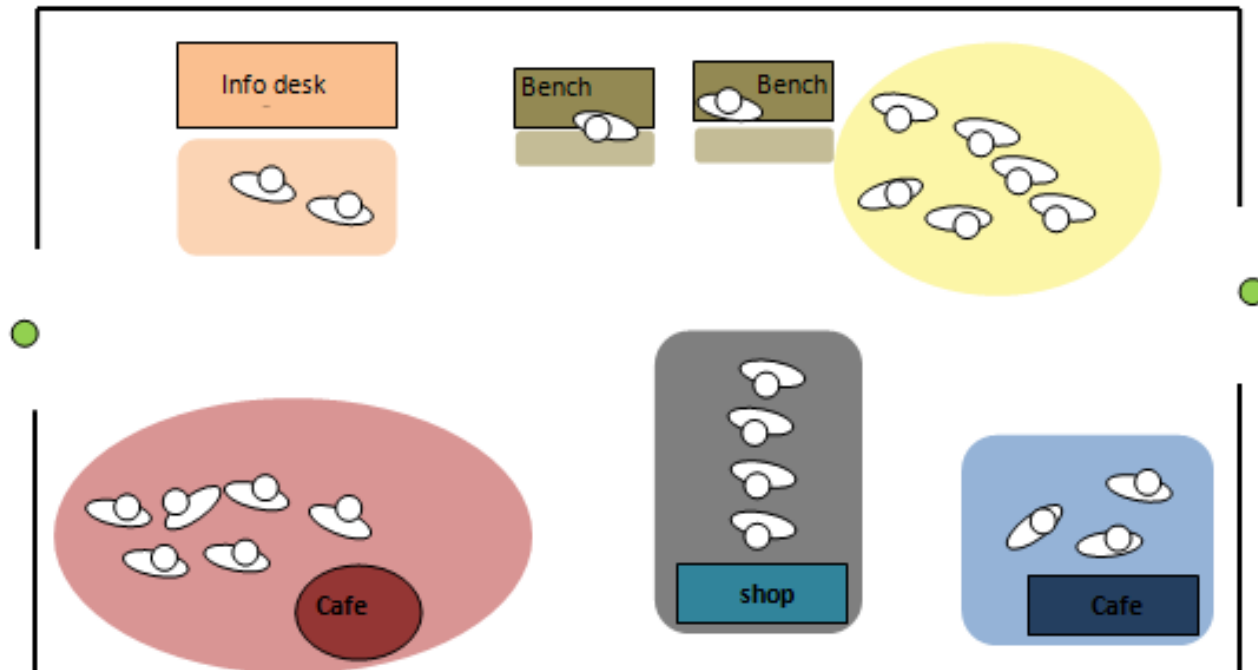# SIMs3D: 3D indoor space subdivision for navigation

25-11-2015

- Dr. Abdoulaye A. Diakité, Delft University of Technology, Postdoc
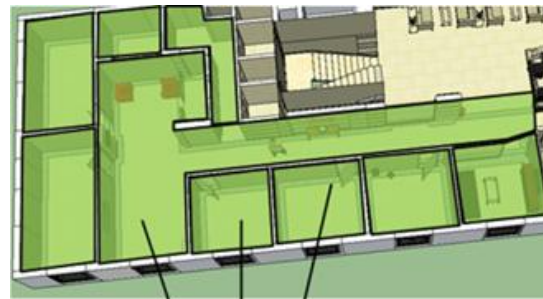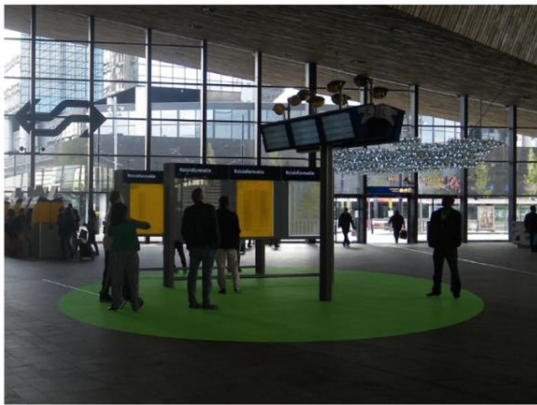- Dr. Sisi Zlatanova, Delft University of Technology, project leader

Why subdividing the space?

