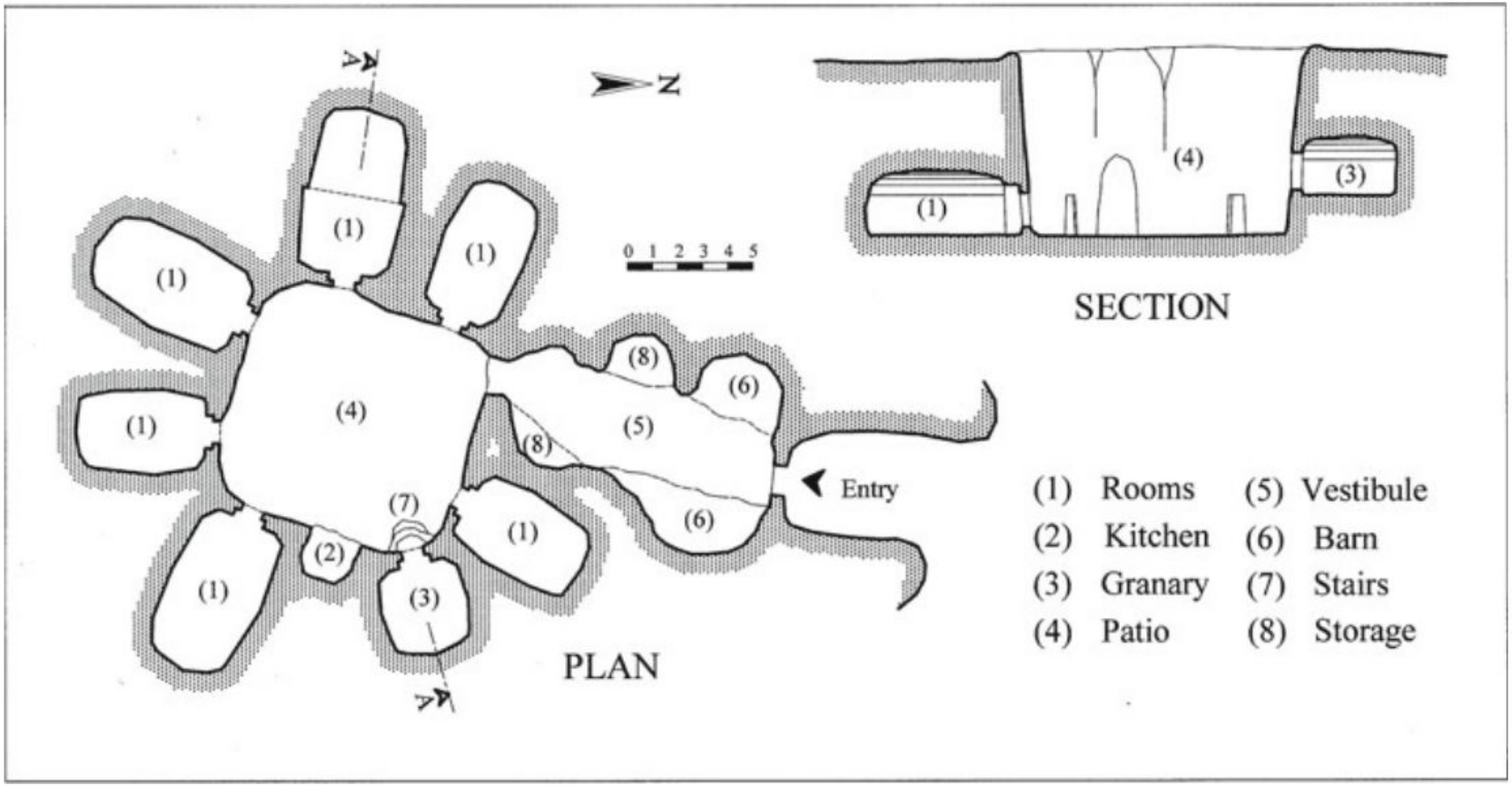
Communal Housing Typology On Mars

Group 4

David, Coby, Mikolaj, Simon

Case study

Case study - underground courtyard design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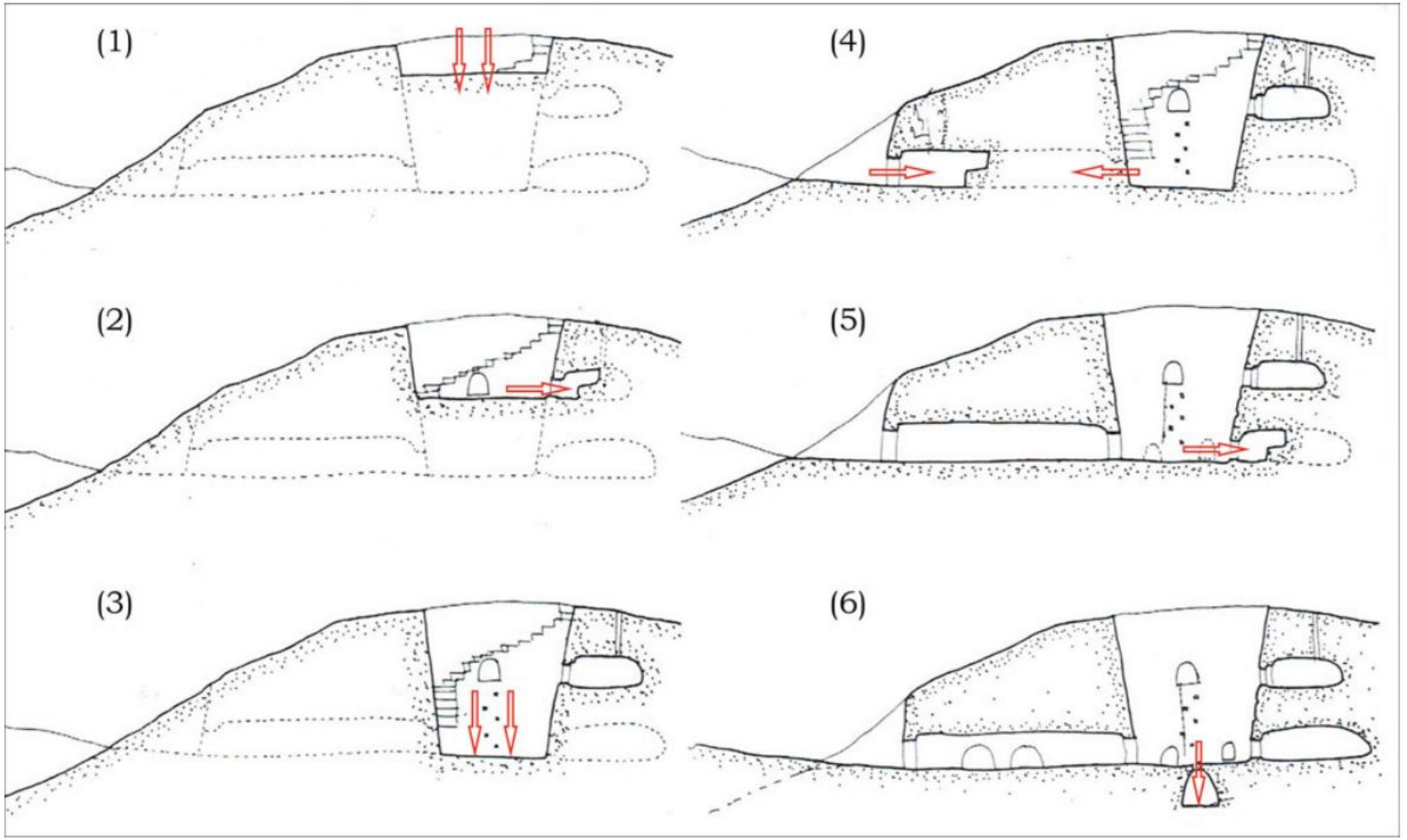
Entry
PLAN
(4)
(3)
(1)
SECTION
(1) Rooms
(2) Kitchen
(3) Granary
(4) Patio
(5) Vestibule
(6) Barn
(7) Stairs
(8) Storage


