

SANDCASTLE

Zaatari Refugee Camp
Elementary School & Cultural Center

AR3B011 Earthy TU Delft Group_04

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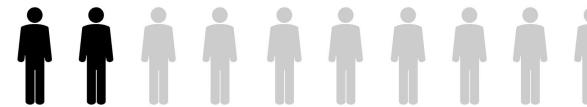
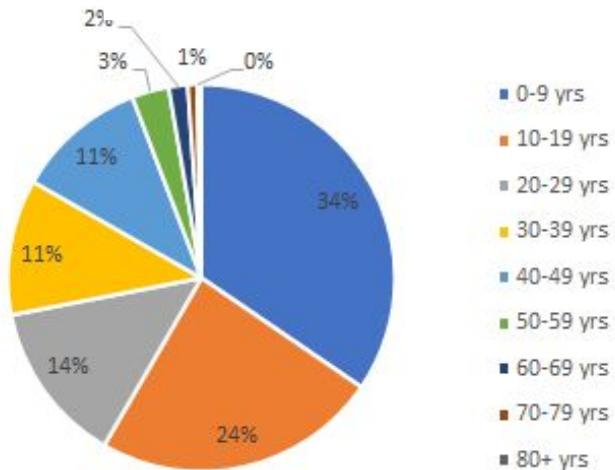
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Our git repository

<https://github.com/constadina/Earthy.git>

STATISTICS



20% is under 5 years old



58% is under 18 years old

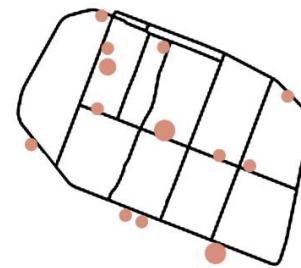
STATISTICS



18.493 children

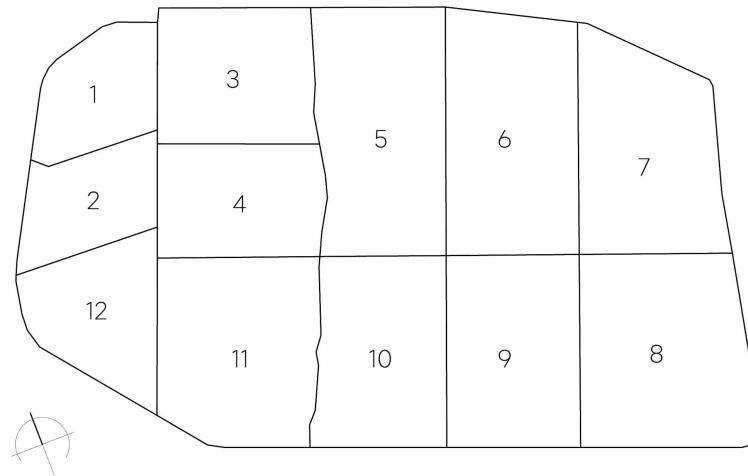


32 schools



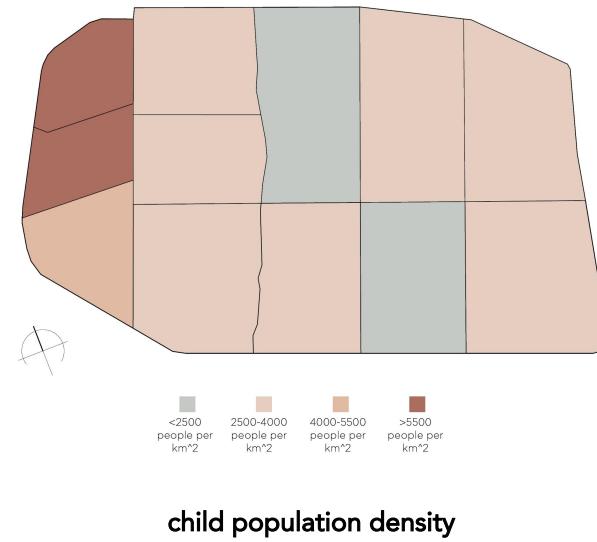
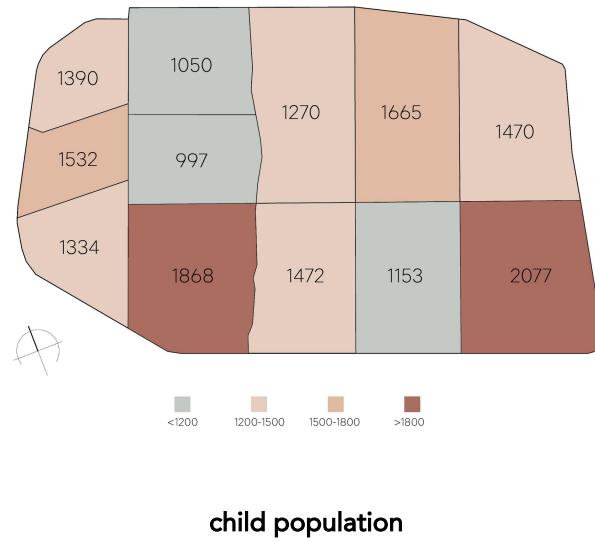
13 school locations

STATISTICS

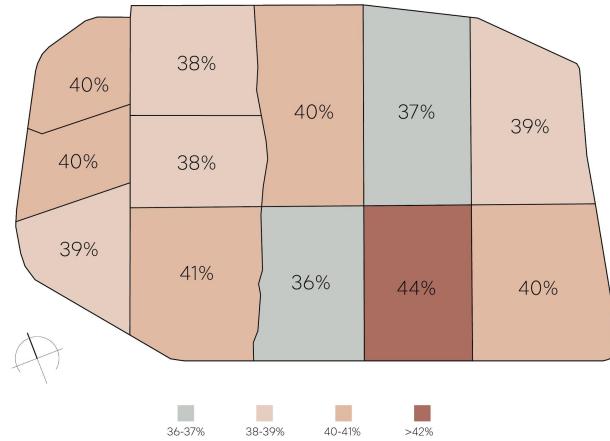


12 districts

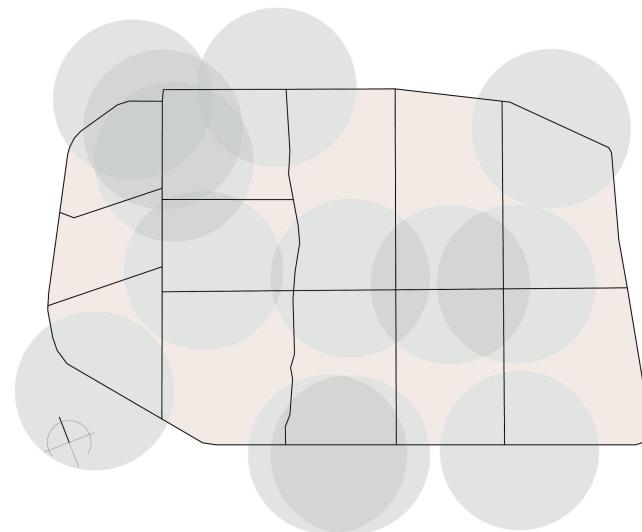
STATISTICS



STATISTICS



**households with all age appropriate
children enrolled**



**walking distance from existing
schools 400m radius**

EXISTING SCHOOLS

Existing Problems

- Child labour
- Girls' harassment
- Insufficient infrastructure



Syrian Khaldoun Al Ahmad decided to spend JD20 to buy a tent and transform it into a school for fellow refugees at a makeshift camp located in the Northern Jordan Valley.

