

Communal Housing Typology On Mars

Group 4

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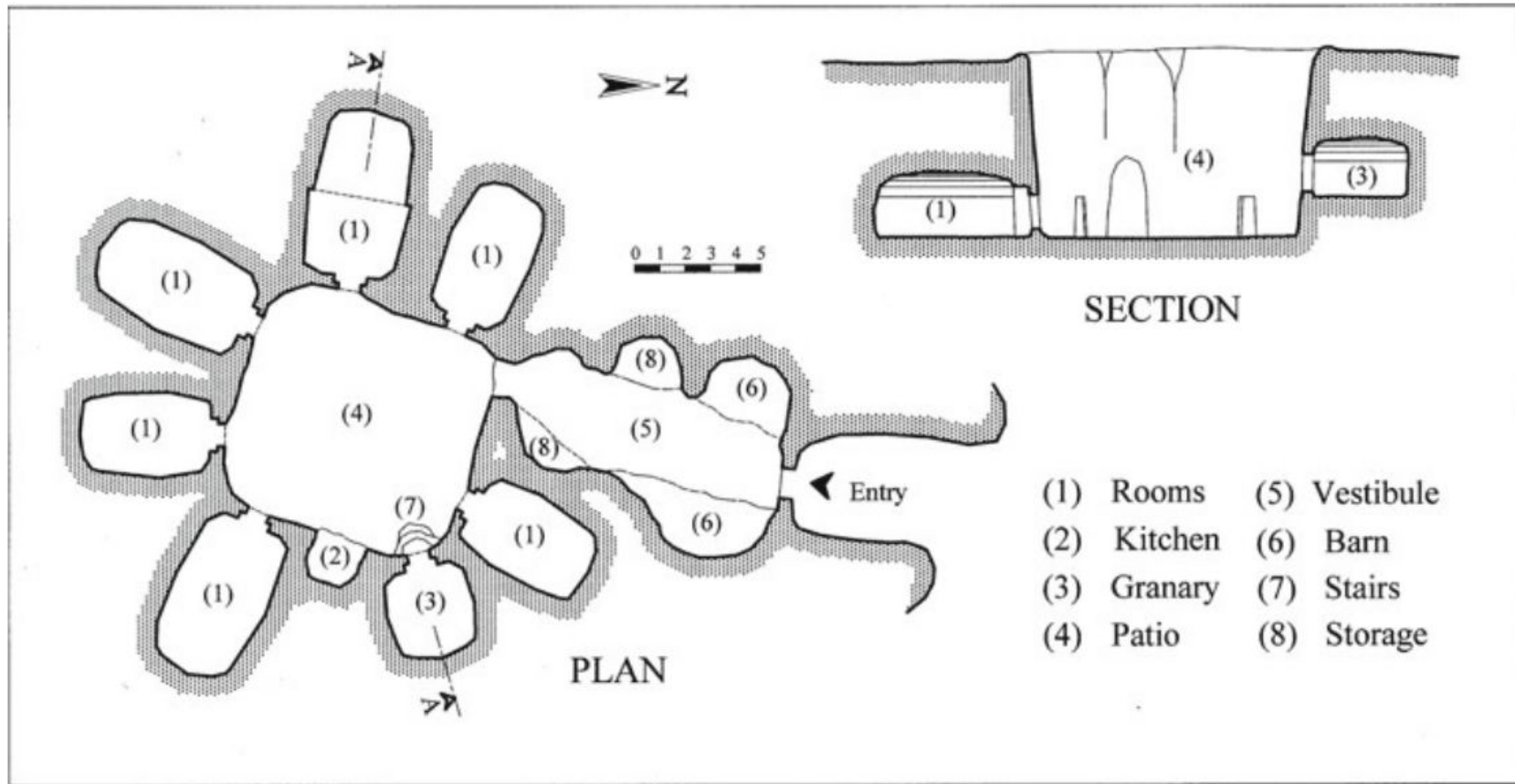
Structure:

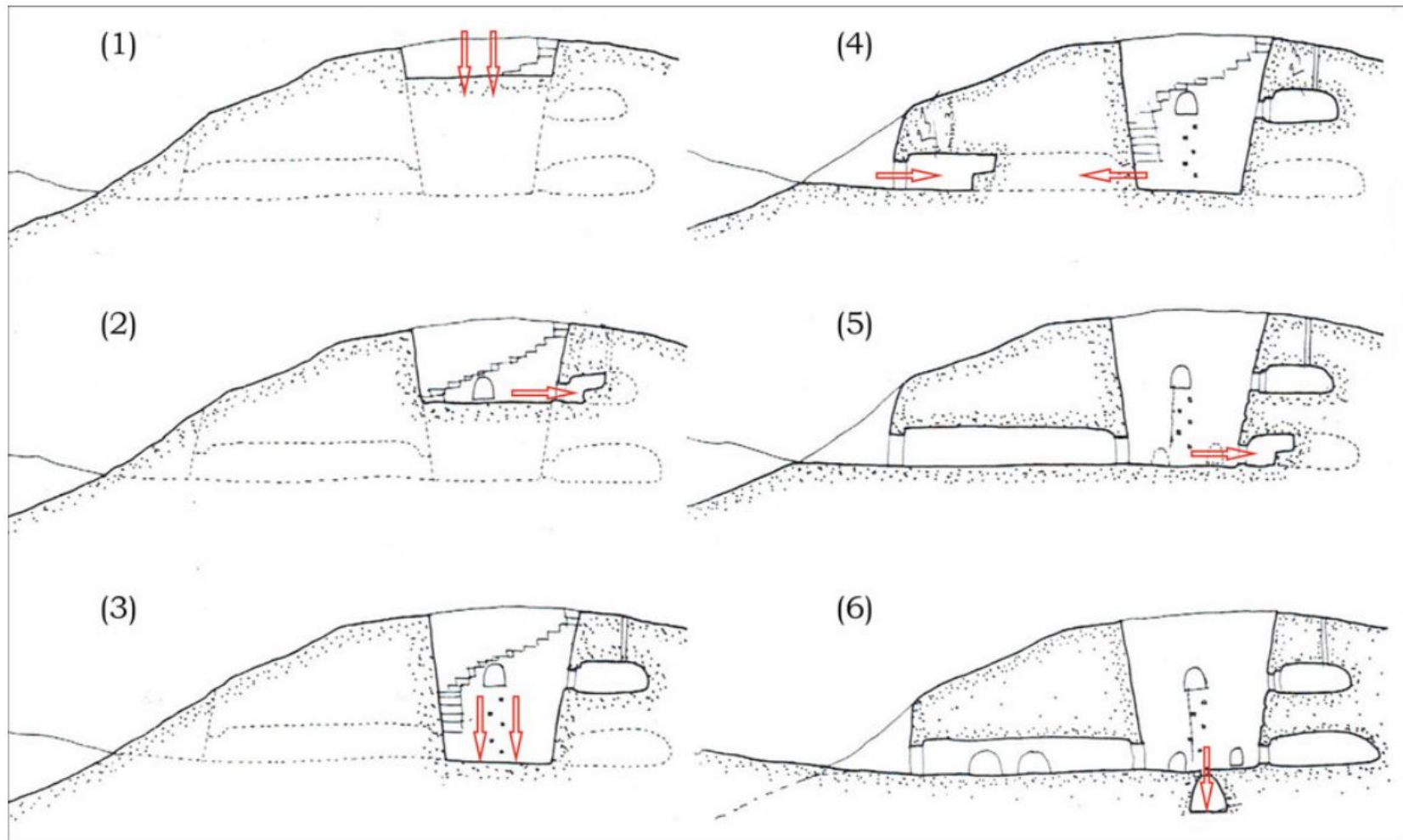
1. Overall & Fragment design
 - a. Case study
 - i. Overview
 - ii. Plan
 - iii. Process
 - b. Overall design
 - i. Programme
 - ii. Courtyard
 - iii. Process
 1. Case Study
 - c. Housing design
 - i. Case study
 - ii. Programme
 - iii. Process
 - iv. Section
 - v. Plan
 - vi. furniture design
 - d. Canopy
 - e. Fragment design
2. Production & Assembly
 - a. process

Case study



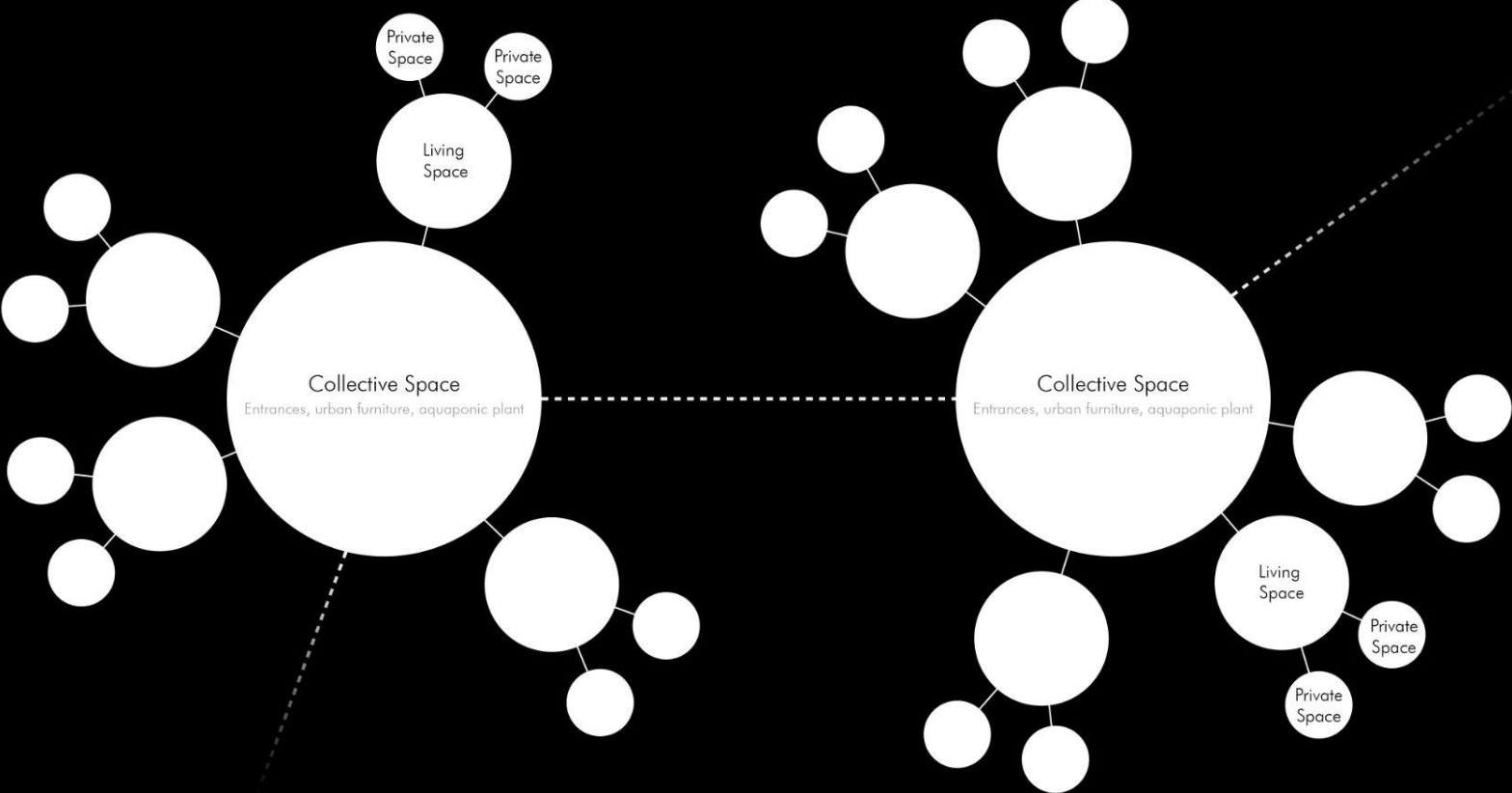
Case study - underground courtyard design



