‘CLIMATE-HOUSE’

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MAS 08-09

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INTRODUCTION

- House is basic need for human beings, from nomads to the richest people. Nowadays everybody tries to build a house to live, to protect him and gain some privacy.
- Evidence is gathering that human activities are changing the climate. This ‘climate change’ could have a huge impact on our lives.
- As contemporary architects we have the obligation to propose solutions in order to create safe and viable houses.
- A program that filters contemporary dwelling through the vital problem of climate denaturation and changing of our planet.
- An attempt to create a flow of information from nature to residence and reversely, in real time.
- A project that started with pretensions and can constitute an important tool for contemporary architects, when refined.

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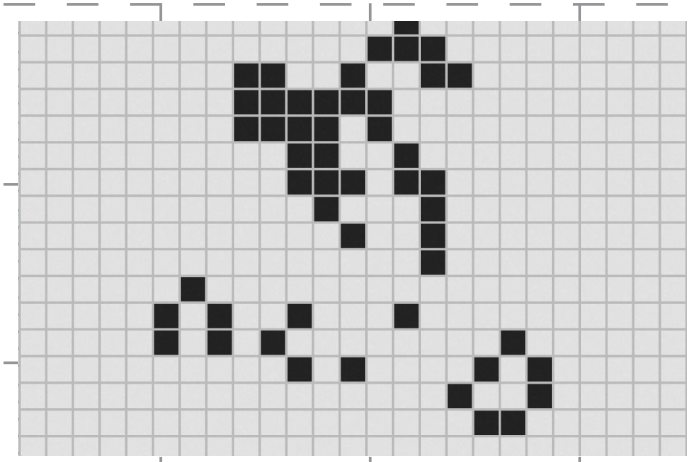
‘CLIMATE-HOUSE’: HOW IT WORKS

- An application in Java-based programming language Processing Beta 0135 that produces possible floor plans for houses, depending on the climate of the area that it is going to be built in.
- Evaluation from factors such as average temperature, noise, light.
- Optimisation until it finds the best position for the rooms.
- The program is based on cellular automaton theory.



CELLULAR AUTOMATON

Four distinct characteristics:

1. cells
2. state of the cell
3. neighbourhood of a cell
4. transition rules

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‘CLIMATE-HOUSE’: HOW IT WORKS

ALLOWED ROOM COMBINATIONS

adjoining room combinations

	room id	entrance 1	living room 2	kitchen 3	bedroom 4	bedroom 5	bedroom 6	bathroom 7	wc 8	guestroom 9	office 10
entrance	1	2	1	1	0	0	0	0	1	0	1
living room	2	1	2	1	1	1	1	0	1	0	1
kitchen	3	1	1	2	0	0	0	0	1	0	1
bedroom	4	0	1	0	2	1	1	1	0	1	1
bedroom	5	0	1	0	1	2	1	1	0	1	1
bedroom	6	0	1	0	1	1	2	1	0	1	1
bathroom	7	0	0	0	1	1	1	2	0	0	1
wc	8	1	1	1	0	0	0	0	2	1	1
guestroom	9	0	0	0	1	1	1	0	1	2	0
office	10	1	1	1	1	1	1	1	1	0	2

0 = room combination can not be next to each other

1 = room combination can be next to each other

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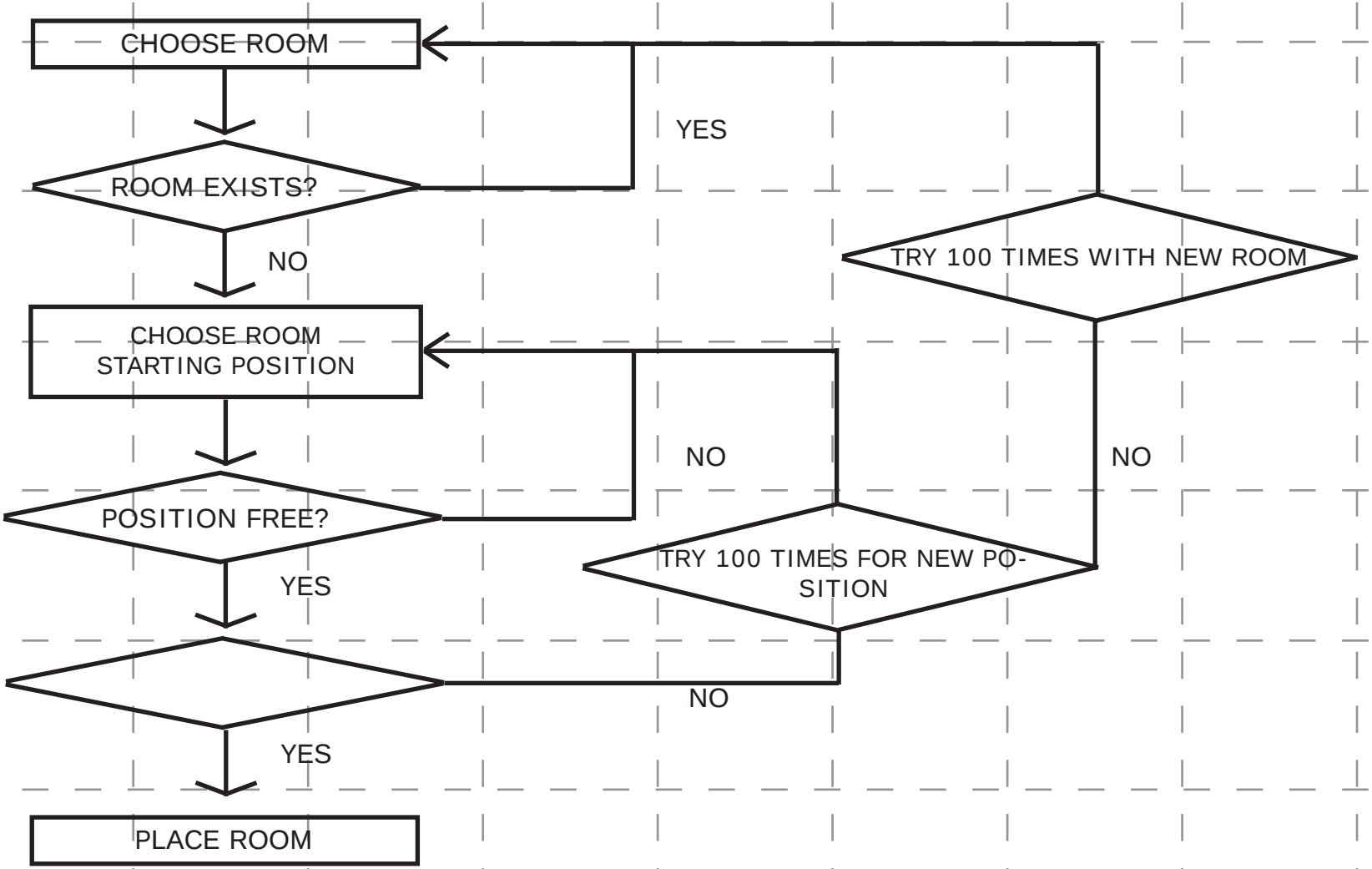
CREATE THE HOUSE