- Occupation of indoor space is relative.

Why subdividing the space?

- To structure the accessible / non-accessible space of the building
- To perform dynamic and optimized 3D navigation
- To allow adaptive generation of navigation routes

Passable Area

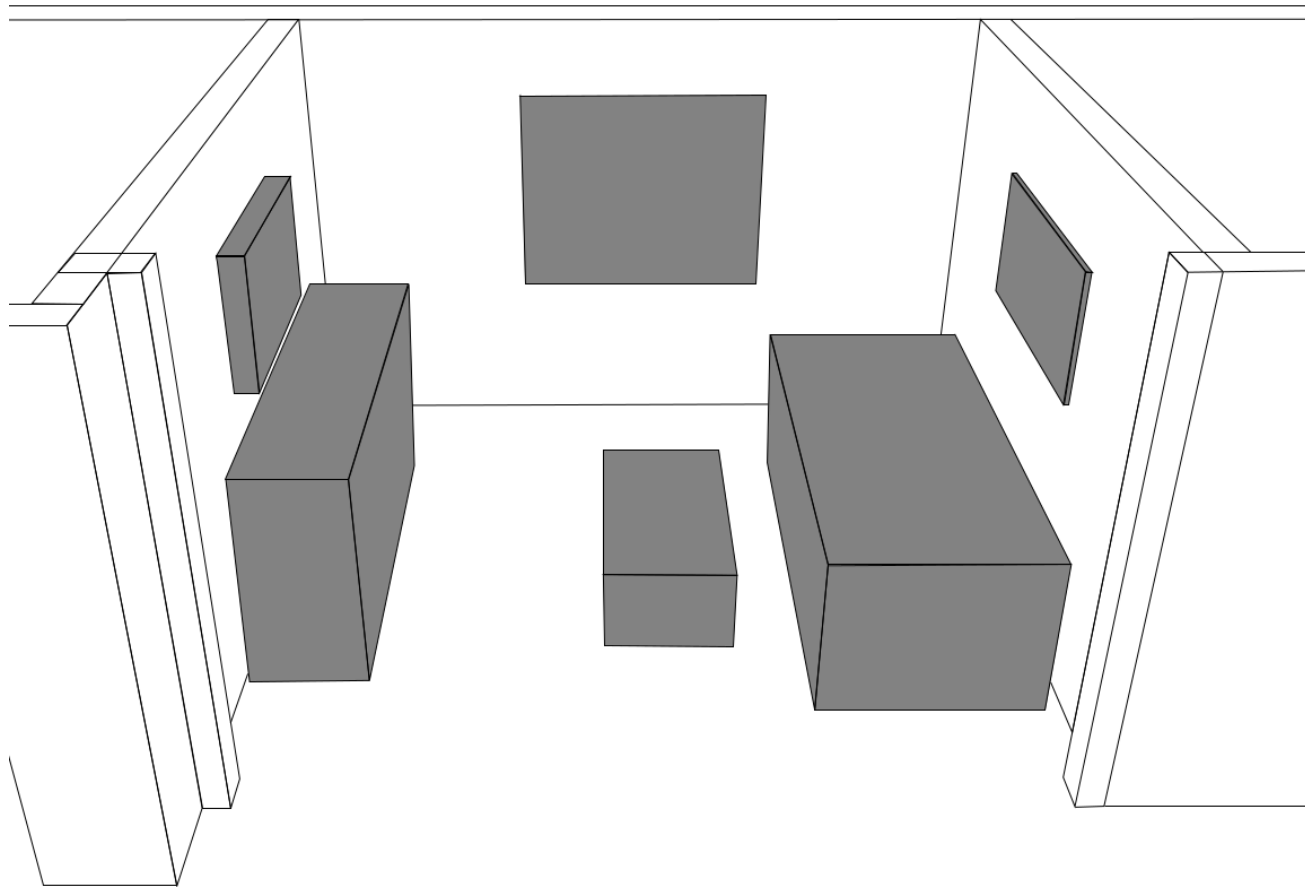Dangerous Area   Inaccessible Area   Passable Area

