Seilevel

requirements defined

Immediately Improve Your Software Requirements with Visual Models

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Role: Develop new elicitation and modeling methodologies, build business analysis centers of excellence, train industry BAs, work on projects as a Business Architect

Community contributions:

- Member of the IIBA BABOK v3 Core Team
- Industry PC for IEEE Requirements Engineering
- Co-chair for Requirements Engineering Education and Training Workshop
- Previous IIBA® Austin Chapter VP of Education
- IREB team member

Co-Author:

- *Visual Models for Software Requirements* with Anthony Chen
- *Software Requirements, 3rd Ed.* with Karl Wiegers

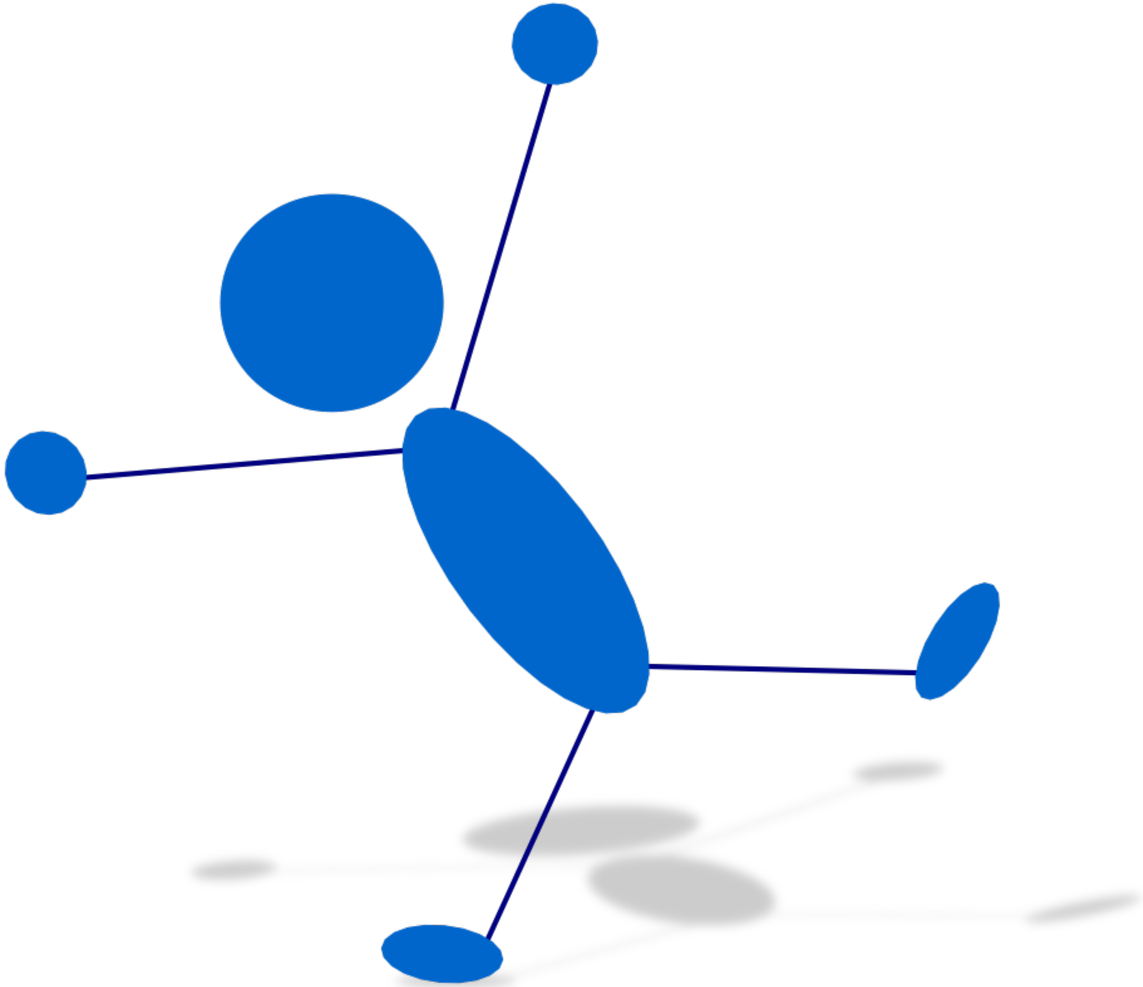
Models overview

Model business processes to identify requirements

Brainstorm and organize features

Model UI screen display and behavior requirements

Meet Blue



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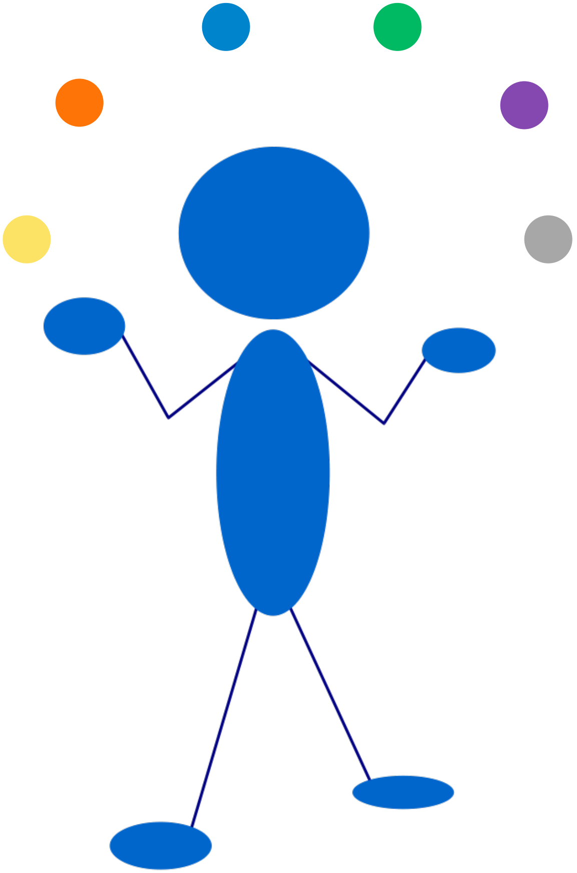
Why do we need to model information?

Miller’s Magic Number

7 ± 2

We can only juggle so many pieces of information

What happens when we add 4 more things?



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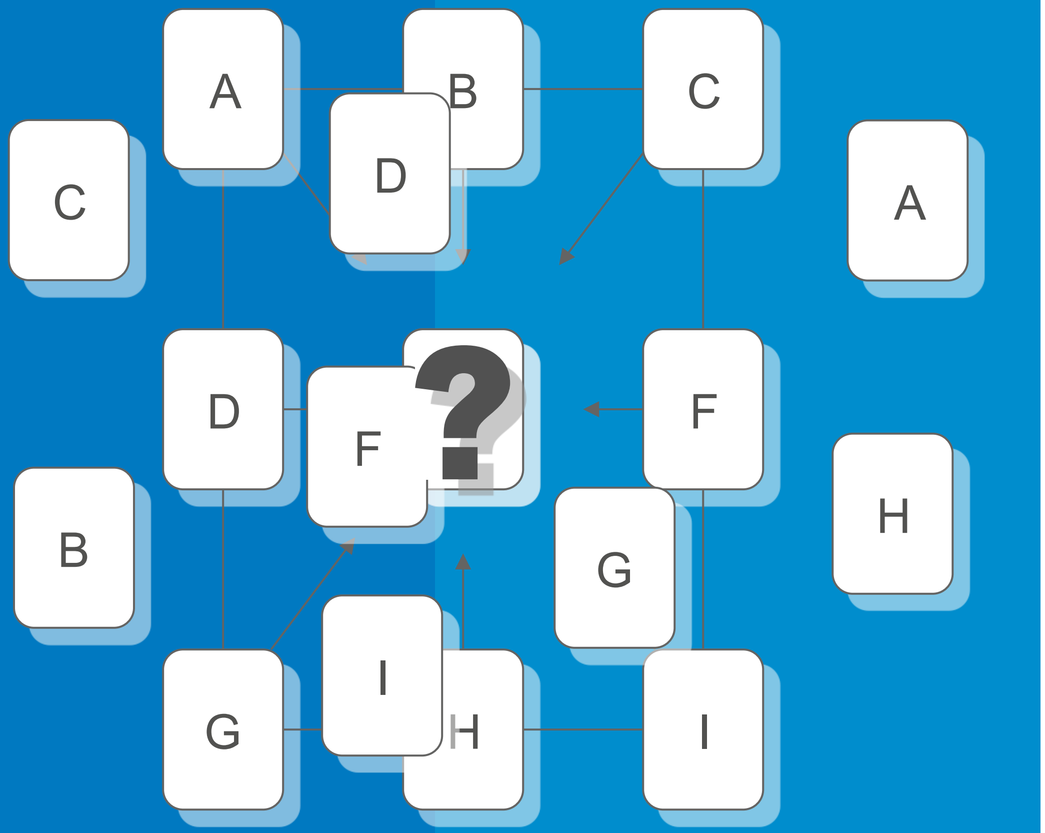
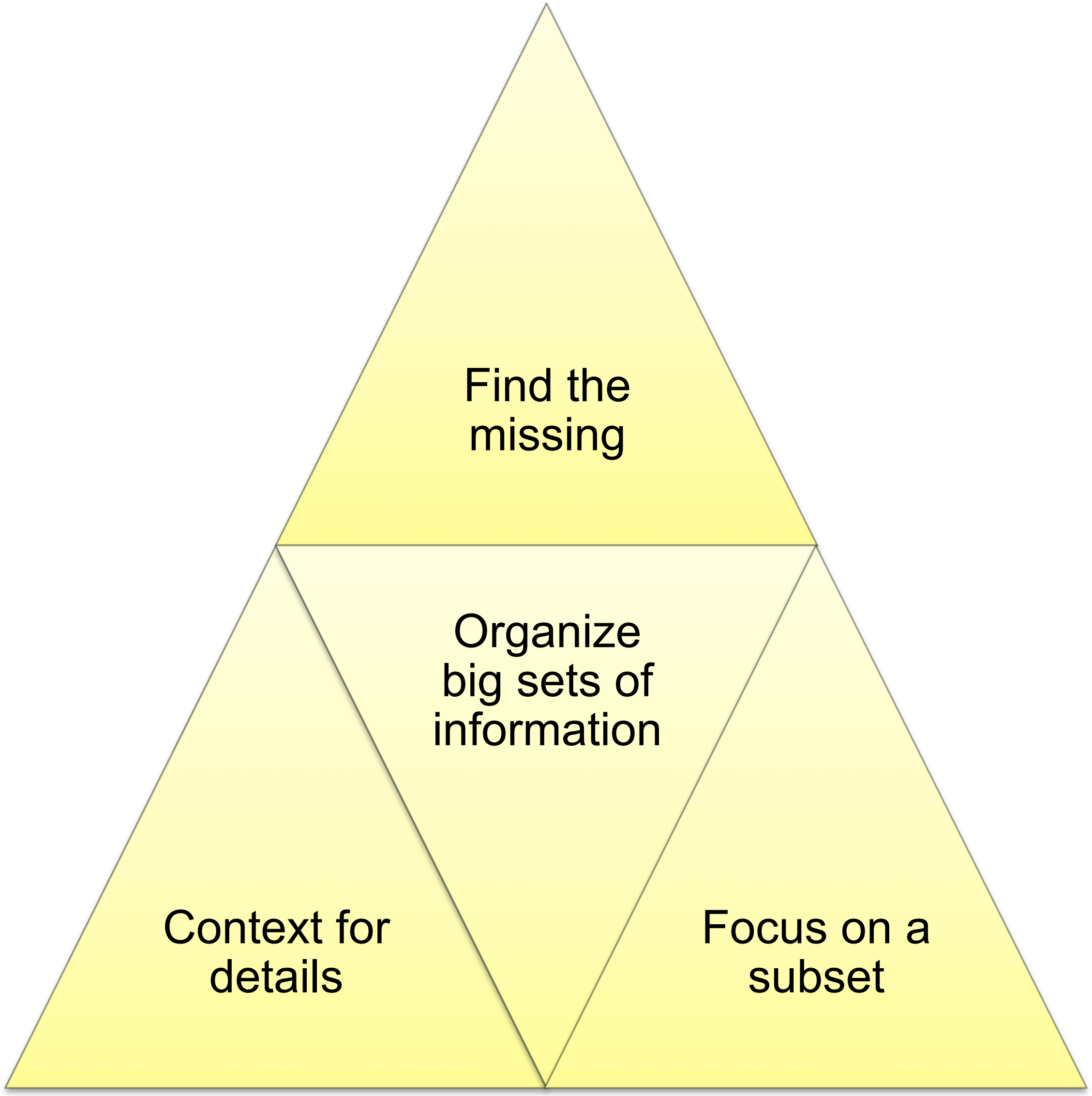


