

Collaborative Mass Housing Design Studio

Ornaments and Patterns 2013



Poster #48

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Abstract

With the rising densities of cities, many **housing** has transformed from individual floored units to multistoried sky-high apartments to accommodate more people. **The aspiration to own an own home** with roof, walls, and backyard is replaced with the need to just simply have a ‘container’ for living. Families are living in identical units designed and ‘**prefabricated**’ for efficiency and affordability and not for them as users. They are not involved in the design process.

However, with the advancement of technology in digital architecture, there is a possibility for a **user-centric design process** (Fabian et al, 2013).

‘Barcode housing system’ (Madrazo et al, 2009) is such an example but the freedom of design provided for the occupant is limited.

At present, most of the **computational method** addresses the possibilities of a fully parameterized design yet it is still mainly generated by a top-down approach of being controlled by solely architects.

Housing that highly engaged occupants closely are generated using primitive methods (Bech-Danielsen, 1996). By adopting computational methods, the freedom of design can be developed further, yet maintaining the possibility of mass production for economical purpose (Gao et al, 2012).

We aim to understand the extent of design freedom necessary for a user-participatory design system.

The study is done in a **bottom-up approach** where two groups of ten designers generate each one high-rise apartment. The uniqueness of this method is that each of the ten designers are allocated one tenths of the total units of the apartment but have to collaborate on one building to fit the individual designs and proposals into the framework of one building envelope.

We present process and extent of **consistency vs. individuality** that appears in this design method and the possibility of an integrated system of this bottom-up approach (user-involved) with the top-down approach where the design is generated fully by computational method.

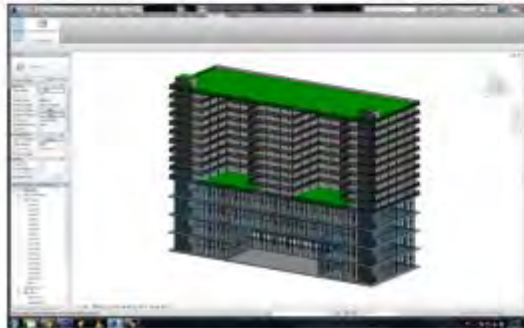
The Collaborative Studio has at its core a blended designing- and learning-environment that constructs knowledge in an authentic setting with scaffolded and interaction experiences.

Contraire to a conventional sequential problem-based learning (PBL) setting, in the presented collaborative studio everybody engages and contributes to a common goal that shares not only resources and exchanges knowledge, but also generates a high motivation for the all stakeholders through the social interaction of the design studio set-up.

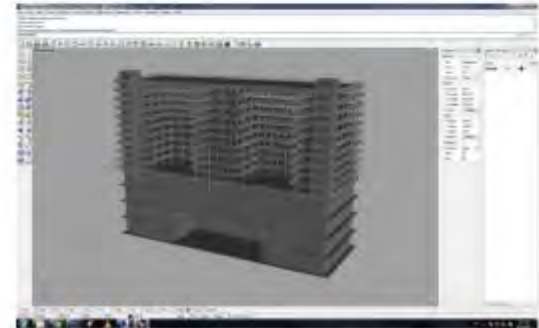
Design Brief



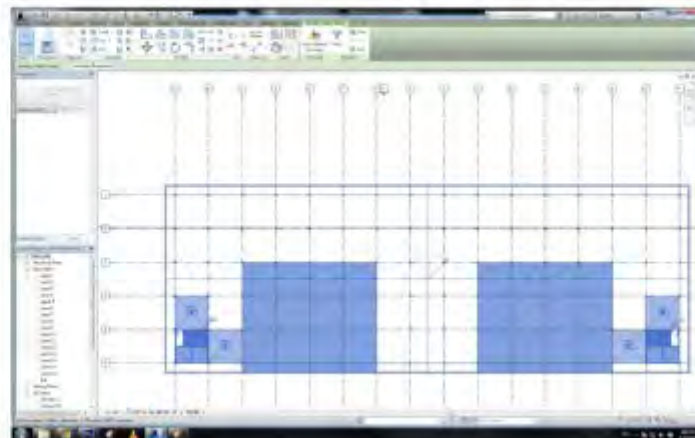
Visualisation in Virtual Environment



Base Model in Revit (BIM)



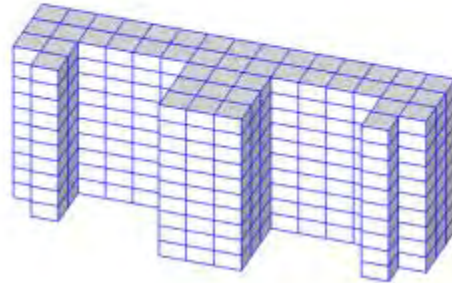
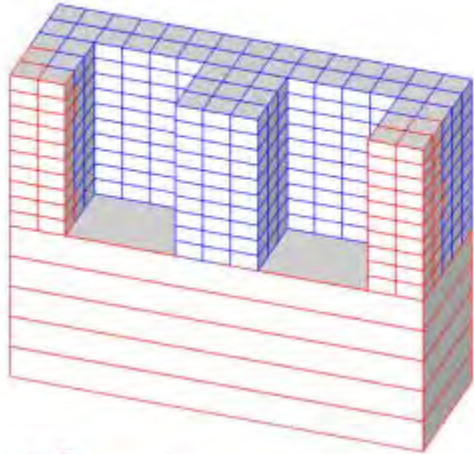
Export to Rhino to do model or link with Grasshopper



Grid plan

Design Strategy

Example:

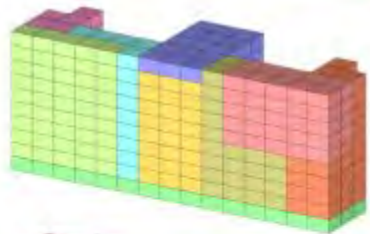


2 Set of model.

Each 450 units (5m by 5m by 3m)

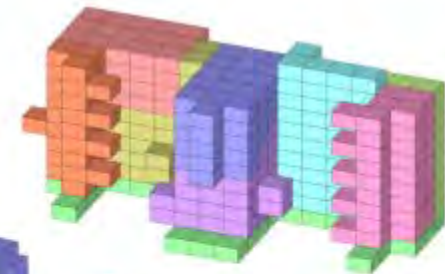
10 students to each set.

