

# 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<sup>th</sup> 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

*different geometric realizations from the same set of conventions*

**bungalow**

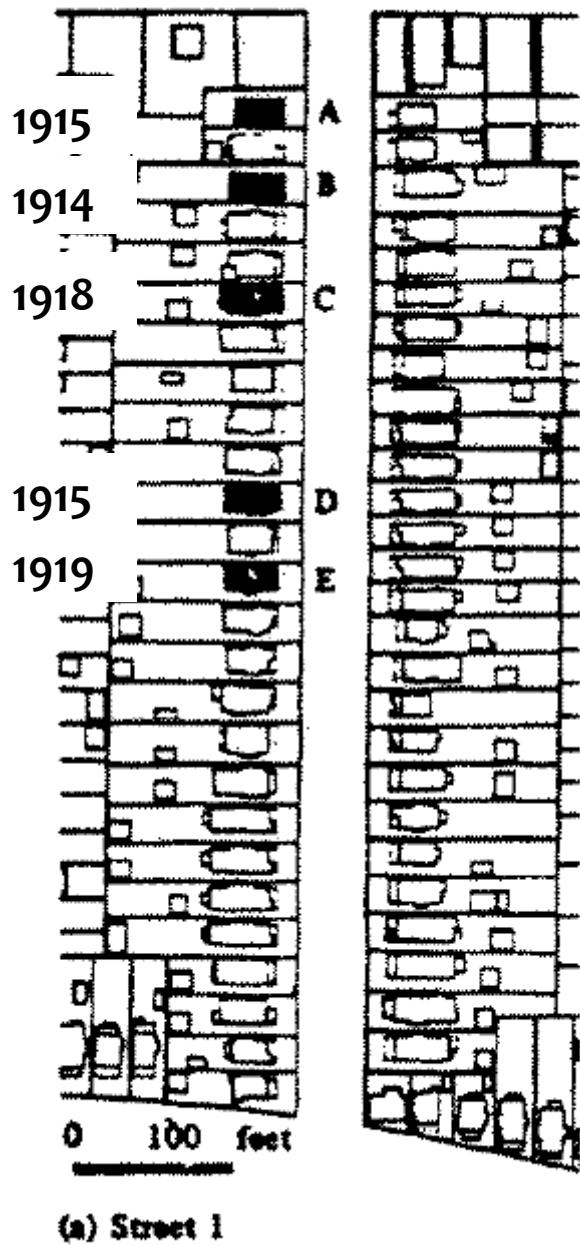
recall that analytic  
shape grammars are  
intended for a  
**particular style**

clarify *commonality of structure* and  
appearance manifest in buildings in a  
corpus; here, **7 measured drawings of  
houses from 1914 to 1926**

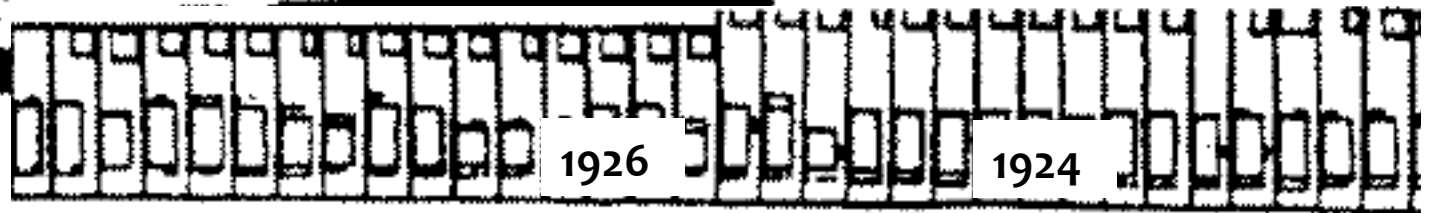
supply *conventions and criteria* to  
determine whether any other building  
outwith the original corpus is an instance  
of the style; and

provide a *compositional machinery* to  
describe other buildings in the style.

