SUPER-DECORATED FACADE DESIGN

ONE UNIT

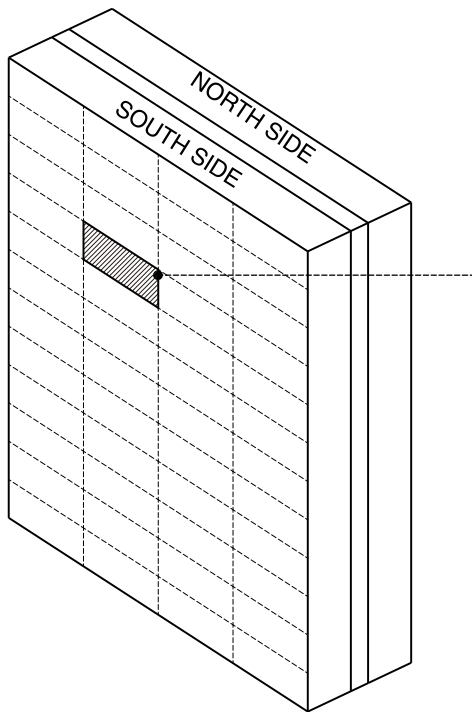TRANSPARENT   BALCONY   OPAQUE

TOP

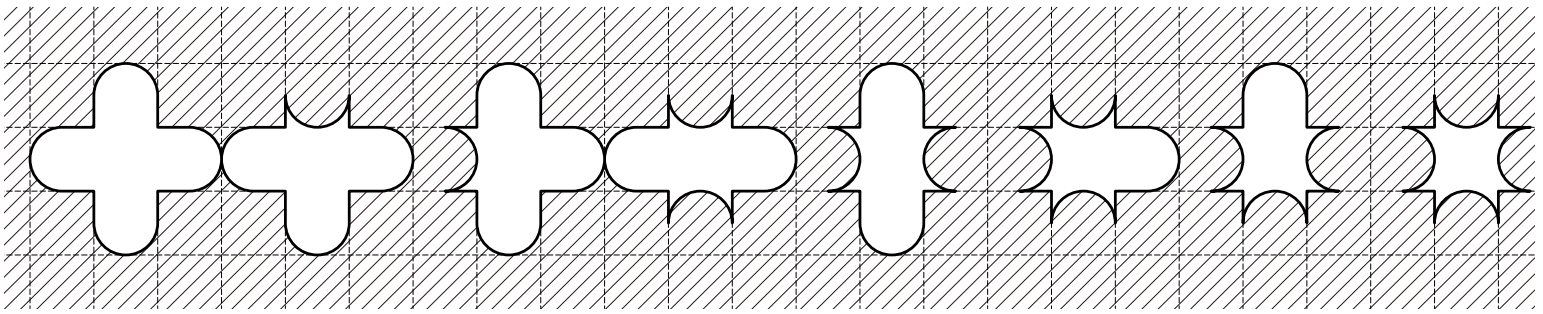LEFT   MID   RIGHT

