

Cloud Matrix

Midterm Presentation

Earthy 4.0
Group 8

Educational and Skill center

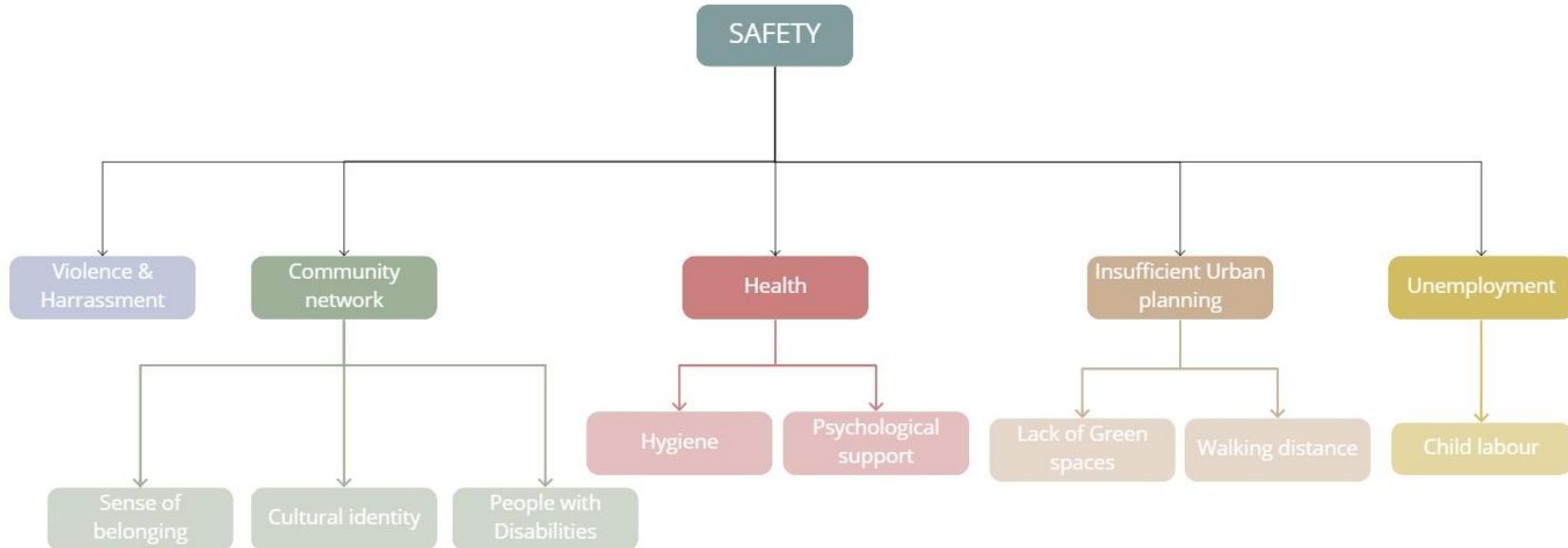
Facts



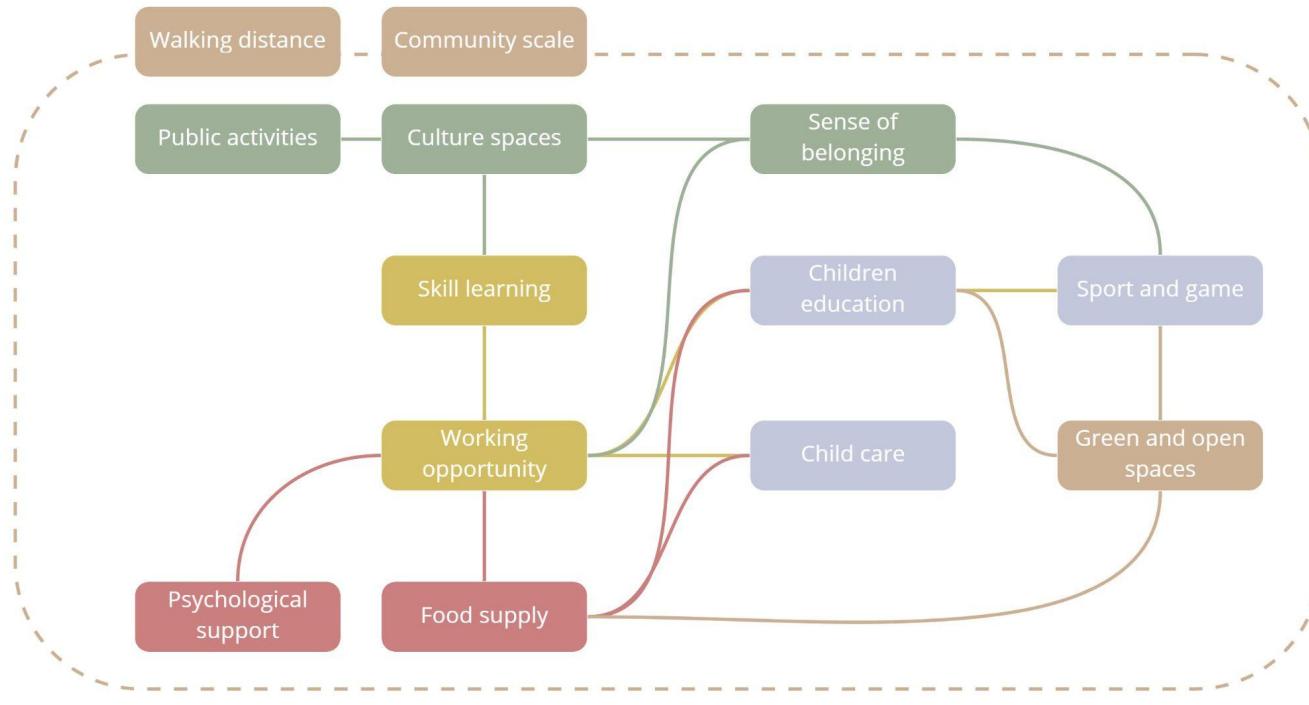
This mural painted by children, reads 'Let's go register for school'.