<http://www.jordantimes.com/news/local/temporary-schools-hopefully-temporary-situation-young-syrian-refugees-find-right-people>

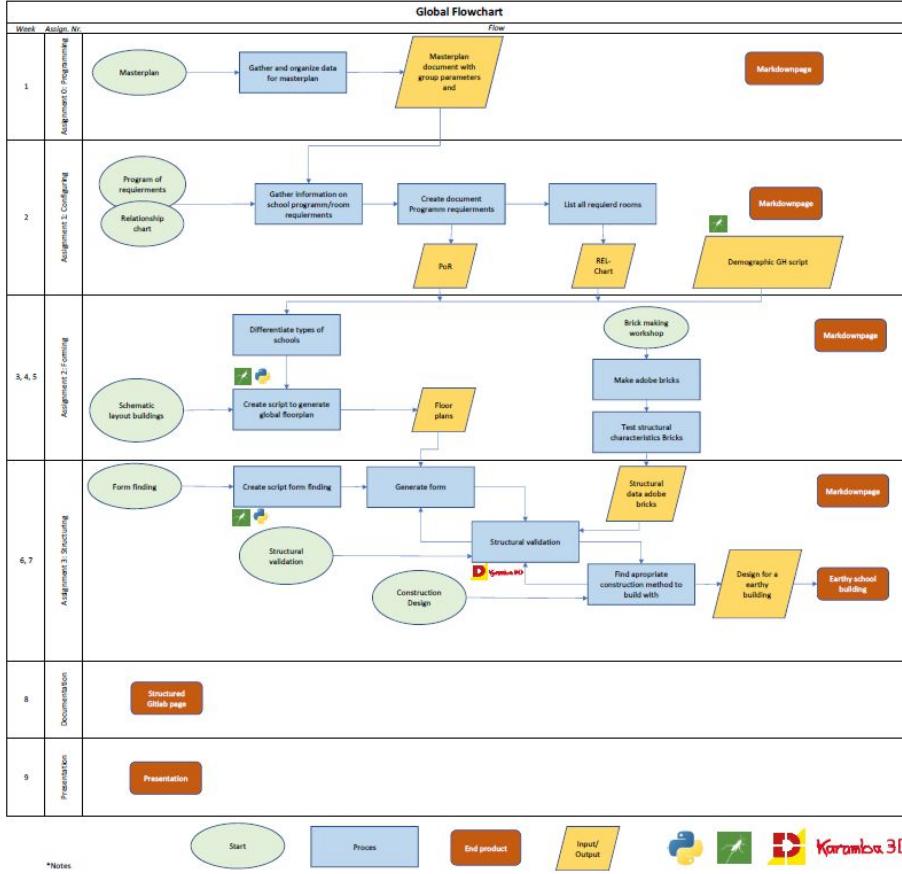


Syrian refugee children attend classes during an afternoon at one of aid group Save The Children International's locations at Zaatari Refugee Camp.

(Photo by Alisa Reznick)

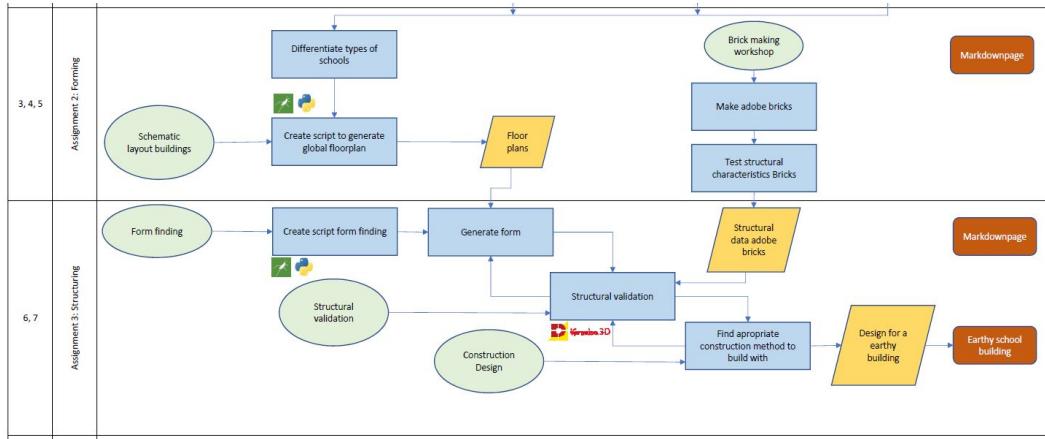
<https://learningspacealive2015.wordpress.com/future-learning-space-3/>

FLOW CHART



The following flowchart shows the process for the entire project. The chart makes a distinction between the different types of steps that have to be taken during the project, these are displayed in different colors. For the processes where software is used, the expected program that will be used is also displayed. At several moments code has to be written, for these parts more detailed flow charts will be made corresponding to the required program.

