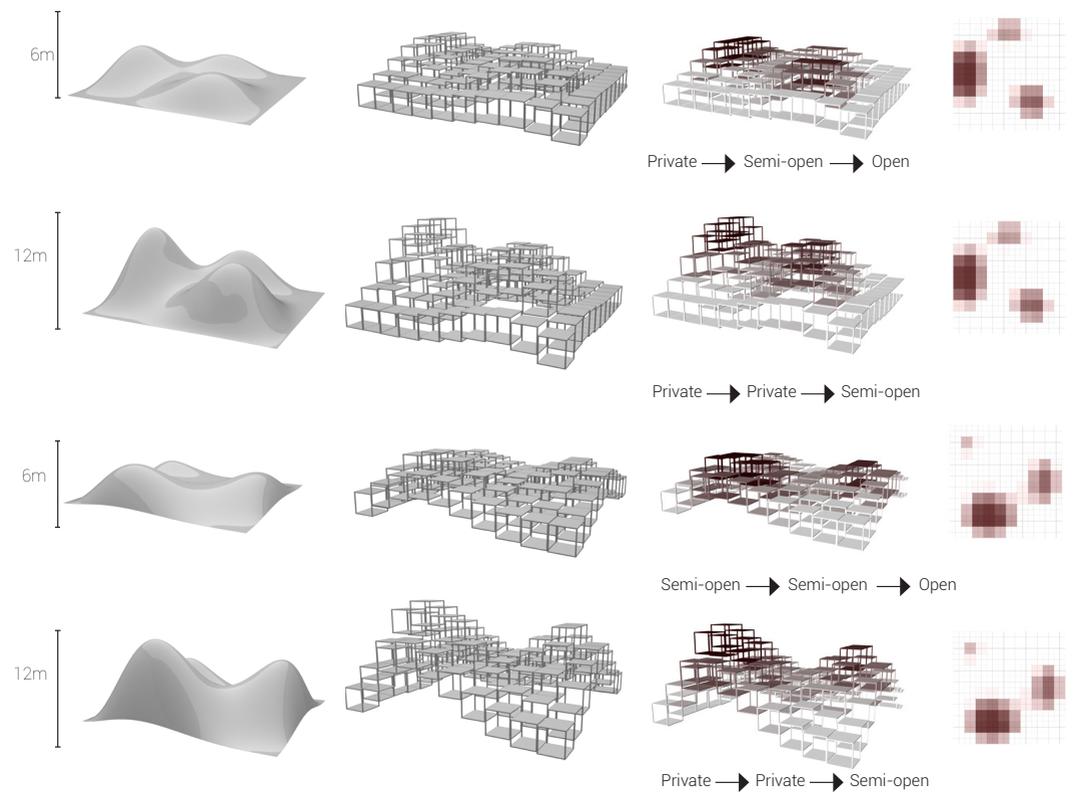
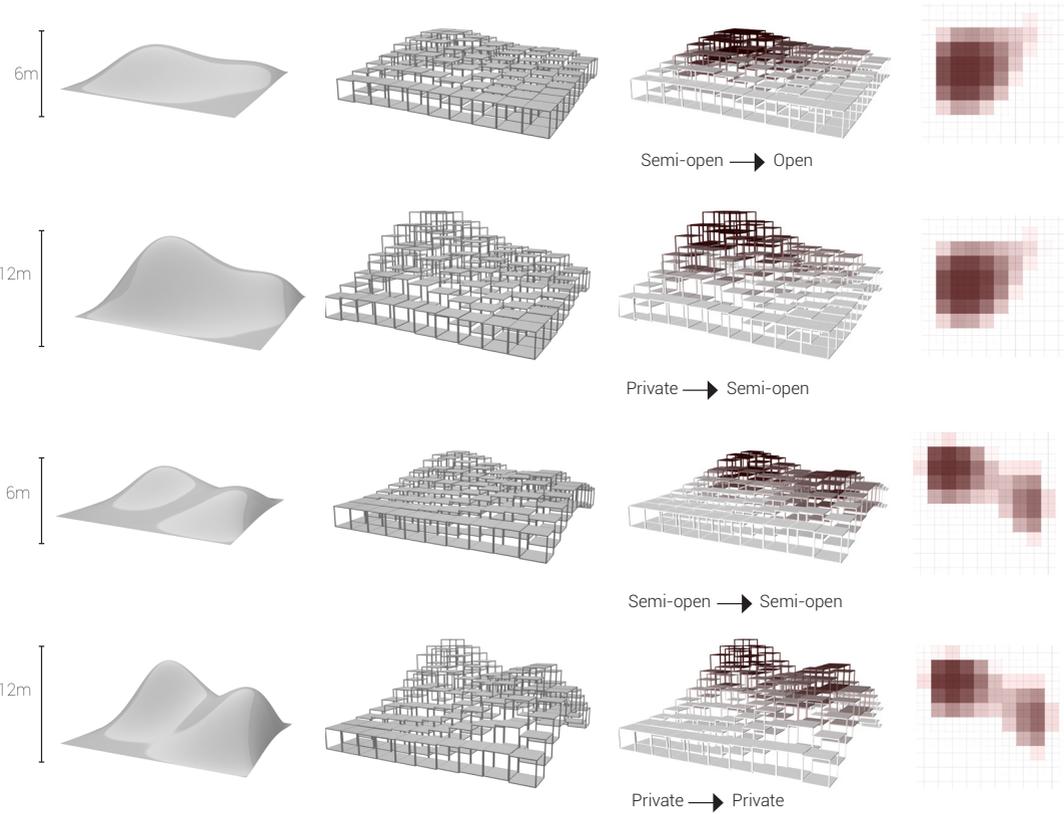
Morphological changes in continuous three - dimensional space

Prototype 1

Morphological changes in continuous three - dimensional space

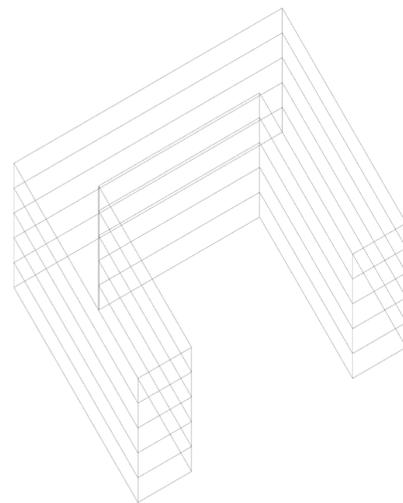
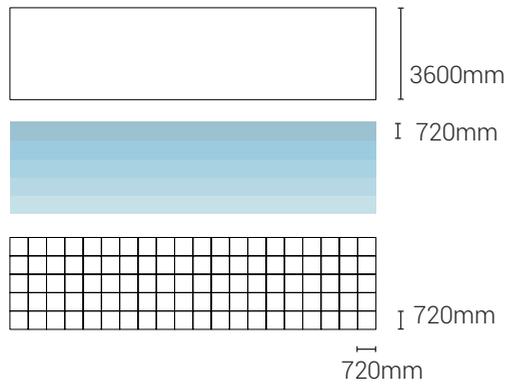
2 peaks

