

**GRAMAZIO  
KOHLER  
R S RCH  
E EA**

**dbt**

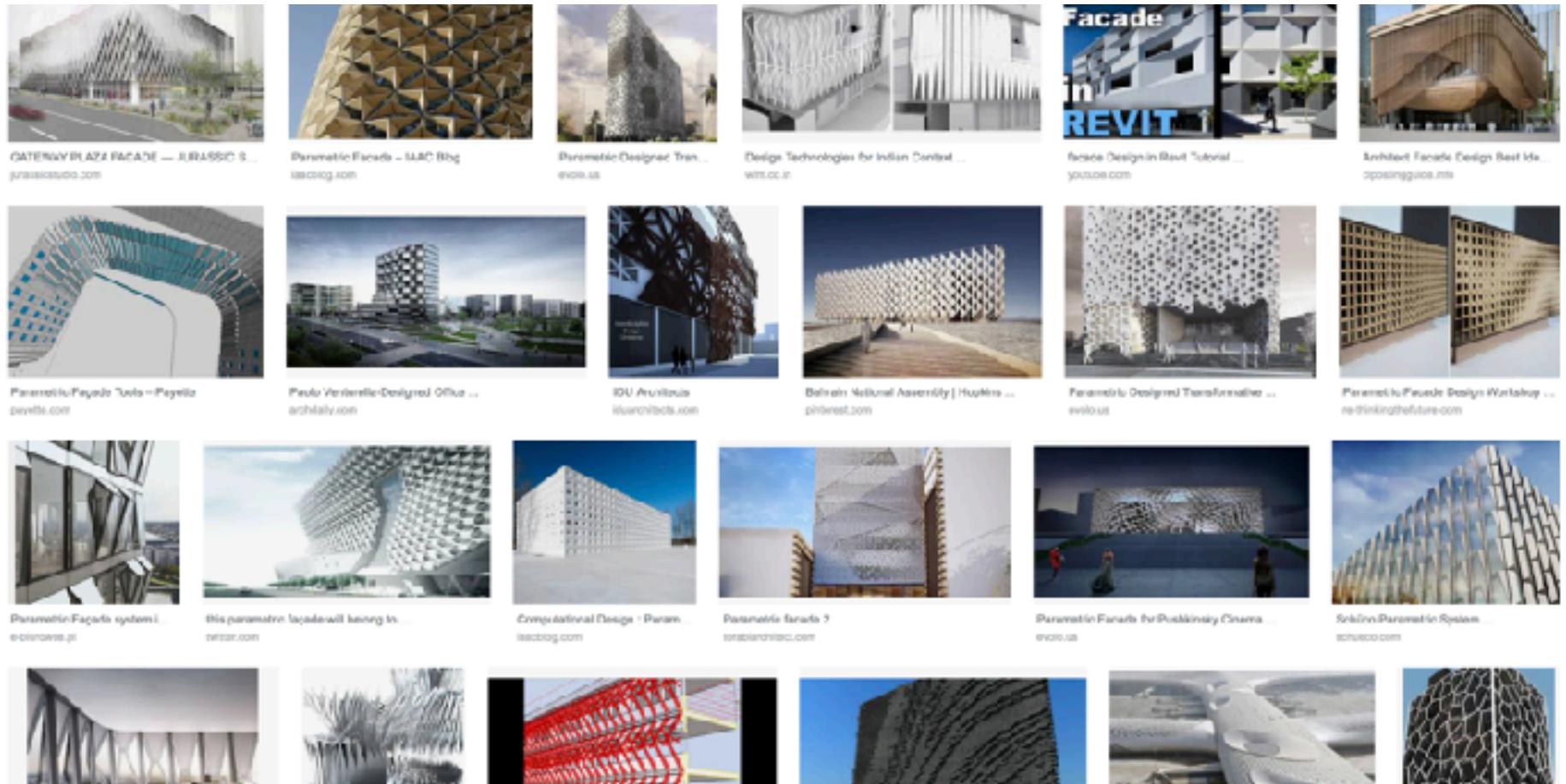
**ETHzürich**

**dbt**

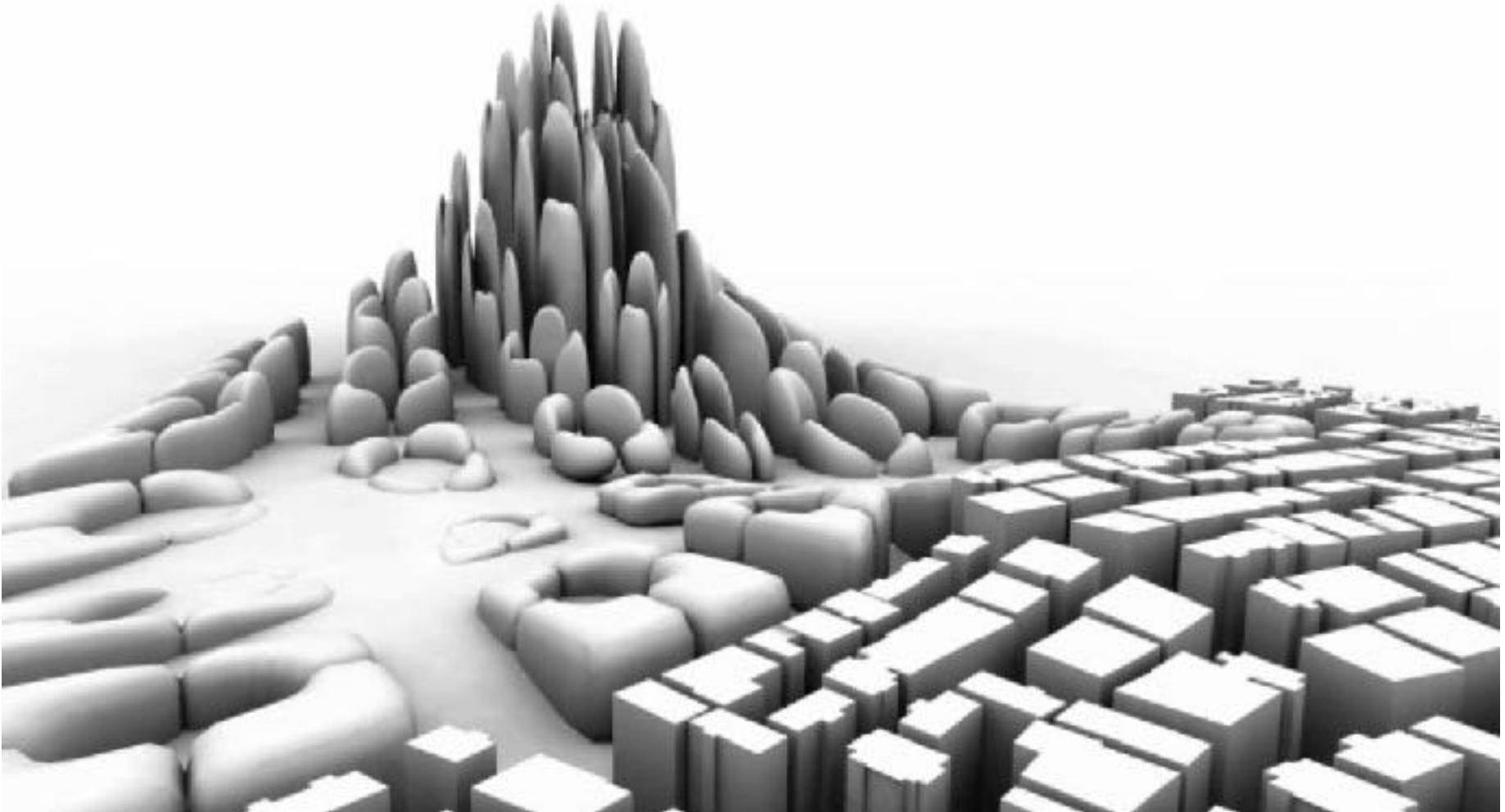
**GRAMAZIO  
KOHLER  
R S RCH  
E EA**

**ETHzürich**

# Parametric Design



# Urbanism

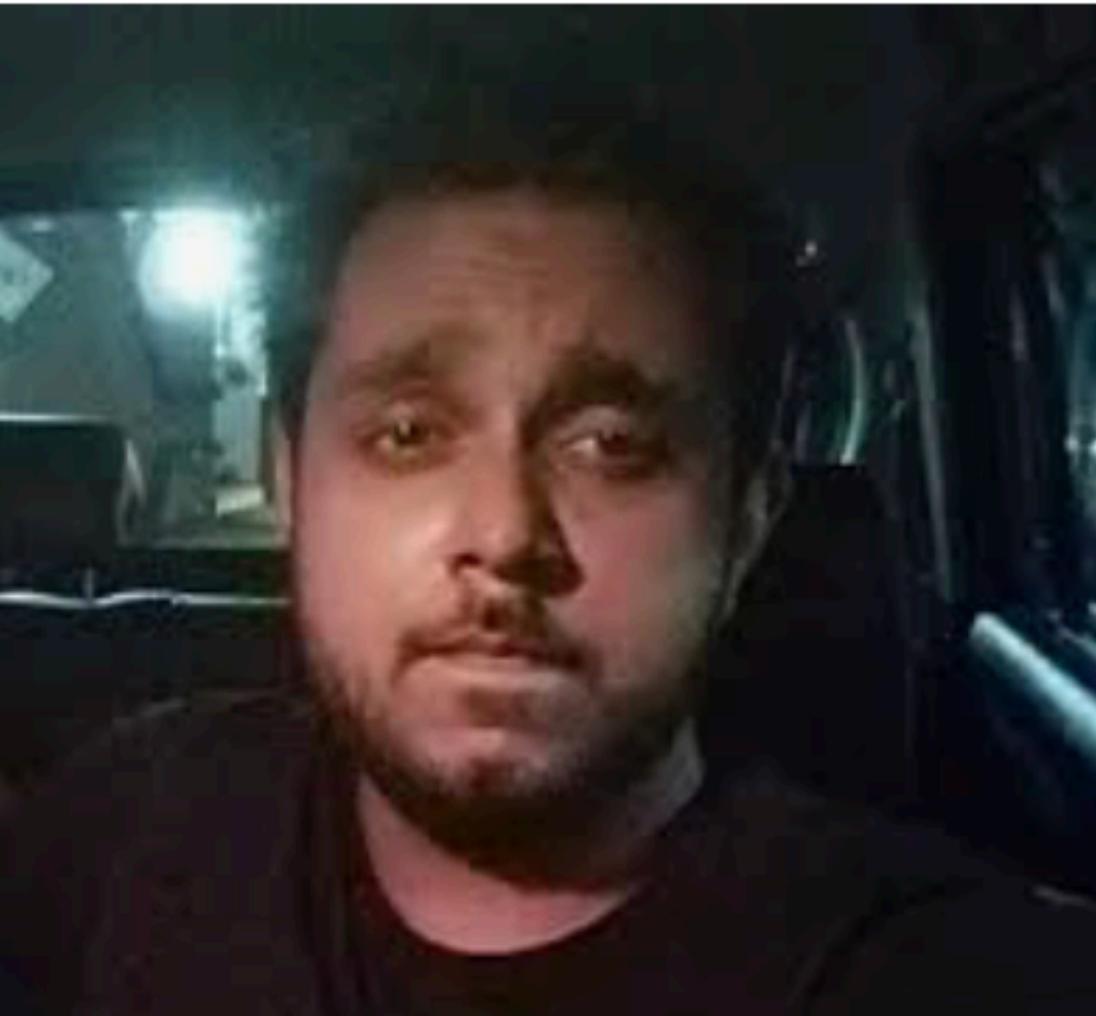


Machine #1



Machine #2





Specialized in Rhino Architecture ...  
[superprof.co.in](http://superprof.co.in)