BOTTOM

TOP

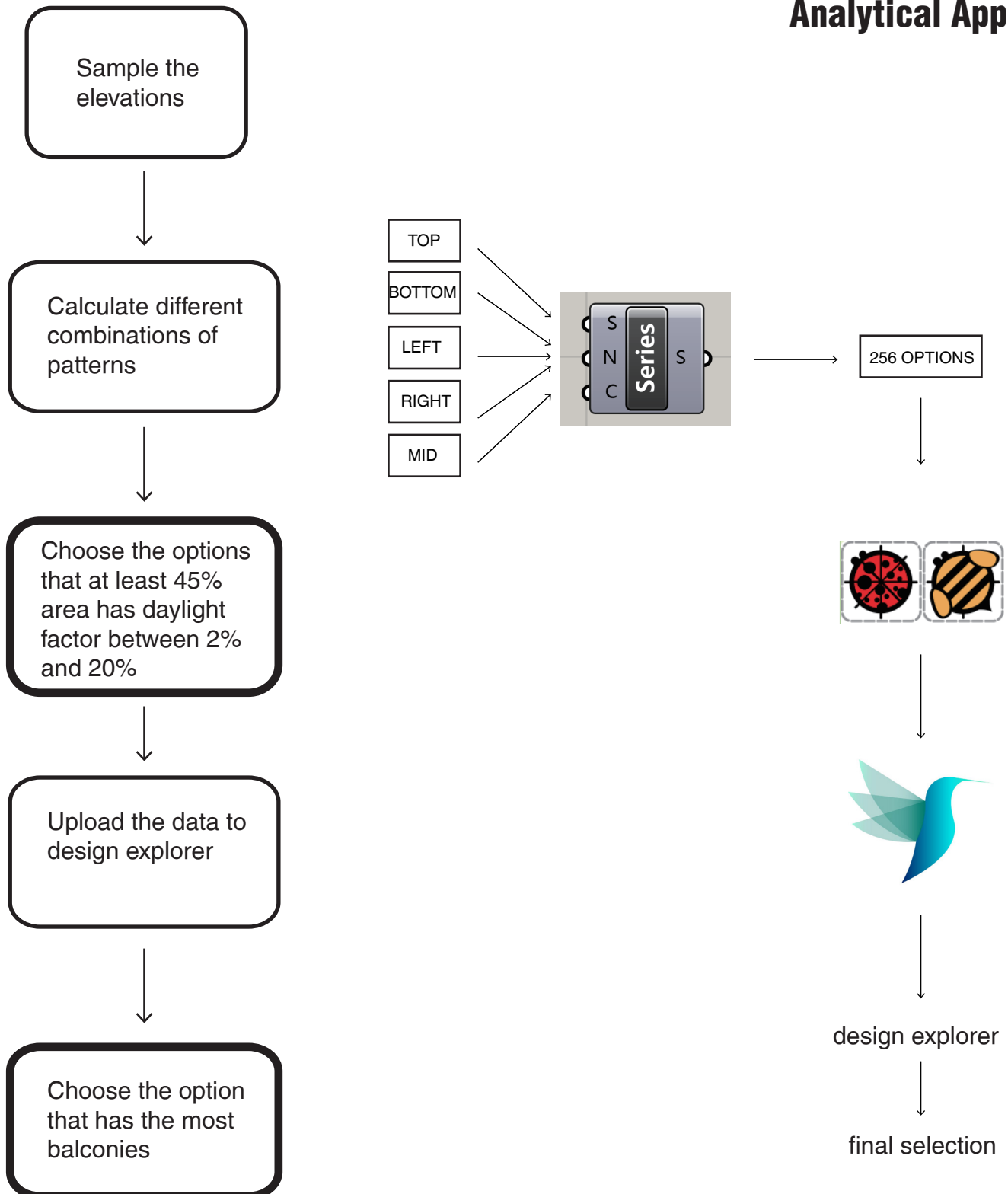BOTTOM

LEFT

RIGHT

MID
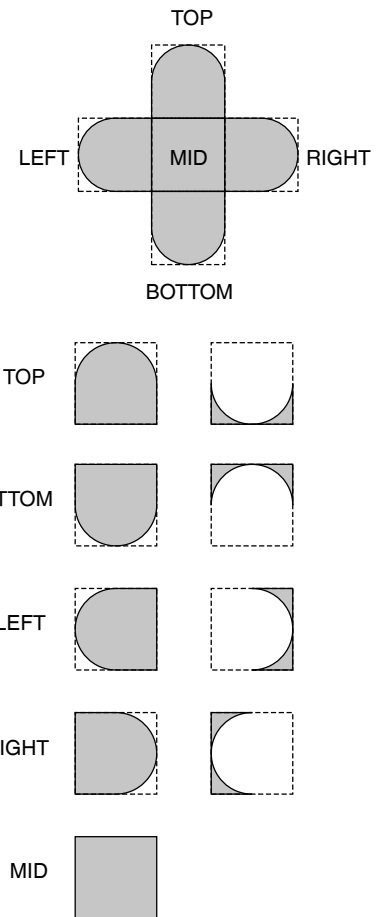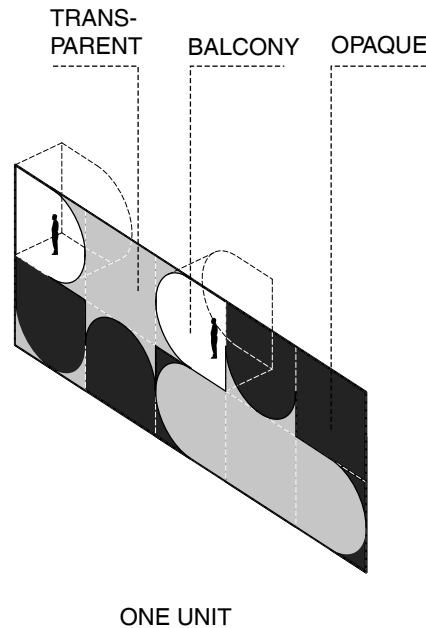
Design Problem