(1)
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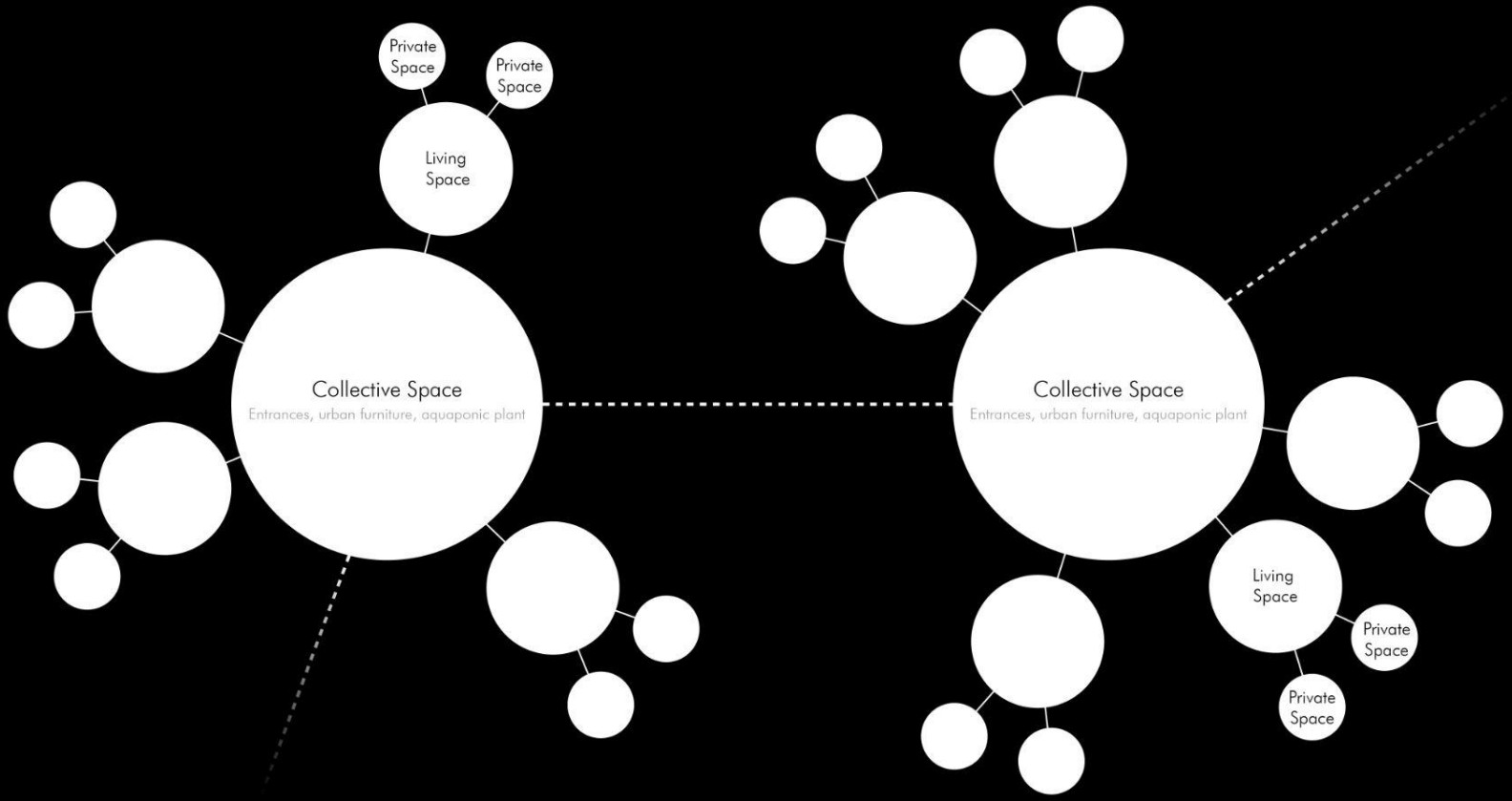
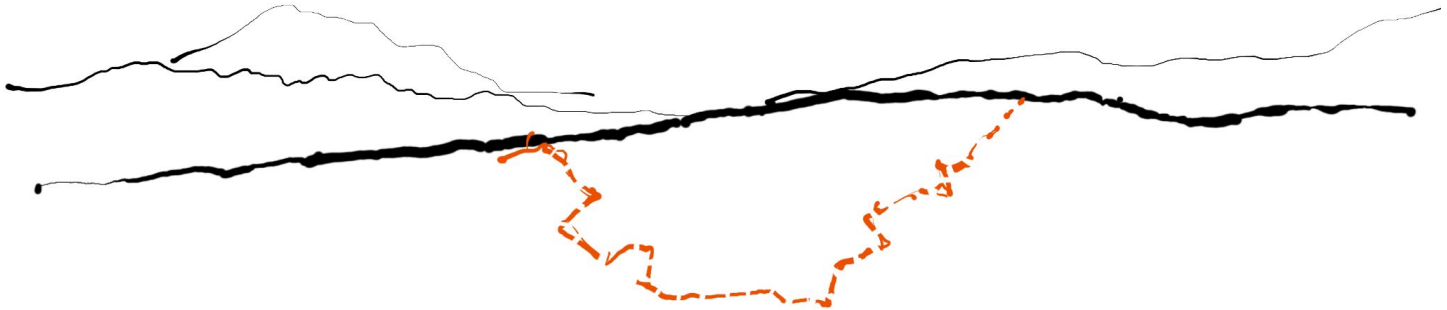
Overall design