STAGES IN THE DESIGN PROCESS THAT COULD BE SUPPORTED BY ALGORITHMS



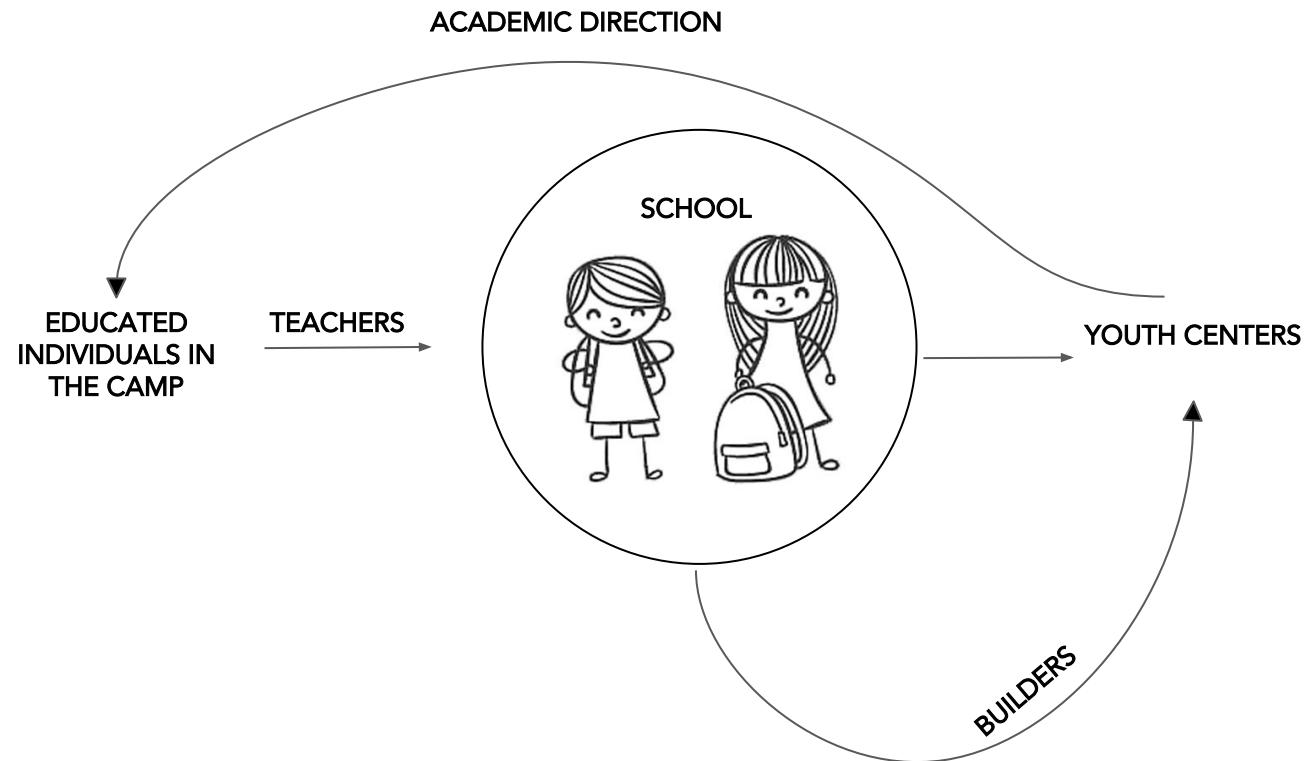
For the following parts of the project algorithms could be made:

- Generation of the floor plans.
- Form finding
- Structural validation

DESIGN PRINCIPLES

Accessibility	→	Walking distance < 400m
Safety	→	Off paved streets with traffic, Courtyard layout
Attractive-fun-uniqueness	→	Castle concept
Feeling of ownership	→	Ability of interference classroom + playground
Communal	→	Cultural use off school hours
Hierarchy	→	Program of requirements
Emphasis	→	Courtyard

SOCIAL CONTEXT



URBAN CONTEXT

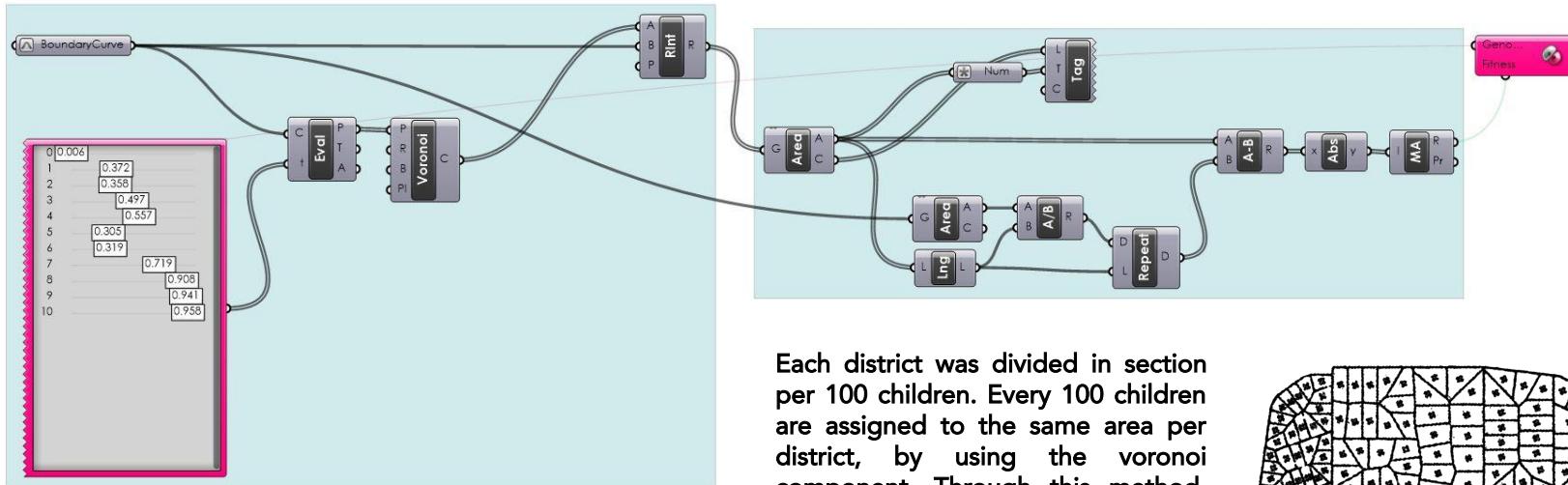
Since the start of the Syrian civil war, the population in the Zataari refugee camp have grown rapidly. By trying to keep the camp as organized as possible, it was divided into twelve different districts. These districts differ in type of population, and density, but in general each one inhabits around 6000 people. The districts are separated by the big roads that function as main traffic corridors through the camp.

Most public functions in the camp, are located alongside these roads, creating spaces to meet for the residents. However, for schools these locations might not be the most suitable ones. Especially with little children, less vivid areas would be much better. In order to arrange that, the following set of rules have been set:

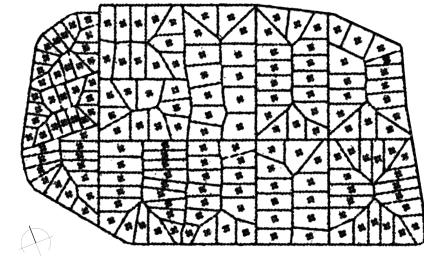
- walking distance should be maximum 400m
- proximity to mosque
- no entrances on paved streets
- not placed in central district areas
- not close to hamams
- close to recreational areas/greenery
- they will work day and night in shifts

URBAN CONTEXT

Method for Density Points



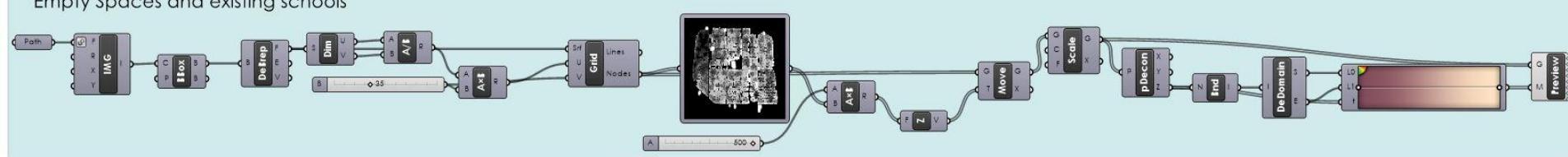
Each district was divided in section per 100 children. Every 100 children are assigned to the same area per district, by using the voronoi component. Through this method, the density of children throughout the camp is already taken into account for further calculations.



