THEATERRA

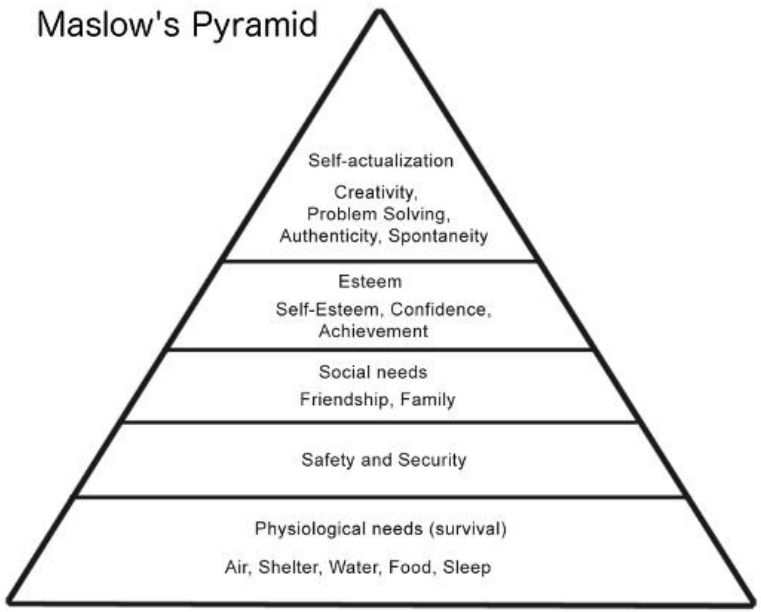
Crafting an oasis of culture within a refugee camp

JENS | JOB | FAWZI | RHEA | SHREYAS

28.10.2021 #

PROBLEM STATEMENT

The majority of the Al' Zaatari camp population (56%) is under 18, and they have mostly not experienced life elsewhere. Culture is being treated as secondary since organizations are only focusing on essential needs. We propose a cultural center built by the people themselves, allowing for the transfer of Syrian culture, knowledge, and craftsmanship to the younger generation.



DESIGN GOALS

1. **Outlet for Cultural Expression**

   The center will be an outlet for cultural expression - a space for people to learn,

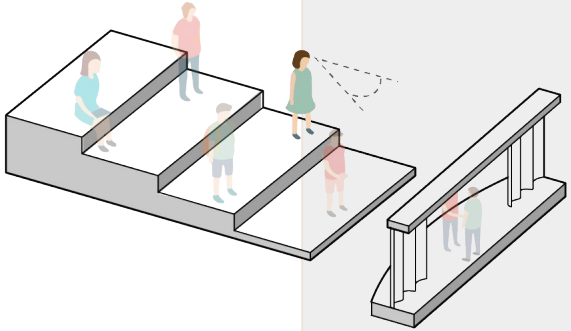
2. **Space to connect with Culture**

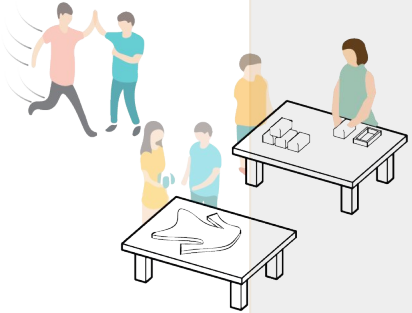
   Reinstating culture back into the camp, to have fun and connect with and experience their cultural identity

3. **Build as a community**

   The center will be an outlet for cultural expression - a space for people to learn. The spaces will grow and adapt to meet people's growing needs and create a sense of belonging.

CONCEPT





Passive education

- Theatre
- Workspaces
- Exhibitions

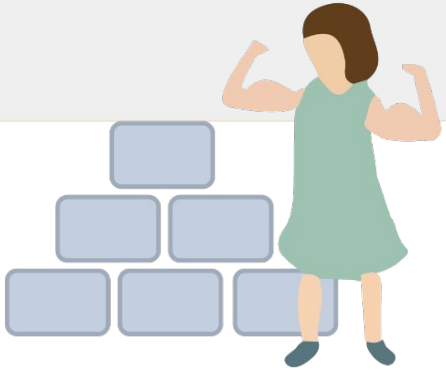
Active education

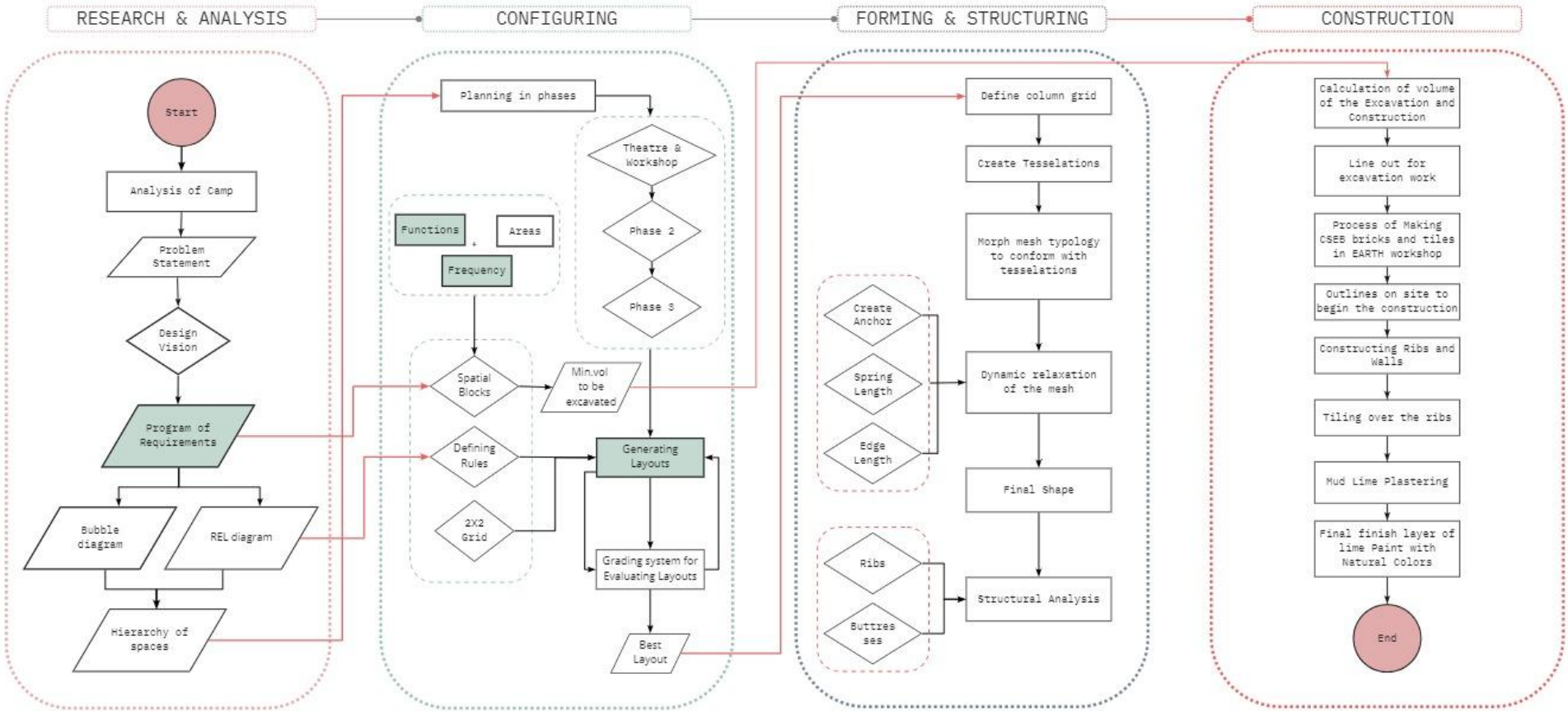
- Rehearsal Space
- Workshops

“For them”

“From them”

“Theirs”

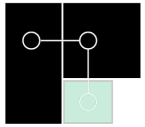




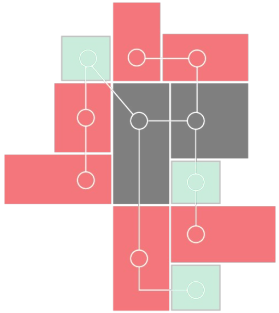
All the indicate the inputs given by the community

WORKFLOW

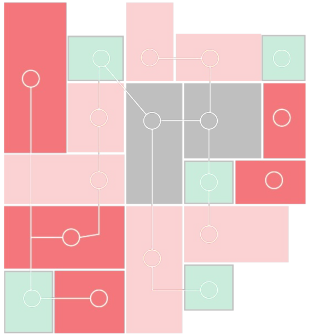
Base



Attracting people
Setting up events
Obtaining material



More hands
Variety of attractive functions
Obtaining more materials

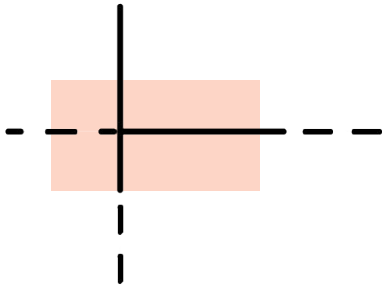


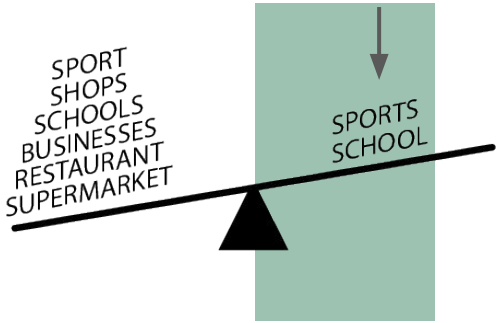
All cultural functions
Helping community
Supporting locals
Educating culture

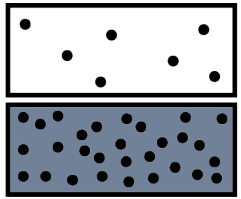
Research and Analysis

Research & Site selection

Methodical way of obtaining Ideal site for culture centre







Axis

- Shortest path algorithm
- Creating dictionary of local roads and origins/destinations
- Most used crossing

Functional balance

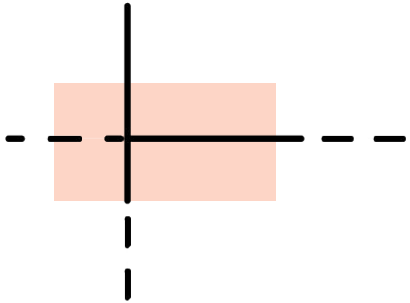
- Density of facilities
- Pick domain on road in low density areas

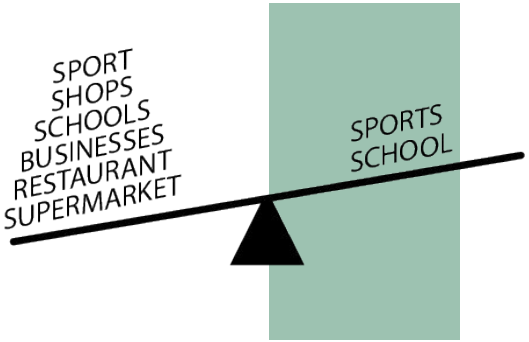
Density

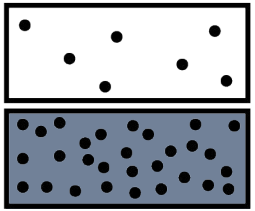
- Find plot near road with lower density of houses