Each students will have (45 + 5) units to work with.



10 sets of 45

Extra 5 units
(not Compulsory)



1st Pattern: Layout of units

2nd Pattern: Facade

With Constrain

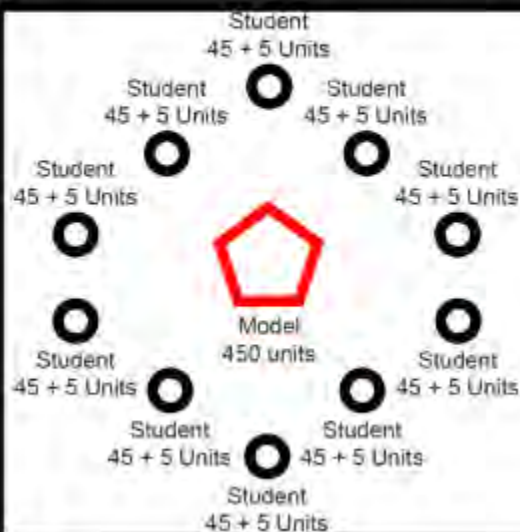
- Units divided and allocated
- Circulation defined
- Unit design specified
- Groups are not to be changed



Without Constrain

- Choose own group of 45 units
- Self - defined circulation
 - no dead - end
 - connect to elevators
- Unit design not specified
- Group of units need not be together (set of 45 can be separated in more groups)

- Keep within the boundary of the building unless structurally possible
- Every grid can have the choice of being empty (shared space)



- Students will be split into 2 groups.
- Every student is allocated 45 + 5 massing units to work with.
- The massing units can be a solid unit or a void.
- With the allocated / chosen geometry, the initial task of the students will be to arrange their massing units in any manner possible.
- The 45 units is a must-use, the extra 5 units are optional and can be used to trade with other students.
- The aim of each student is to use the massing units and design a living space for 9 - 15 families.
- It can be 9 families of 5 units each, 15 families of 3 units each or even 6 families of different number of units etc
- Each housing units must be livable (receive ample sunlight, comfortable spatial quality etc)
- Before each lesson, the students will submit the soft copies of the massing/models to be compiled for discussion.
- Part of the grade will be determined by the extend of design consideration given to the neighbours.
- Collaboration between each student in the group is encouraged.

Precedent Studies

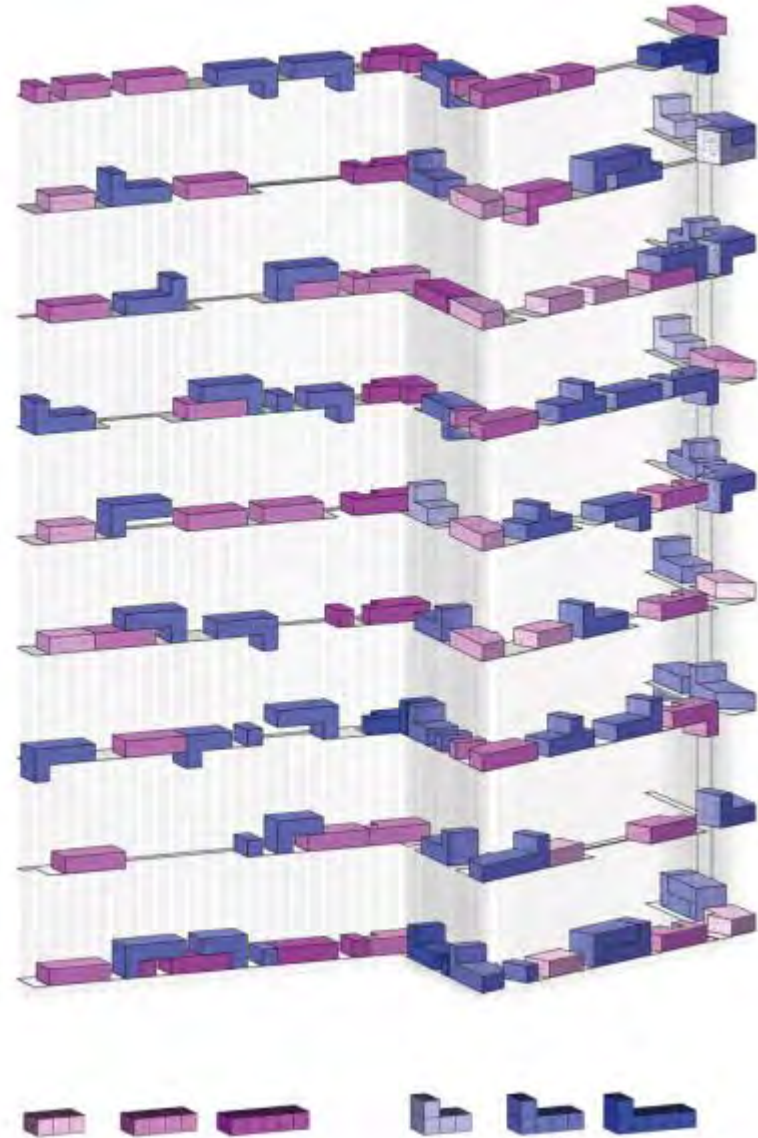
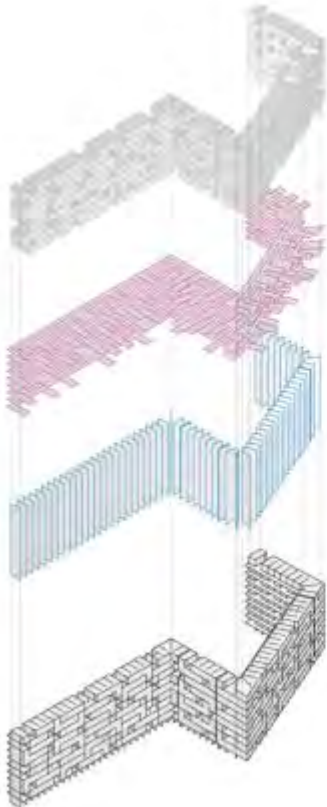
GIFU KITAGATA APARTMENT BUILDING Kazuyo Sejima (SANAA)