language → **style** ← shape grammar



**the sources** - two streets and seven bungalows  
 - first street and five bungalows



F

G



the sources

100 feet

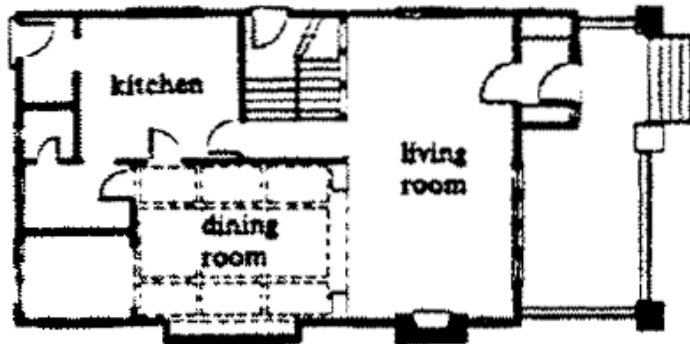
- second street and two bungalows



east elevation



north elevation



plan of first floor

bungalow A

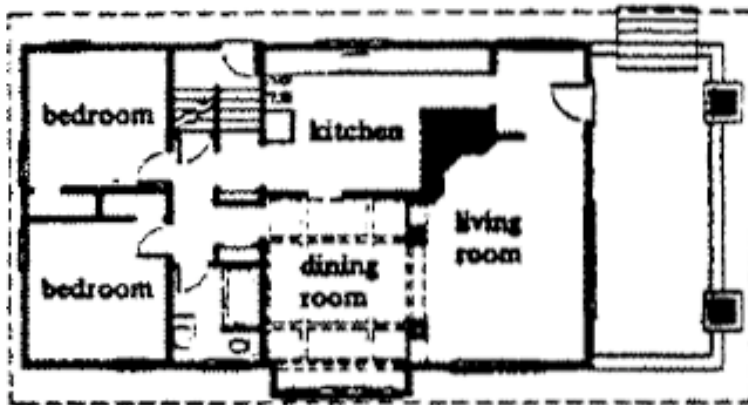
the bungalows



east elevation



north elevation



plan of first floor

bungalow B

the bungalows

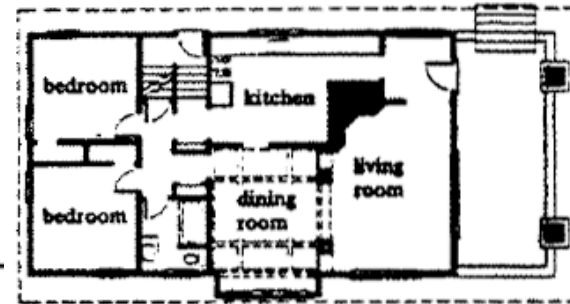




east elevation

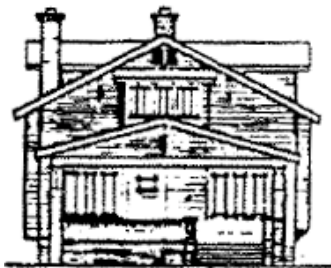


north elevation



plan of first floor

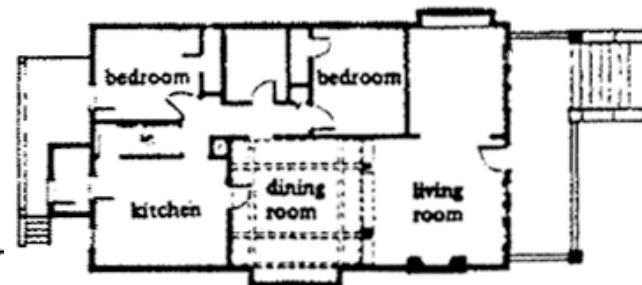
bungalow B



east elevation



north elevation



plan of first floor

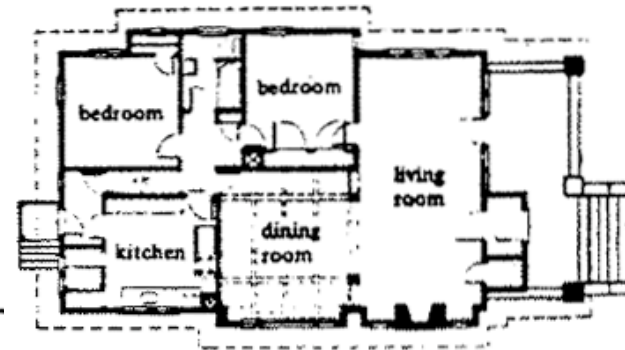
bungalow C



east elevation



south elevation



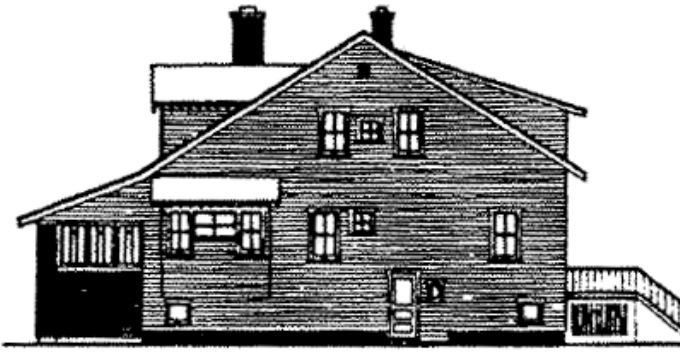
plan of first floor

bungalow D

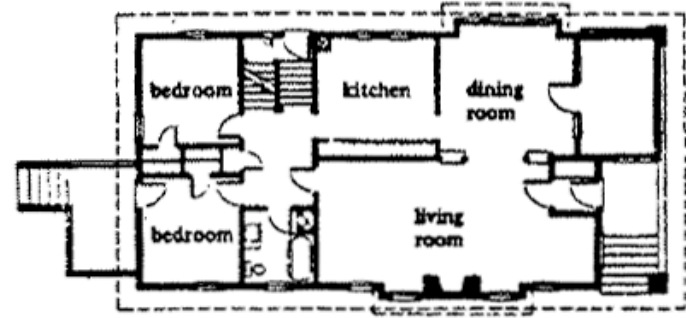




east elevation



north elevation

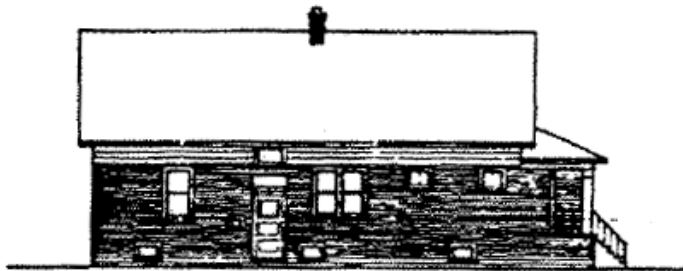


plan of first floor

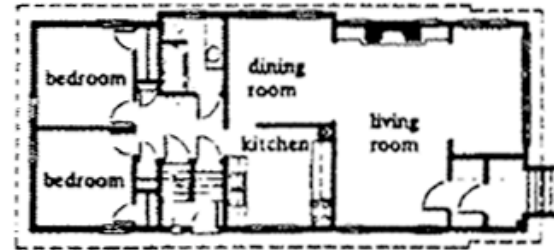
