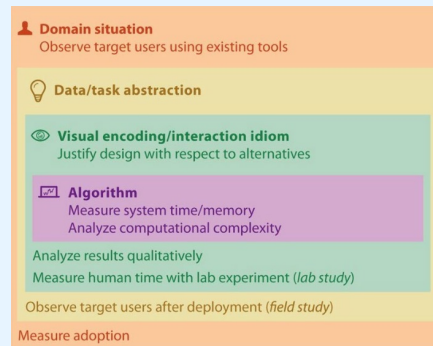## Nested Models

Domain	Understand the user, the data and tasks
	Use domain specific vocabulary
	Produce a set of tasks/questions of target users on the data, on different levels
Data/task abstraction	Data described in generic (Visualization) terms
	Tasks described in generic (Visualization) terms
Visual encoding/-interaction idiom	Design space, select visual encodings, define interactions, etc.
Algorithm	layout algorithm, ordering, rendering, etc.

Dangers at each level

Domain situation
You misunderstood their needs

Data/task abstraction
You're showing them the wrong thing

Visual encoding/interaction idiom
The way you show it doesn't work

Algorithm
Your code is too slow

A mistake at the higher level cannot be corrected on the lower

Nested model - Validation

Domain situation
Observe target users using existing tools

Data/task abstraction

Visual encoding/interaction idiom
Justify design with respect to alternatives

Algorithm
Measure system time/memory
Analyze computational complexity

Analyze results qualitatively
Measure human time with lab experiment (*lab study*)

Observe target users after deployment (*field study*)

Measure adoption

Visual encoding design

Data abstraction	What is shown?
Task abstraction	Why is the user looking at it?
Visual encoding and interaction	How is it shown?