Building Area: 584 sqm
Total Floor Area: 4,706 sqm

Floors: 10
Dwellings: 107

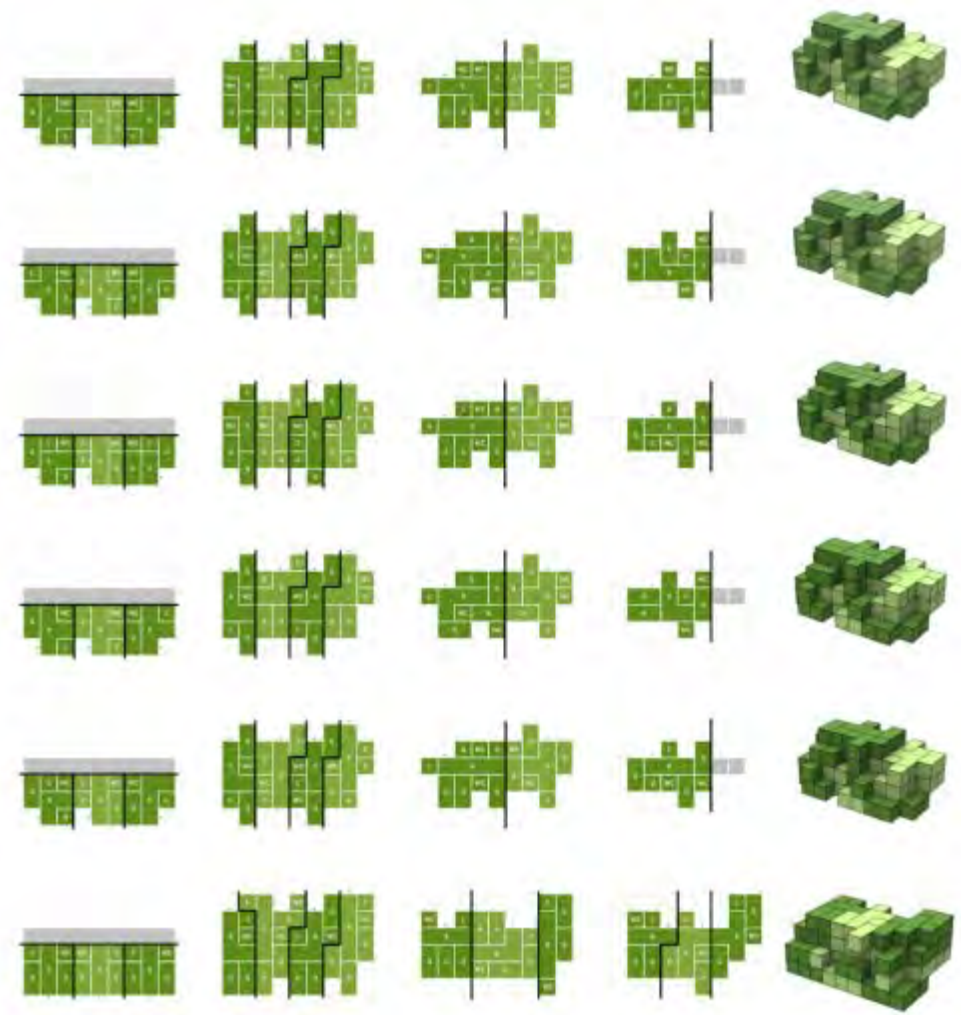
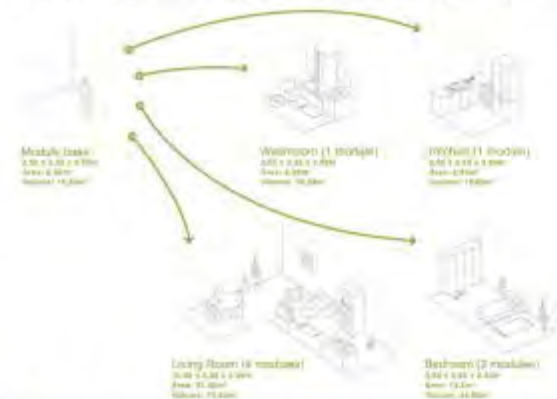
Folded+Perforated Block

