

Data Visualisation Tasks

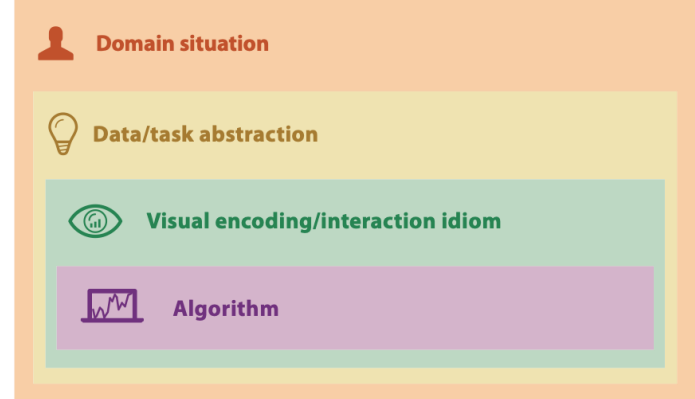
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Slides taken, reformatted, and used from Tamara Munzner (UBC, Canada)

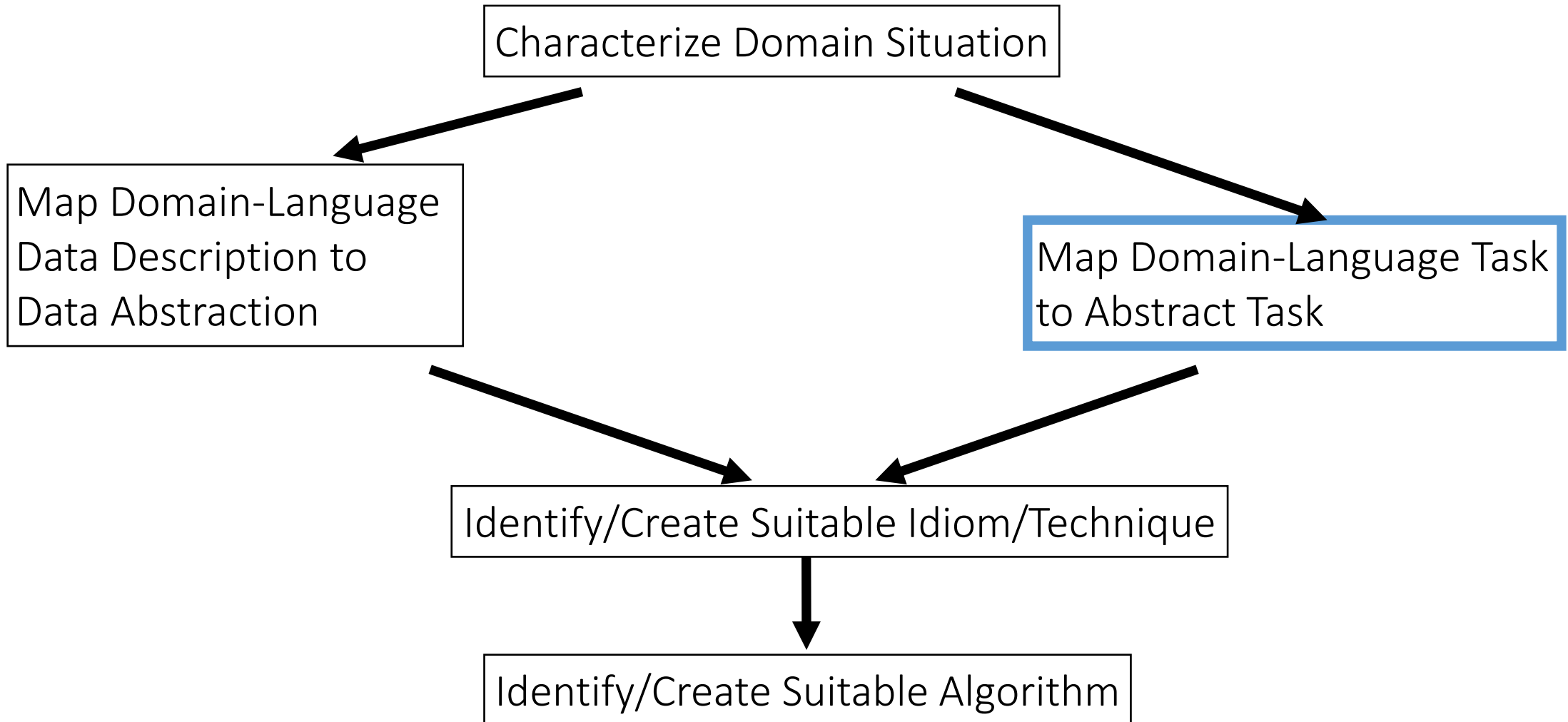
From domain to abstraction

- Domain characterization: details of application domain
 - Group of users, target domain, their questions and data
 - Varies wildly by domain
 - Must be specific enough to get traction
 - Domain questions/problems
 - Break down into simpler abstract tasks
- Abstraction: data and task
 - Map what and why into generalized terms
 - Identify tasks that users wish to perform or already do
 - Find data types that will support those tasks
 - Possibly transform/derive if need be