MODELS add structure



Visual Models

We developed a requirements modeling language to be easy to create and consume

- Business Objectives Model
- Organization Chart
- Ecosystem Map
- Business Data Diagram
- Objective Chain
- Process Flow
- Display Action Response Table
- Data Flow Diagram
- Key Performance Indicator Model
- Data Dictionary
- Feature Tree
- State Table
- Requirements Mapping Matrix
- State Diagram
- Use Case
- System Flow
- Decision Tree
- Report Table
- Roles & Permissions Matrix
- User Interface Flow
- Decision Table
- System Interface Table

RML

Models are categorized to help you figure out when to use them

OBJECTIVES MODELS
DESCRIBE THE BUSINESS VALUE OF THE SYSTEM

PEOPLE MODELS
SHOW WHO USES THE SYSTEM AND HOW

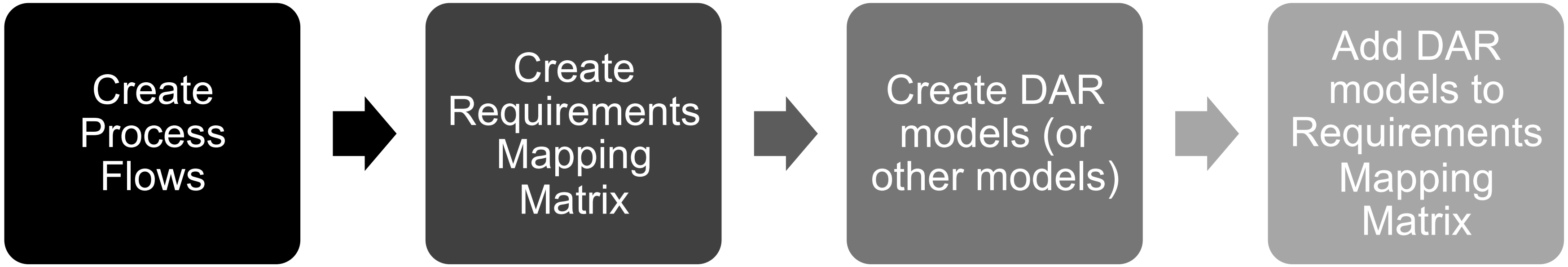
SYSTEM MODELS
DETAIL THE INTERACTION S BETWEEN SYSTEMS

DATA MODELS
FOCUS ON THE INFORMATION IN THE SYSTEM AND HOW IT'S MODIFIED

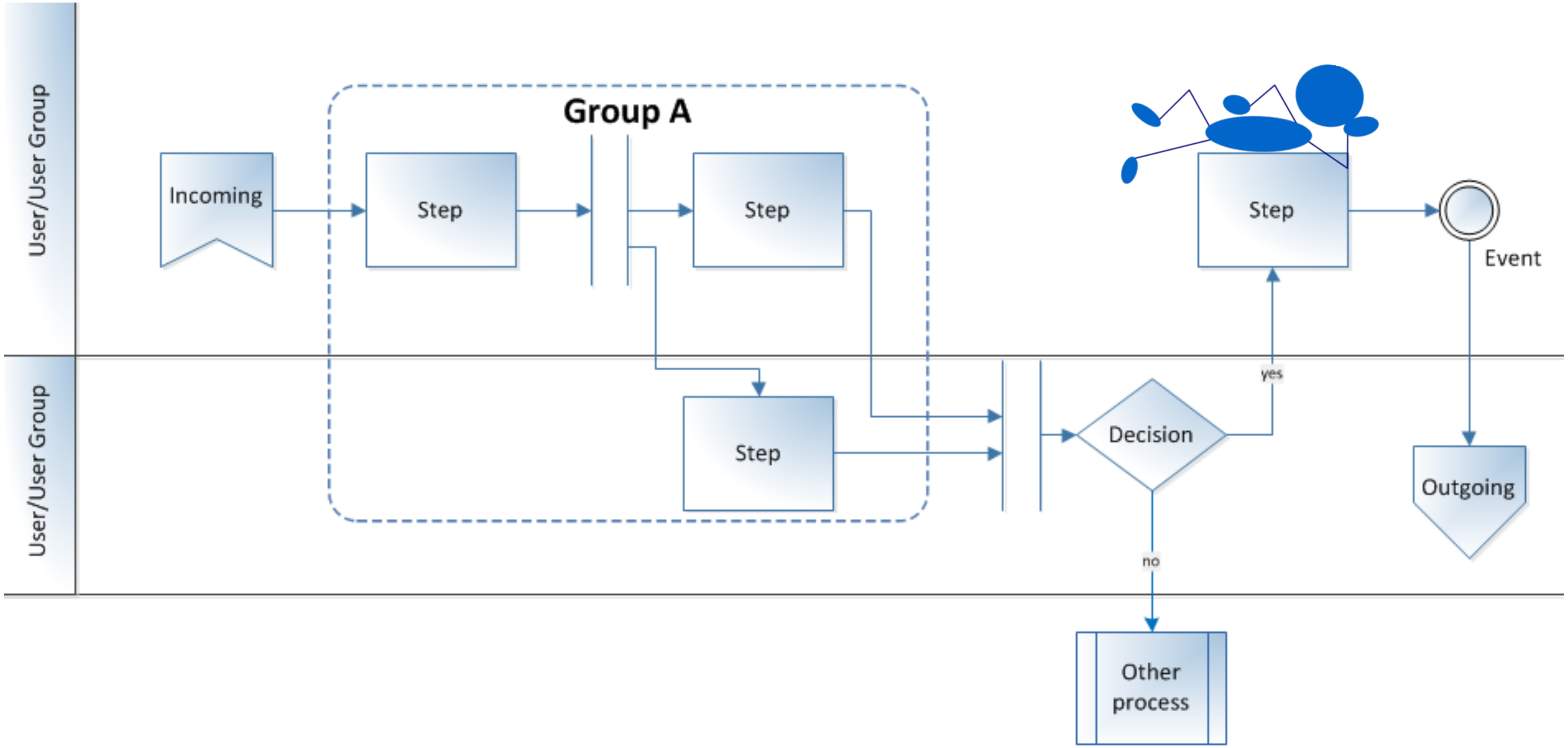
Quickstart Models

Objectives	People	Systems	Data
Business Objectives Model	Organization Chart	Ecosystem Map	Business Data Diagram
Objective Chain	Process Flow	Display Action Response Table	Data Flow Diagram
Key Performance Indicator Model	Use Case	System Flow	Data Dictionary
Feature Tree	Roles & Permissions Matrix	User Interface Flow	State Table
Requirements Mapping Matrix		System Interface Table	State Diagram
		Decision Tree	Report Table
		Decision Table	

An approach that most projects can implement at any stage for immediate improvement


Create Process Flows
Create Requirements Mapping Matrix
Create DAR models (or other models)
Add DAR models to Requirements Mapping Matrix

Create Process Flows for all your critical business processes



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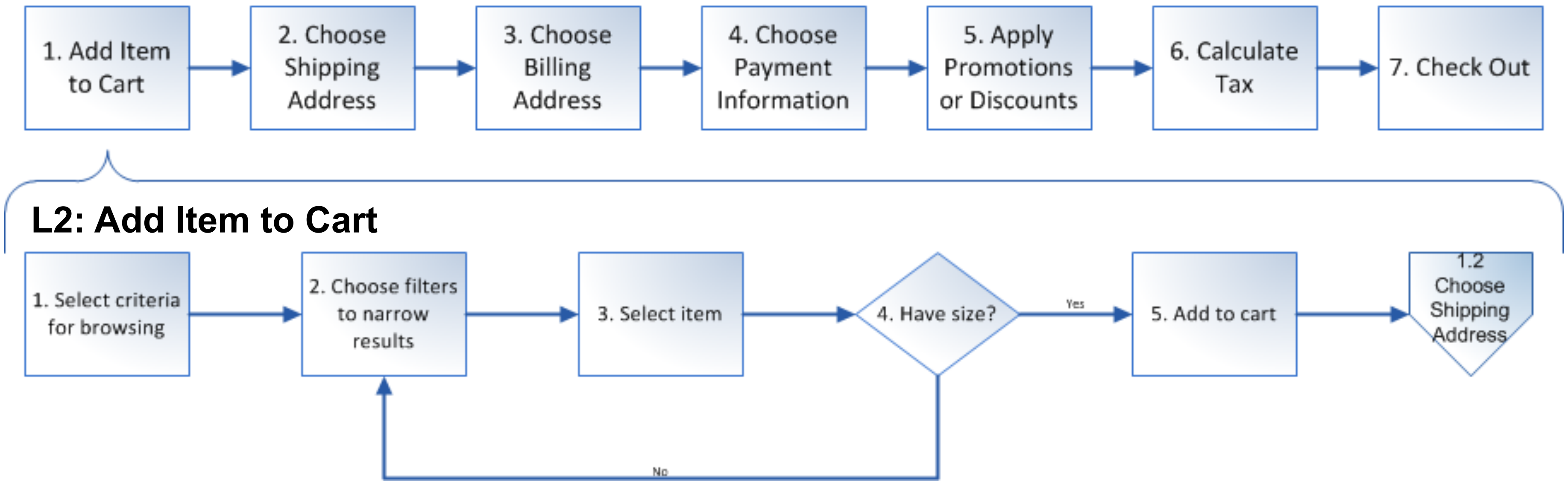
Example Process Flow: Add to Cart