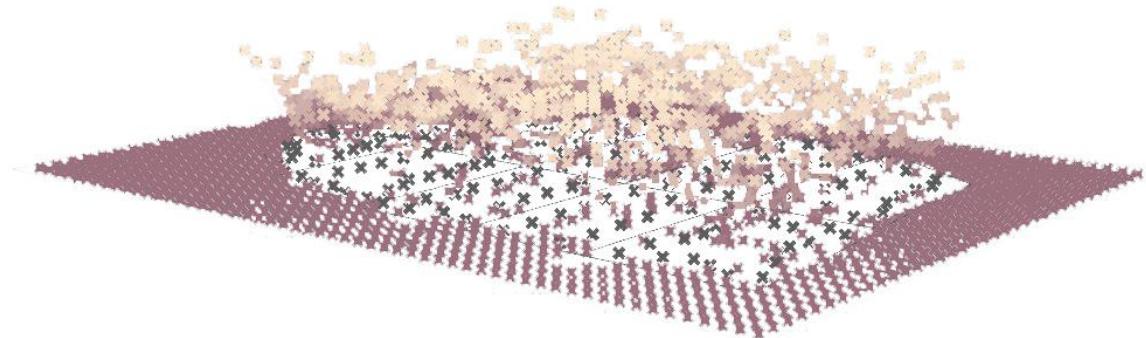
final camp tessellation

URBAN CONTEXT

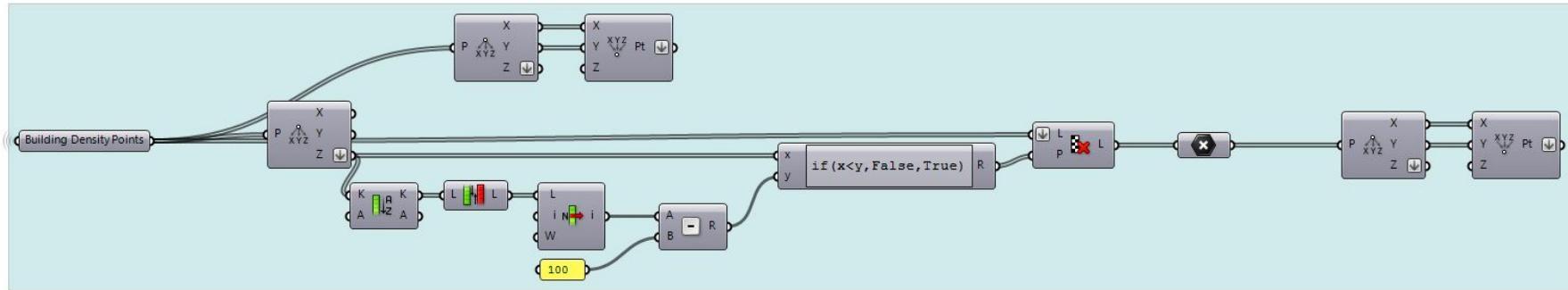
Empty Spaces and existing schools



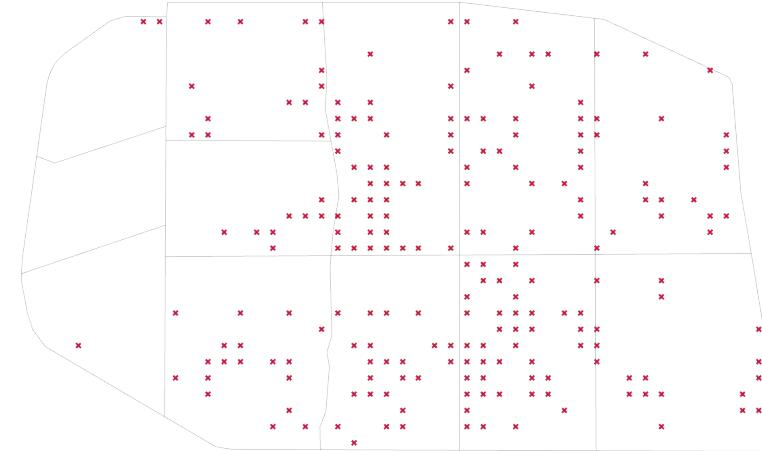
From the density map of the camp, the empty spaces and existing school locations were defined. Those points were risen to a higher z coordinate than the rest, as more suitable.



URBAN CONTEXT

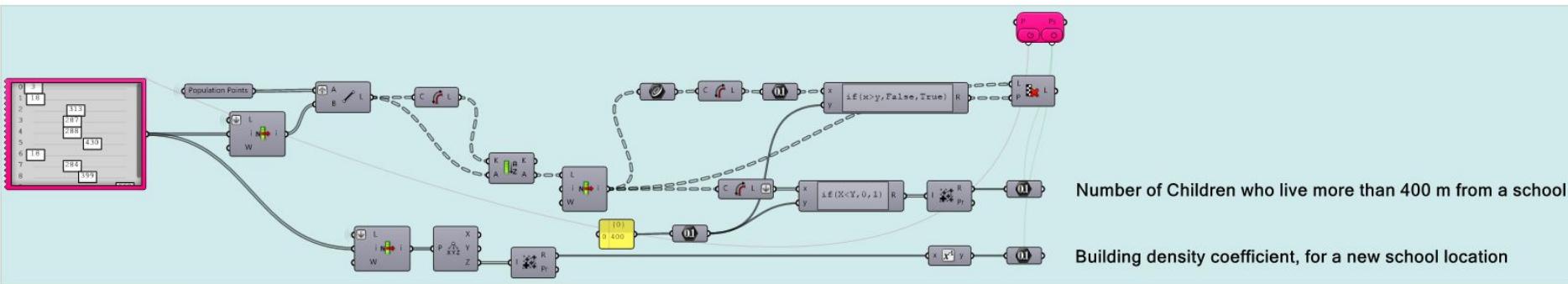


From these points, only the highest ones are considered as possible locations for a new school. The constraining parameter can be altered to in- or decrease the amount of possible locations. The resulting points will be used as input in the following script