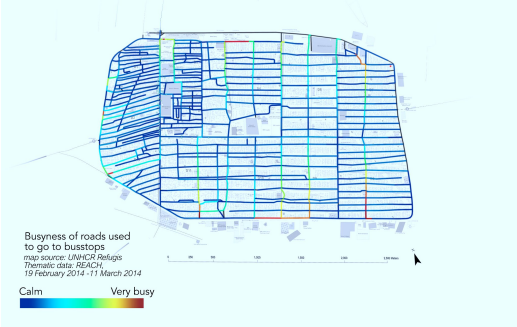
Site Selection

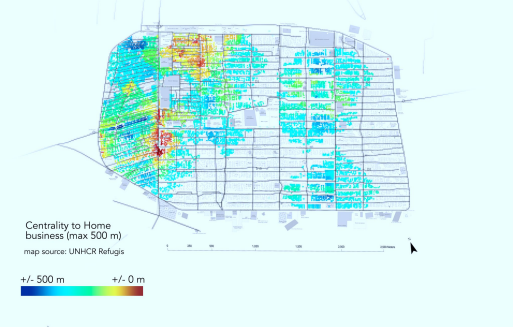
Specific for Zaatari refugee camp

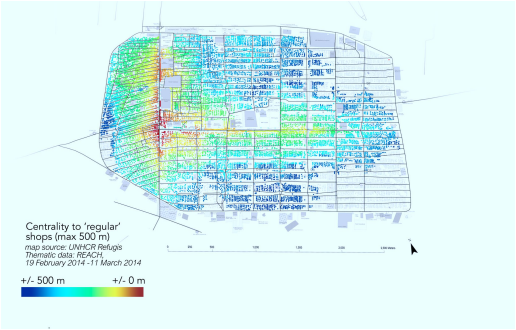






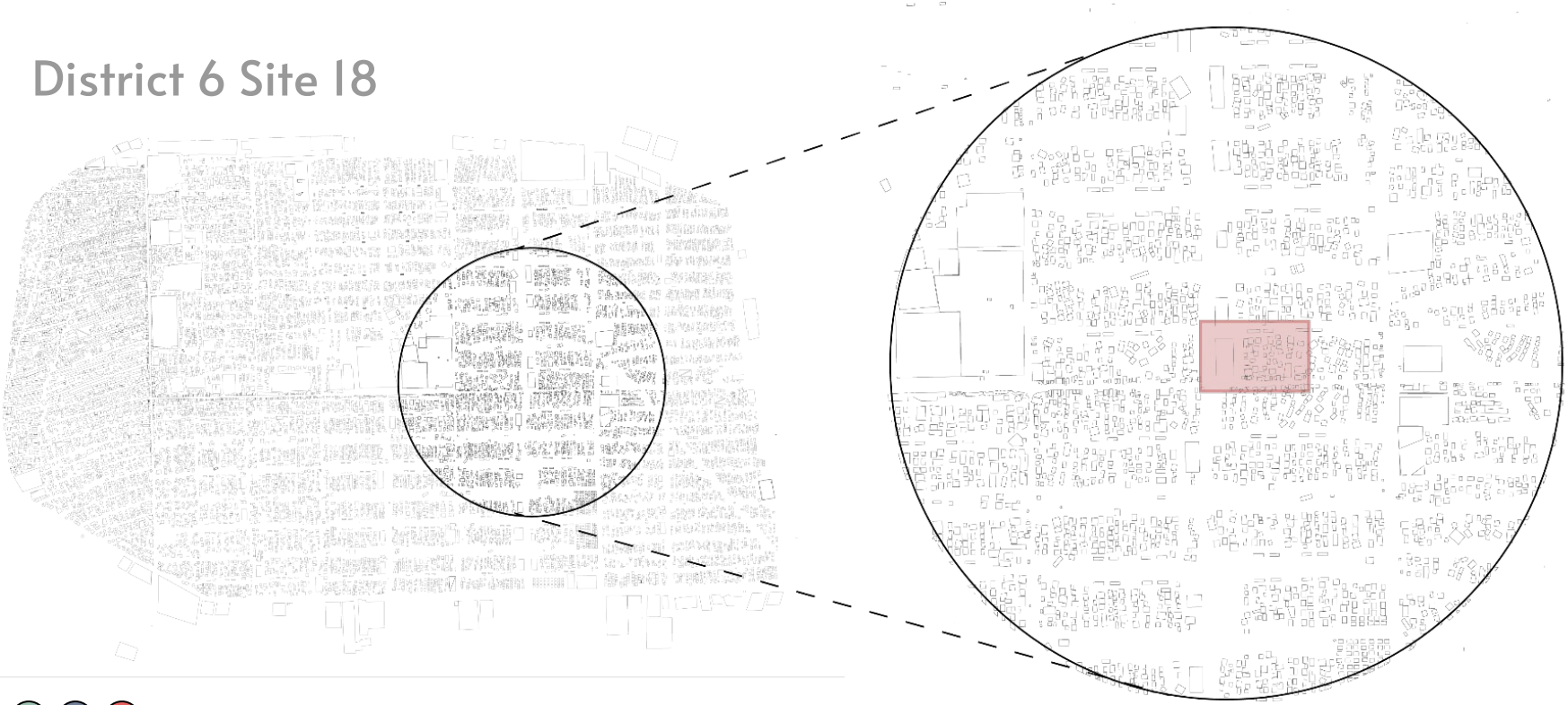




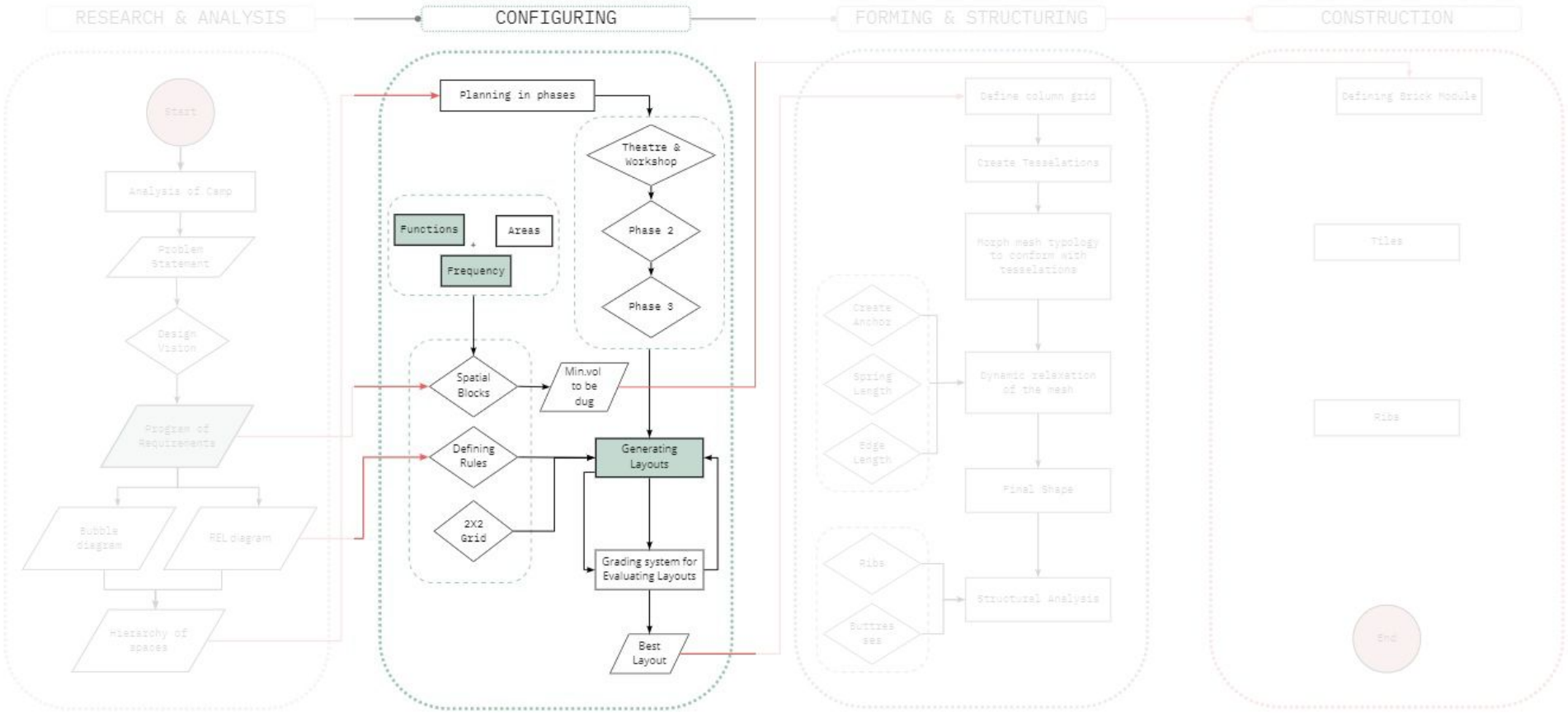


General | Chosen site

District 6 Site 18



Configuring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Ribs
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Structural Analysis
Defining Brick Module
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WORKFLOW

LAYOUT

PHASE 1 -BASE

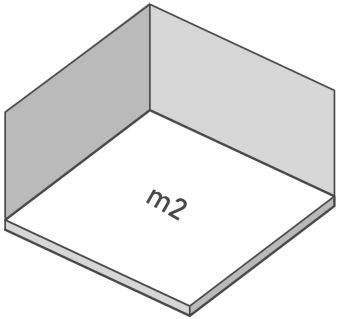
- Entry
- Earth_building_workshop
- Theater
- Toilet_theater

PHASE 2- EXPANSION

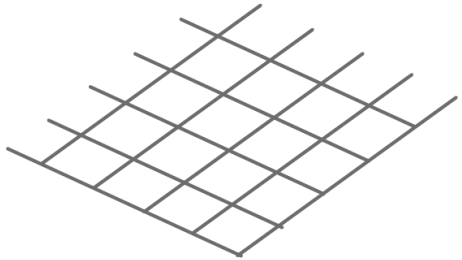
- Courtyard_workshop
- Rehearsal_space
- Changing_room_1
- Changing_room_2
- Stage_design_workshop
- Storage
- Cafeteria
- Kitchen
- Toilet_expansion
- Courtyard_workshop
- Workplaces

PHASE 3- FINAL

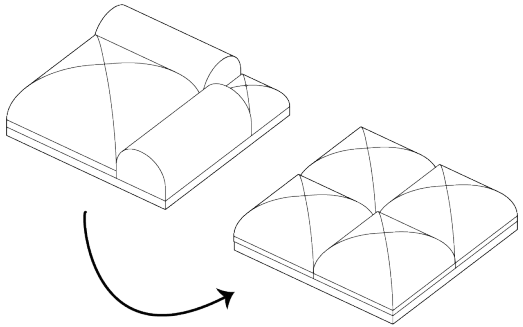
- Shop_1
- Shop_2
- Shop_3
- Shop_4
- Textile_workshop
- Exhibition_space
- Meeting_room
- Lobby
- Toilet_commercial



Area



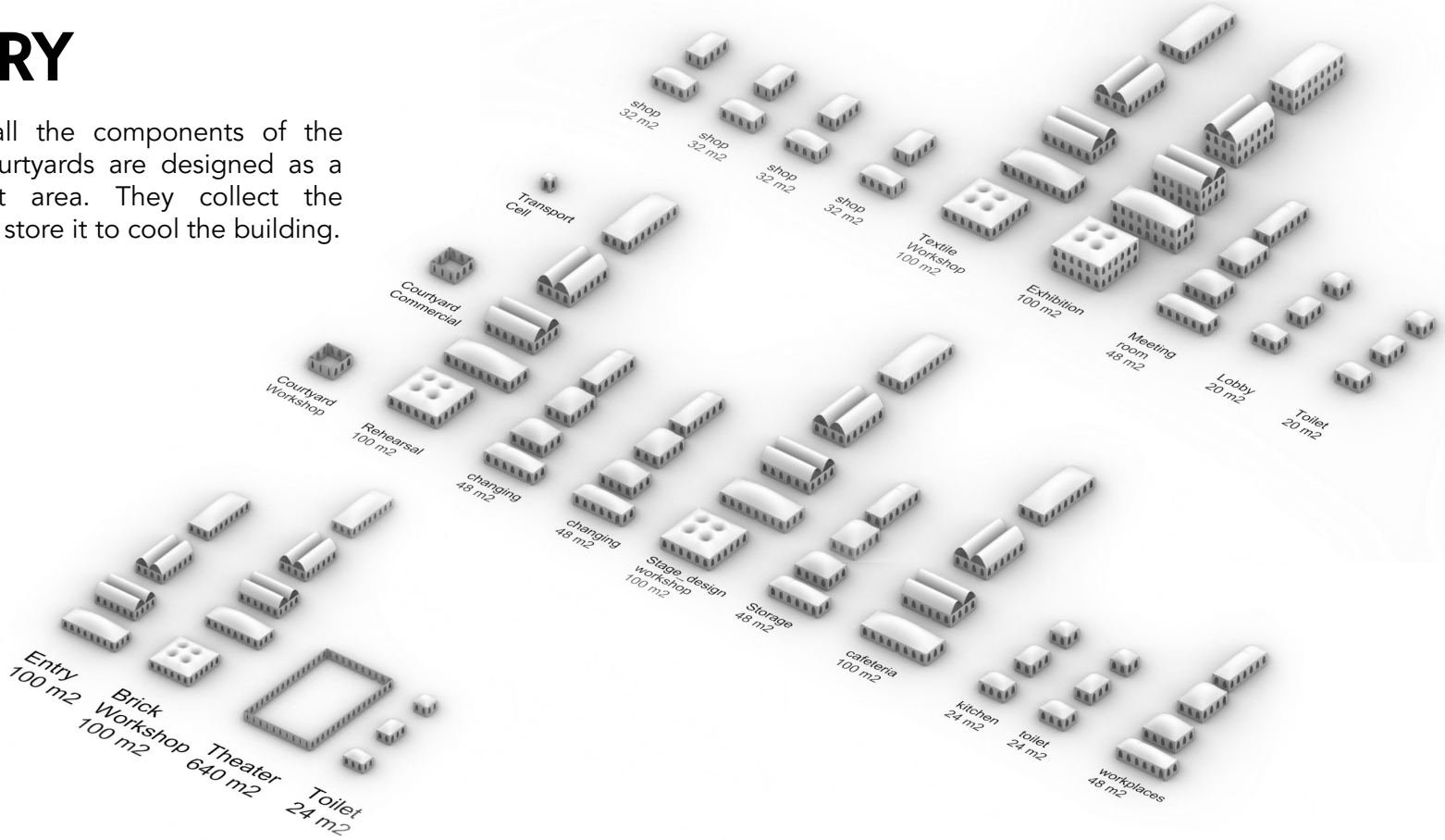
Grid size



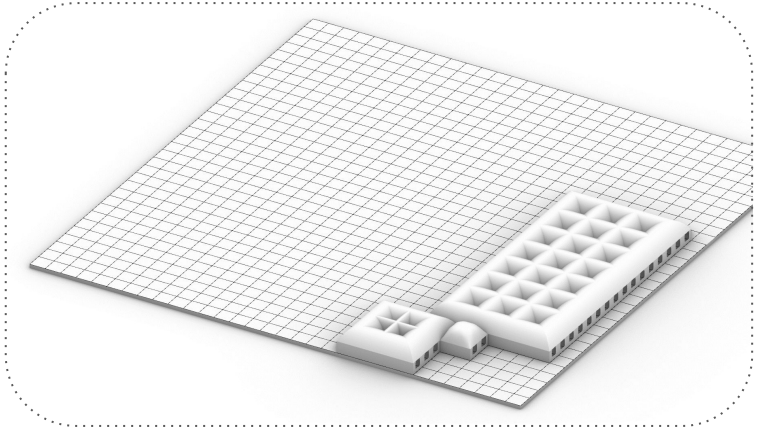
Structure limitations

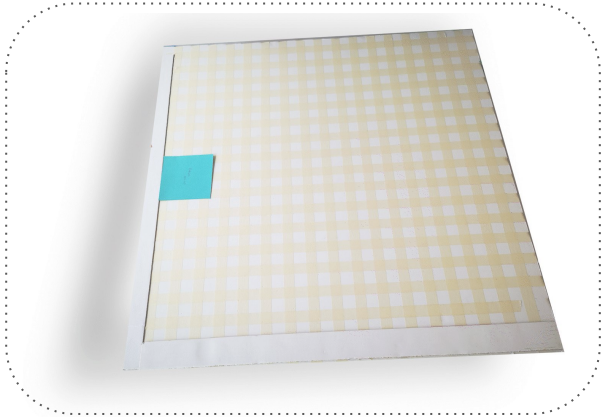
LIBRARY

The set of all the components of the game.The courtyards are designed as a big transport area. They collect the rainwater and store it to cool the building.