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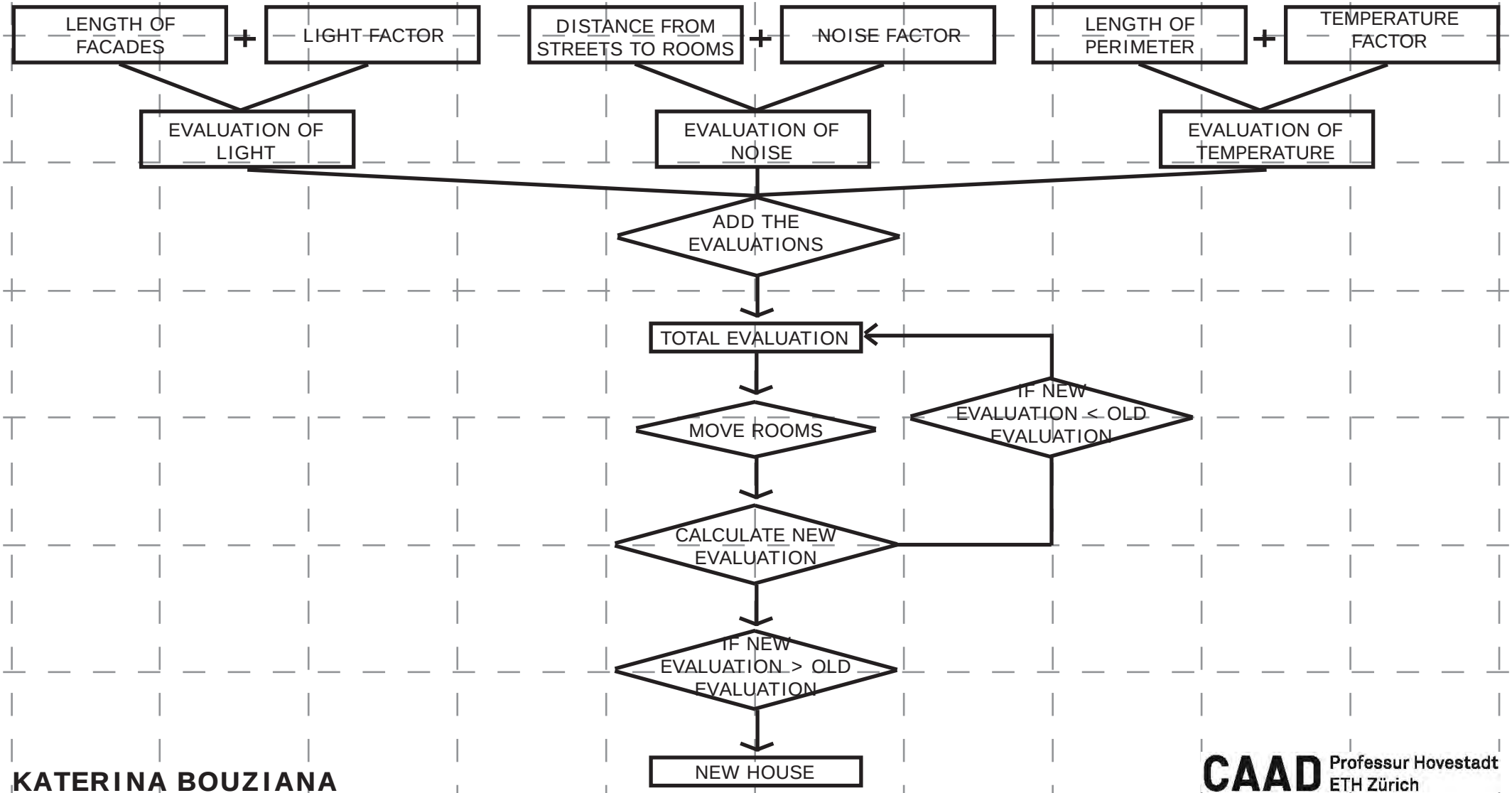
EVALUATION



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‘CLIMATE-HOUSE’: THE RESULTS

- The project results of a clear scripting procedure.
- Architecture finally becomes truly time-based and climate- based.
- Space communicates actively with the users and the environment in real time.