The site is a twelve-storey hotel building, with its south and north facades formed by pre-designed 2d patterns. Our design challenge is to optimize the lighting conditions by altering the pattern aggregation and material choices on the facade. We aim to find the best aggregation that result in the heighest number of balconies while at the same time provides desirable daylight factor range for all the hotel units.
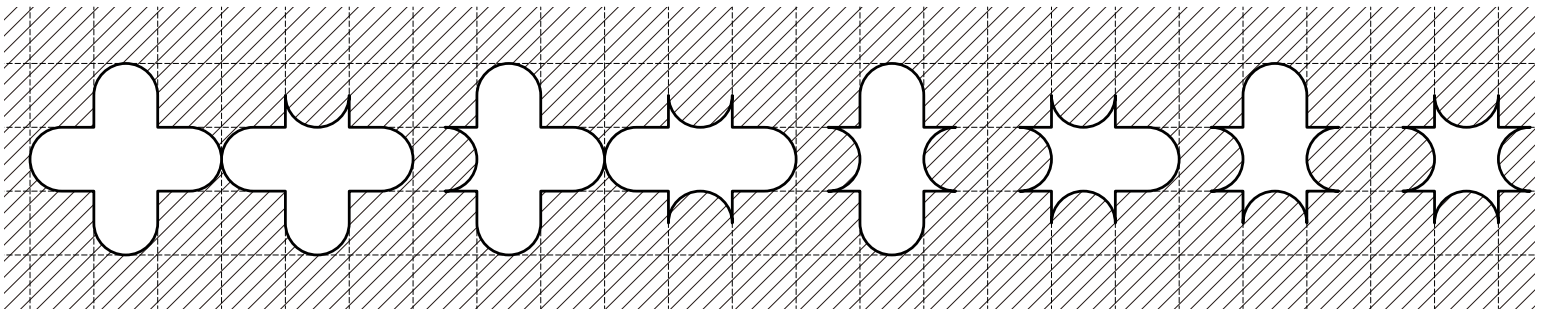
To be more specific, we identified one hotel unit as our sample unit. Each hotel unit consists of 10 pattern grids. Each pattern grid is either a window panel, a solid panel, or an extruded back balcony. The more balconies, the less area of glass, the more desirable the units. As shown in the upper right diagram, for one pattern, the four side grids has two material choices, but the center grid is limited to window panel. So each hotel unit has two center grids and eight side grids, resulting in 256 alterations for one sample. These 256 conditions are our pool of samples among which to evaluate and filter based on daylight factor and balcony numbers.

The end goal is to select the solutions that achieve 45% and above of unit area having 2-20% daylight factor, and at the same time provide as many balconies as possible.