Money is a great servant,  
but a bad master.

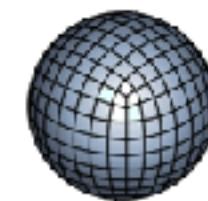
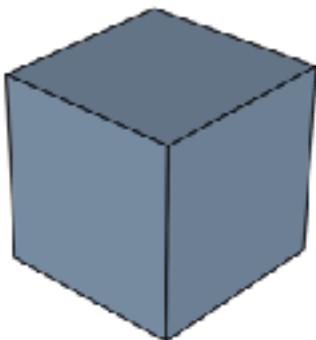
*Francis Bacon*

Technology is a great servant,  
but a bad master.  
*internet wisdom*

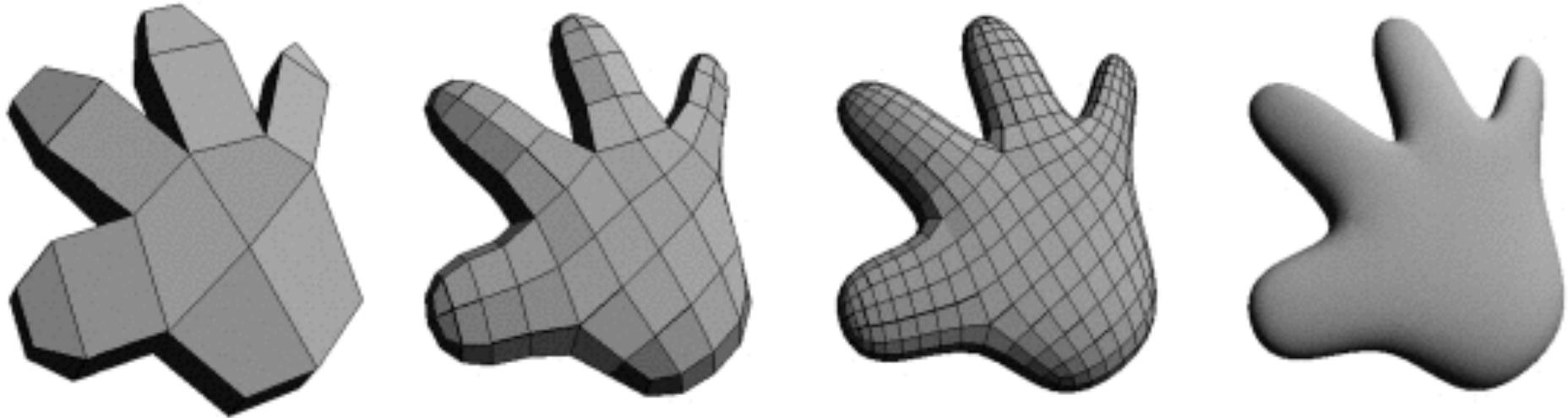
Literacy



## Subdivision



## Characters

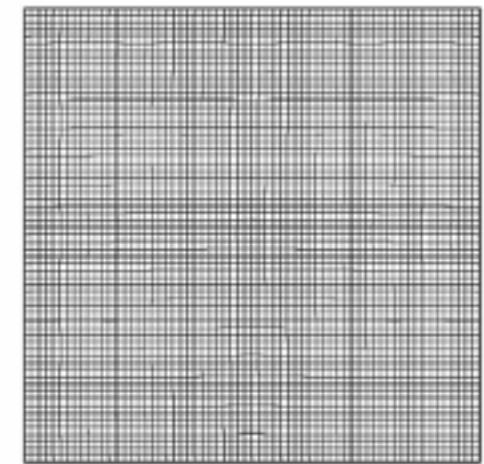
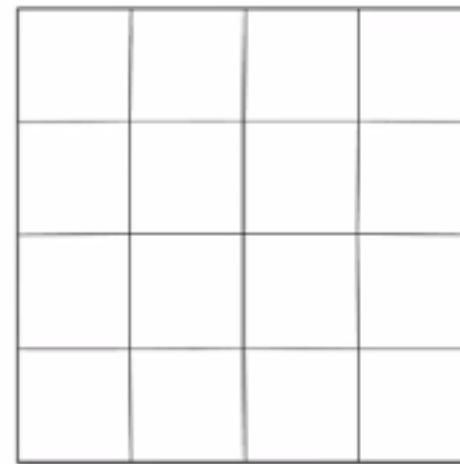
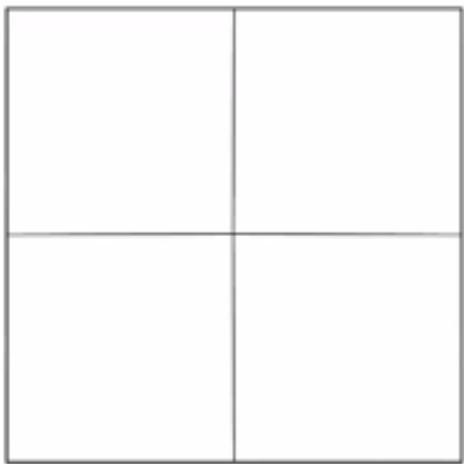