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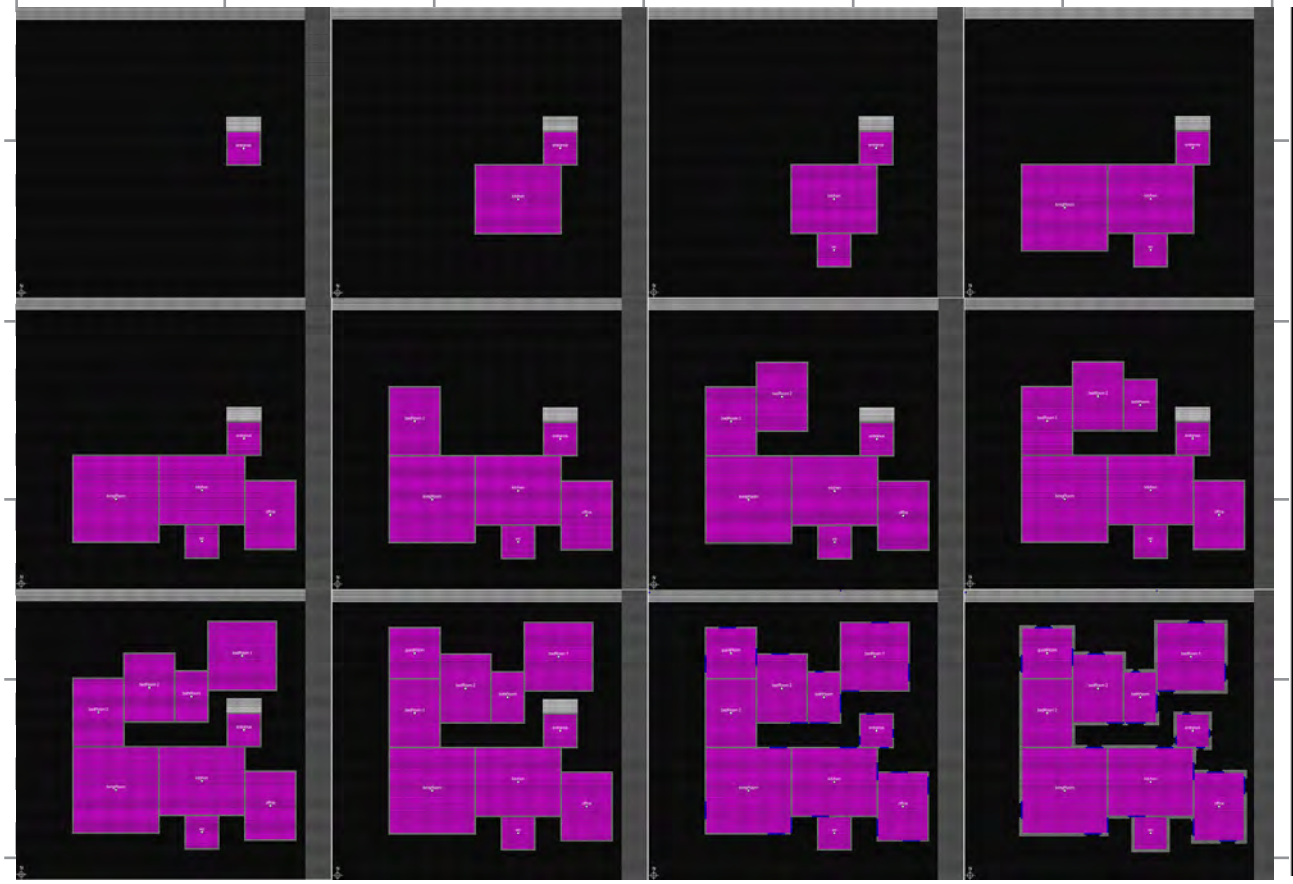
‘CLIMATE-HOUSE’: THE RESULTS

PROCEDURE



1 Room: Number 1 = entrance
2 Room: Number 3 = kitchen
3 Room: Number 8 = wc
4 Room: Number 2 = livingRoom
5 Room: Number 10 = office
6 Room: Number 6 = bedRoom 3
7 Room: Number 5 = bedRoom 2
8 Room: Number 7 = bathRoom
9 Room: Number 4 = bedRoom 1
10 Room: Number 9 = guestRoom

Perimeter: 844
North Facade: 224
South Facade: 224
East Facade: 198
West Facade: 198

Temperature: 35 C
Evaluation of Temperature: 240

	DistL	DistD	Noise	Light	Up	Down	Left	Right
entrance:	74,000	35,000	288	31	0	0	0	0
kitchen:	103,000	59,000	293	36	0	0	0	0
wc:	132,000	59,000	293	28	0	0	1	1
livingRoom:	108,000	108,000	292	75	0	0	1	0
office:	117,000	20,000	249	60	1	1	0	0
bedRoom 3:	64,000	118,000	282	45	0	0	1	0
bedRoom 2:	50,000	89,000	273	69	1	1	0	0
bathRoom:	55,000	65,000	291	25	1	1	0	0
bedRoom 1:	32,000	36,000	249	111	1	1	0	0
guestRoom:	30,000	118,000	276	78	0	0	0	0
total:			2786	558	4	4	3	1

Total Evaluation Of House: 3584.0

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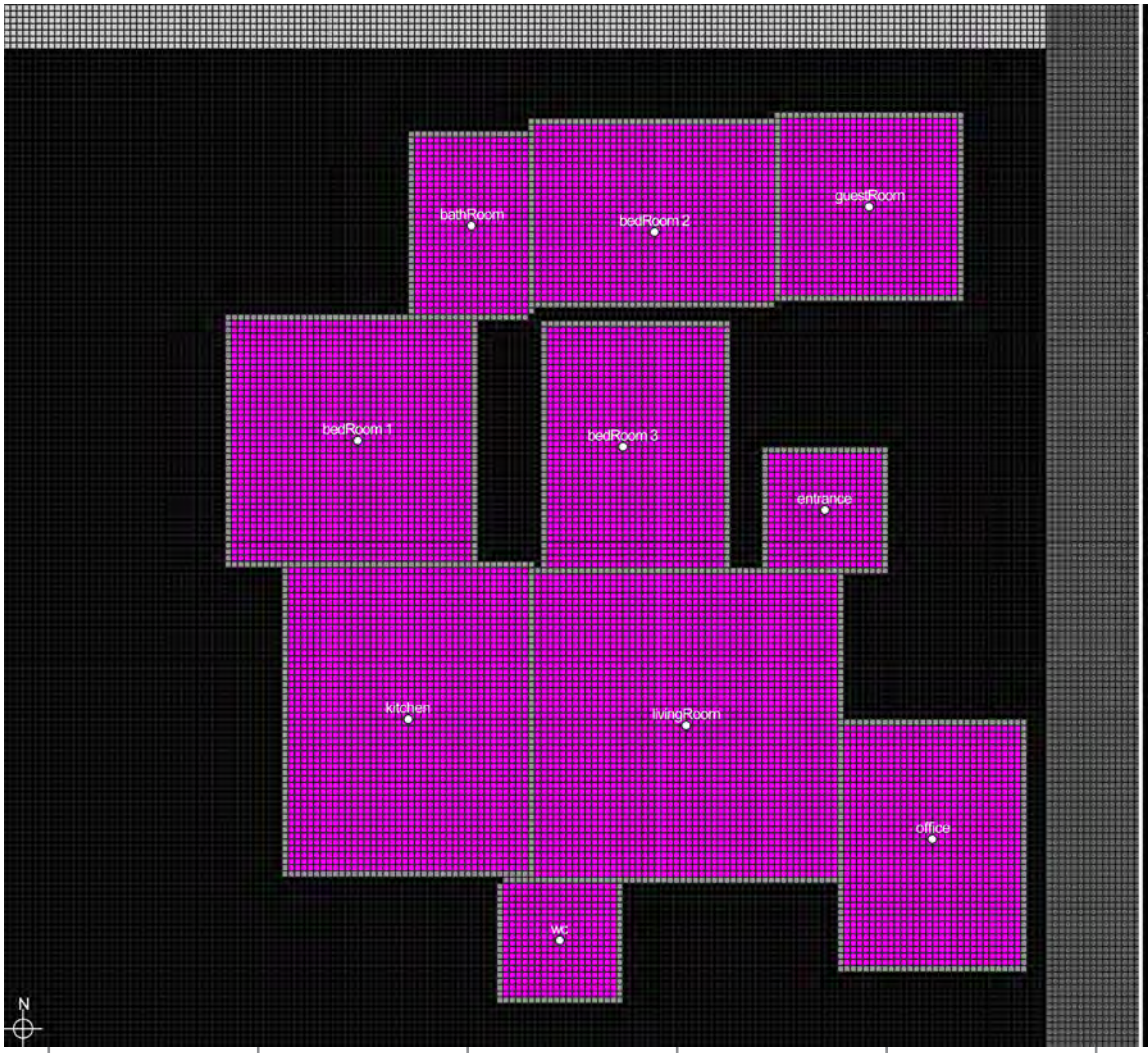
‘CLIMATE-HOUSE’: THE RESULTS