Source: UNHCR, Jared.J.Kahler

Problem Statement

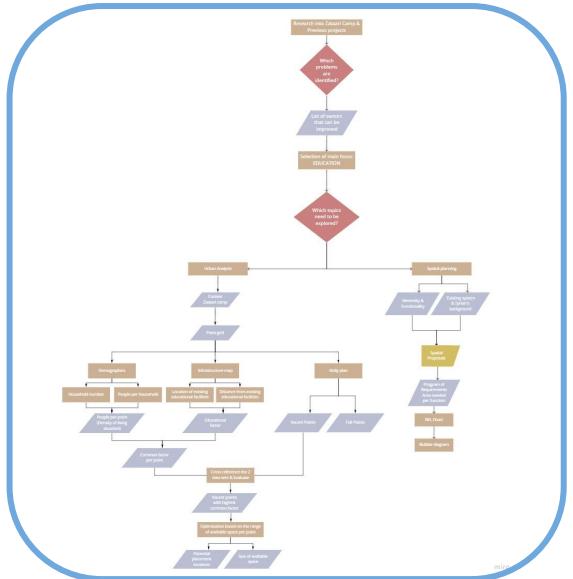


Design Vision



Flowchart

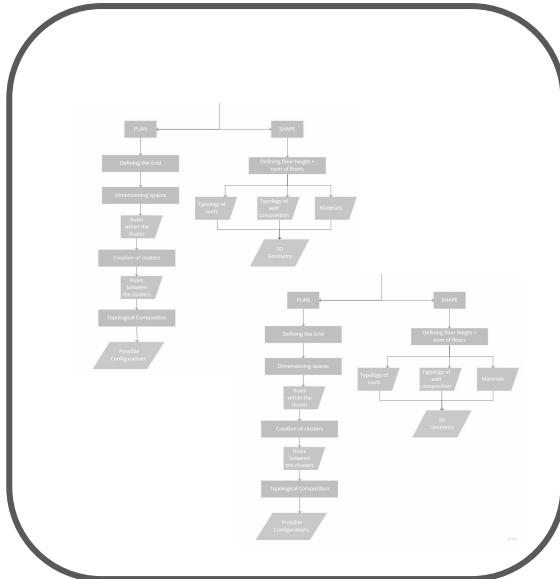
01. Configuring



02. Forming



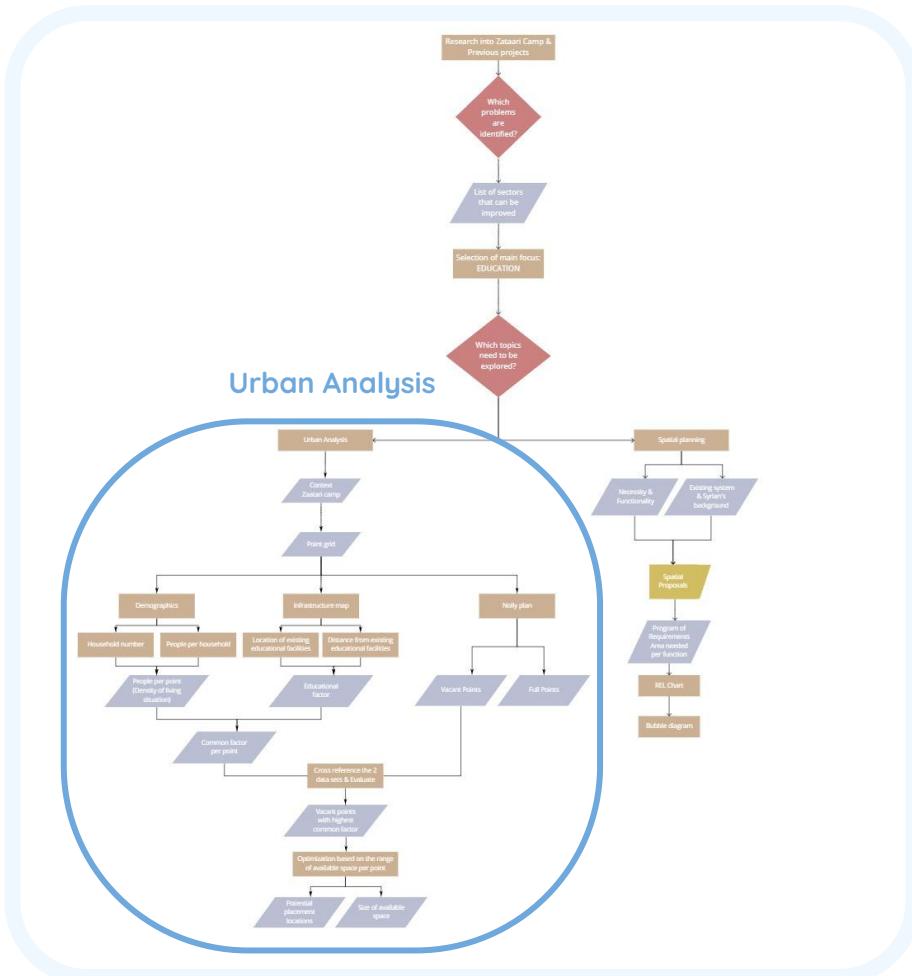
03. Structuring



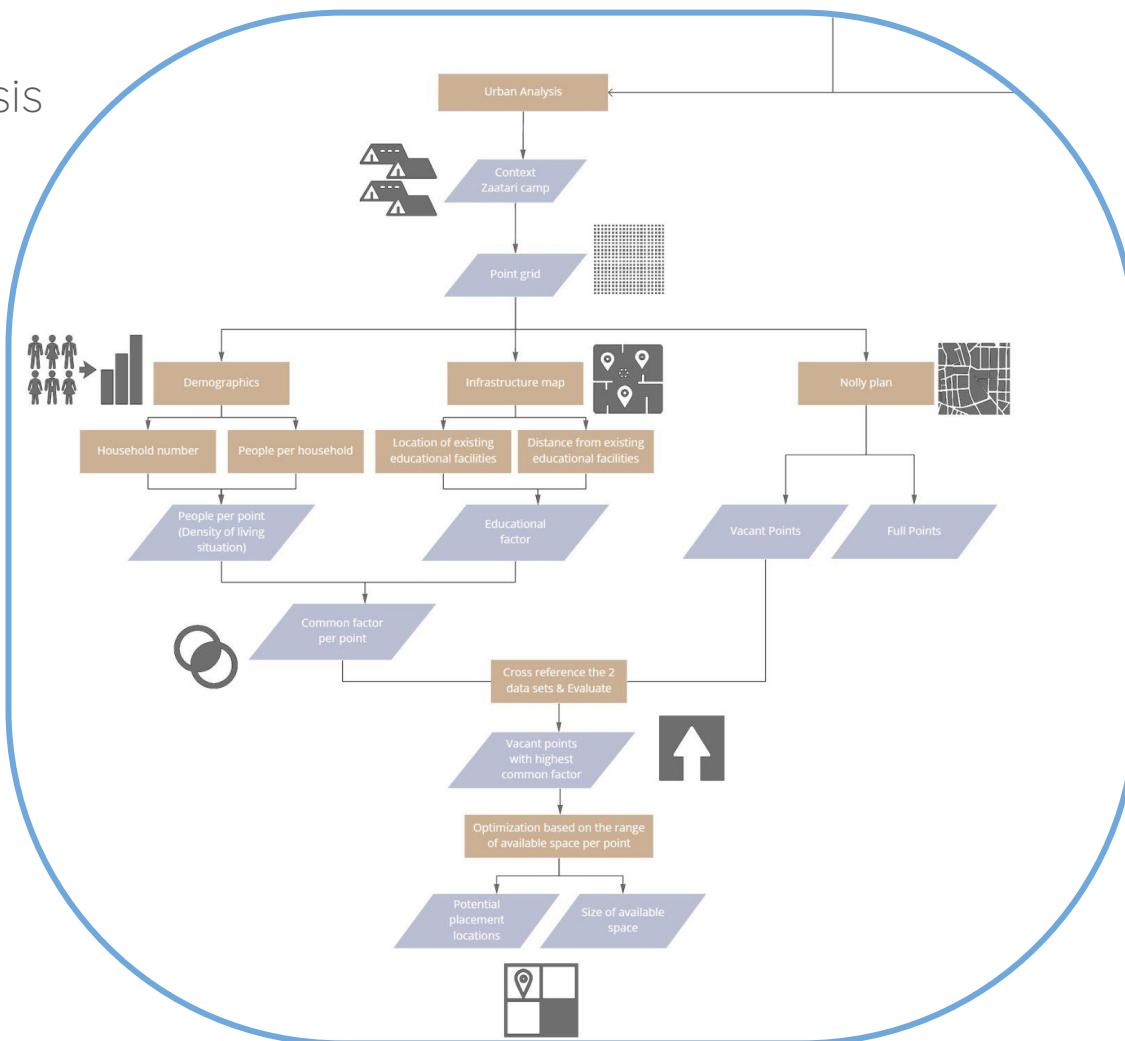
01. Configuring

Flowchart

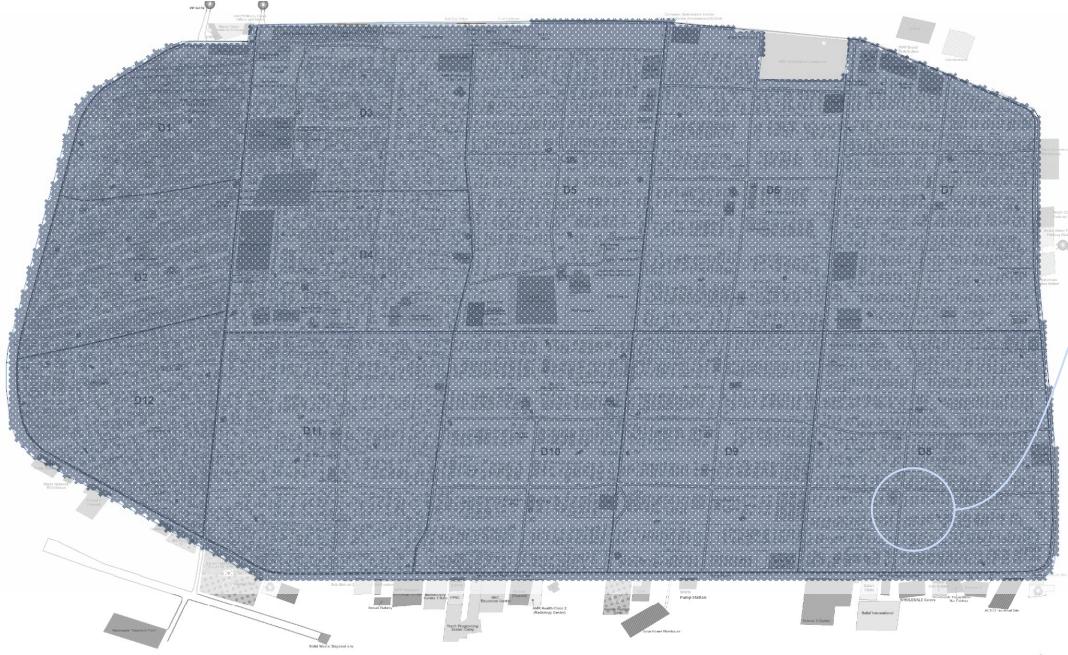
0.1 Configuring



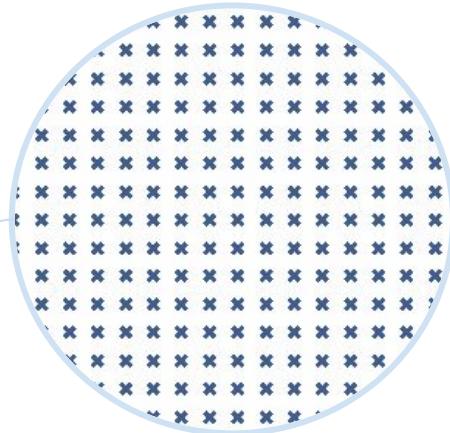
Urban Analysis



Point matrix in camp



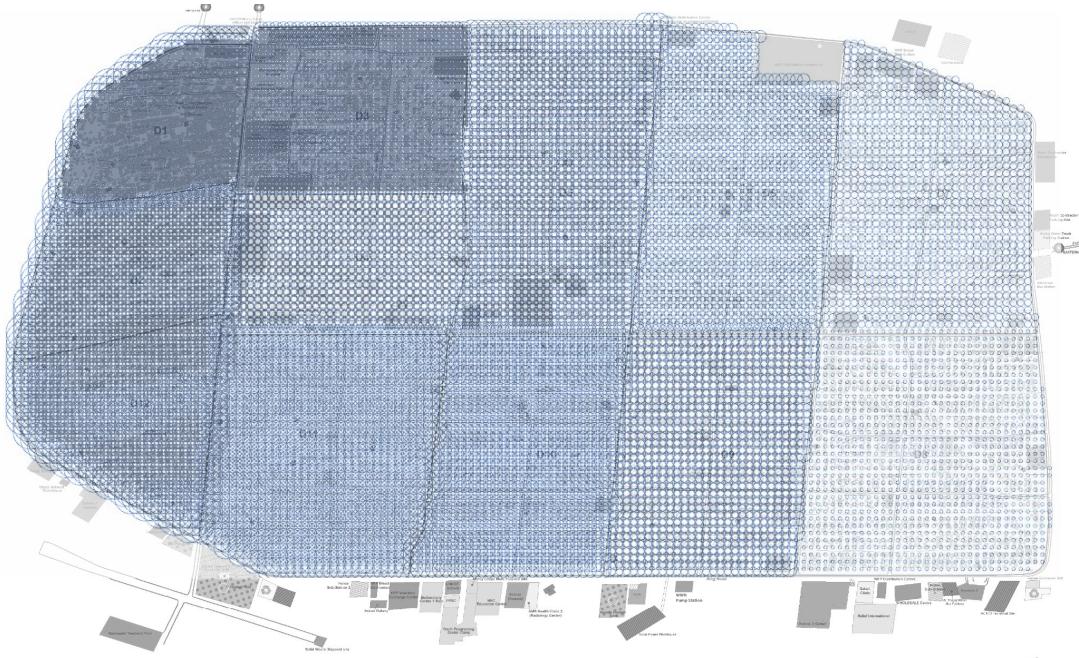
Point matrix = $2^*2\text{ m}^2 = 14548$ points



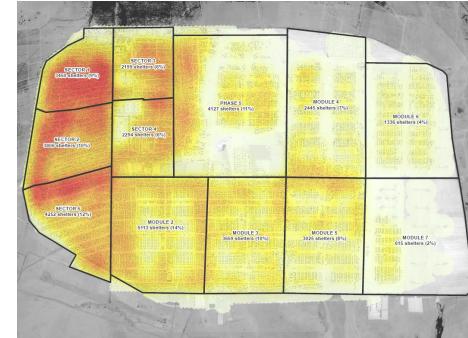
A Point Cloud is used in order to parameterize the process.

Population Factor

A1_Household Number



The darker blue the more people per household.



(source:<https://reliefweb.int/map/jordan/al-zaatari-refugee-camp-shelter-locations-and-shelter-density-31-march-2013>)

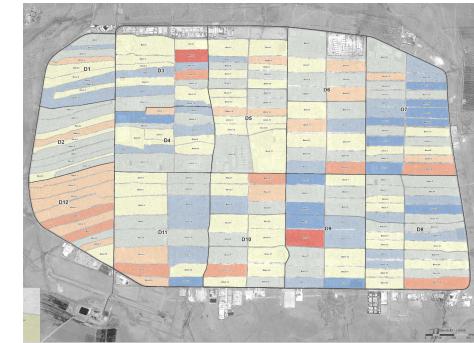
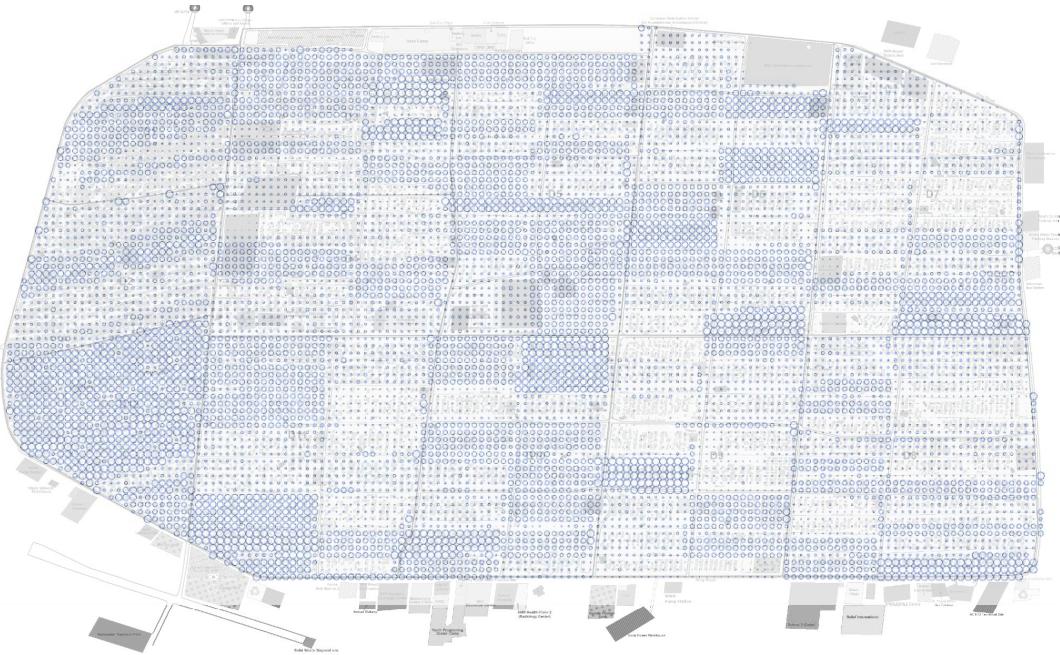
Sex	household	population	age range	percentage
1	3450	18113	0 to 4	-
			5 to 11	-
			12 to 17	-
2	3806	21276	18 to 59	-
			60+	-
			0 to 4	-
3	2199	12466	5 to 11	-
			12 to 17	-
			18 to 59	-
4	2284	12407	60+	-
			0 to 4	-
			5 to 11	-
5	4127	23362	12 to 17	-
			18 to 59	-
			60+	-
6	2445	13643	0 to 4	-
			5 to 11	-
			12 to 17	-
			18 to 59	-
			60+	-
			60+	-

Sector	household	population	age range	people number
7	1336	7114	0 to 4	4
			5 to 11	1530
			12 to 17	1024
			18 to 59	2014
8	615	3375	60+	192
			0 to 4	665
			5 to 11	726
			12 to 17	488
9	3025	16375	18 to 59	1334
			60+	91
			0 to 4	3206
			5 to 11	3495
10	3689	20971	12 to 17	2344
			18 to 59	6673
			60+	430
			0 to 4	4131
11	5113	28409	5 to 11	5209
			12 to 17	3030
			18 to 59	8598
			60+	566
12	4252	25767	0 to 4	5507
			5 to 11	5540
			12 to 17	3710
			18 to 59	10655
			60+	696

Hand Calculation

Population Factor

A2_People number per household



(source:[https://reliefweb.int/map/jordan/al-zaatari-refugee-camp-shelter-locations and shelter density 31 march 2013](https://reliefweb.int/map/jordan/al-zaatari-refugee-camp-shelter-locations-and-shelter-density-31-march-2013))