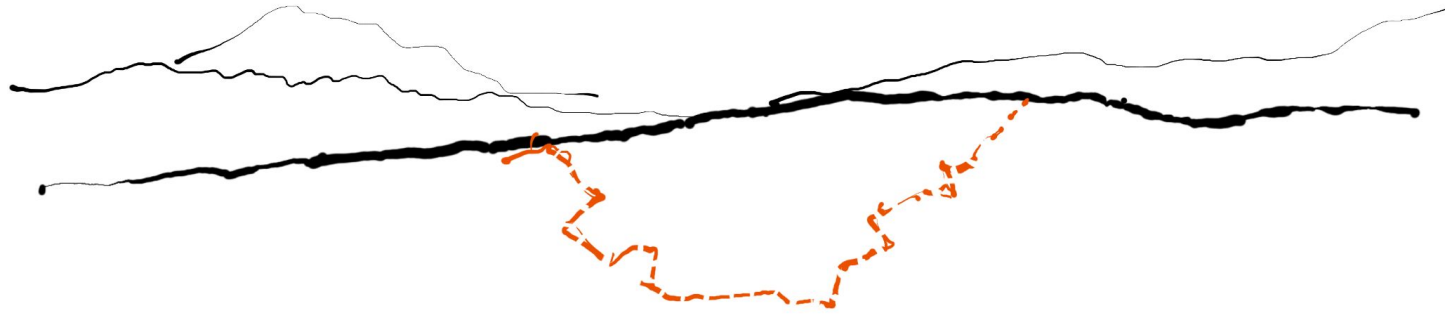


Overall design

Courtyard organization concept



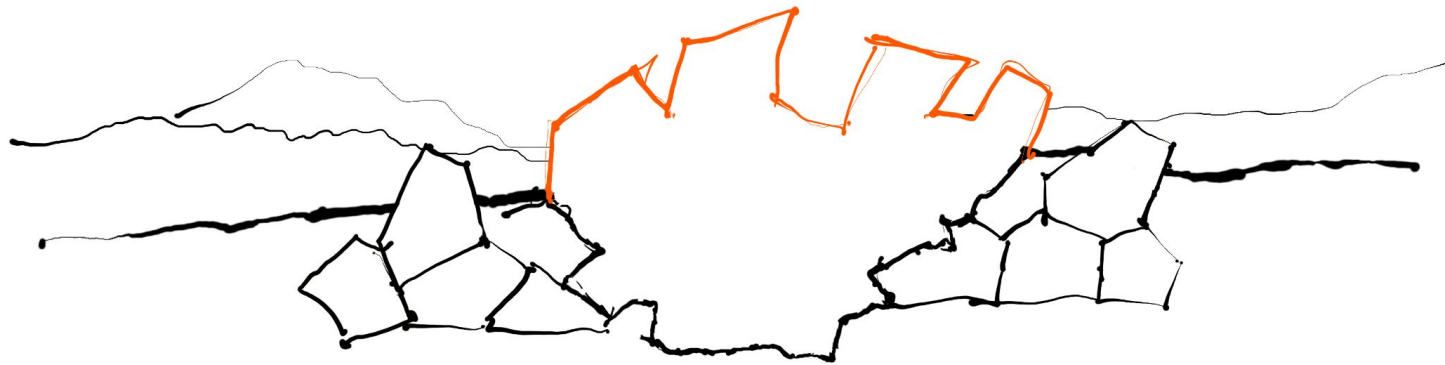
components: courtyard + housings + canopy