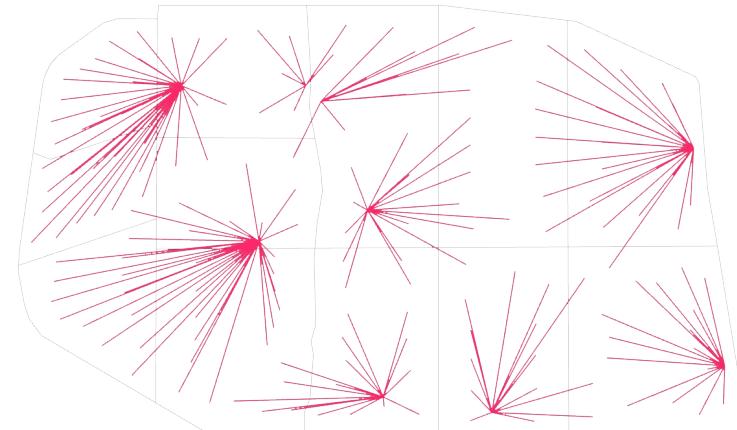
URBAN CONTEXT

Placing the schools and evaluate the distances to the houses



For each point, which represents 100 kids, the closest distance to a school is calculated. The design will be evaluated by octopus, which will try to minimize the amount of points, which are not within a 400 meter radius from a school. A second objective is to minimize the building density coefficient. By doing this, the impact on the existing buildings and homes will be minimized as much as possible.

The final positions of the schools, still need to be determined.



CONCEPT

By analysing the demographics of the refugee camp it emerged as a necessity to provide to the camp a better quality of life in long terms. An effective way to do that is by investing on Zataari's camp education. It was observed that there is a significant shortage of schools in respect to the number of children recorded. Therefore, our concept regards the erection of an elementary school co-located with a cultural center.

Our vision is to help the refugees create a school for themselves. The school will not function only as a conventional school but it will have additional qualities, mostly social.

DESIGN GOALS

By analysing the existing school facilities, 3 different types of interventions were decided as necessary. Some schools were to be improved, others expanded due to insufficient space and new ones would also need to be located, as the existing ones are not enough.

Space requirements, space configurations

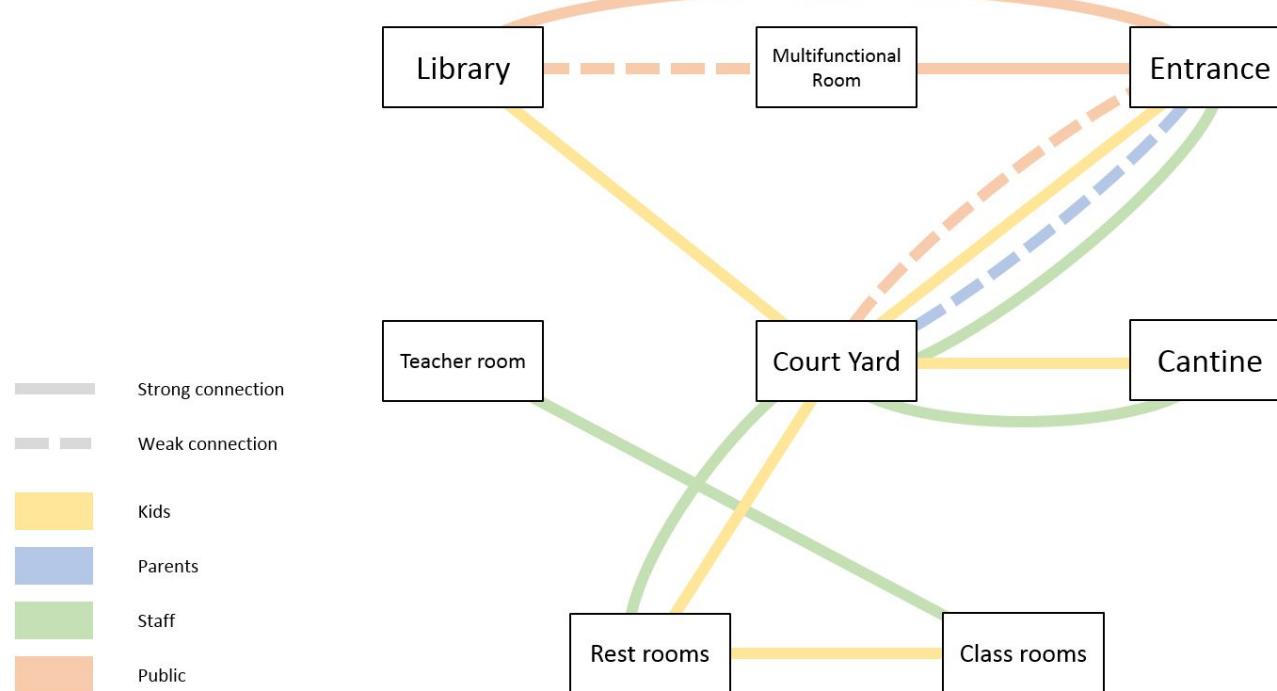
- Comfort**
- Usability**
- Safety**
- Sustainability**
- Productivity**
- Privacy**
- Visual appeal**

PROGRAM OF REQUIREMENTS

Functional Areas (Bubble diagram)	Description	Day light requirement	open / semi-open / closed space	min Free height requirements	Quantity	Size	Number of people in	m^2 per person	Orientation (N,E,S,W)	Operating Hours	Operating Months	Connected to (REL Chart)		
Class rooms		300- 500 LUX	Semi Open	2700	7 class rooms	45 m^2 fpr 30 Pupils	30 pupils in each class	-	1.5	Morning and Evening Shifts	Sept - June			
Multi Functional room	Music Art Gym Community ...etc	300	Semi Open	4000		420 m^2 (basketball court size 15*28)	150	-	All day		all year round	adjacent to courtyard, easy access from public and kids		
Communal Library	Might include a computer hall and is open to public out of school hours	200 (Shlf area) - 500 reading area	Closed	2700		0 40 shelves only	-	-	All day			Ouside access as well as inside		
Staff Restrooms (F)		150	Closed	-		(3 * 0.9 * 1.7) + 3 = 1 7.6	-	-	All day					
Staff Restrooms (M)		150	Closed	-		(3 * 0.9 * 1.7) + 3 = 1 7.6	-	-	All day					
Kids Restroom (F/M)		150	Closed	-		1 per class (7x0. 1 9x1.7)+3.5= 14.2	-	-	All day					
Court Yard	In the Center	-	Open	-		1 Proportional	-	-						
Cantine		200	Semi Open	2700		7 m^2 (kiosk for events and teachers while the multi functional room can host eating tables if 1 needed)			South			connected to kitchen		
Kitchen		500	Closed	2700		1	4		South					
Teachers room		500	Semi Open	2700		1 50 m2		20	-			adjacent to administration		
Administration		500		2700		1 20 m2		3	-					
Liwan		200	semi	5400		1	30	-	South			open to courtyard		
winter living room		200	semi	5400		1	30	-	North			open to courtyard		
storage room		-	closed	-		1 20 m2	-		-			-		
		https://glamox.com/uk/solutions/test-small-class-room							https://www.engineeringtoolbox.com/number-persons-buildings-d_118.html					
									https://masht.rks.gov.net/uploads/2015/06/masht-vol2-eng-print-5mm-bleed-0mm-inside-final.pdf					