Fire   No Key   Smoke
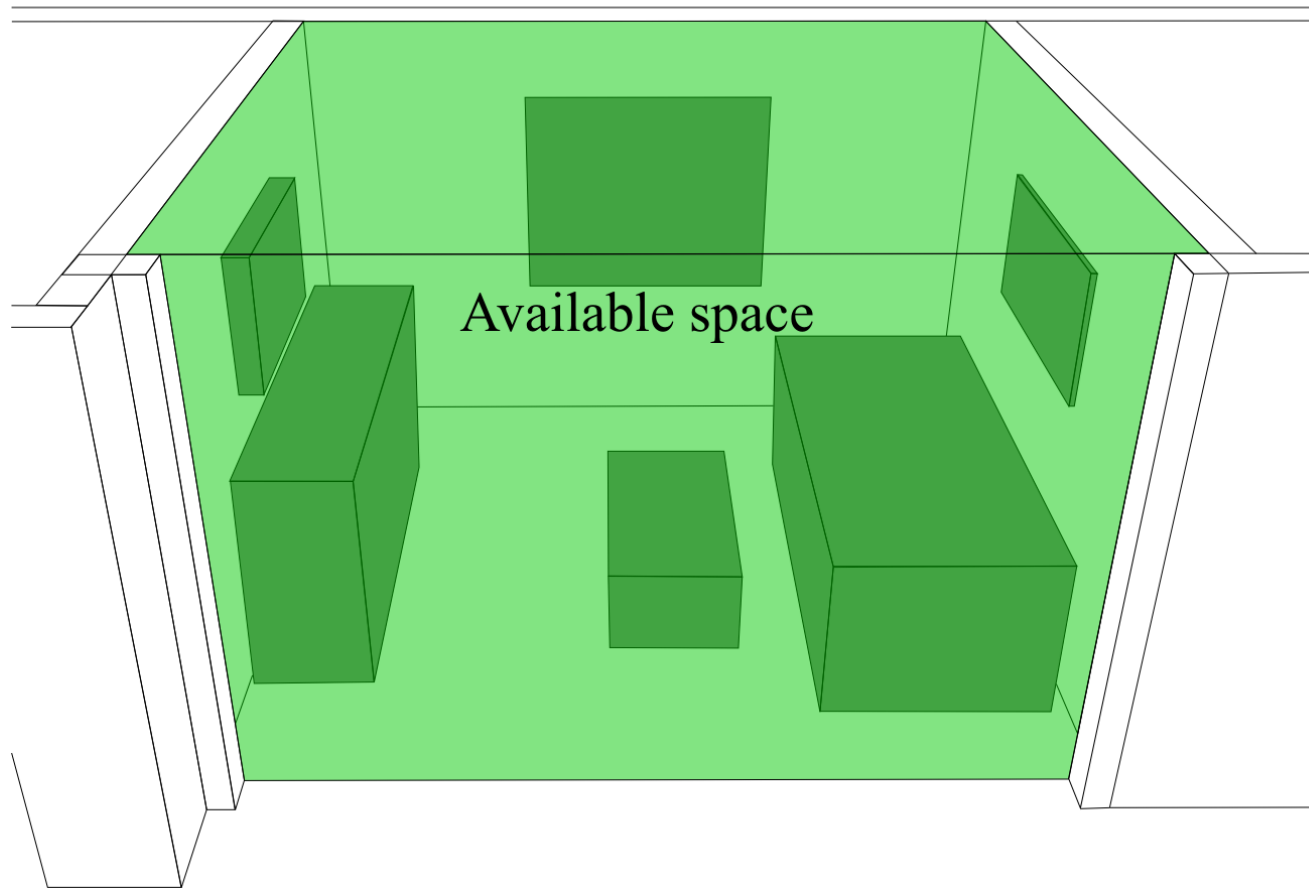
How to subdivide the space?