courtyard excavation



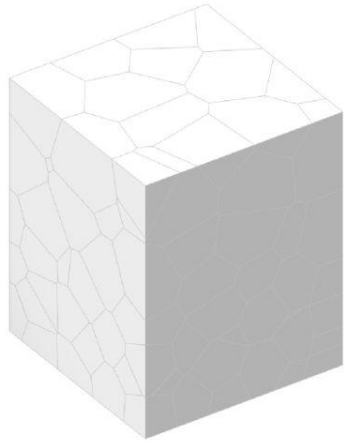
housing unit



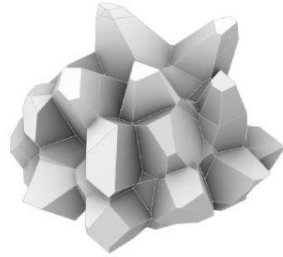
radiation shielding canopy

Overall design process

Overall voronoi design



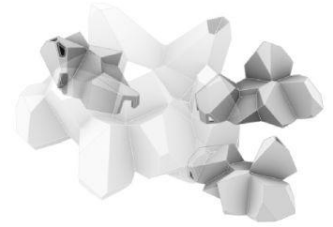
Bounding box



Extraction of courtyard volume



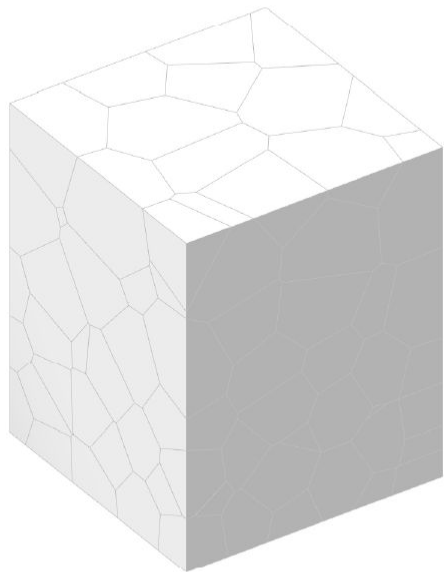
Formation of courtyard and canopy



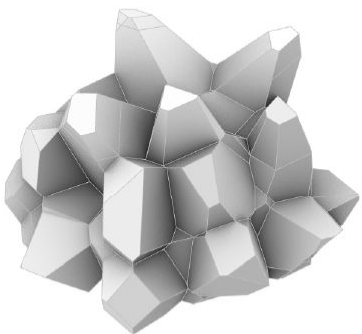
Integration of courtyard and houses



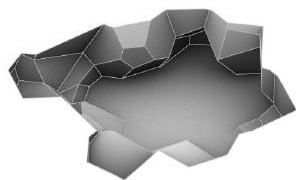
Box to Voronoi



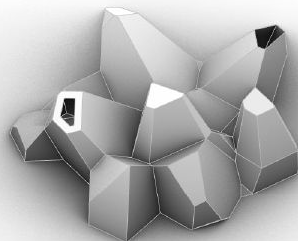
Voronoi selection



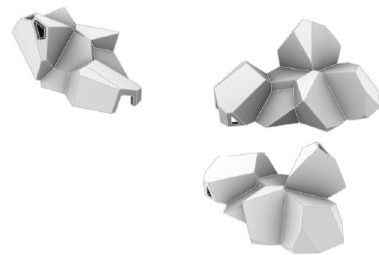
Creating courtyard



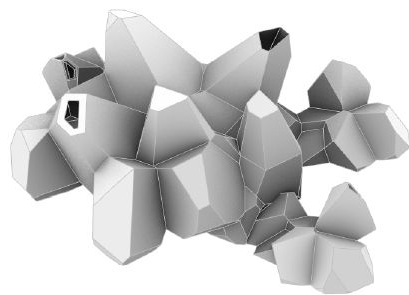
Creating canopy



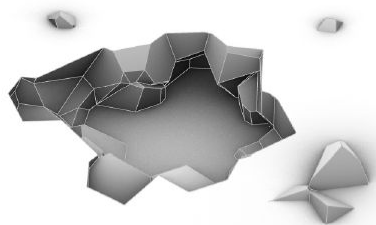
Creating housing units

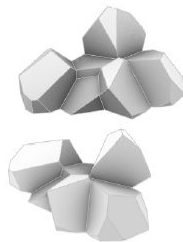


Attaching the housing units



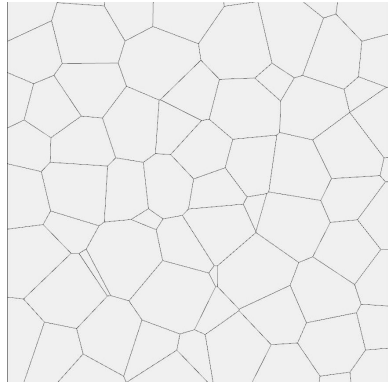
Overall design





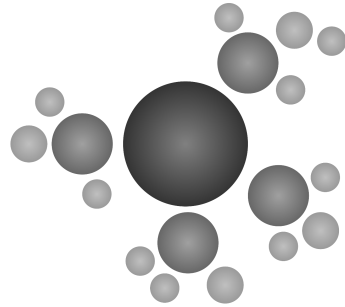
Courtyard design

Voronoi housings to community

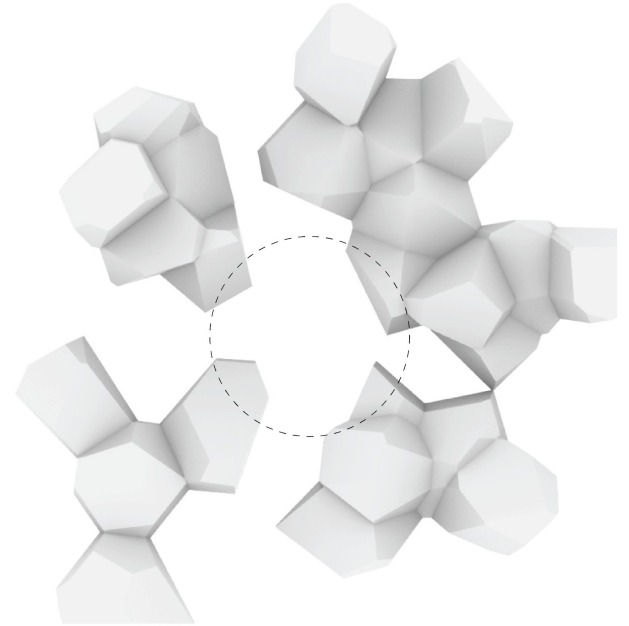


Voronoi cell construction

+

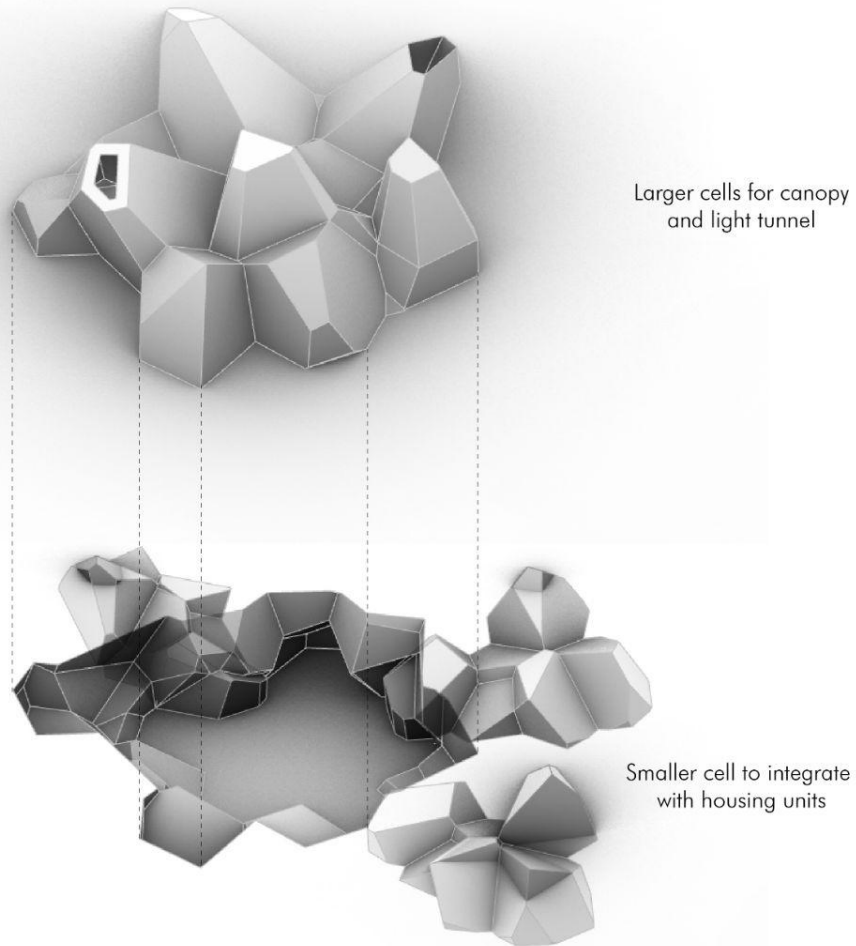
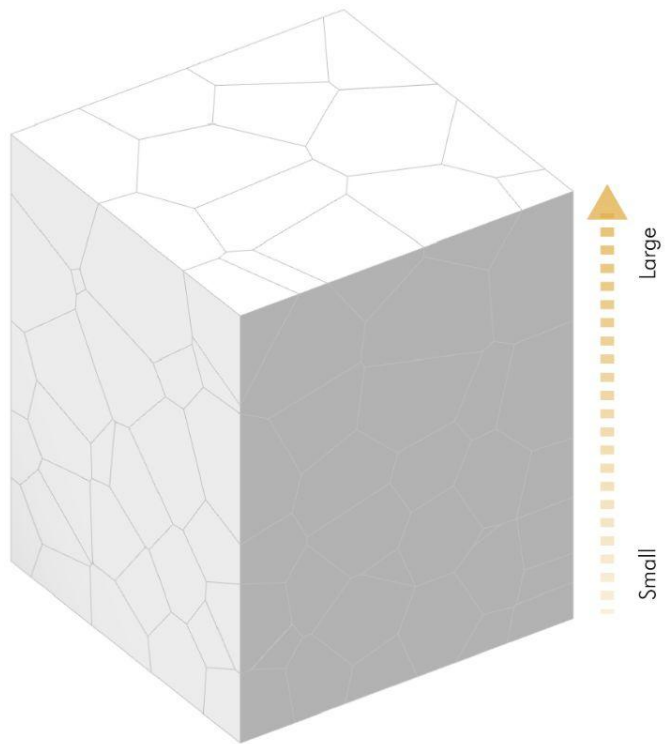