Courtyard organization concept

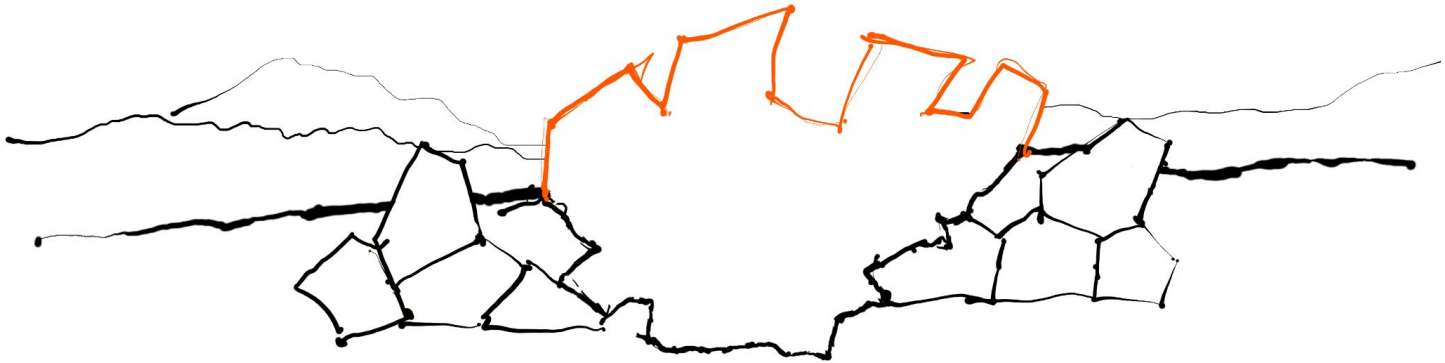


components: courtyard + housings + canopy



courtyard excavation

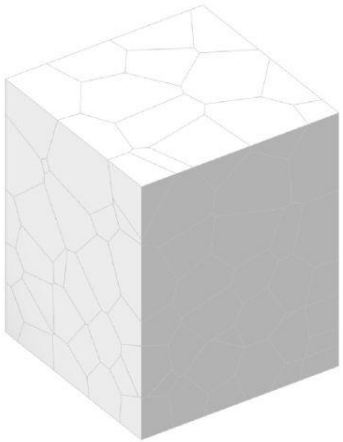
housing unit

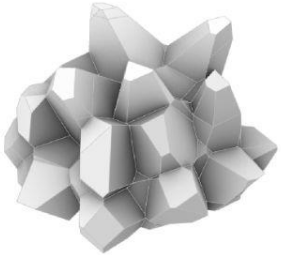


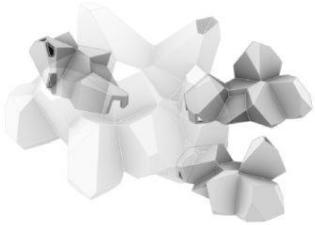
radiation shielding canopy

Overall design process

Overall voronoi design







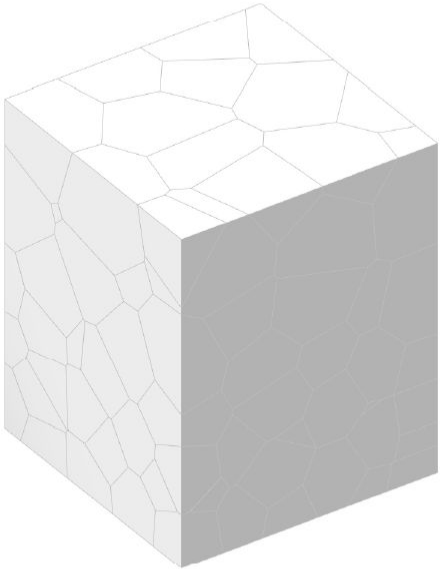
Bounding box

Extraction of courtyard volume

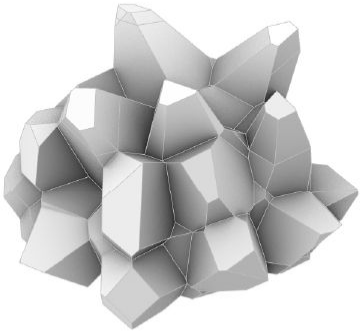
Formation of courtyard and canopy

Integration of courtyard and houses

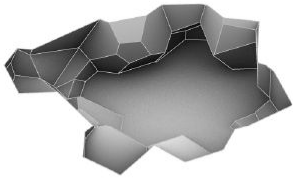
Box to Voronoi



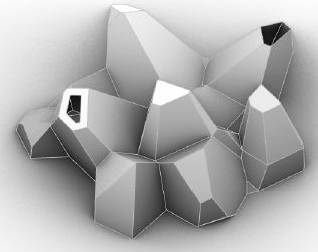
Voronoi selection



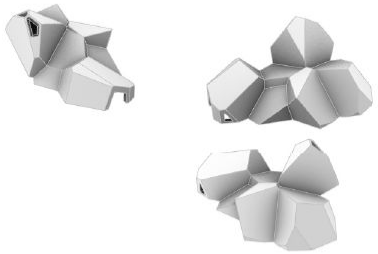
Creating courtyard



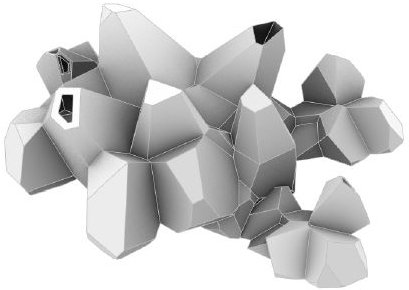
Creating canopy