3 peaks



Prototype
Imaginary context

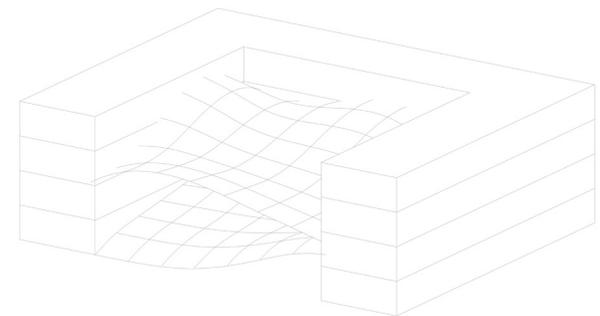
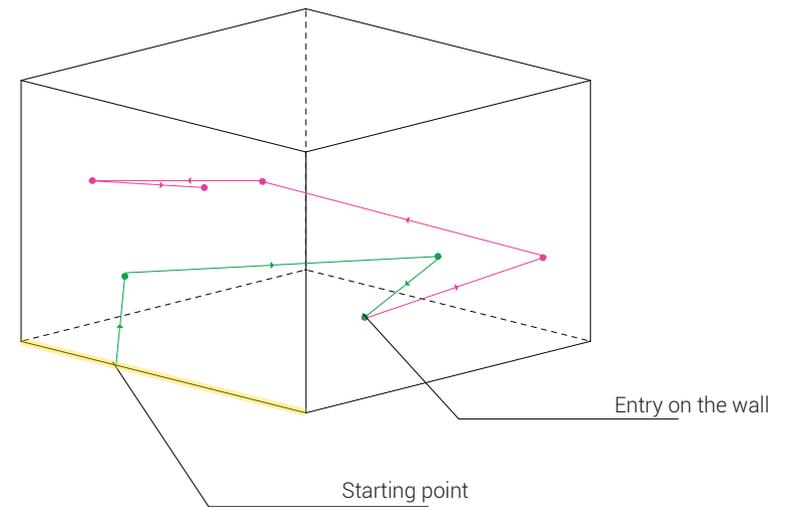
Single wall



Three - sided enclosure
with a courtyard

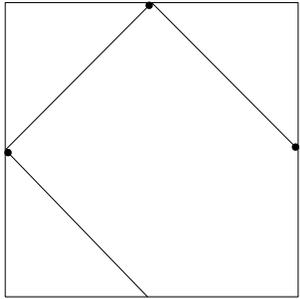
Prototype
Imaginary context

Frame of the courtyard

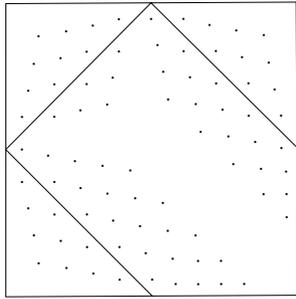


Morphological changes in an imaginary context

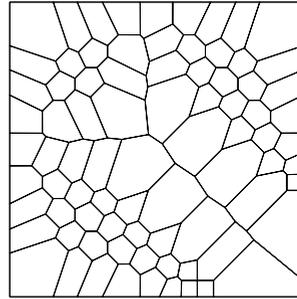
2D circulation



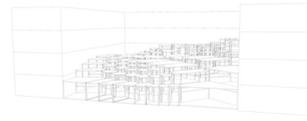
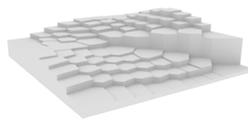
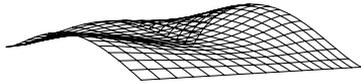
Logic of centroid



Voronoi

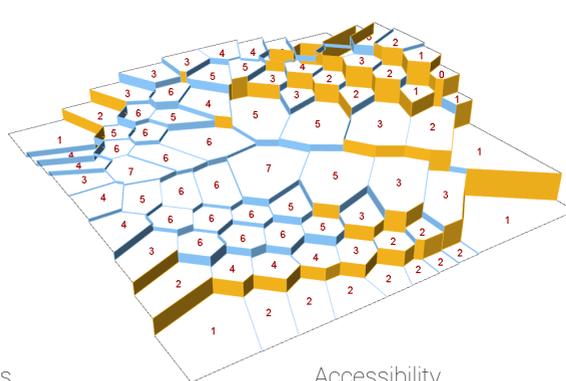
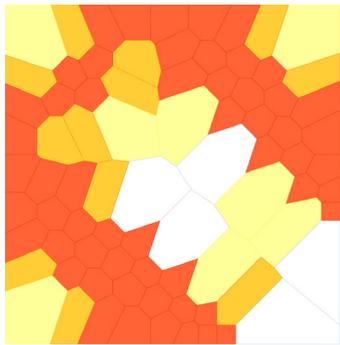


3D circulation



Common area groups

Connections per platform based on the distance between every adjacent platforms

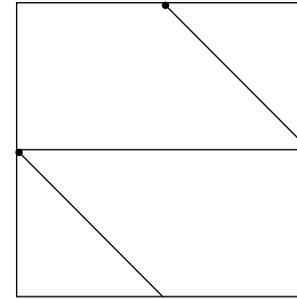


Overall, the size of each area is concentrated in two ranges and also in a obvious group form.

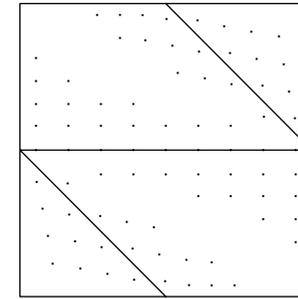


Morphological changes in an imaginary context

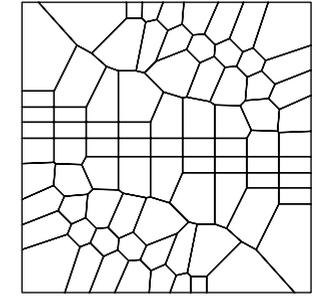
2D circulation



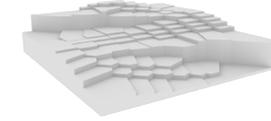
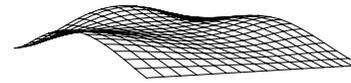
Logic of centroid



Voronoi

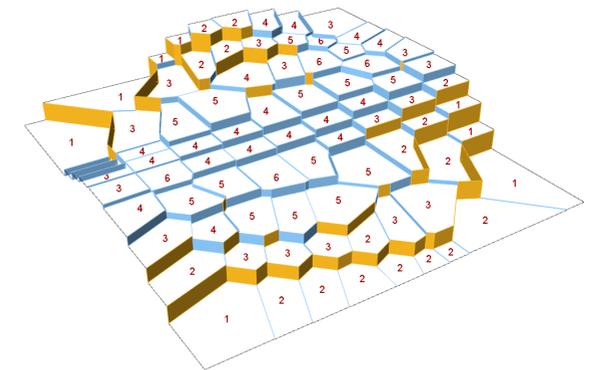
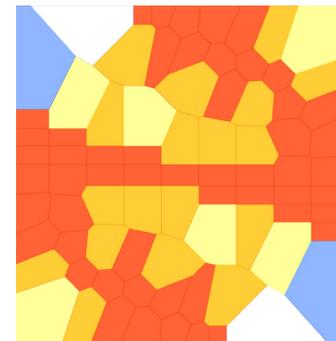


3D circulation



Common area groups

Connections per platform based on the distance between every adjacent platforms

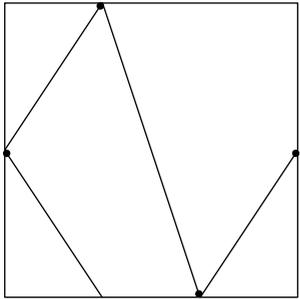


Area changes are concentrated in the corner area, and the area distribution is more average.