Programme organization

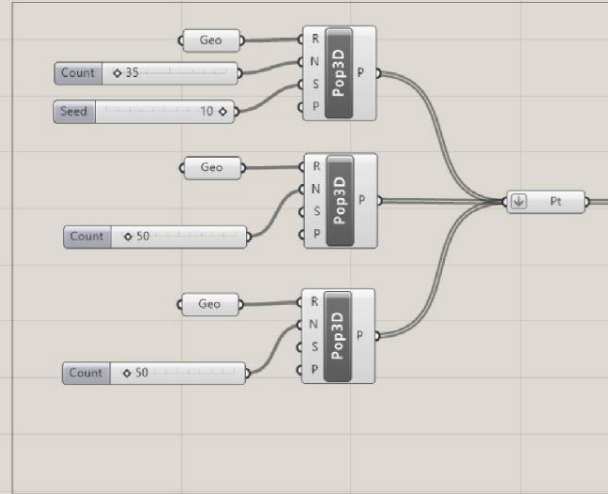


Voronoi cell organization

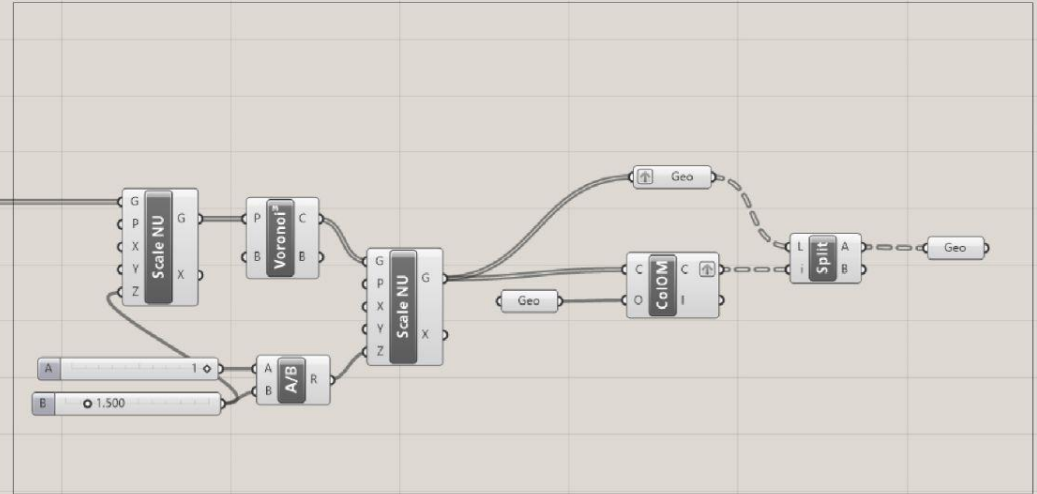
Courtyard voronoi design



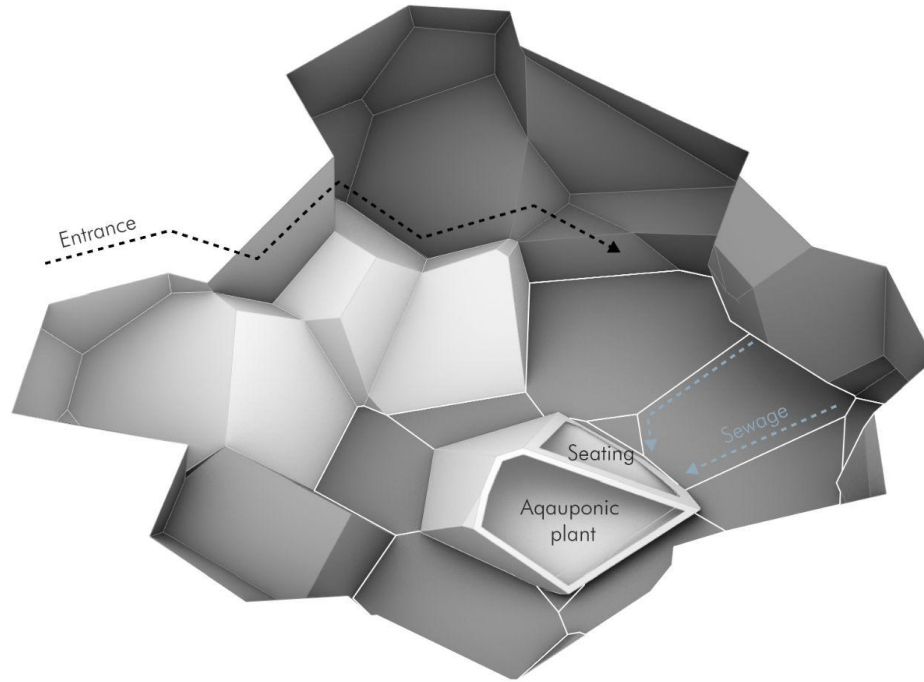
Control of voronoi size



Formation of voronoi



Courtyard urban furniture design



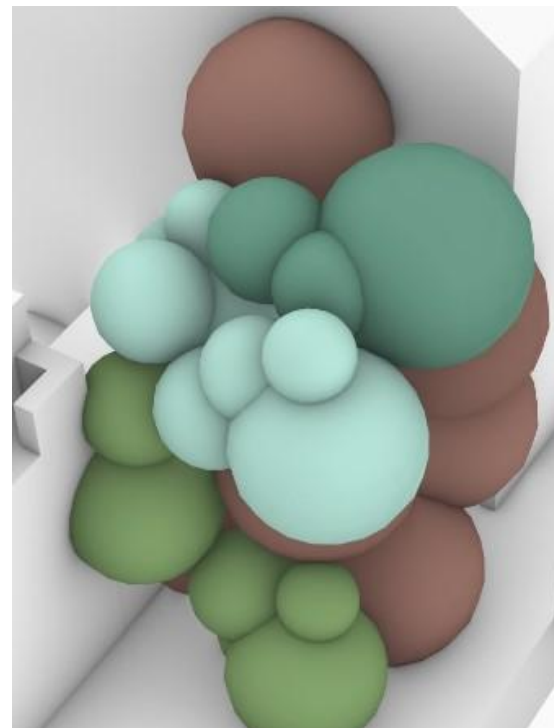
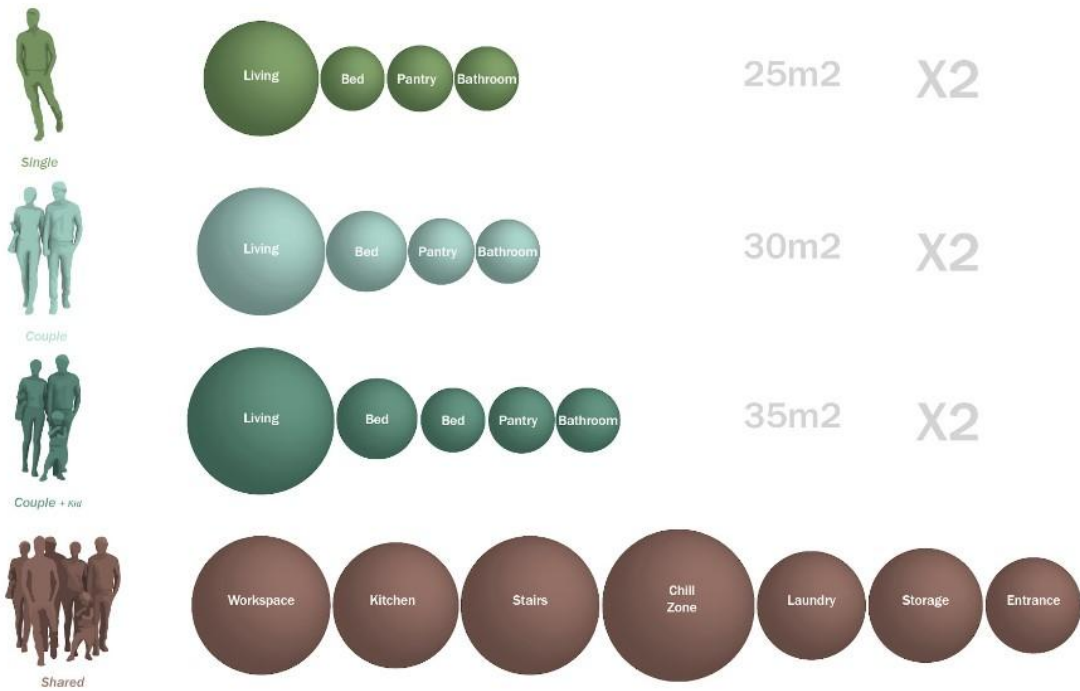
Cell stair design



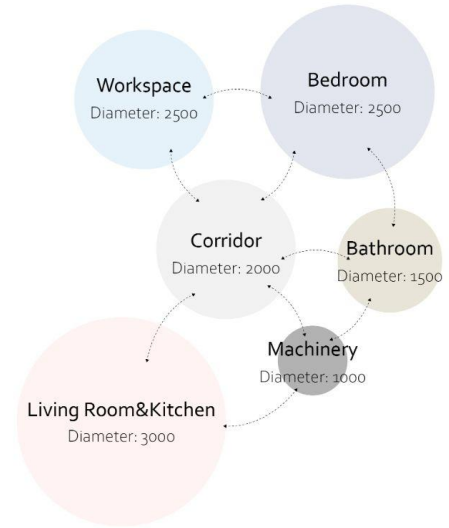
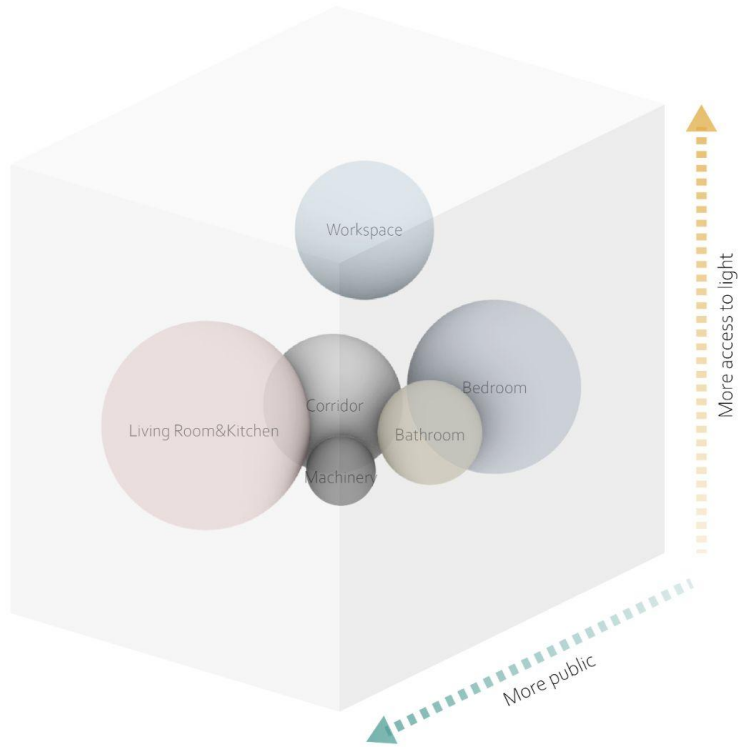
Aquaponic plant

Housing design

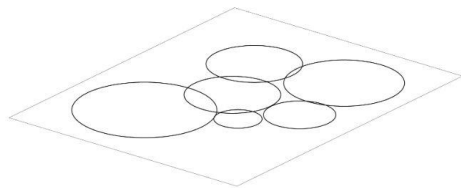
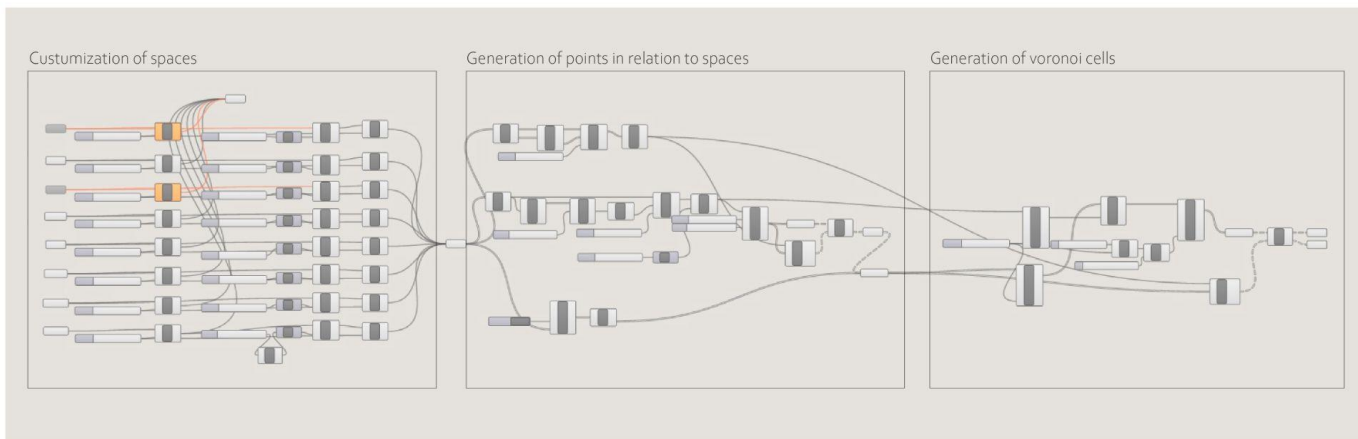
Case study - customization of spaces