bungalow E



north elevation



east elevation



plan of first floor

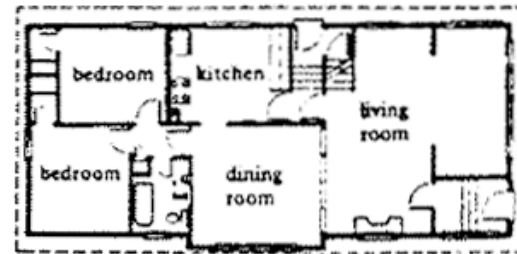
bungalow F



north elevation



west elevation



plan of first floor

bungalow G

*“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

symbol	meaning	symbol	meaning
b	bedroom	m	additional living
c	closet	n, o, p	open porches
d	dining	q	enclosed porch
h	hall	s	staircase
K	kitchen	t	bathroom
l	living	v	vestibule

(0,0):K,1

*Initial shape*

**conventions** for the shape grammar

*allocation of spaces*

starting pattern

primary spaces

+ staircase, bathroom & hall

extension of spaces

+ built-in closets

merging of spaces

+ porch

**stages** in shape grammar

*generation of connections*

front entrance

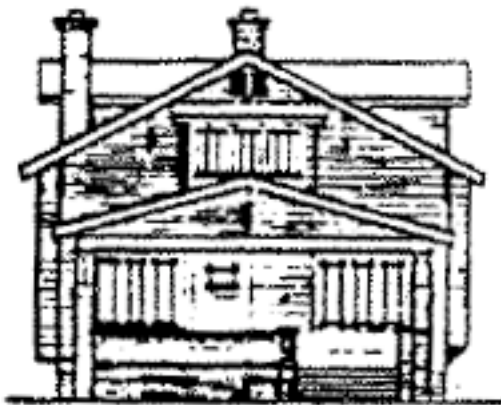
second entrance

internal doors & openings

windows

**termination**

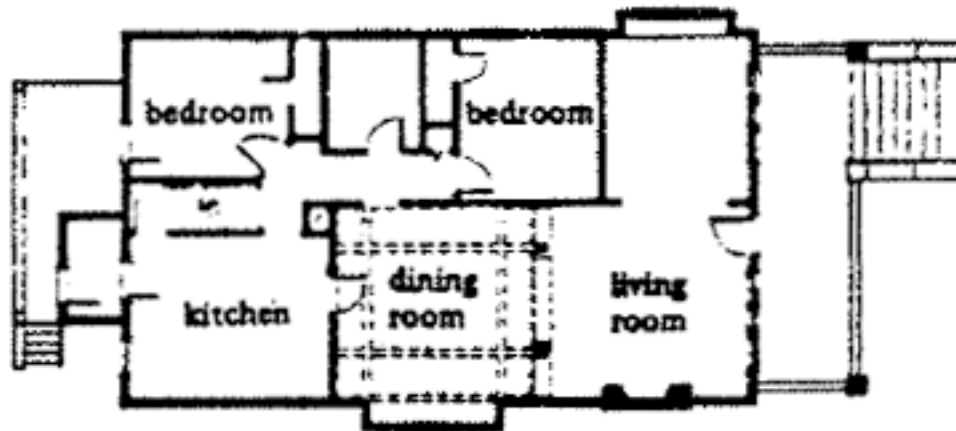
allocation of spaces



east elevation



north elevation

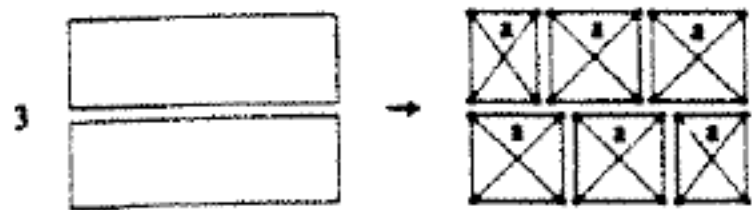
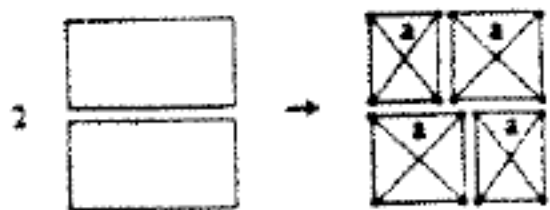
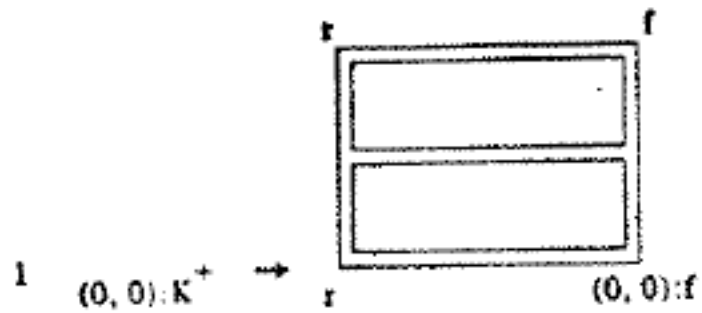