L1: Cart and Checkout



1. Add Item to Cart

2. Choose Shipping Address

3. Choose Billing Address

4. Choose Payment Information

5. Apply Promotions or Discounts

6. Calculate Tax

7. Check Out

L2: Add Item to Cart

1. Select criteria for browsing

2. Choose filters to narrow results

3. Select item

4. Have size?

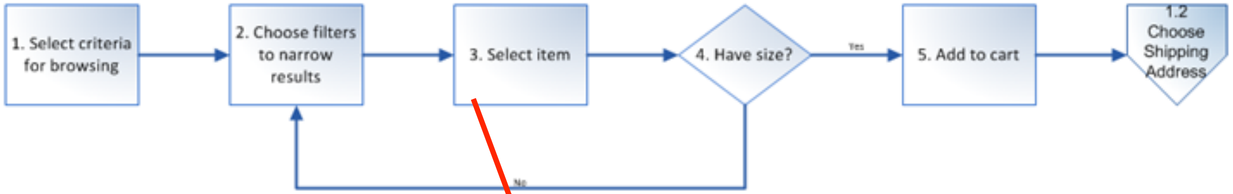
Yes

5. Add to cart

1.2 Choose Shipping Address

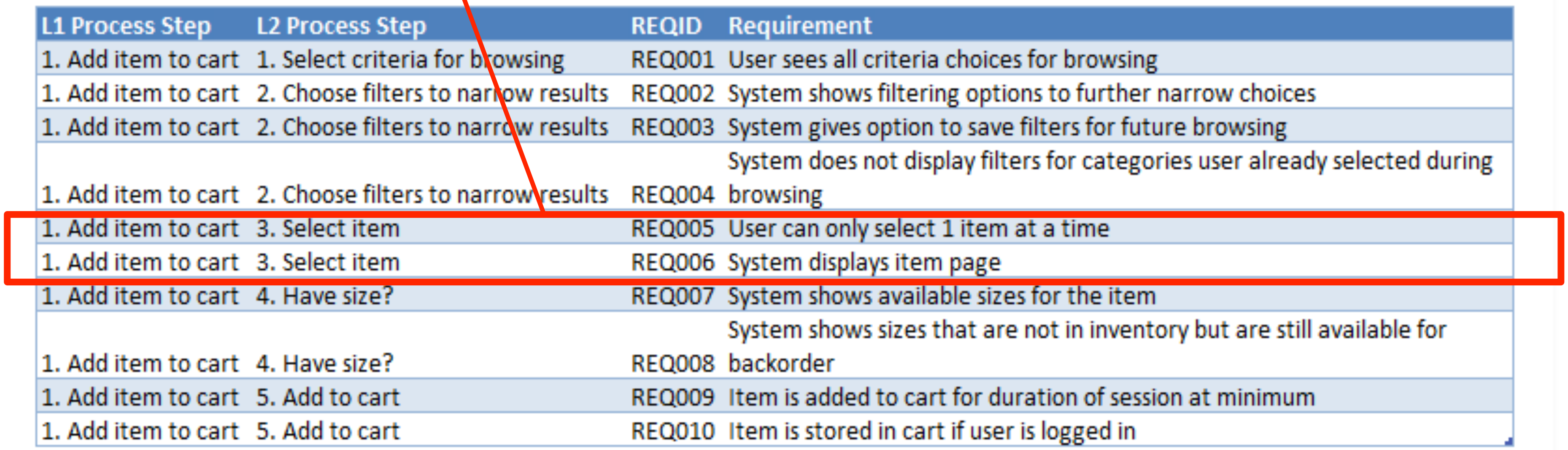
No

Create a Requirements Mapping Matrix (RMM) to map process steps to requirements


1. Select criteria for browsing
2. Choose filters to narrow results
3. Select item
4. Have size?
Yes
No
5. Add to cart
1.2 Choose Shipping Address

1. Add process steps to the matrix

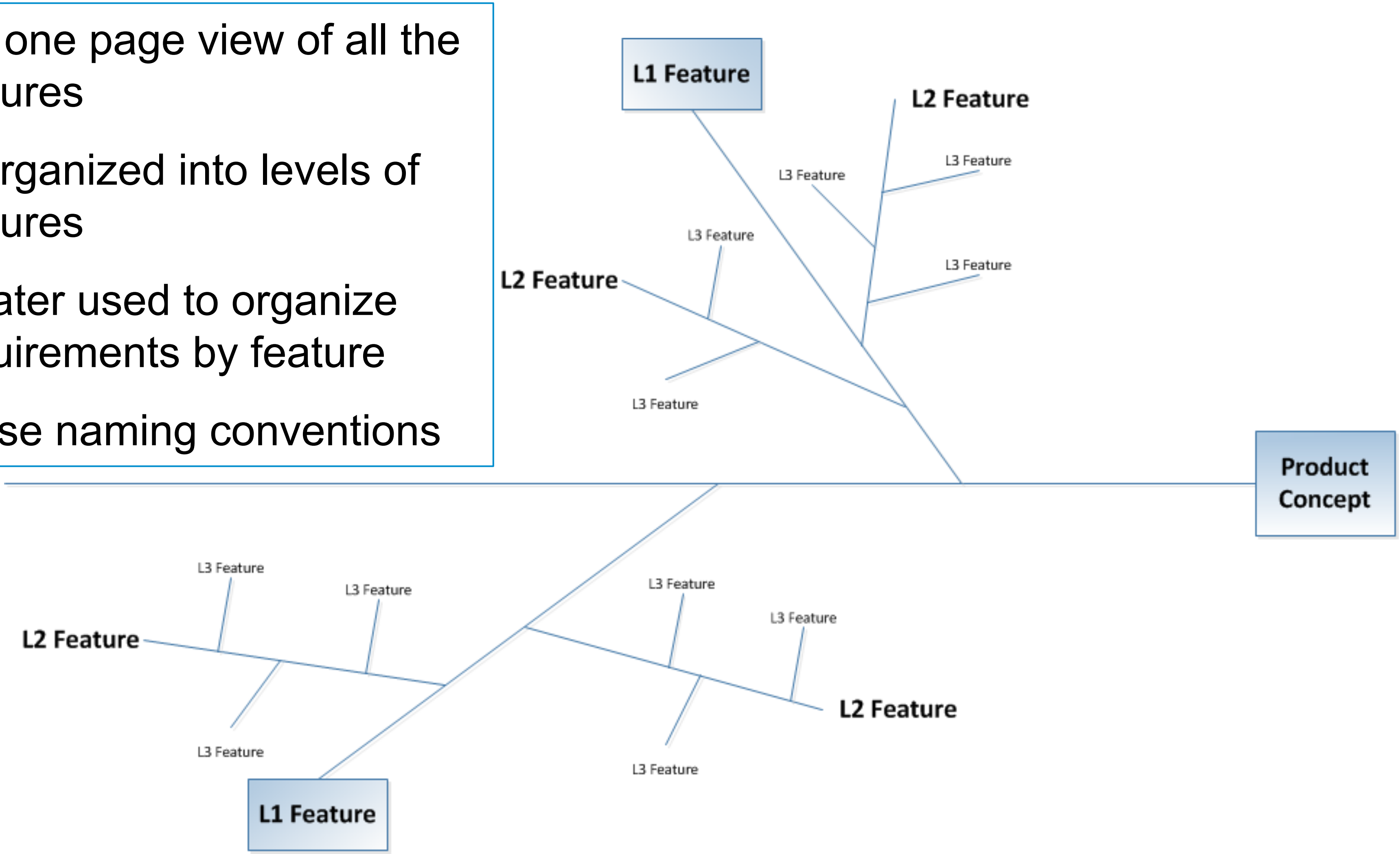
2. Add requirements to the matrix by step



L1 Process Step	L2 Process Step	REQID	Requirement
1. Add item to cart	1. Select criteria for browsing	REQ001	User sees all criteria choices for browsing
1. Add item to cart	2. Choose filters to narrow results	REQ002	System shows filtering options to further narrow choices
1. Add item to cart	2. Choose filters to narrow results	REQ003	System gives option to save filters for future browsing
1. Add item to cart	2. Choose filters to narrow results	REQ004	System does not display filters for categories user already selected during browsing
1. Add item to cart	3. Select item	REQ005	User can only select 1 item at a time
1. Add item to cart	3. Select item	REQ006	System displays item page
1. Add item to cart	4. Have size?	REQ007	System shows available sizes for the item
1. Add item to cart	4. Have size?	REQ008	System shows sizes that are not in inventory but are still available for backorder
1. Add item to cart	5. Add to cart	REQ009	Item is added to cart for duration of session at minimum
1. Add item to cart	5. Add to cart	REQ010	Item is stored in cart if user is logged in

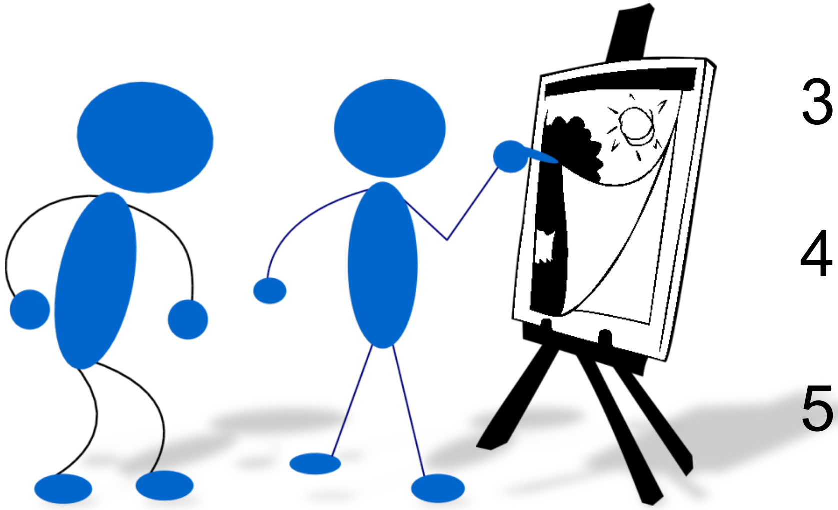
Feature Tree

- A one page view of all the features
- Organized into levels of features
- Later used to organize requirements by feature
- Use naming conventions