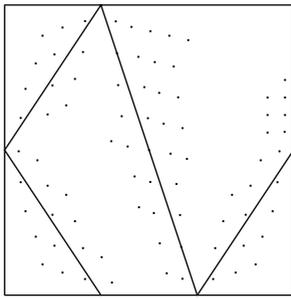


Morphological changes in an imaginary context

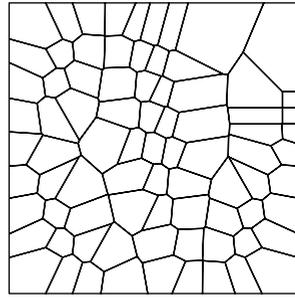
2D circulation



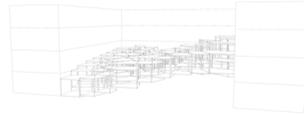
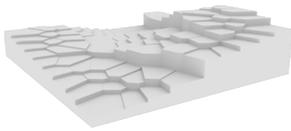
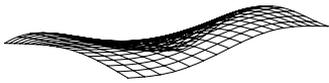
Logic of centroid



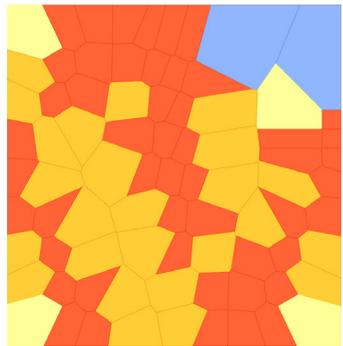
Voronoi



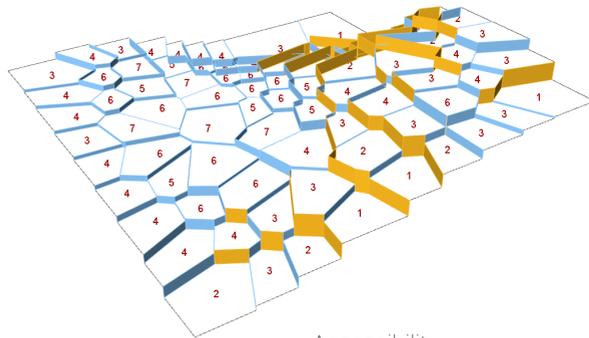
3D circulation



Common area groups



Connections per platform based on the distance between every adjacent platforms



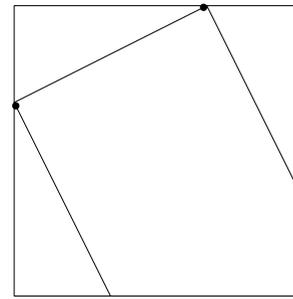
The area changes little, the larger areas only appear in the upper part.

Accessibility

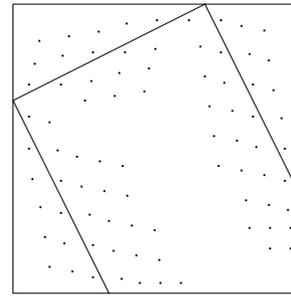


Morphological changes in an imaginary context

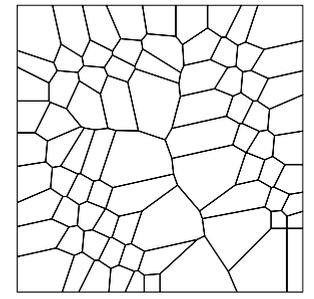
2D circulation



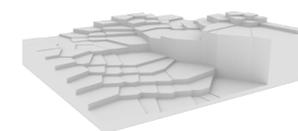
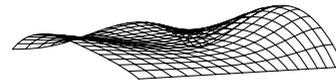
Logic of centroid



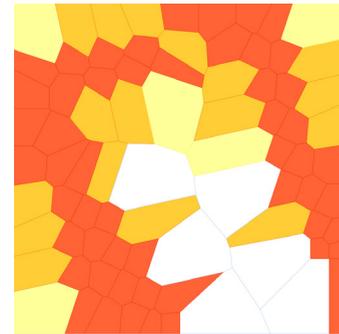
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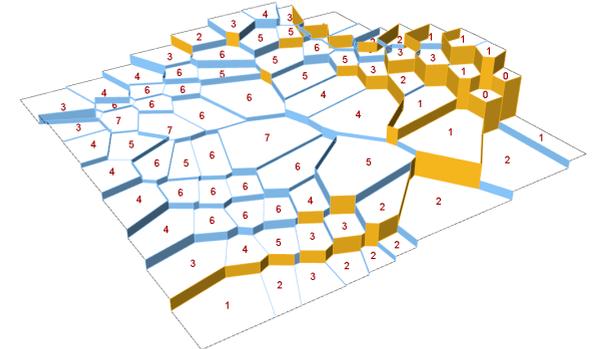
3D circulation



Common area groups



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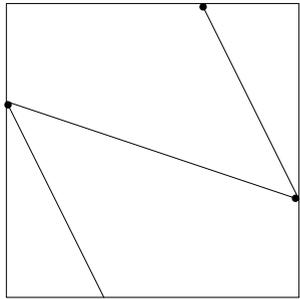
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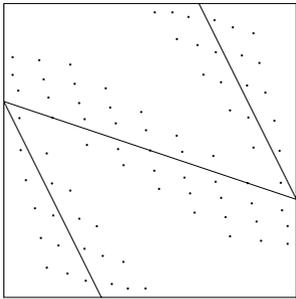


Morphological changes in an imaginary context

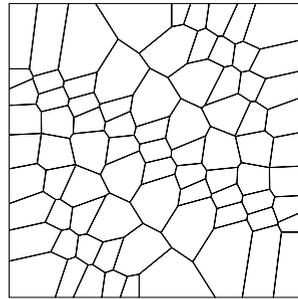
2D circulation



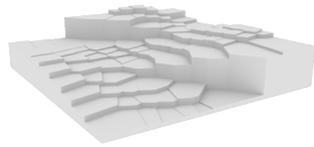
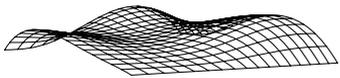
Logic of centroid



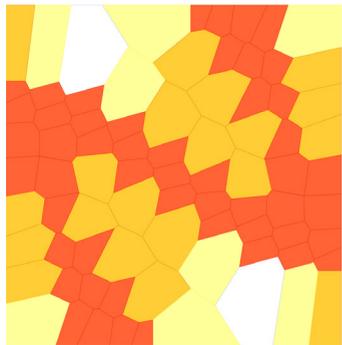
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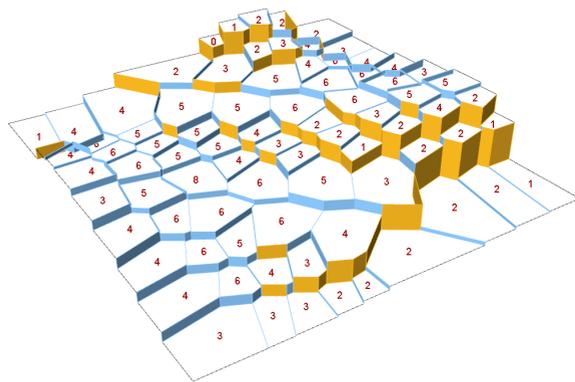
3D circulation