plan of first floor

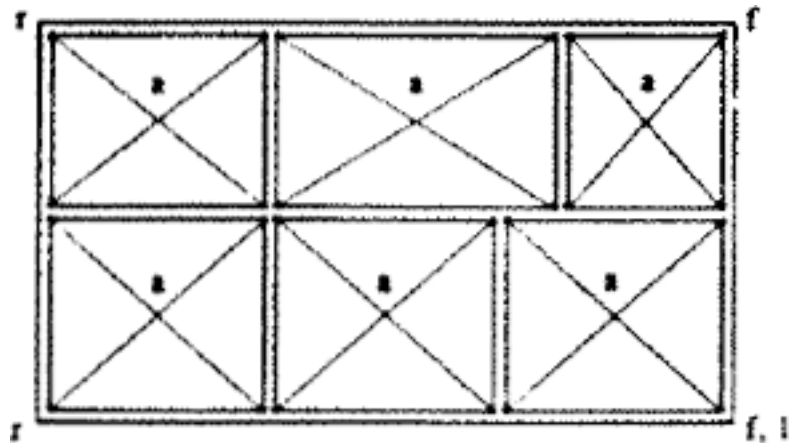
bungalow C

exemplar



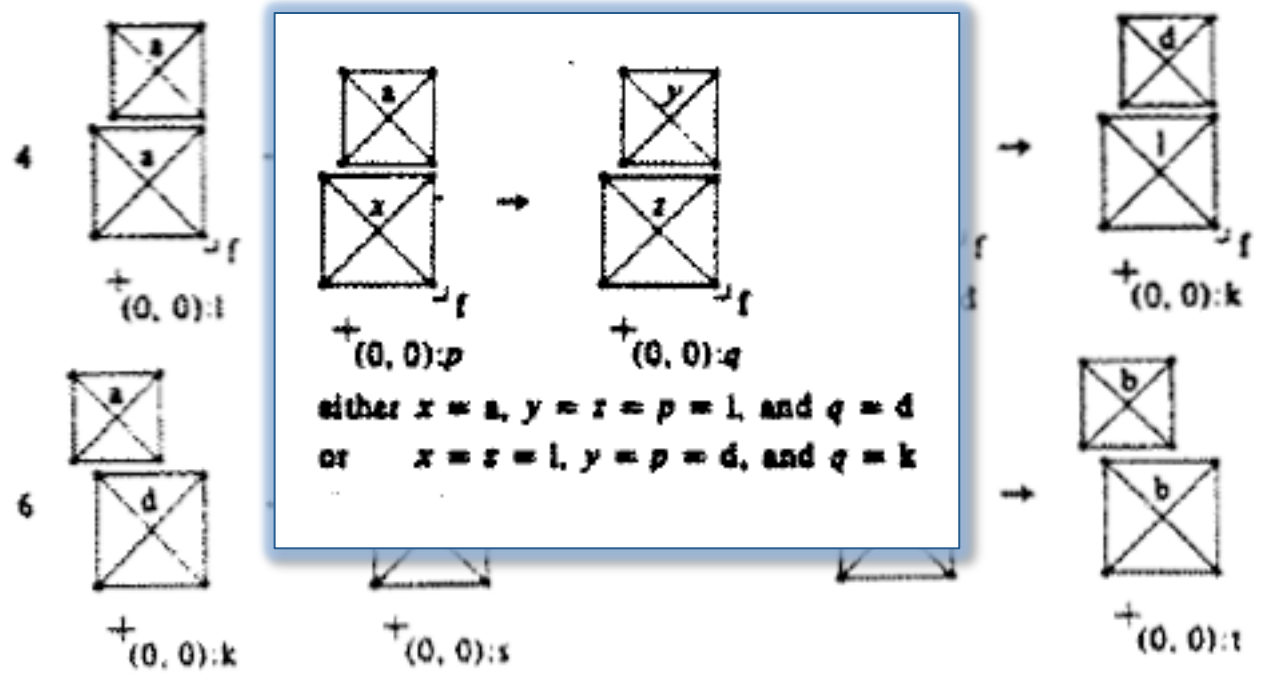


starting pattern

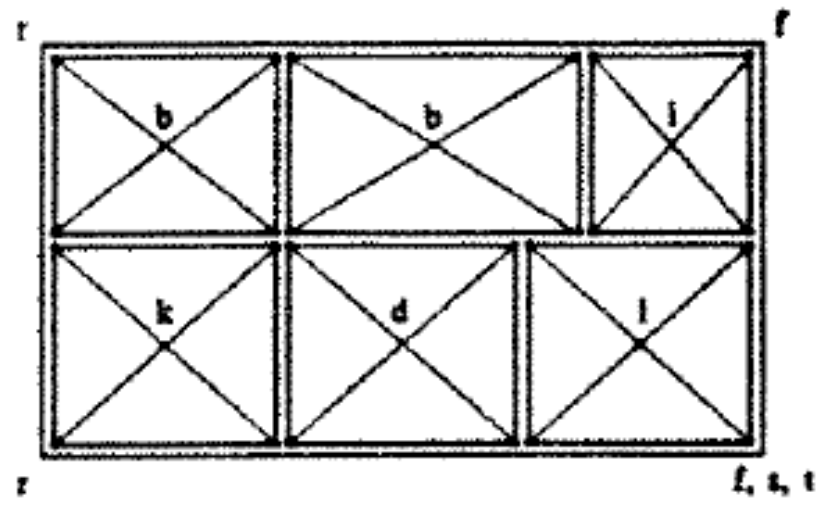


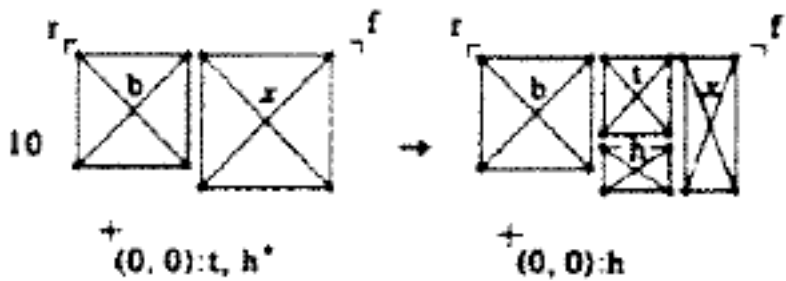
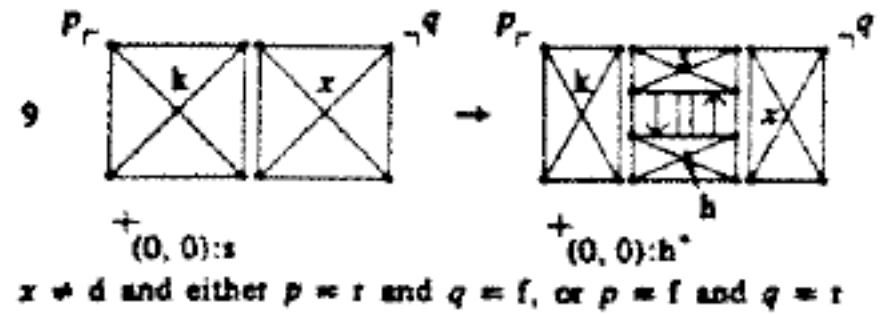
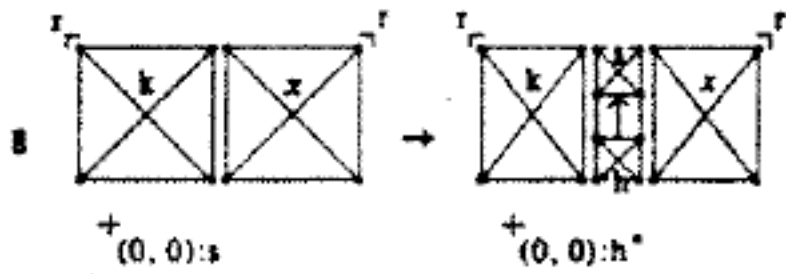
Bungalow	Length	Width	Clear width uz	Clear width lz
A	39'6"	24'9"	12'0"	11'0"
B	44'0"	24'6"	12'0"	11'0"
C	44'0"	26'0"	13'6"	11'4"
D	44'6"	26'3"	13'6"	10'6"
E	47'0"	27'0"	12'6"	12'3"
F	45'0"	23'3"	10'0"	10'6"
G	44'0"	22'6"	11'0"	9'10"