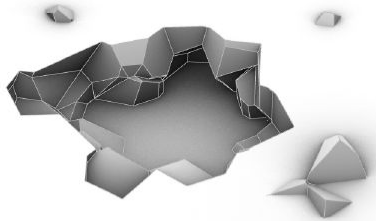
Creating housing units

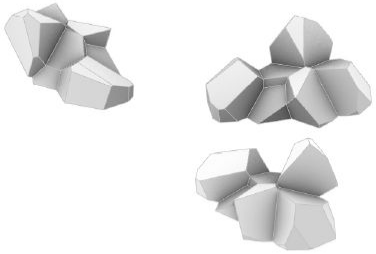


Attaching the housing units



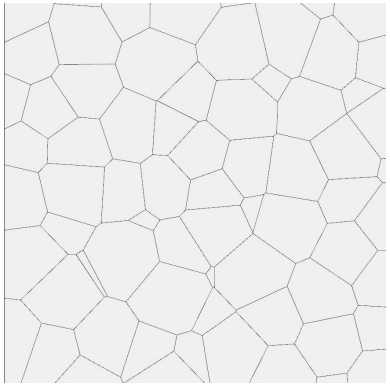
Overall design





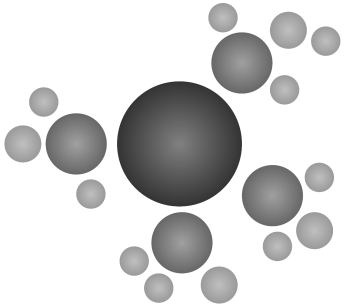
Courtyard design

Voronoi housings to community

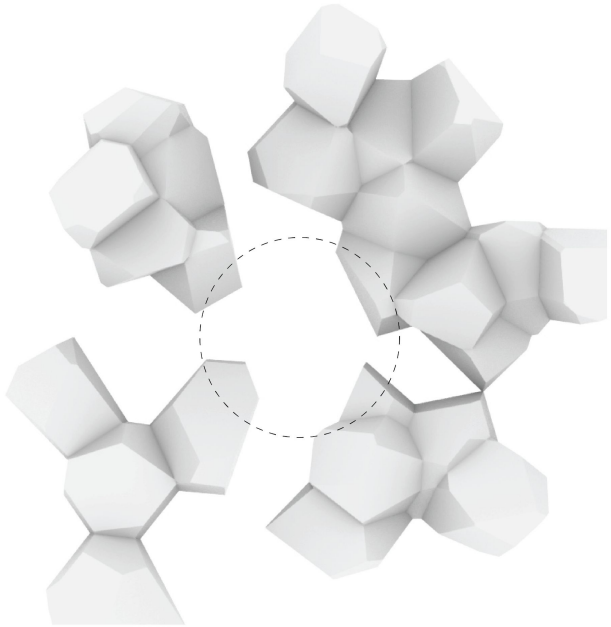


Voronoi cell construction

+

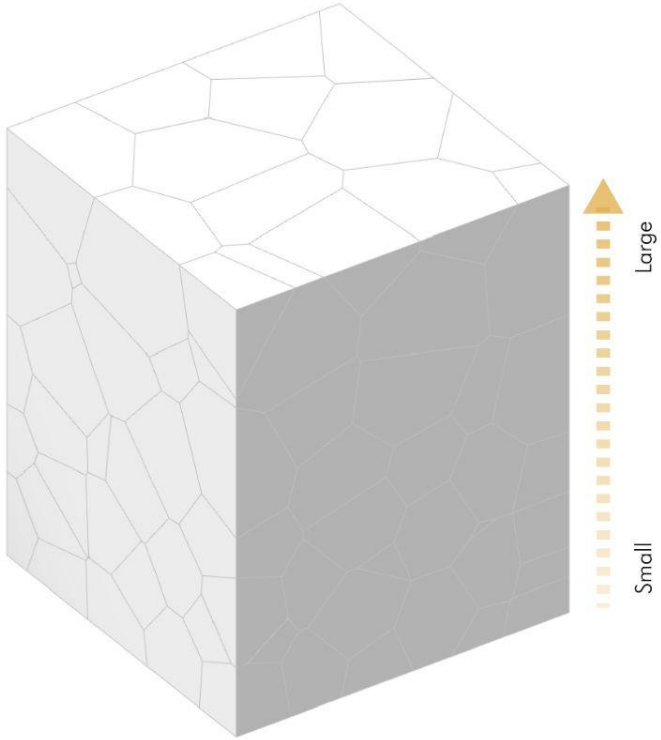


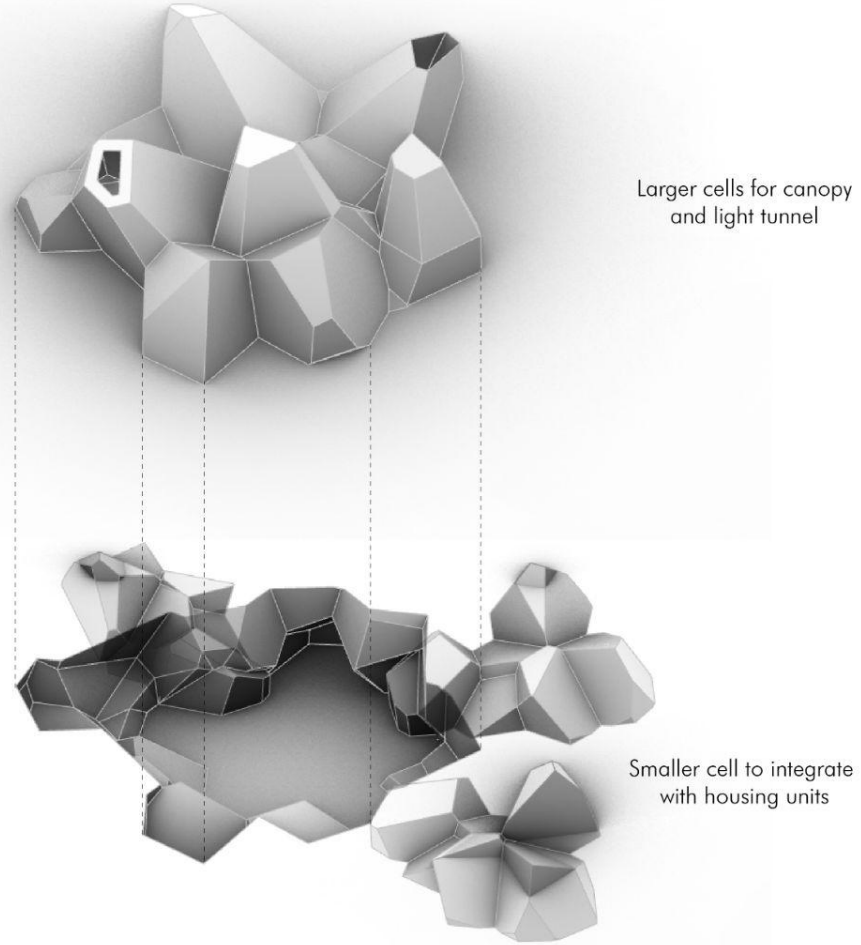
Programme organization

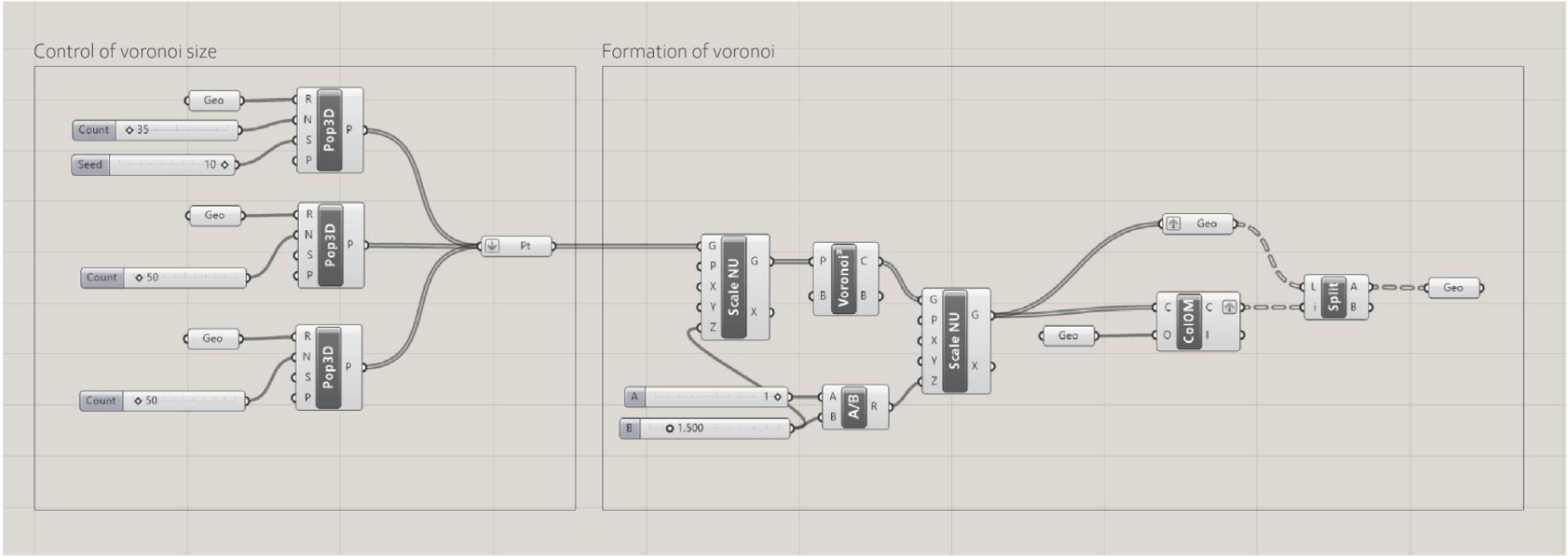


Voronoi cell organization

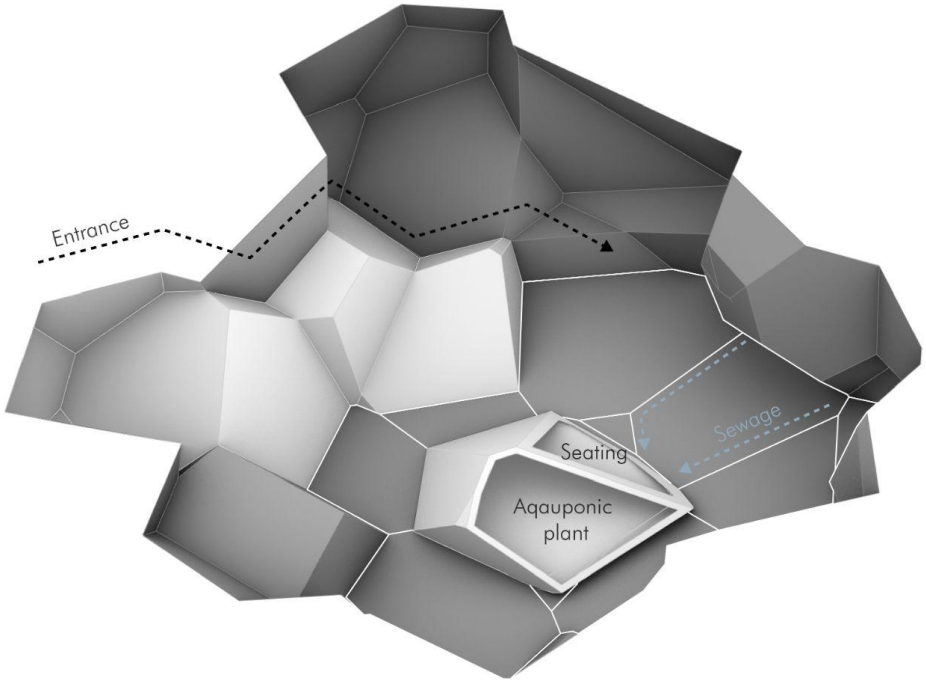
Courtyard voronoi design

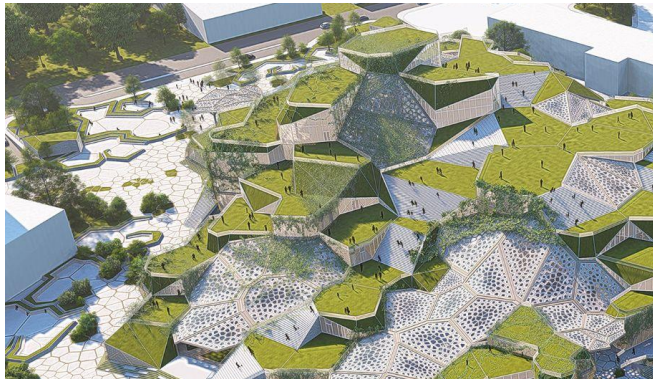





Control of voronoi size
Formation of voronoi
Geo
Count
35
Seed
10
Pop3D
R
N
S
P
Pt
50
Scale NU
G
X
Y
Z
Voronoi
C
B
A
1
1.500
A/B
R
ColOM
O
I
Split
L
i