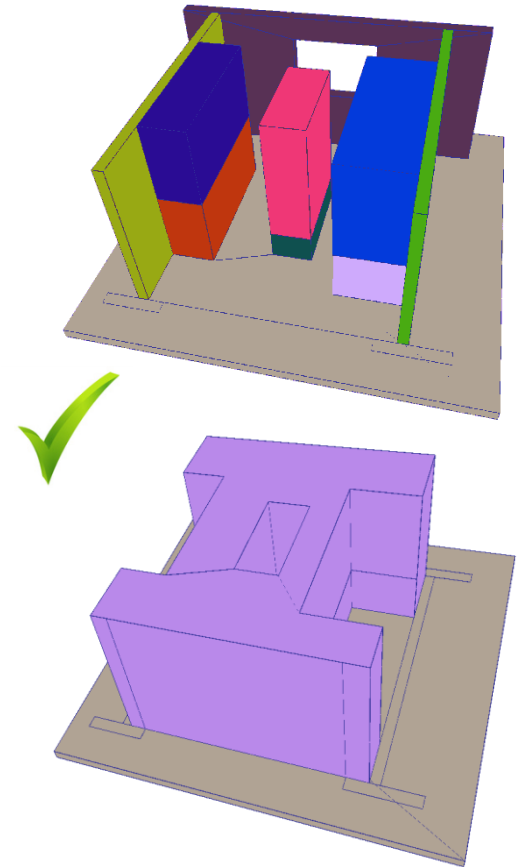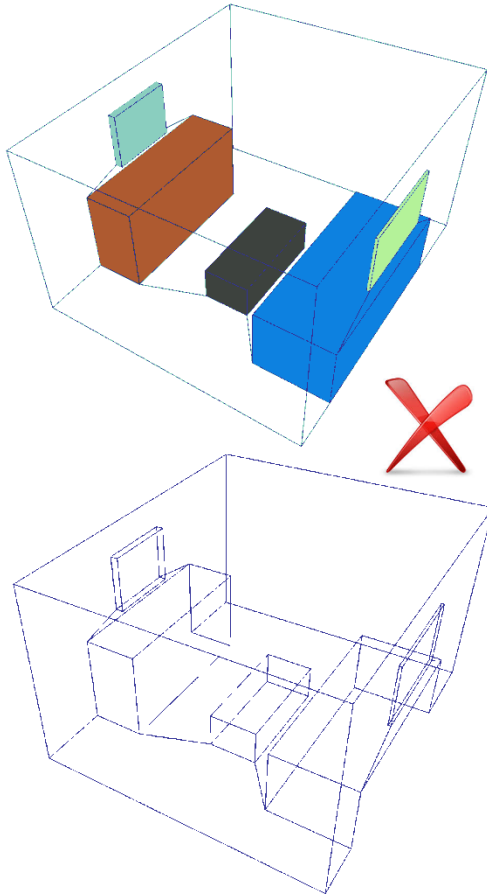# Start from a furnished BIM model (geometry + semantic + topology)