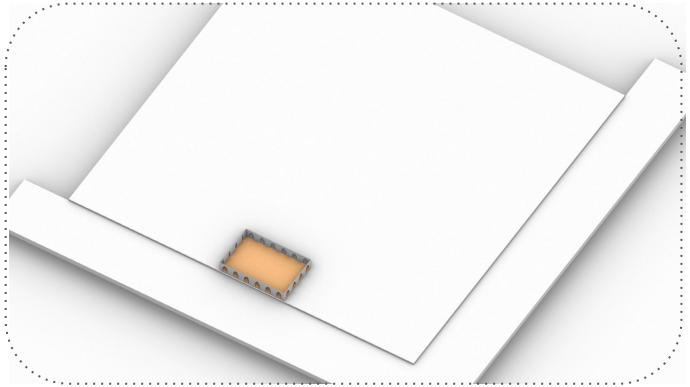
Program the whole layout.
Let the computer generate everything



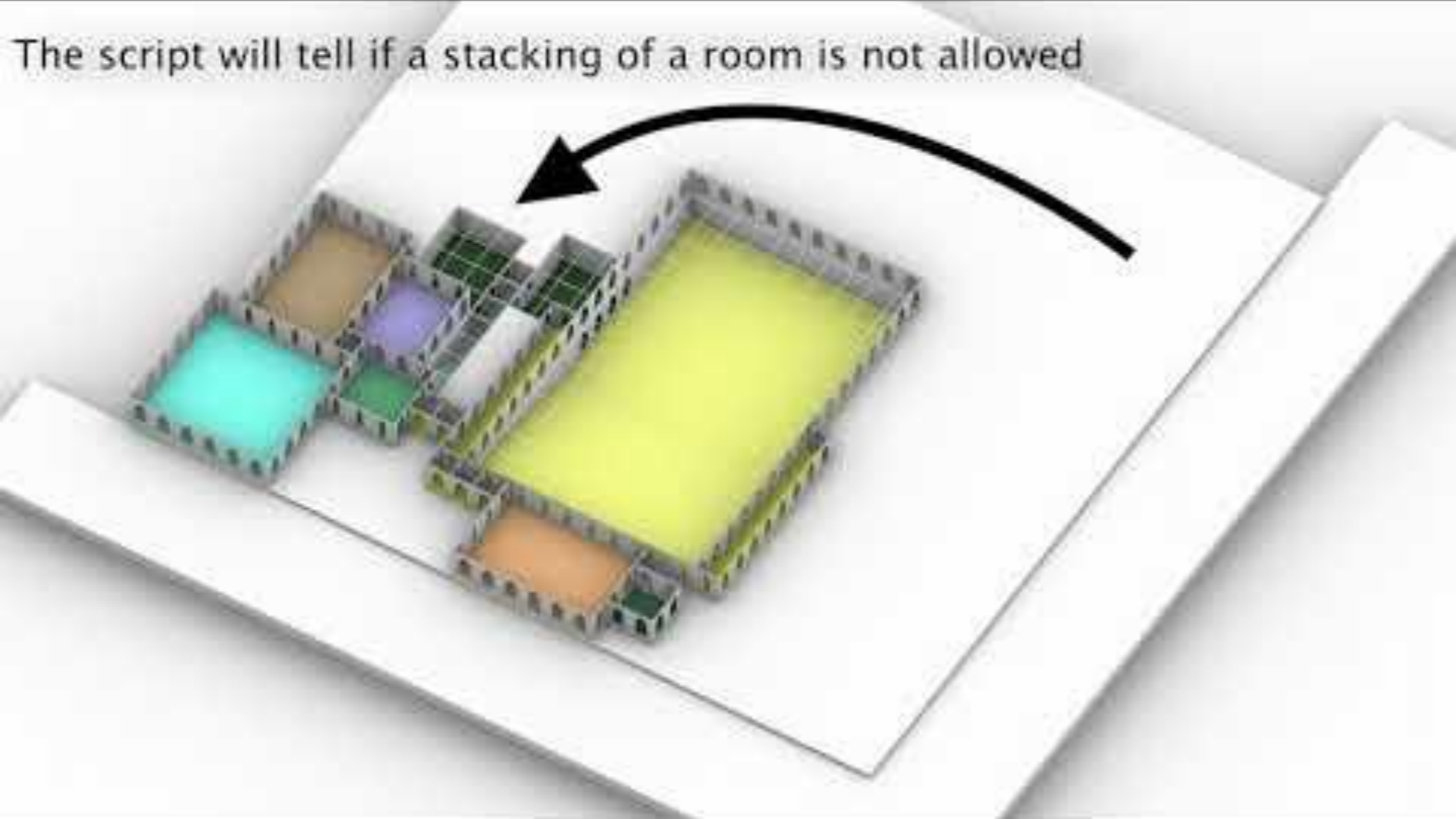


Testing it manually to check if the game is "playable". Many new rules and the game was not easy/fun to play

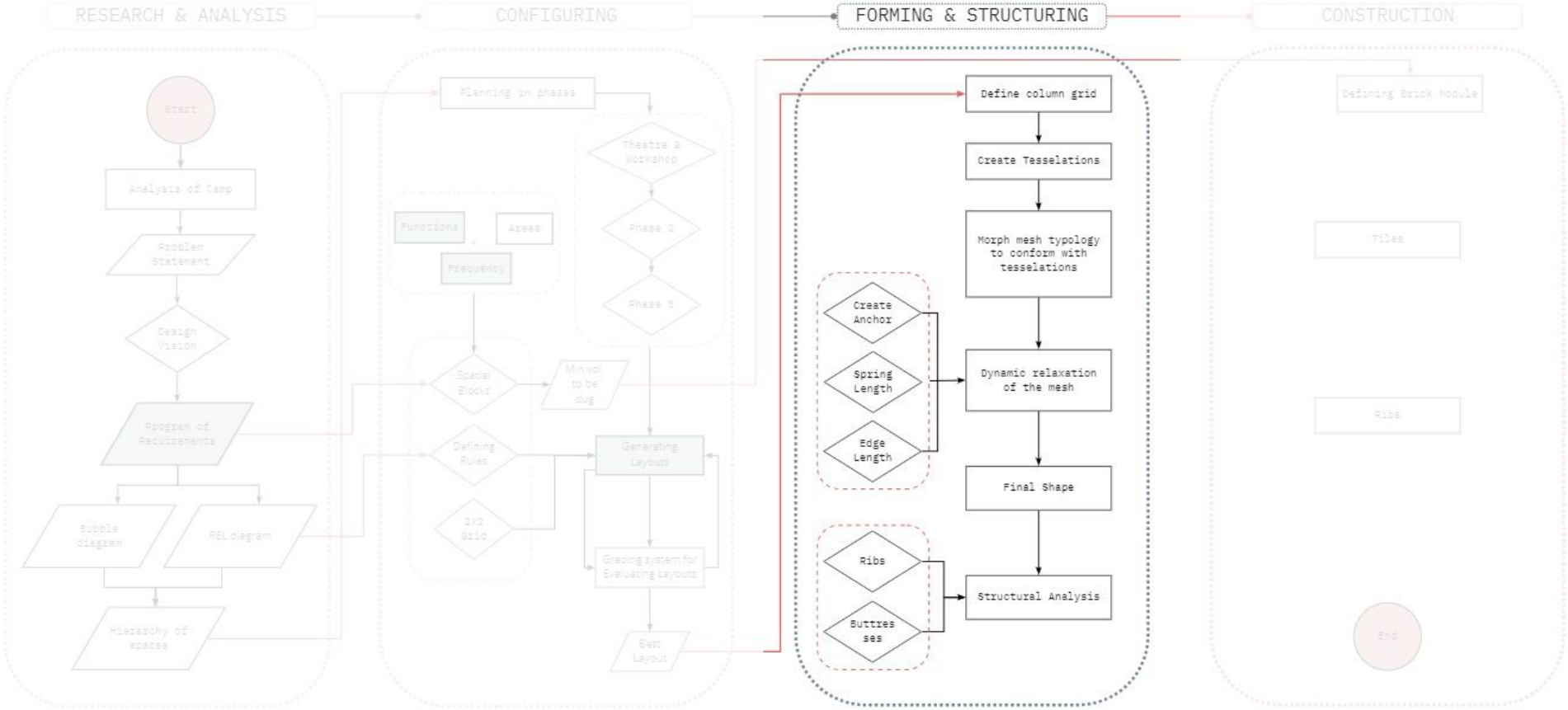
Separating rules and points to make it into a fun and easy game. All rules are included in the grading system.



The script will tell if a stacking of a room is not allowed



Forming and Structuring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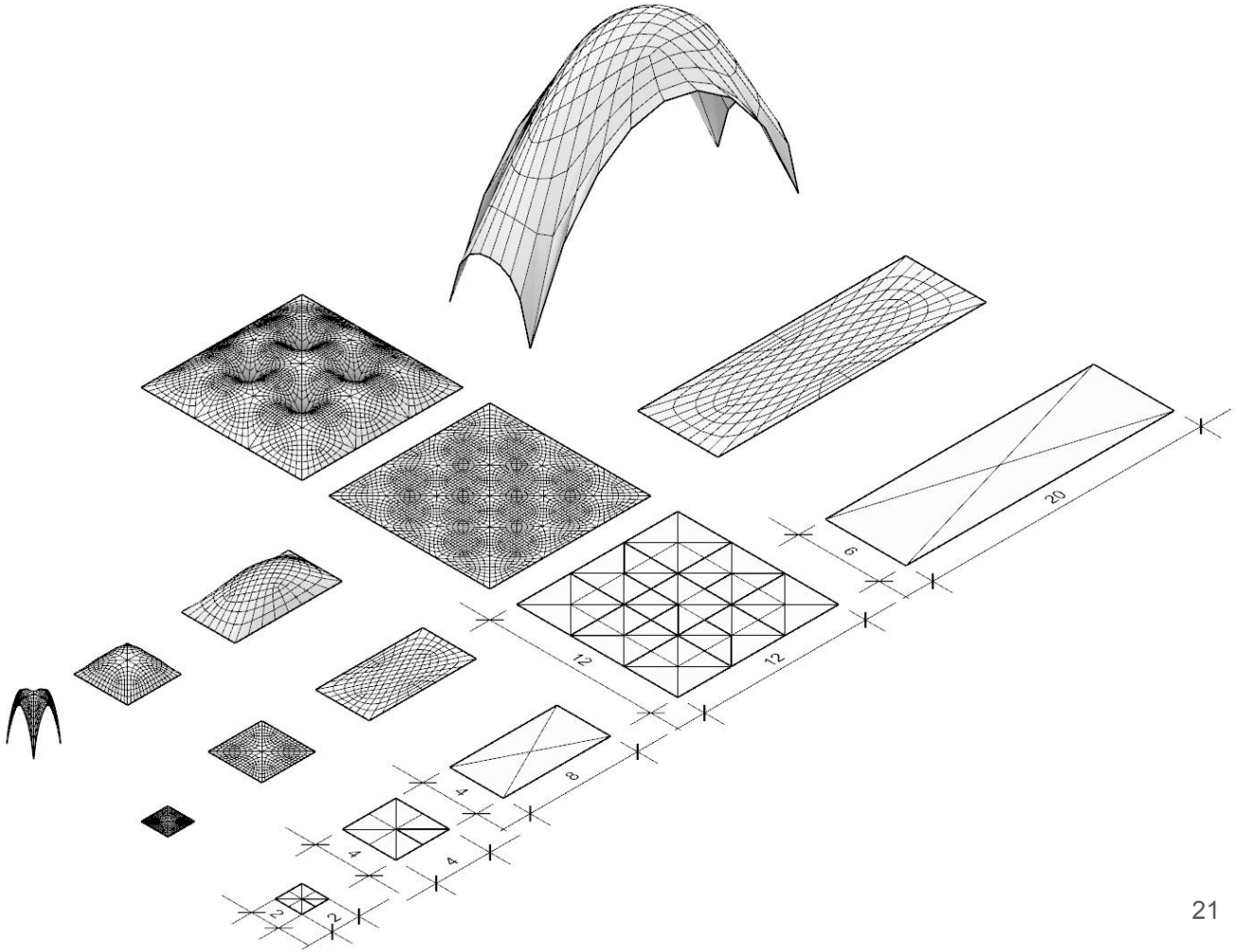
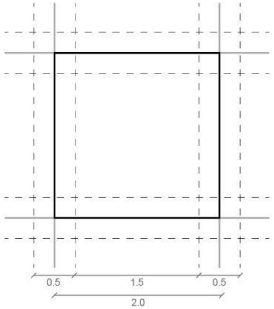
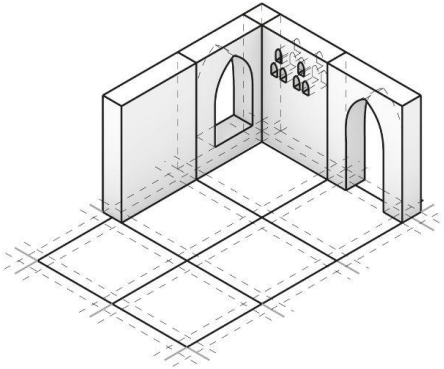
ROOF LIBRARY
// Tessellation