Courtyard urban furniture design



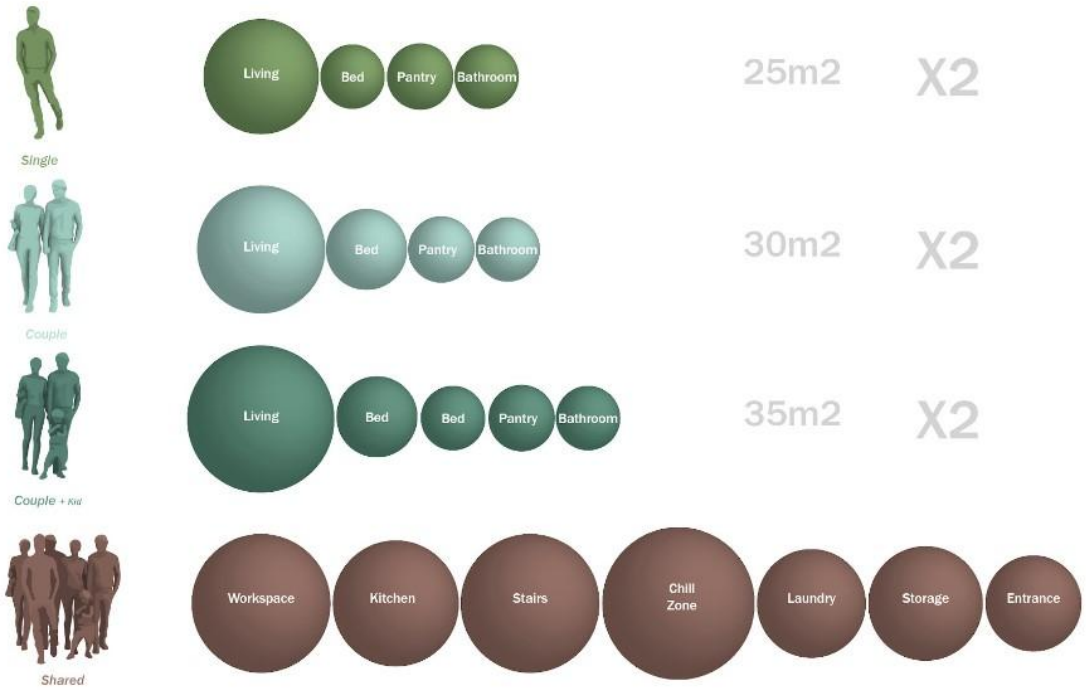


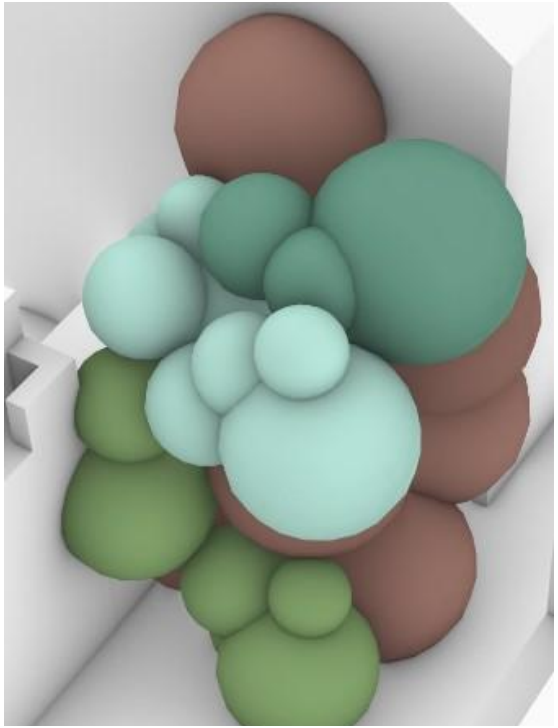
Cell stair design

Aquaponic plant

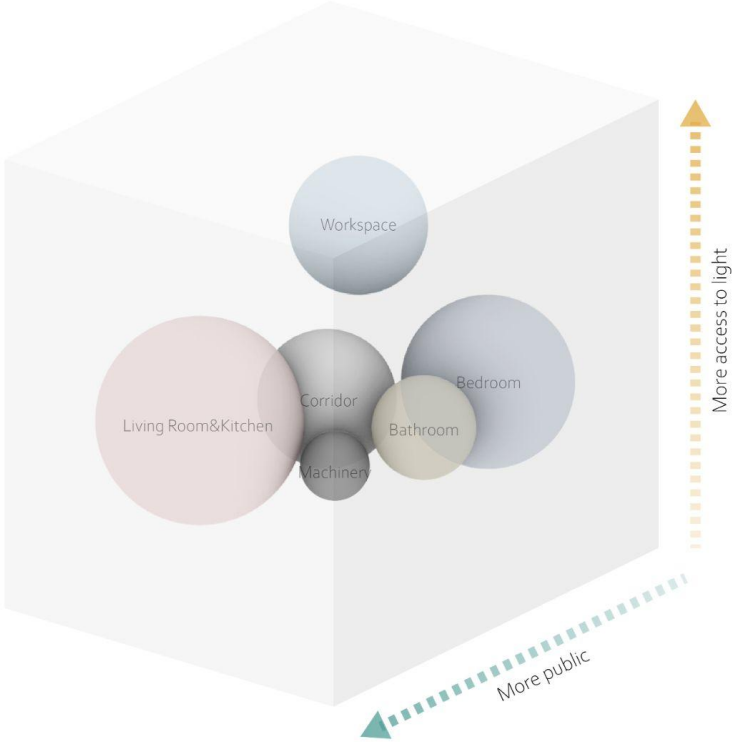
Housing design

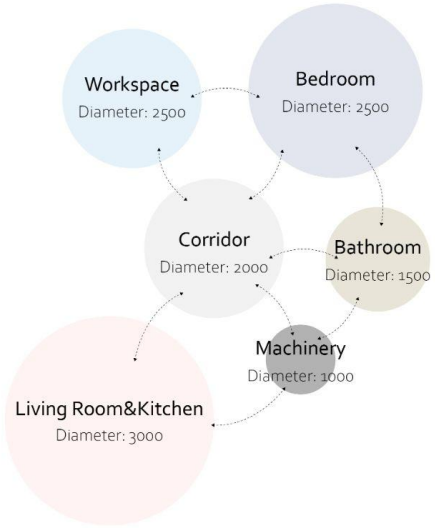
Case study - customization of spaces



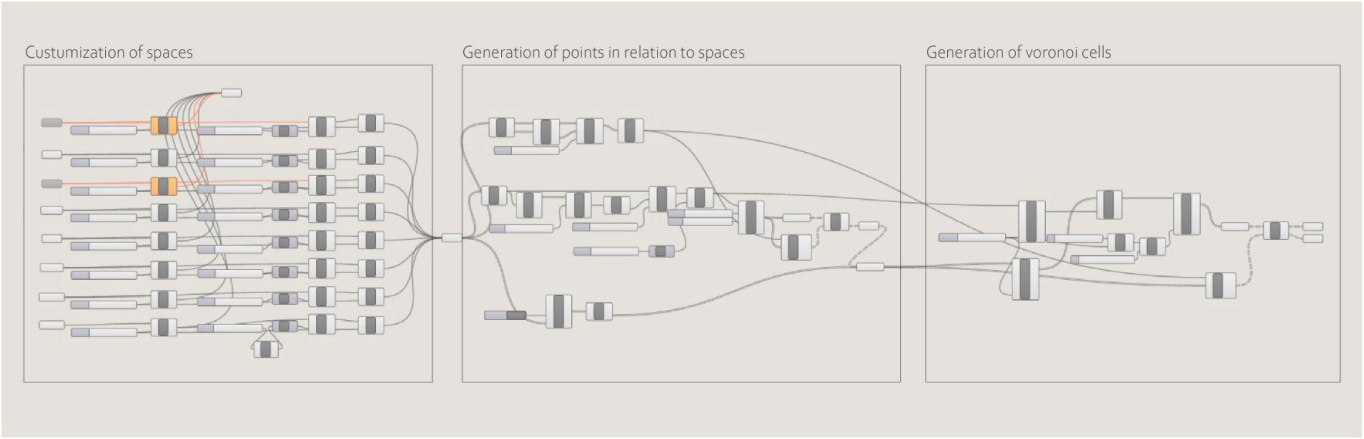


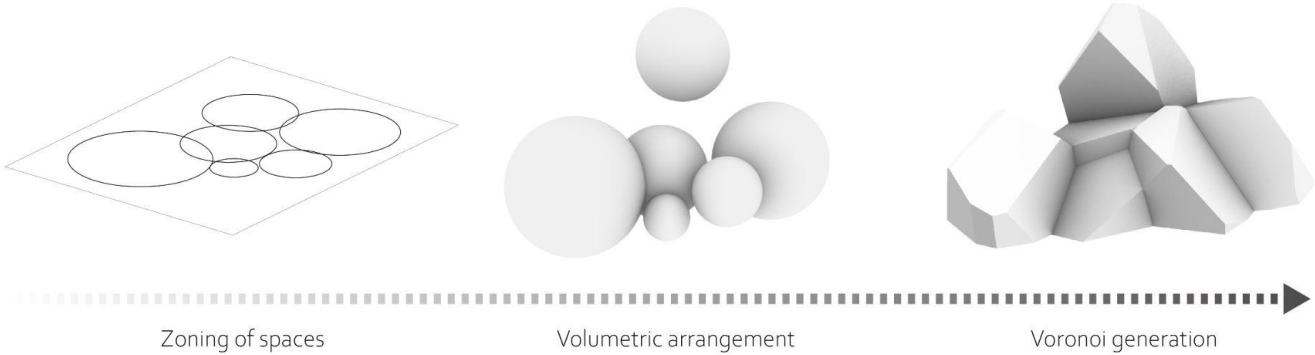
Design strategy - customization of volume