Sector	household	population	age range	people number
1	3450	18113	0 to 4	3568
			5 to 11	3049
			12 to 17	2608
			18 to 59	7426
			60+	489

Sector	household	population	age range	people number
7	1336	7114	0 to 4	1401
			5 to 11	1534
			12 to 17	1024
			18 to 59	2017
			60+	192

Sector	household	population	age range	people number
2	3806	21276	0 to 4	4191
			5 to 11	4574
			12 to 17	3094
			18 to 59	8723
			60+	574

Sector	household	population	age range	people number
3	2199	12456	0 to 4	2454
			5 to 11	2678
			12 to 17	1794
			18 to 59	5107
			60+	358

Sector	household	population	age range	people number
4	2294	12407	0 to 4	2444
			5 to 11	2667
			12 to 17	1783
			18 to 59	5087
			60+	335

Sector	household	population	age range	people number
5	4127	23362	0 to 4	4603
			5 to 11	4902
			12 to 17	3394
			18 to 59	9579
			60+	631

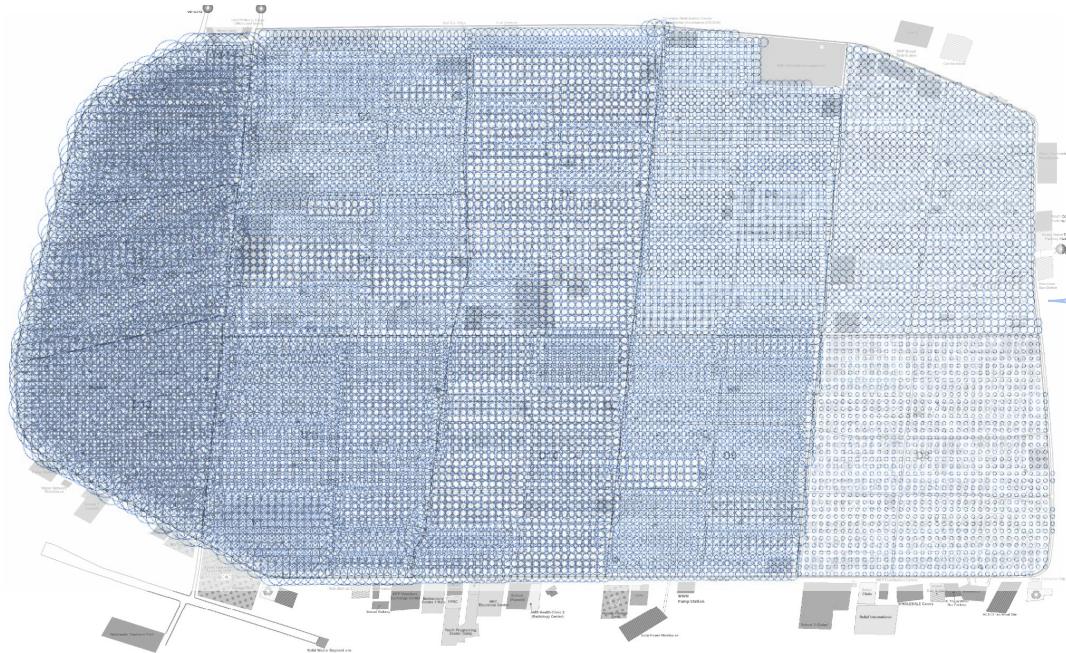
Sector	household	population	age range	people number
6	2445	13645	0 to 4	2688
			5 to 11	2913
			12 to 17	1965
			18 to 59	5594
			60+	358

Sector	household	population	age range	people number
7	3025	16275	0 to 4	4131
			5 to 11	4599
			12 to 17	3244
			18 to 59	6675
			60+	470

Hand Calculation

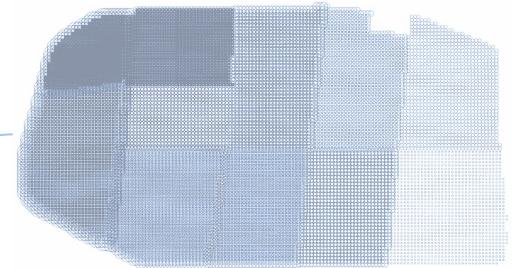
Population Factor (people per 4m²)

$$A = A1 * A2$$

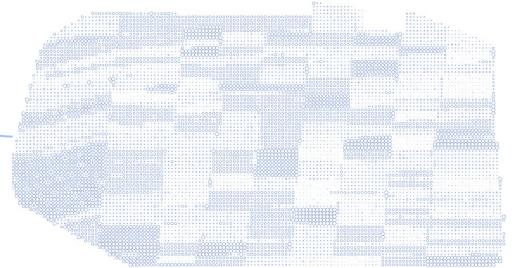


A1

A2

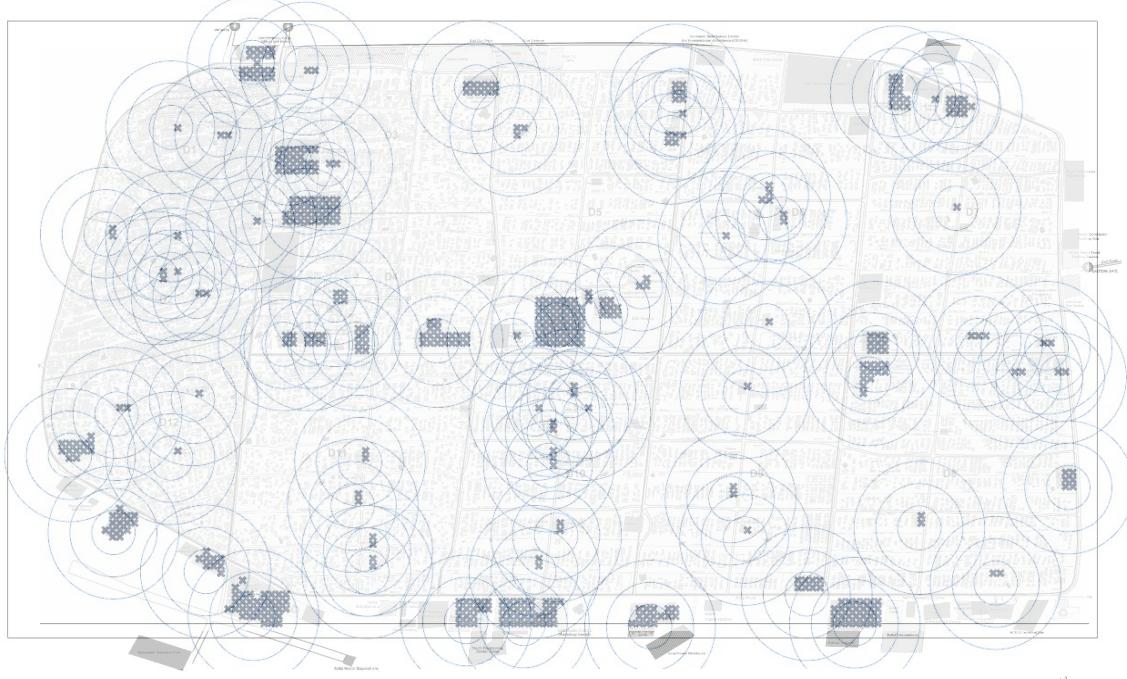


Household number



People number per
household

Educational facilities



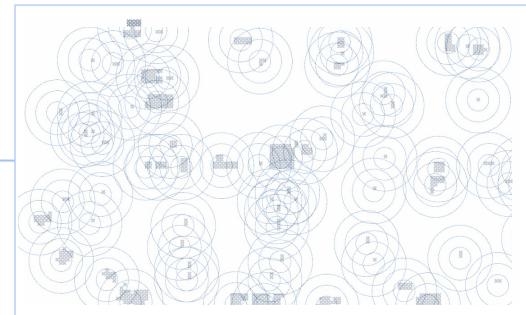
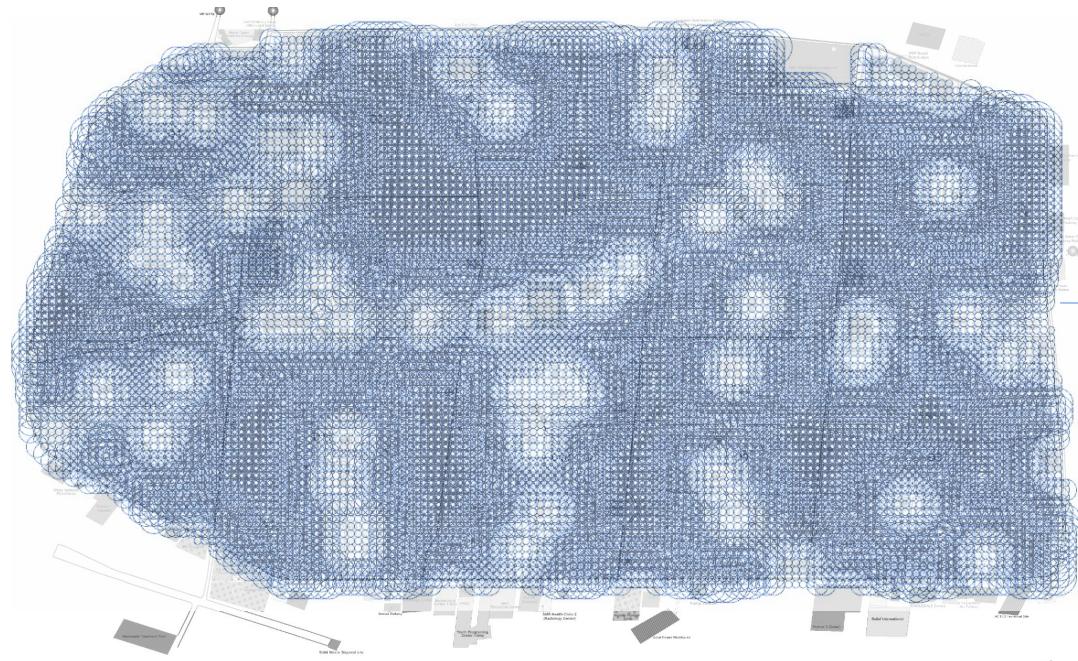
Homocentric circles show the distance from each educational facility.



(source: UNHCR)

Educational factor

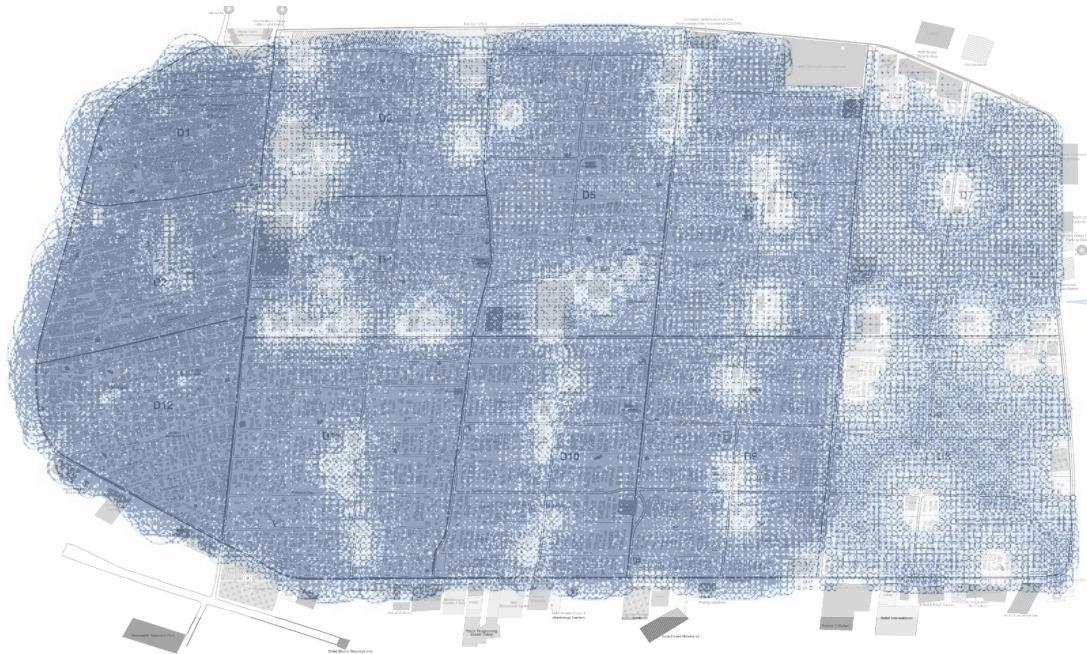
B



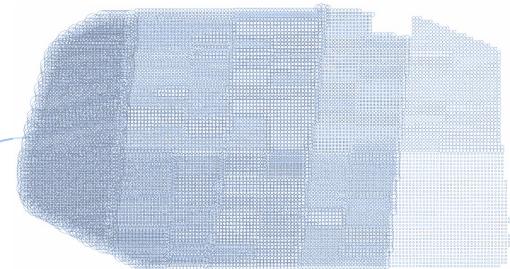
The darker blue the more distant from an educational center.