- Tessellation is based on rib placement and openings
- Tessellation as a base for mesh topology
- Mesh is dynamically relaxed to follow a catenary line



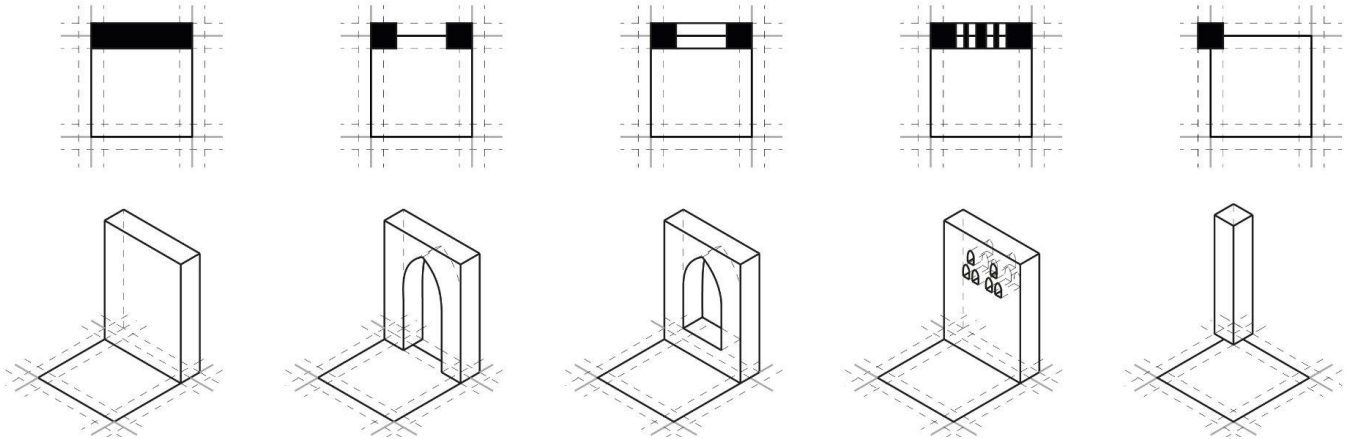
WALL LIBRARY
//Configurations



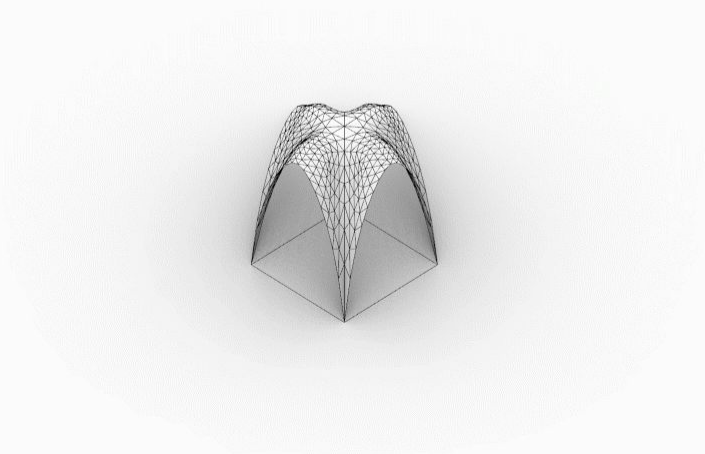


The wall modules follow the tartan grid, and are configured based on adjacencies & functional requirements.

Additionally, the openings follow a sub-grid on the elevation of the wall. All configurations can be made from this wall and window modules.

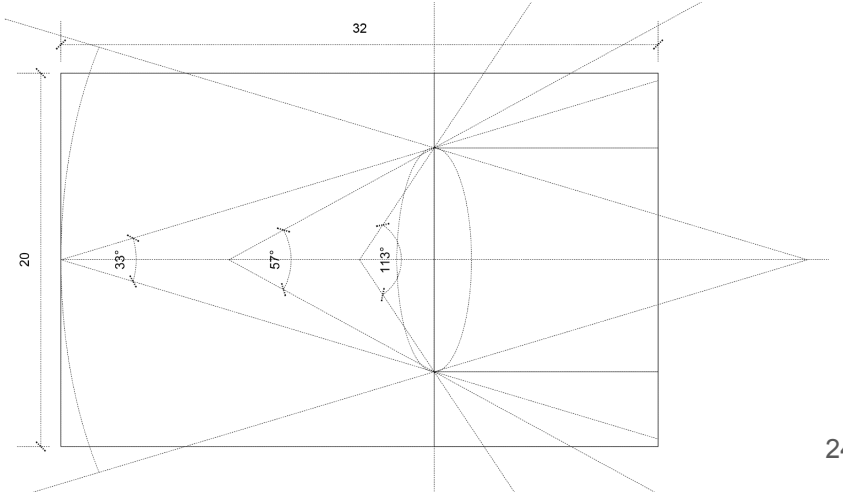


FORMING //SHAPING



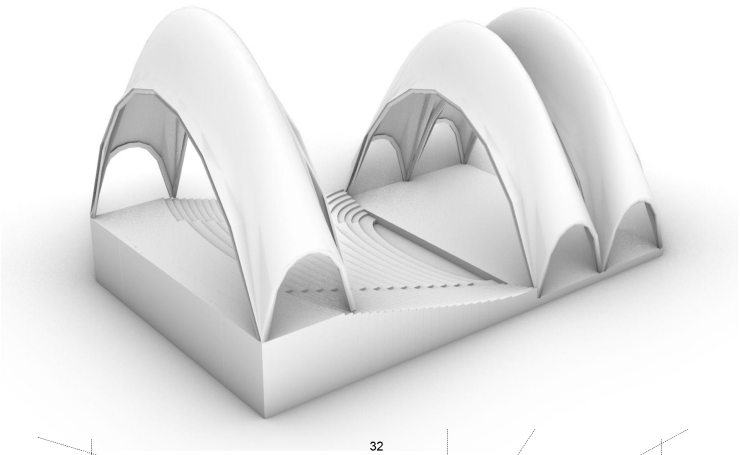
THEATRE MODULE

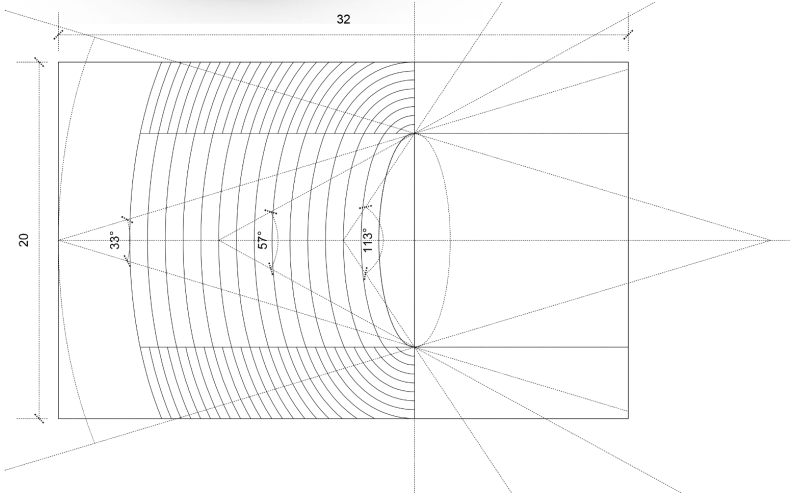
Theater layout was design on the basis of view angle from all the positions.

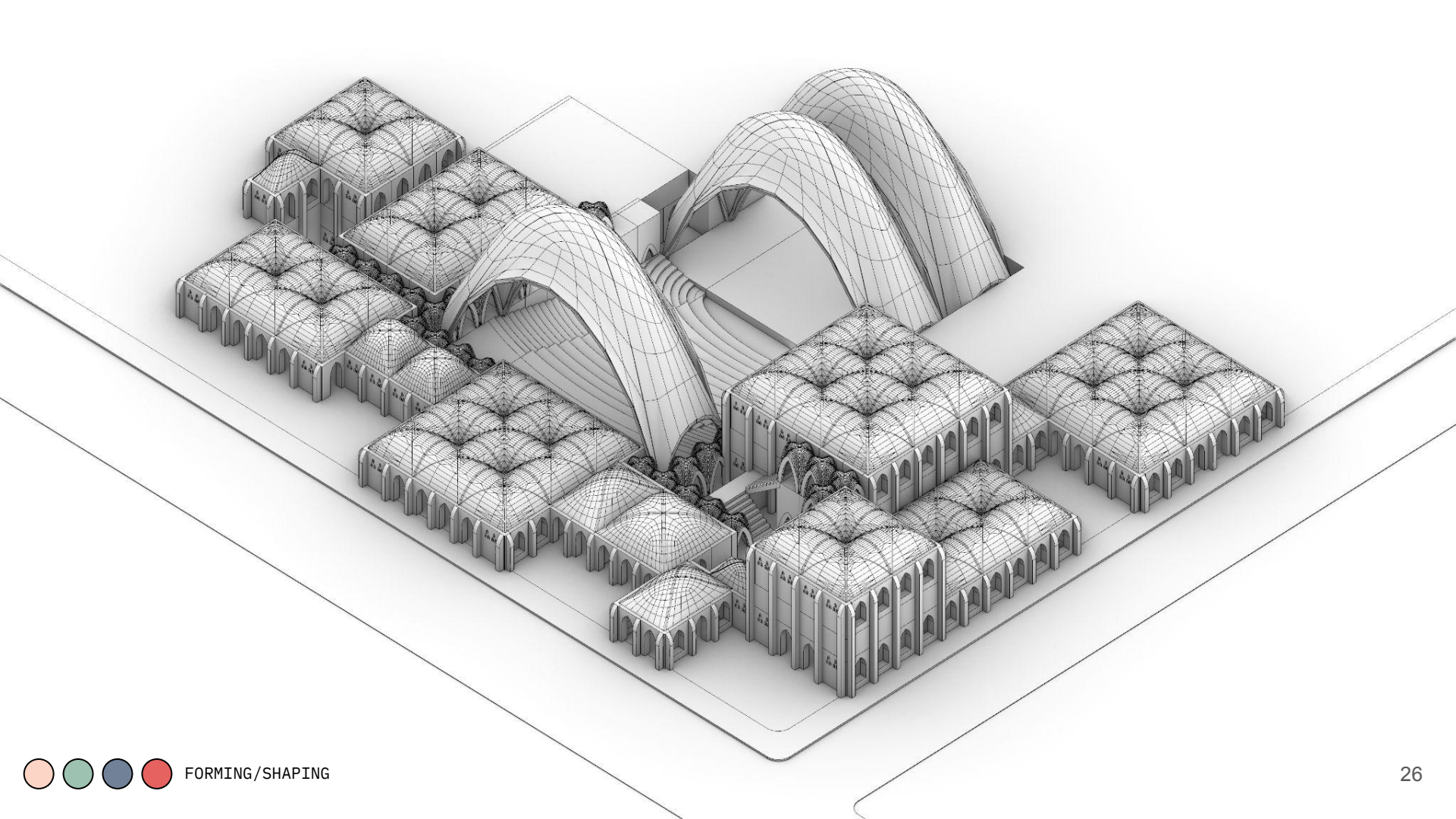


THEATRE MODULE

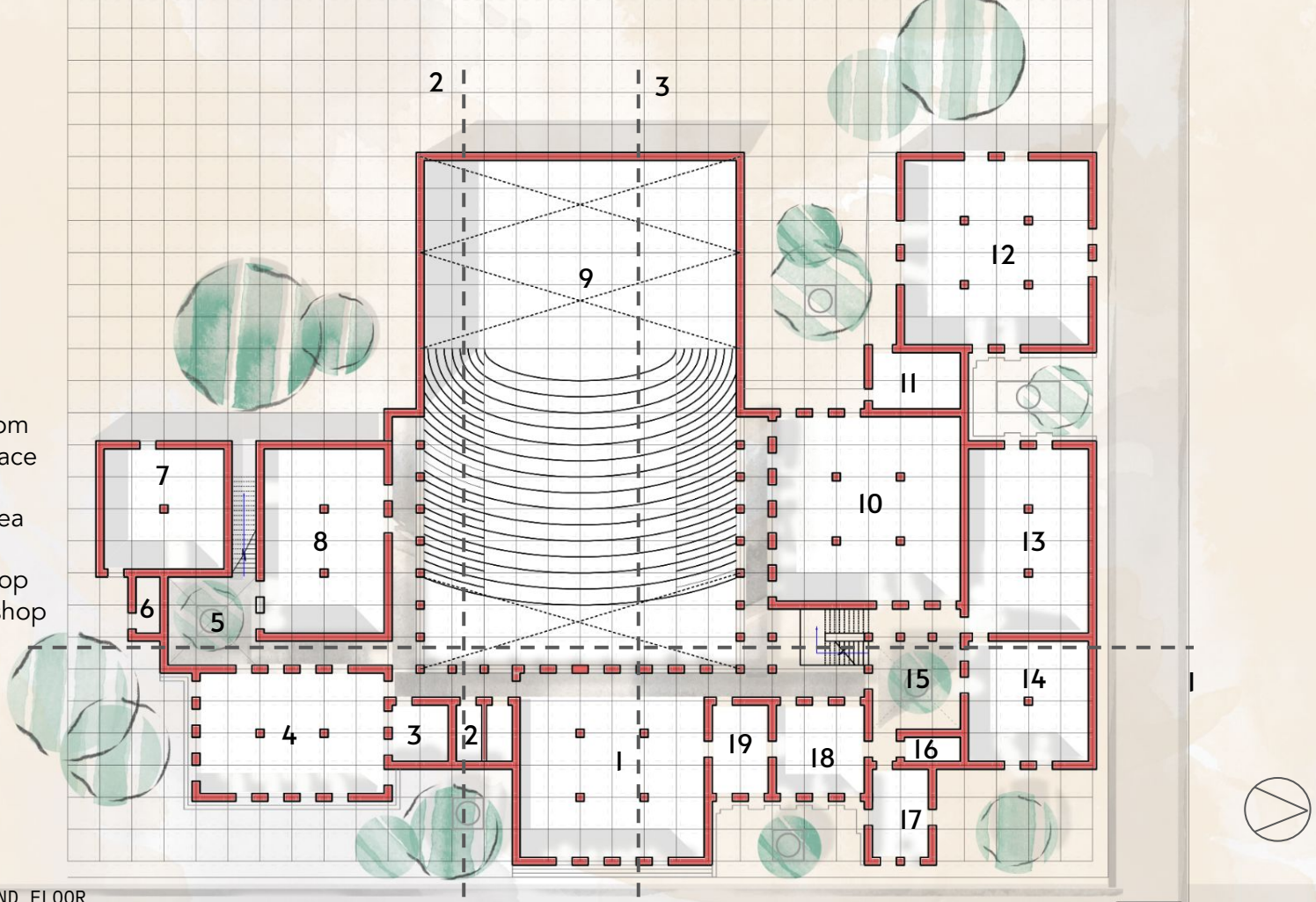
The ellipse derived from the width of the front line of stage guides the sitting arrangement.