BEFORE



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2 Room: Number 2 = livingRoom
3 Room: Number 10 = office
4 Room: Number 6 = bedRoom 3
5 Room: Number 5 = bedRoom 2
6 Room: Number 3 = kitchen
7 Room: Number 9 = guestRoom
8 Room: Number 7 = bathRoom
9 Room: Number 8 = wc
10 Room: Number 4 = bedRoom 1

Perimeter: 850
North Facade: 212
South Facade: 212
East Facade: 213
West Facade: 213

Temperature: -10 C
Evaluation of Temperature: -850

	DistL	DistD	Noise	Light	Up	Down	Left	Right
entrance:	74,000	35,000	288	28	0	0	0	0
livingRoom:	108,000	57,000	286	42	0	0	0	0
office:	126,000	18,000	243	56	0	0	0	0
bedRoom 3:	64,000	67,000	276	69	0	0	0	0
bedRoom 2:	30,000	62,000	258	51	0	0	0	0
kitchen:	107,000	101,000	295	42	0	0	0	0
guestRoom:	26,000	28,000	254	93	1	1	0	0
bathRoom:	29,000	91,000	287	24	0	0	0	0
wc:	142,000	77,000	295	27	0	0	0	0
bedRoom 1:	63,000	109,000	282	87	0	0	0	0
total:			2764	519	1	1	0	0

Total Evaluation Of House: 2433.0

bedRoom 3: false New Position: x: 122 y: 17

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‘CLIMATE-HOUSE’: THE RESULTS

AFTER

1 Room: Number 1 = entrance
2 Room: Number 2 = livingRoom
3 Room: Number 10 = office
4 Room: Number 6 = bedRoom 3
5 Room: Number 5 = bedRoom 2
6 Room: Number 3 = kitchen
7 Room: Number 9 = guestRoom
8 Room: Number 7 = bathRoom
9 Room: Number 8 = wc
10 Room: Number 4 = bedRoom 1

Perimeter: 782
North Facade: 179
South Facade: 179
East Facade: 212
West Facade: 212

Temperature: -10 C
Evaluation of Temperature: -780

	DistL	DistD	Noise	Light	Up	Down	Left	Right
entrance:	74,000	35,000	288	29	0	0	0	0
livingRoom:	108,000	57,000	286	39	0	0	0	0
office:	126,000	18,000	243	56	1	1	0	0
bedRoom 3:	64,000	67,000	276	60	0	0	0	1
bedRoom 2:	30,000	62,000	258	42	1	0	0	0
kitchen:	107,000	101,000	295	42	0	0	1	0
guestRoom:	26,000	28,000	254	93	1	1	0	0
bathRoom:	29,000	91,000	287	23	0	0	0	0
wc:	142,000	77,000	295	27	0	0	1	1
bedRoom 1:	63,000	109,000	282	81	0	0	1	1
total:			2764	492	3	2	3	3

Total Evaluation Of House: 2476.0

: false New Position: x: 0 y: 0

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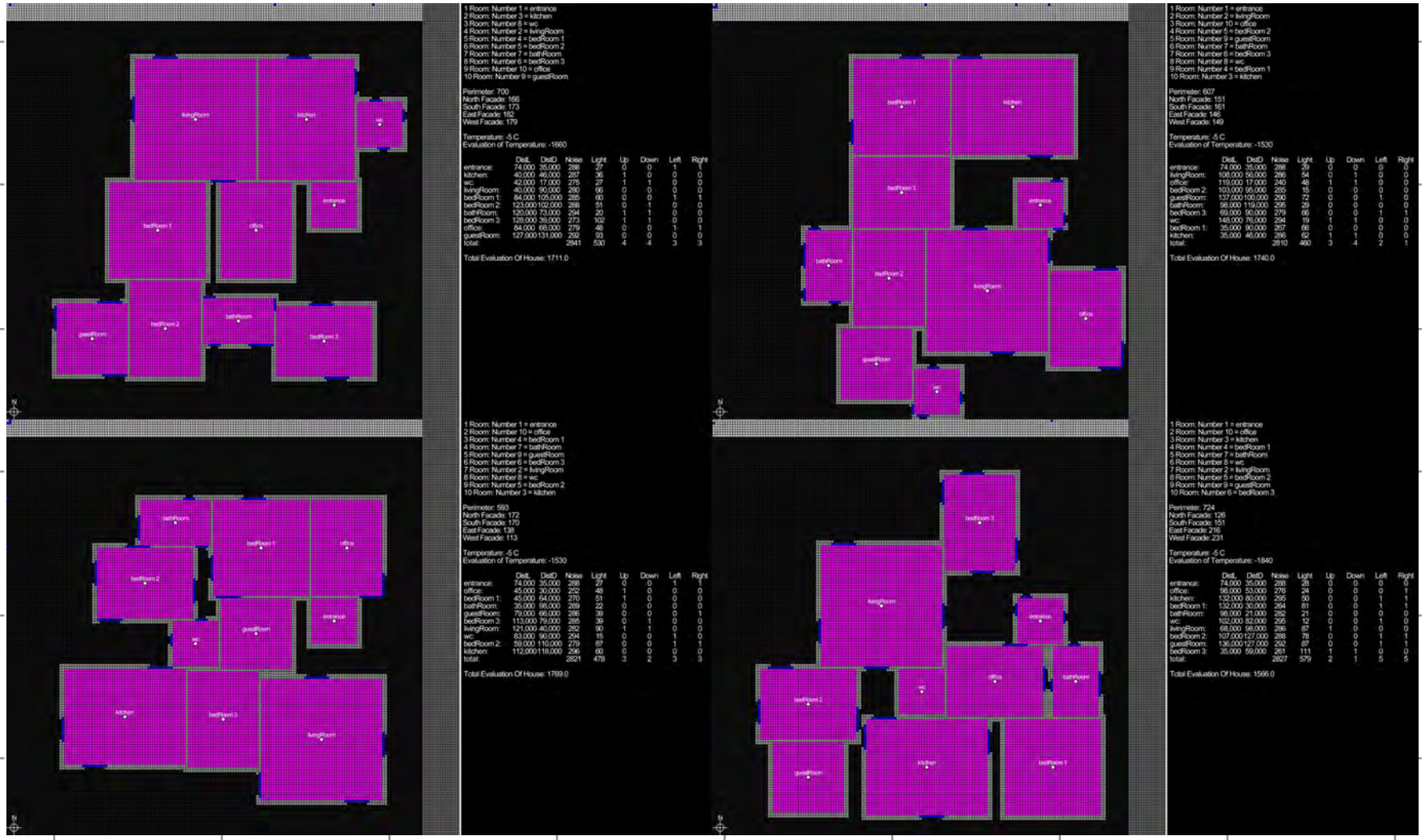
‘CLIMATE-HOUSE’: THE RESULTS