Common factor

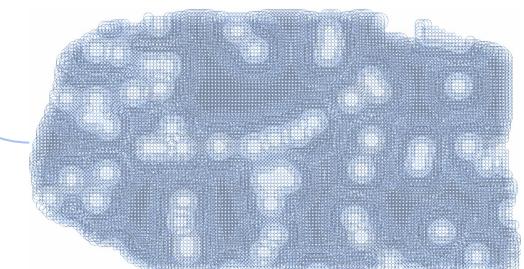
$$C = A * B$$



A



B



Educational factor

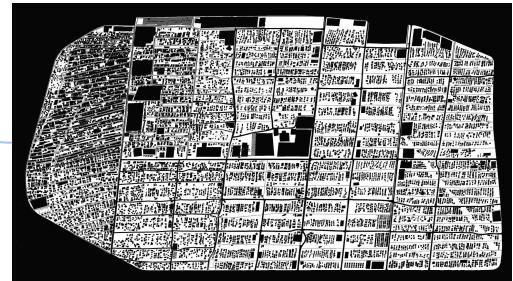
By cross referencing A and B, the darker blue the higher density and the longer distance from an educational center.

Highest Factor Points



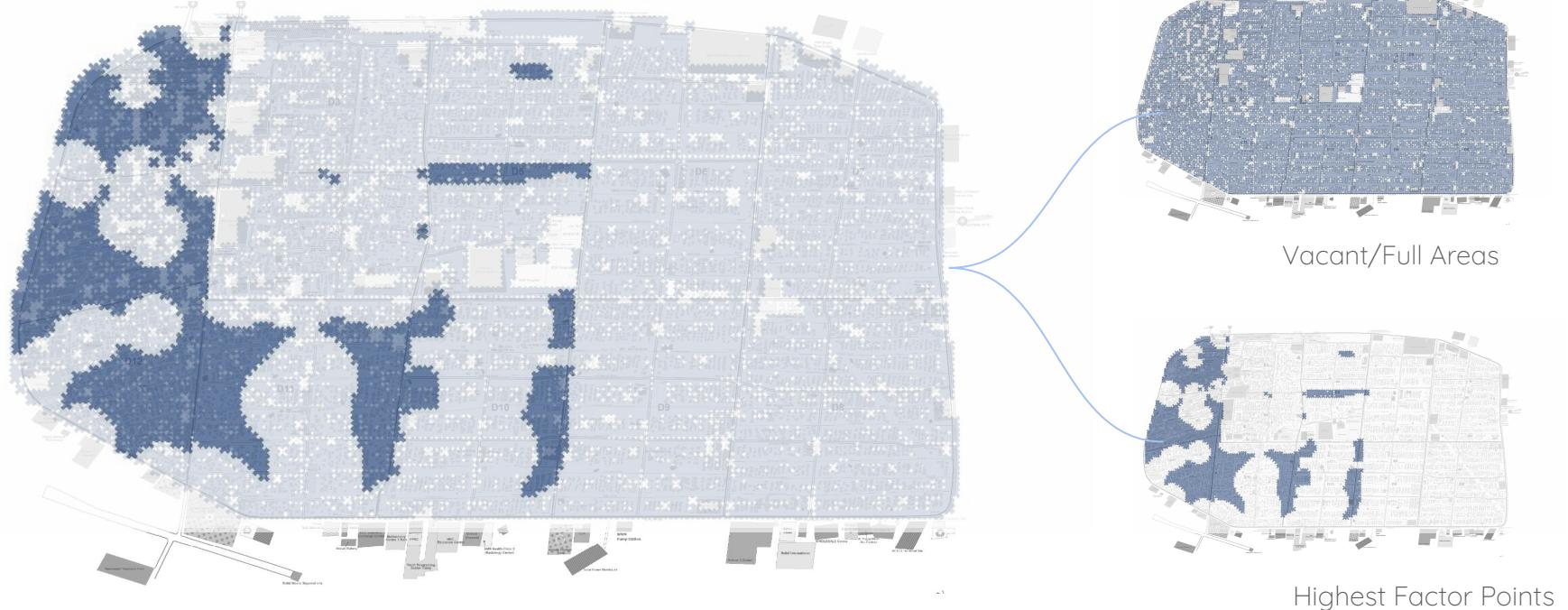
We choose 2000 points with the highest values in order to find the most urgent area that has high population and a long distance from an educational center.

Vacant space



The vacant space is necessary to be found in order to evaluate if in the previous most urgent areas we have enough space to accommodate the selected program.

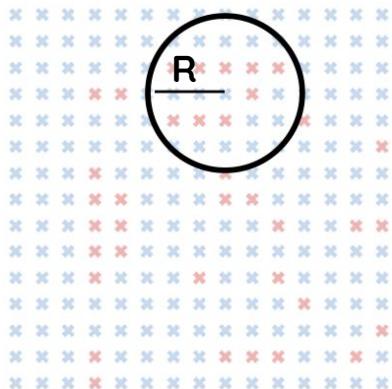
Cross Referencing Highest Factor Points and Vacant Spaces



By linking these we have as a result full and vacant point the the areas with the most urgent need for educational center.

Potential placement locations methodology

Goal: Identify if the vacant space is continuous or scattered for a specific surface.

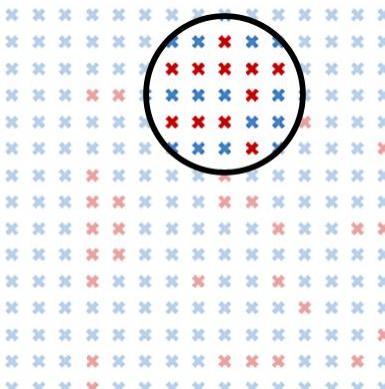
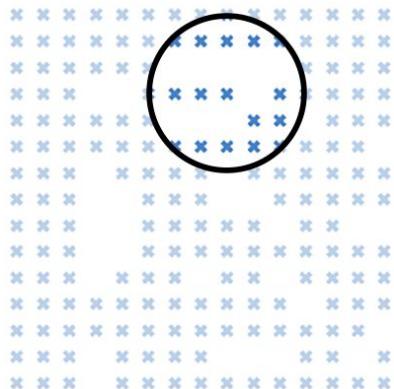


Step1:

Define the surface based on a radius.

Step2:

Number of vacant points in the circle / Total points in the circle

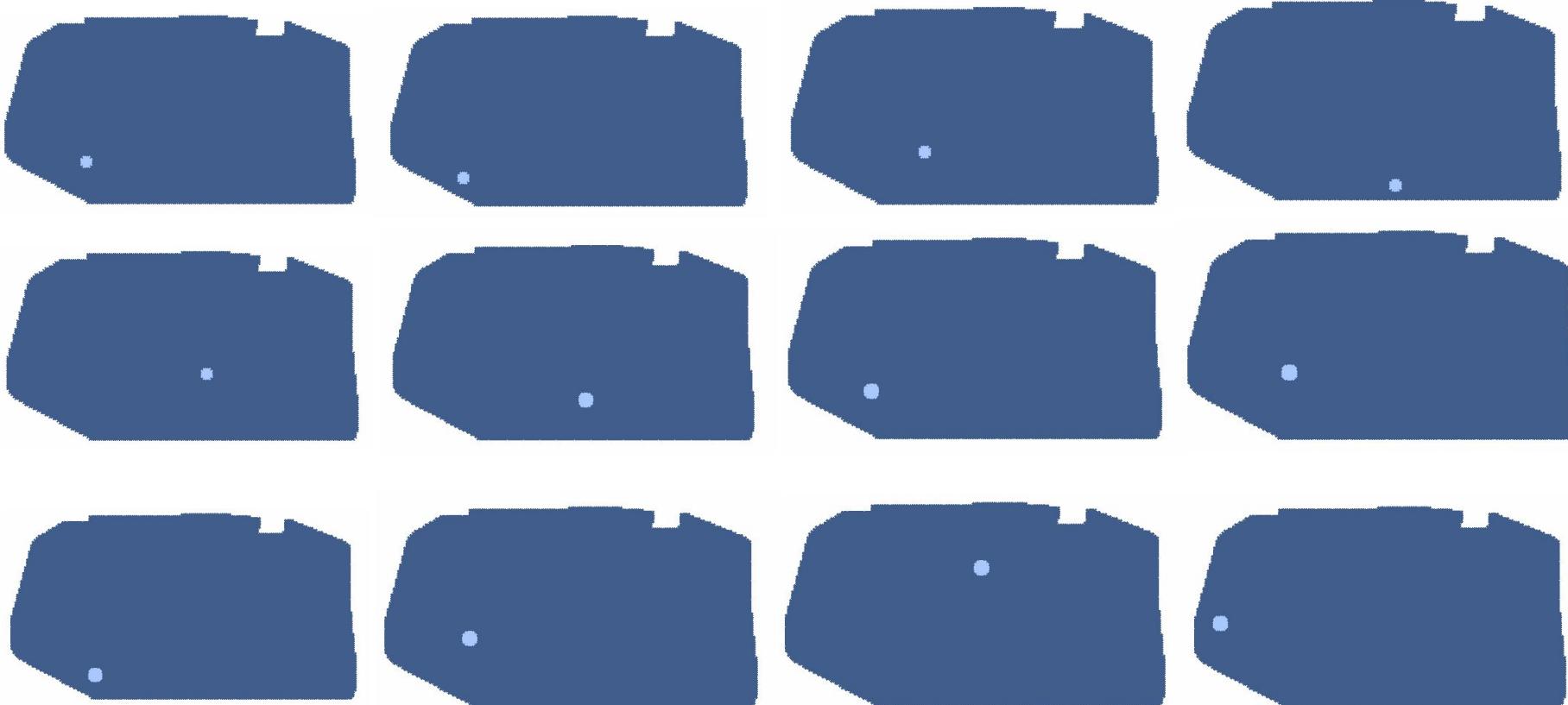


$$= \%$$

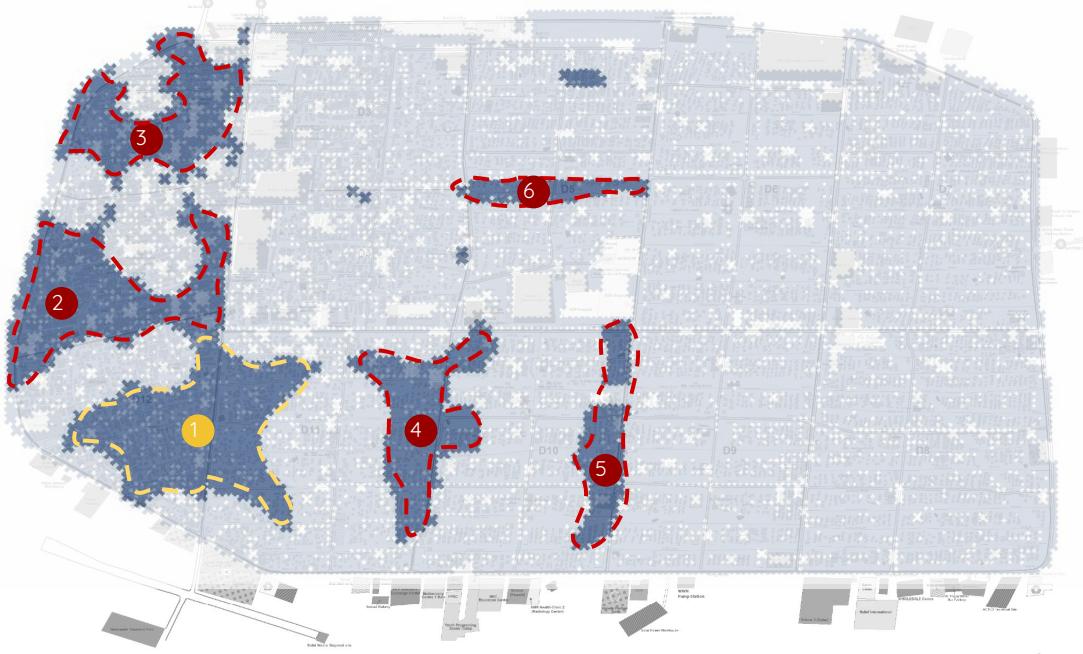
Step3:

