48-747 Shape Grammars

THE BUNGALOWS OF BUFFALO
by Downing and Flemming
originally, small vacation house or country retreat

at the turn of the 20\textsuperscript{th} century, it also referred to permanently occupied suburban houses that share features with the original

this led to conventions and principles that regulated their exterior appearance and internal organization, i.e., pattern books

paper concentrates on one aspect, viz., spatial organization as seen in their first floor plans or rather

\textit{different geometric realizations from the same set of conventions}

bungalow
recall that analytic shape grammars are intended for a particular style

clarify commonality of structure and appearance manifest in buildings in a corpus; here, 7 measured drawings of houses from 1914 to 1926 supply conventions and criteria to determine whether any other building outwith the original corpus is an instance of the style; and provide a compositional machinery to describe other buildings in the style.

language $\rightarrow$ style $\leftarrow$ shape grammar
the sources - two streets and seven bungalows
- first street and five bungalows
the sources

- second street and two bungalows
the bungalows
the bungalows
“In the East, even the cheapest house, except when it is occupied only for a couple of months in the summer time, requires a cellar and a comparatively substantial foundation and as this foundation is the chief sources of expense the tendency is to make it cover as small an area as possible and to build over it a comparatively high square box of a house. The necessity of providing a roof with a slope sharp enough to shed the snow readily tends to make our cheaper Eastern and Middle Western house a stiff, angular little building, which is rather perched upon the site than highly fitted tightly to it”

from the pattern book – a rectangular box with a large pitched roof
primary spaces: living, dining, kitchen, bedrooms

secondary spaces: all other rooms

requirements: functional, contextual and formal spaces are identified by symbols

<table>
<thead>
<tr>
<th>symbol</th>
<th>meaning</th>
<th>symbol</th>
<th>meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>bedroom</td>
<td>m</td>
<td>additional living</td>
</tr>
<tr>
<td>c</td>
<td>closet</td>
<td>n, o, p</td>
<td>open porches</td>
</tr>
<tr>
<td>d</td>
<td>dining</td>
<td>q</td>
<td>enclosed porch</td>
</tr>
<tr>
<td>h</td>
<td>hall</td>
<td>s</td>
<td>staircase</td>
</tr>
<tr>
<td>K</td>
<td>kitchen</td>
<td>t</td>
<td>bathroom</td>
</tr>
<tr>
<td>l</td>
<td>living</td>
<td>v</td>
<td>vestibule</td>
</tr>
</tbody>
</table>

conventions for the shape grammar

(0,0):K,1

Initial shape
### Allocation of Spaces
- Starting pattern
- Primary spaces
  - + staircase, bathroom & hall
- Extension of spaces
  - + built-in closets
- Merging of spaces
  - + porch

### Generation of Connections
- Front entrance
- Second entrance
- Internal doors & openings
- Windows
- **Termination**

**Stages** in shape grammar
allocation of spaces
starting pattern
<table>
<thead>
<tr>
<th>Bungalow</th>
<th>Length</th>
<th>Width</th>
<th>Clear width uz</th>
<th>Clear width lz</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>39’6”</td>
<td>24’9”</td>
<td>12’0”</td>
<td>11’0”</td>
</tr>
<tr>
<td>B</td>
<td>44’0”</td>
<td>24’6”</td>
<td>12’0”</td>
<td>11’0”</td>
</tr>
<tr>
<td>C</td>
<td>44’0”</td>
<td>26’0”</td>
<td>13’6”</td>
<td>11’4”</td>
</tr>
<tr>
<td>D</td>
<td>44’6”</td>
<td>26’3”</td>
<td>13’6”</td>
<td>10’6”</td>
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<tr>
<td>E</td>
<td>47’0”</td>
<td>27’0”</td>
<td>12’6”</td>
<td>12’3”</td>
</tr>
<tr>
<td>F</td>
<td>45’0”</td>
<td>23’3”</td>
<td>10’0”</td>
<td>10’6”</td>
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<tr>
<td>G</td>
<td>44’0”</td>
<td>22’6”</td>
<td>11’0”</td>
<td>9’10”</td>
</tr>
</tbody>
</table>

(common) measured dimensions
creating a starting pattern
creating staircase, bathroom and hall
rules as a tree of possibility
either $x = d$ and $y = d'$ or $x = y$ and $y \in \{l, l'\}$

either $x = d$ and $y = d'$, or $x = y = b$

extending spaces
either $x = y = b$, or $(x, y) = (k, d')$

adding a **built-in closets**
adding a front porch
generation of connections
read the second half of the paper and follow the rules and see if you can produce the final configuration

exercise