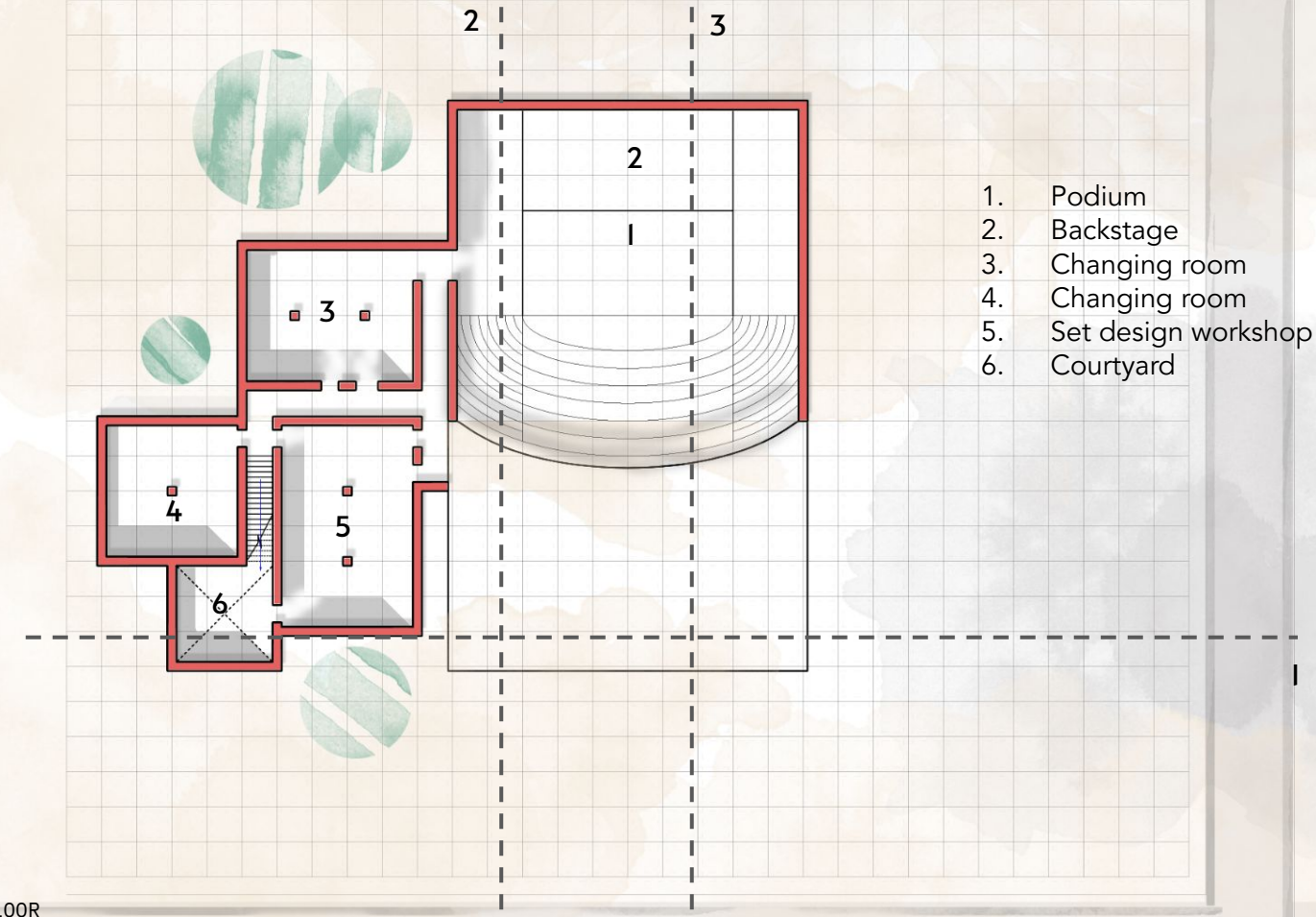




1. Entry
2. Toilet
3. Kitchen
4. Cafeteria
5. Courtyard 1
6. Toilet
7. Changing room
8. Rehearsal Space
9. Theatre
10. Exhibition Area
11. Shop
12. Brick Workshop
13. Textile Workshop
14. Workplaces
15. Courtyard
16. Toilet
17. Shop
18. Lobby
19. Shop