Vacant space factor

Potential placement locations



Final Building Location

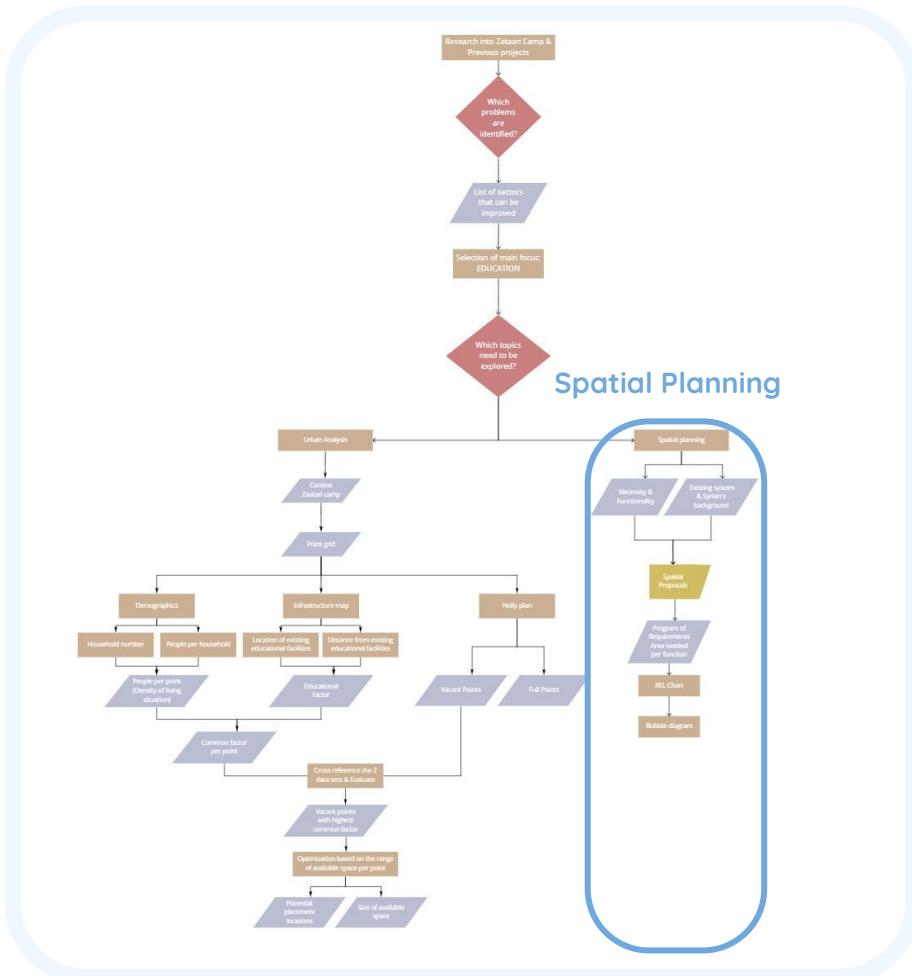


- Identifying six areas with biggest needs.
- Placing one educational center in each of them in order to create a network.
- Starting with the largest area because it corresponds to highest population with no access to education.

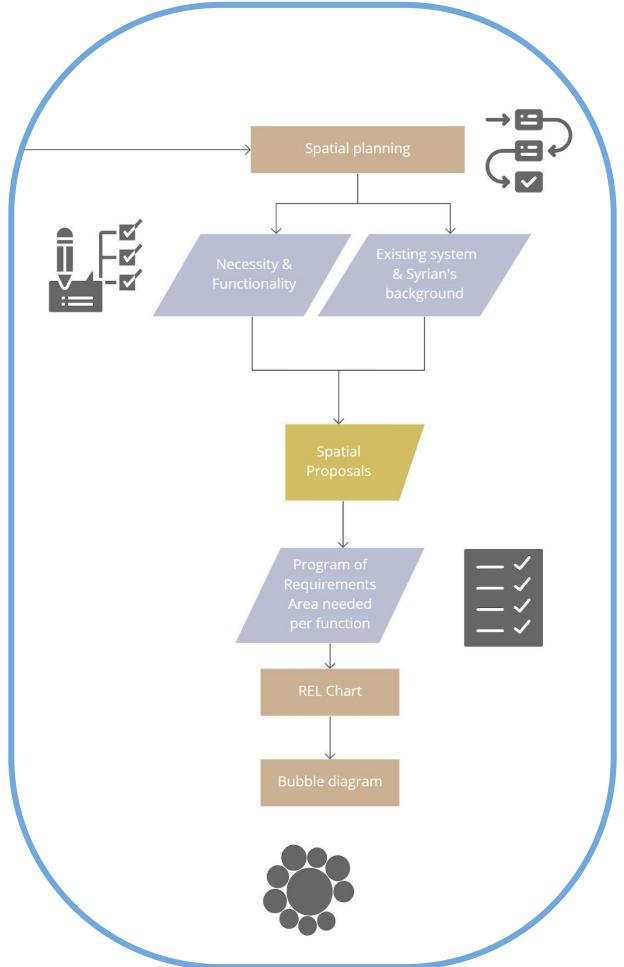
01. Configuring

Flowchart

0.1 Configuring



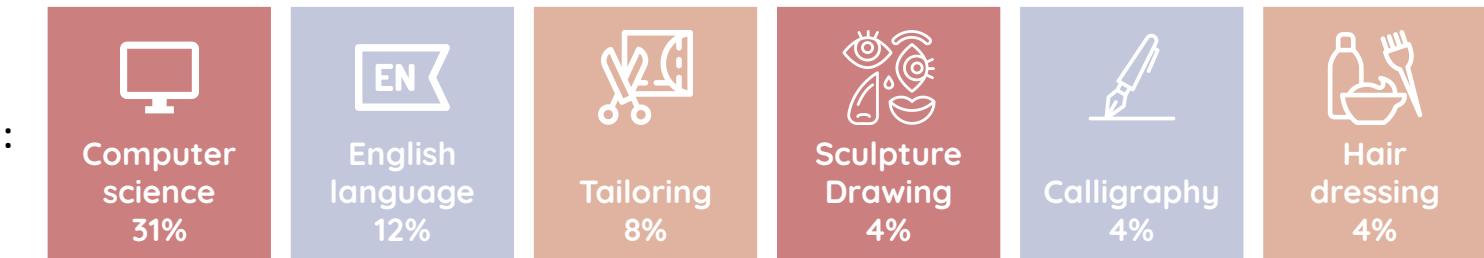
Spatial planning



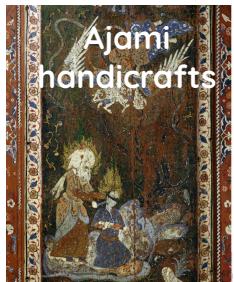
Research

Most preferred skills to acquire

(source : Evaluating a vocational training programme for women refugees at the Zaatari camp in Jordan: women empowerment: a journey and not an output, Sinaria Abdel Jabbar & Haidar Ibrahim Zaza, 2016)

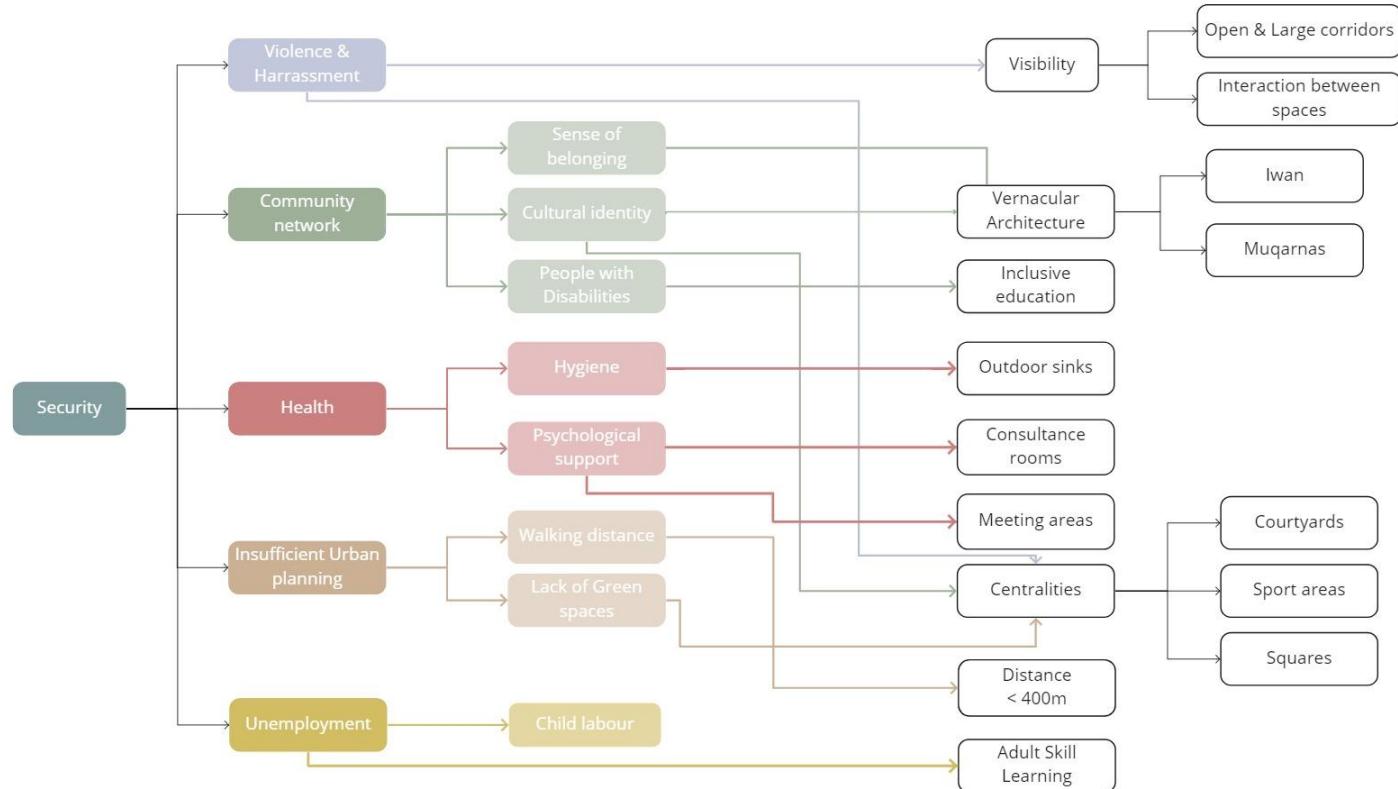


Syrian tradition

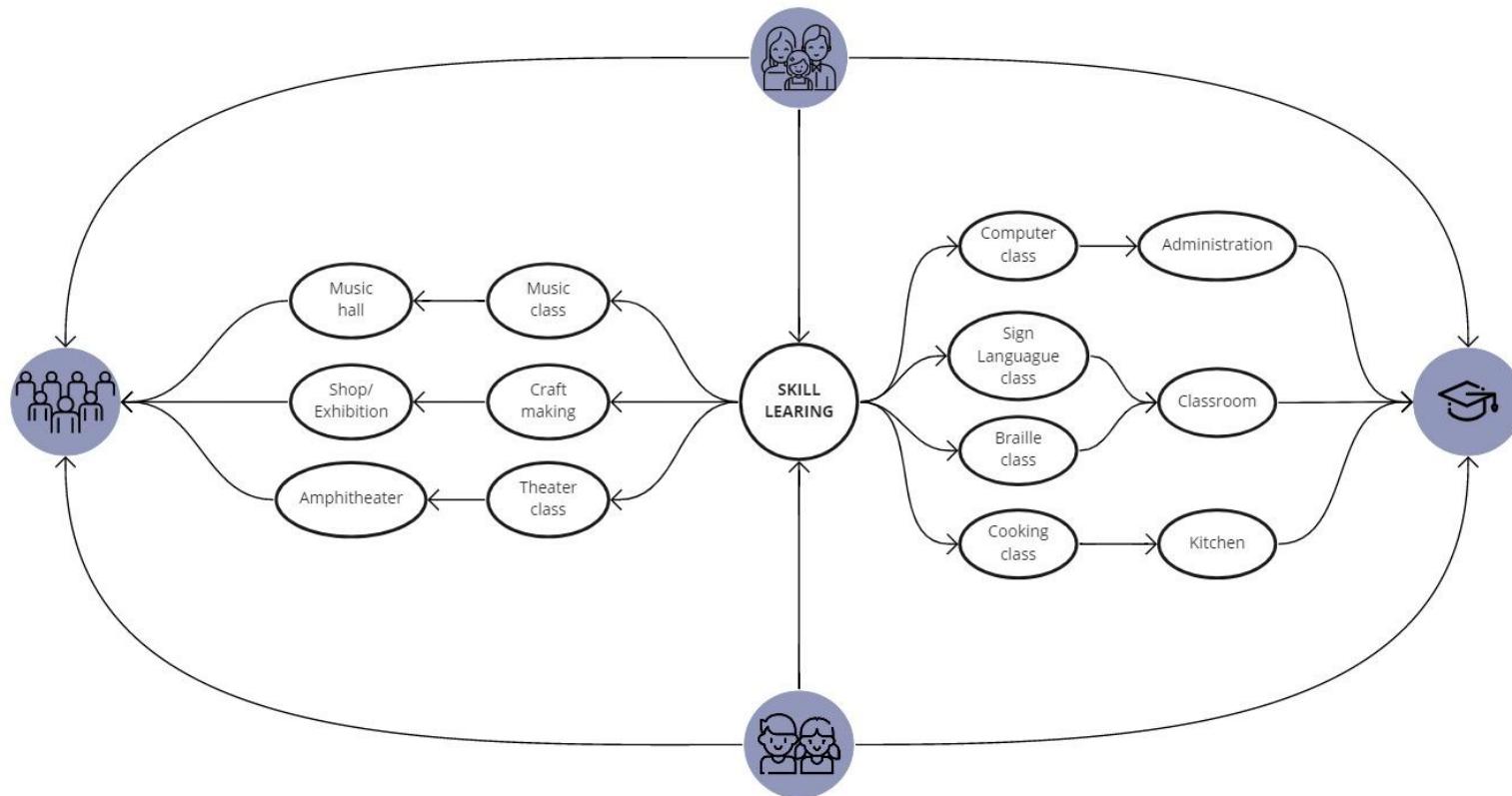


Sources: <https://syrian-heritage.org/grandmasters-of-the-ajami-craft/>
<https://syrian-heritage.org/the-threads-of-life-syrian-textile-ornamentation/>
<https://syrian-heritage.org/the-soul-of-ajami-interview-with-ziad-baydoun/>