Design strategy - customization of volume



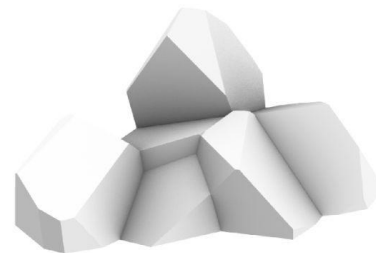
Translation of volume to voronoi



Zoning of spaces



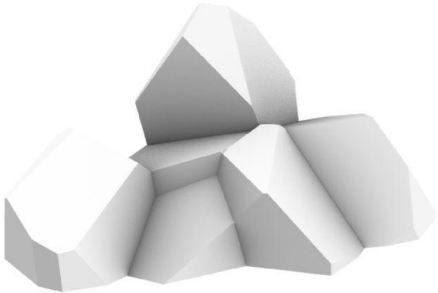
Volumetric arrangement



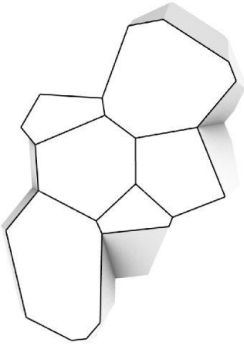
Voronoi generation



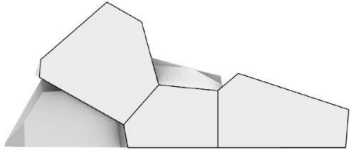
Selection of better options



Voronoi overview

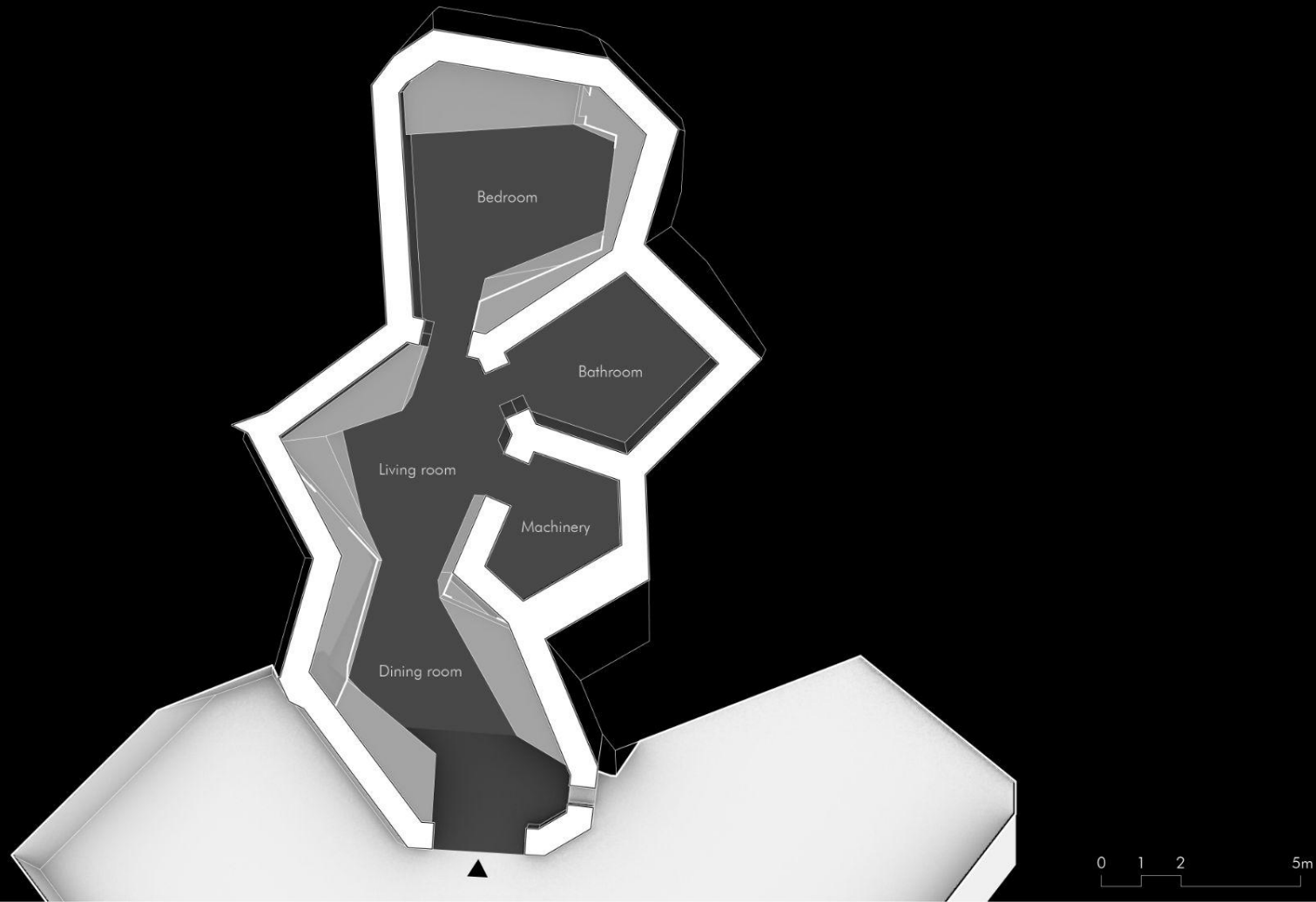


plan

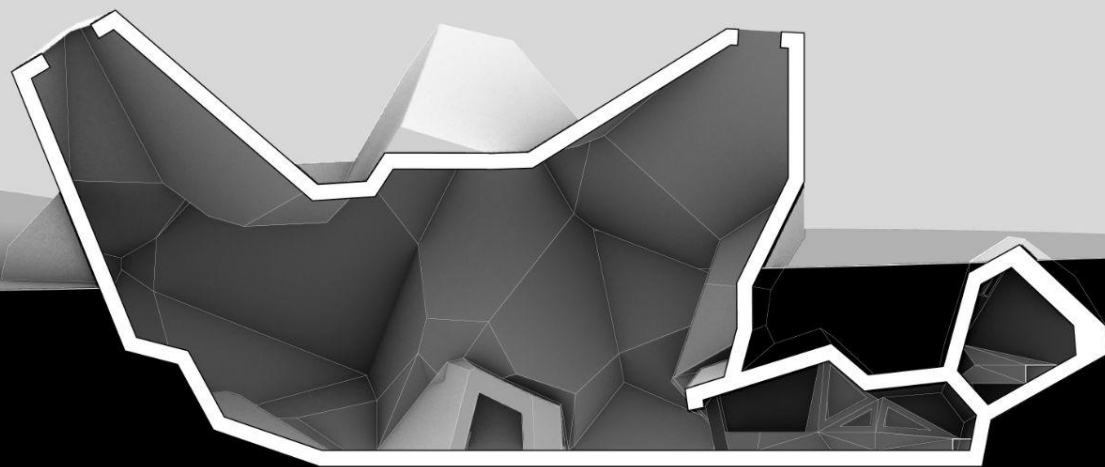


section

House unit plan

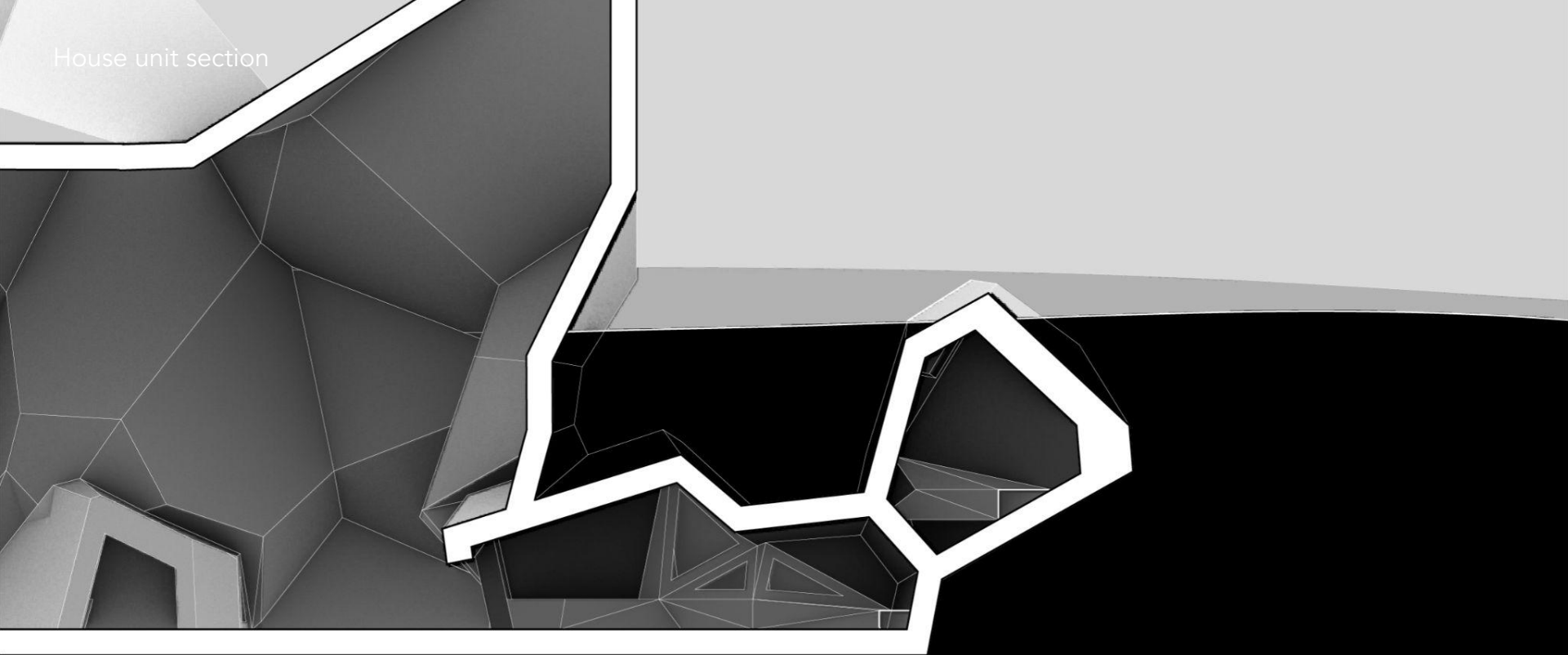


Courtyard section



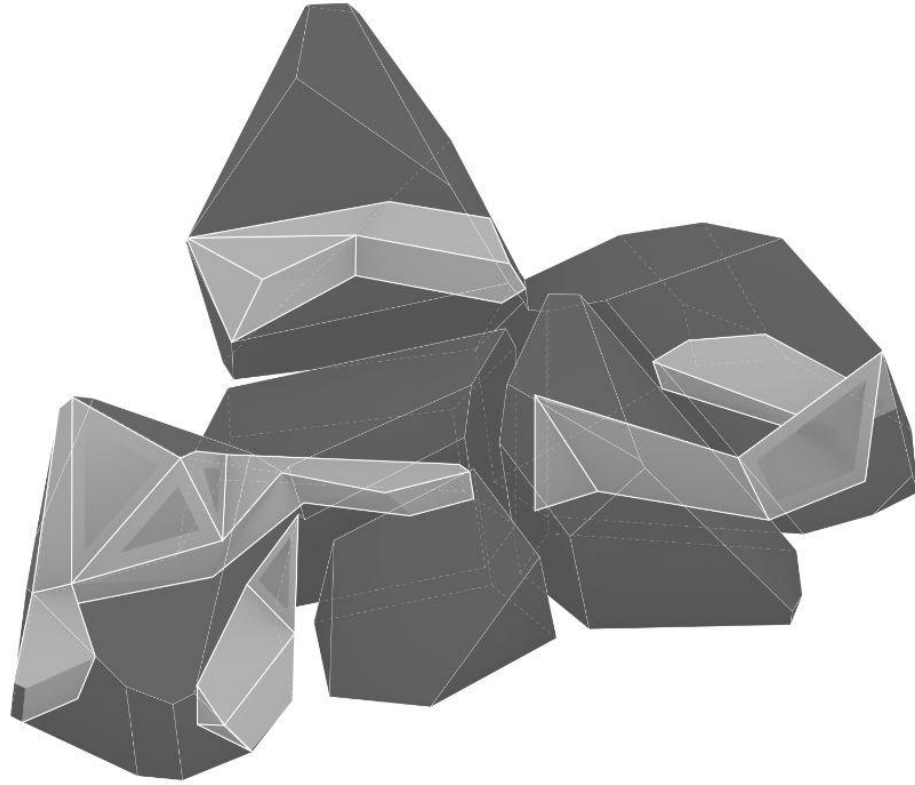
0 1 2 5 10m

House unit section



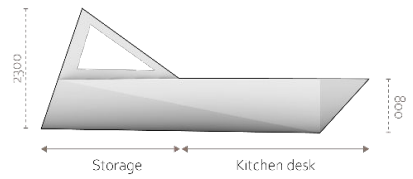
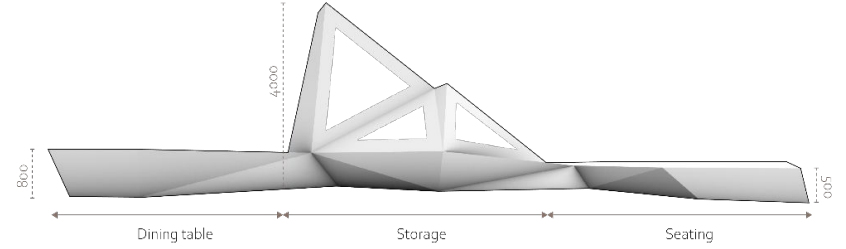
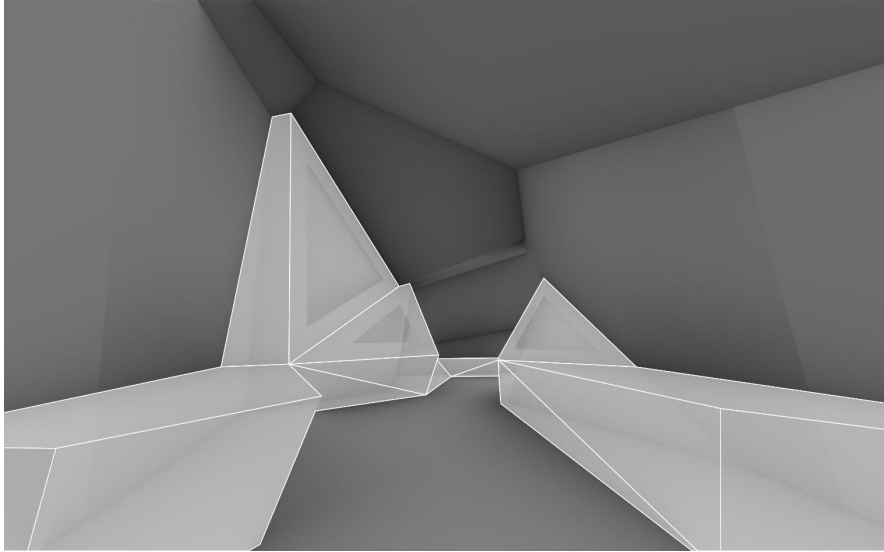
0 1 2 5m