Common area groups



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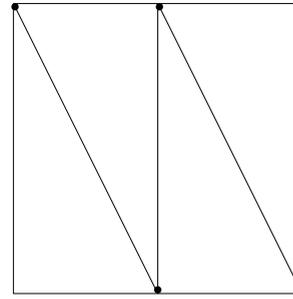
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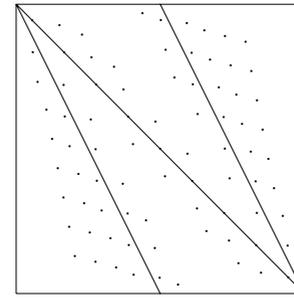


Morphological changes in an imaginary context

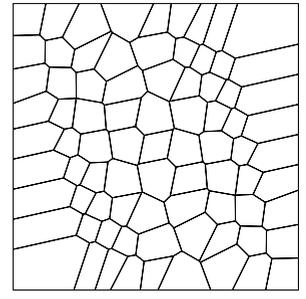
2D circulation



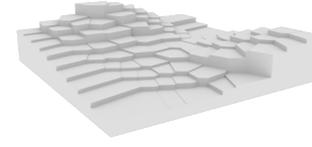
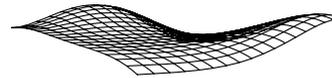
Logic of centroid



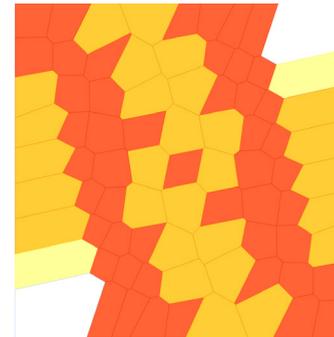
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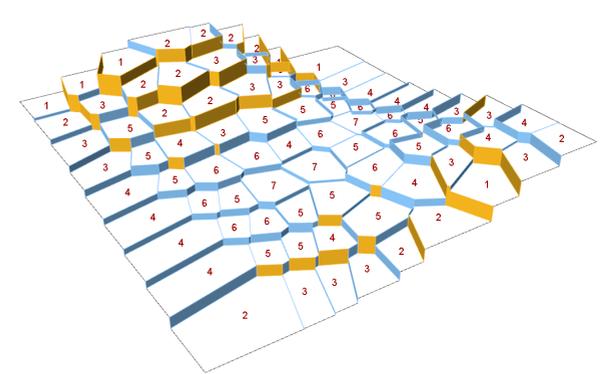
3D circulation



Common area groups



Connections per platform based on the distance between every adjacent platforms



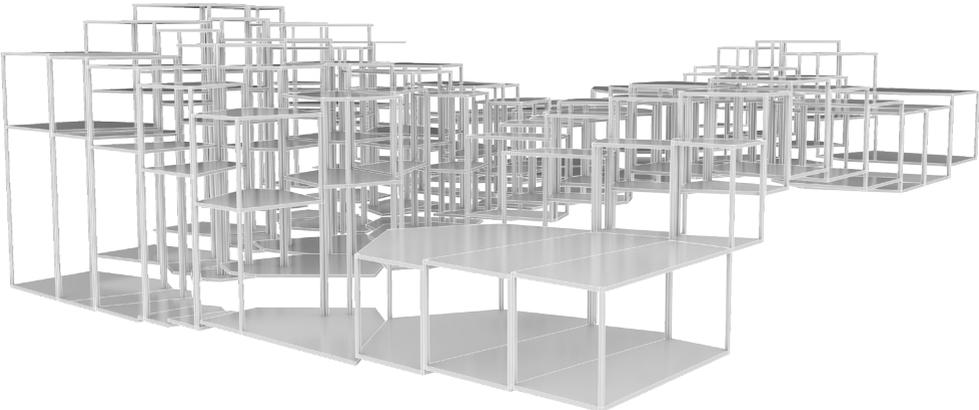
The area distribution is quite average.

Accessibility



Prototype
Final Prototype

Perspective



BACKGROUND

Section



Formation
Contextual Forces

Key Points

- Grassland
- Restaurant
- Library
- Parking
- Bus Station
- Sports
- Kiosk
- Study Room

Public Space For Students

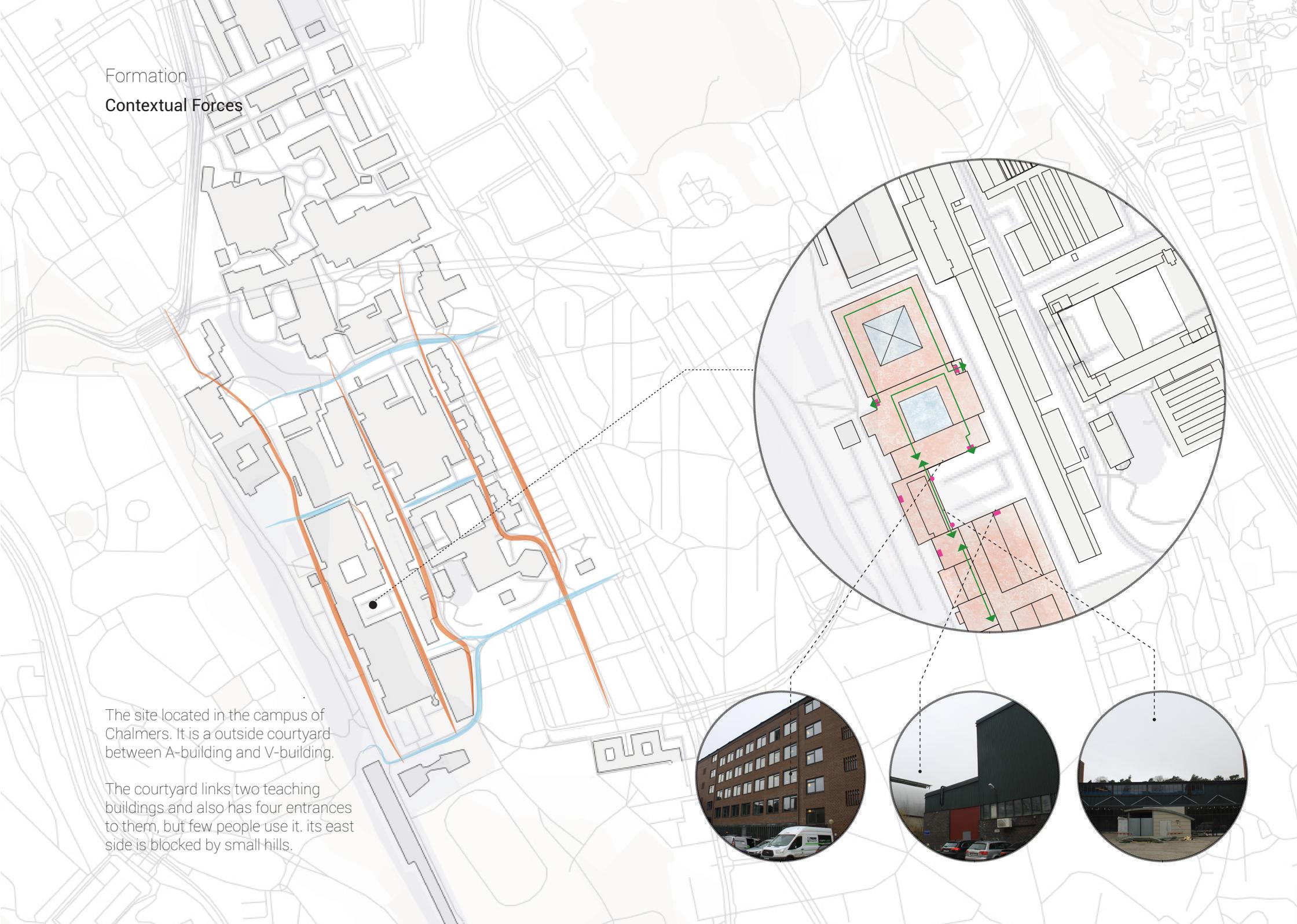
- Open Space
- Semi-open Space
- Indoor Space
- Commercial Space

?