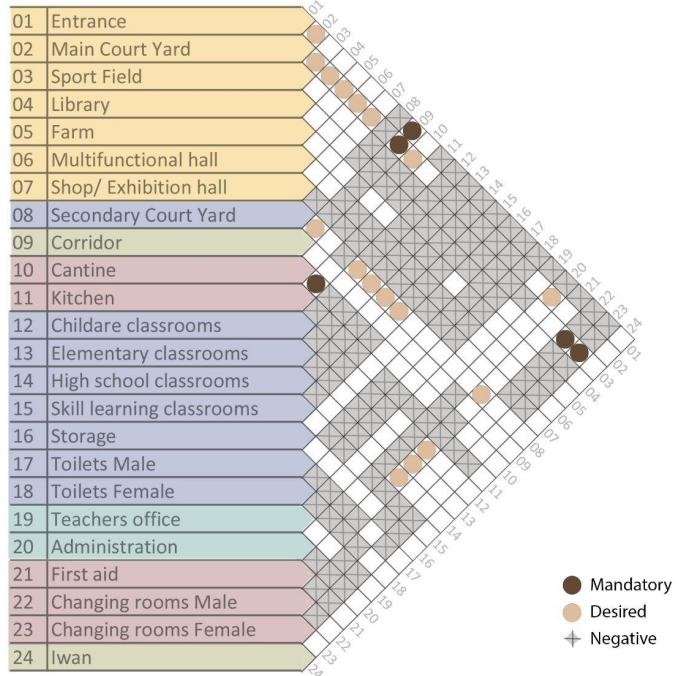
Spatial Proposals



Relation / social/ function / connection



Program of requirements

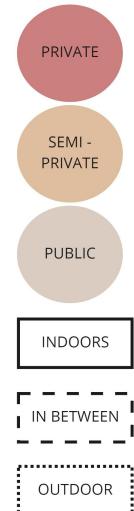
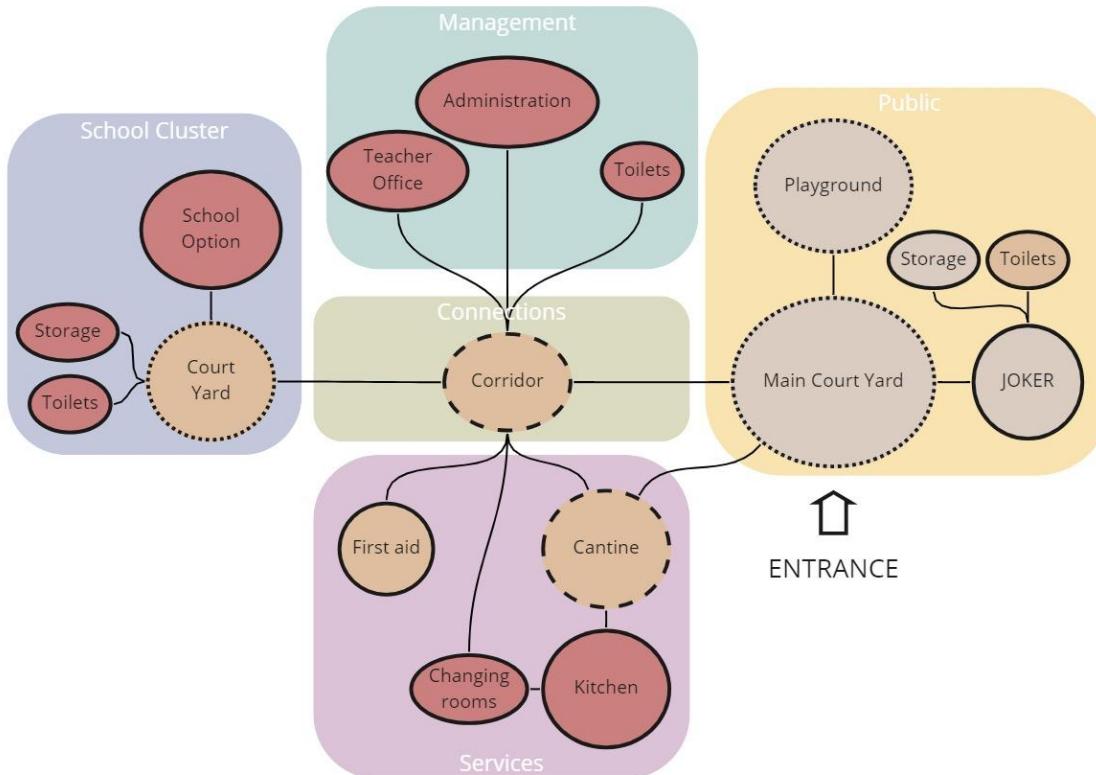


REL chart

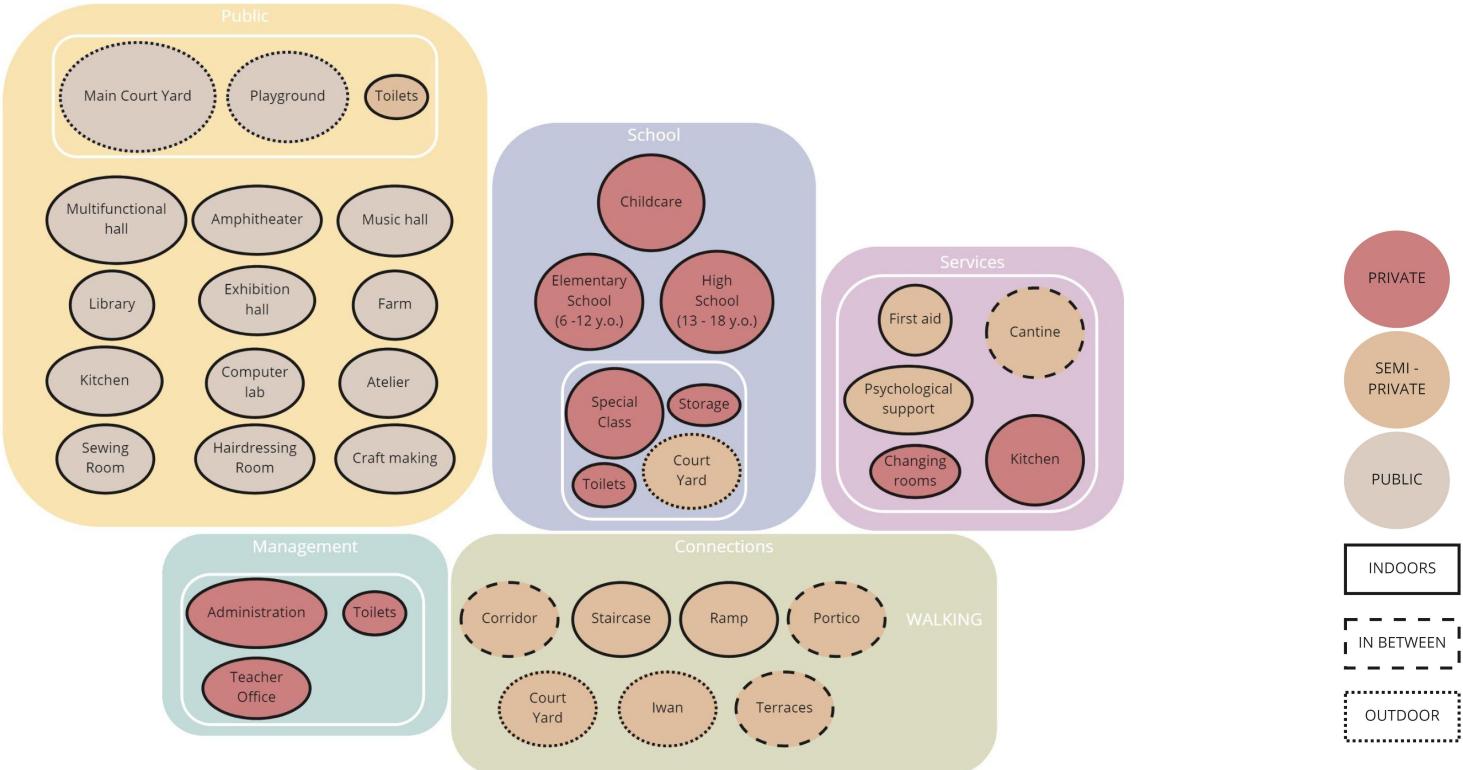
Sources: <https://neu.org.uk/advice/space-requirements-classrooms>
<https://www.playfinder.com/blog/football-pitch-size>
https://en.wikipedia.org/wiki/Basketball_court
<https://www.nsw.gov.au/covid-19/rules/changes/square-metres-rules>
https://www.engineeringtoolbox.com/number-persons-buildings-d_118.html

	FUNCTION	LEVEL OF PRIVACY	INDOOR - OUTDOORS	AREA (m2)	NUMBER OF PEOPLE	HEIGHT REQUIREMENT	QUANTITY OF ROOMS	DAYLIGHT (LUX)
	Main Court Yard	PUBLIC	OUTDOORS	128 m2	80 people	-	1	-
	Playground	PUBLIC	OUTDOORS	64 m2	40 pupils	-	1	-
	Kitchen	PUBLIC	INDOORS	64 m2	7 staff	2,7 m	1	-
	Library	PUBLIC	INDOORS	min. of 149 m2 and a max. of 372 m2	30-80 pupils	2,7 m	-	200 (book area) / 500 (reading area)
	Farm	PUBLIC	OUTDOORS	64 m2	32 pupils	-	-	-
	Multifunctional hall	PUBLIC	INDOORS	one multipurpose space of 93 m2	for each 100 pupils	4,0 m	-	300
	Computer lab	PUBLIC	INDOORS	48 m2	20 pupils each	2,7 m	-	150
	Atelier	PUBLIC	INDOORS	48 m2	20 pupils each	2,7 m	-	300
	Music hall	PUBLIC	INDOORS	96 m2	for each 100 pupils	4,0 m	-	200
	Amphitheater	PUBLIC	INDOORS	128 m2	for each 130 pupils	4,0 m	-	-
	Sewing room	PUBLIC	INDOORS	48 m2	20 pupils each	2,7 m	-	-
	Hairdressing room	PUBLIC	INDOORS	48 m2	20 pupils each	2,7 m	-	-
	Art Class	PUBLIC	INDOORS	83 m2 per classroom	20 pupils each	2,7 m	-	300-500
	Craft Making	PUBLIC	INDOORS	48 m2	20 pupils each	2,7 m	-	300-500
	Shop/ Exhibition hall	PUBLIC	INDOORS	64 m2	30 people	4,0 m	1	200
	Toilets	SEMI-PRIVATE	INDOORS	4 m2 per toilet	15 pupils	2,7 m	2	150
	Corridor	SEMI-PRIVATE	IN BETWEEN	25% of the total net area	-	2,7 m	1-2	-
	Canteen	SEMI-PRIVATE	IN BETWEEN	32 m2	20 pupils	2,7 m	1-2	200
	Changing rooms (M & F)	PRIVATE	INDOORS	15 - 20 m2	10 pupils	2,7 m	1-2	150
	First Aid	PRIVATE	INDOORS	10 m2	5 pupils	2,7 m	1-2	200
	Psychological support	PRIVATE	INDOORS	32 m2	2 staff & 4 pupils	2,7 m	1	-
	Court Yard	SEMI-PRIVATE	OUTDOORS	64 m2	40 people	-	1-2	-
	CLASSROOMS: Childcare	PRIVATE	INDOORS	20 m2 per classroom	20 pupils each	2,7 m	6	300-500
	CLASSROOMS: Elementary or High school	PRIVATE	INDOORS	40 m2 per classroom	20 pupils each	2,7 m	6	300-500
	Special class	PRIVATE	INDOORS	20 m2 per classroom	10 pupils each	2,7 m	1	300-500
	Storage	PRIVATE	INDOORS	20 m2	-	2,7 m	2-4	-
	Toilets (M & F)	PRIVATE	INDOORS	4 m2 per toilet	1 for every 20 pupils 1 for every 25 staff	2,7 m	2-4	150
	Teachers Office	PRIVATE	INDOORS	around 15m2	min. of 14 m2 of space per adult	2,7 m	1-2	500
	Administration	PRIVATE	INDOORS	16 m2	4 staff	2,7 m	1	500
	Toilets (M & F)	PRIVATE	INDOORS	4 m2 per toilet	1 for every 20 pupils 1 for every 25 staff	2,7 m	2-4	150