Simplify the geometry of the furniture using minimal bounding boxes

Extract the free space that correspond to the navigable space

Available space

Subdivide the free space depending on cases/constraints/subjects
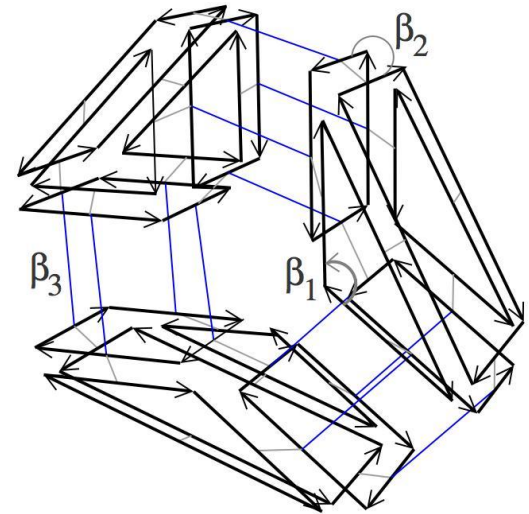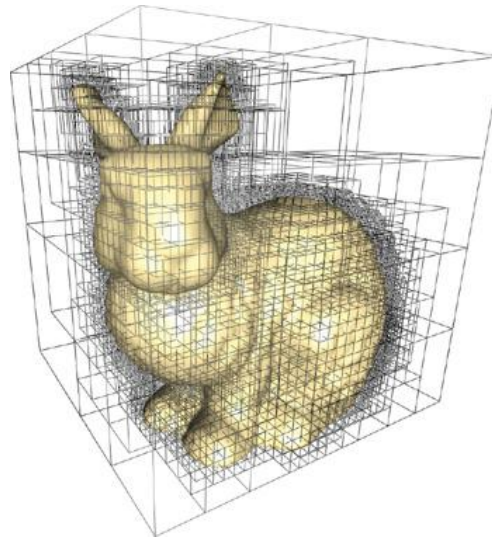
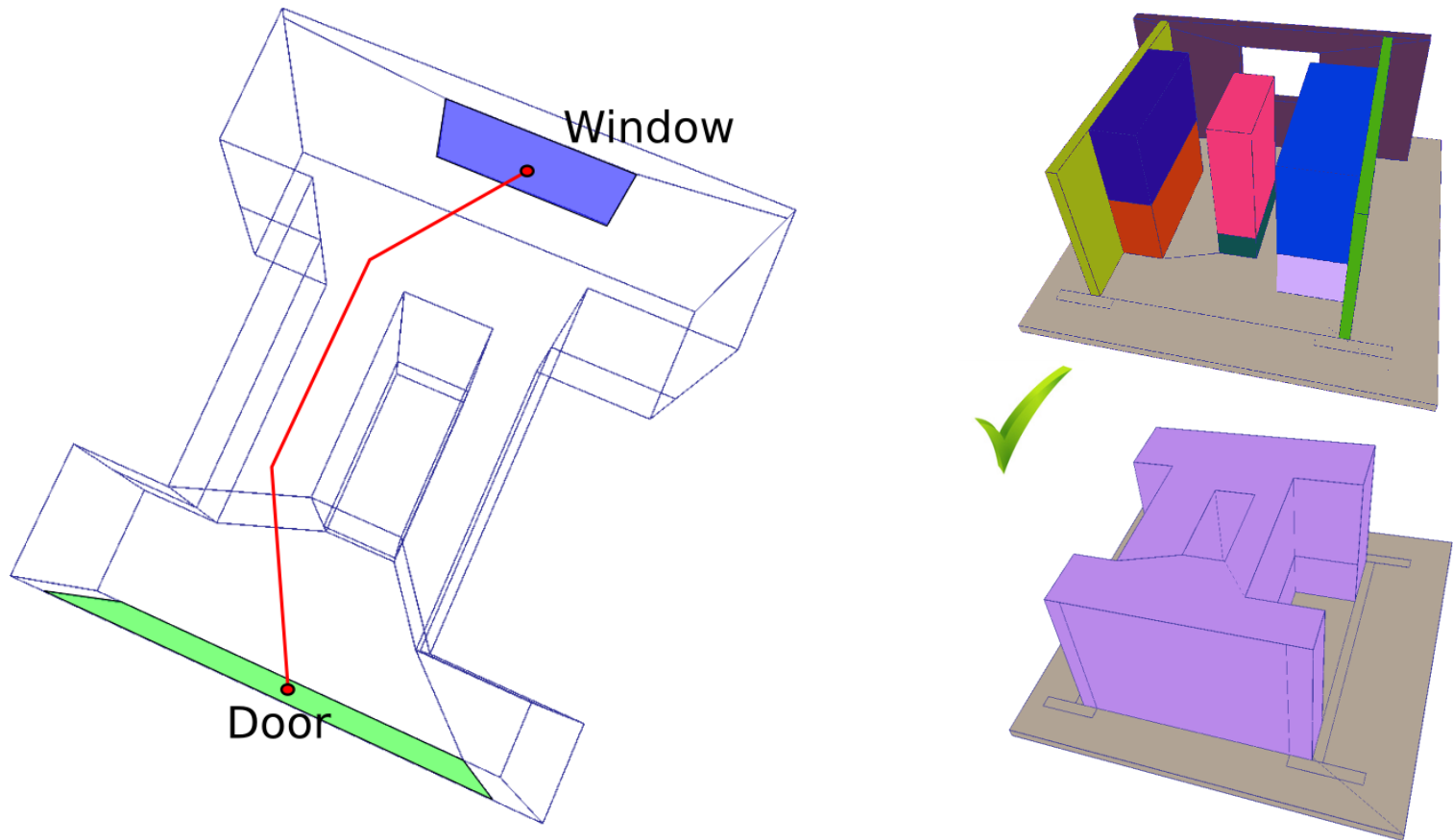# Subdivide the free space depending on cases/constraints/subjects