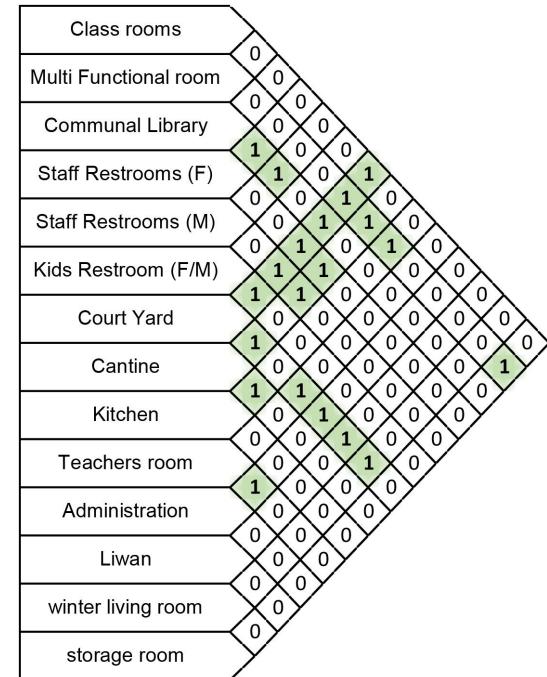
SPACE CONFIGURATION OF SCHOOL

Routing



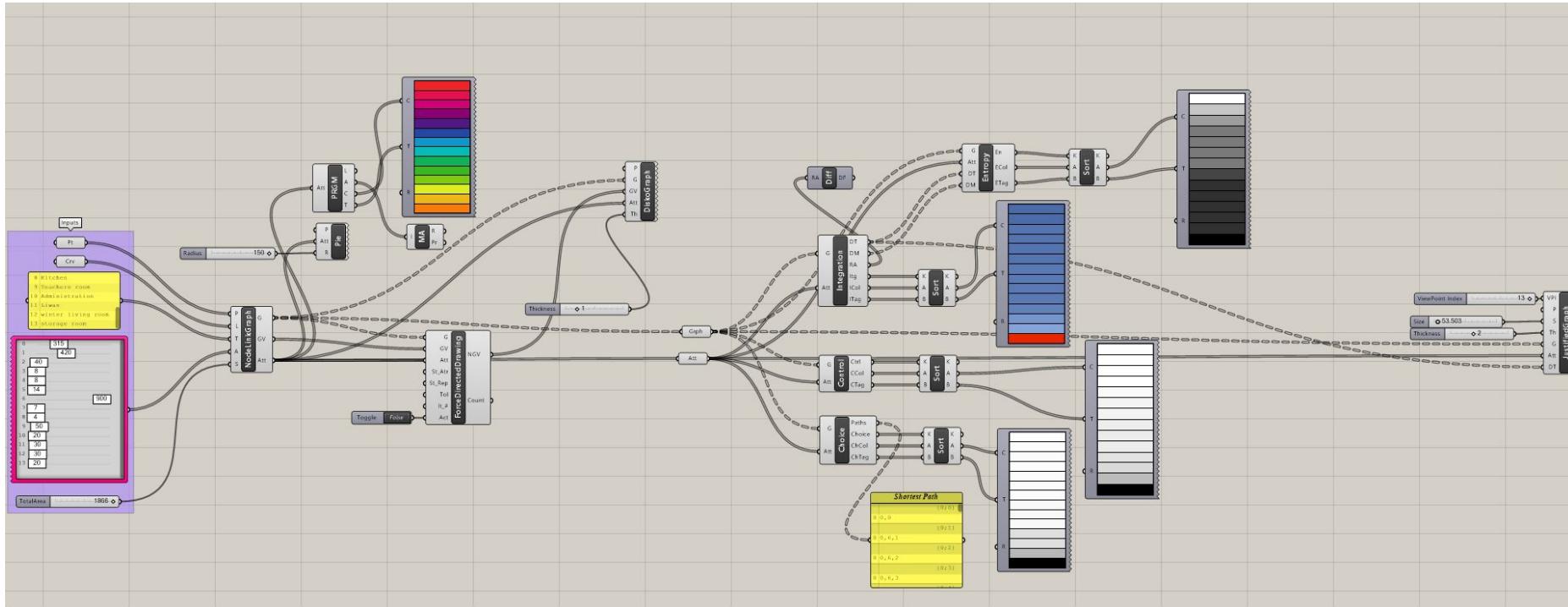
SPACE CONFIGURATION OF SCHOOL REL chart

The following REL charts shows the same principle but it is displayed in a different way. These graphs provide an overview to get a sense of the configuration of the building program. The REL charts shows the real connection between the different spaces in the building. These connections show that the spaces of which they are connected to each other with a door. Spaces that are similar in context are clustered together. Ultimately, these spaces will also have their own connections to the other spaces.