Public space in the campus plays an important role in teachers and students life, and is also an important part of teaching environment. It is important to provide multi-level public space to meet the needs of campus functions and enhance the campus environment quality.

And Chalmers campus planning just lack of semi-open public space for students.

Formation
Contextual Forces



The site located in the campus of Chalmers. It is a outside courtyard between A-building and V-building.

The courtyard links two teaching buildings and also has four entrances to them, but few people use it. its east side is blocked by small hills.

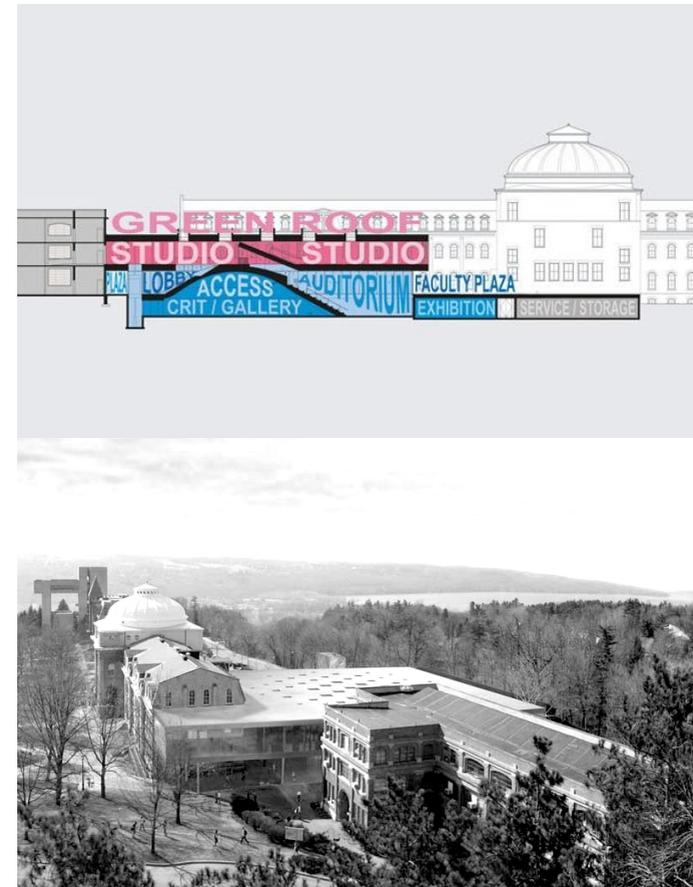


Formation

Reference 2: Organization Inspirational Evidence

Milstein Hall at Cornell University

Architects: OMA
Location : Ithaca, New York, USA

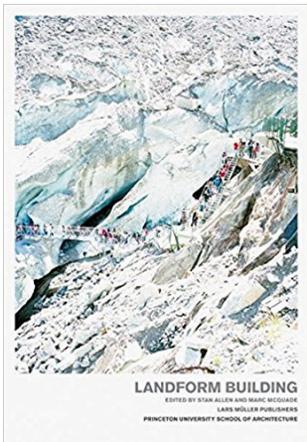


Formation

Reference 2: Organization Inspirational Evidence

Landform Building : Architecture's New Terrain

by Allen, Stan (Editor); McQuade, Marc (Editor)



Reference 2: Organization
Use Network-like Configuration to Achieve the Diversity of Space Experience

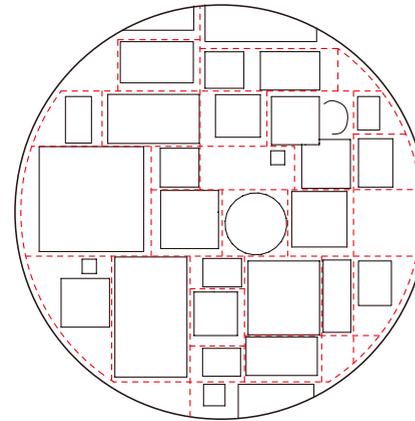
21st Century Museum of Contemporary Art, Kanazawa

Architects: SANAA
Location : Kanazawa, Ishikawa, Japan

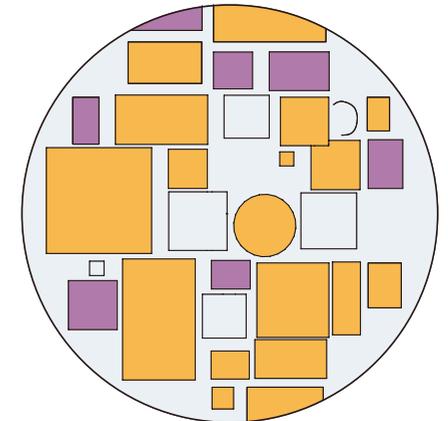
The Museum is located in the center of Kanazawa, near Kenroku-en garden and the Ishikawa Prefectural Museum of Art. The building has a circular form, with a diameter of 112.5 metres. This shape aims to keep the appearance of the overall building volume low, to mitigate the scale of the project and allows access from multiple points of entry. The transparency of the building further manifests the wish to avoid the museum being perceived as a large, introverted mass.



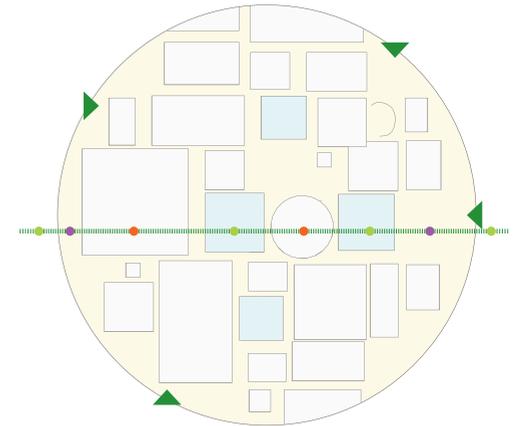
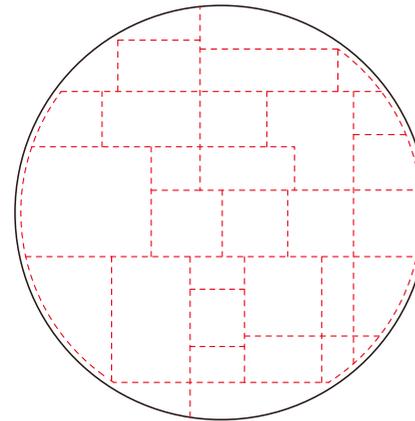
Base Organization System
Use Network-like Configuration to Achieve the Diversity of Space Experience