# A Computer Animated Hand

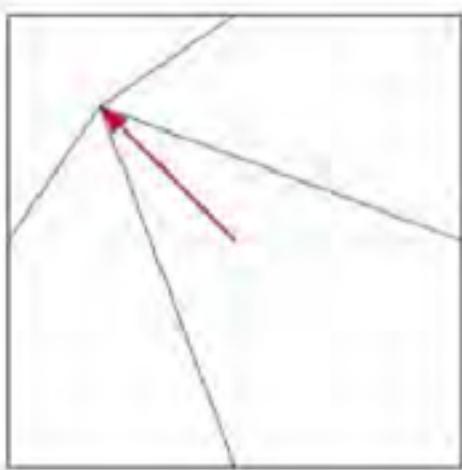
*Ed Catmull and Fred Parke  
1972*



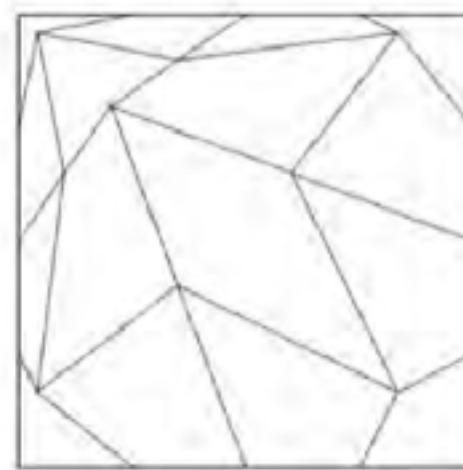
## Regular Subdivision out-of-the-box



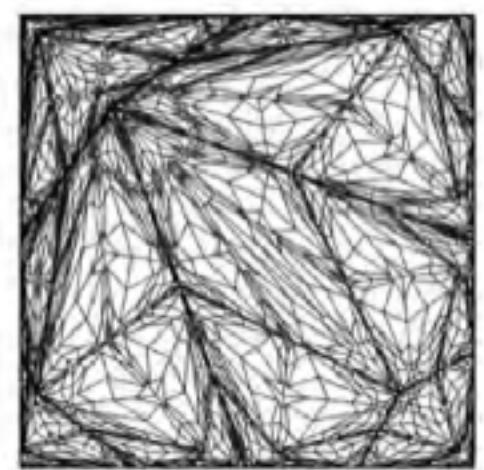
## Custom Subdivision



→



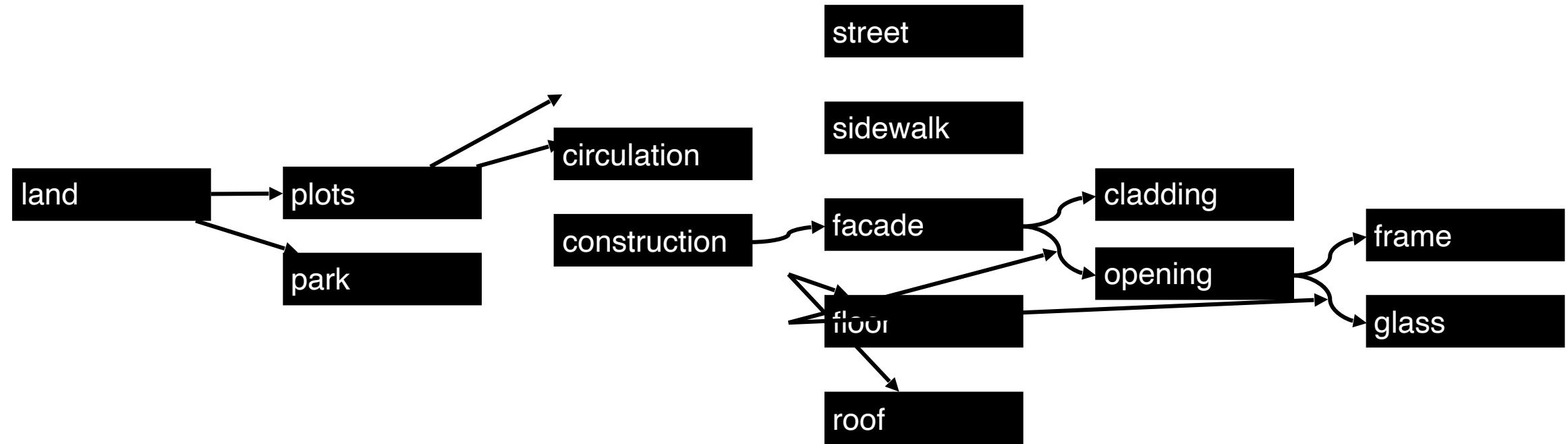
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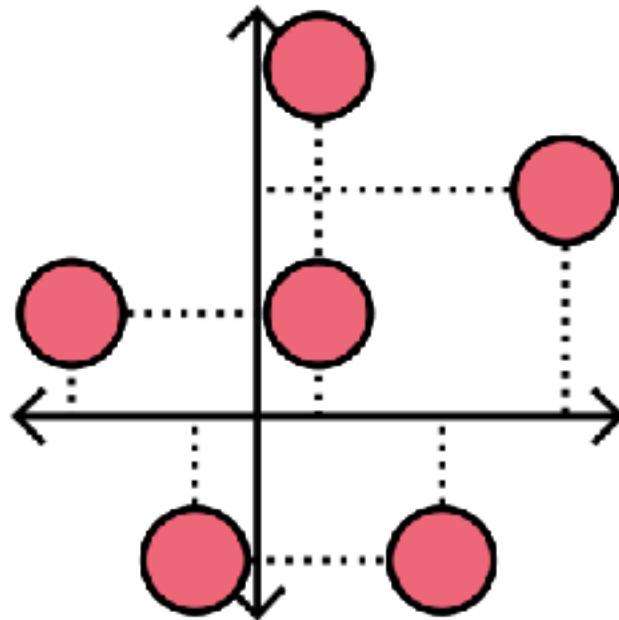
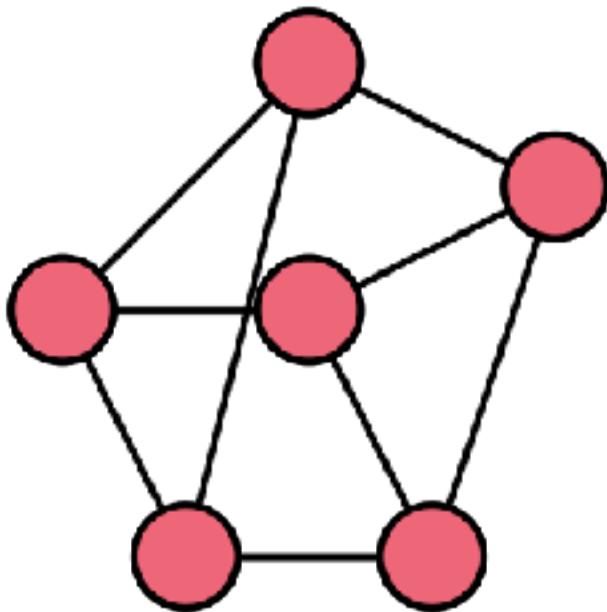


Monstrocity

# Custom Subdivision

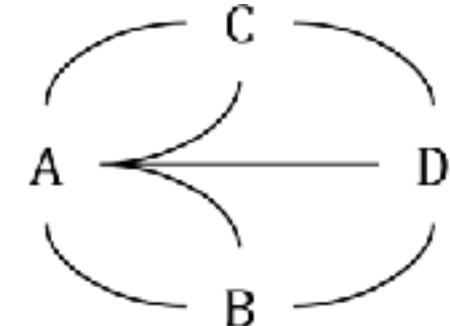
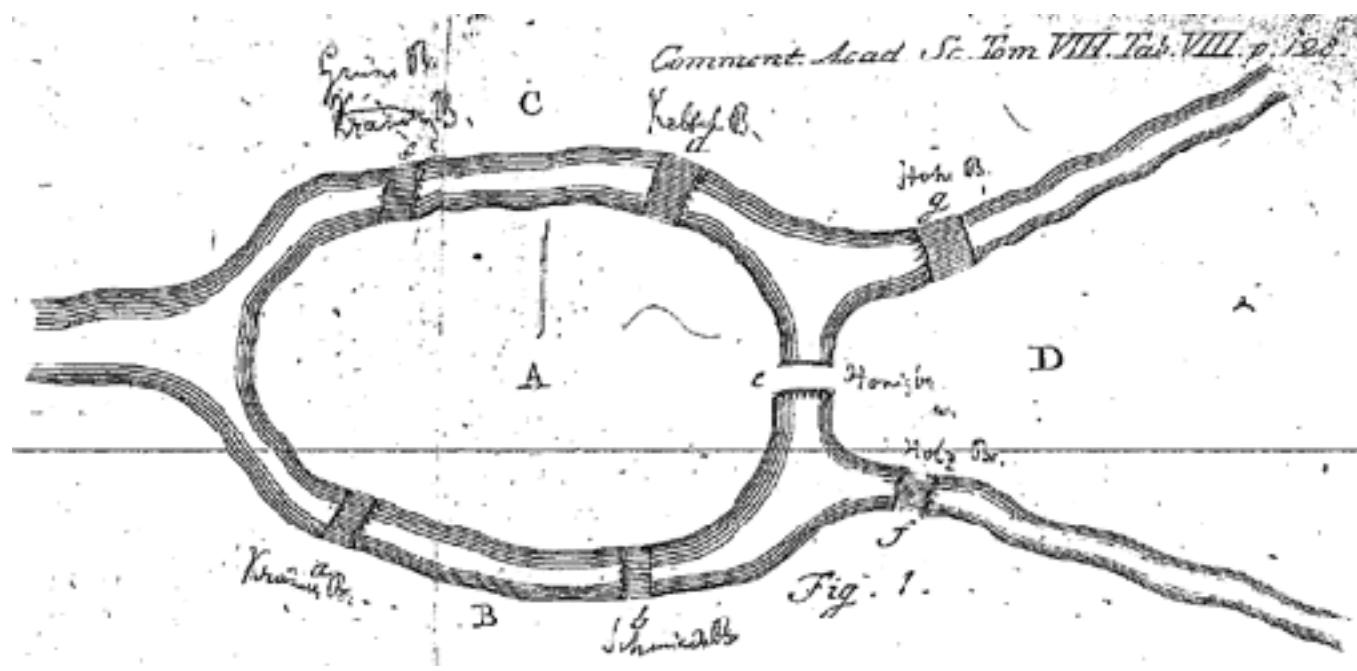