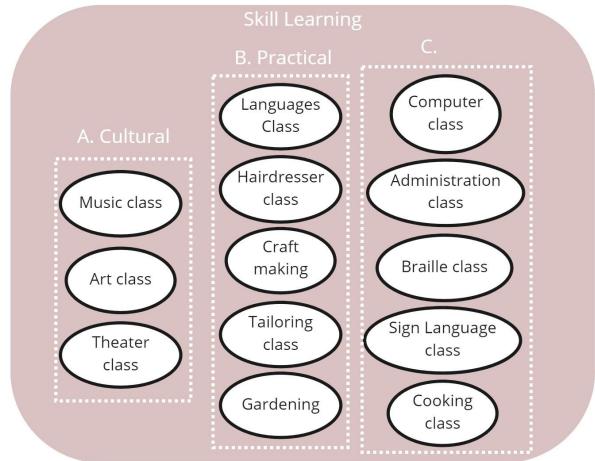
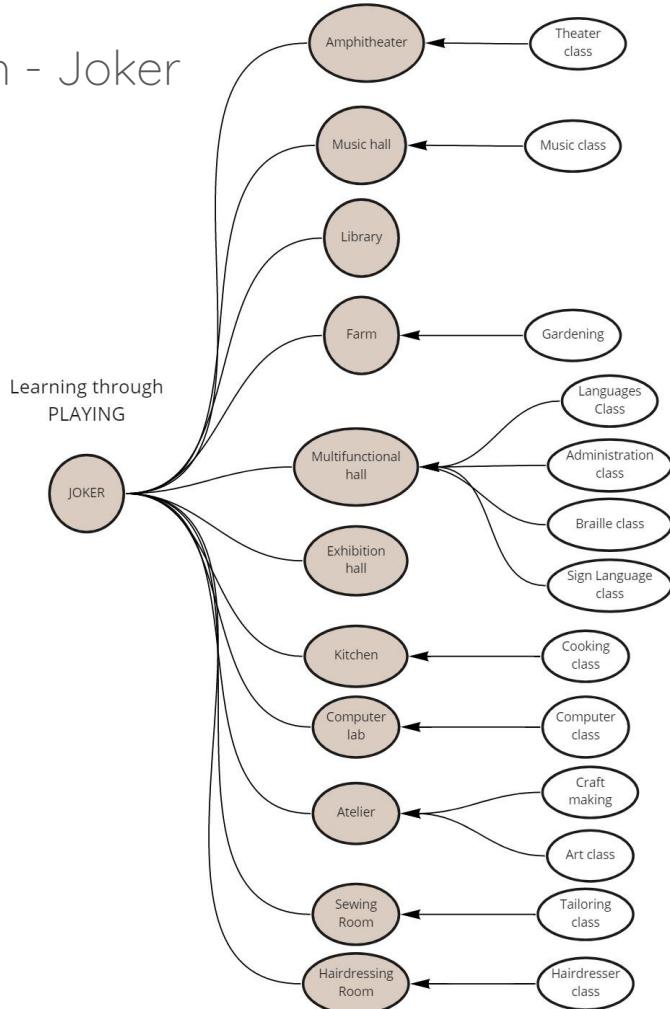
Bubble diagram



Bubble diagram - Clusters

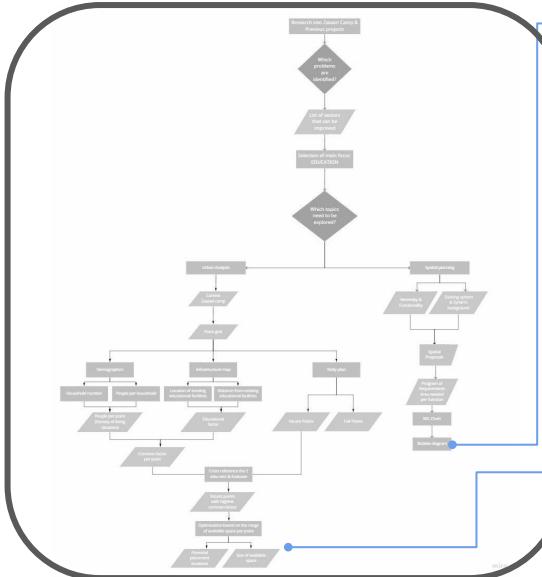


Bubble diagram - Joker

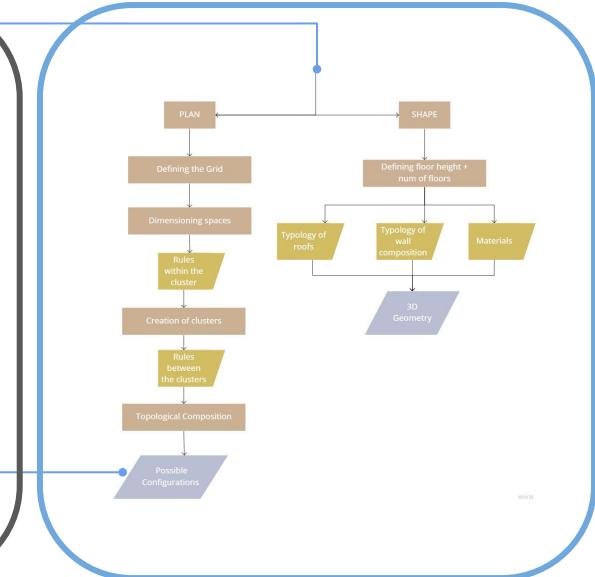


Flowchart

01. Configuring



02. Forming



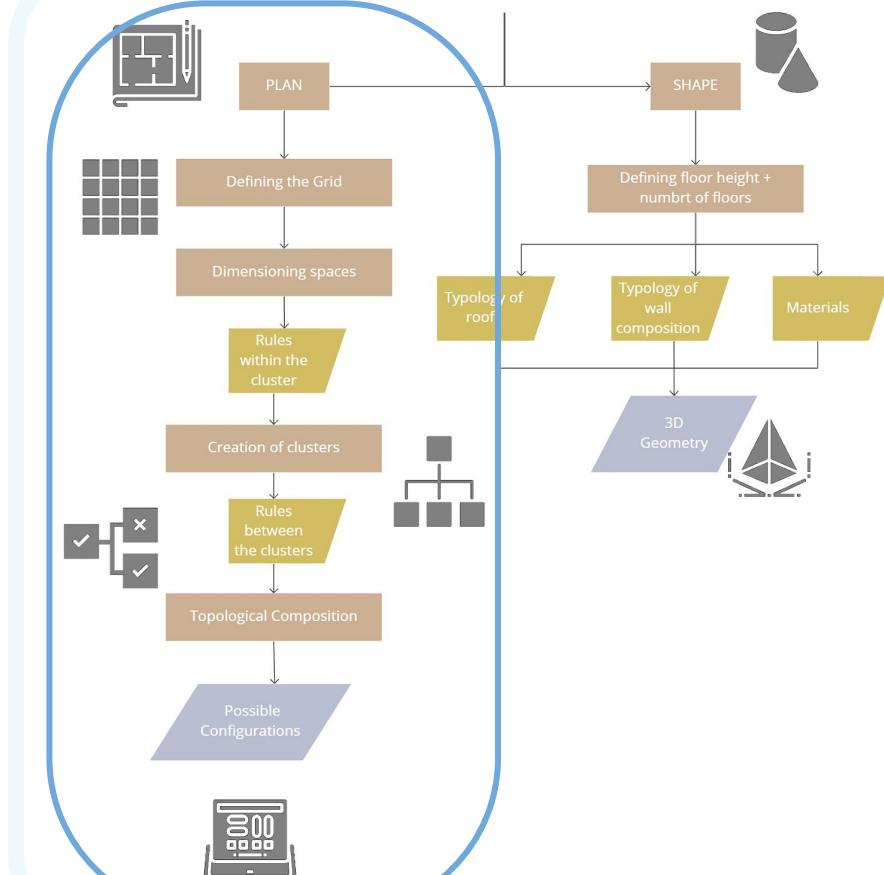
03. Structuring



02. Configuring

Flowchart

0.2 Forming

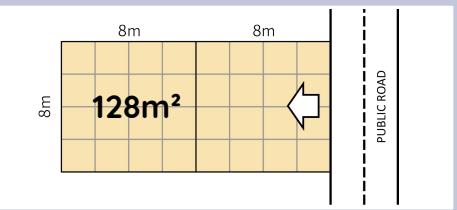


Topological Composition

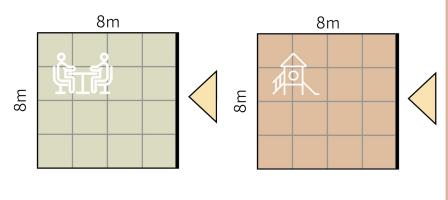
RULES of the GAME:

Public Cluster

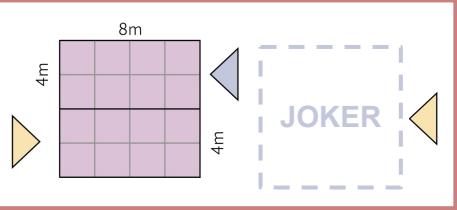
Main Courtyard:
One edge open to the city



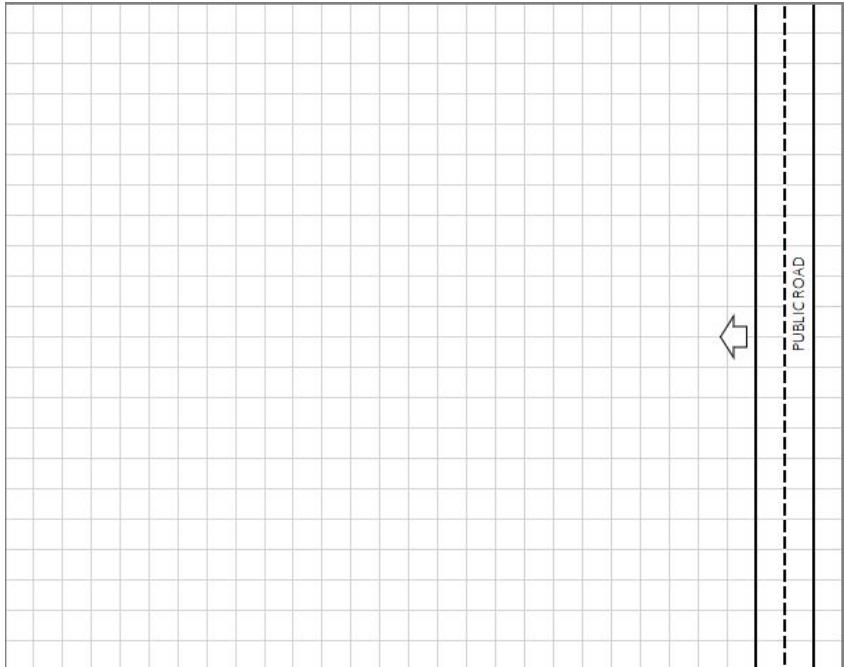
Sitting Area + Playground:
One edge to Main Courtyard