domain

Design Process



Task abstraction : Actions and Targets

- Very high-level pattern
 - Actions
 - Analyze
 - High-level choices
 - Search
 - Find a known/unknown item
 - Query
 - Find out about the characteristics of the item
 - Targets
 - What is being acted on
- {action, target} pairs
 - Discover distribution
 - Compare trends
 - Locate outliers
 - Browse topology

Actions: Analyze

- Consume
 - Discover vs present
 - Classic split
 - Explore vs explain
 - Enjoy
 - Newcomer
 - Casual, social
- Produce
 - Annotate, record
 - Derive
 - Crucial design choice

→ Analyze

→ Consume

→ Discover



→ Present



→ Enjoy



→ Produce

→ Annotate



→ Record







→ Derive

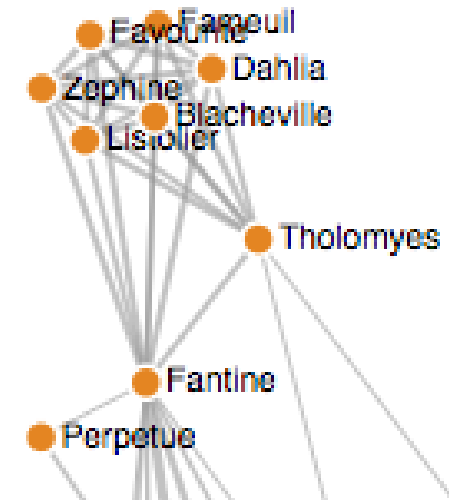


Actions: Search

- What does the user know?
 - Target, location
- Lookup
 - Ex: word in a dictionary
 - Alphabetical order
- Locate
 - Ex: keys in your house
 - Ex: node in network
- Browse
 - Ex: books in the bookstore
- Explore
 - Ex: find cool neighborhood in a new city

→ Search

	Target known	Target unknown
Location known	 <i>Lookup</i>	 <i>Browse</i>
Location unknown	 <i>Locate</i>	 <i>Explore</i>



Actions : Query

- How much of the data matters?

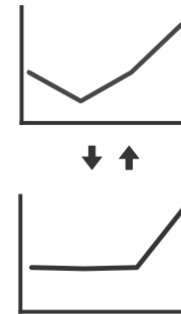
- One : identify
- Some : compare
- All : summarize

➔ **Query**

➔ Identify



➔ Compare



➔ Summarize



Actions

- Independent choices for each of these three levels
 - Analyze, search, query
 - Mix and match

Actions

→ Analyze





→ Consume



→ Produce



→ Search

	Target known	Target unknown
Location known	 Lookup	 Browse
Location unknown	 Locate	 Explore