Chan Hoi Hin Instin 1009600082



FALA ATELIER Alvenaria Social Housing Lisbon, Portugal

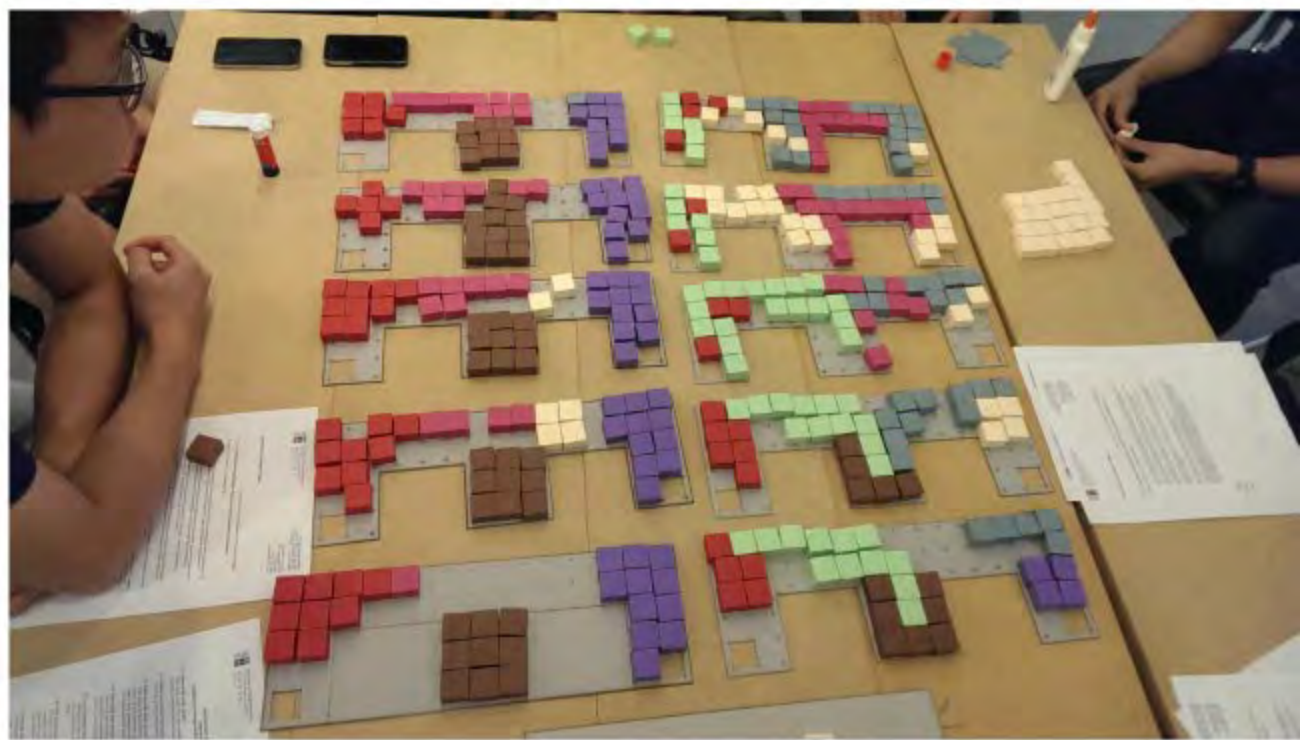
Architects: fala atelier
 Location: Lisbon, Portugal
 Team: Filipe Magalhães, Ana Luisa Soares
 Type: Public Competition
 Year: 2013



WC: Washroom C: Kitchen S: Living room Q: Bedroom
 A1: CHEUNG Chung Kan 1155029622

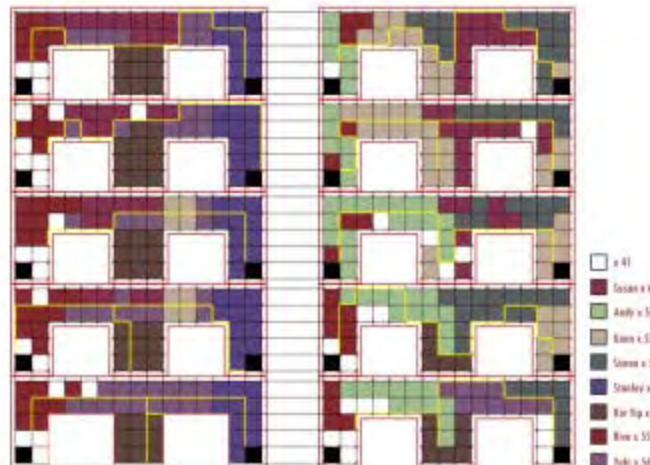
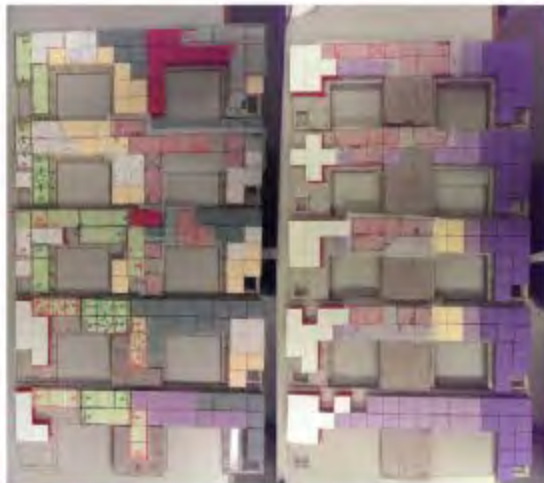
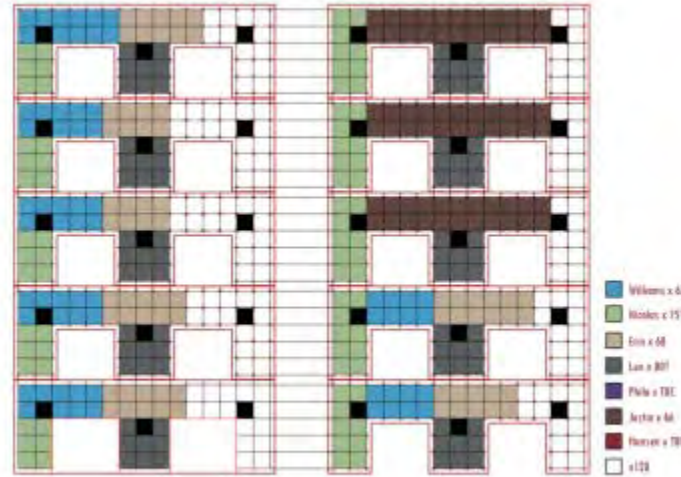
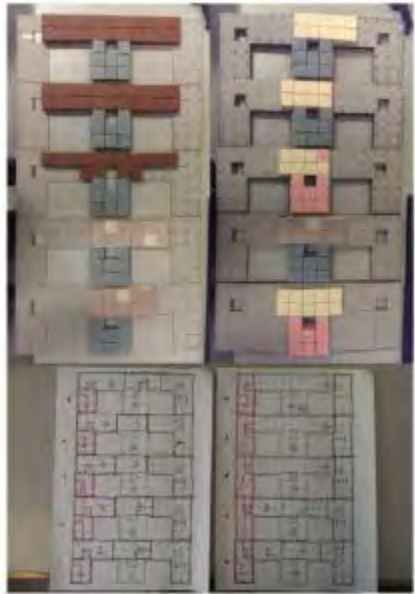
Process (Arrangement)