Toilets:
made of 1 cell with 2 entrance

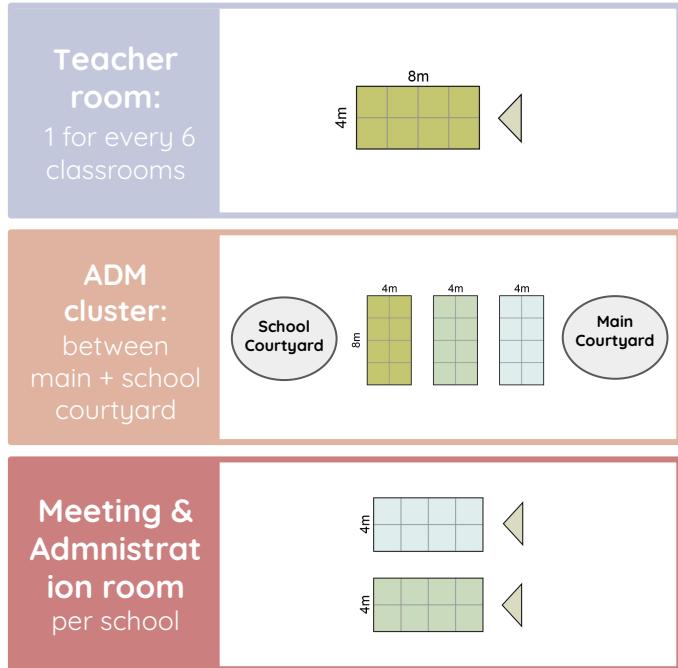


Possible RESULT:

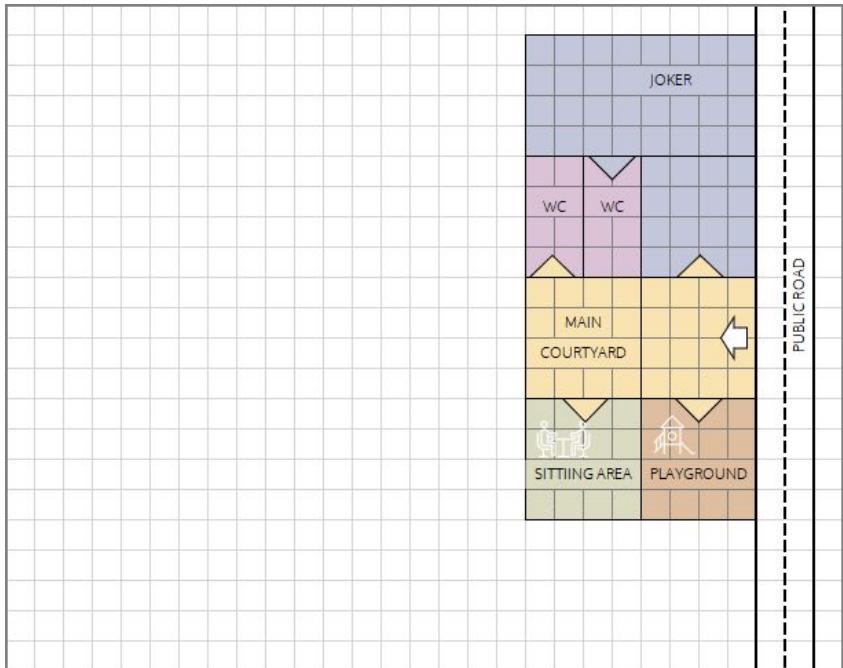


Topological Composition

RULES of the GAME:
Administration Cluster



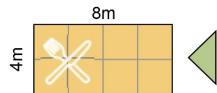
Possible RESULT:



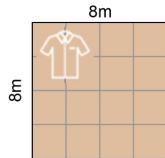
Topological Composition

RULES of the GAME: Service Cluster

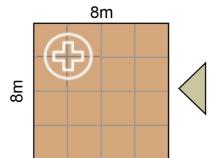
Canteen:
One edge to
the kitchen
One edge to
corridor or
courtyard



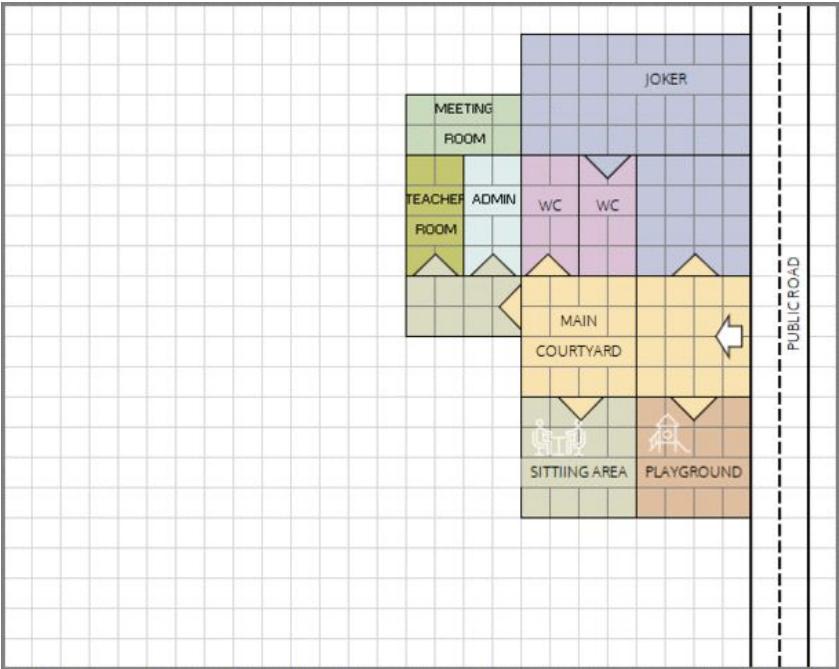
Changing Room:
Connected to
the kitchen



**First Aid +
Psychologis-
t:**
connected to
the main
courtuard



Possible RESULT:



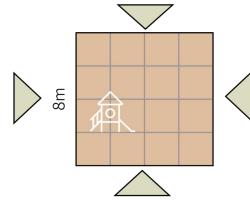
Topological Composition

RULES of the GAME: Classroom Cluster

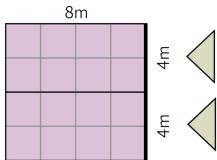
Classroom:
One edge connected to a courtyard



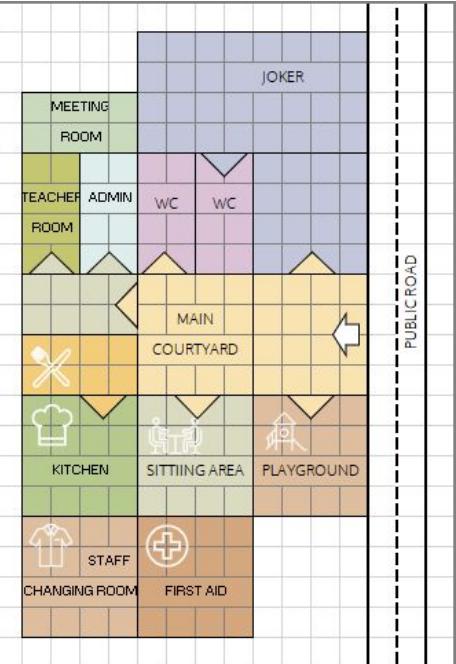
Courtyard:
All edges to Private or Semi-private space



Toilets + Storage:
made of 1 cell



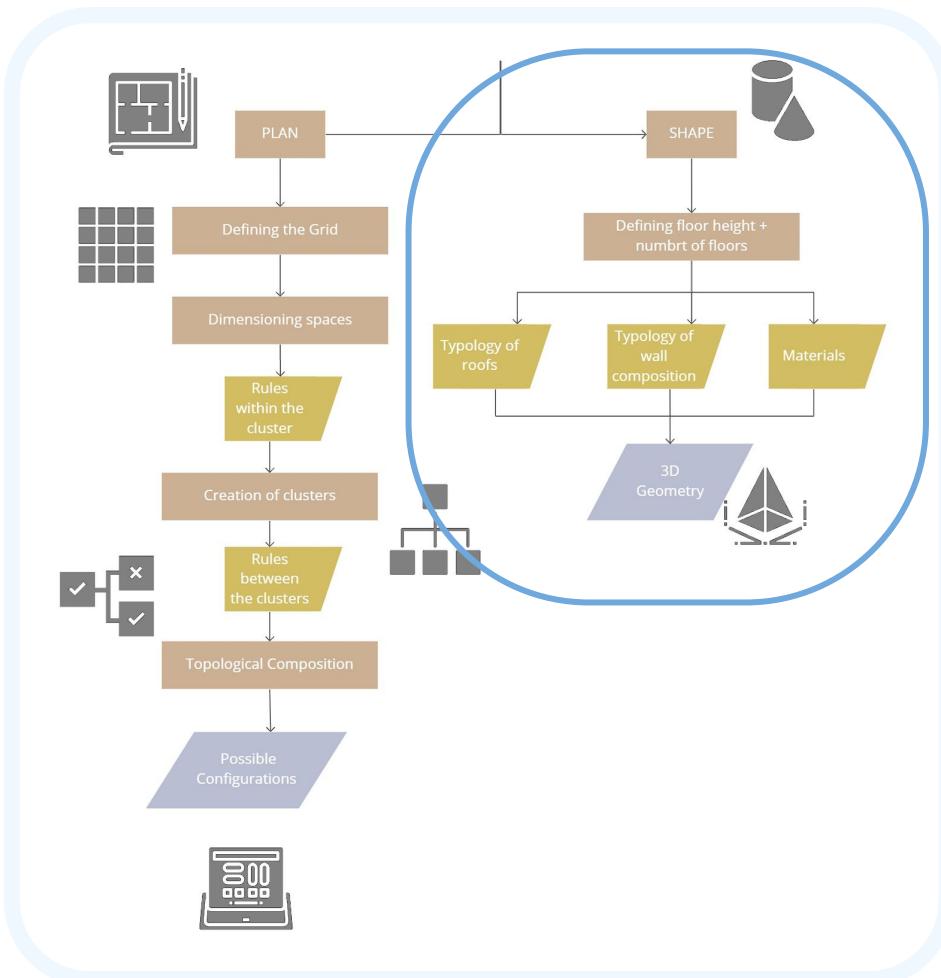
Possible RESULT:



02. Forming

Flowchart

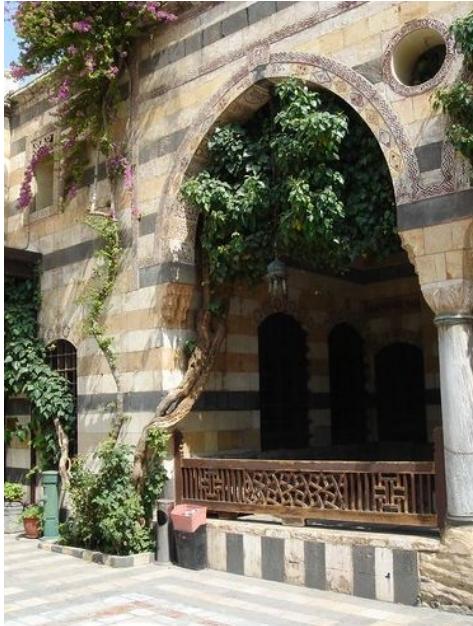
0.2 Forming



Inspiration for forming - light, wind and color



Syrian beehive shaped houses



**Typology of arches derived from islamic architecture
(Azem palace, Syria)**

Sources: <https://acidcow.com/pics/7209-impressive-architecture-of-iran-128-pics.html>
<https://www.flickrriver.com/places/Syria/Dimashq/search/>
<https://www.atlasofwonders.com/2011/06/looking-up-40-magnificent-ceilings-from.htm>
<https://www.greenprophet.com/2011/07/syrias-beehive-architecture/>

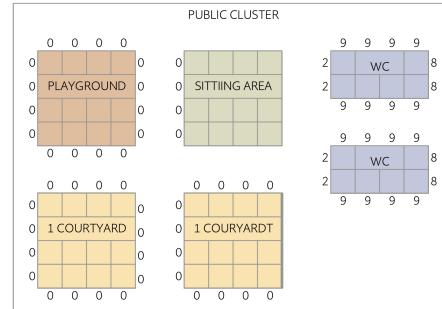
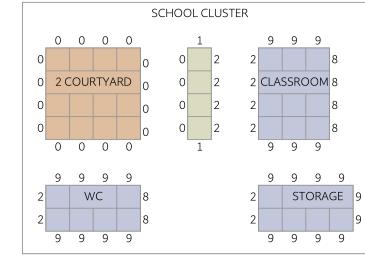


Typology of roofs derived from islamic architecture

What is next?



1. Defining typology of the interface between spaces.
(wall, opening...)
2. Defining the 3D Geometry for different functions with construction constraint.
3. Choosing the Geometry of the building components.
4. Decide on the exact material and technique to use.
(minimum thickness, maximum span)



Questions?