**(common) measured dimensions**

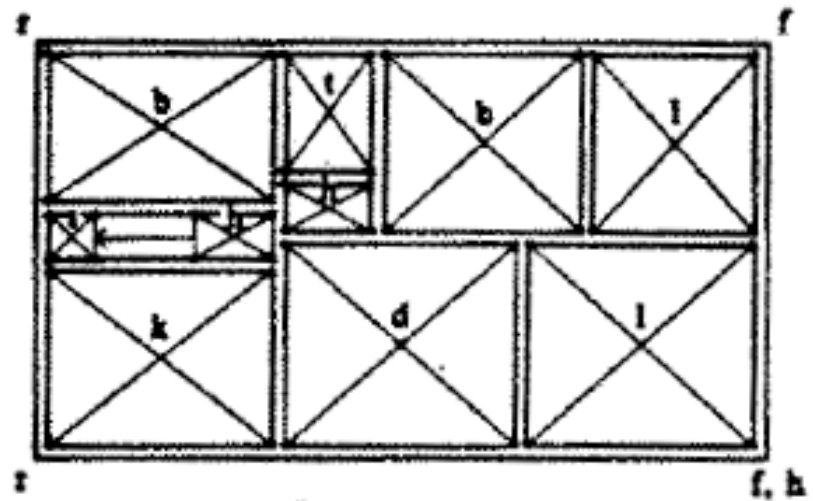


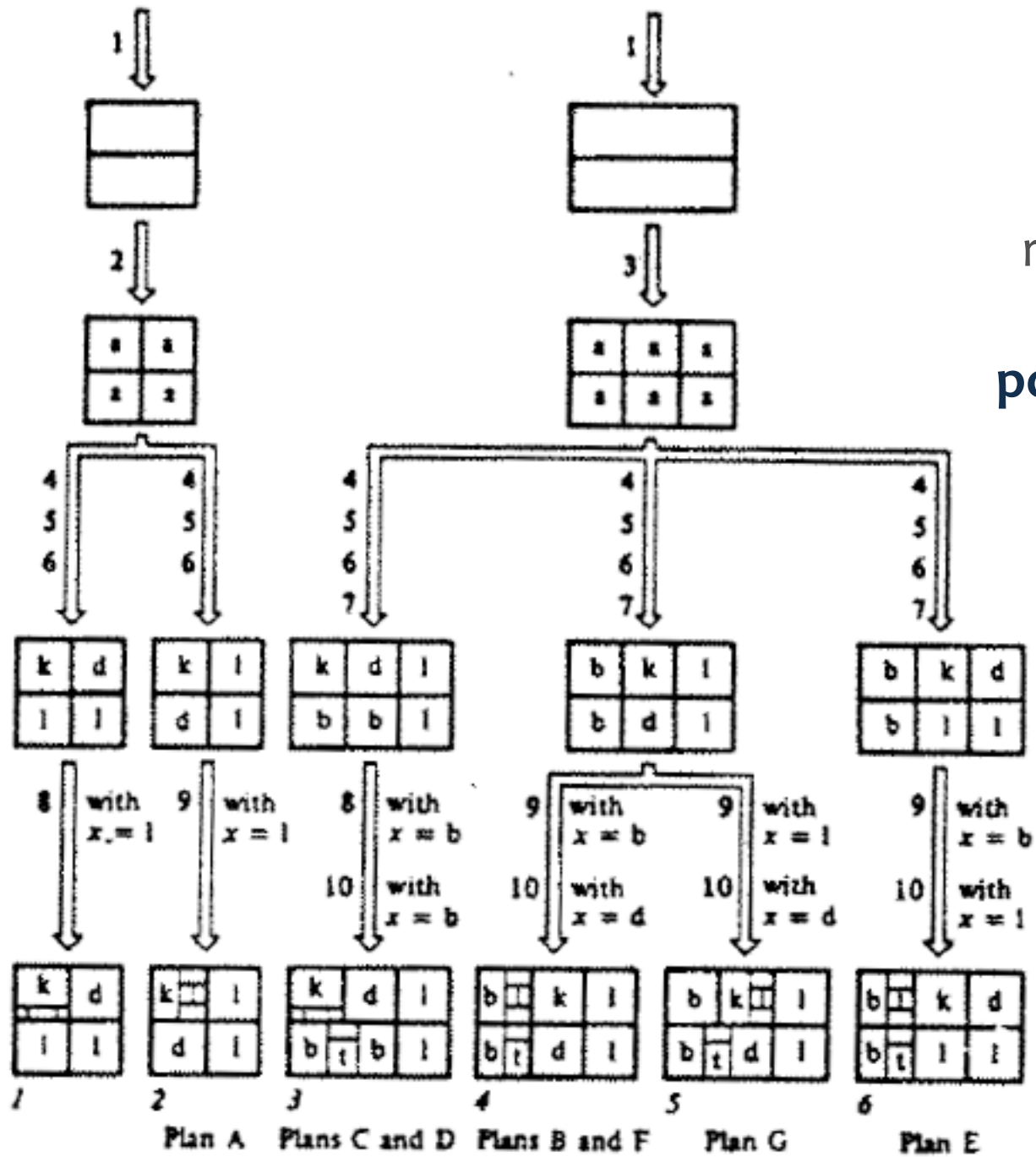
creating a  
 starting pattern



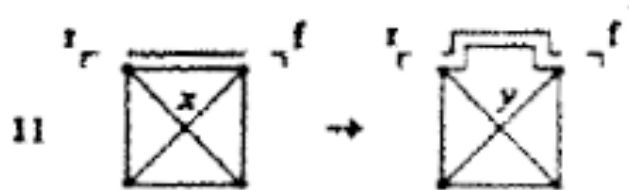


creating  
staircase, bathroom and hall

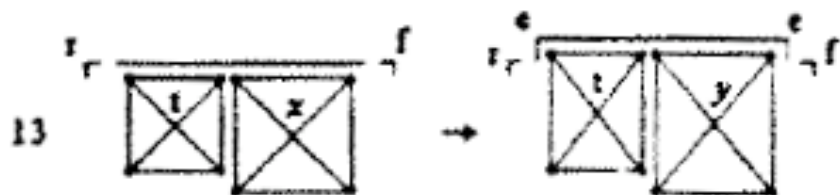
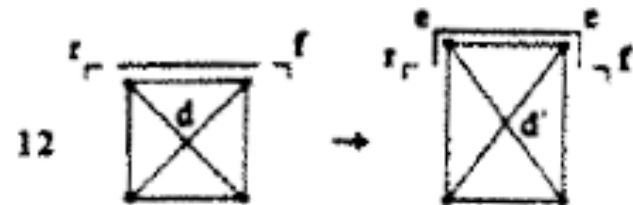