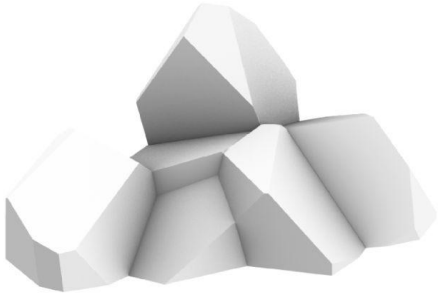


Translation of volume to voronoi

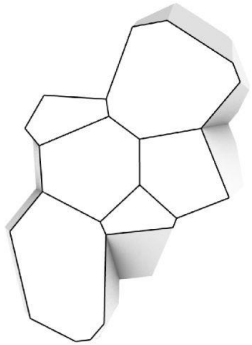




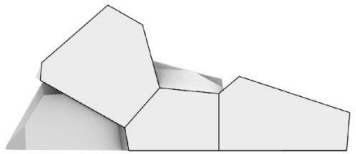
Selection of better options



Voronoi overview

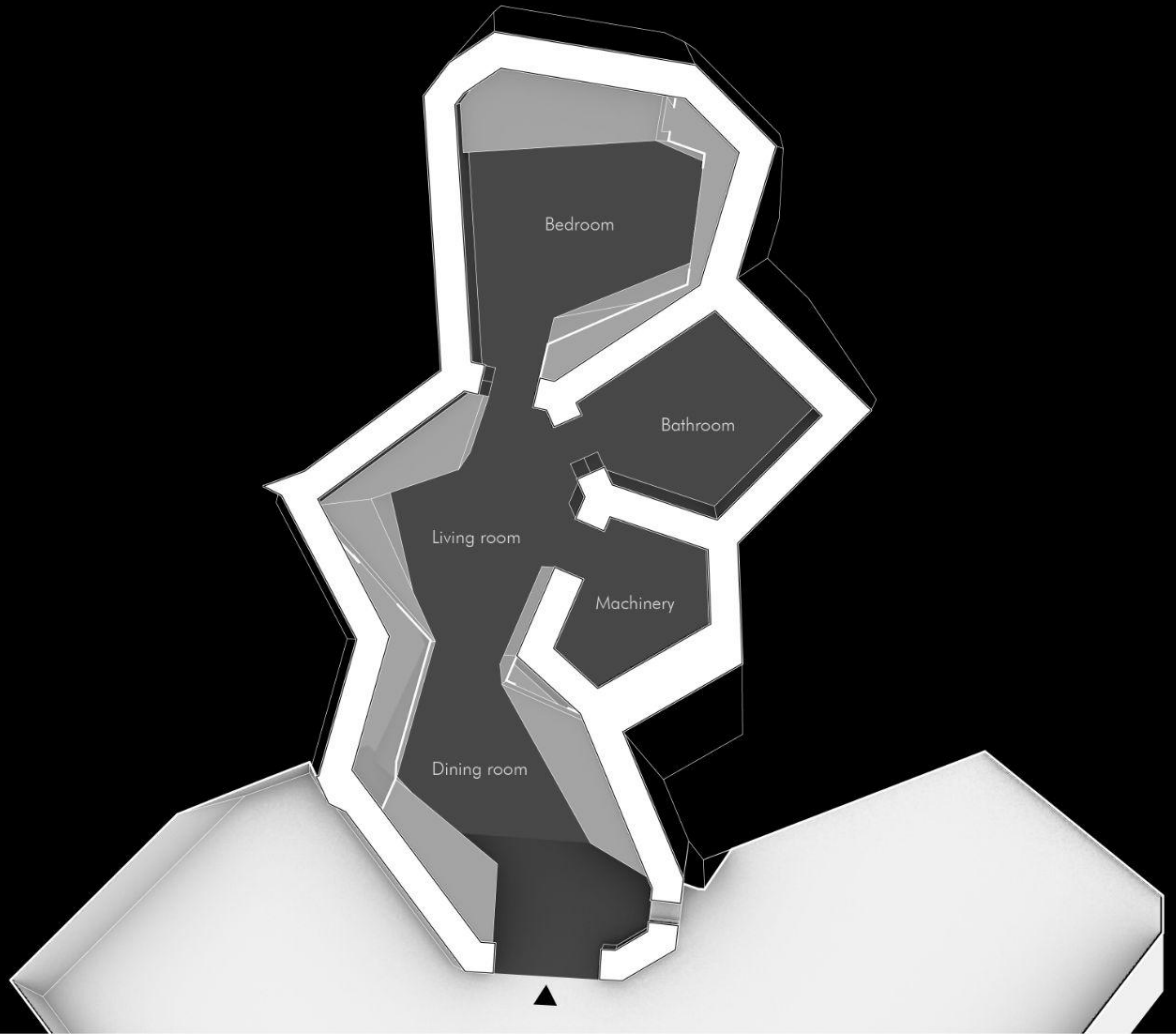


plan

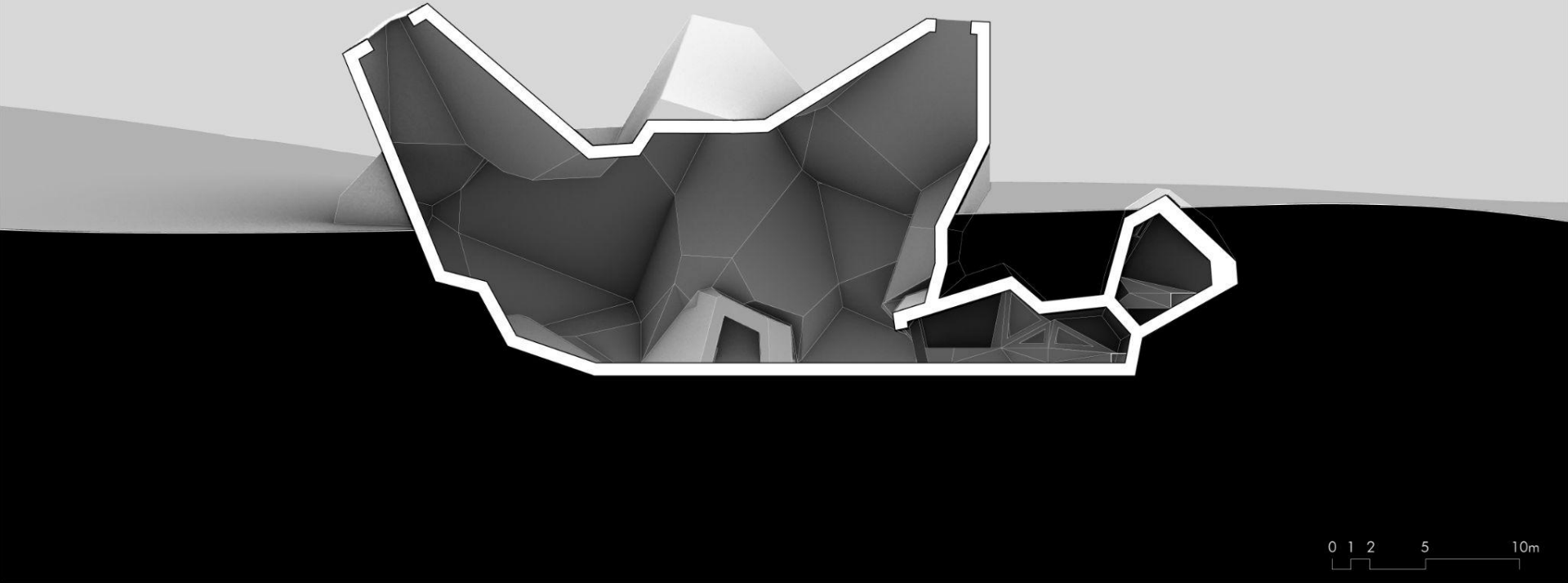


section

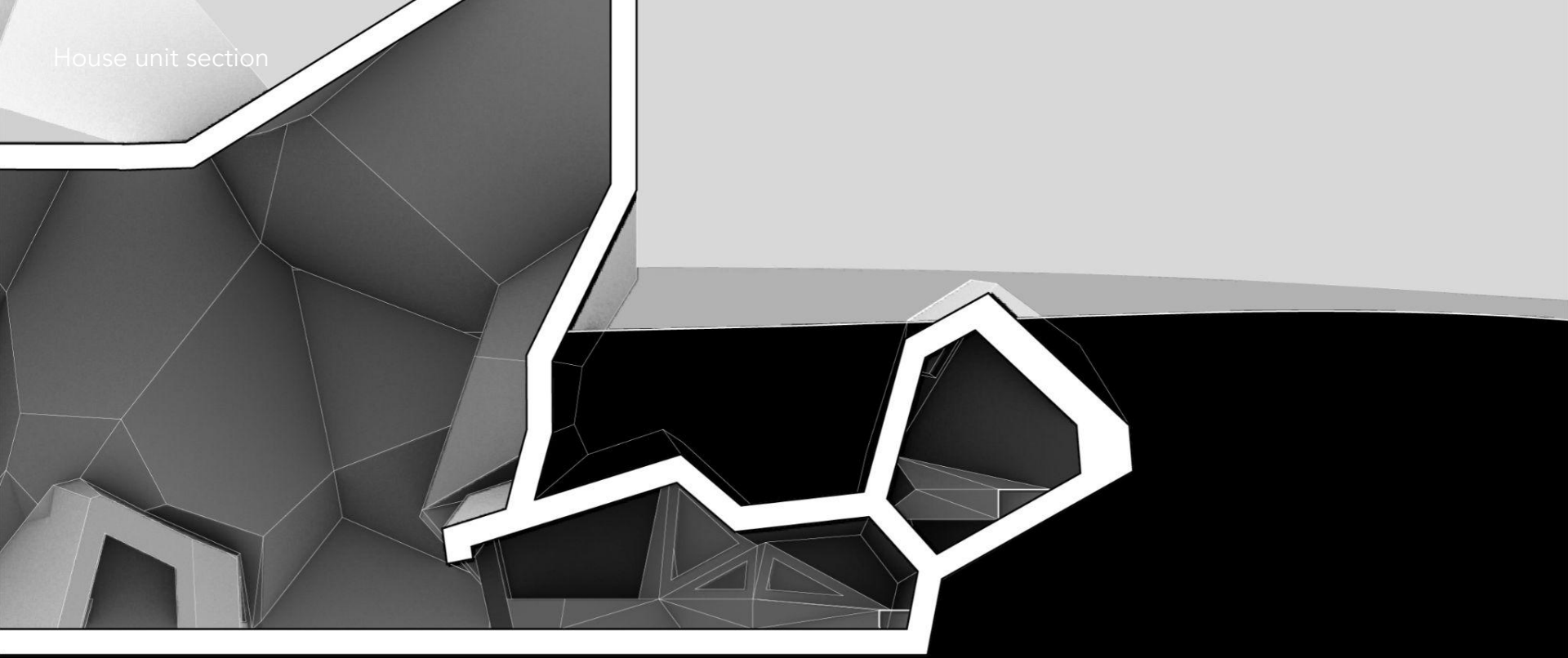
House unit plan



Courtyard section



House unit section



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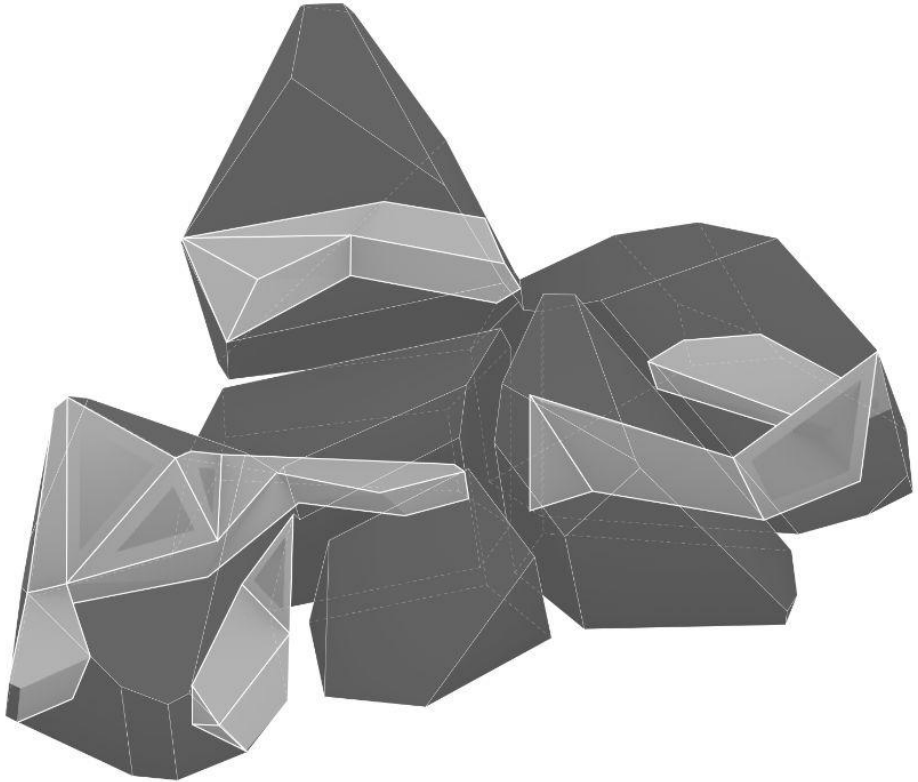
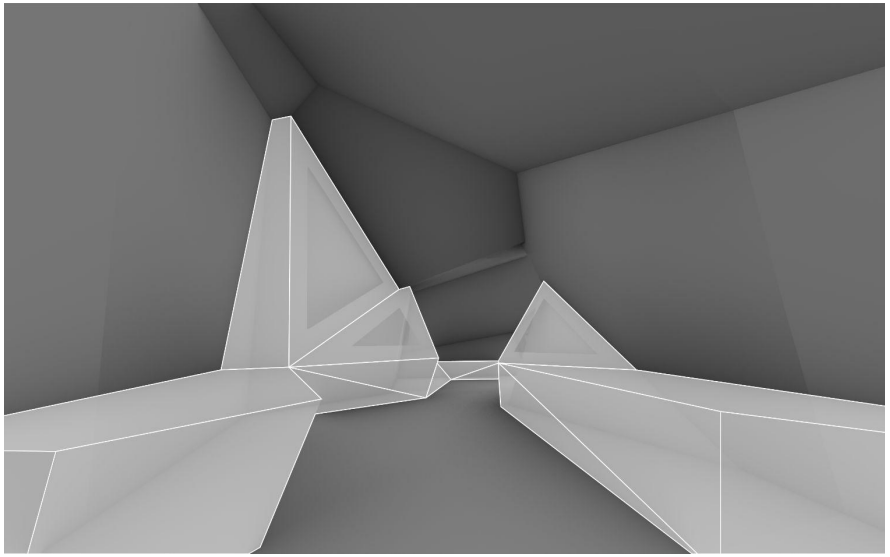
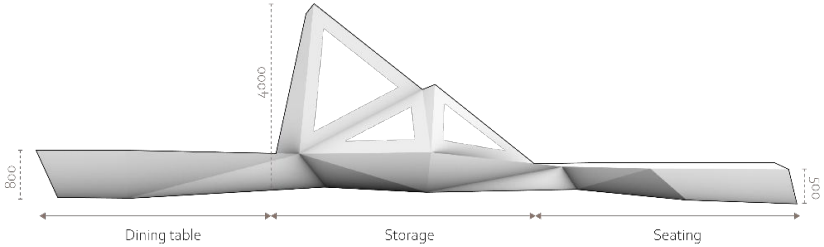
Furniture design

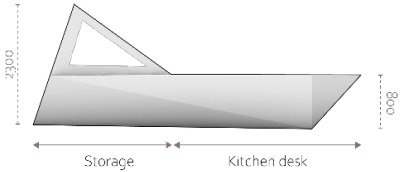


-extended from the wall
-continuous triangulated plane
-variations in form for different usage