## On Topology and Topography



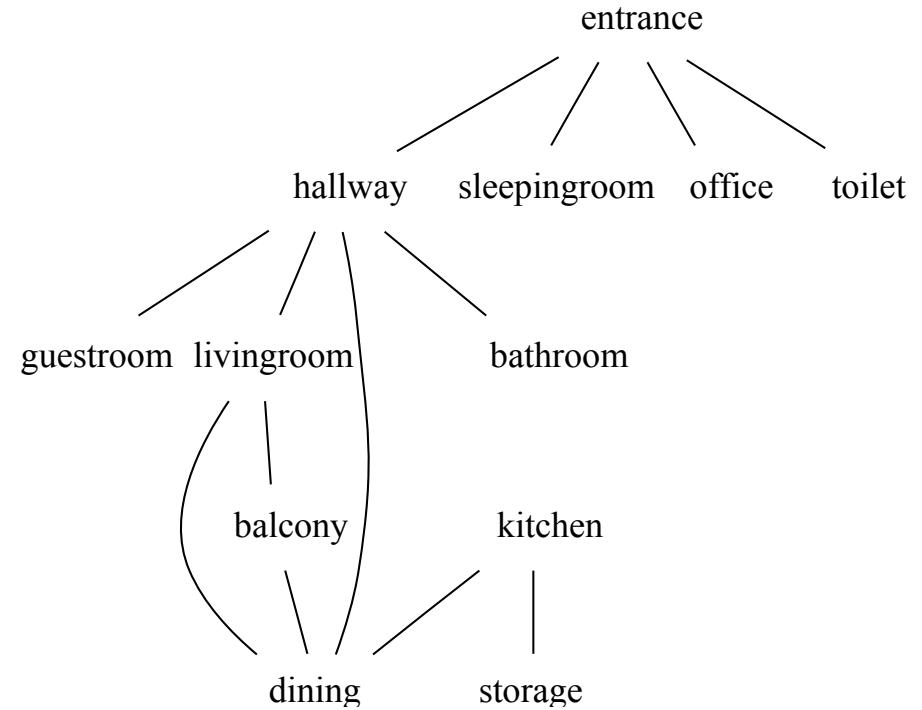
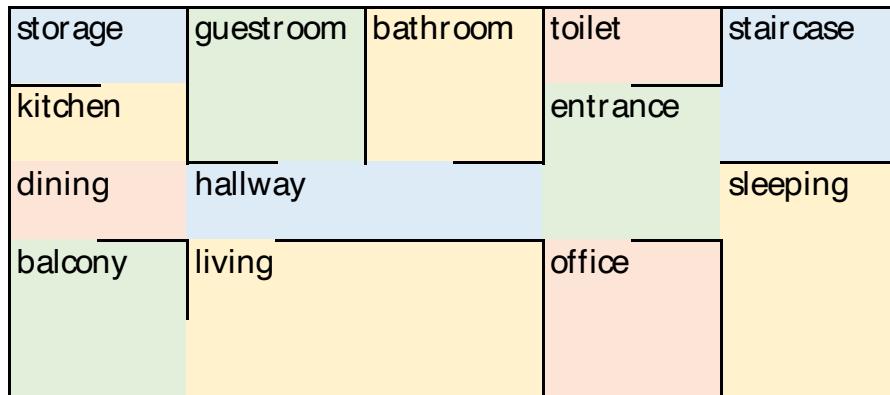
# Euler and the Königsberg Bridge Problem

Leonhard Euler, 1736  
*Solutio problematis ad geometriam situs pertinentis*



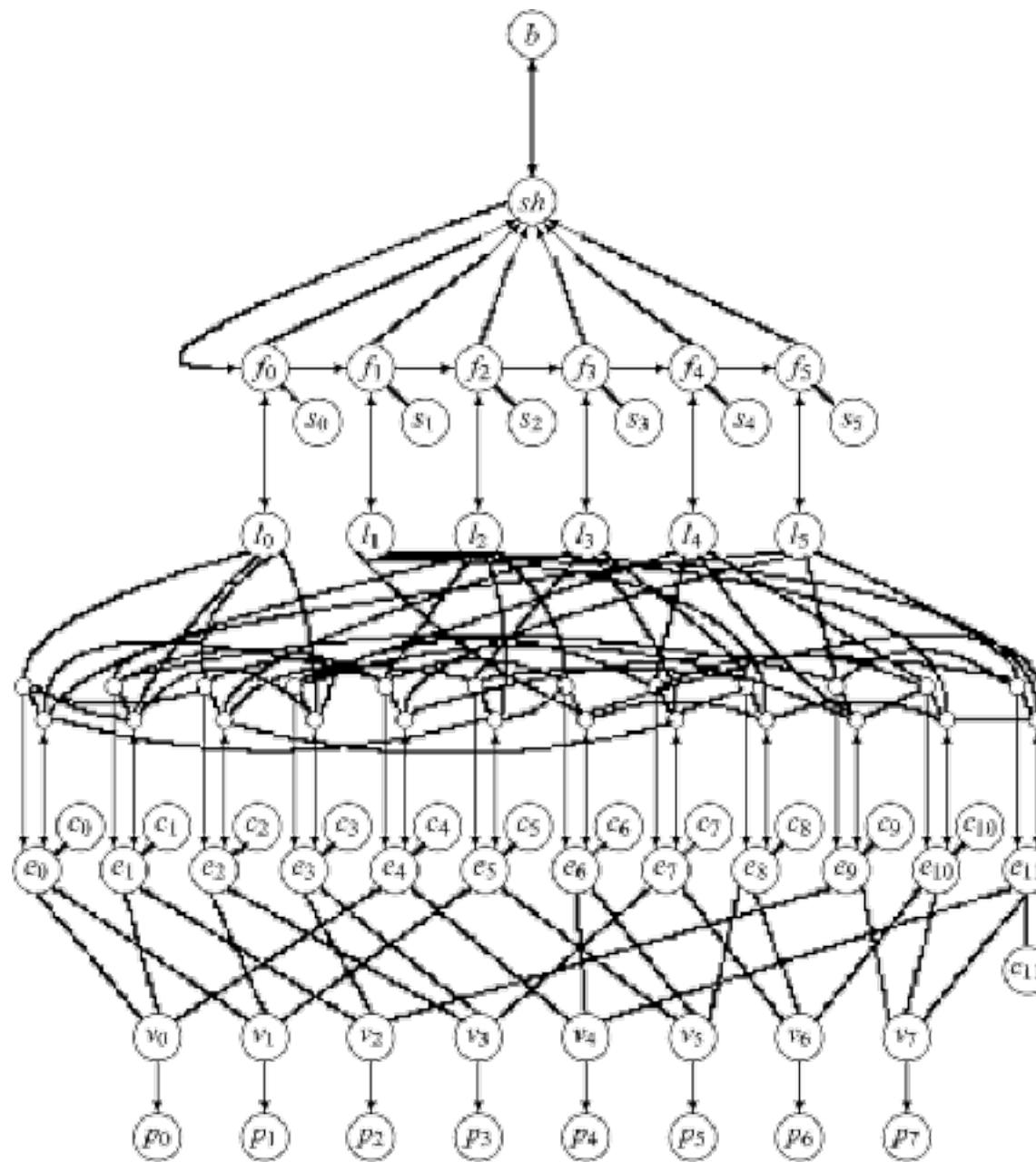
	A	B	C	D
A	-	2	2	1
B		-	0	1
C			-	1
D				-

# Floorplan

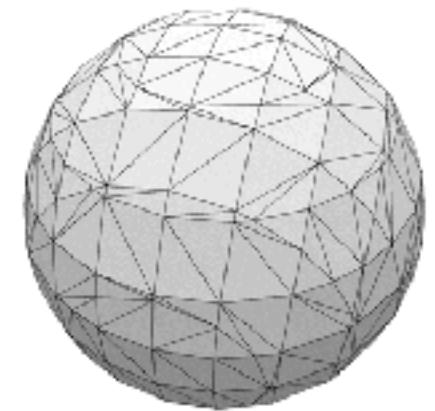
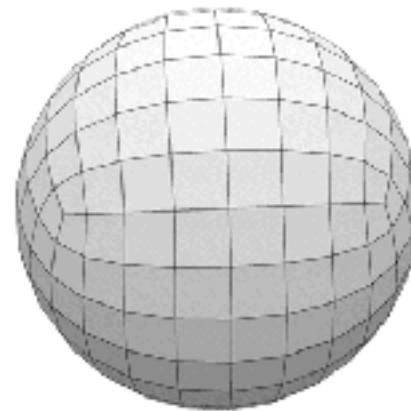
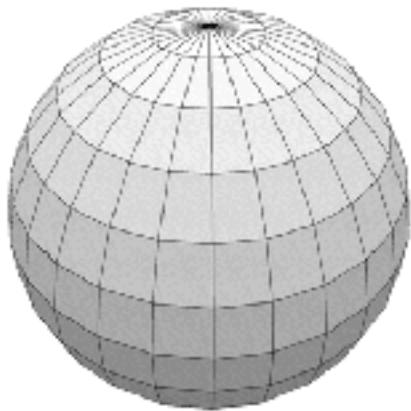


# Topology of a Cube

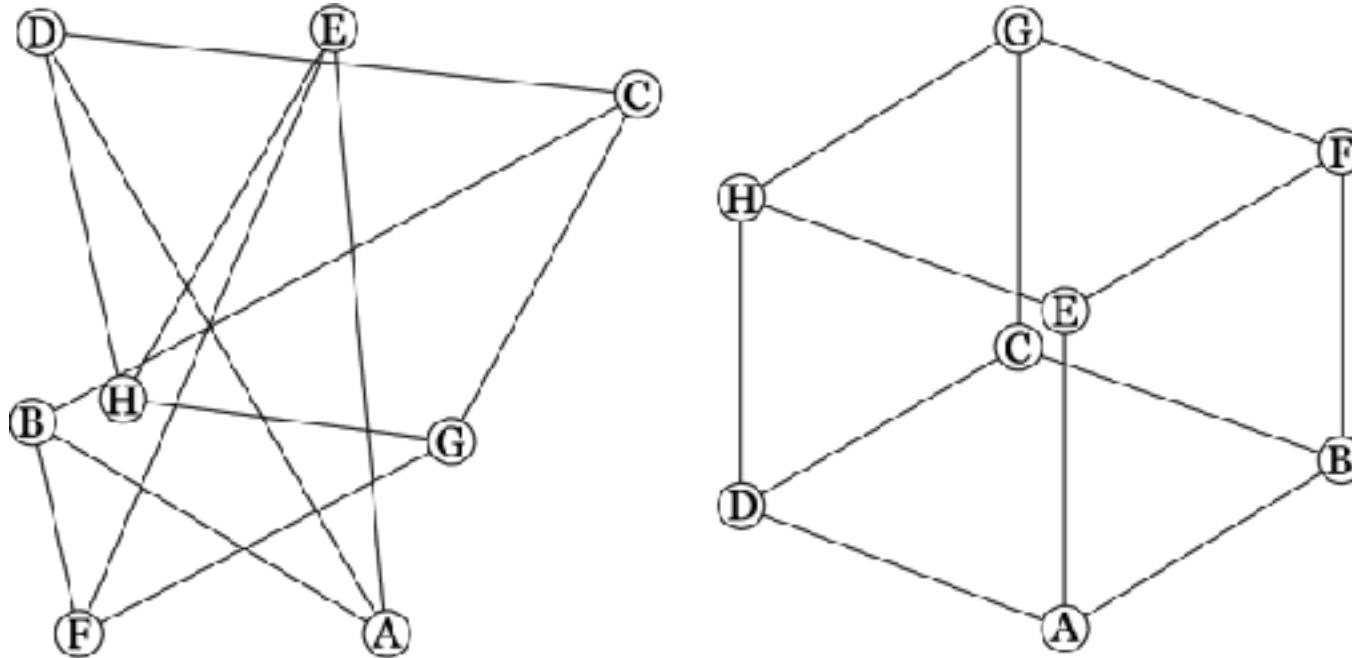
Stroud and Nagy, 2011  
Solid Modelling  
and CAD Systems