Furniture design

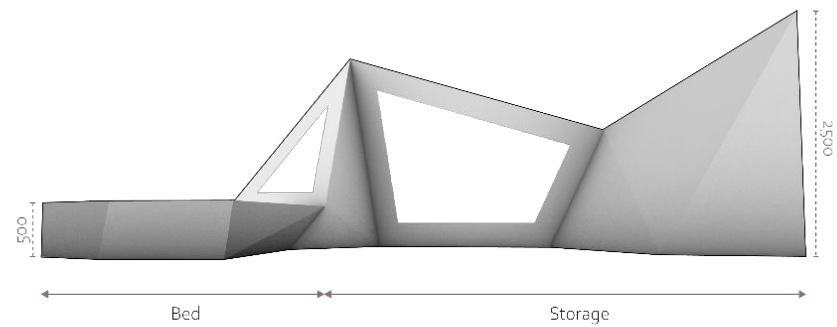
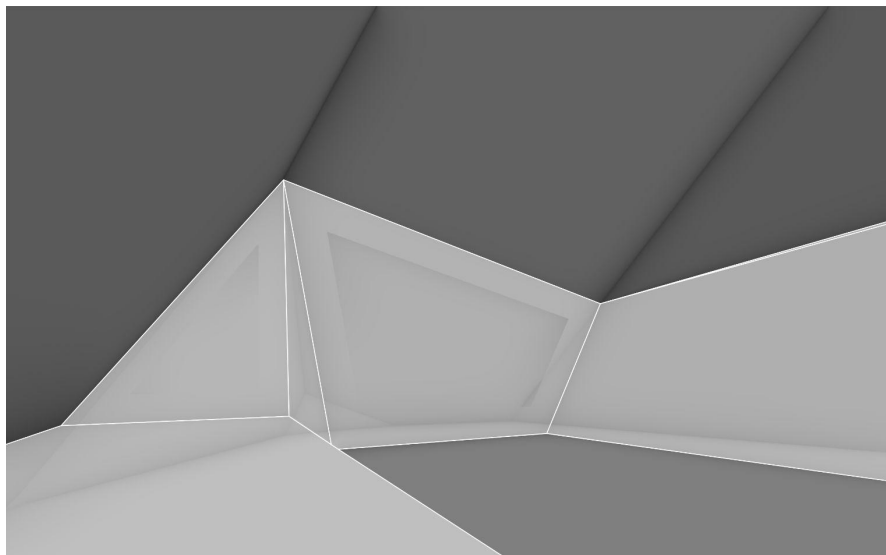


- extended from the wall
- continuous triangulated plane
- variations in form for different usage

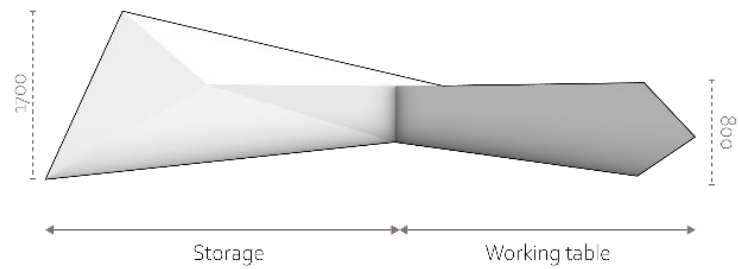
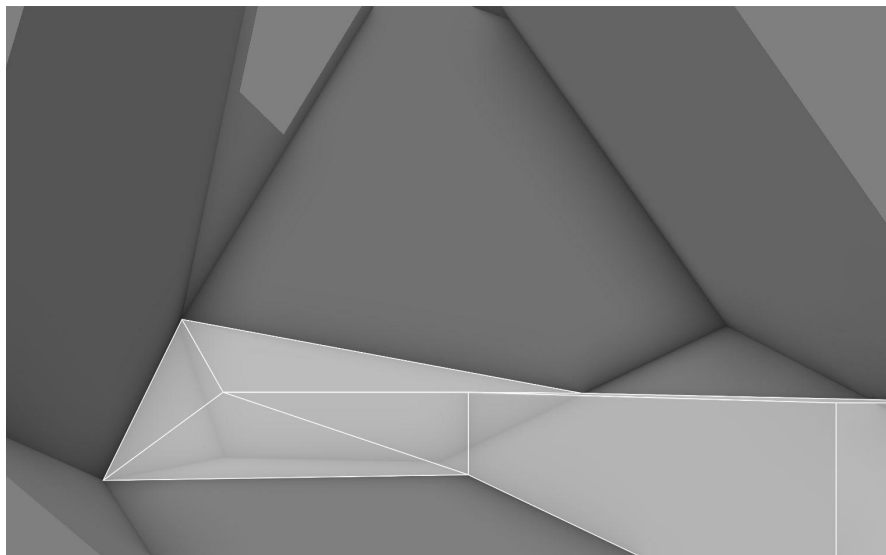
Furniture design - dining room