→ Query

→ Identify



→ Compare



→ Summarize



Task abstractions : Targets

➔ All Data

➔ Trends



➔ Outliers



➔ Features



➔ Attributes

➔ One

➔ Distribution



➔ Extremes

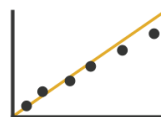


➔ Many

➔ Dependency



➔ Correlation

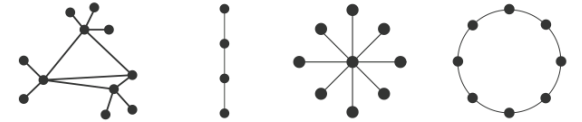


➔ Similarity



➔ Network Data

➔ Topology

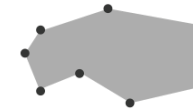


➔ Paths



➔ Spatial Data

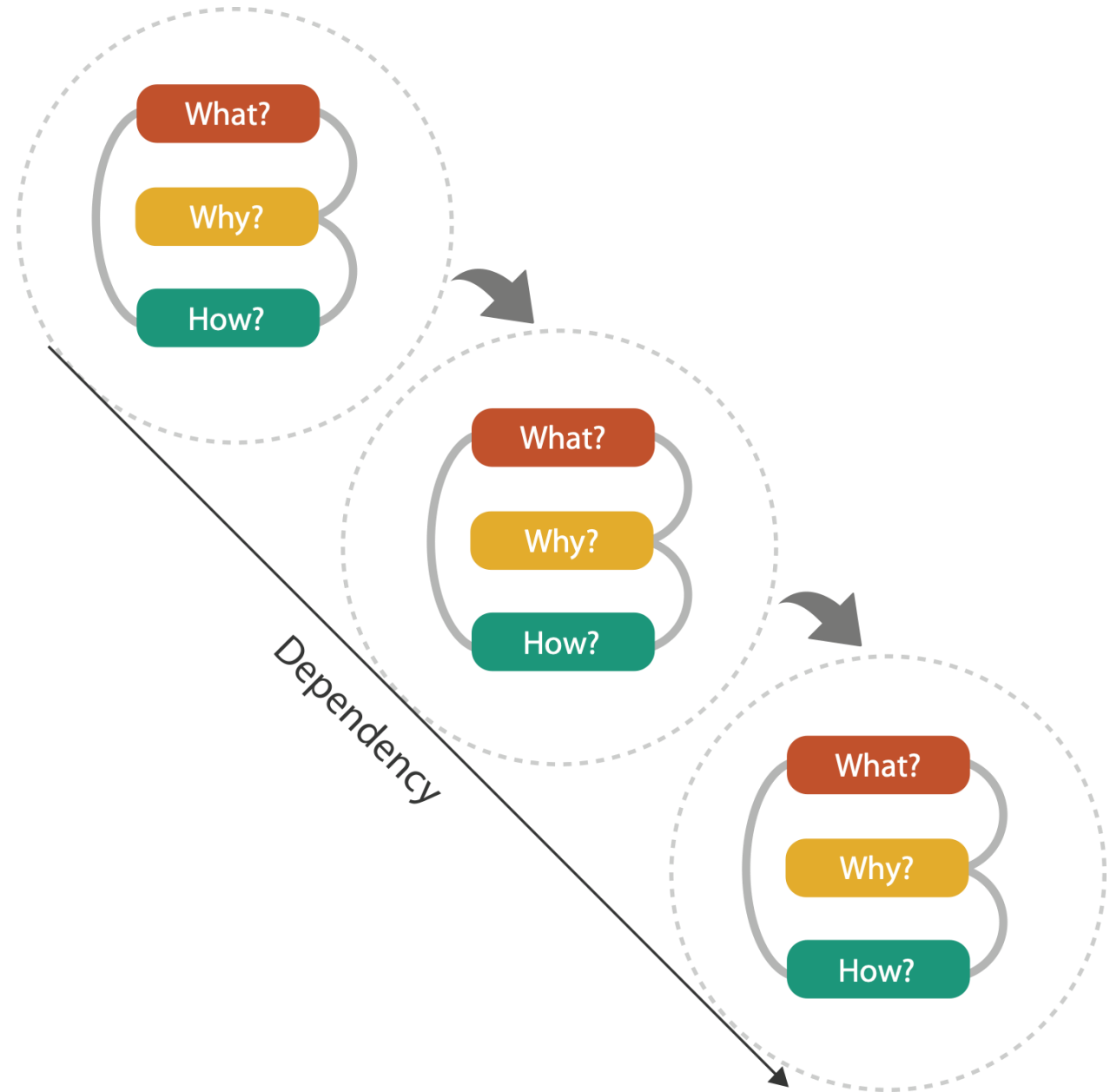
➔ Shape

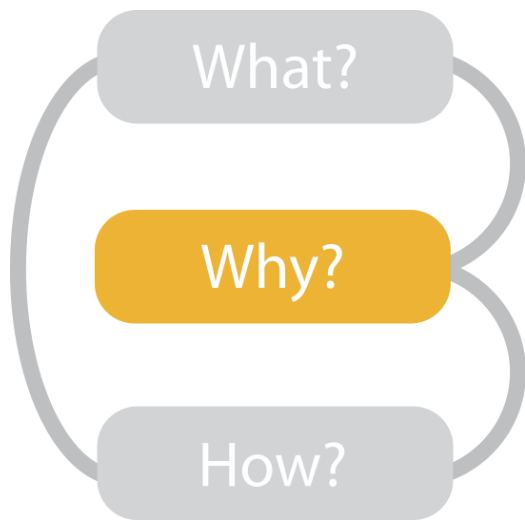


Abstraction

- These {action, target} pairs are a good starting points for vocabulary
 - But sometime you will need more precision!
- Rule of thumb
 - Systematically remove all domain jargon
- Interplay : task and data abstraction
 - Need to use data abstraction within task abstraction
 - To specify your targets!
 - But task abstraction can lead you to transform the data
 - Iterate back and forth
 - First pass data, first pass task, second pass data, ...

Means and ends





- {action, target} pairs
 - *discover distribution*
 - *compare trends*
 - *locate outliers*
 - *browse topology*