Space Subdivision Approaches

- Voxels
- Octree
- Combinatorial Maps

How to use the free space?

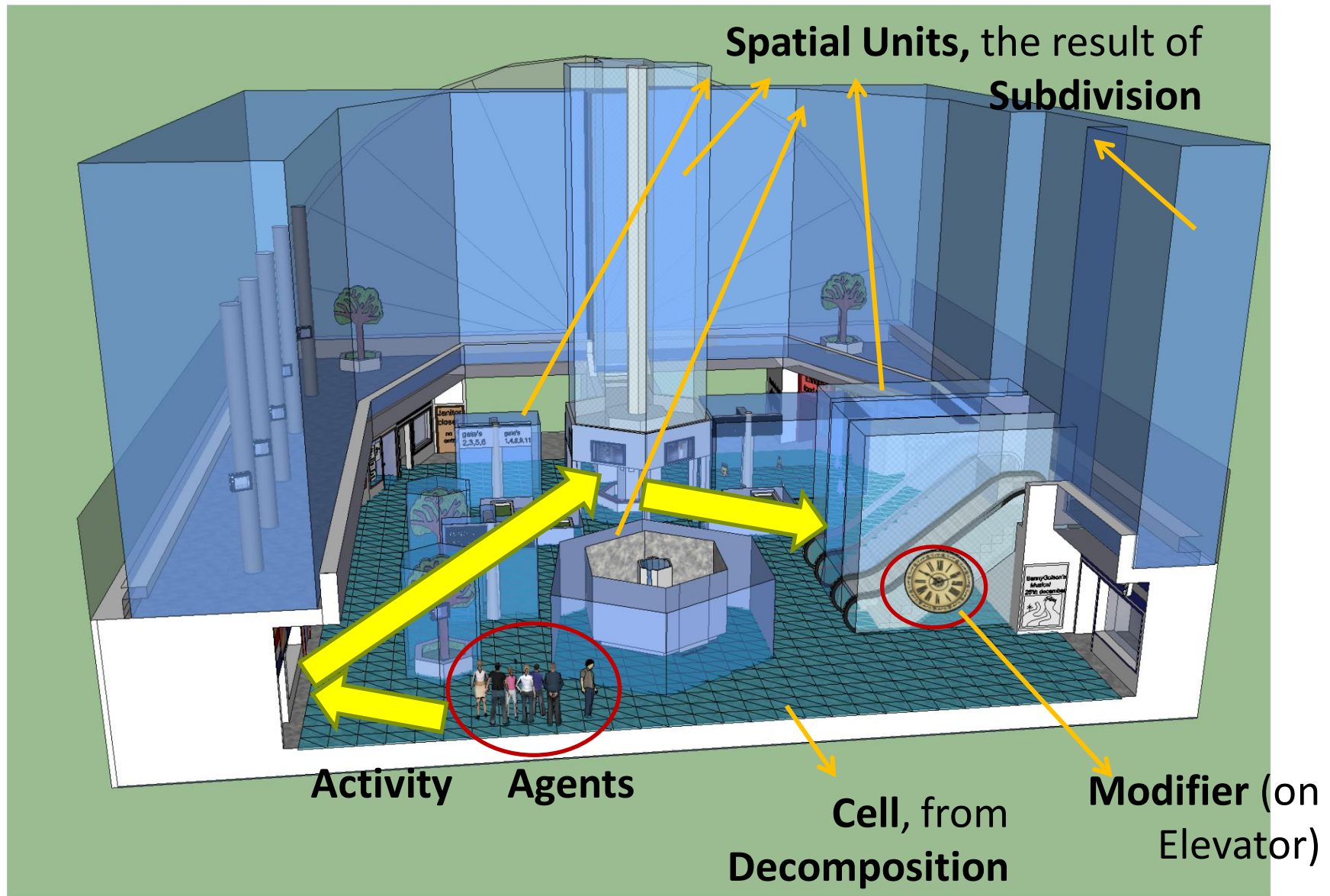- Use topology + semantic to generate indoor navigation path
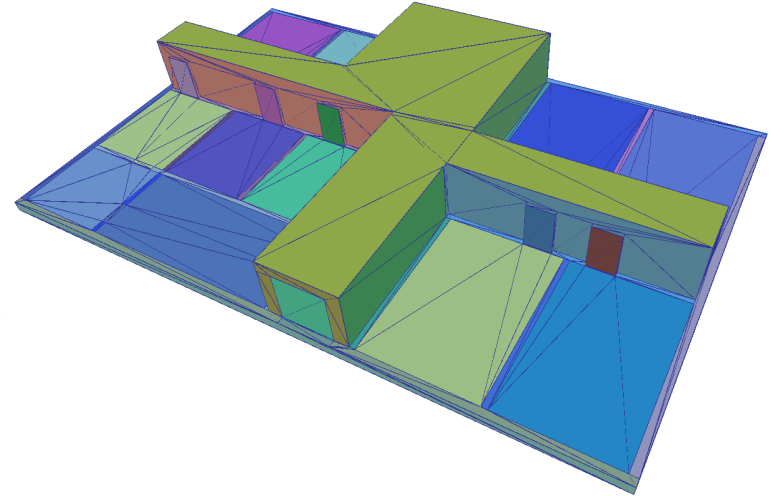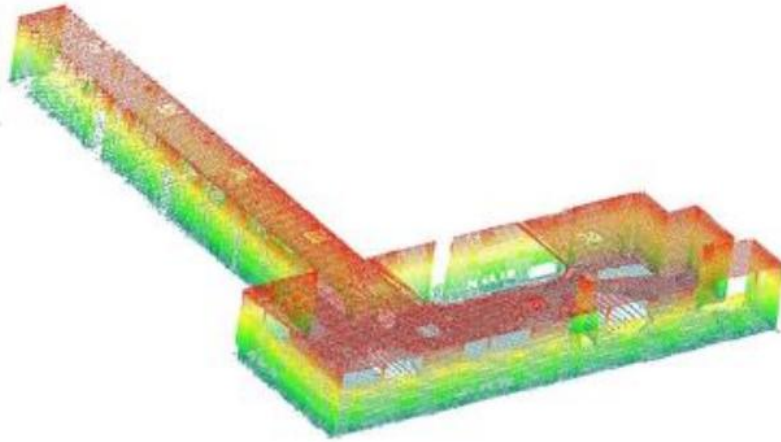
Framework for space subdivision

- ***Space, Subspace, Partition***

- ***Agent***: client in certain navigation
- ***Activity* :** task and navigation behavior performed by an *agent.*
- ***Resource***: things that an *agent* can use in a *sub-space* or take from a *sub-space*.
- ***Modifier***: define what event impacts which *agents/resources/activities* and on which aspects.

Zlatanova, S., L. Liu, and G. Sithole, 2013. A Conceptual Framework of Space Subdivision for Indoor Navigation. ISA '13 Proceedings of the Fifth ACM SIGSPATIAL International Workshop on Indoor Spatial Awareness, ACM New York, NY, USA. pp. 44-48

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Spatial Units, the result of **Subdivision**

Activity **Agents**

Cell, from **Decomposition**

Modifier (on Elevator)

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THANK YOU !

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