Furniture design - bedroom

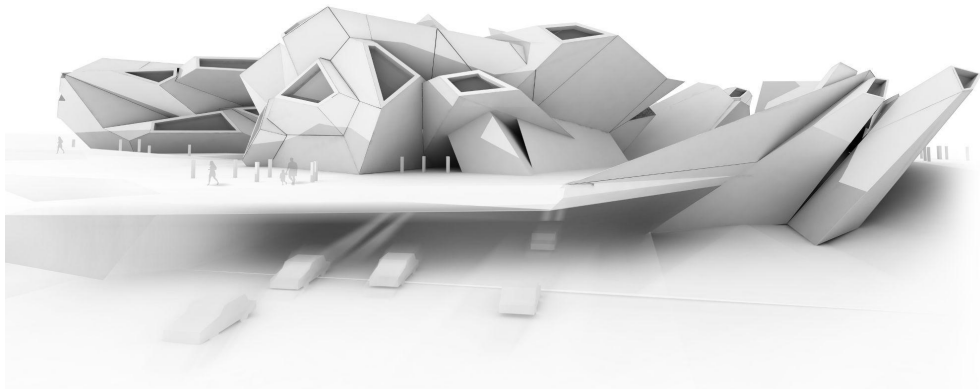


Furniture design - studio

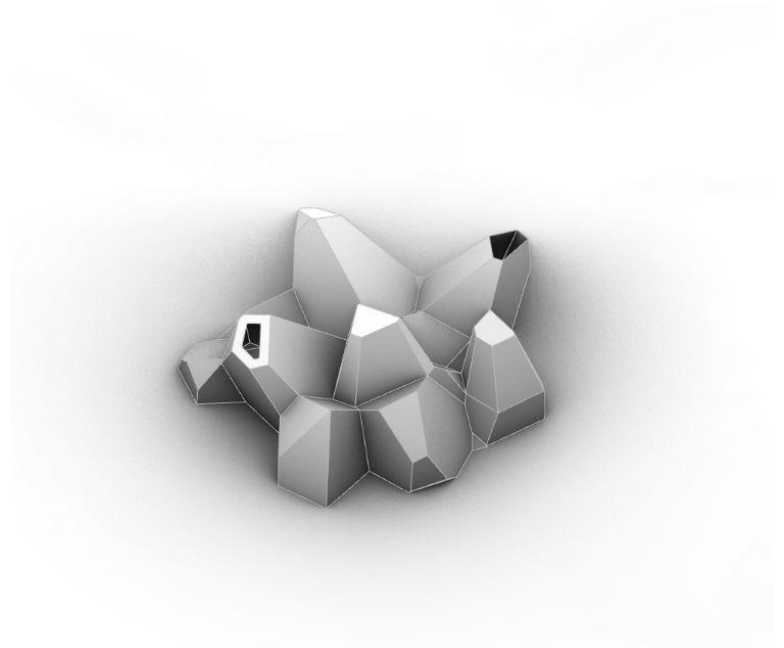


Canopy design

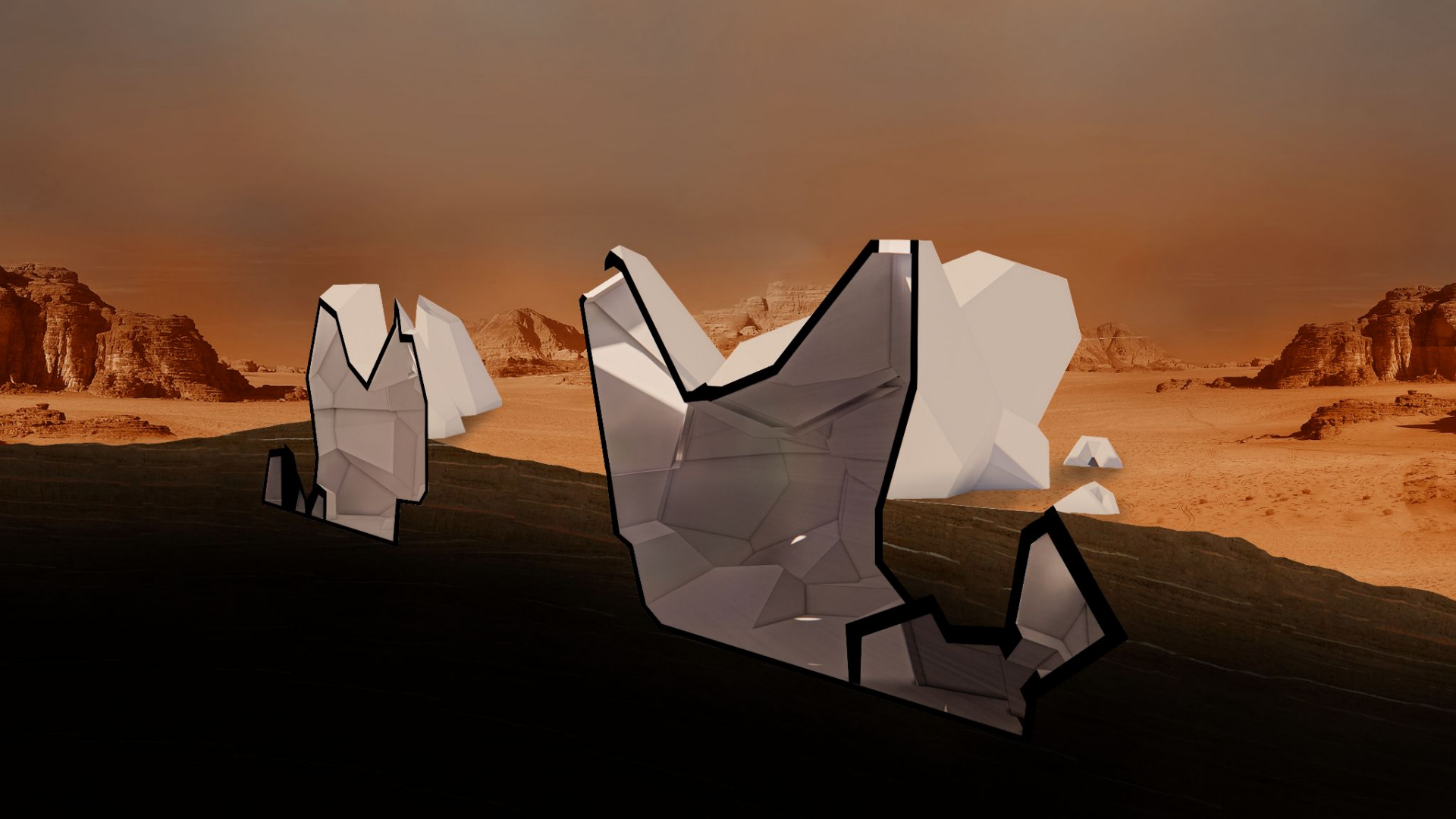
Inspiration



Student example

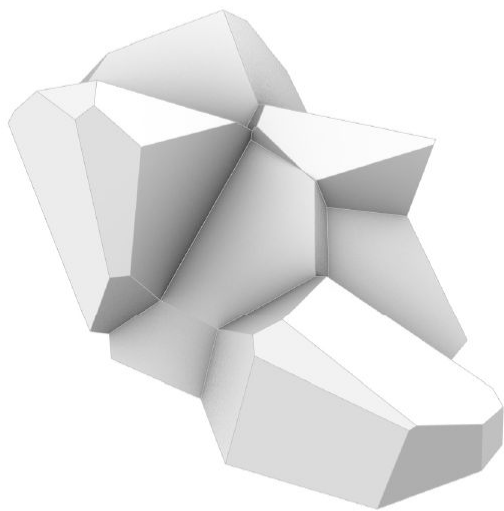


Voronoi dome generation



Production and assembly

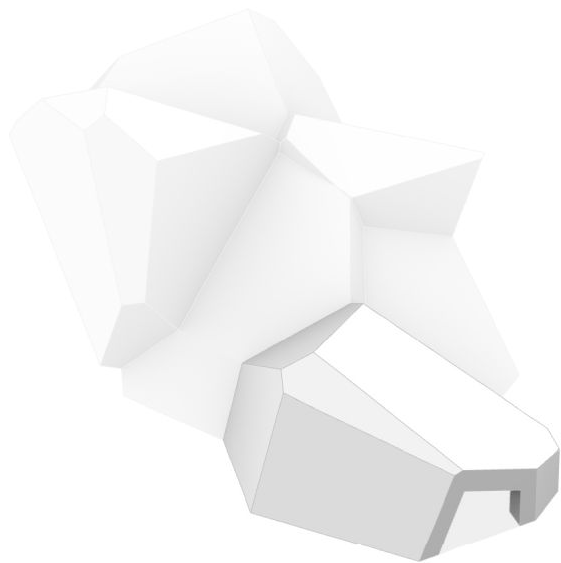
House unit as base model



Selection of one of cell



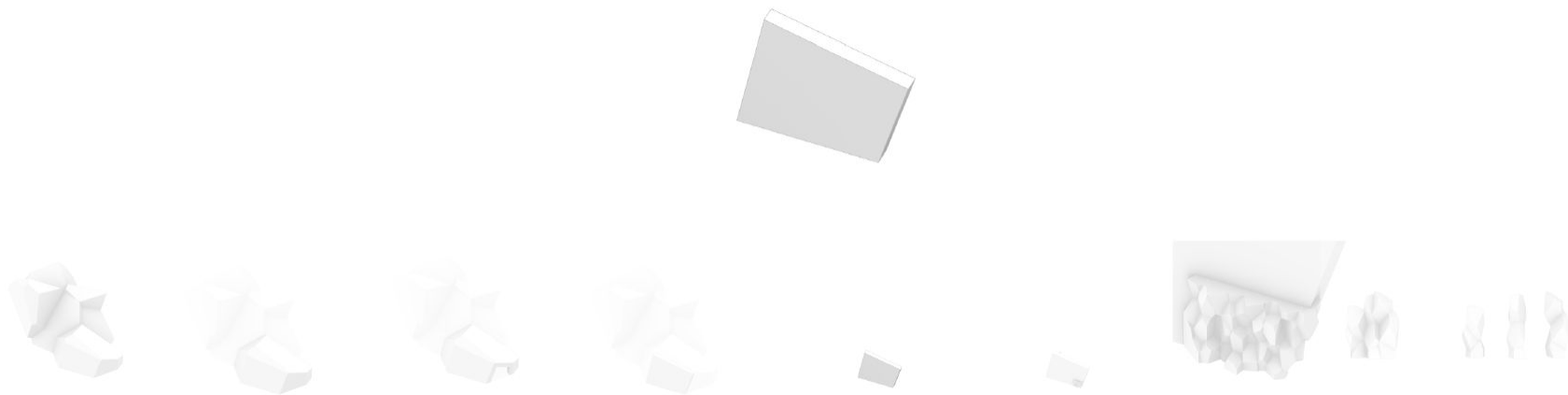
Adding wall thickness of cell



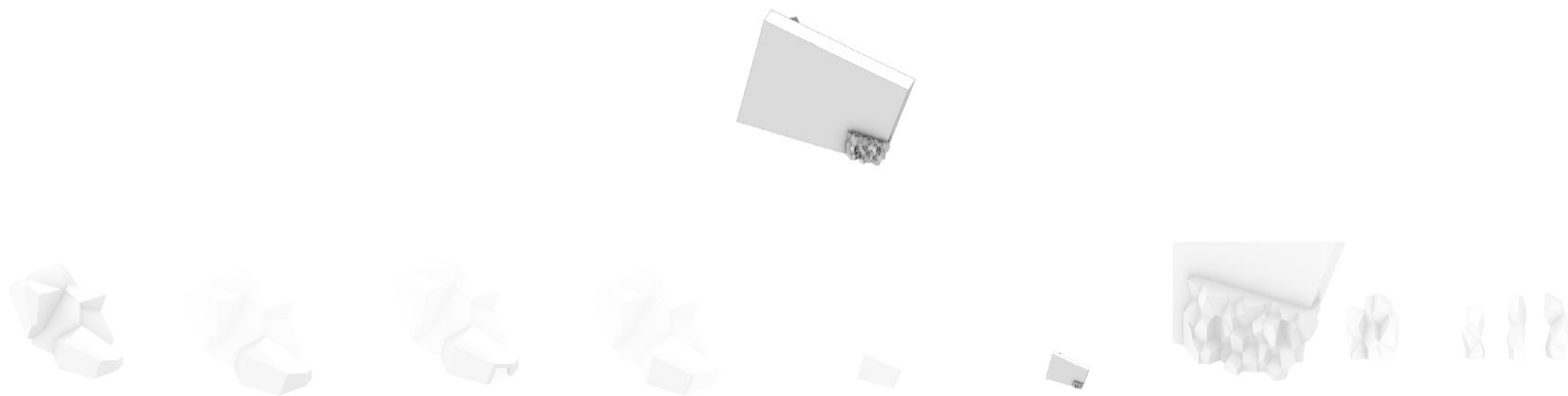
Selection of wall



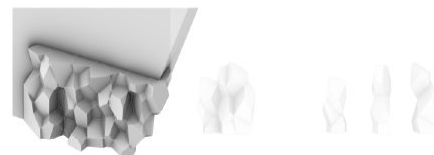
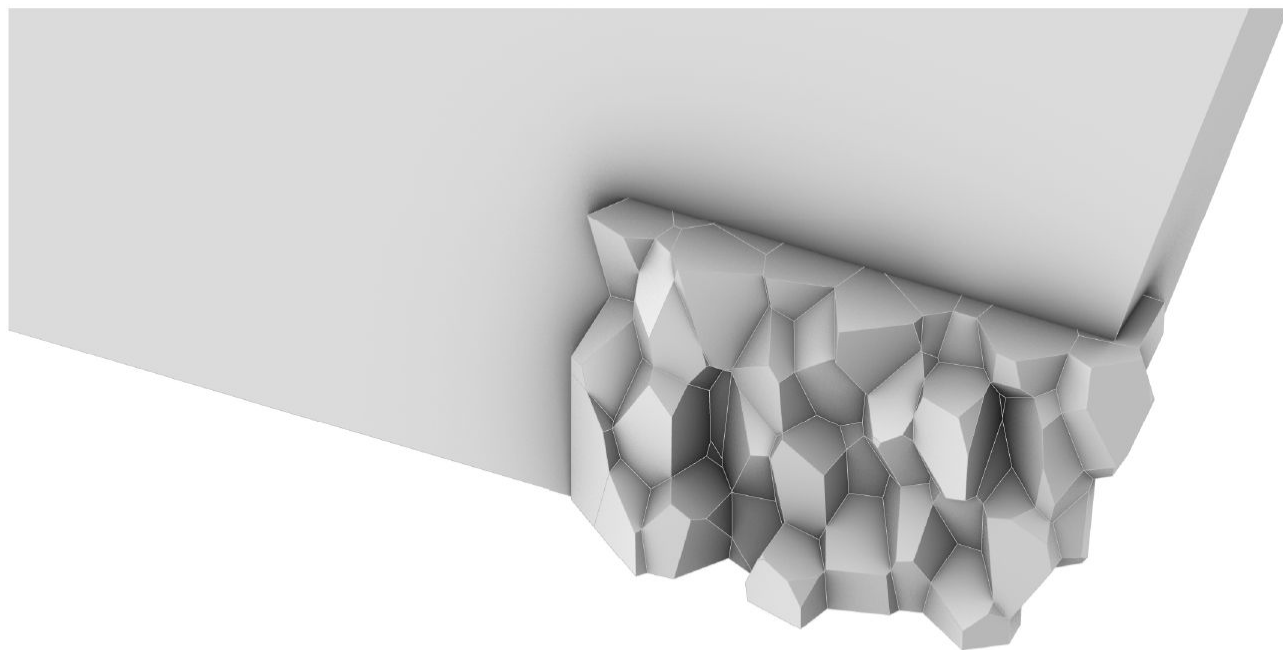
Separating the wall



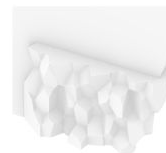
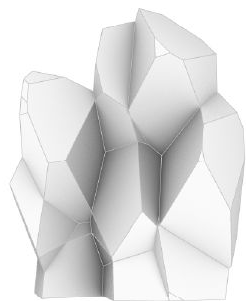
Wall to Voronoi