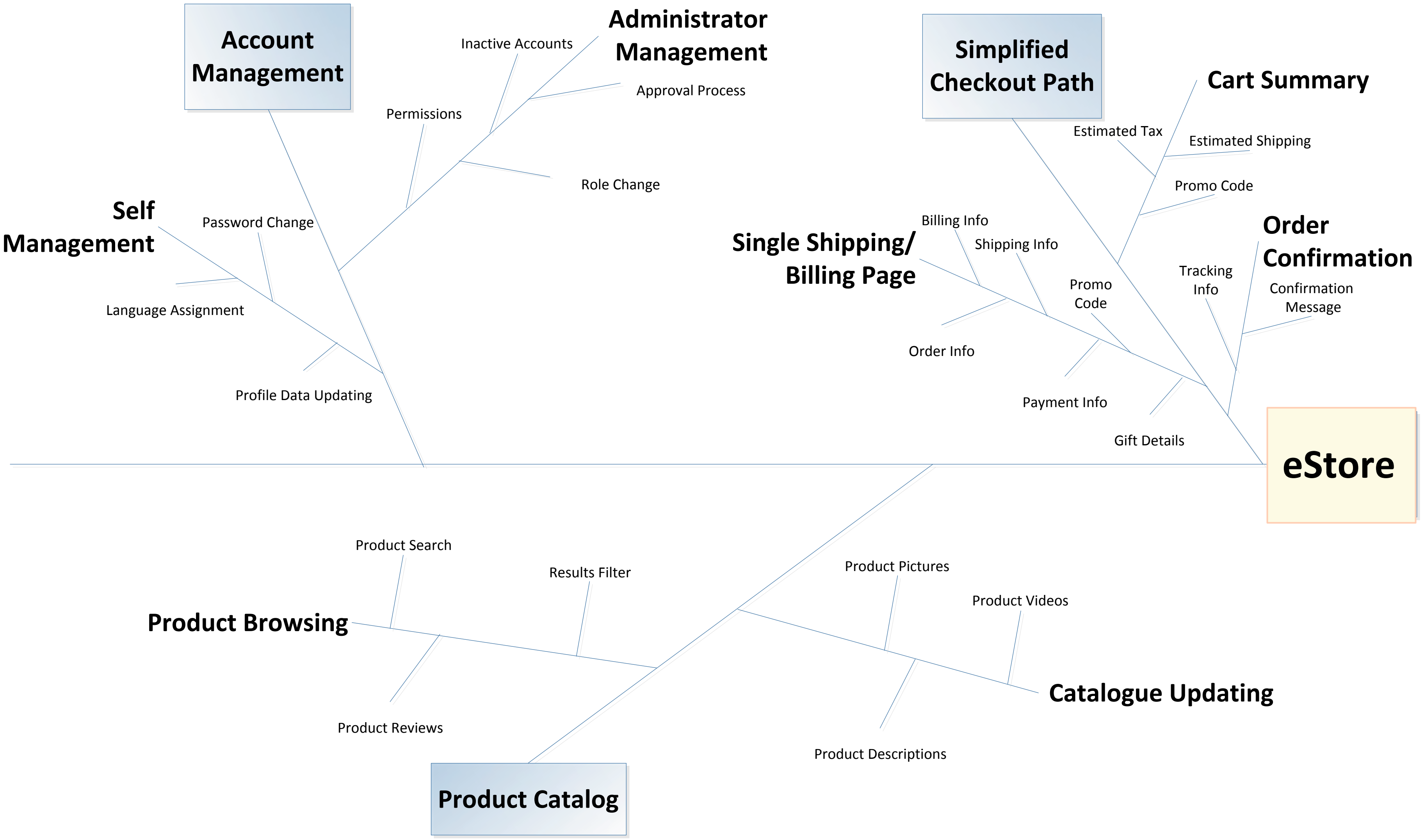
Example features: Product Catalog, Cart, Order Summary

Create a Feature Tree

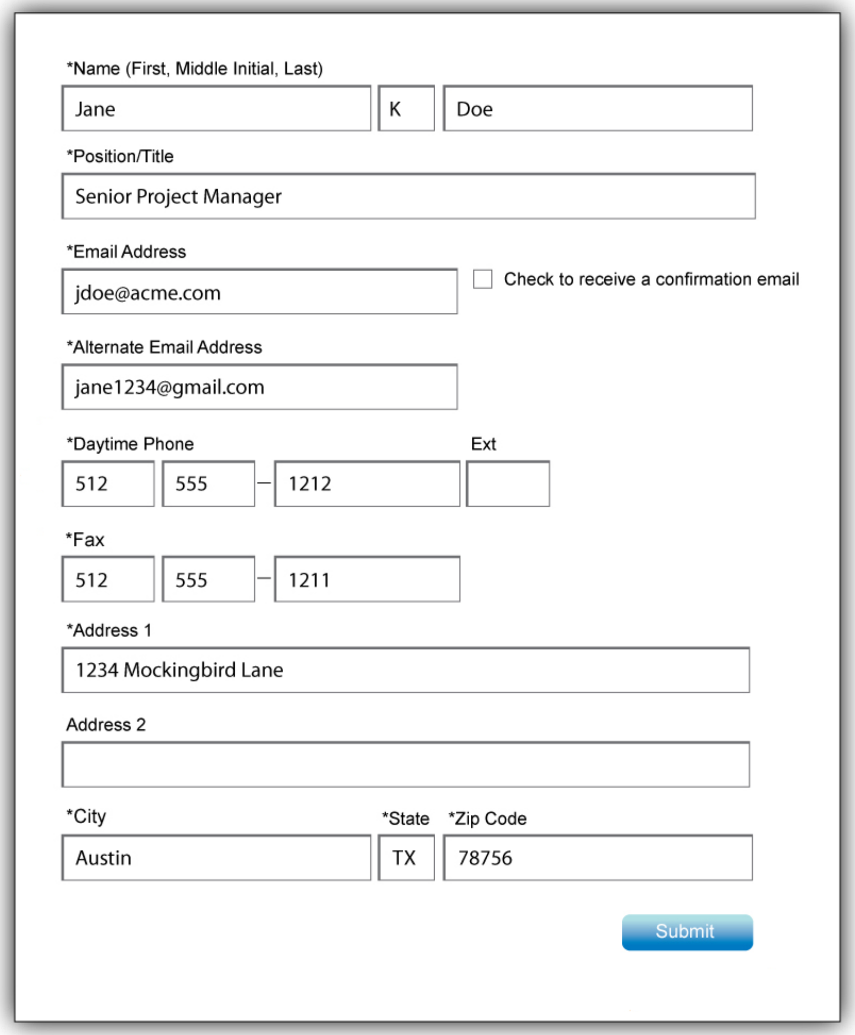


1. Form groups of 3-5
2. Brainstorm features for an online clothing store using sticky notes
3. Together organize features in a tree on the wall
4. Together identify new features
5. Organize into a feature tree

Example: Feature Tree



Typical screen shot and long list of UI requirements



*Name (First, Middle Initial, Last): Jane | K | Doe

*Position/Title: Senior Project Manager

*Email Address: jdoe@acme.com

□ Check to receive a confirmation email

*Alternate Email Address: jane1234@gmail.com

*Daytime Phone: 512 | 555 – 1212 Ext:

*Fax: 512 | 555 – 1211

*Address 1: 1234 Mockingbird Lane

Address 2:

*City: Austin

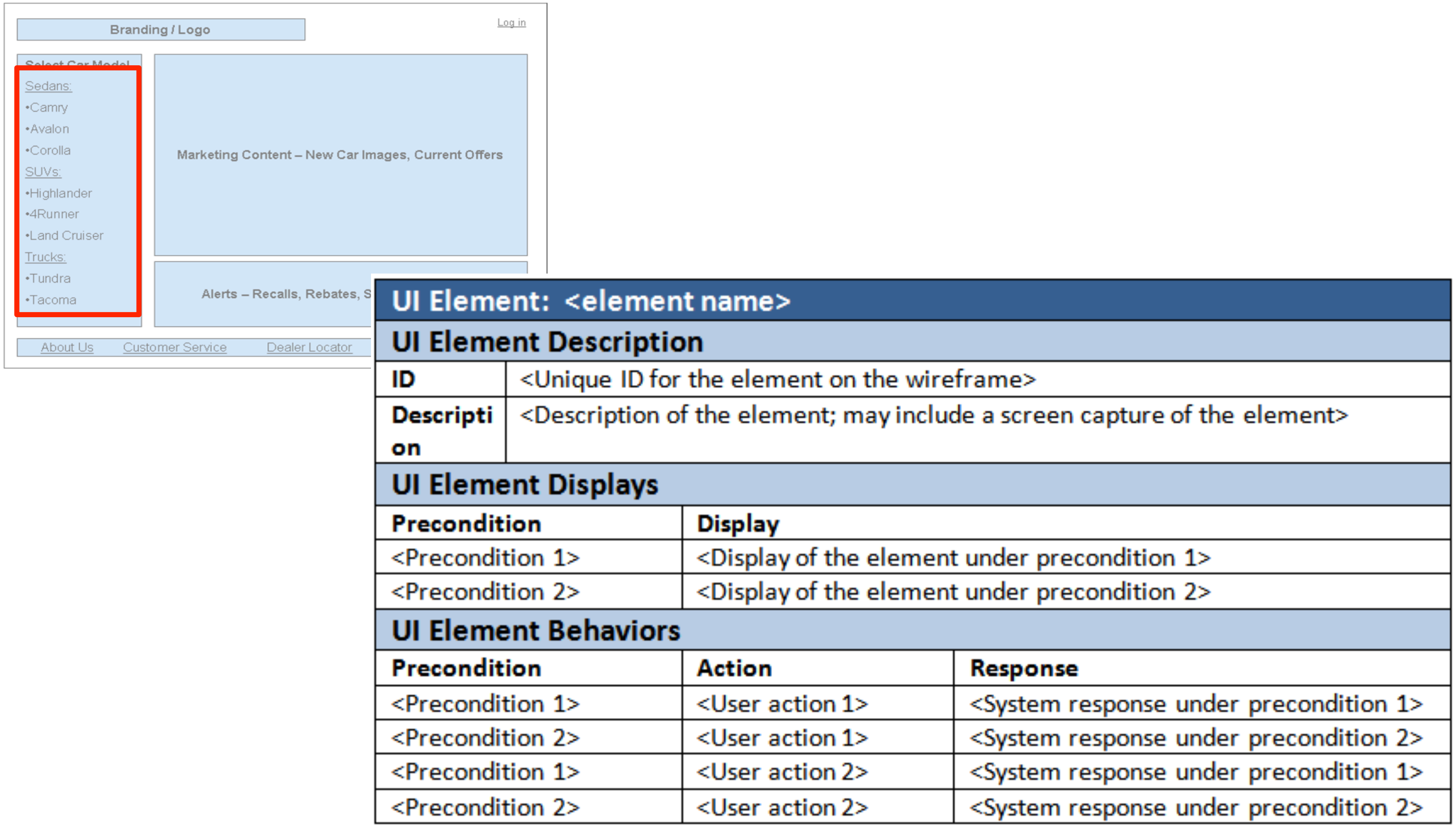
*State: TX

*Zip Code: 78756

Requirements Document

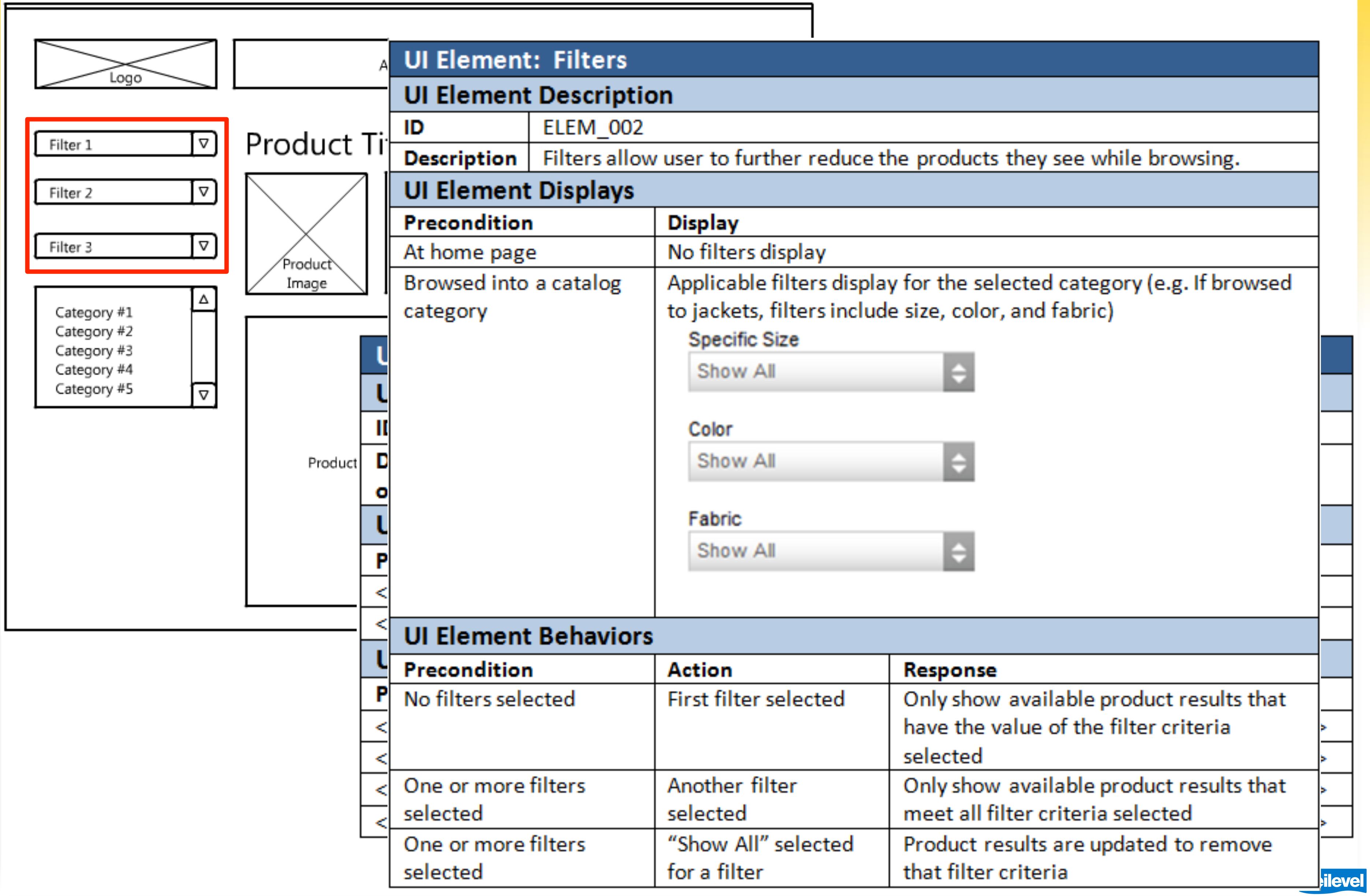
- System shall have fields for first name, middle initial and last name.
- System shall display a name if there is one in the stored profile.
- System shall require name is completed.
- System shall have a field for position or title.
- System shall require title is completed.
- System shall display a position or title if there is one in the stored profile.
- System shall have fields for email and alternate email addresses.
- System shall display an email address if there is one in the stored in the profile.
- System shall require email and alternate email addresses are completed.
- System shall have a field for a daytime phone number.
- System shall display a phone number if there is one in the stored profile.
- System shall require phone number is completed.
- System shall validate the phone number is all digits when user exits the field.
- System shall display an error message if phone number is not all digits.
- System shall have a field for a fax number.
- System shall require fax is completed.
- System shall display a fax number if there is one in the stored profile.
- System shall validate the fax number is all digits when user exits the field.
- System shall display an error message if the fax number field is not all digits.
- System shall have two fields for a street address.
- System shall require the first street address field is completed.
- System shall display an address if there is one in the stored profile.
- System shall have a field for city.
- System shall require the city field is completed.
- System shall display a city if there is one in the stored profile.
- System shall have a field for state.
- System shall display a state if there is one in the stored profile.
- System shall require the state field is completed.
- System shall have a field for zip code.
- System shall display a zip code if there is one in the stored profile.
- System shall require the zip code field is completed.
- System shall look up zip code in the list of zip codes that span counties and display a county selection if it does span counties.
- System shall have a submit option.
- System shall save contact information updates to the order when the submit option is selected.
- System shall validate required fields are completed when the submit is selected.
- System shall display an error message when required fields are not completed, alerting user to which fields need to be completed.
- System shall give the option to receive a confirmation email.
- System shall take user to the billing information page when the contact information is saved successfully.

Display-Action-Response models (DARs) describe display and behavior requirements



<table>
<tr><th colspan="3">UI Element: &lt;element name&gt;</th></tr>
<tr><th colspan="3">UI Element Description</th></tr>
<tr><td><b>ID</b></td><td colspan="2">&lt;Unique ID for the element on the wireframe&gt;</td></tr>
<tr><td><b>Description</b></td><td colspan="2">&lt;Description of the element; may include a screen capture of the element&gt;</td></tr>
<tr><th colspan="3">UI Element Displays</th></tr>
<tr><td><b>Precondition</b></td><td colspan="2"><b>Display</b></td></tr>
<tr><td>&lt;Precondition 1&gt;</td><td colspan="2">&lt;Display of the element under precondition 1&gt;</td></tr>
<tr><td>&lt;Precondition 2&gt;</td><td colspan="2">&lt;Display of the element under precondition 2&gt;</td></tr>
<tr><th colspan="3">UI Element Behaviors</th></tr>
<tr><td><b>Precondition</b></td><td><b>Action</b></td><td><b>Response</b></td></tr>
<tr><td>&lt;Precondition 1&gt;</td><td>&lt;User action 1&gt;</td><td>&lt;System response under precondition 1&gt;</td></tr>
<tr><td>&lt;Precondition 2&gt;</td><td>&lt;User action 1&gt;</td><td>&lt;System response under precondition 2&gt;</td></tr>
<tr><td>&lt;Precondition 1&gt;</td><td>&lt;User action 2&gt;</td><td>&lt;System response under precondition 1&gt;</td></tr>
<tr><td>&lt;Precondition 2&gt;</td><td>&lt;User action 2&gt;</td><td>&lt;System response under precondition 2&gt;</td></tr>
</table>

Example: Add to Cart DAR



UI Element: Filters

UI Element Description

ID	ELEM_002
Description	Filters allow user to further reduce the products they see while browsing.

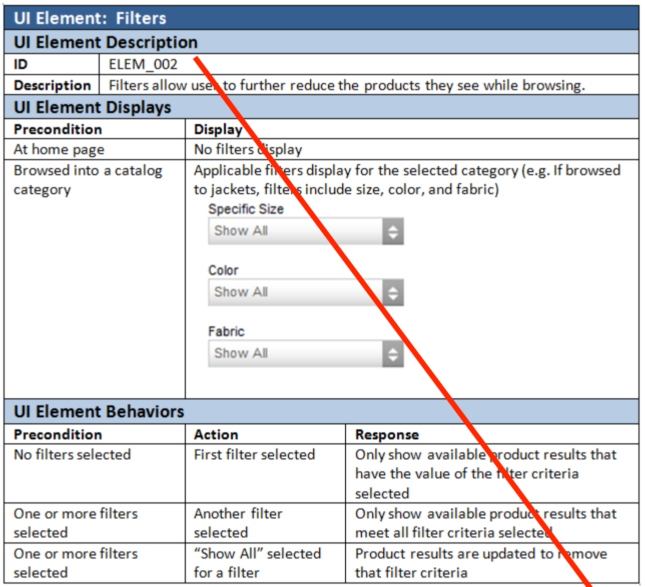
UI Element Displays

Precondition	Display
At home page	No filters display
Browsed into a catalog category	Applicable filters display for the selected category (e.g. If browsed to jackets, filters include size, color, and fabric) Specific Size Show All Color Show All Fabric Show All

UI Element Behaviors

Precondition	Action	Response
No filters selected	First filter selected	Only show available product results that have the value of the filter criteria selected
One or more filters selected	Another filter selected	Only show available product results that meet all filter criteria selected
One or more filters selected	"Show All" selected for a filter	Product results are updated to remove that filter criteria

Add the DAR models to the RMM to ensure that processes can be completed within the screens