rules as a  
tree of  
possibility

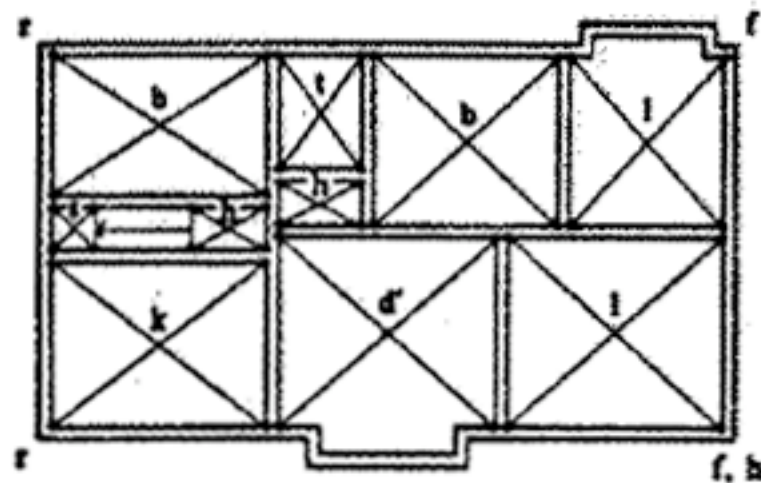


either  $x = d$  and  $y = d'$  or  $x = y$  and  $y \in (L, \Gamma)$

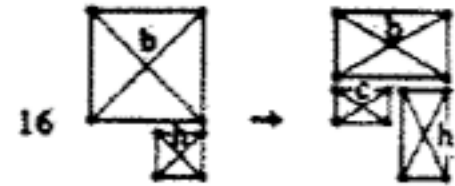
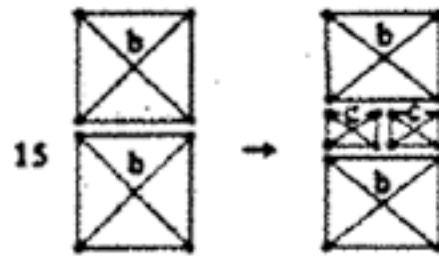
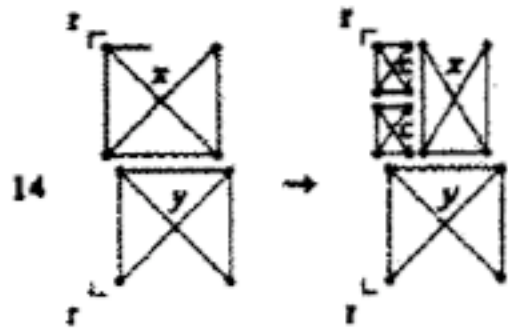


either  $x = d$  and  $y = d'$ , or  $x = y = b$

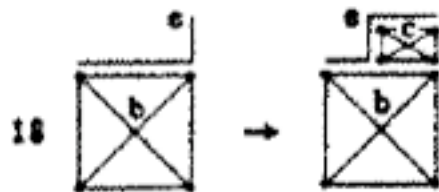
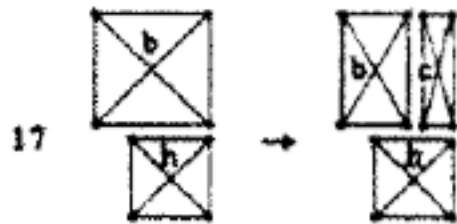
extending spaces