GROUND FLOOR

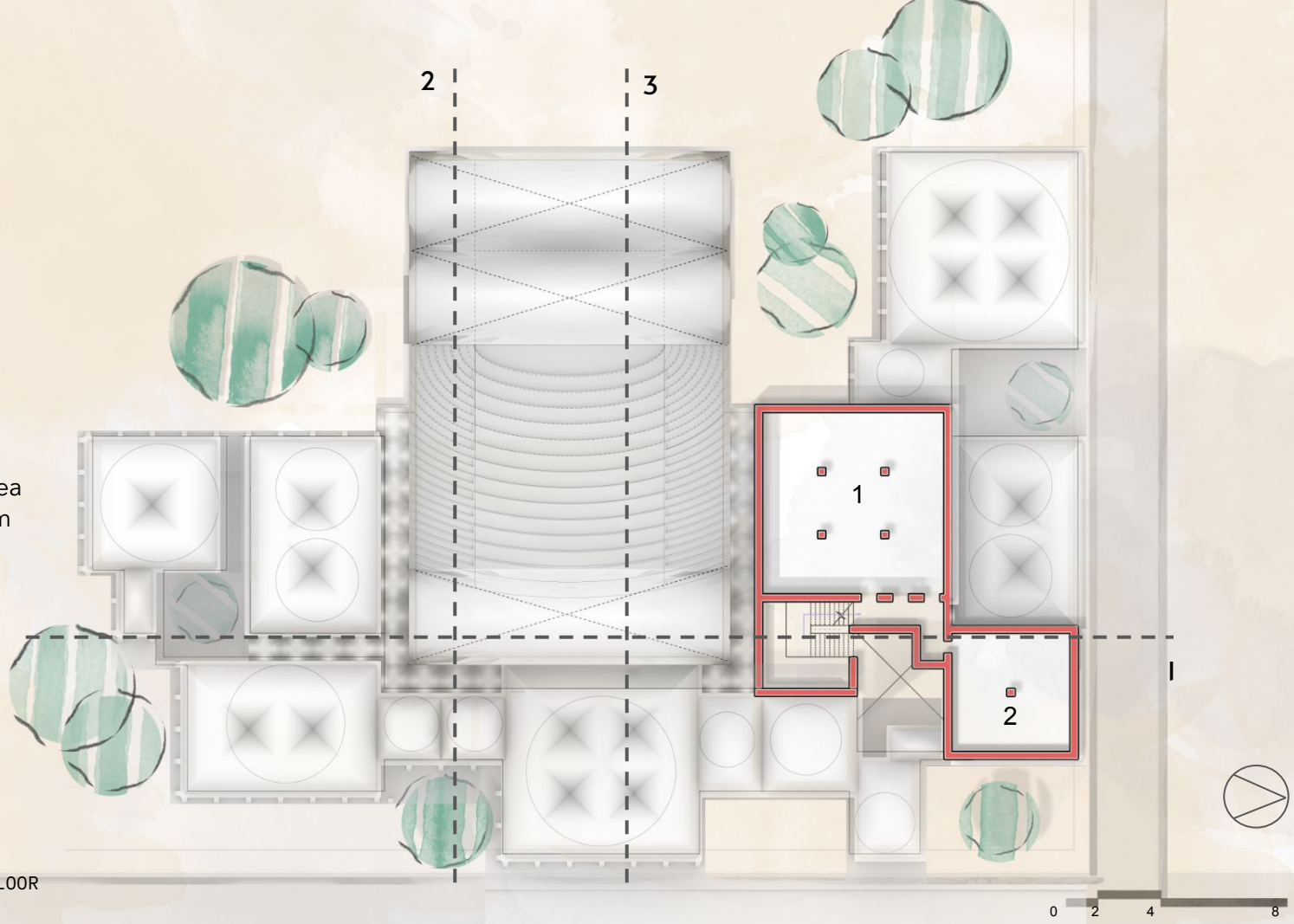


1. Podium
2. Backstage
3. Changing room
4. Changing room
5. Set design workshop
6. Courtyard

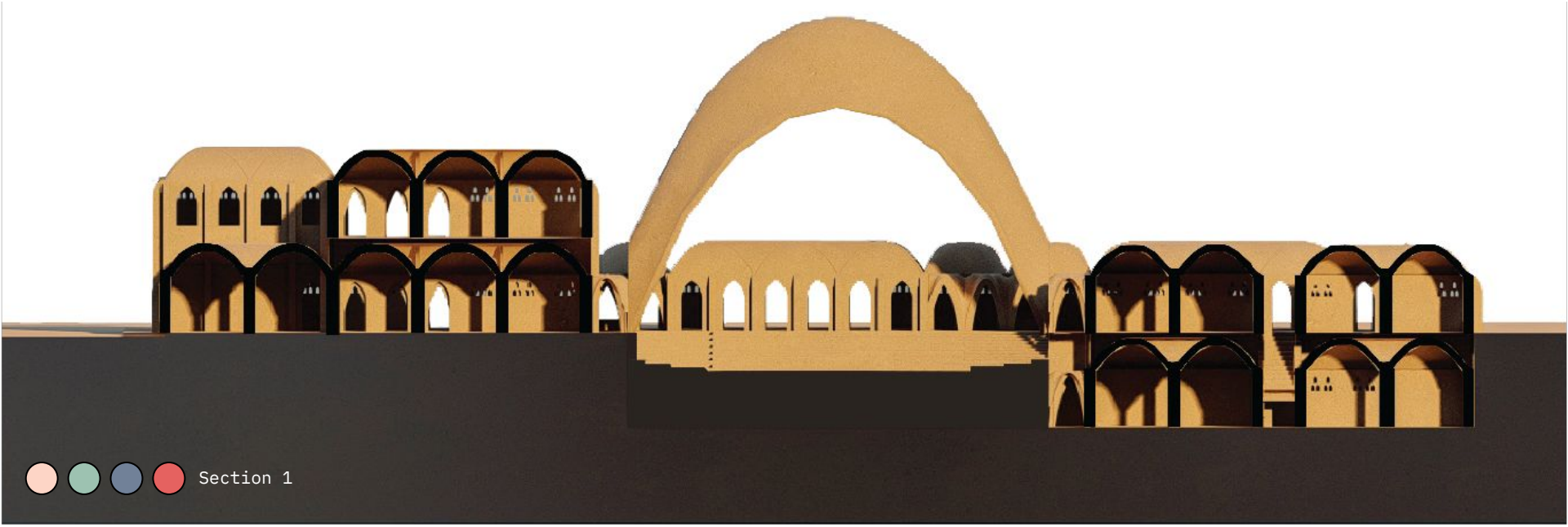
-1 FLOOR

0 2 4 8

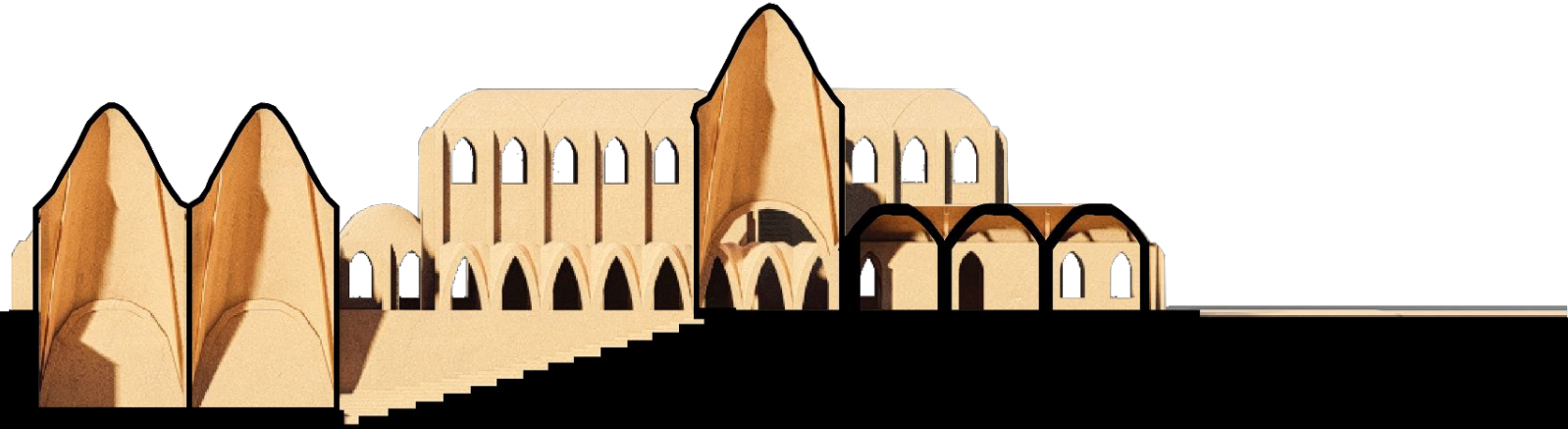
1. Exhibition Area
2. Meeting room



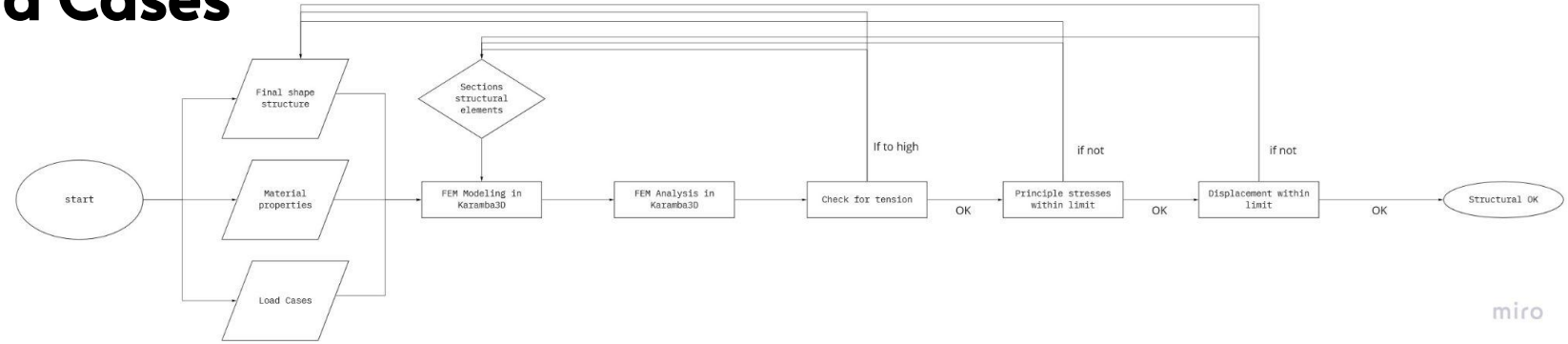
+1 FLOOR



Section 1



STRUCTURE
//Load Cases



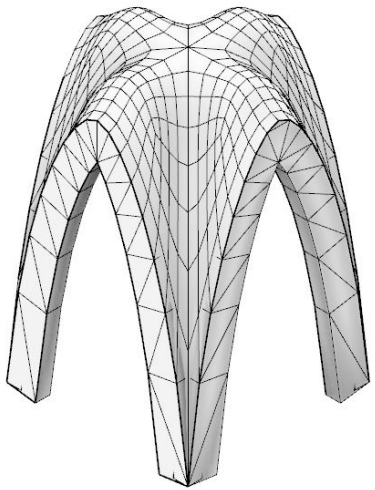
Material properties compressed bricks	
Density [kg/m3]	1500
Young's modulus [MPa]	150
Compressive strength [MPa]	1.5
Tensile Strength [MPa]	0.15

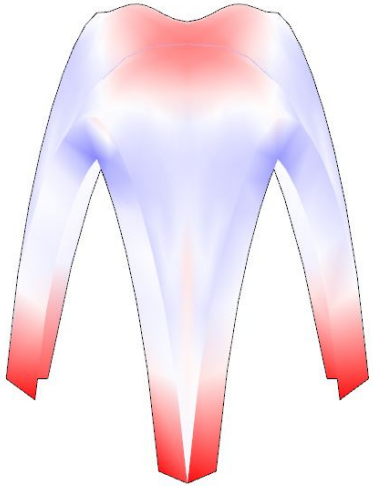
Loads		
	Magnitude	SF
Gravity	-	1.2
Life load [kN/m2]	2.5	1.5
Sand filling [kN/m2]	5	1.5

STRUCTURE

Transportation unit (2x2x3m)

max tension: 0.024 MPa
max compression: 0.078 MPa
disp. 0.12 cm
tiles: 3x4cm
ribs: 32x16cm

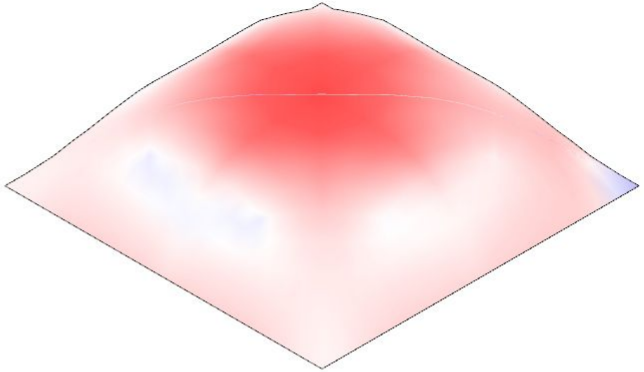


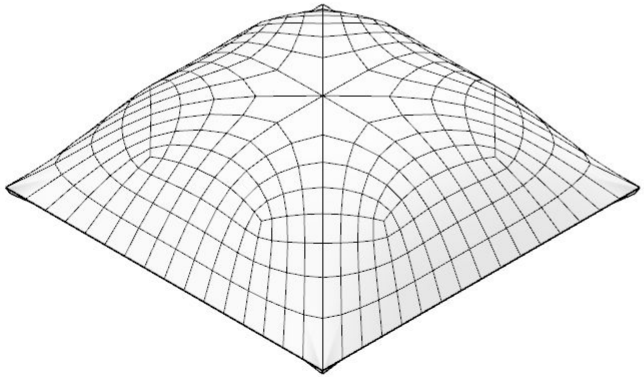


STRUCTURE

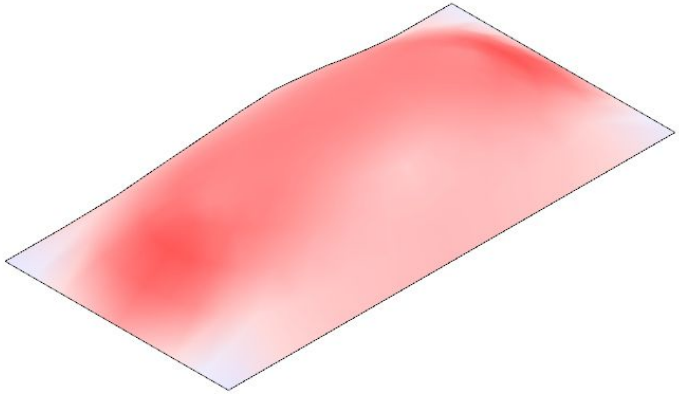
Dome (6x6x1.5m)

max tension: 0.145 MPa
max compression: 0.317 MPa
disp. 1.45 cm
tiles: 3x4cm
ribs: 32x16cm



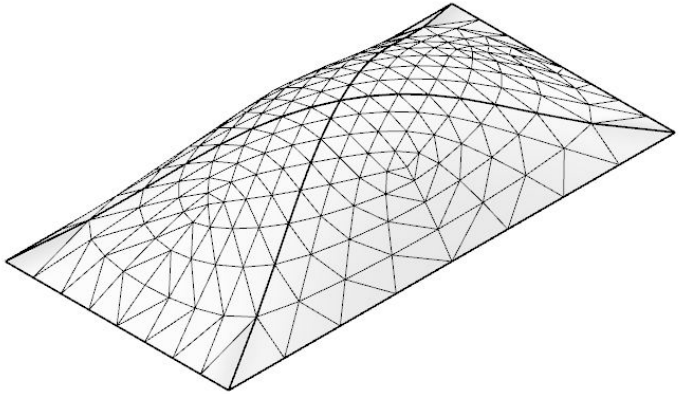


STRUCTURE



Dome (8x4x1.5m)

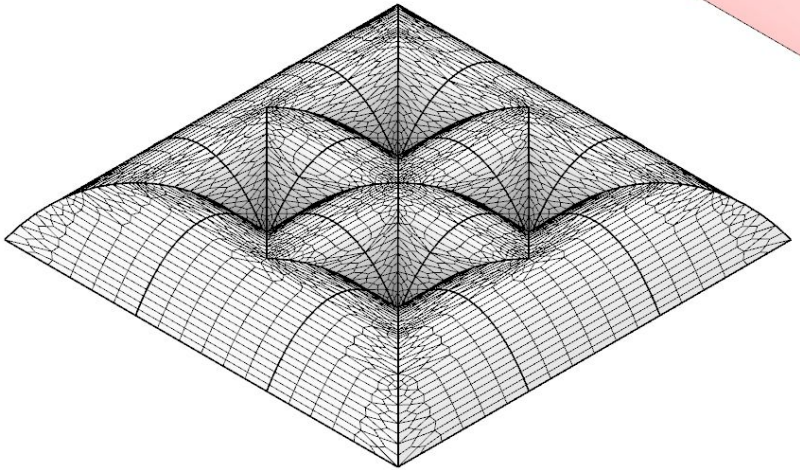
max tension: 0.146 MPa
max compression: 0.558 MPa
disp. 0.75 cm
tiles: 3x4cm
ribs: 32x16cm

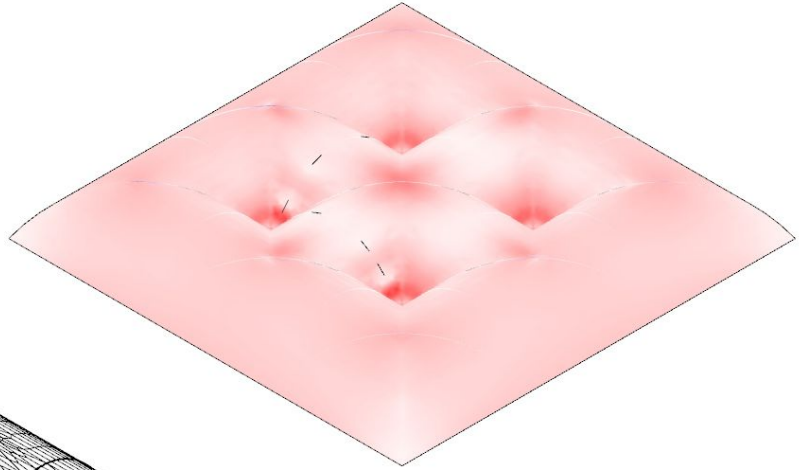


STRUCTURE

Vault (12x12x1.5m)

max tension: 0.114 MPa
max compression: 1.14 MPa
disp. 1.09 cm
tiles: 3x4cm
ribs: 16x32cm

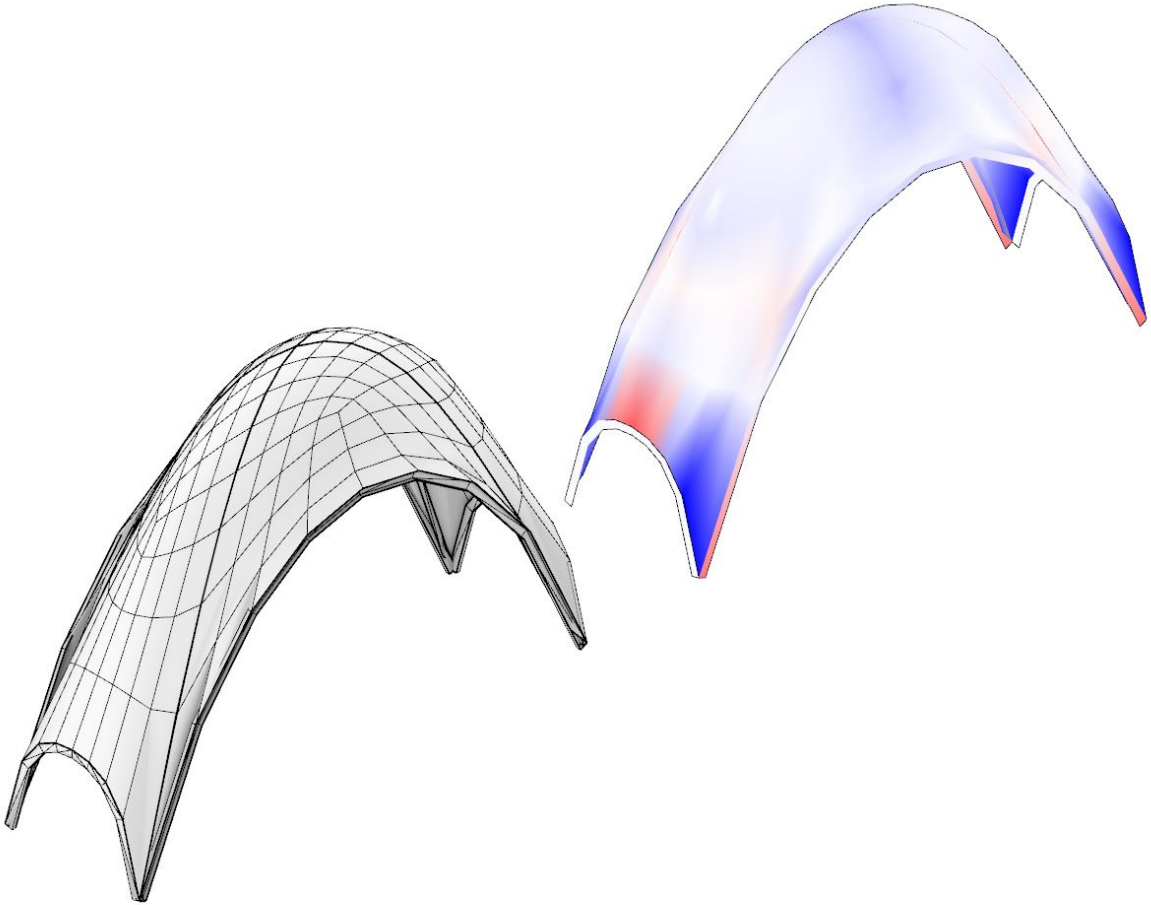




STRUCTURE

Theater roof (20x6x15m)