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UI Element Behaviors

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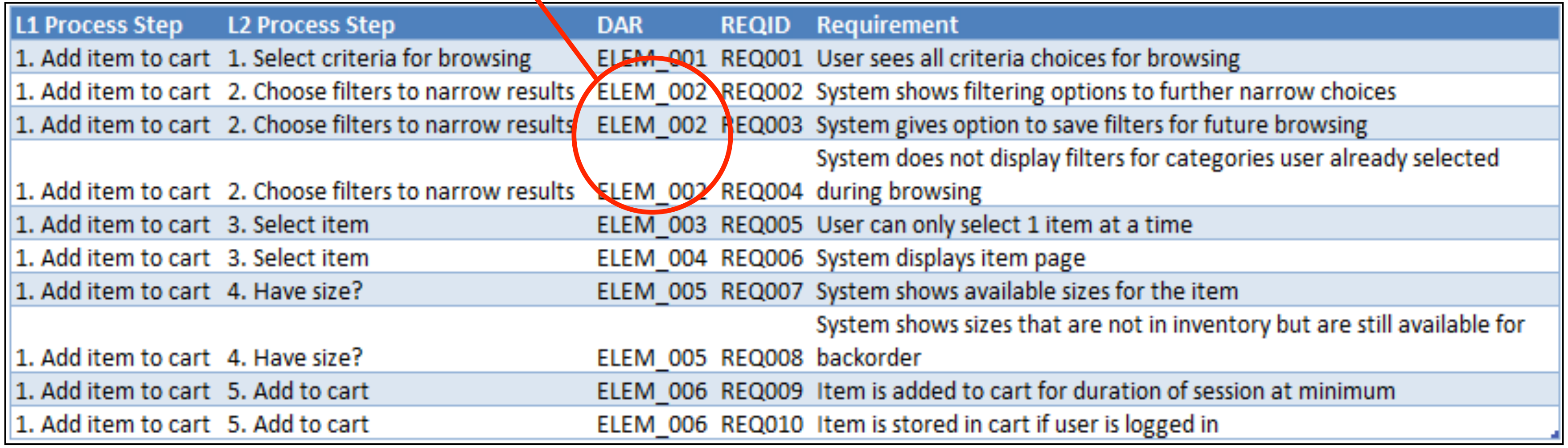
You can add additional models to further organize your requirements



L1 Process Step	L2 Process Step	DAR	REQID	Requirement
1. Add item to cart	1. Select criteria for browsing	ELEM_001	REQ001	User sees all criteria choices for browsing
1. Add item to cart	2. Choose filters to narrow results	ELEM_002	REQ002	System shows filtering options to further narrow choices
1. Add item to cart	2. Choose filters to narrow results	ELEM_002	REQ003	System gives option to save filters for future browsing
1. Add item to cart	2. Choose filters to narrow results	ELEM_002	REQ004	System does not display filters for categories user already selected during browsing
1. Add item to cart	3. Select item	ELEM_003	REQ005	User can only select 1 item at a time
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1. Add item to cart	4. Have size?	ELEM_005	REQ007	System shows available sizes for the item
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1. Add item to cart	5. Add to cart	ELEM_006	REQ009	Item is added to cart for duration of session at minimum
1. Add item to cart	5. Add to cart	ELEM_006	REQ010	Item is stored in cart if user is logged in

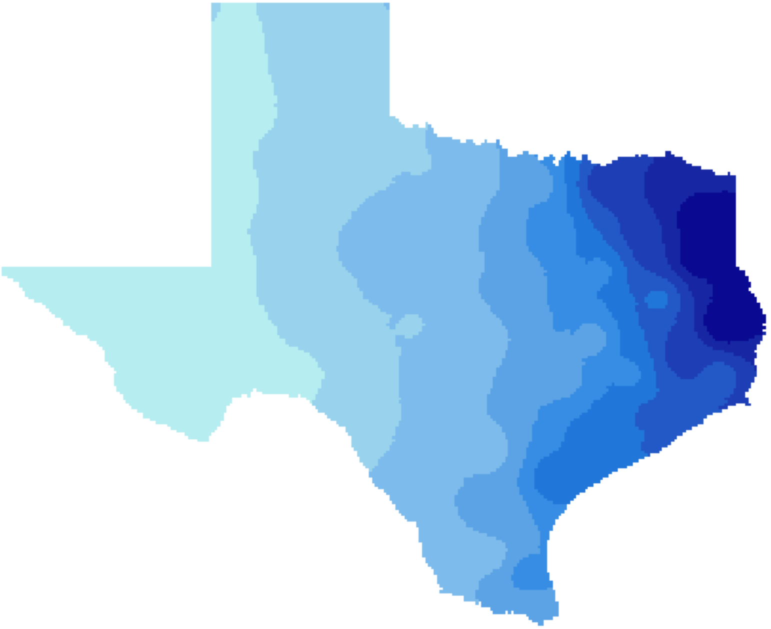
☑ Models overview

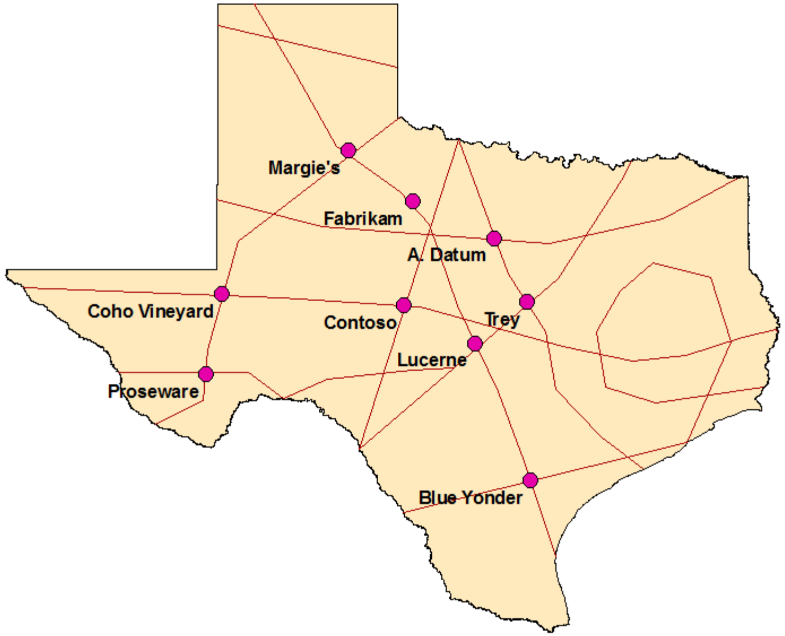
☑ Model business processes to identify requirements

☑ Brainstorm and organize features

☑ Model UI screen display and behavior requirements

Final Point:
You will need to use many models, no one model shows it all





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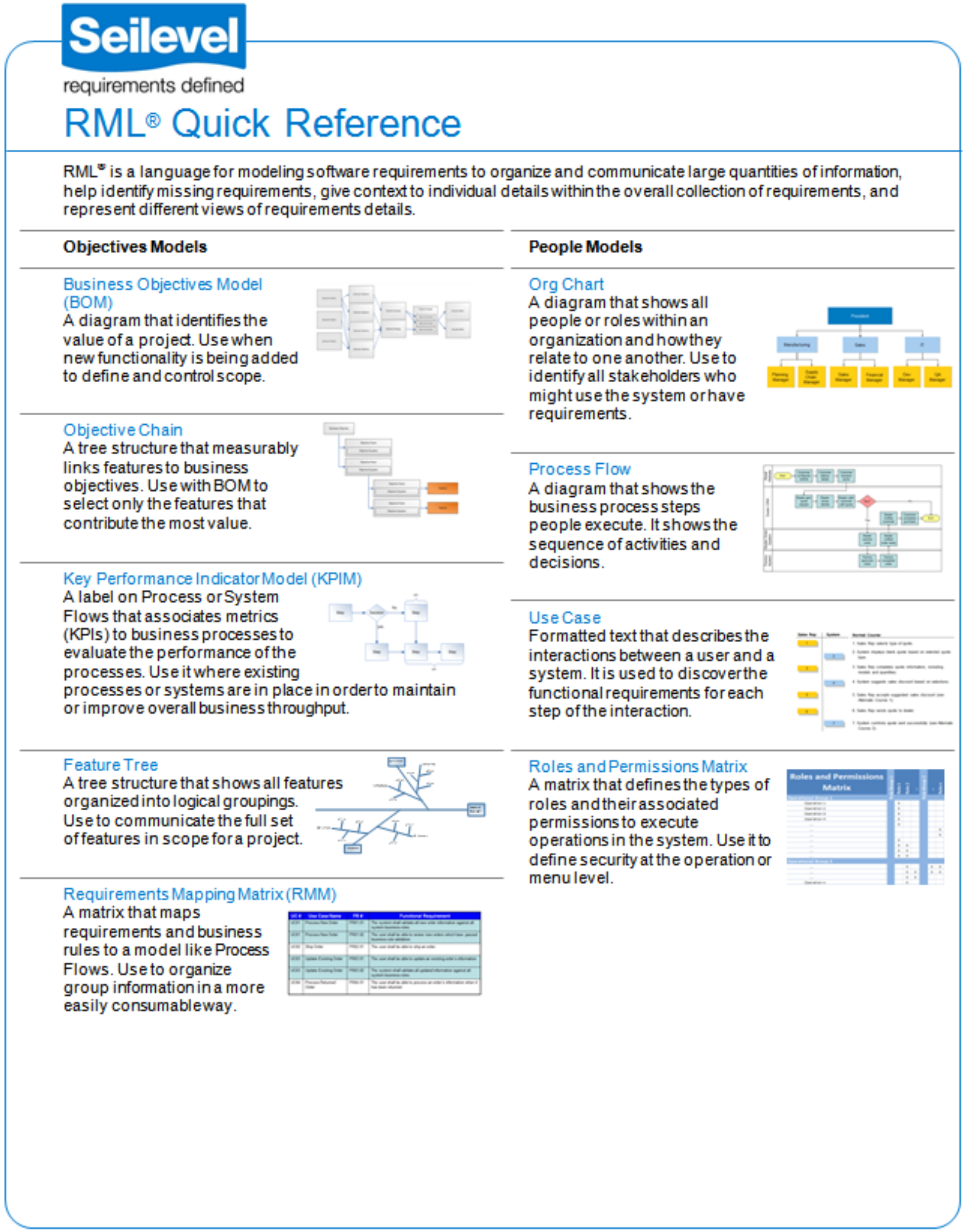
Take-away: RML® Quick Reference



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RML® Quick Reference

RML® is a language for modeling software requirements to organize and communicate large quantities of information, help identify missing requirements, give context to individual details within the overall collection of requirements, and represent different views of requirements details.

Objectives Models

Business Objectives Model (BOM)
A diagram that identifies the value of a project. Use when new functionality is being added to define and control scope.

Objective Chain
A tree structure that measurably links features to business objectives. Use with BOM to select only the features that contribute the most value.

Key Performance Indicator Model (KPIM)
A label on Process or System Flows that associates metrics (KPIs) to business processes to evaluate the performance of the processes. Use it where existing processes or systems are in place in order to maintain or improve overall business throughput.

Feature Tree
A tree structure that shows all features organized into logical groupings. Use to communicate the full set of features in scope for a project.

Requirements Mapping Matrix (RMM)
A matrix that maps requirements and business rules to a model like Process Flows. Use to organize group information in a more easily consumable way.