Process 2 (Planning)

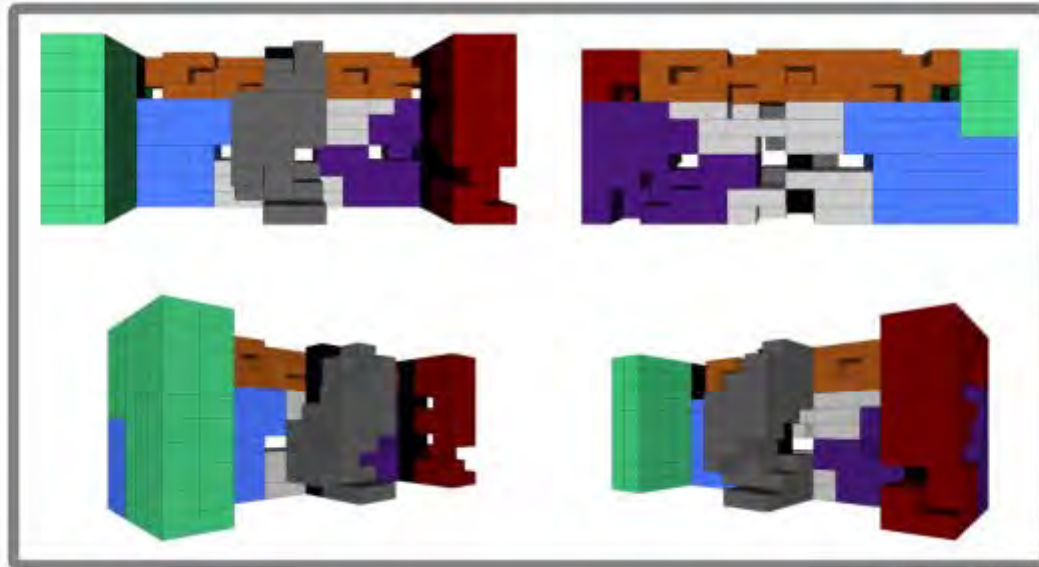
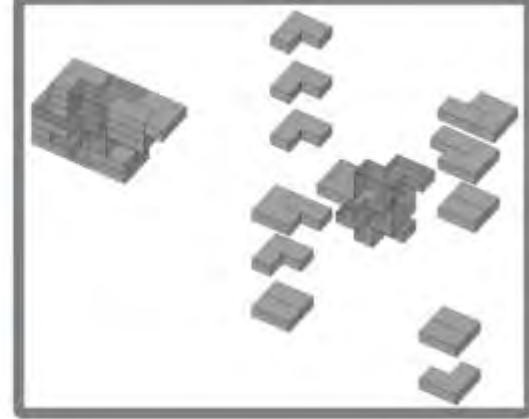
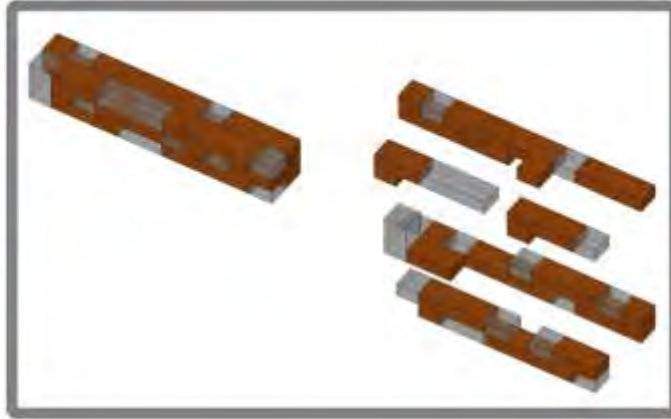
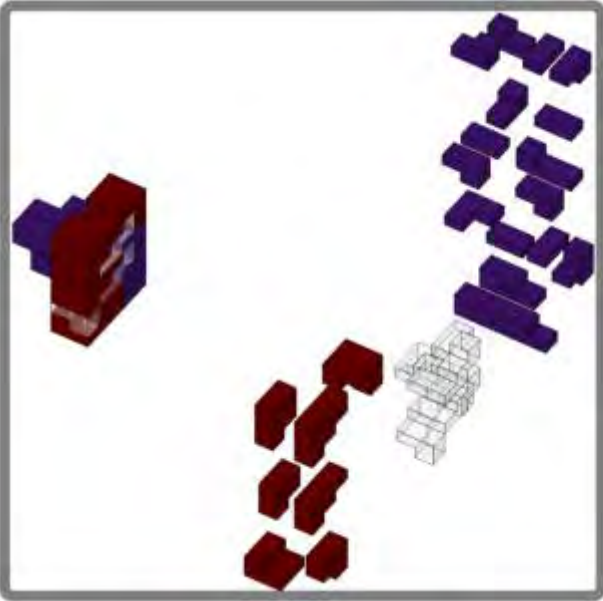