Roads



Rooms

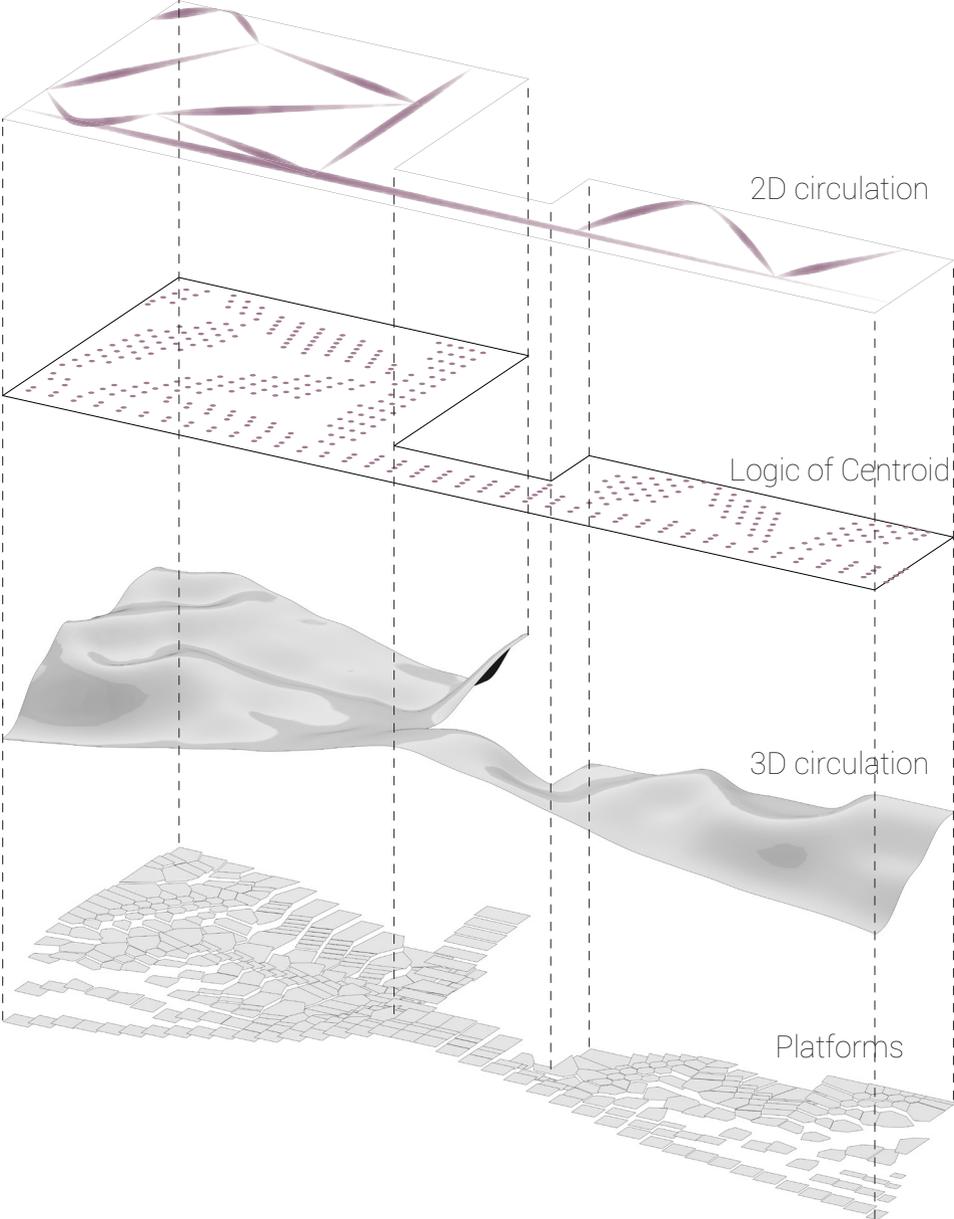


DESIGN PROPOSAL

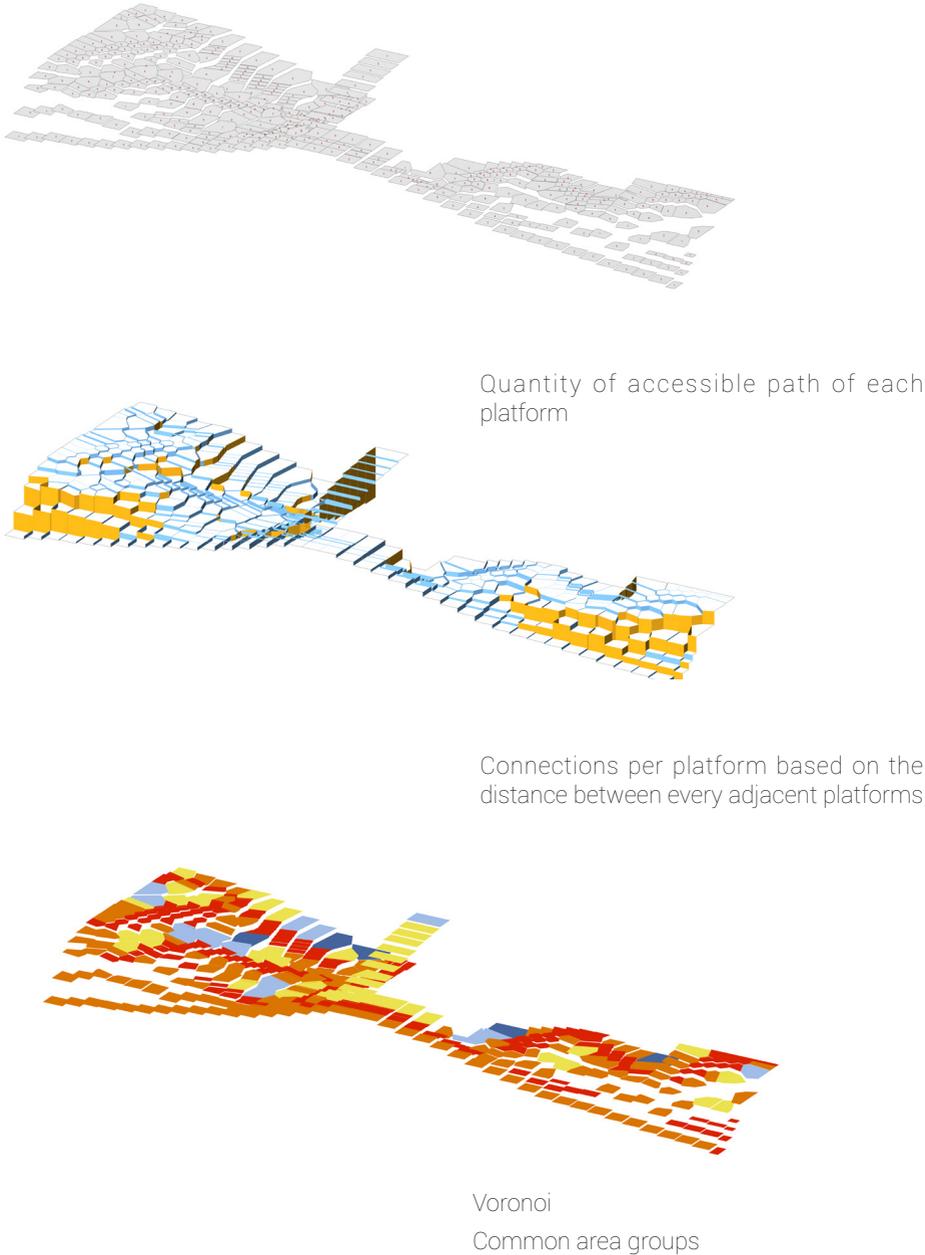


Logic of centroid

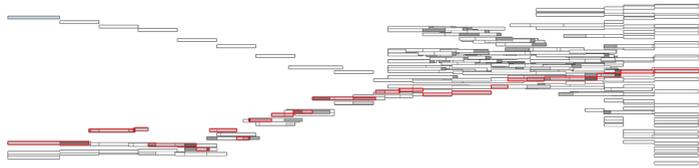
Logic of Circulation Based on Context



Logic of Circulation Based on Context



Section of the platforms



verticality



horizontal



verticality



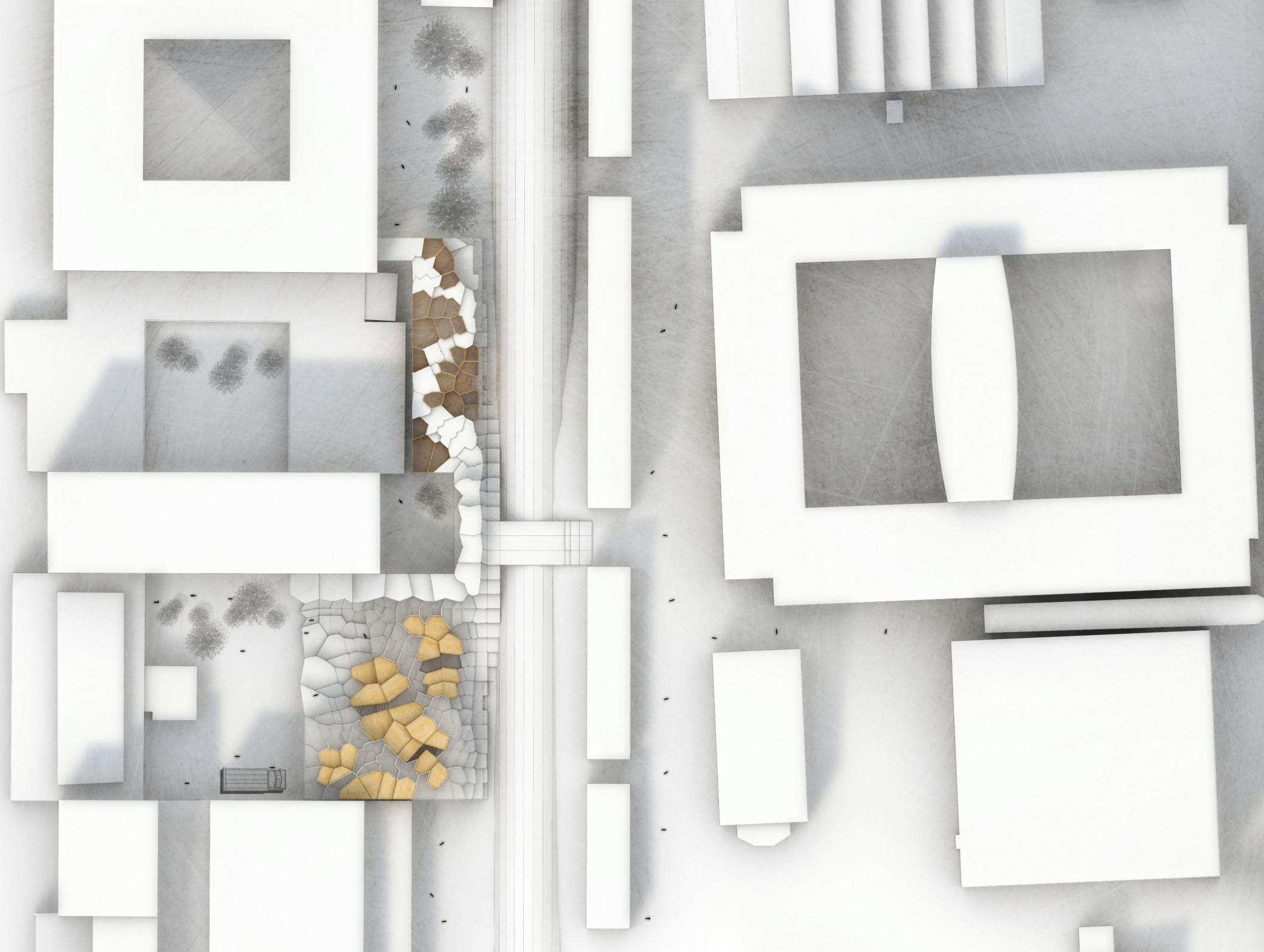
horizontal



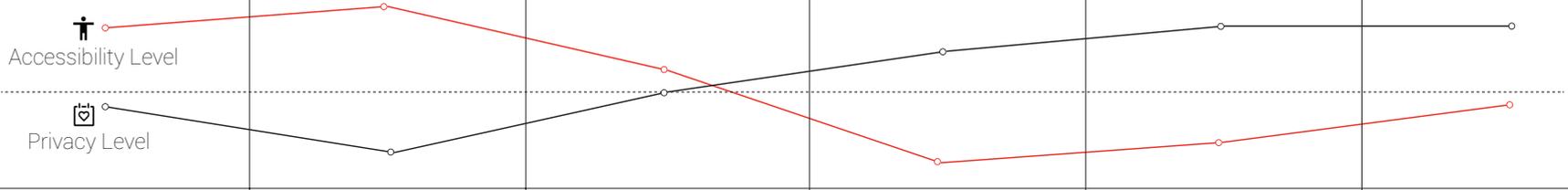
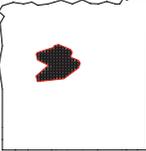
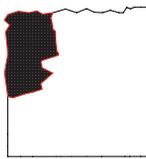
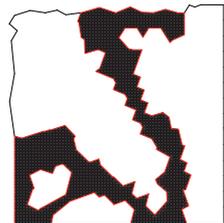
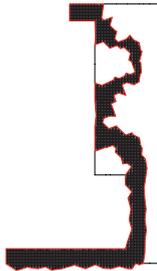
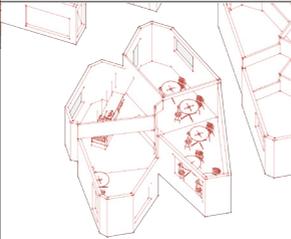
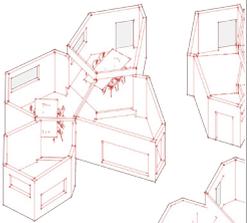
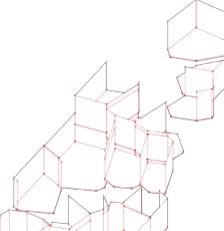
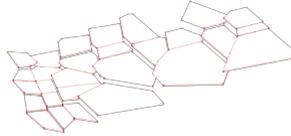
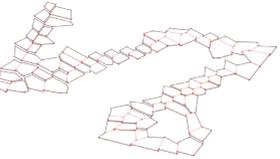
diagonal



diagonal



Function

Function Type	Cafe/Kiosk	Meeting Group Studio Room	Pin-up Exhibition Critique Space	Free Space	Corridor with Glass Roof	Corridor without Glass Roof	
Accessibility/ Privacy Level	 Accessibility Level  Privacy Level						
Zone Location							
Feature of Each Zone	Interior Easy to get access Center of the courtyard	Interior Flexible Higher privacy level Good sight view	Interior Flexible Natural light Next to A-building	Outside Flexible Natural light High accessibility Next to V-building	Inside Natural light High accessibility Next to V-building	Inside Natural light High accessibility Connect V-building and A-building	
State of Each Zone							