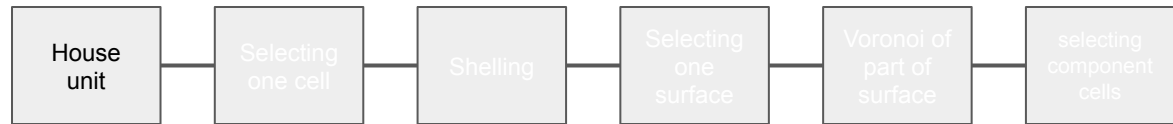
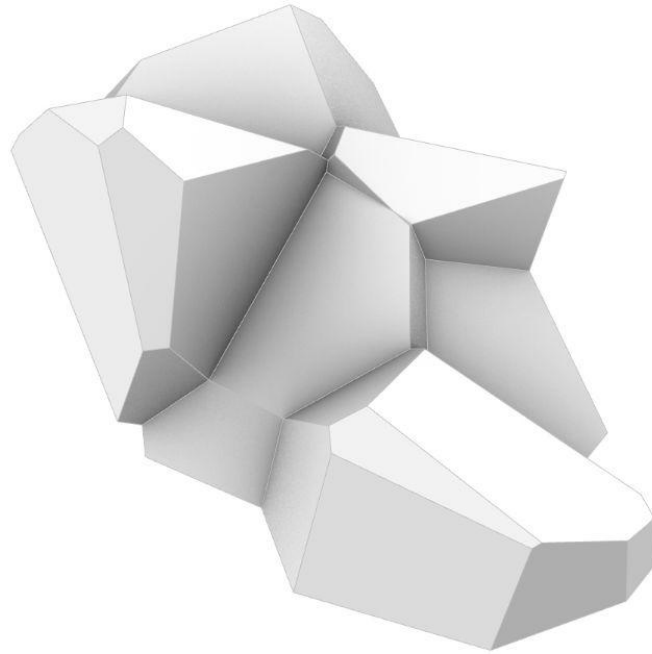
Voronoi in wall fragment



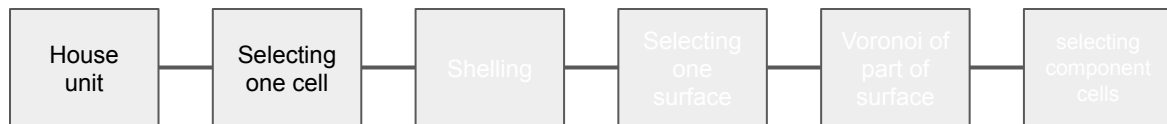
Selection of component



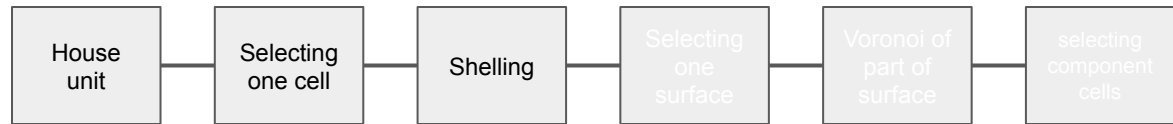
House unit as base model



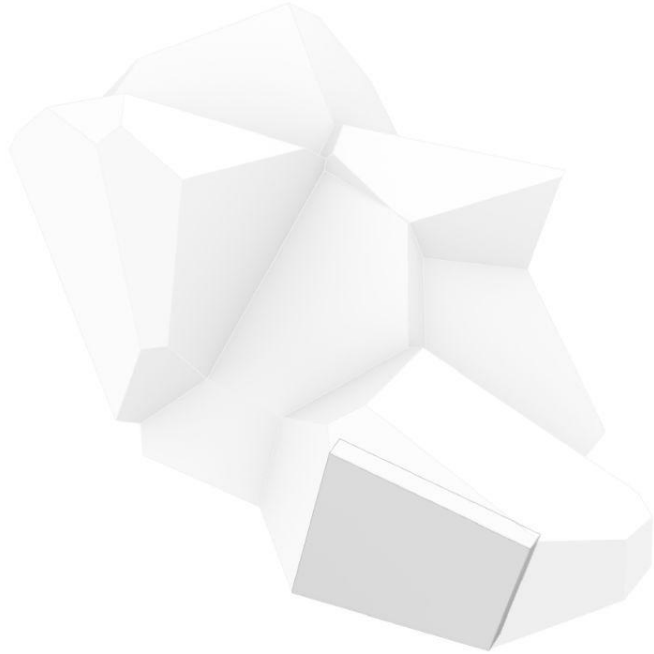
Selection of one of cell



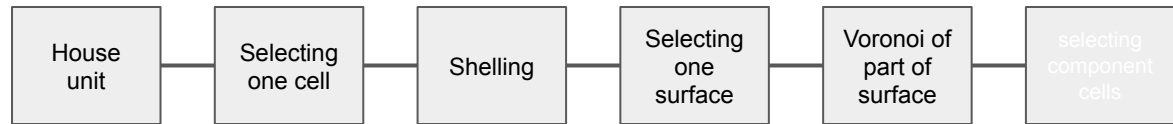
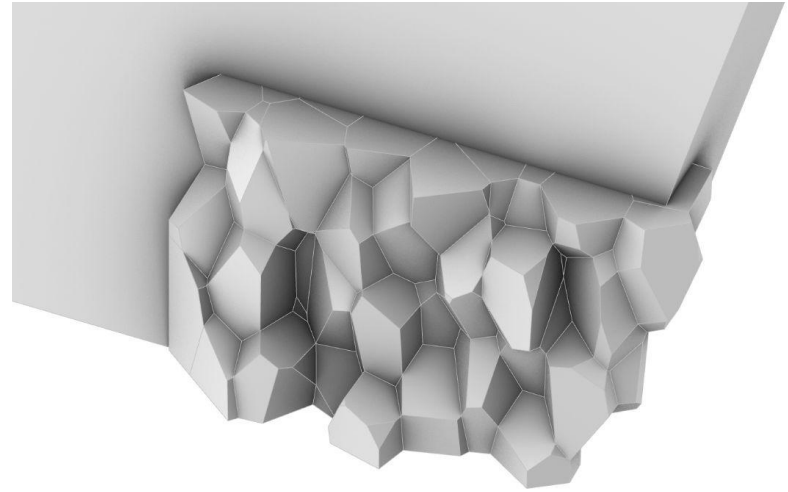
Adding wall thickness of cell



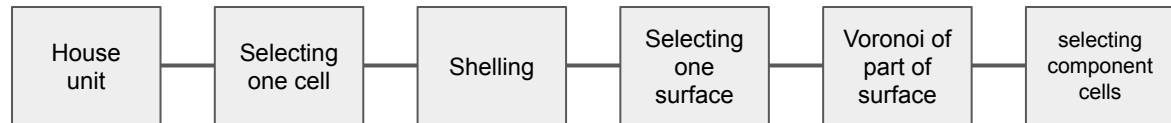
Selection of wall



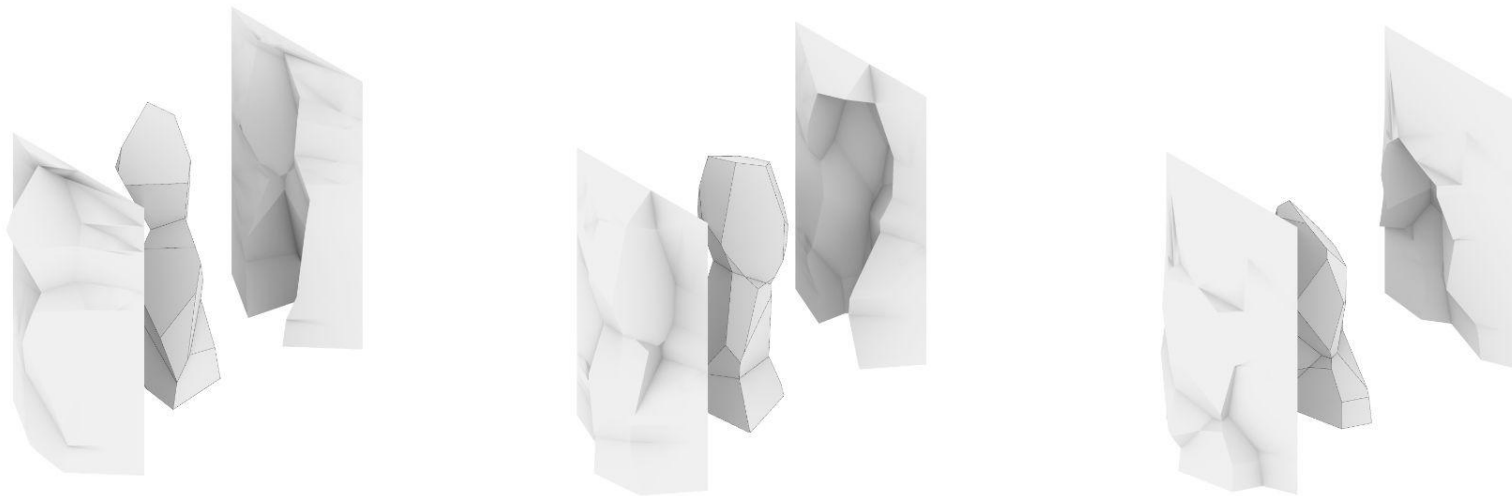
Voronoi in wall fragment



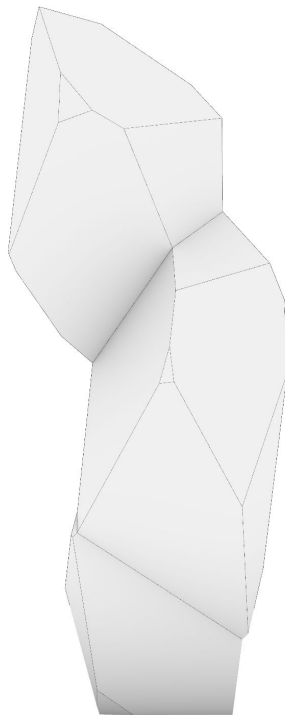
Selection of component



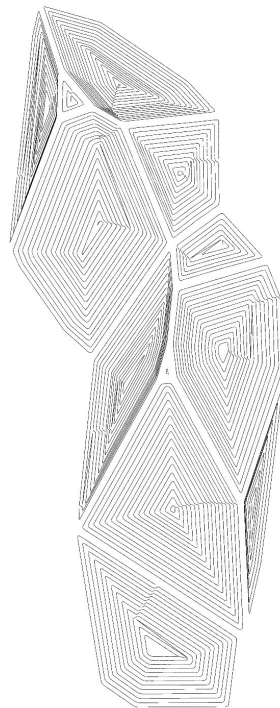
Preparing the components for initial material removal tool path creation



Face selection, face texturization and hole selection



Isolate naked faces



Create tool paths for the faces



Texturized faces and holes