A Sphere is a  
Sphere is a  
Sphere



## Dimensionality Reduction



# Topology Posterchild

dbt

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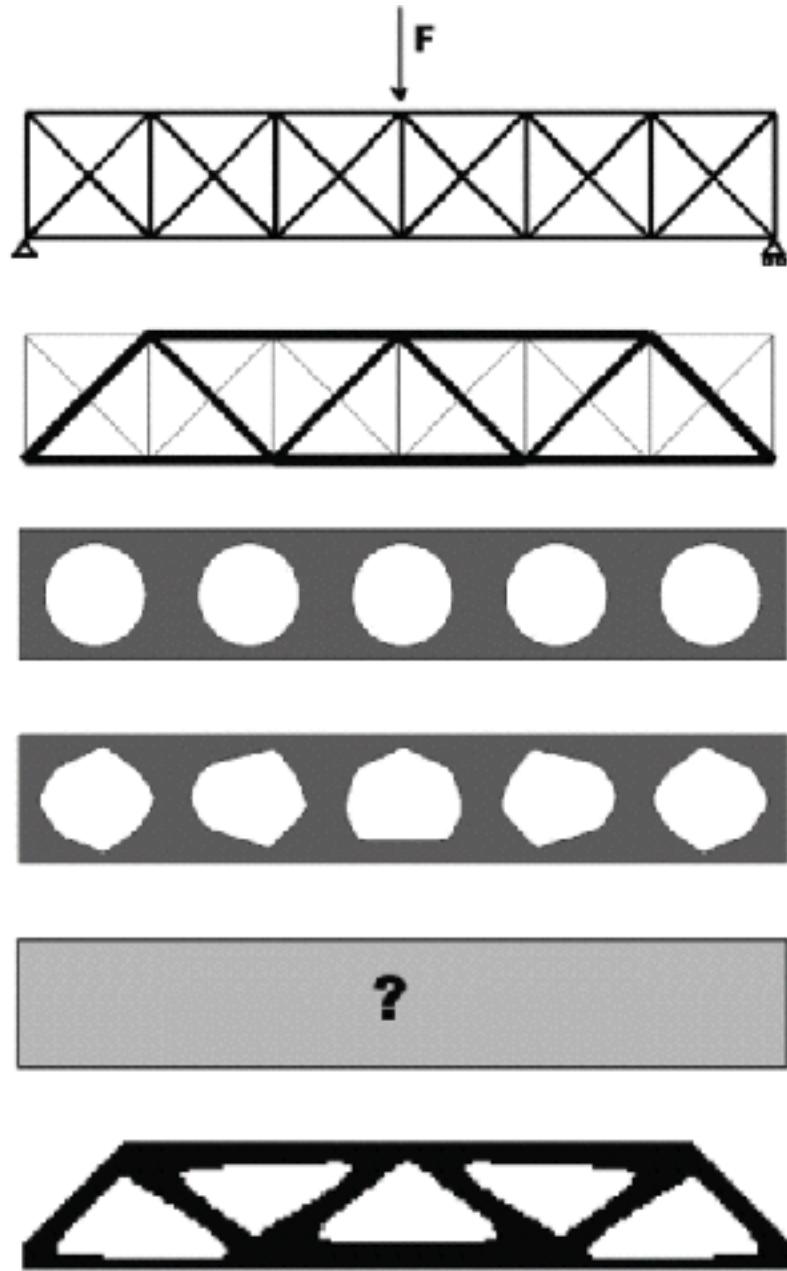


## Topology Optimization

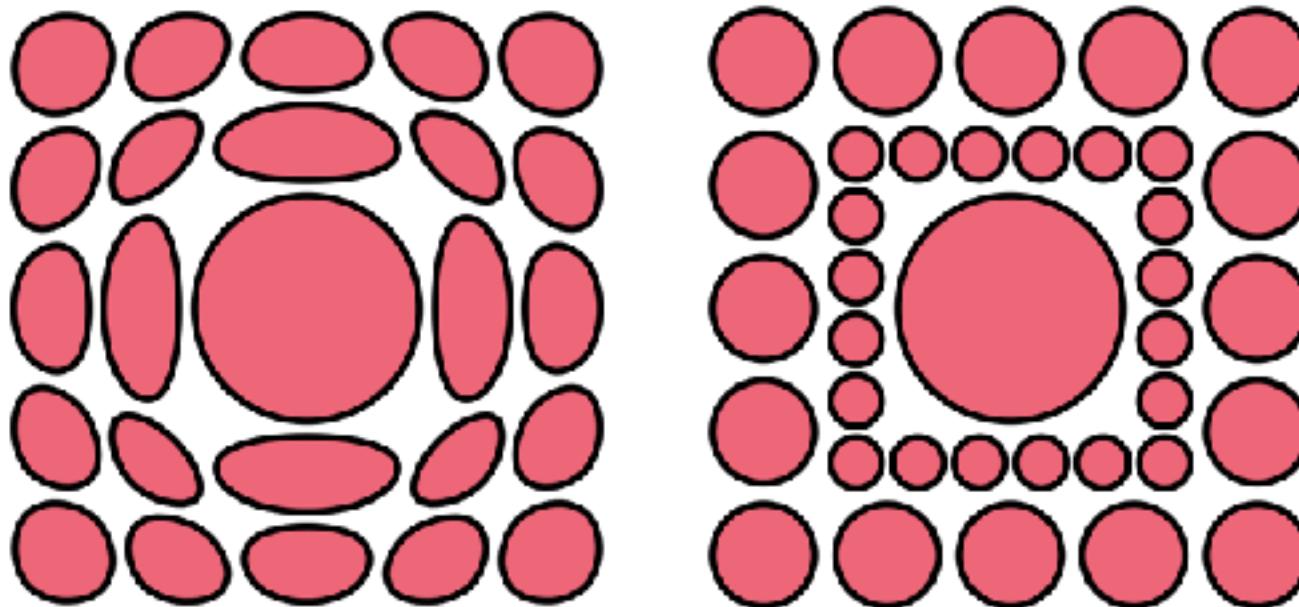


# Topography and Topology Optimization

*adapted from  
Bendsøe and Sigmund  
Topology Optimization:  
Theory, Methods and  
Applications*

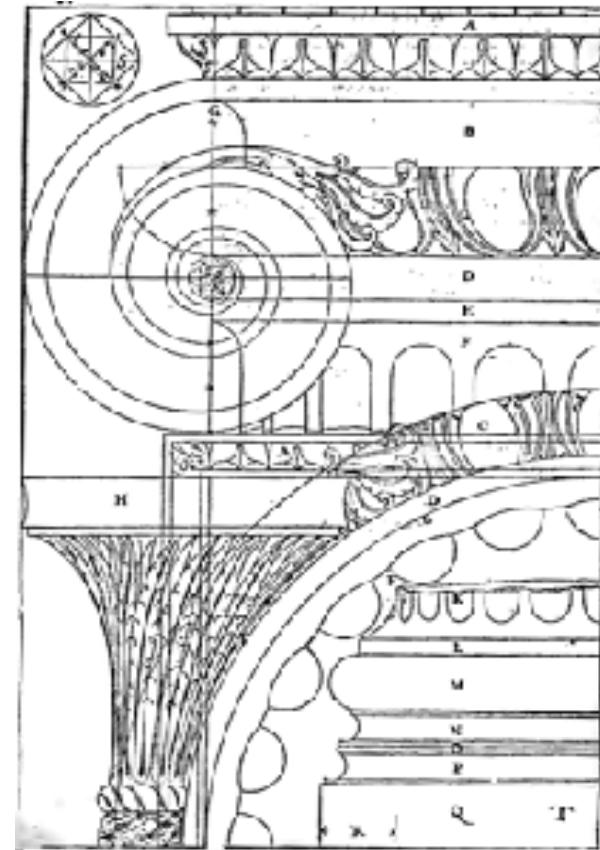
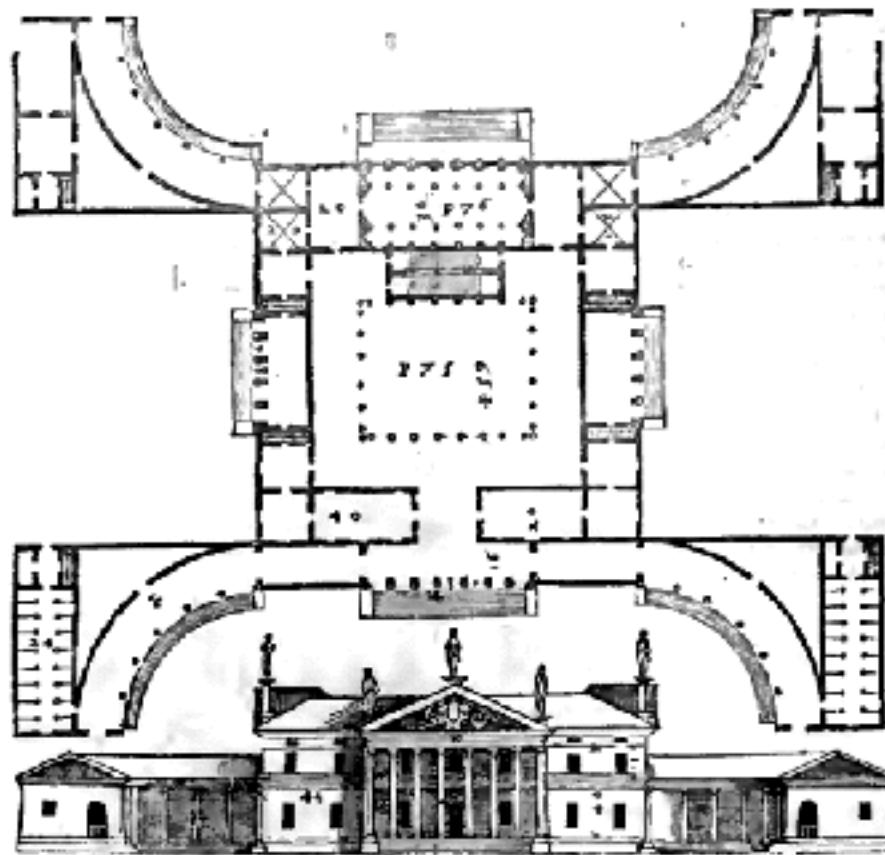