TEMPERATURE: -5 C



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TEMPERATURE: 40 C

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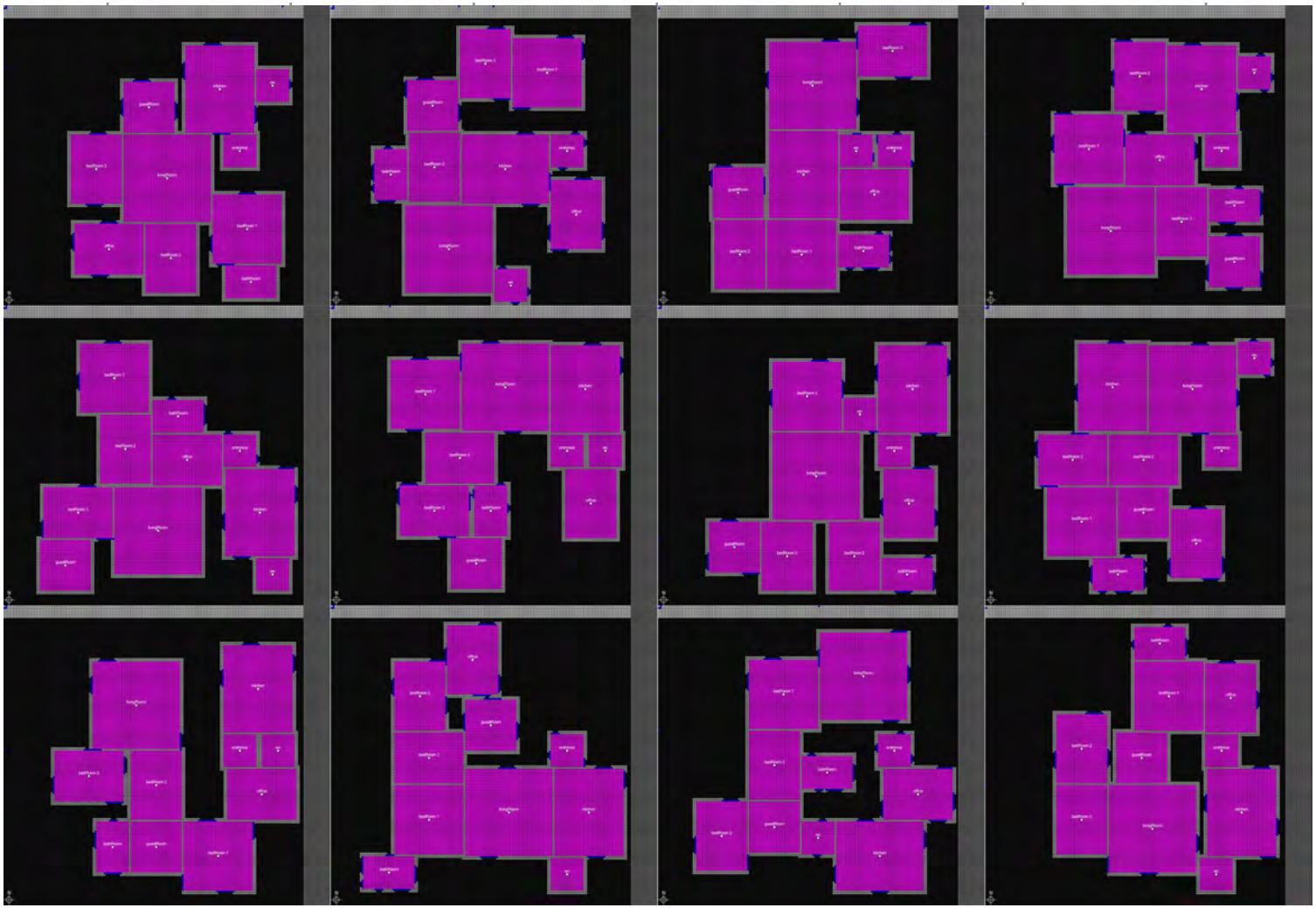
‘CLIMATE-HOUSE’: THE RESULTS