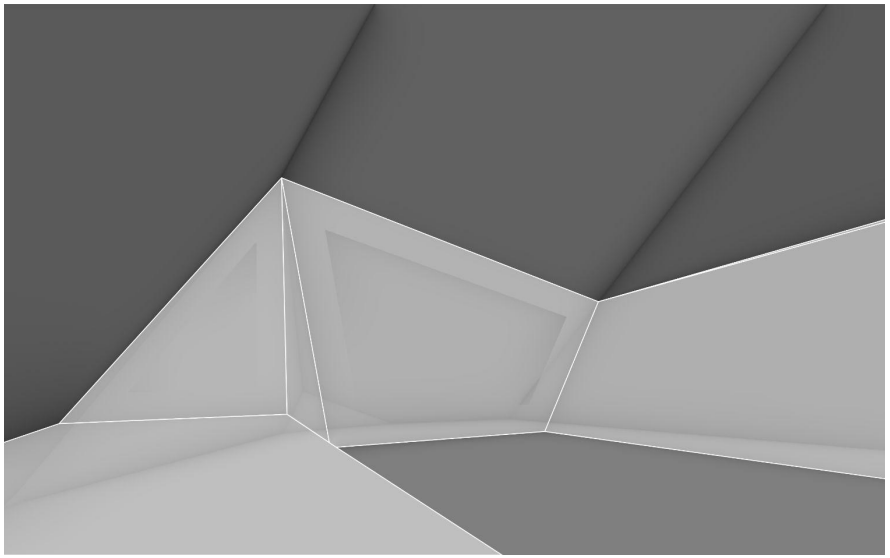
Furniture design - dining room

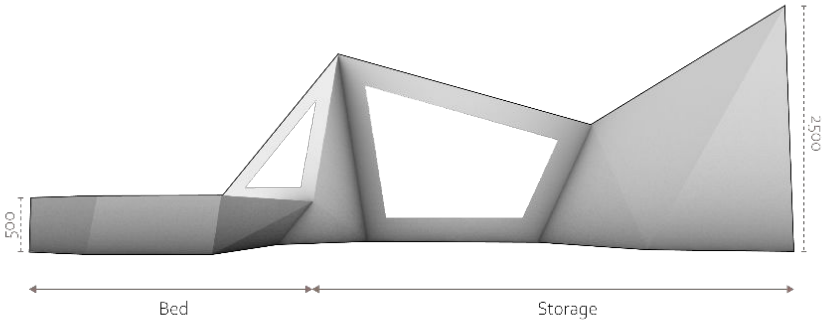




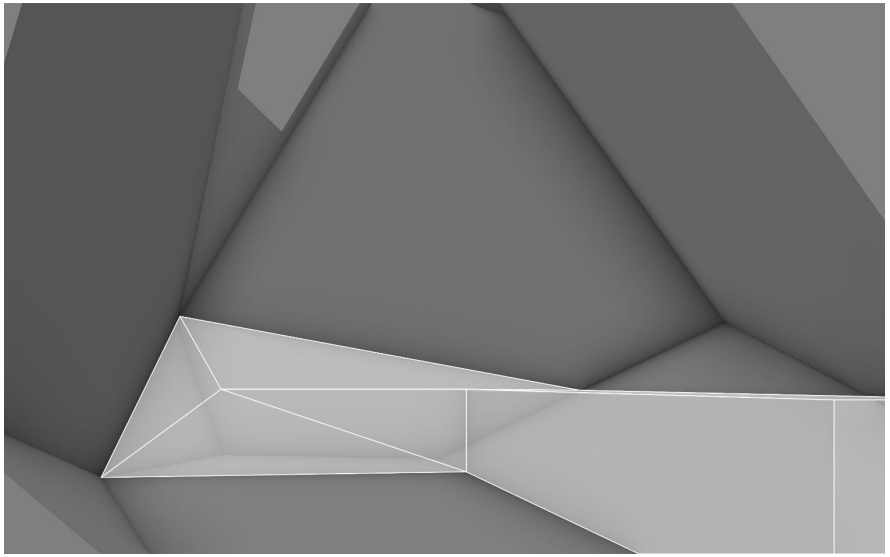


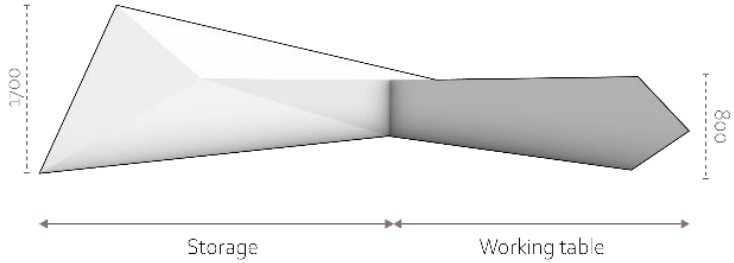
Furniture design - bedroom





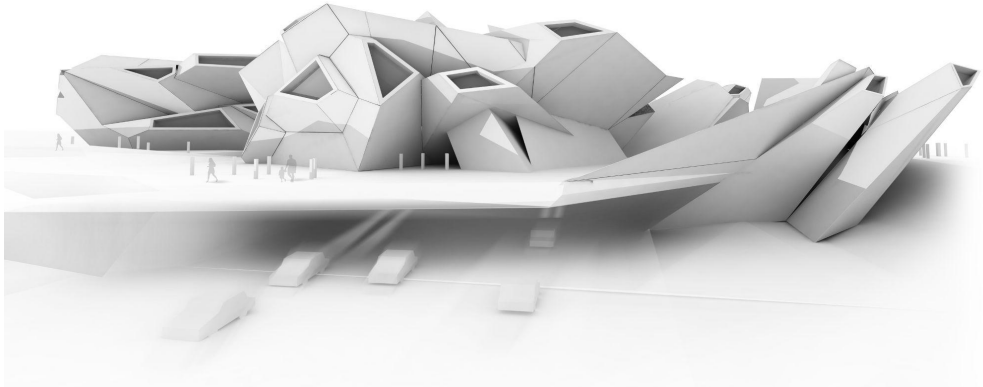
Furniture design - studio



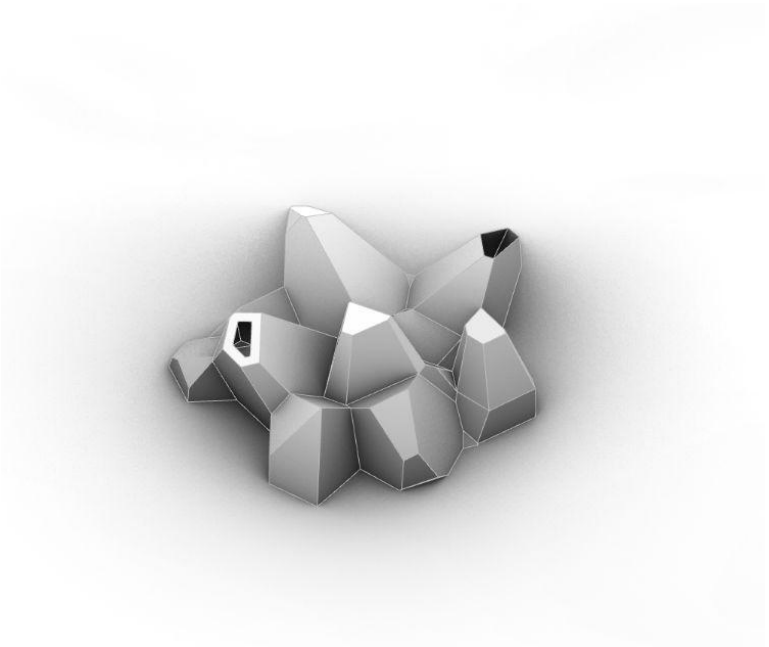


Canopy design

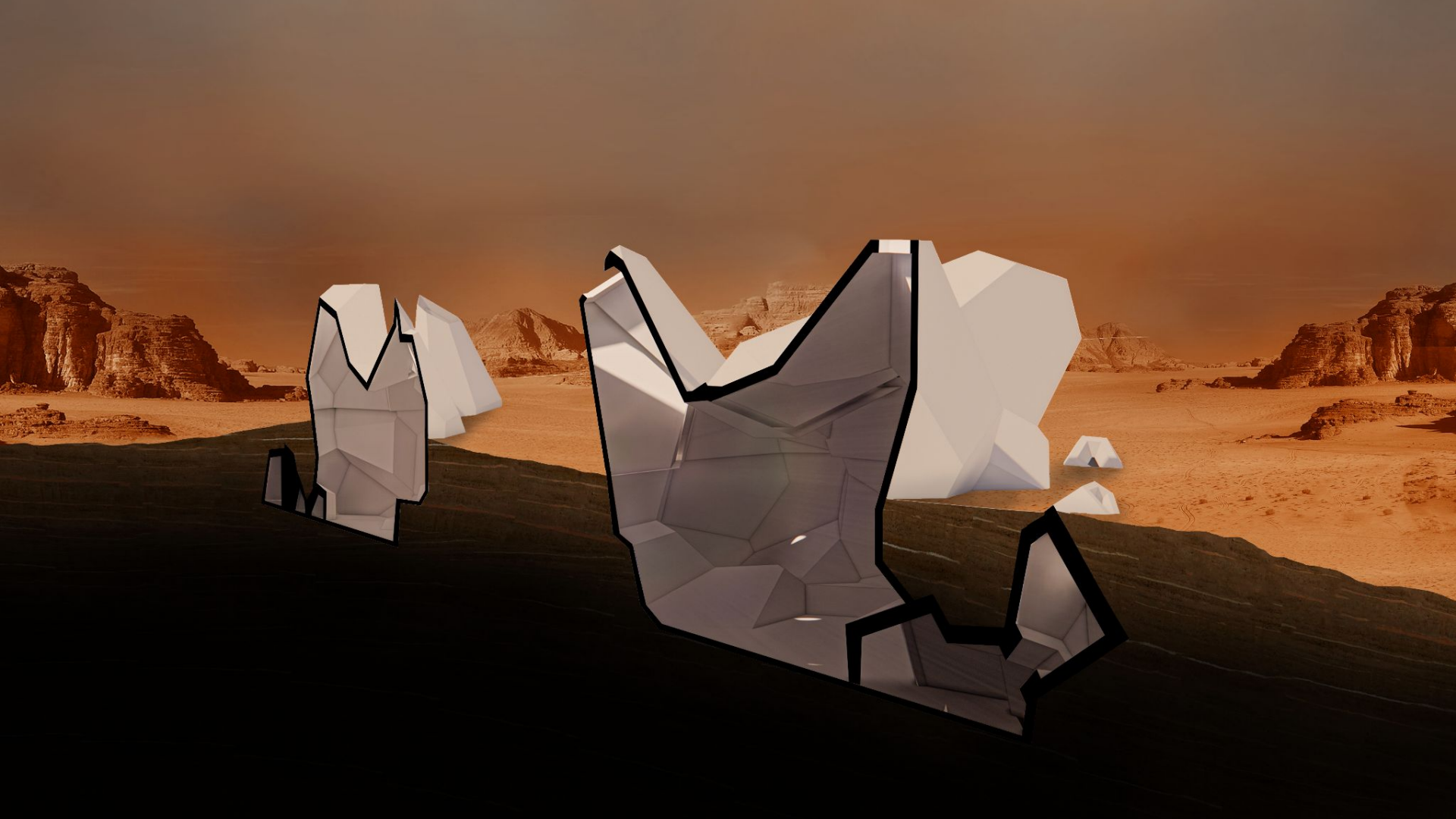
Inspiration



Student example

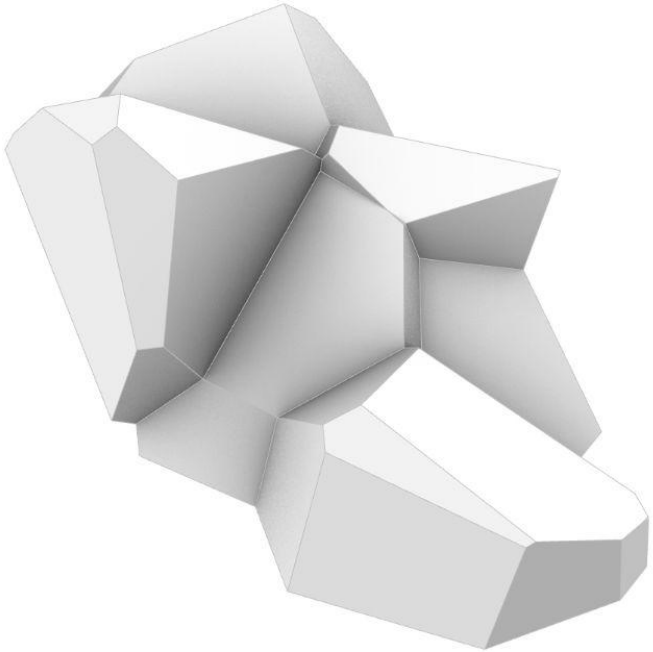


Voronoi dome generation



Production and assembly

House unit as base model

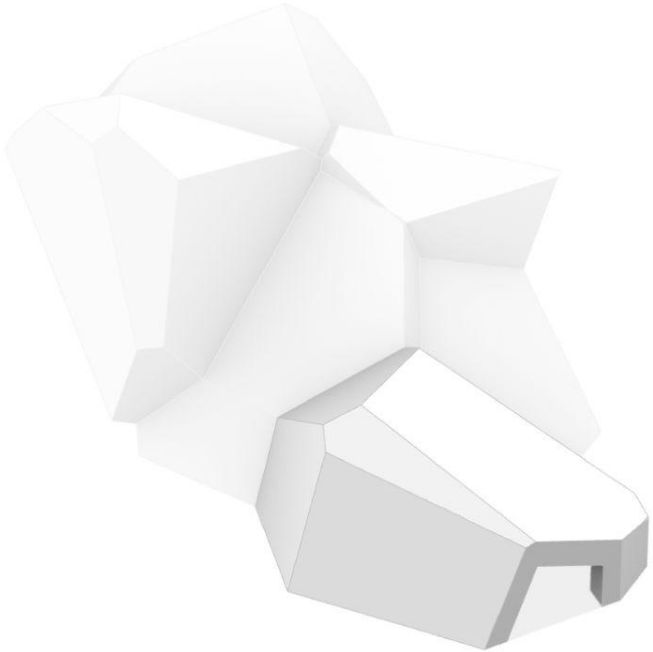


House unit → Selecting one cell → Shelling → Selecting one surface → Voronoi of part of surface → selecting component cells

Selection of one of cell

House unit → Selecting one cell → Shelling → Selecting one surface → Voronoi of part of surface → selecting component cells

Adding wall thickness of cell

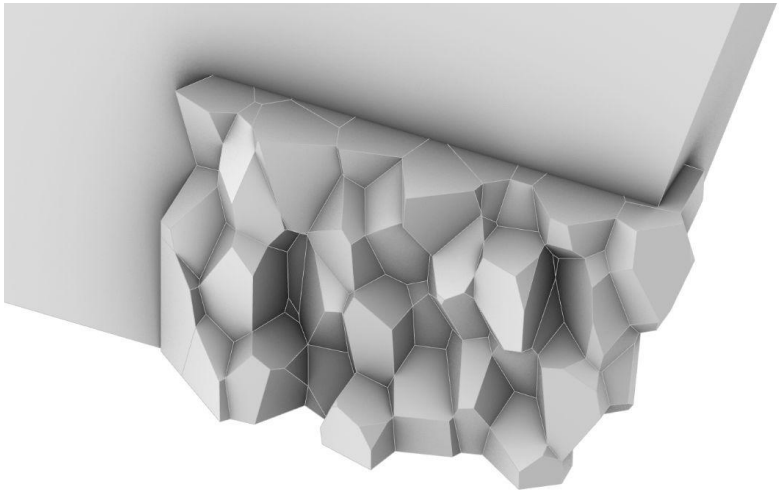