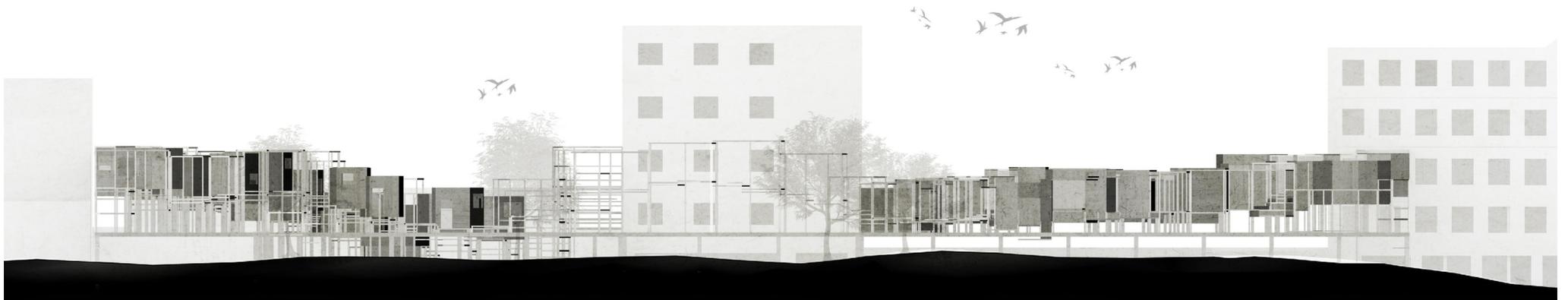
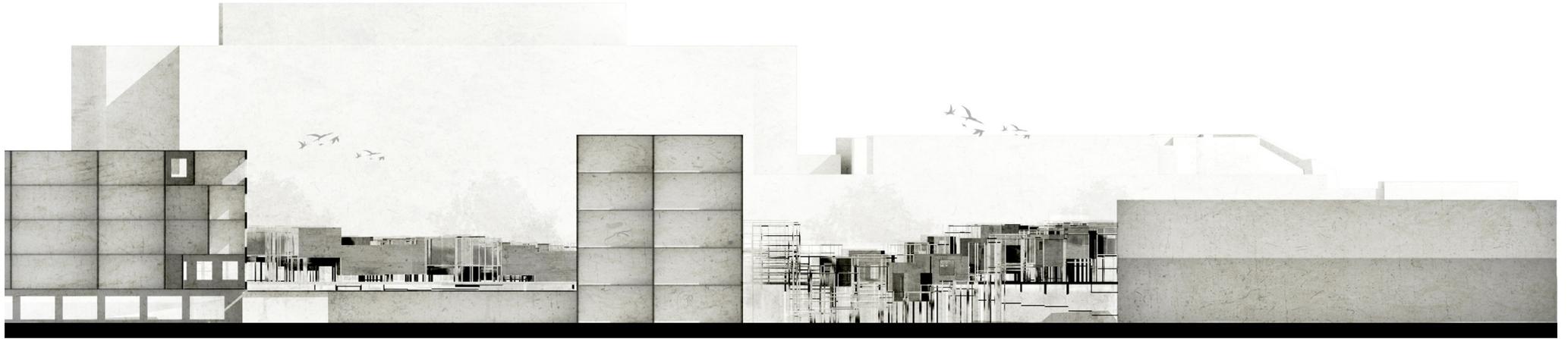
Interior Layout



Interior Layout



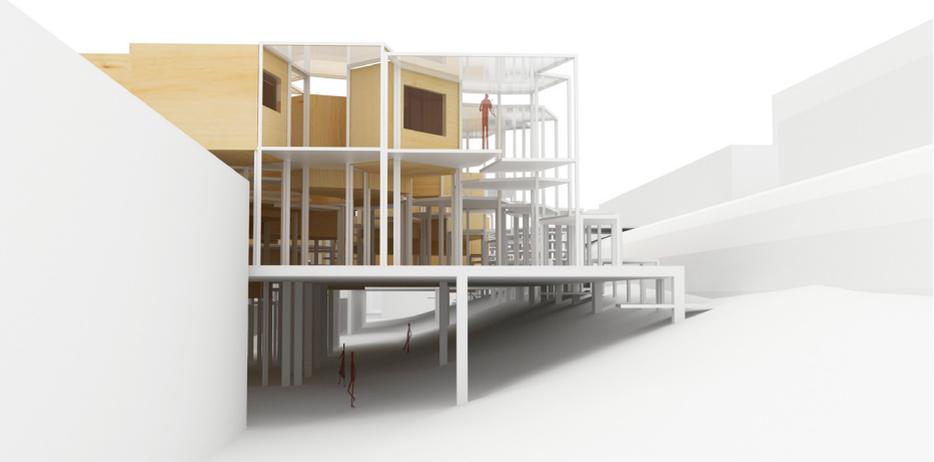
Section



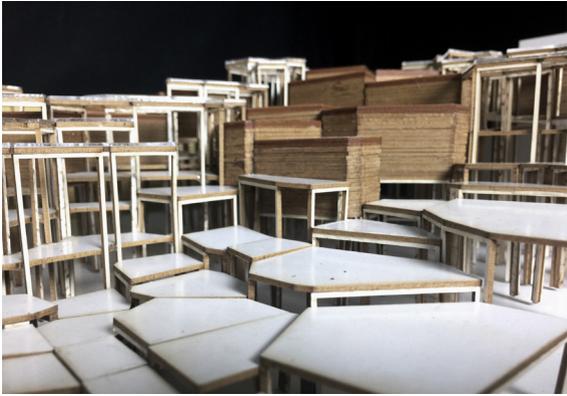
Perspective



Perspective



Model



Discussion

This project started with the thinking of the places that the transformation could happen. At first, it is just a simple idea that creating an additional place that offer extra space. It could be some small volume that stick to an existing building. That is the original idea of this master thesis. Then I feel that this form could be used to change the spatial performance of a district. So it developed towards the thinking of circulation influence when adding some extra parts.

How to arrange multiple layers of height difference is the first problem to be solved. Here I need to thank one of my guest tutor Jonas Runberger. He gave me the advice of landform buildings which inspired me a lot.

The final result is more like a continuous landscape between a series of buildings. At the same time, offer some free using space for the students and also break the barrier in the site.

Through the exploration in the establishment of the circulation system, this master thesis offer a way to solve the circulation problem with a flexible option that could adapt to any context.

Thanks to

Doing the master thesis is like a journey which is filled with various flavours of candies. Sometimes sweet, sometime bitter. However, it is a meaningful and also unforgettable time because all of you, my dear friends.

Without you, I couldn't imagine completing the model. Thank you so much for your dedication and patience, Yupeng. So glad to meet you here and wish you all the best. Tianhai and Ruowen, thank you as well for your helping for making the model.

And also my beloved friends, thanks for accompanying and supporting me all the time, Zhiyu, Wenhui and Yiwon.

Then it's my tutor Kengo, thanks for the longtime patience and selfless dedication. Also Jonas lundberg, Jonas Runberger and Daniel, thanks for your important advice.

Finally, my parents, thanks for your supporting and understanding.

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