## On Parameter and Grammar

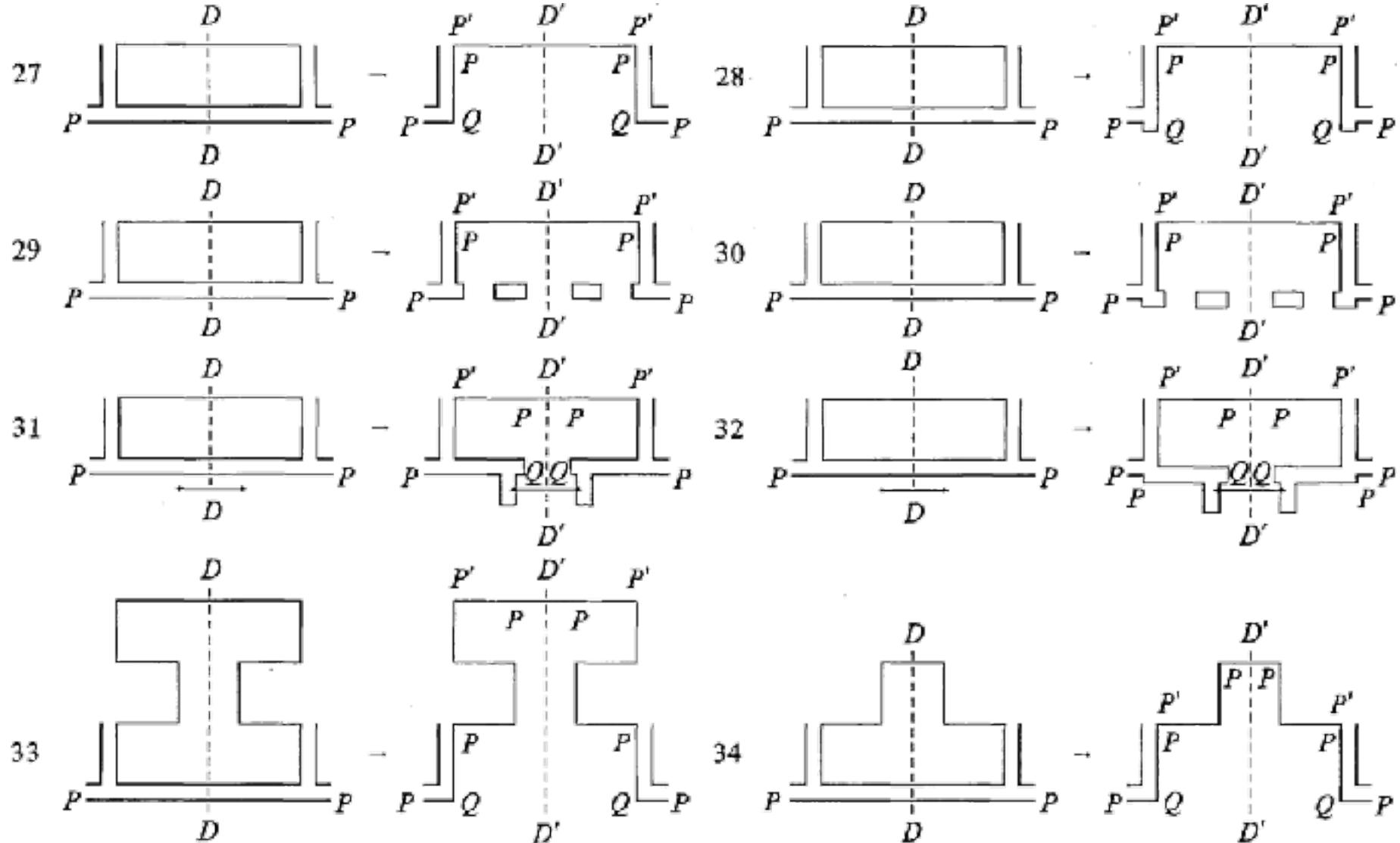


# Andrea Palladio

Andrea Palladio, 1570  
Quattro Libri dell'Architettura

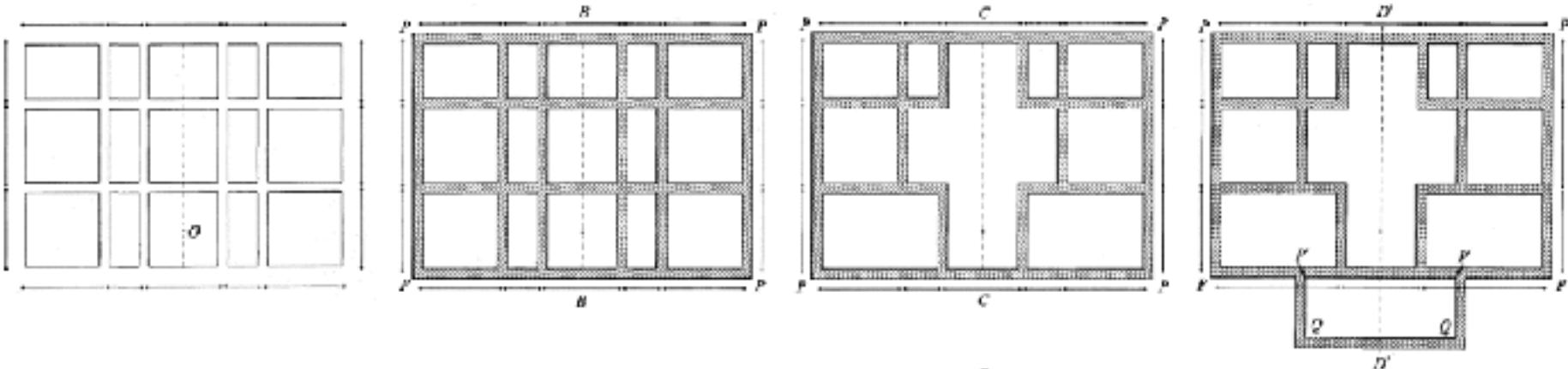


# Villa Grammar

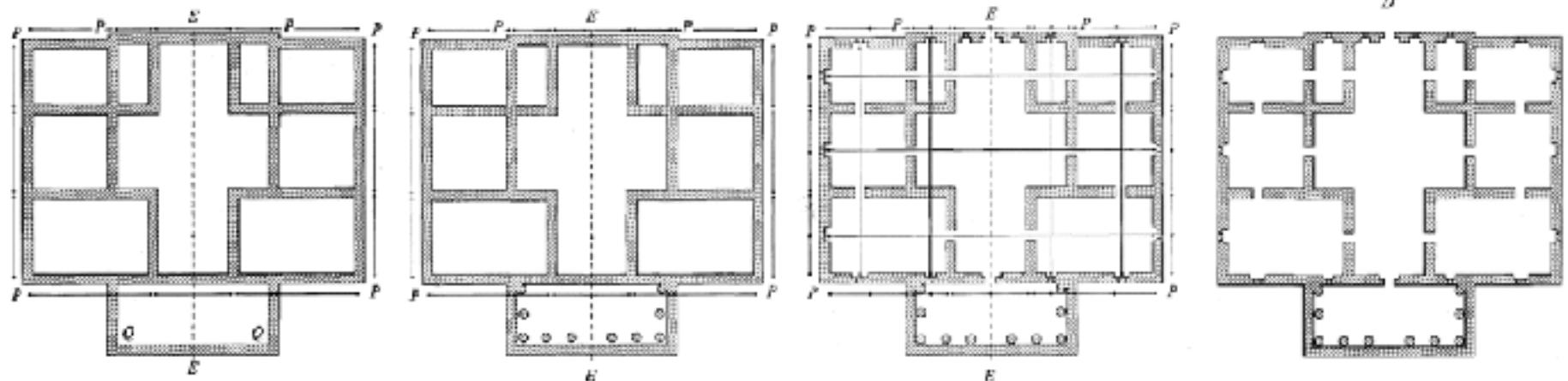


Stiny and Mitchell, 1978  
The Palladian Grammar

## Villa Grammar

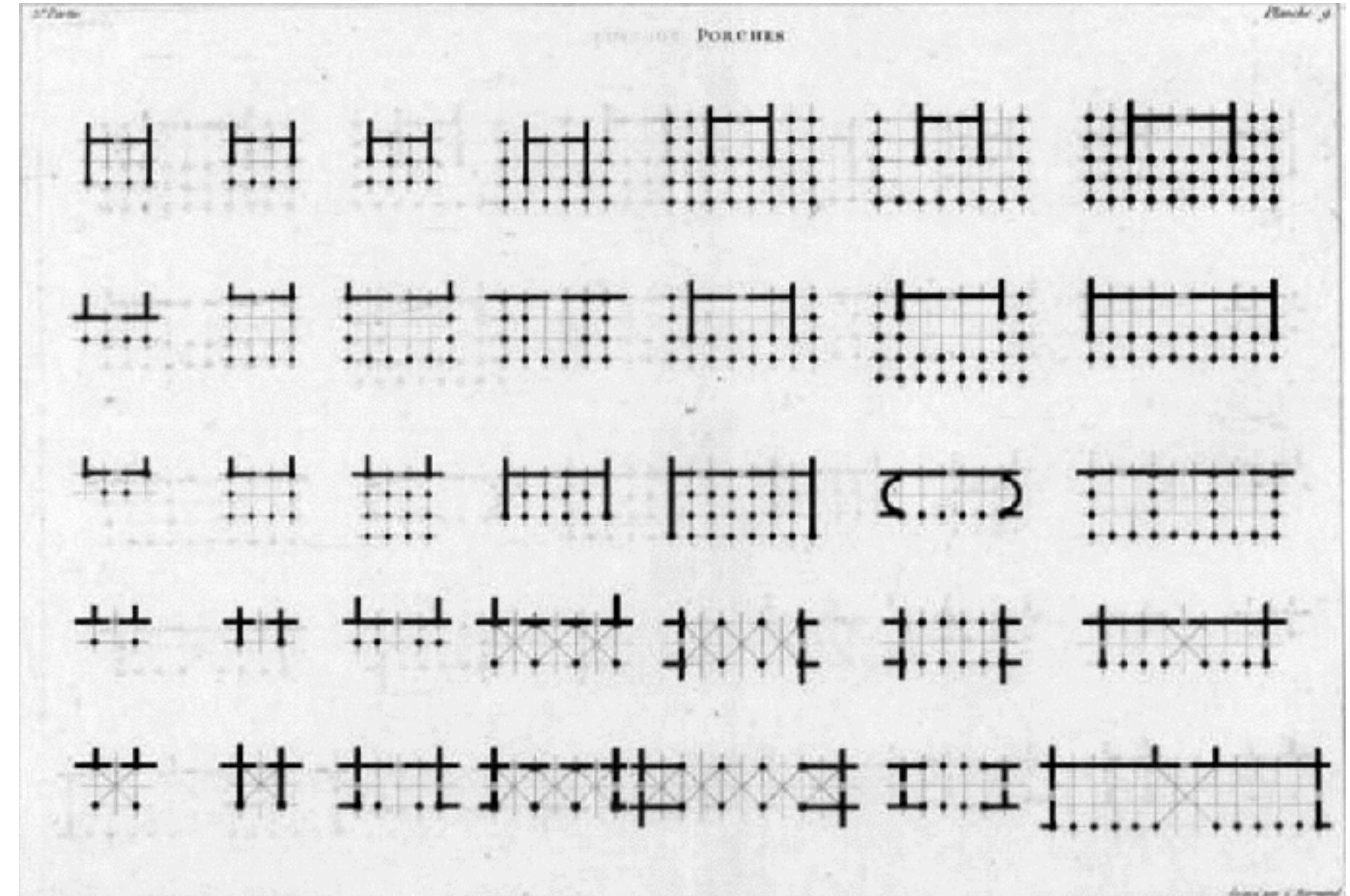


*Stiny and Mitchell, 1978  
The Palladian Grammar*



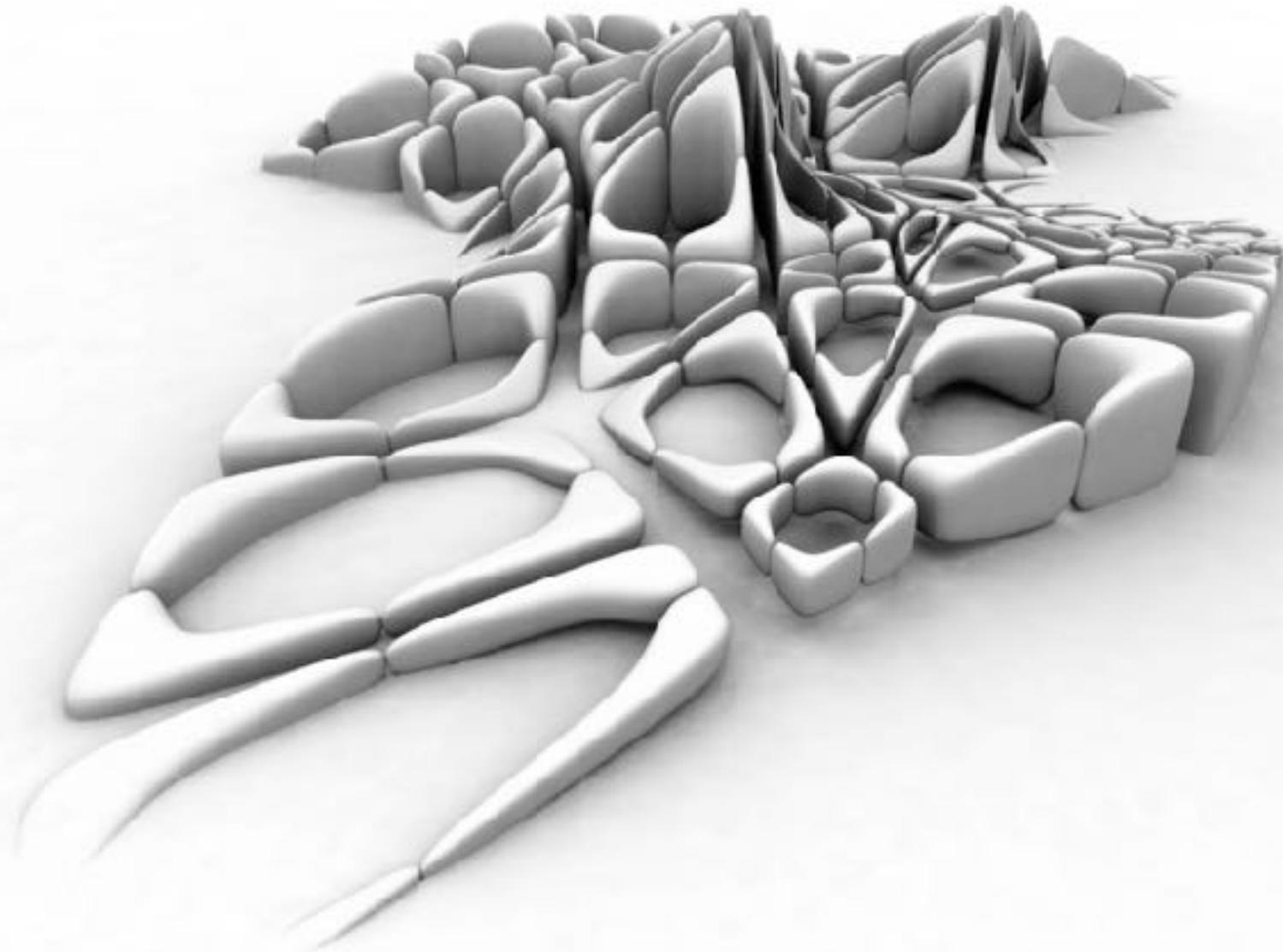
## Look Up Table

Durand, 1805  
*Précis des Leçons d'Architecture*