House unit → Selecting one cell → Shelling → Selecting one surface → Voronoi of part of surface → selecting component cells

Selection of wall

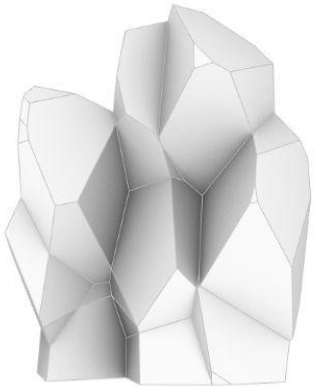
House unit → Selecting one cell → Shelling → Selecting one surface → Voronoi of part of surface → selecting component cells

Voronoi in wall fragment



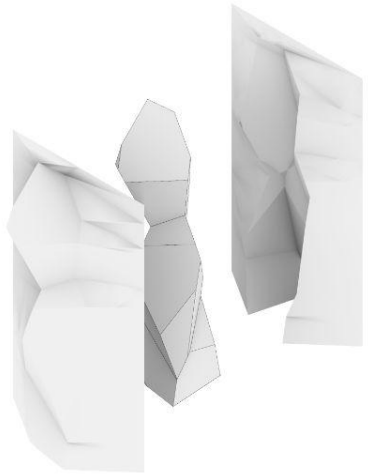
House unit → Selecting one cell → Shelling → Selecting one surface → Voronoi of part of surface → selecting component cells

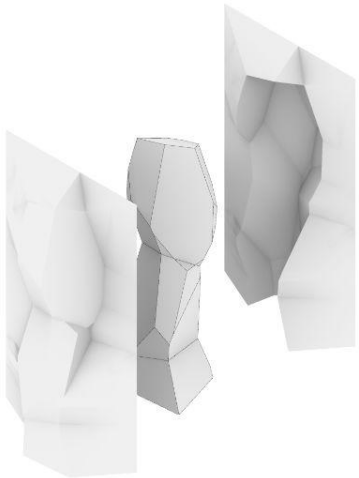
Selection of component

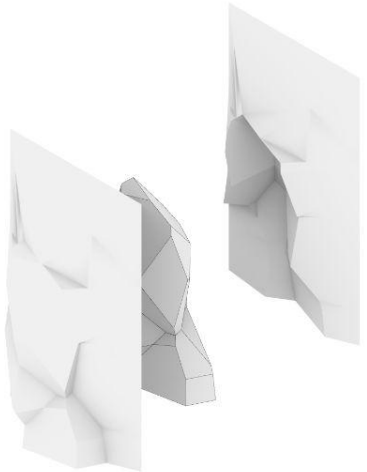


House unit → Selecting one cell → Shelling → Selecting one surface → Voronoi of part of surface → selecting component cells

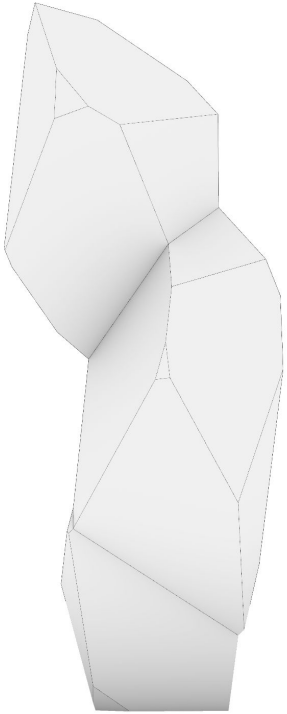
Preparing the components for initial material removal tool path creation



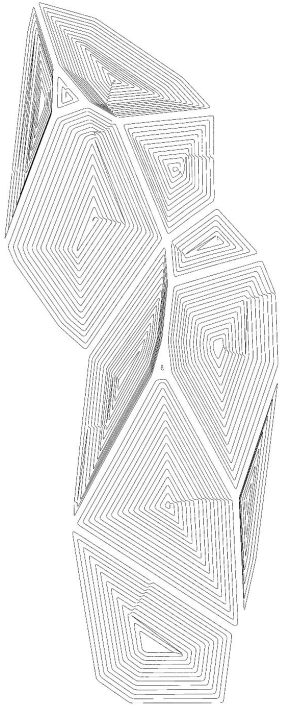




Face selection, face texturization and hole selection



Isolate naked faces



Create tool paths for the faces

Texturized faces and holes

KUKA