

Basic Location Models

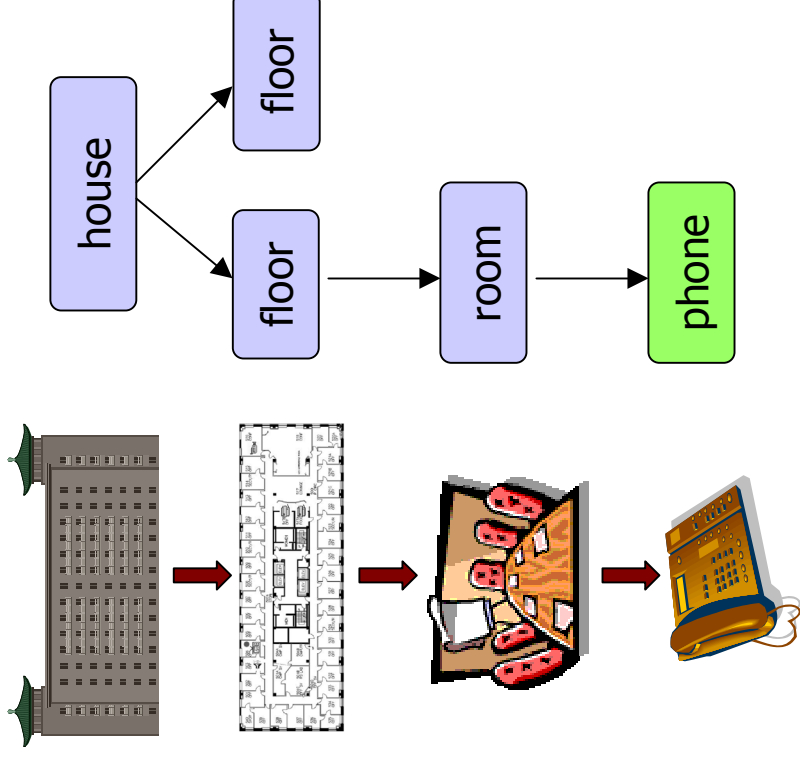
Extensions and Challenges

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RESEARCH GROUP FOR
Distributed Systems

Ingredients

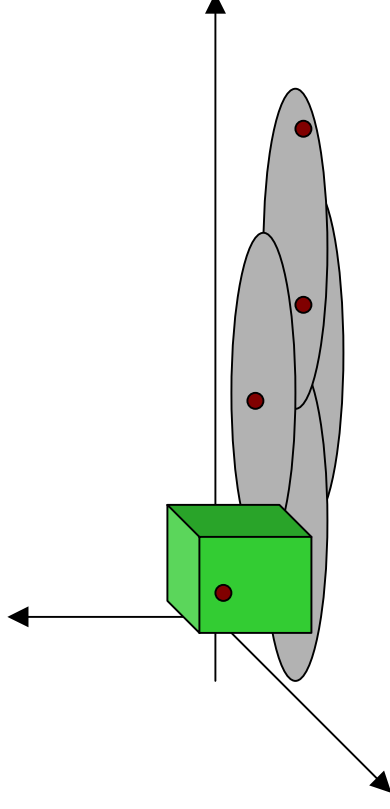
- **Elements**
 - *locations*
 - *objects* [can also be locations for other objects]
- **Relationships** [between the main elements]
 - distance
 - hierarchy...
- **Attributes**
 - certainty, resolution, time, orientation, complexity...



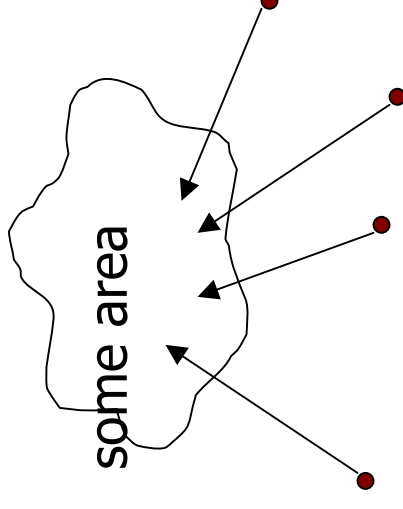
Basic Models

by U. Leonhardt, 1998

- **Geometric**
 - locations and located objects:
points, areas, volumes - sets of coordinate-tuples
 - Based on reference *coordinate* systems (RCS)