12 FLOOR PLANS



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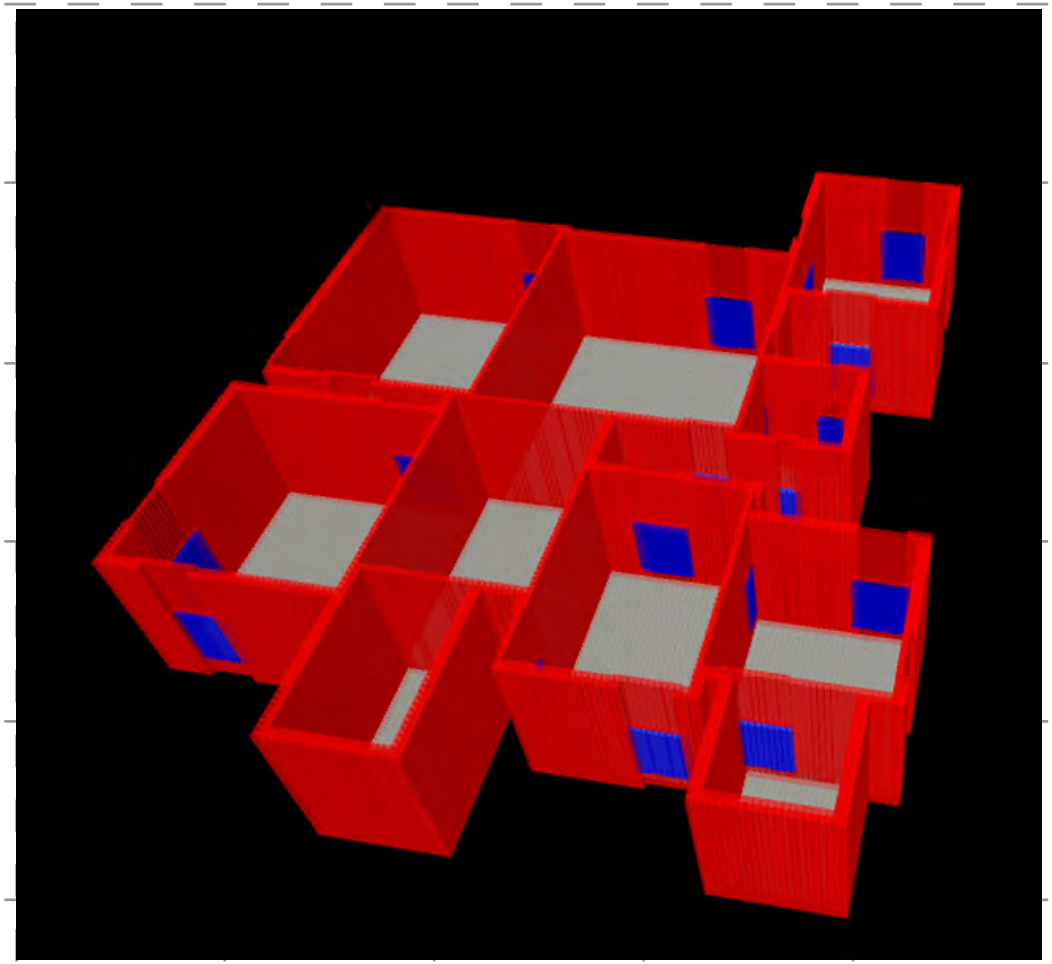
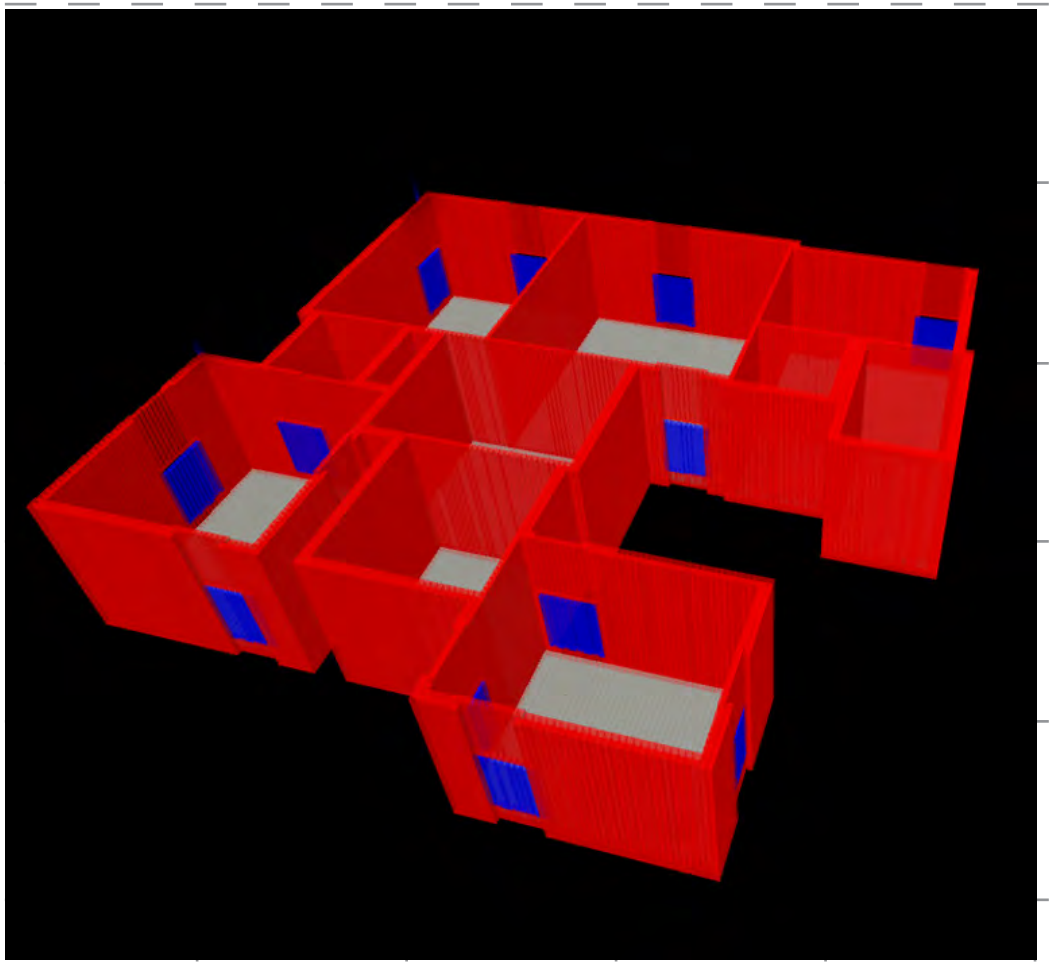
3D IN PROCESSING





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‘CLIMATE-HOUSE’: THE RESULTS