People Models

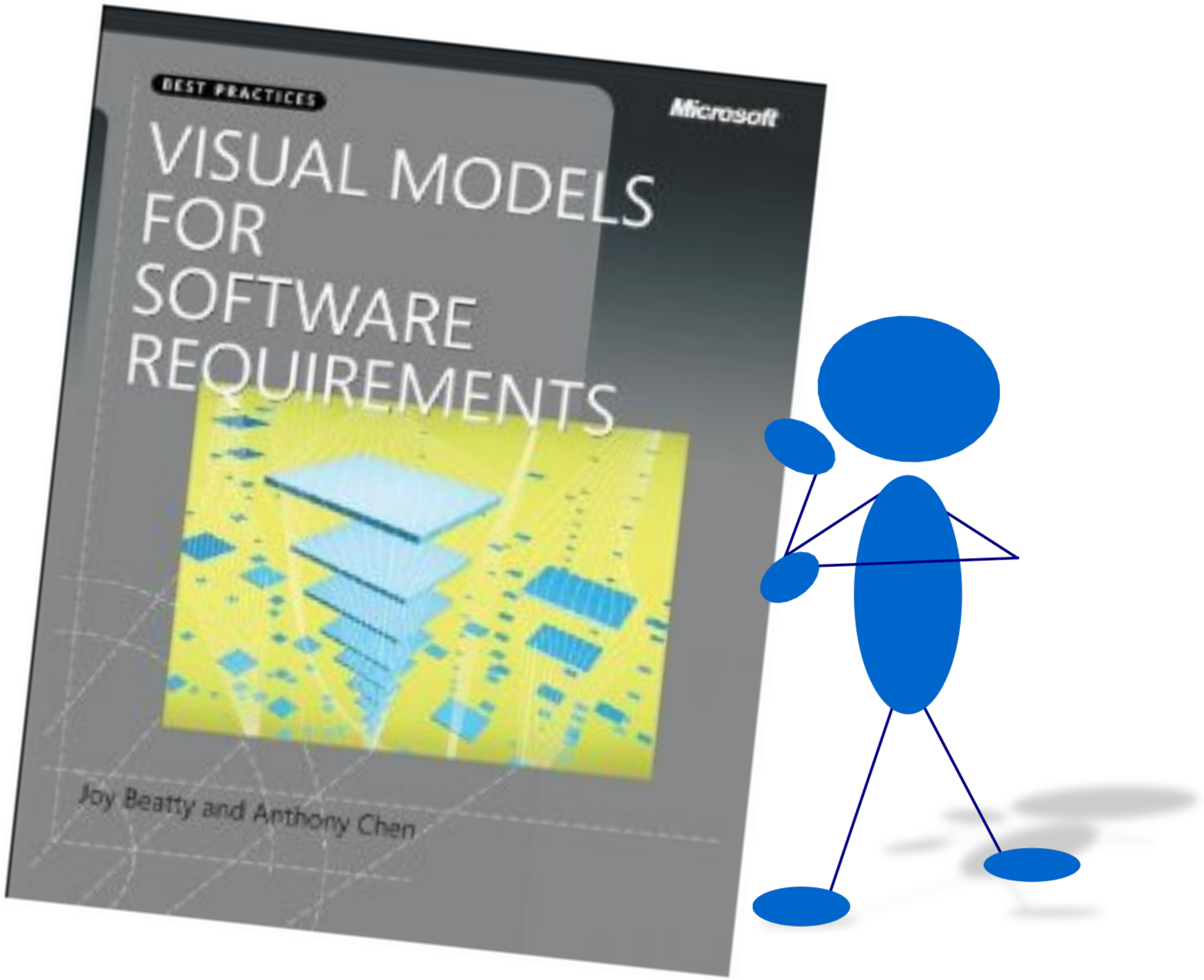
Org Chart
A diagram that shows all people or roles within an organization and how they relate to one another. Use to identify all stakeholders who might use the system or have requirements.

Process Flow
A diagram that shows the business process steps people execute. It shows the sequence of activities and decisions.

Use Case
Formatted text that describes the interactions between a user and a system. It is used to discover the functional requirements for each step of the interaction.

Roles and Permissions Matrix
A matrix that defines the types of roles and their associated permissions to execute operations in the system. Use it to define security at the operation or menu level.

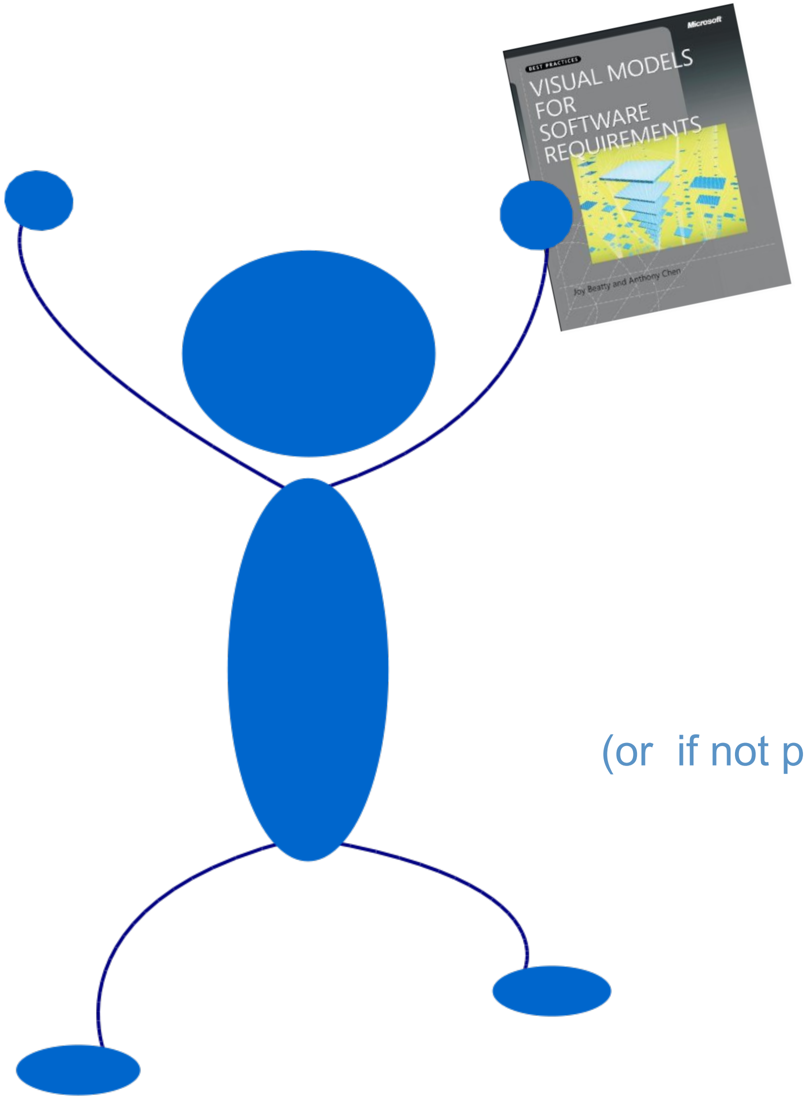
Suggested Reading


BEST PRACTICES
Microsoft
VISUAL MODELS FOR SOFTWARE REQUIREMENTS
Joy Beatty and Anthony Chen

Link to book: http://amzn.to/OxgGsC

Our Requirements Blog: http://www.seilevel.com/blog

And the winners of a free book are from the sign-in sheet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(or if not present, to the next lower number)

Joy Beatty

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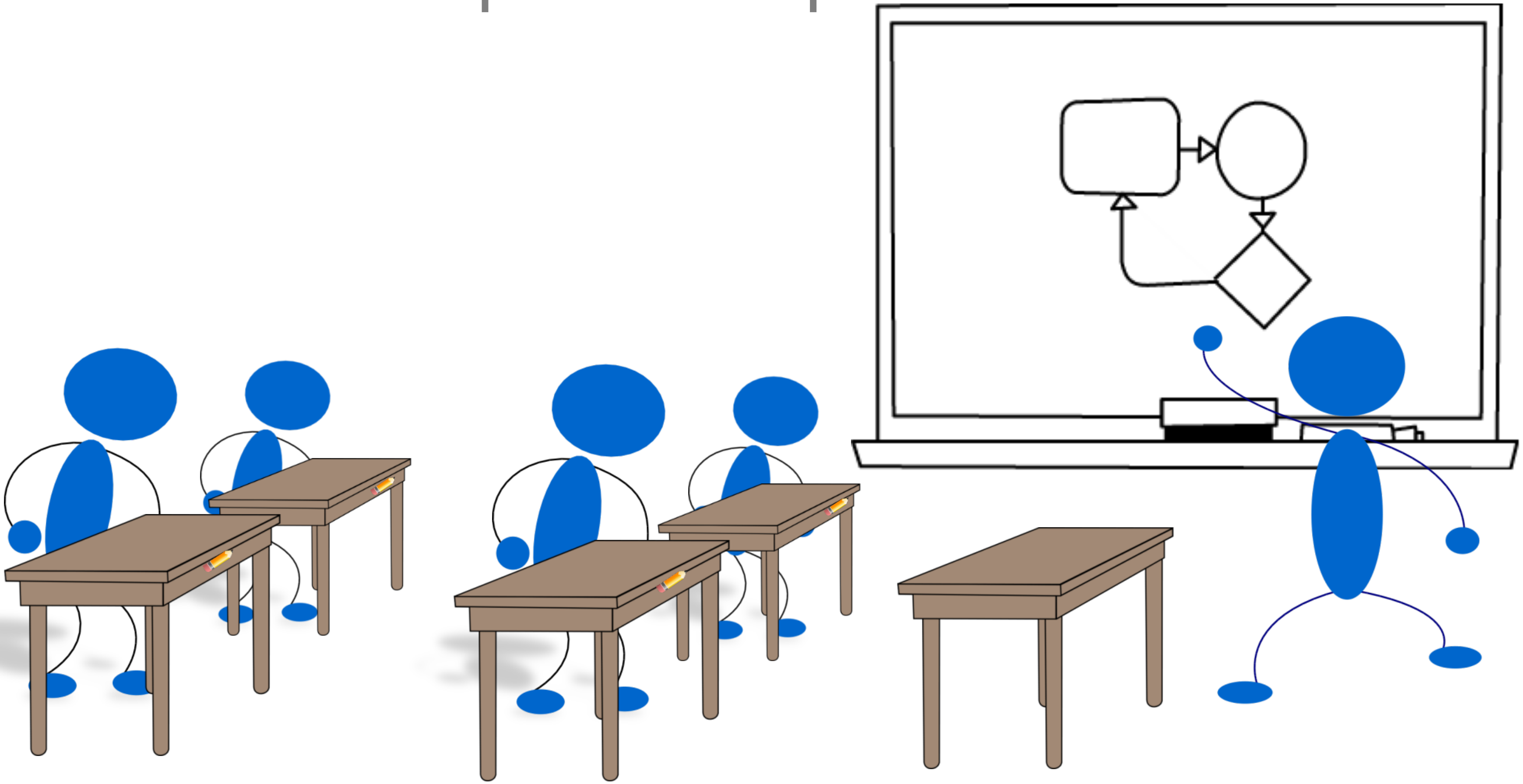
Let’s create a Process Flow for an online purchase process