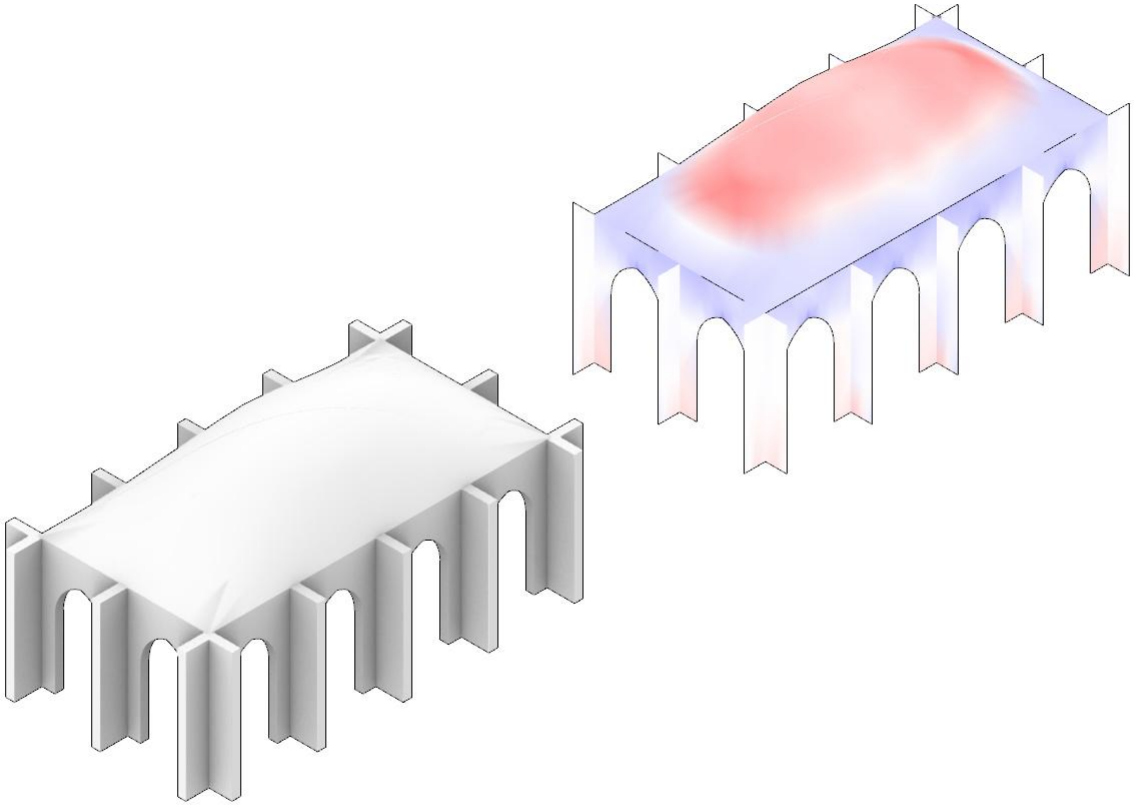
max tension: 0.142MPa
max compression: 0.366 MPa
disp. 2.71 cm
tiles: 6x4cm
ribs: 32x16cm



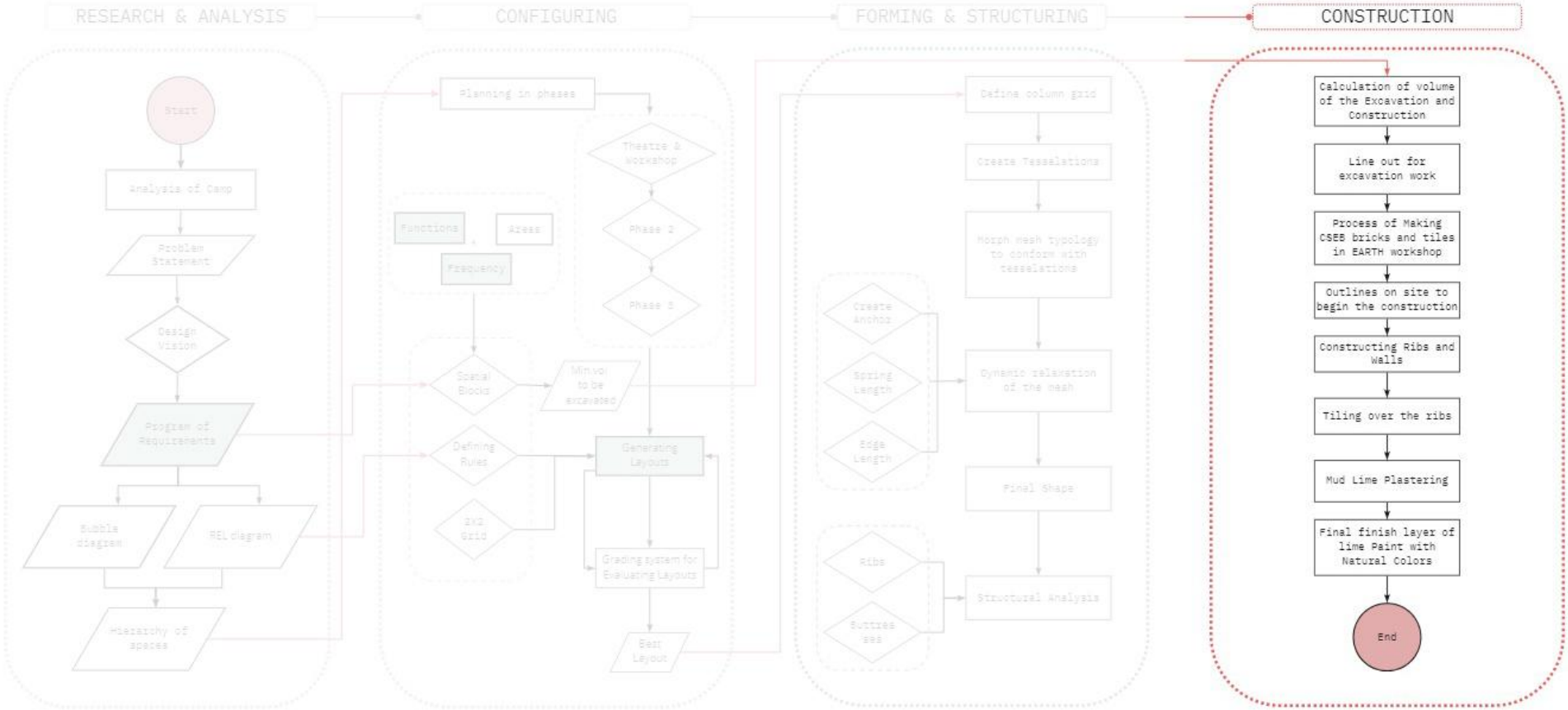
STRUCTURE

Dome on walls (8x4m)

max tension: 0.149 MPa
max compression: 0.304 MPa
disp. 0.93 cm
tiles: 3x4cm
ribs: 32x16cm
Buttresses: 64x32cm

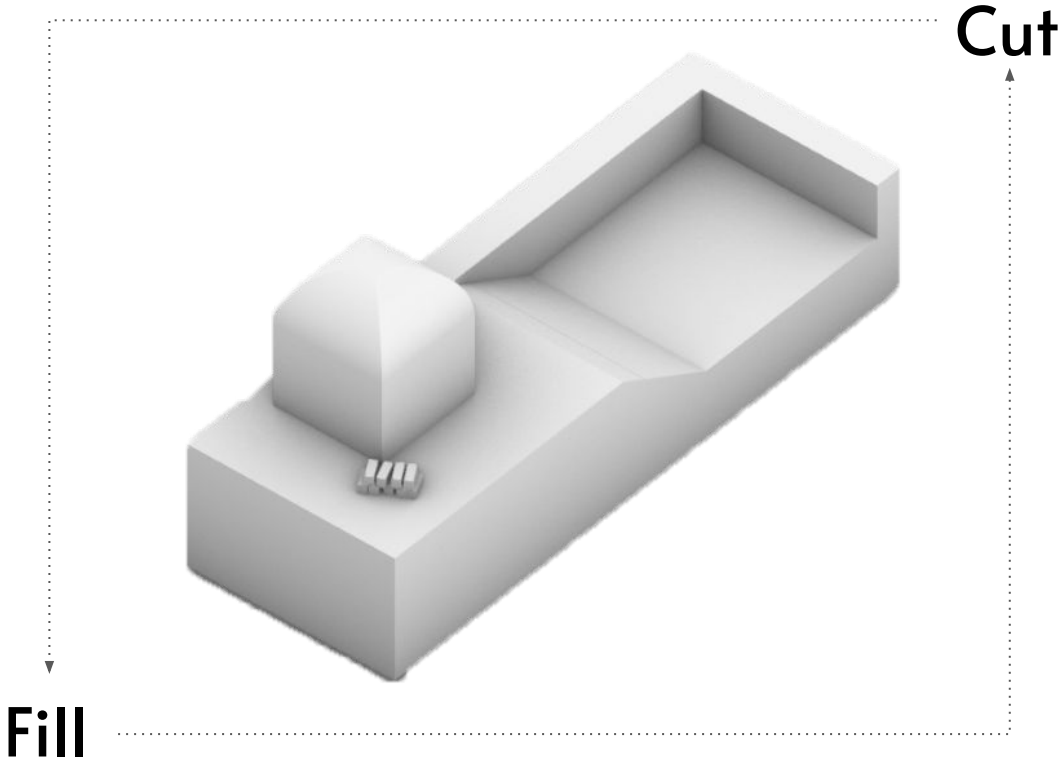


Construction


RESEARCH & ANALYSIS
CONFIGURING
FORMING & STRUCTURING
CONSTRUCTION
Start
Analysis of Camp
Problem Statement
Design Vision
Program of Requirements
Bubble diagram
REL diagram
Hierarchy of spaces
Planning in phases
Theatre & workshop
Phase 2
Phase 3
Functions
Areas
Frequency
Spatial Blocks
Min vol to be excavated
Defining Rules
2x2 Grid
Generating Layouts
Grading system for Evaluating Layouts
Best Layout
Define column grid
Create Tessellations
Morph mesh typology to conform with tessellations
Create Anchor
Spring Length
Edge Length
Dynamic relaxation of the mesh
Final Shape
Ribs
Buttress ses
Structural Analysis
Calculation of volume of the Excavation and Construction
Line out for excavation work
Process of Making CSEB bricks and tiles in EARTH workshop
Outlines on site to begin the construction
Constructing Ribs and Walls
Tiling over the ribs
Mud Lime Plastering
Final finish layer of lime Paint with Natural Colors
End

WORKFLOW

Methodology of the construction



EXCAVATION
//Calculation

Theater Excavation volume

1788 m^3

Relation of Volume of Excavated Soil with Volume of bricks

1.68 m^3 Soil = 1m^3 Bricks

1m^3 Bricks = 244 Bricks

Volume of Anchored Spaces

Walls = 305 m^3 Bricks
Roof = 242 m^3 Bricks

Total = 547 m^3 Bricks

Total soil required = 918 m^3

Making of CSEB Brick

Soil Composition

- Sand = 40%
- Silt = 19%
- Clay = 41%
- Lime = 5% - 7%

→

Grinding and Mixing all the raw materials in Grinder and Mixer.

→

Compressed in a Brick Machine using respective Mould.