# Parametricism

Zaha Hadid Architects  
Kartal Pendik

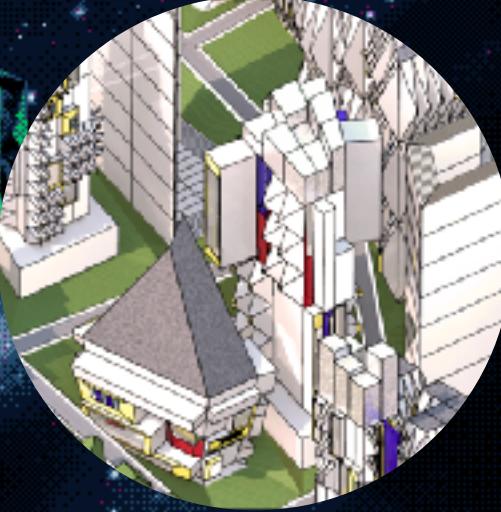


# Populated Planetary Polyhedra

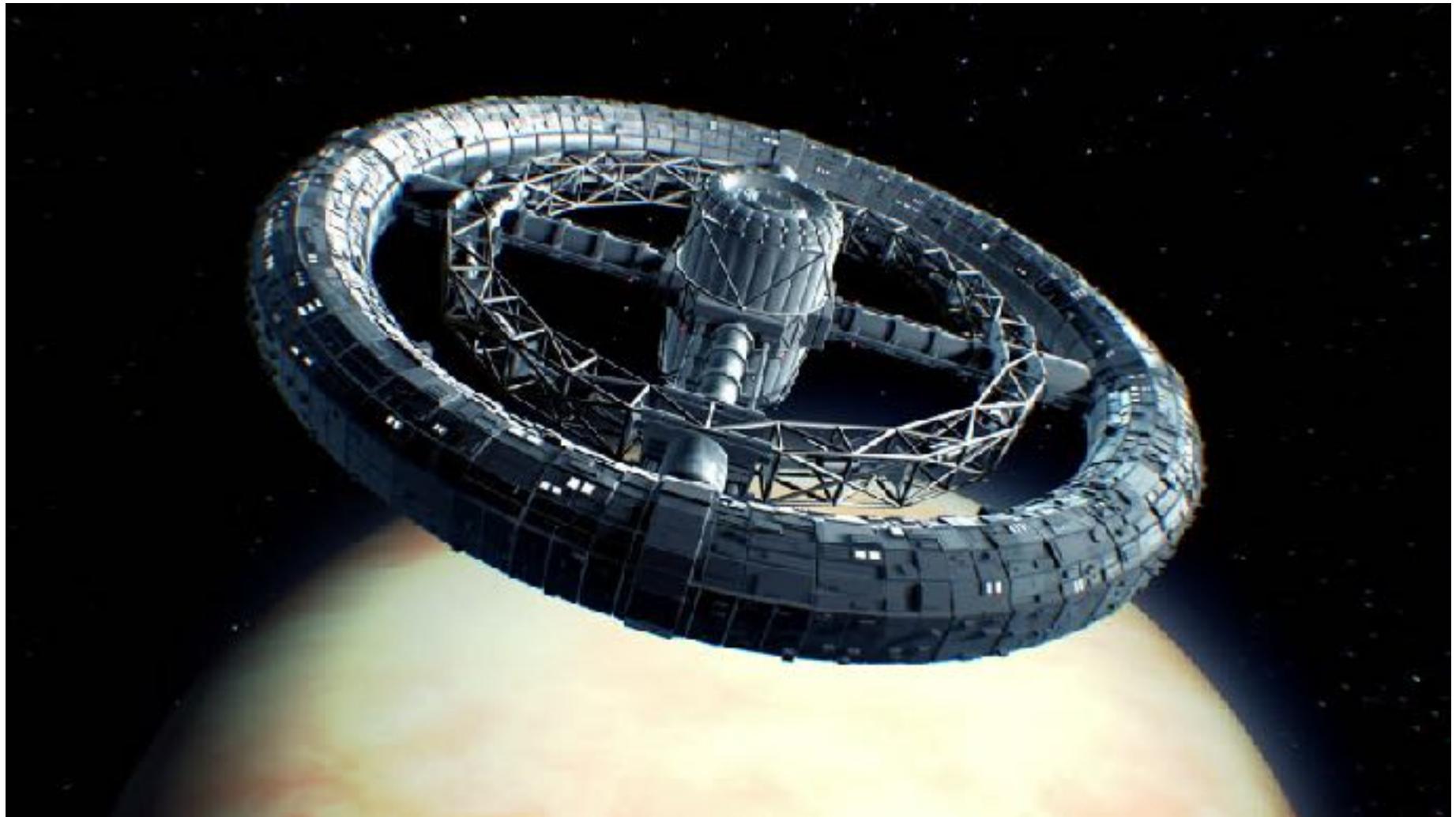
*MAS dfab 7. – 11. October 2019*

*Angela Yoo, Ioanna Mitropoulou, Mathias Bernhard*

# Glorious Galaxy



Primitives



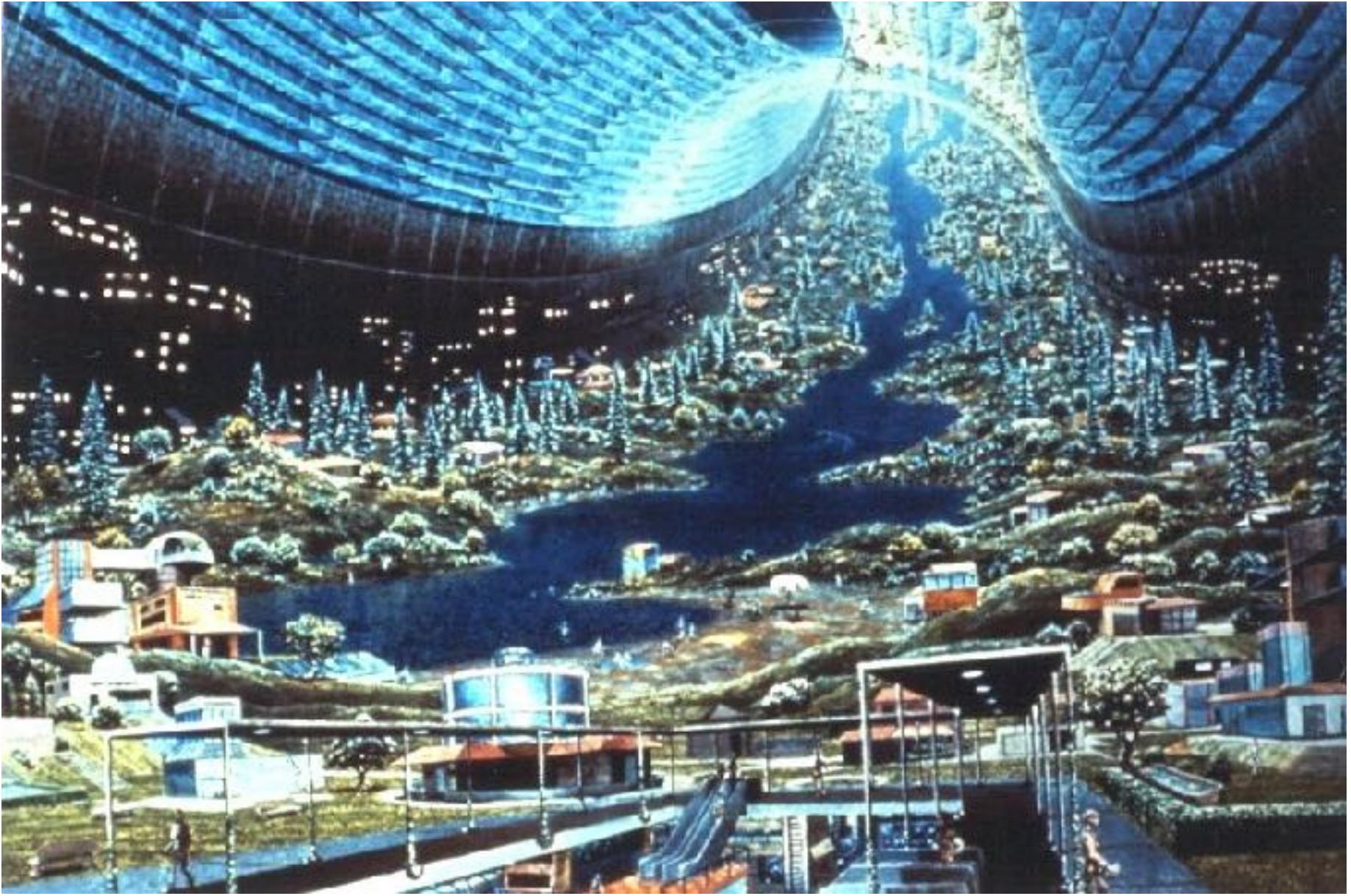


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Scale



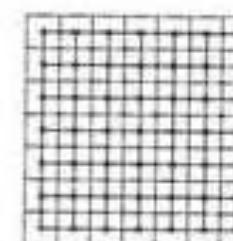
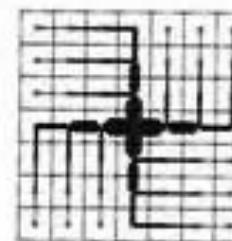
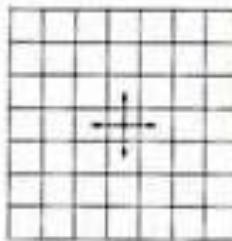