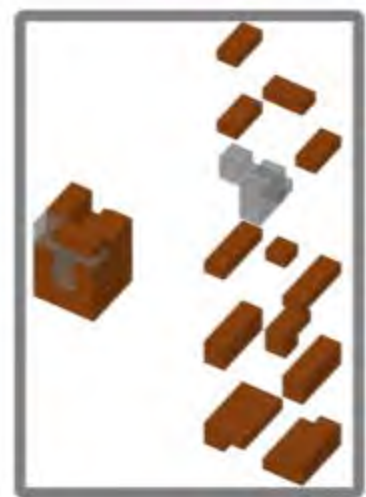
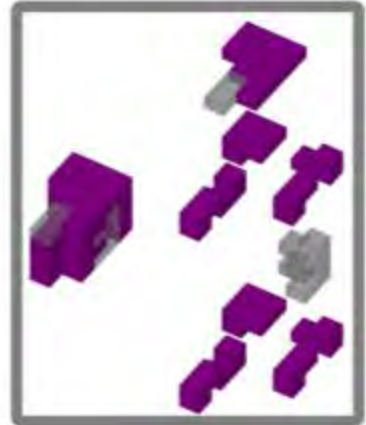
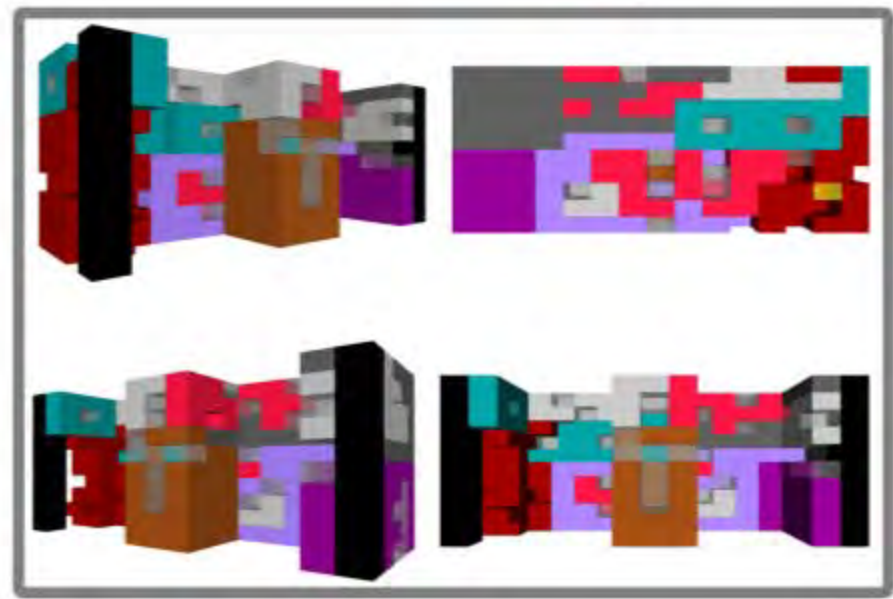
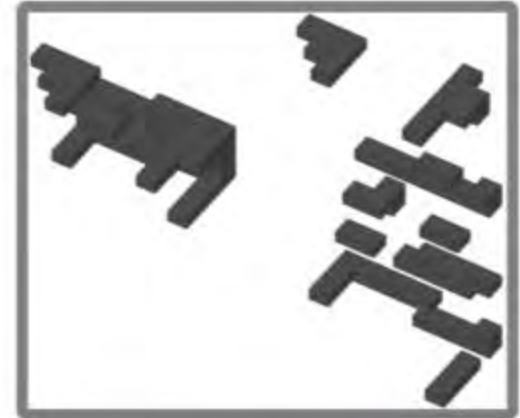
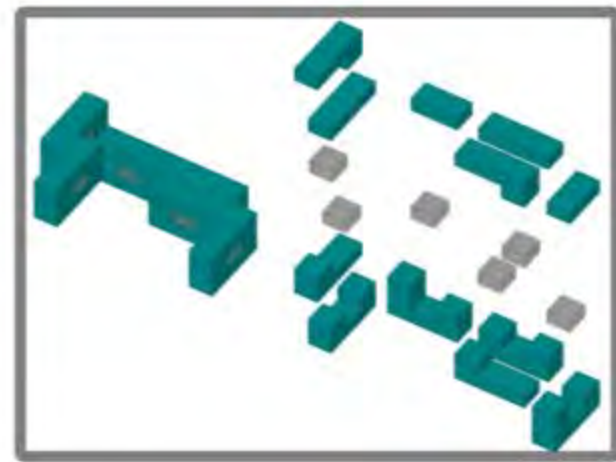
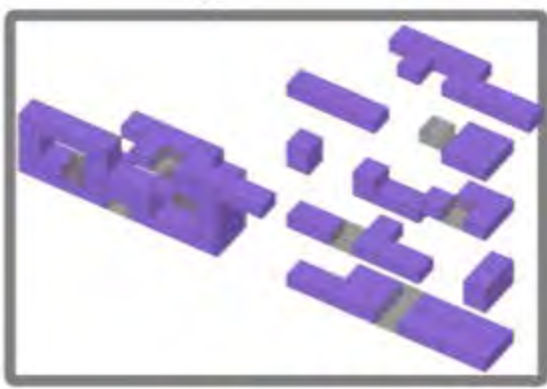
Process 3 (Form-making)