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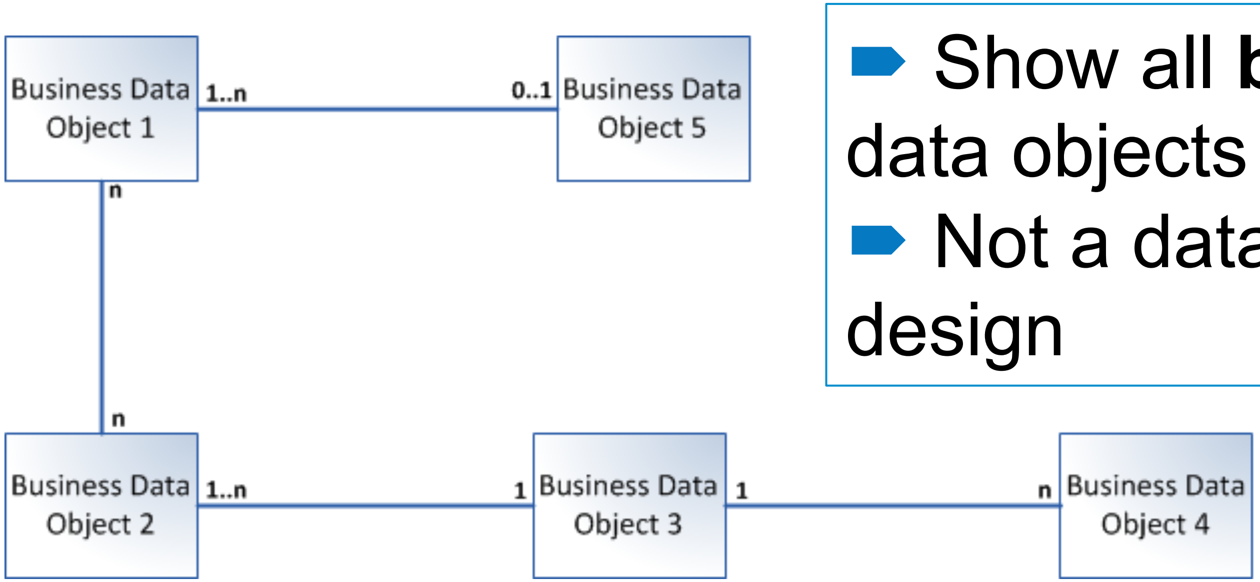
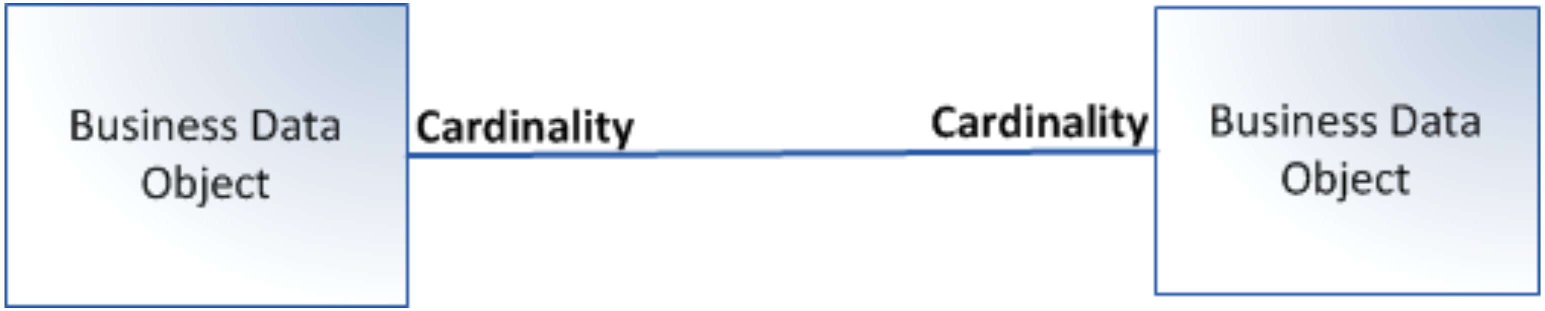
Business Data Diagram (BDD)



- Show all **business** data objects
- Not a database design

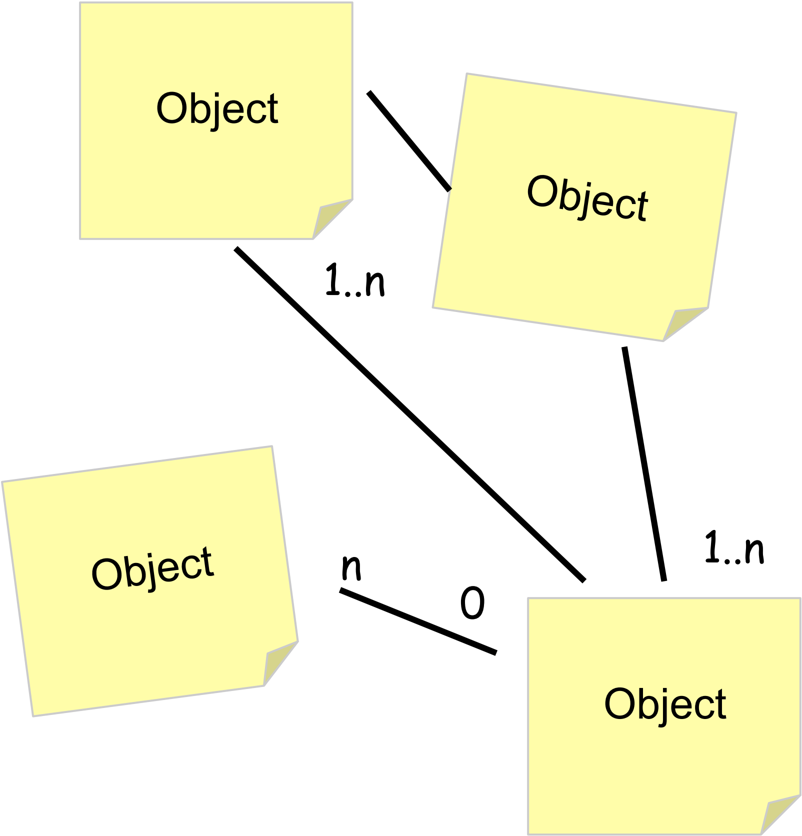
Business Data Diagram (BDD)



Key

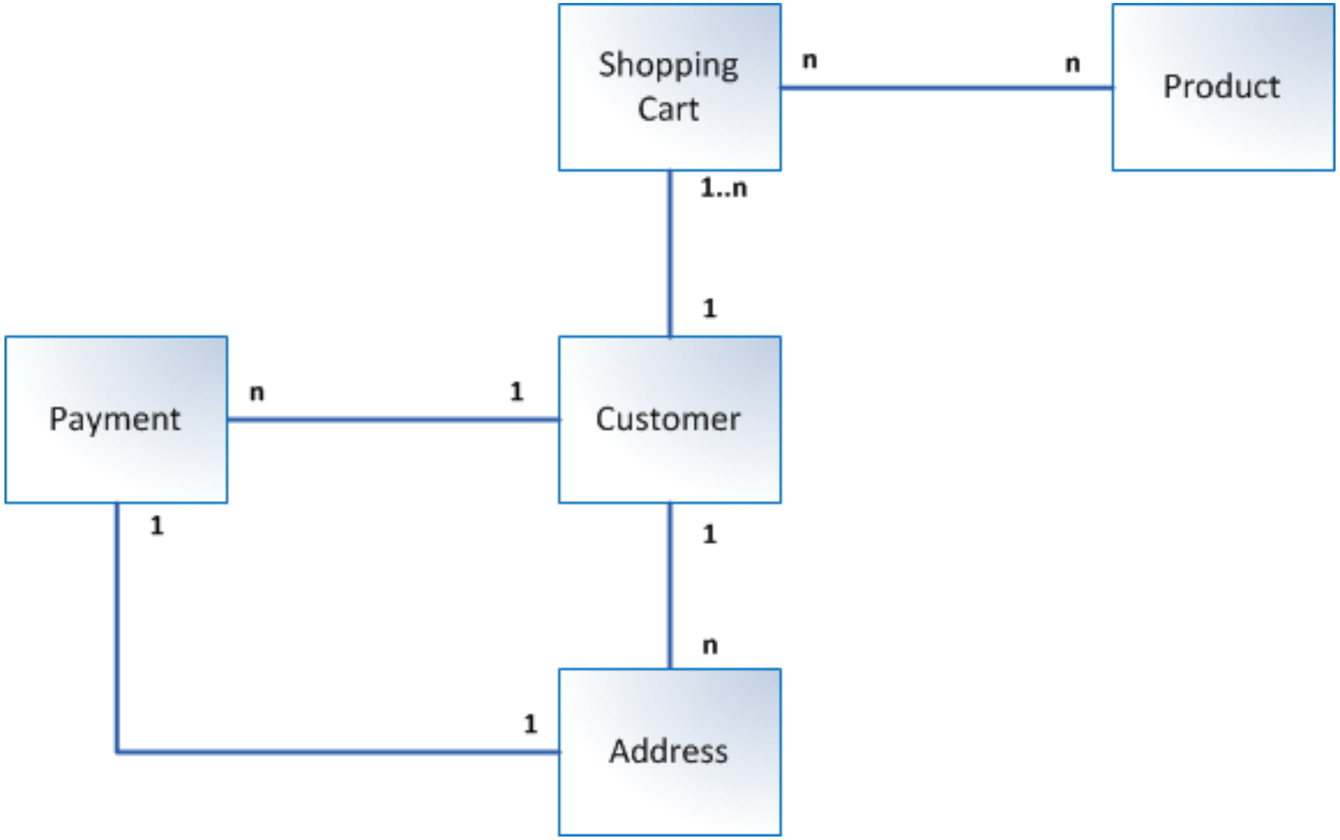
1	Single Cardinality
0..n	None to Multiple Cardinality
0..1	Single or No Cardinality
1..n	Single to Multiple Cardinality
—	Relationship
□	Business Data Object

Create a Business Data Diagram



1. Form teams of 3-5 people
2. Identify the business data objects
3. Create a BDD

Example BDD


Shopping Cart
n
n
Product
1..n
1
Payment
n
1
Customer
1
1
n
1
Address