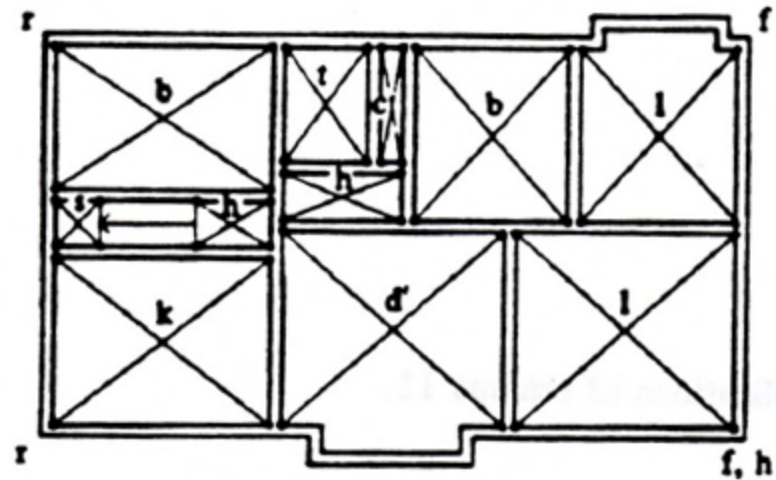


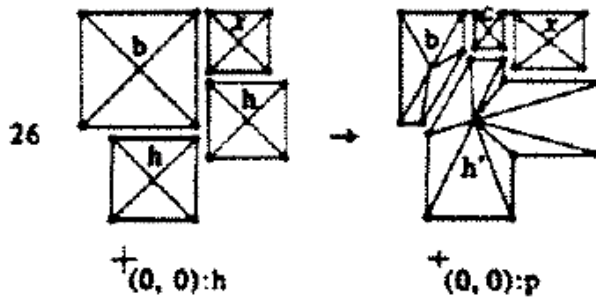
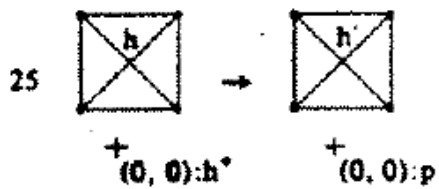
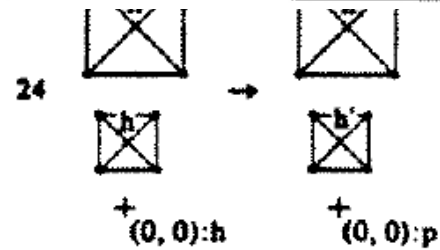
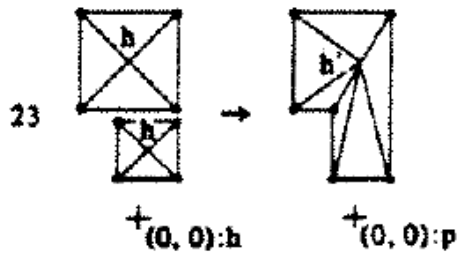
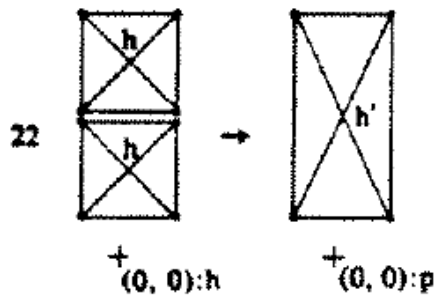
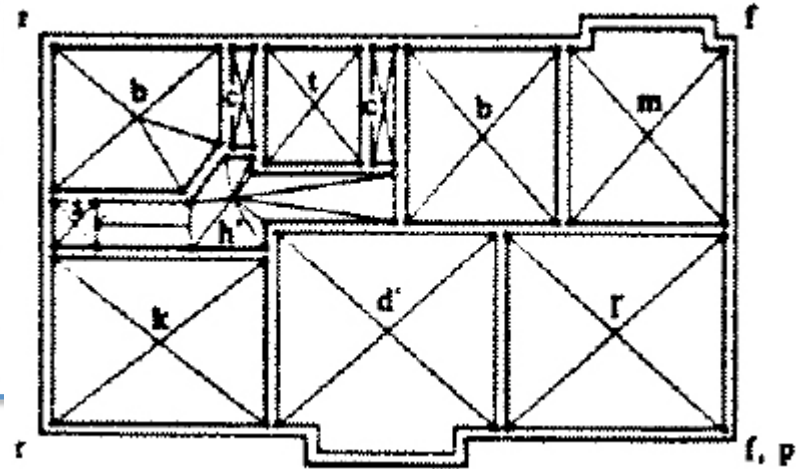
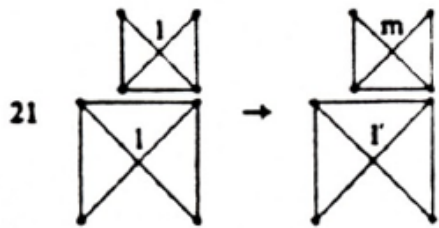
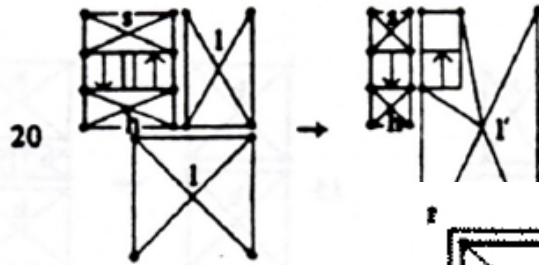
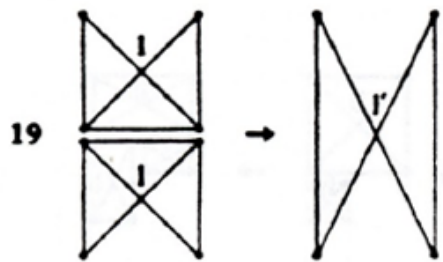