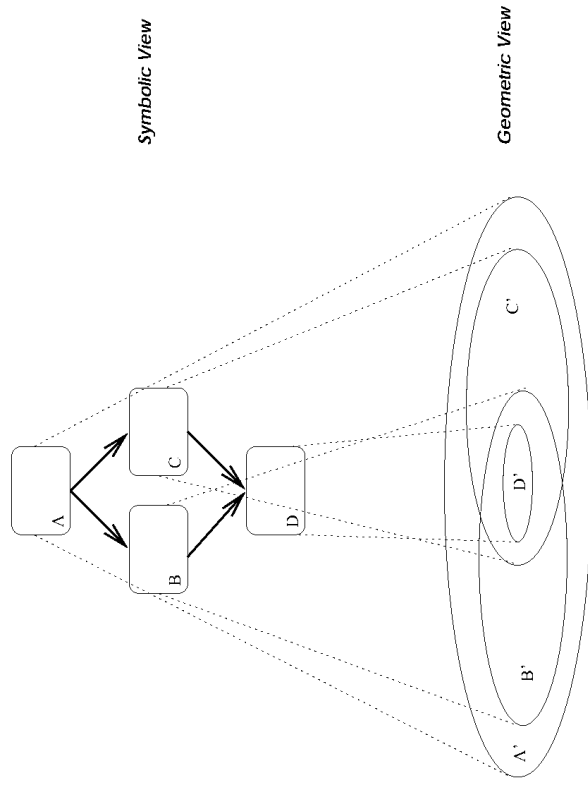
- **Symbolic**
 - locations: *sets*
 - located-objects: *members of sets*
 - refer to locations by *abstract symbols*
 - hierarchies



Basic Models

by U. Leonhardt, 1998

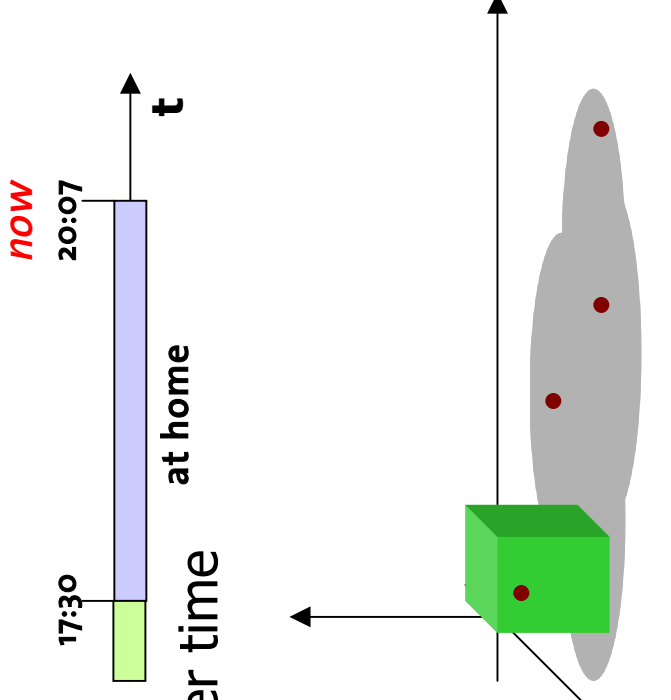
- **Combined**
 - *located-object*:
 - membership in location domains (symb.)
 - coordinates of area (geom.)
 - *location*:
 - well-defined fixed area
 - a large mobile object



static: environment invariable over time

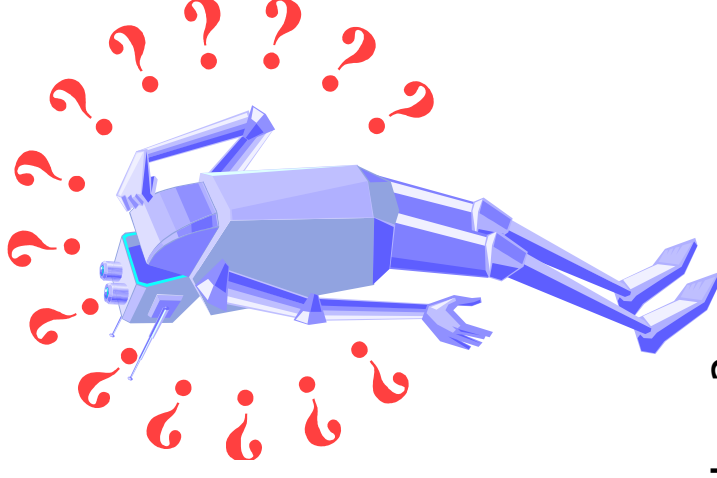
Extensions

- **Time**
 - hierarchies change over time
 - physical environments change over time
 - tracking
- **Probability**
 - sensor data not perfect
 - imprecise geometric data
 - uncertain semantic data
- **Semantic**
 - ontologies for better inference



Challenges, Issues

- Position prediction
- Vague shapes
- What's the right resolution?
 - amount, precision, format
- Application independent solutions?
- Authentication through location
- Privacy
 - integral problem, or can it be dealt with elsewhere?



So then...

- There is more about
 - Elements?
 - Other basic models?
 - More extensions?
 - Further challenges?