# Topology: Infrastructure

Flächenmuster und Zahl der Verbindungen  
planar pattern and number of connections

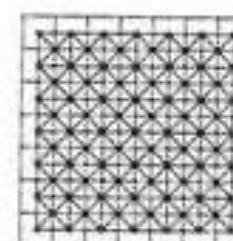
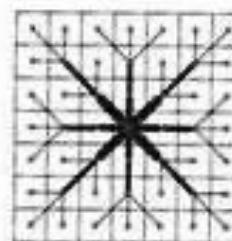
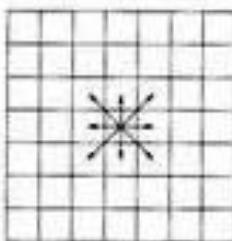
wege vom zentrum zu den übrigen Orten  
distances from center to other places

Netzwerk  
linear network

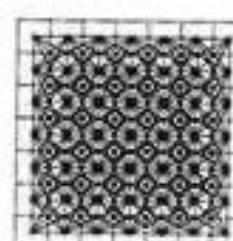
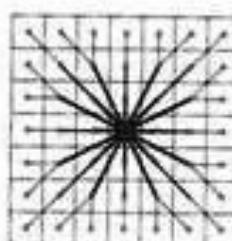
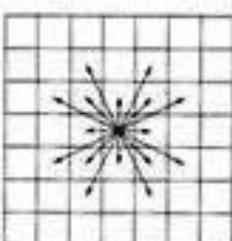
4 Richtungen  
4 directions



8 Richtungen  
8 directions



16 Richtungen  
16 directions



Matplotlib