either  $x = y = b$ , or  $(x, y) = (k, d')$

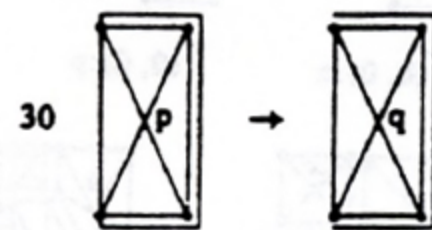
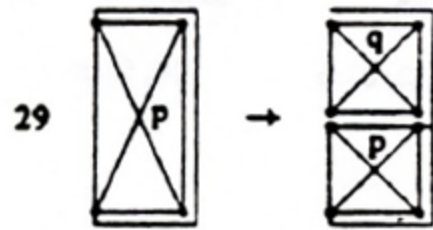
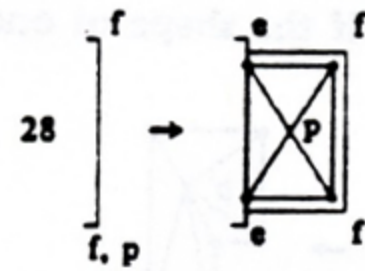
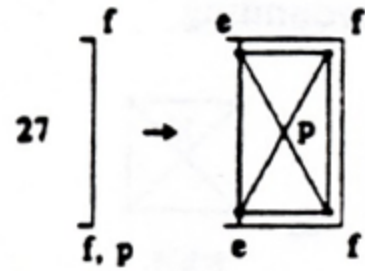


adding a **built-in closets**





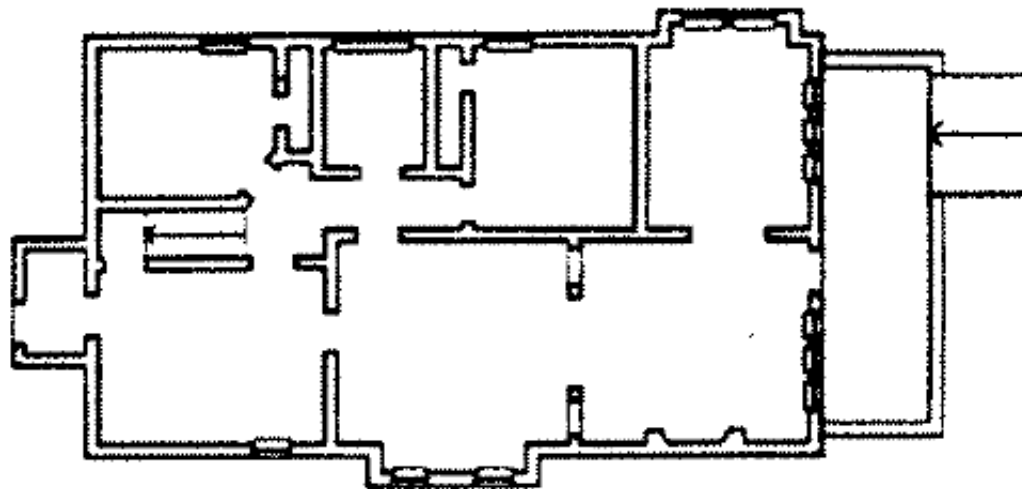
merging spaces



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**