

### Introduction Nested Models

#### Nested Models

<b>Domain</b>	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
<b>Data/task abstraction</b>	Data described in generic (Visualization) terms
	Tasks described in generic (Visualization) terms
<b>Visual encoding/-interaction idiom</b>	Design space, select visual encodings, define interactions, etc.
<b>Algorithm</b>	layout algorithm, ordering, rendering, etc.

#### Dangers at each level

<b>Domain situation</b>	You misunderstood their needs
<b>Data/task abstraction</b>	You're showing them the wrong thing
<b>Visual encoding/interaction idiom</b>	The way you show it doesn't work
<b>Algorithm</b>	Your code is too slow

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

#### Nested model - Validation

<b>Domain situation</b>	Observe target users using existing tools
<b>Data/task abstraction</b>	
<b>Visual encoding/interaction idiom</b>	Justify design with respect to alternatives
<b>Algorithm</b>	Measure system time/memory Analyze computational complexity
	Analyze results qualitatively
	Measure human time with lab experiment ( <i>lab study</i> )
	Observe target users after deployment ( <i>field study</i> )
	Measure adoption

#### Visual encoding design

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