SPACE CONFIGURATION OF SCHOOL

Space Syntax using SYNTACTIC GH Plug-in

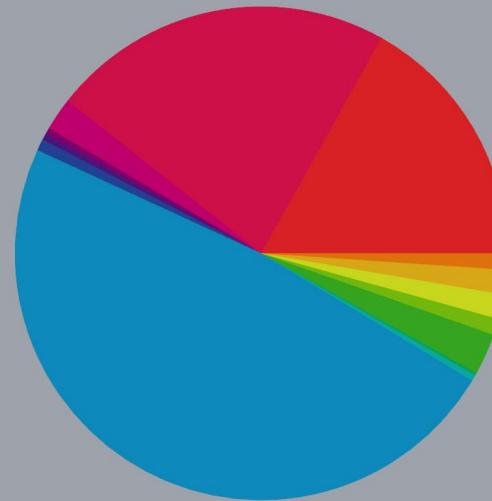


SPACE CONFIGURATION OF SCHOOL

Space Syntax using SYNTACTIC GH Plug-in



Point-Curve Network of functional rooms based on the REL Chart

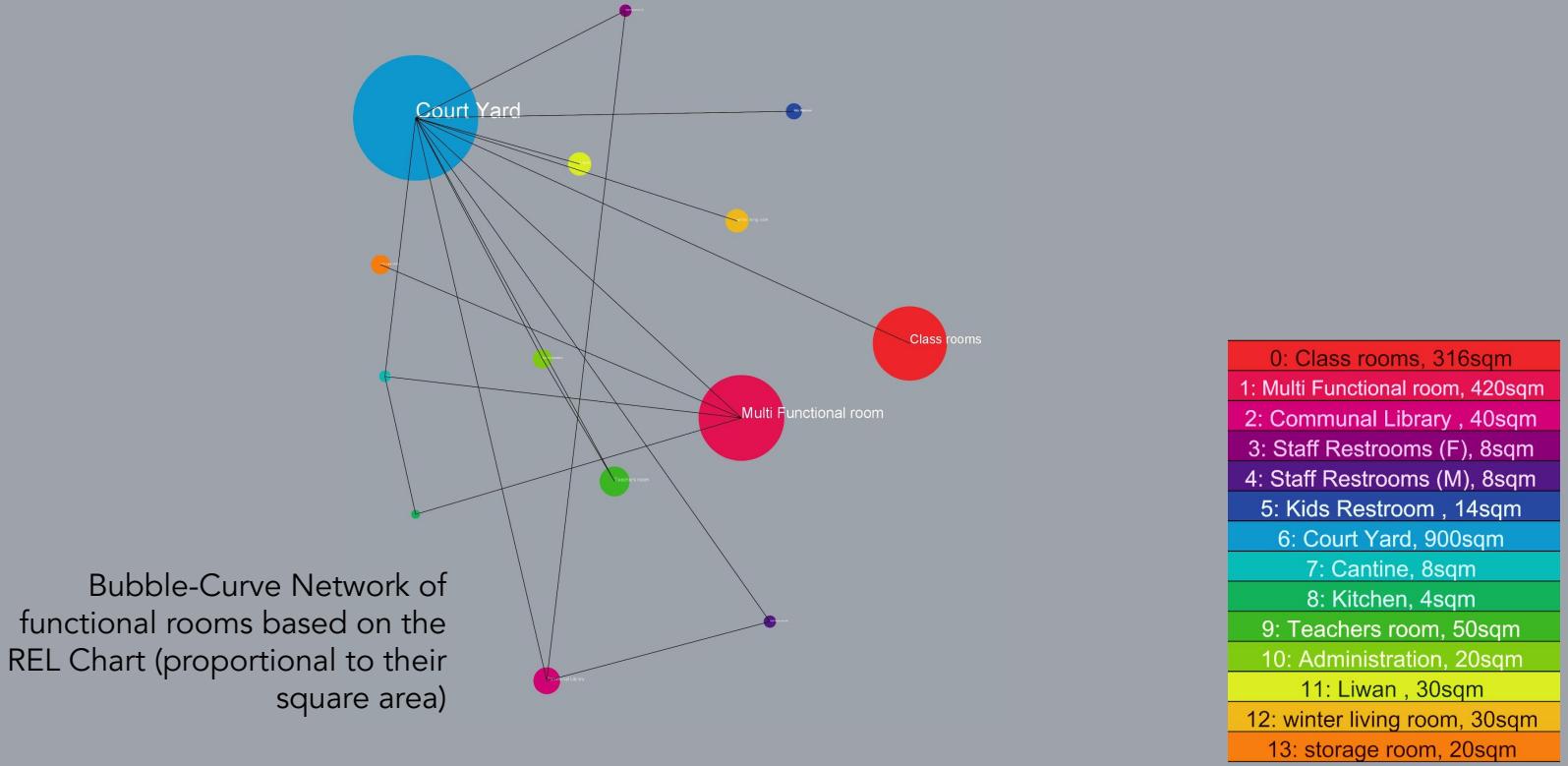


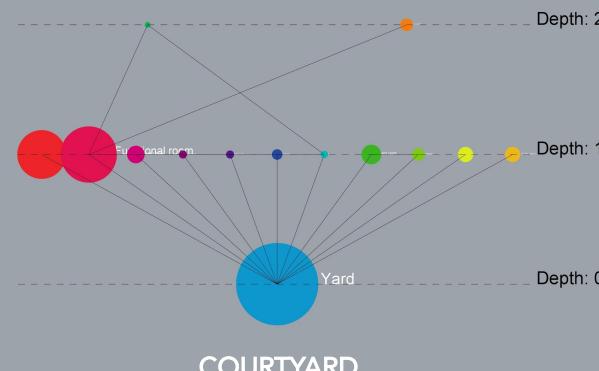
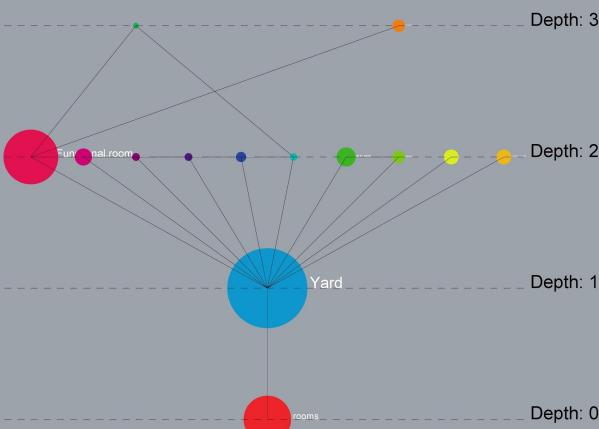
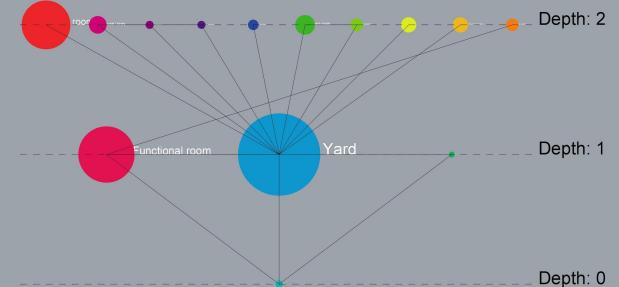
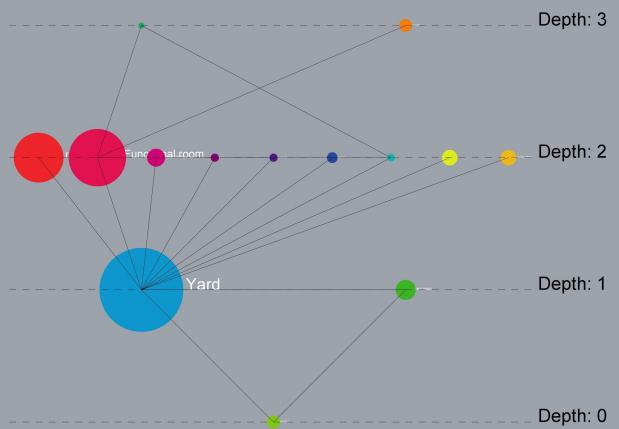
Pie Chart representing functional rooms proportional to their square area