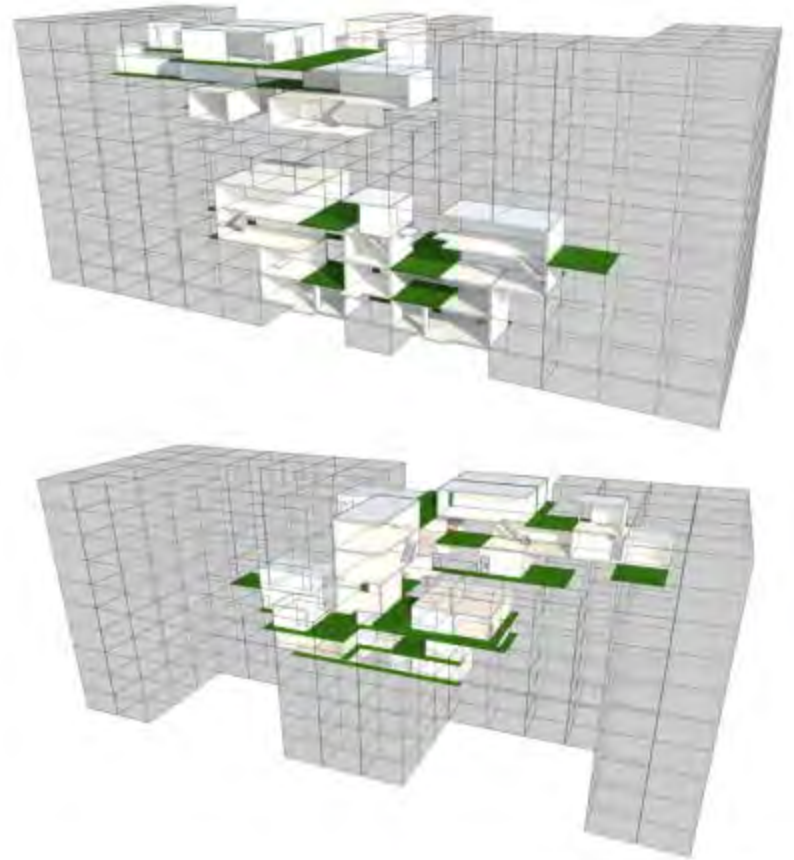


Results



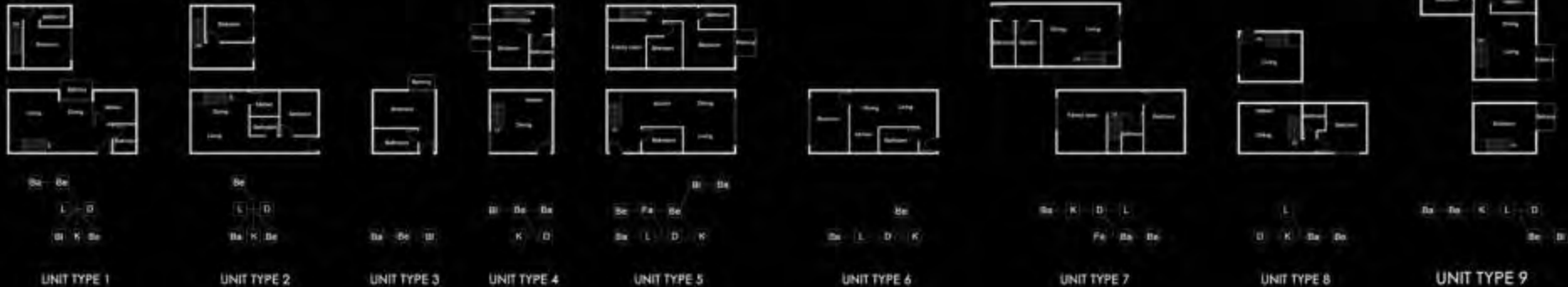


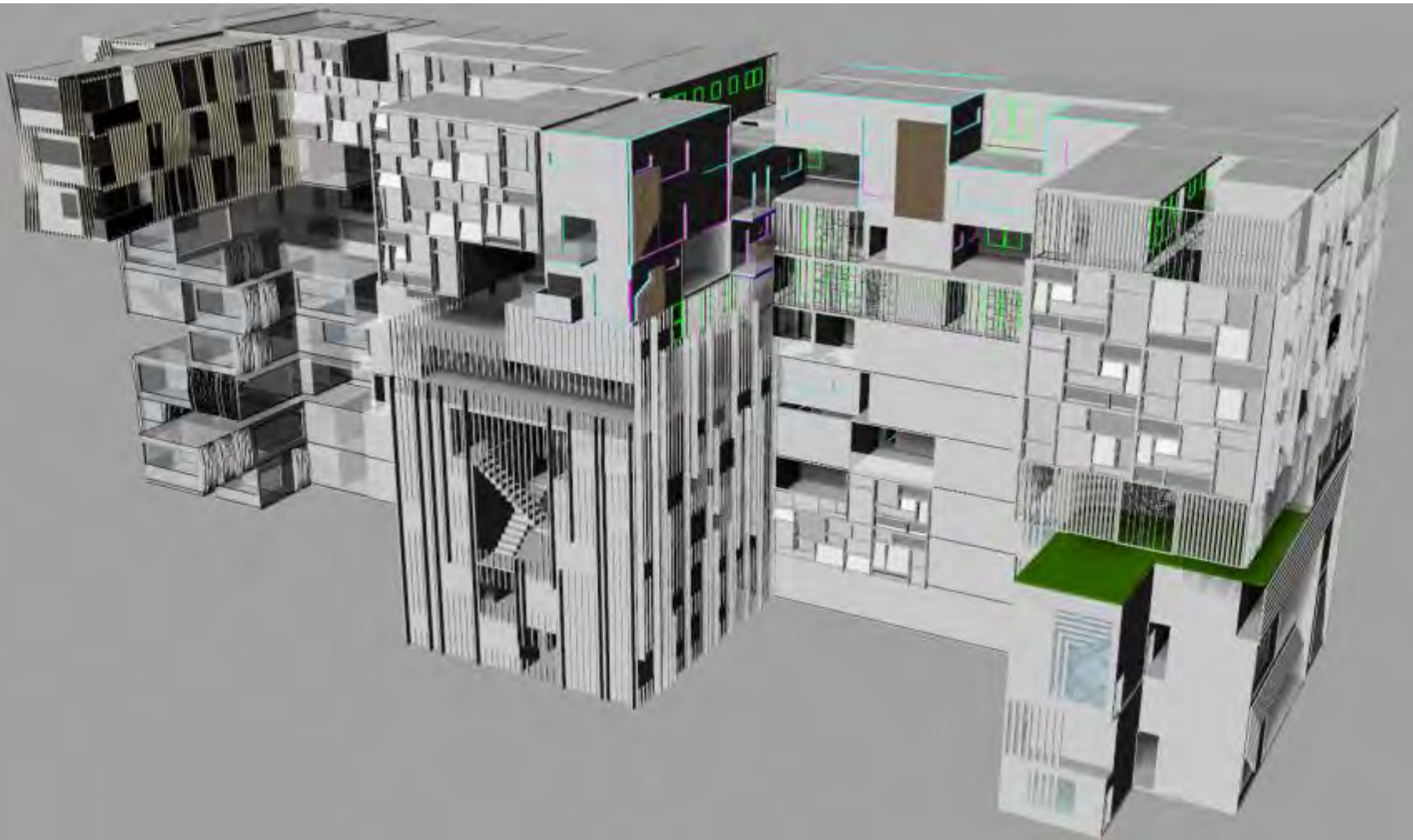
UNIT DISTRIBUTION_1:400

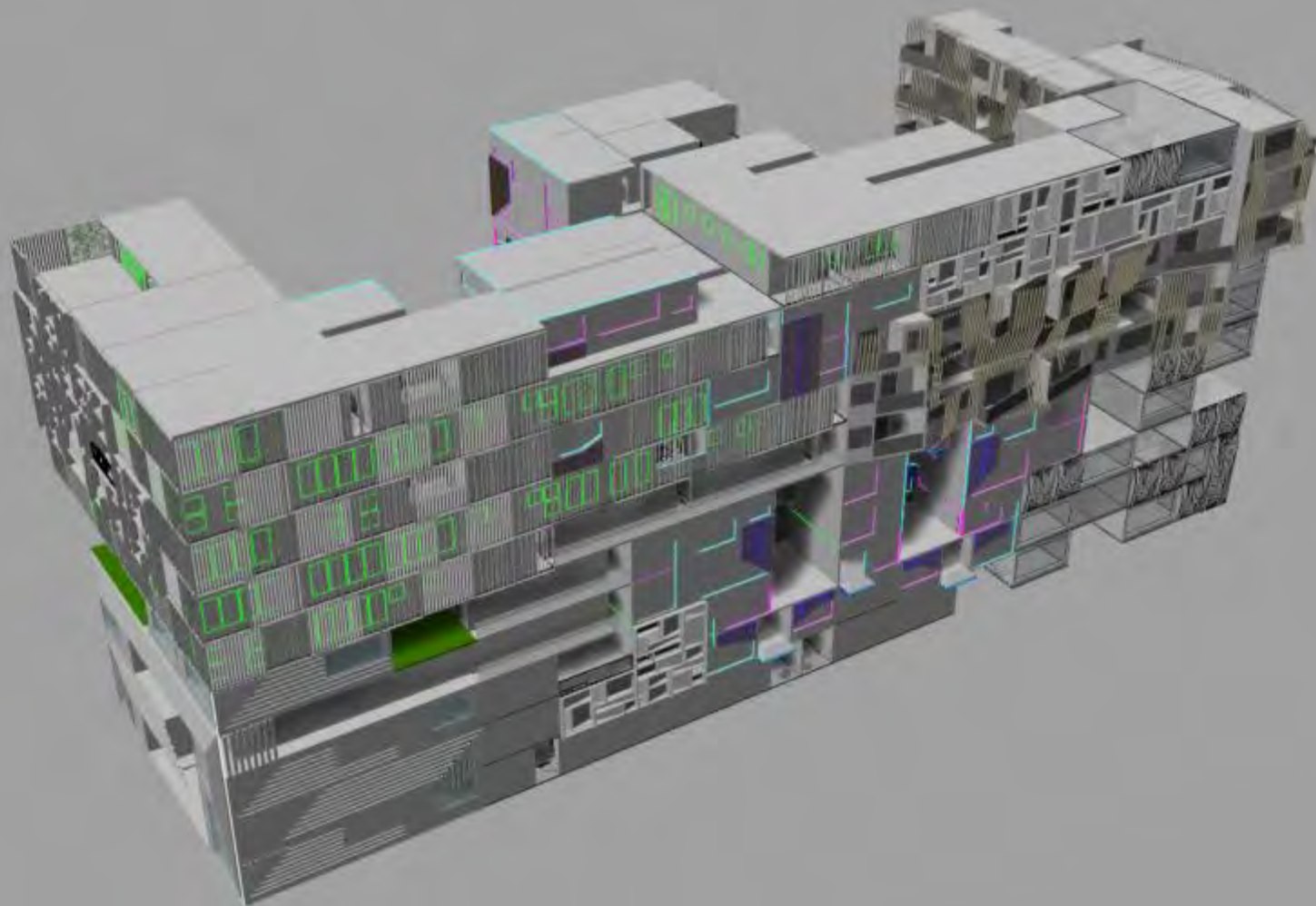


UNIT TYPES_1:150

- D = Dining
- L = Living
- K = Kitchen
- Ba = Bathroom
- Bl = Bedroom
- Bc = Balcony
- Fa = Family room
- Bs = Balcony







Pro & Con

- Individuality achieved
- Shared Authorship
- Overall design can be improved
- Students picked up a new form of design
- Social Learning
- Students did not break out of the cubic look

Difficulties faced

- Busy schedule of group members
- Uncooperative members
- Need better methods to resolve conflicts
- Insufficient time
- Life-long learning

The End

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