→

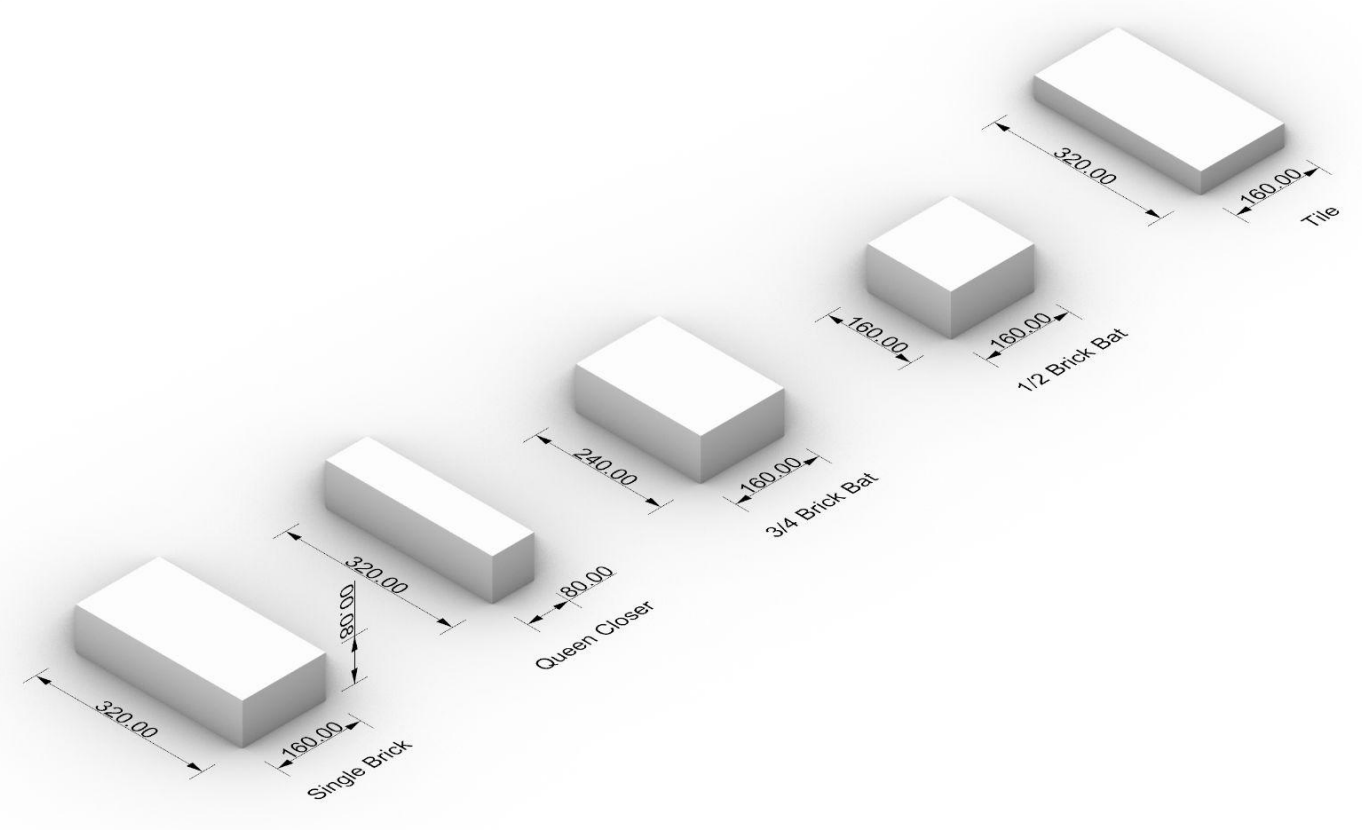
Curing

28 days

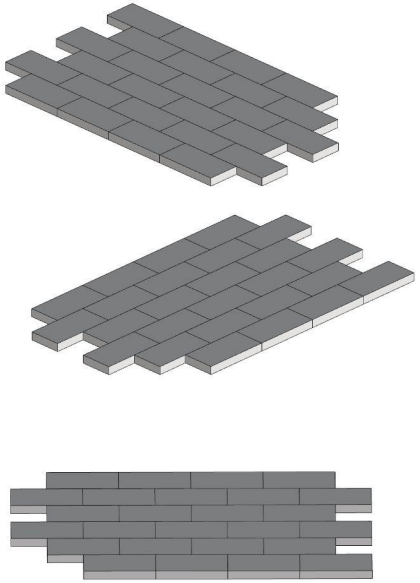
Bricks & Tile Sizes

X = 40mm

- Single Brick = 8X x 4X x 2X
- Queen Closer = 8X x 2X x 2X
- ¾ Brick Bat = 6X x 4X x 2X
- ½ Brick Bat = 4X x 4X x 2X
- Tile = 4X x 8X x X



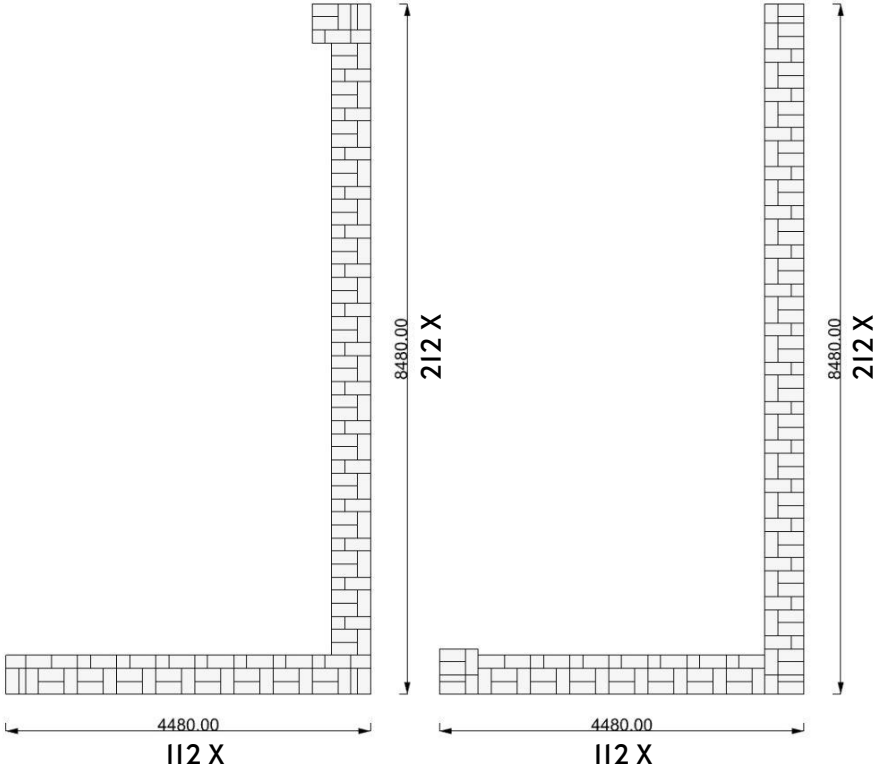
Brick and Tile Pattern



Third Layer at 135°

Second Layer at 45°

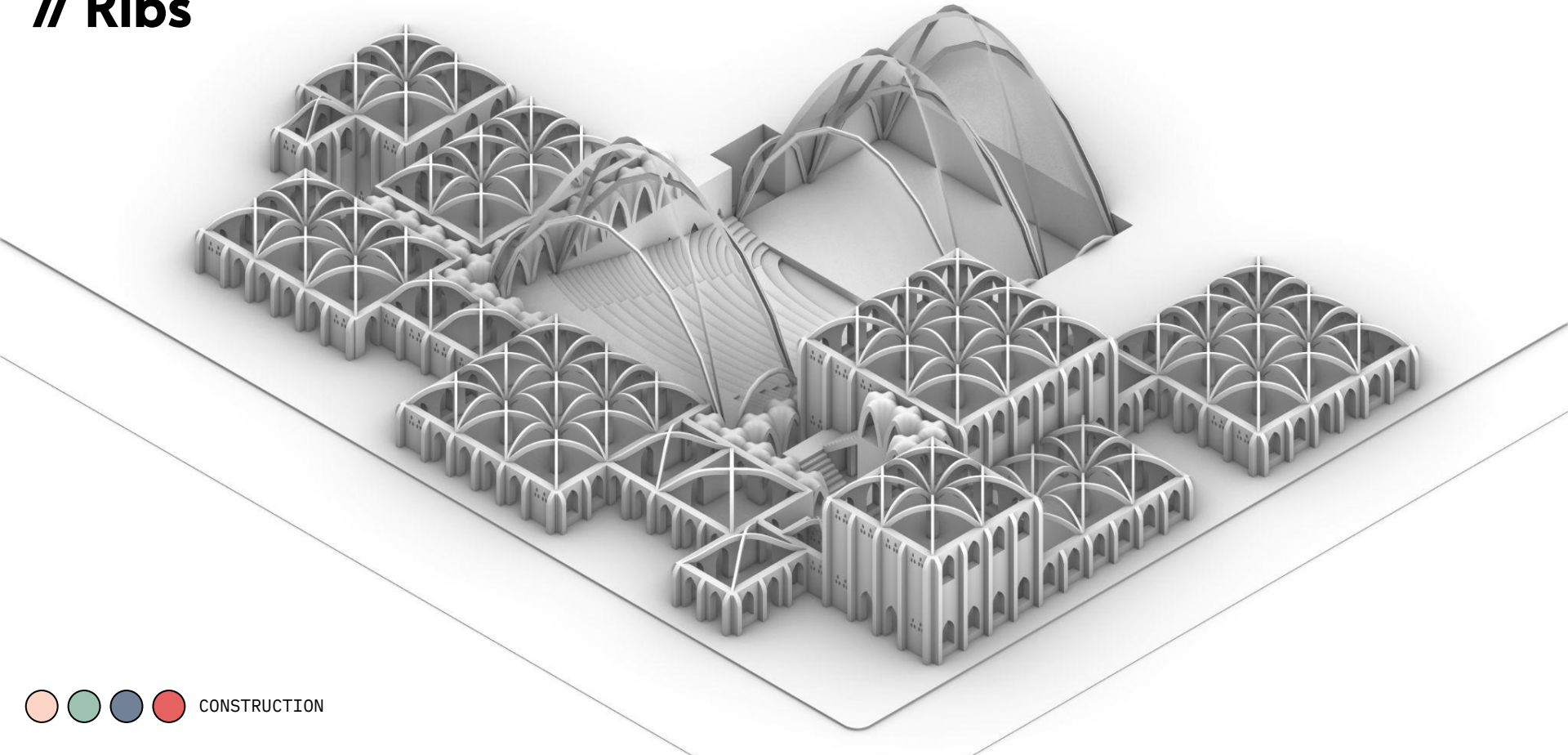
First Layer



Odd Courses

Even Courses

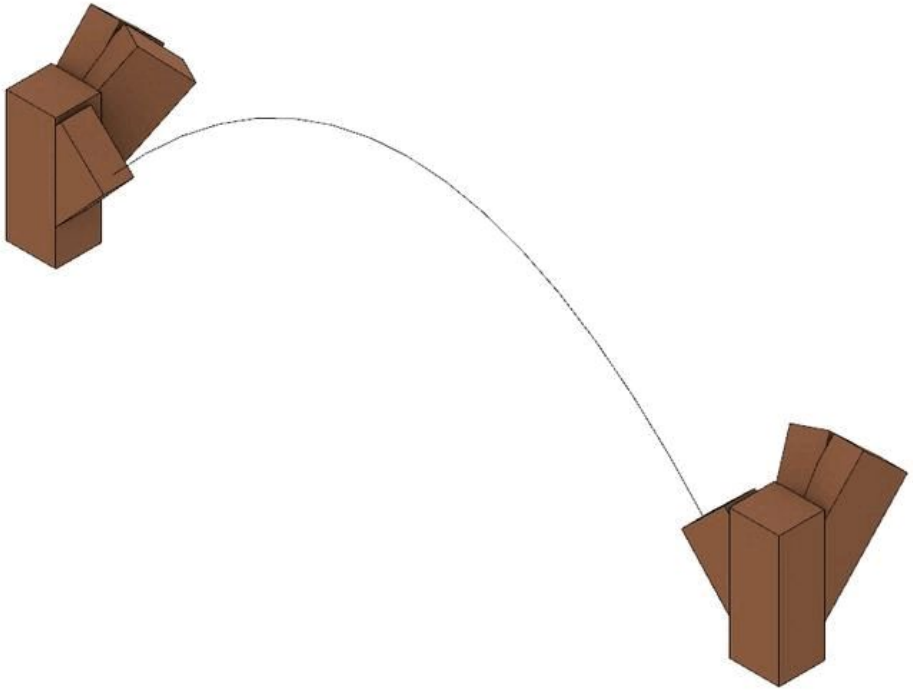
CONSTRUCTION
// Ribs



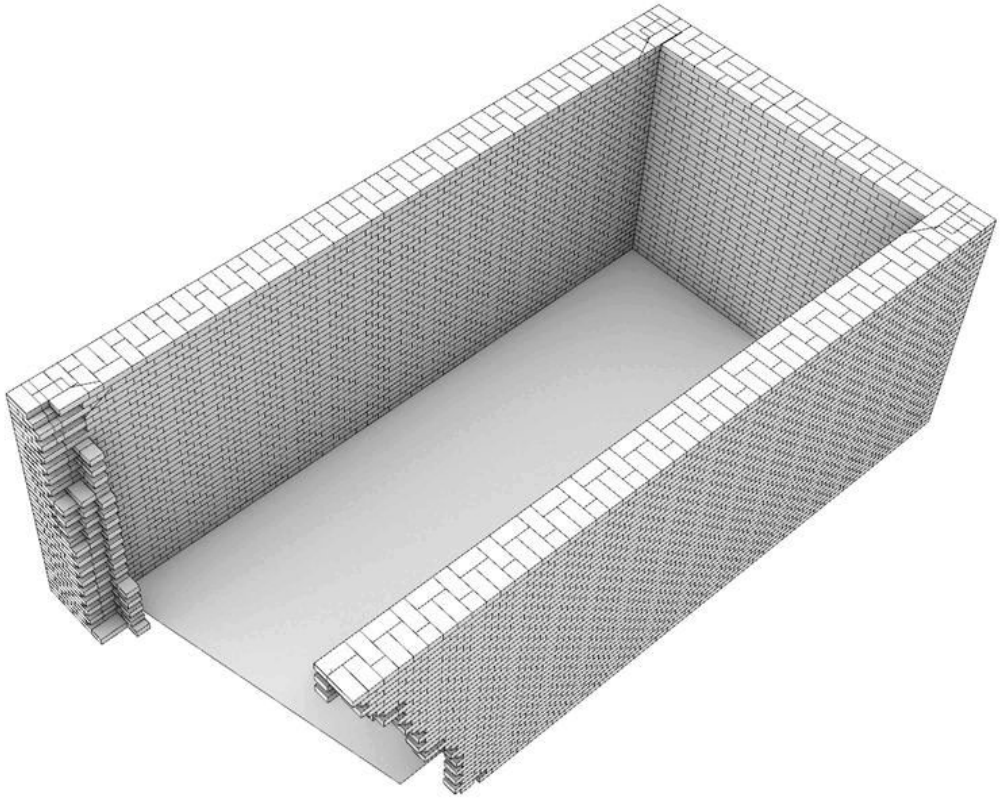
CONSTRUCTION
// Ribs

Working of the Ribs

- Only 2 special blocks
- Build out of bricks and wedges
- Easy building sequence



CONSTRUCTION
// Building sequence



REFLECTION

1. Excavation & possible improvements
2. Construction method
3. Interoperability different scripts
4. Digital Game Interface

‘Through difficult configurations and karamba analysis’

أسئلة

HAPPY TO ANSWER QUESTIONS!