                    Xiaoling Wang, Yangchao Ni, Wen Zhu

Sample the elevations

Calculate different combinations of patterns

Choose the options that at least 45% area has daylight factor between 2% and 20%

Upload the data to design explorer

Choose the option that has the most balconies

TOP
BOTTOM
LEFT
RIGHT
MID

S
N
C

Series

S

256 OPTIONS

design explorer

final selection

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Outcome Visualization

http://tt-acm.github.io/DesignExplorer/?GFOLDER=0B2ZEPIILMYXraWJmZnB6ODlnYVk

Without Filter
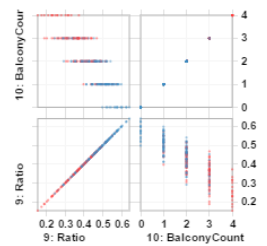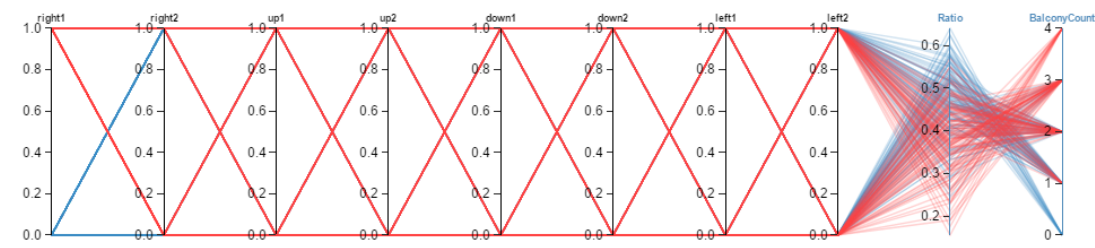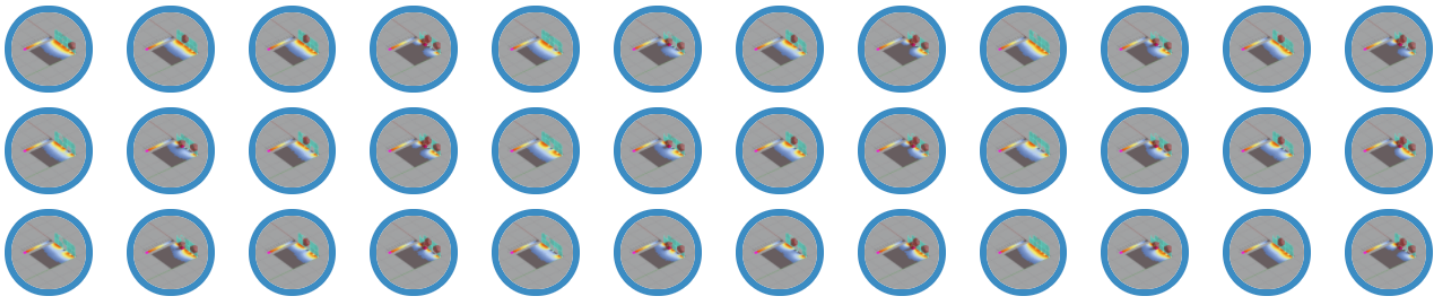
Filtered by ">45% area ranges from 2-20% daylight factor" + "3 balconies"
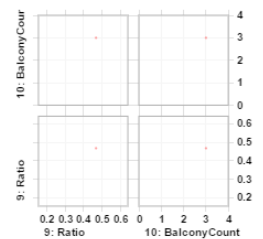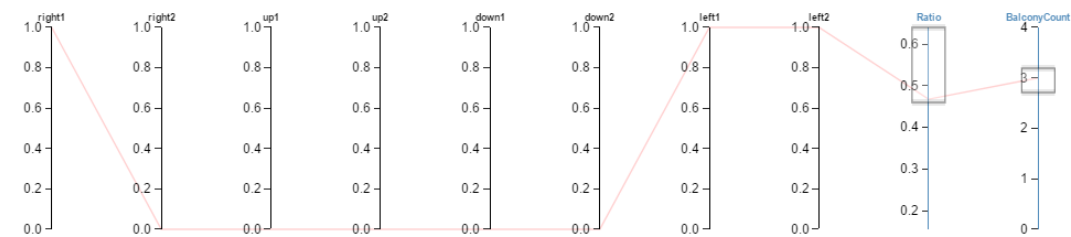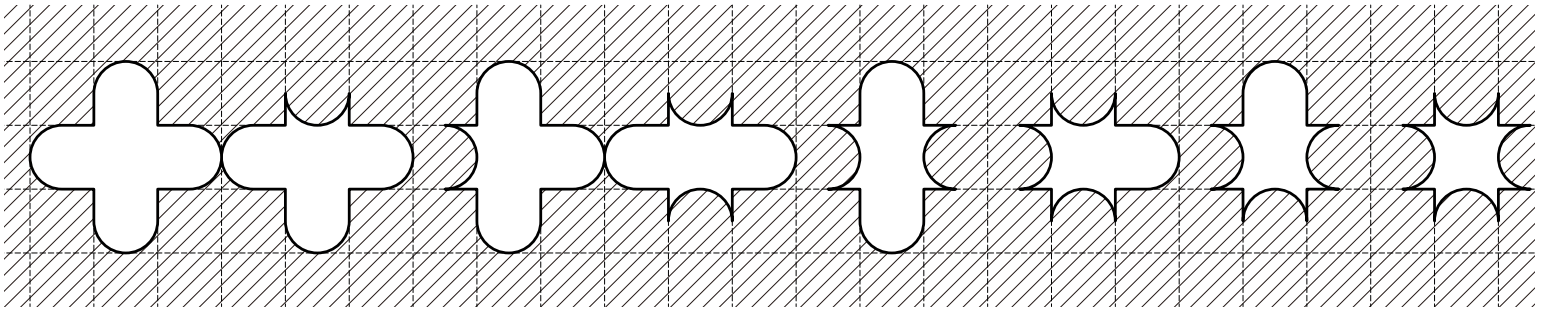
Best Unit

Best Aggregation