0: Class rooms, 316sqm
1: Multi Functional room, 420sqm
2: Communal Library , 40sqm
3: Staff Restrooms (F), 8sqm
4: Staff Restrooms (M), 8sqm
5: Kids Restroom , 14sqm
6: Court Yard, 900sqm
7: Cantine, 8sqm
8: Kitchen, 4sqm
9: Teachers room, 50sqm
10: Administration, 20sqm
11: Liwan , 30sqm
12: winter living room, 30sqm
13: storage room, 20sqm

SPACE CONFIGURATION OF SCHOOL

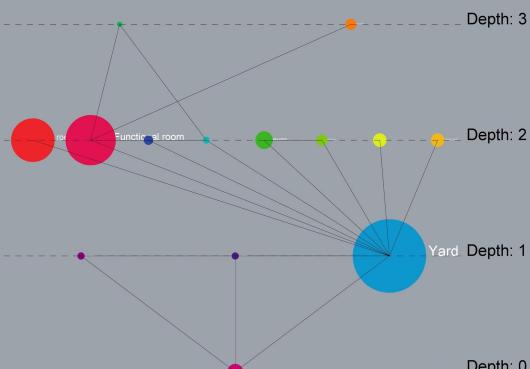
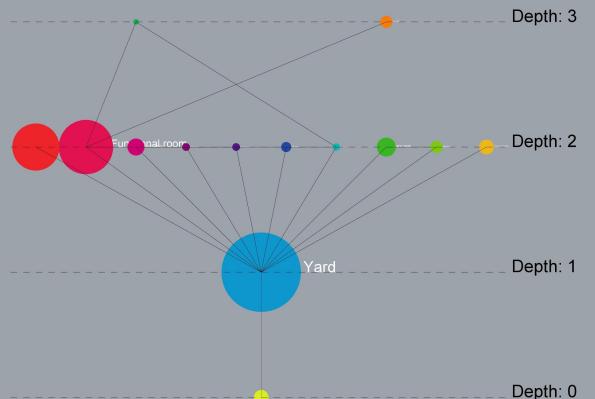
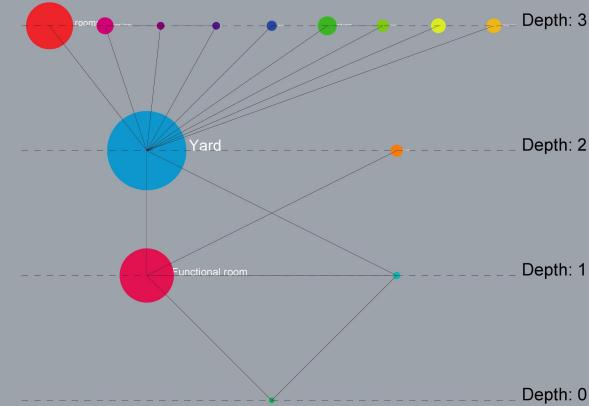
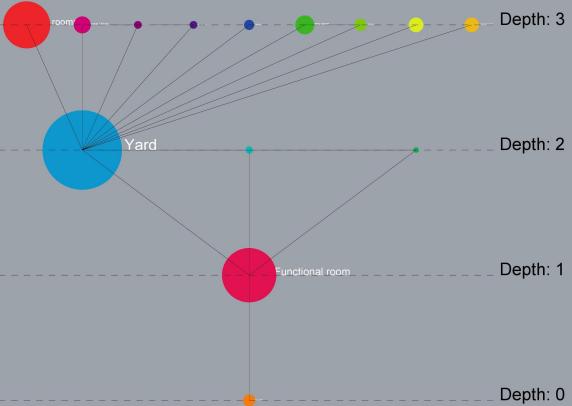
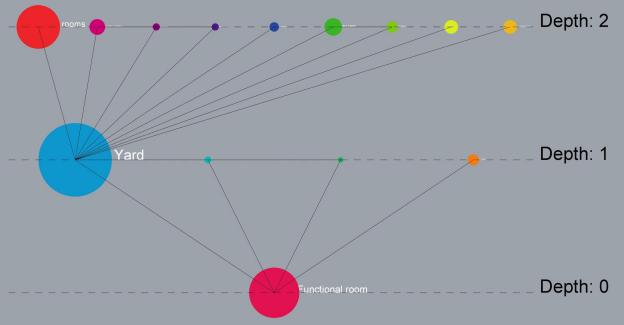
Space Syntax using SYNTACTIC GH Plug-in





Right: Space Syntax using SYNTACTIC GH Plug-in
 Legend. Left (also on the next slide): Bubble-Curve Network of functional rooms based on the REL Chart (proportional to their square area). This graph is based on a rout/accessibility hierarchy starting on "Depth 0" with the room function described under each graph.

0: Class rooms, 316sqm
1: Multi Functional room, 420sqm
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13: storage room, 20sqm

CONCEPT INSPIRATION

Inspired by vernacular syrian
architecture
Courtyard
Liwan
Micro-clima

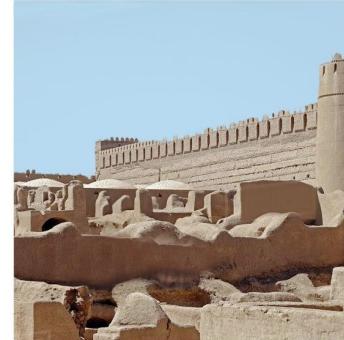
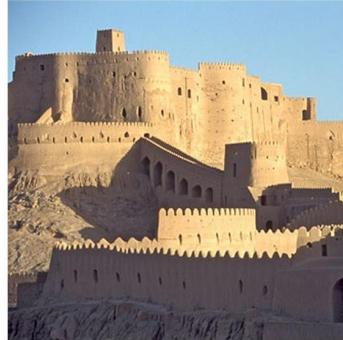


Emergency Architecture and Human Rights Project: 100 classrooms for refugee children

<https://www.independent.co.uk/life-style/design/syria-refugee-school-zaatari-win-archdaily-eahr-architecture-prize-photos-amman-a8212496.html>

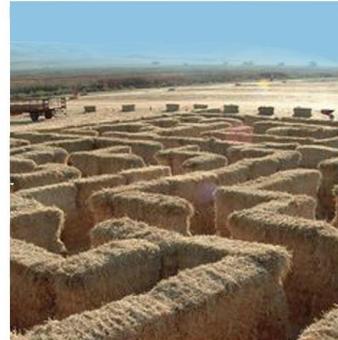
<https://www.plataformaarquitectura.cl/cl/881872/xx-bienal-de-arquitectura-y-urbanismo-de-chile-co-nvoca-a-workshop-arquitectura-y-derechos-humanos/59e75e5eb22e383b09000213-xx-bienal-de-arq-uitectura-y-urbanismo-de-chile-convoca-a-worksho-p-arquitectura-y-derechos-humanos-imagen>

CONCEPT INSPIRATION



Morphology

CONCEPT INSPIRATION



Playground ideas