FINAL HOUSE

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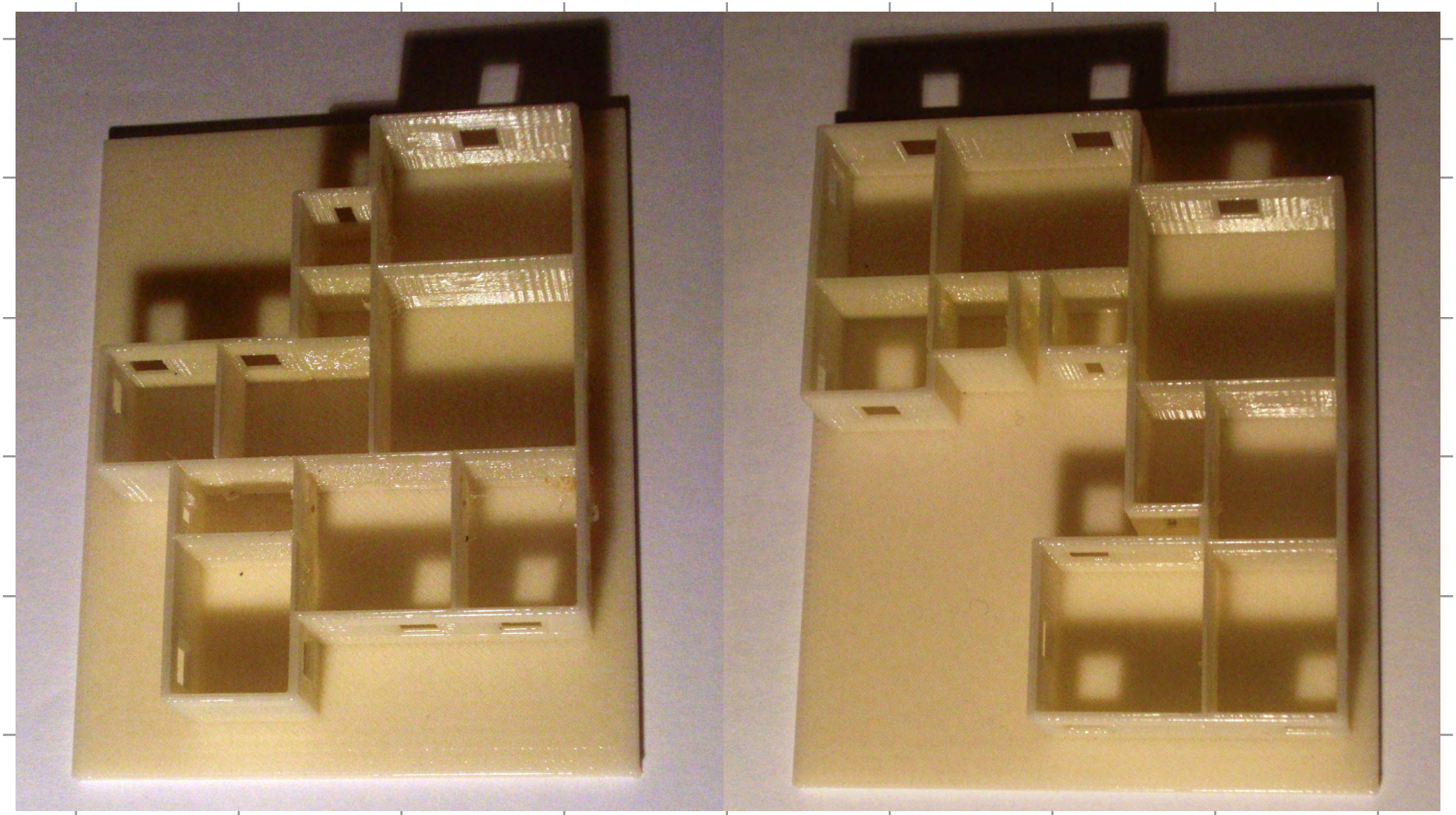
3D PRINTER



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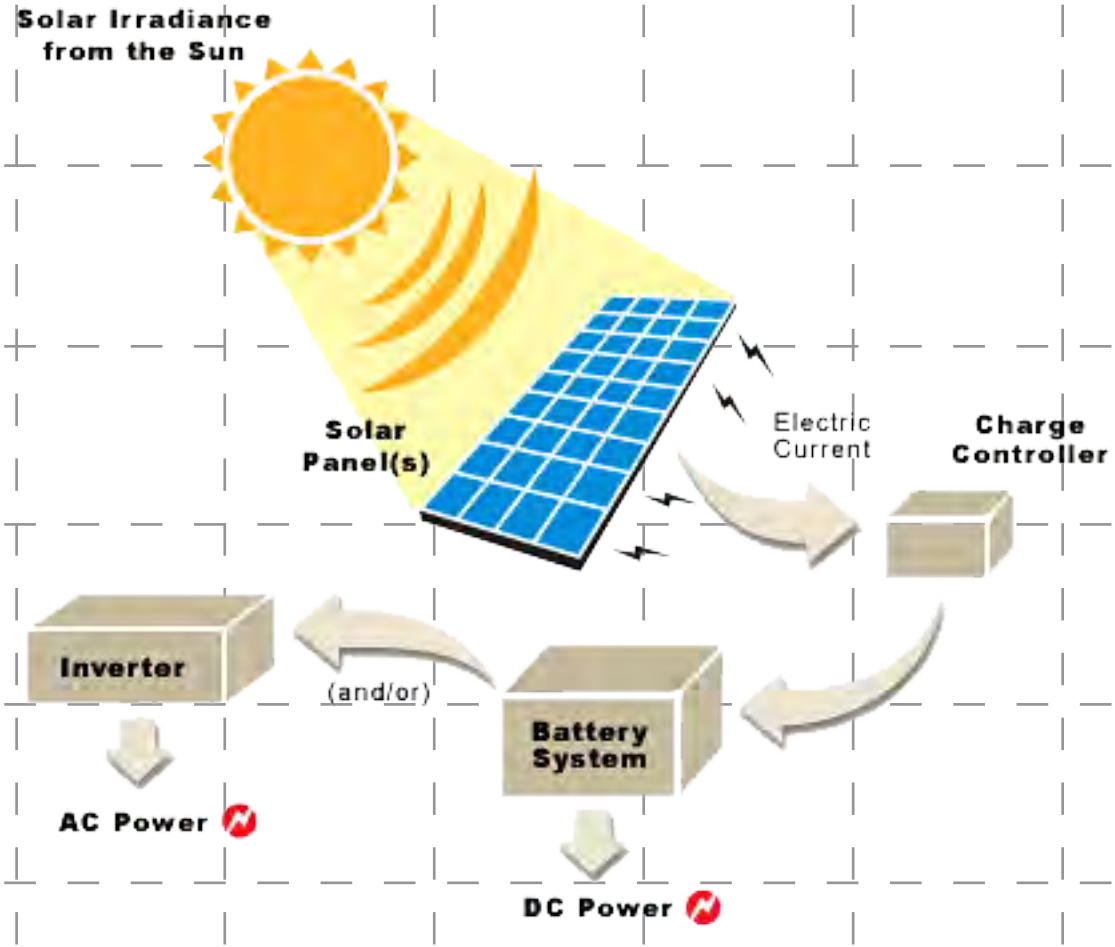
VISION - NEXT STEPS

- Apply solar power panels for independent houses.



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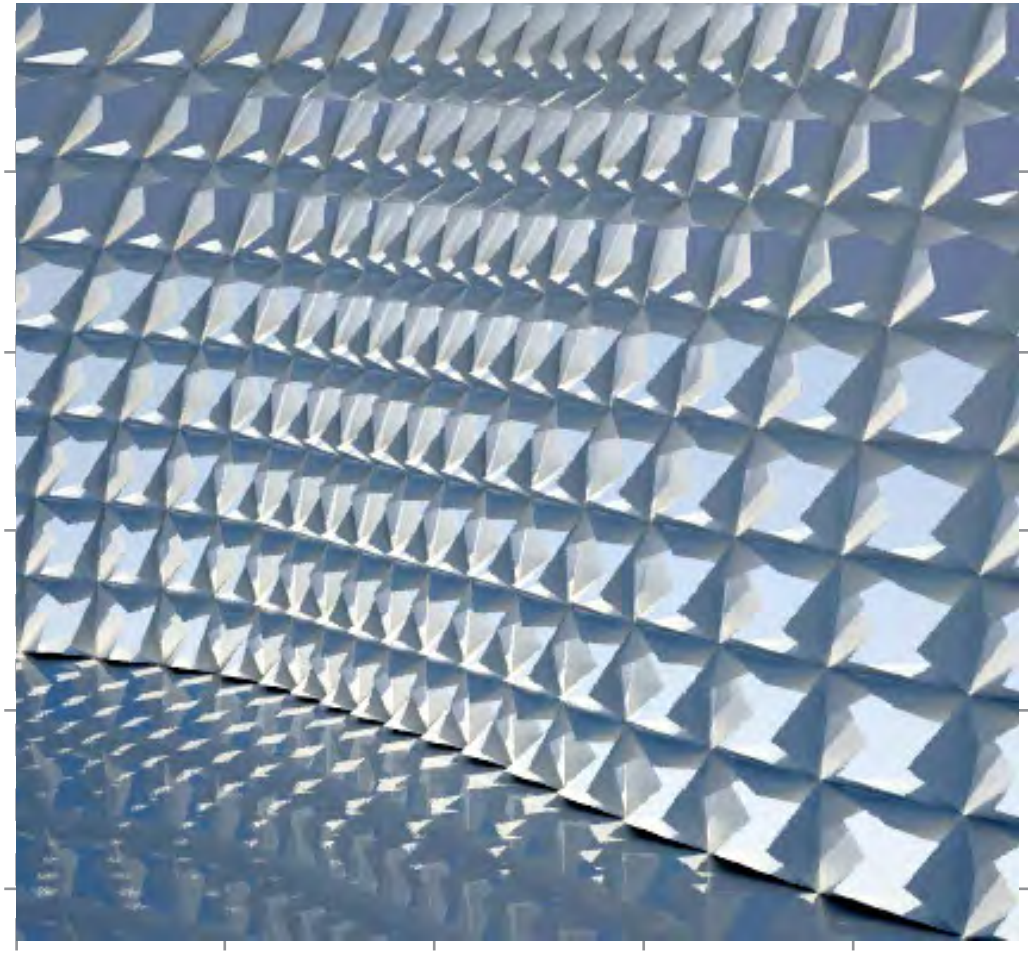
VISION - NEXT STEPS

- Design parametric and movable facades.



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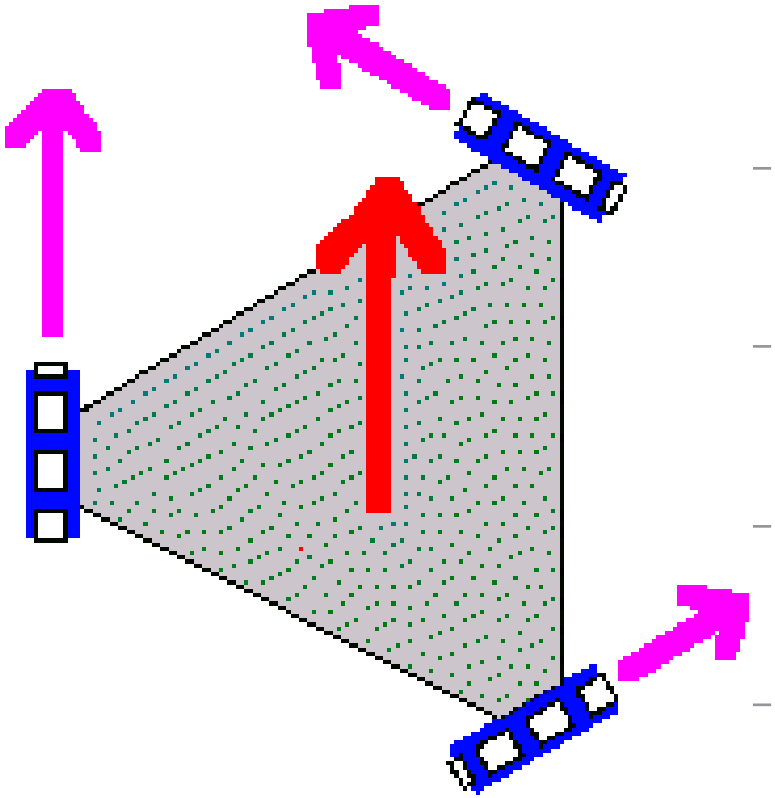
VISION - NEXT STEPS

- Design systems for movable rooms, smart and flexible houses.

http://www.youtube.com/watch?v=maCbriz6FN8&feature=player_embedded



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CONCLUSIONS

- Dynamic buildings that keep the process alive and apply meaning to the behaviour in real time.
- A continuous stream of data to and from the built structure.
- The building becomes a live organism, it becomes the installation.

THE END

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