



# MIS 3504

## Digital Design and Innovation

Process Flow

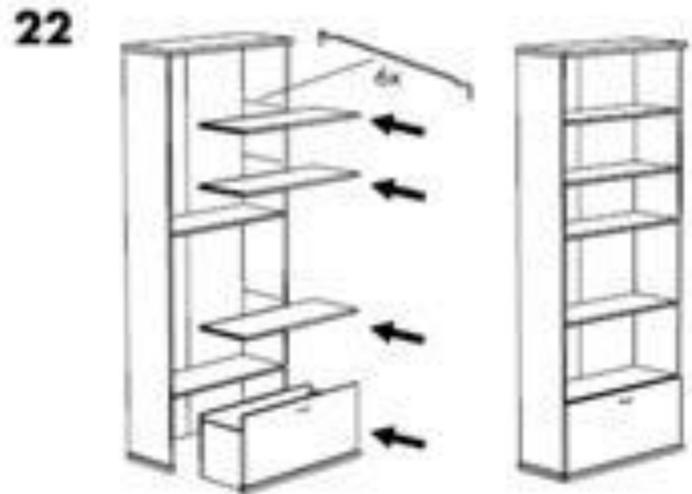
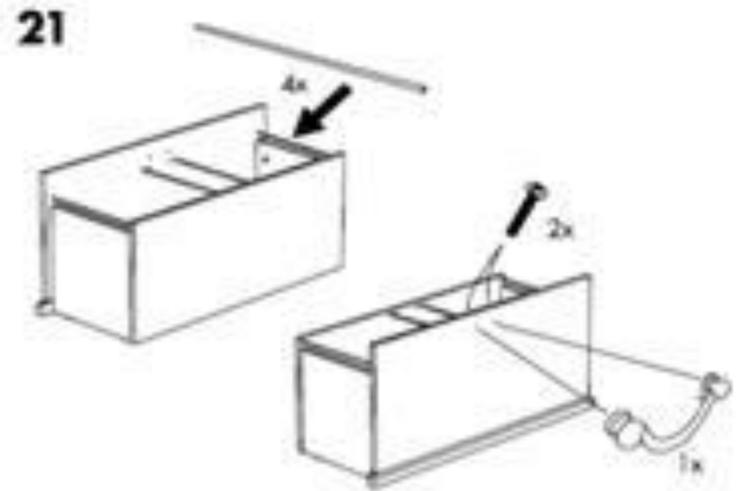
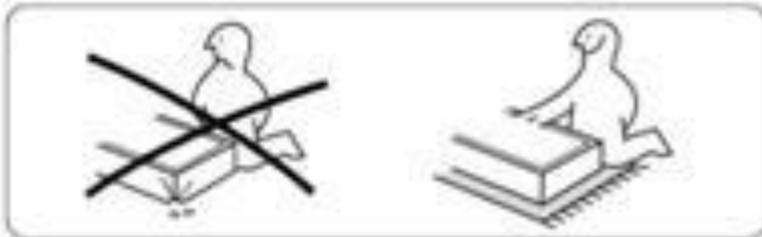
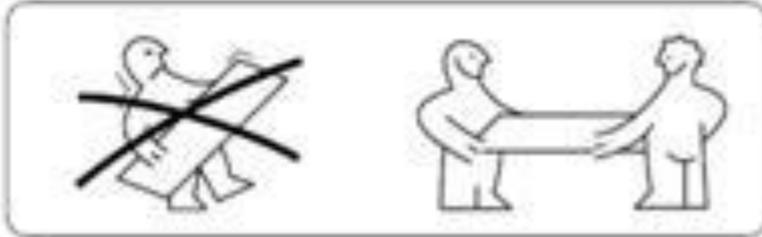
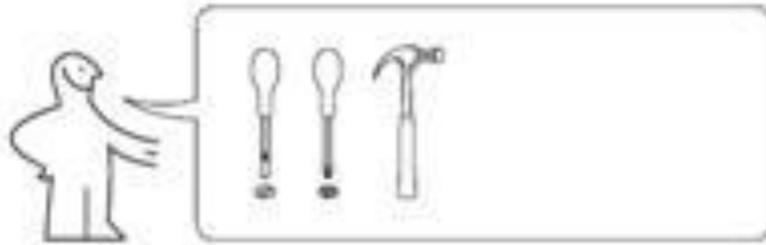
Rich Flanagan / James Moustafellos /  
Stephen Salvia

Photo: Installation by Jenny Holzer, US Pavillion, Venice Biennale 1990

# Process **DIAGRAMMING**

Understanding **HOW**  
people do their work

Think VISUALLY



assembly process: **IKEA**

# Workflow Diagrams

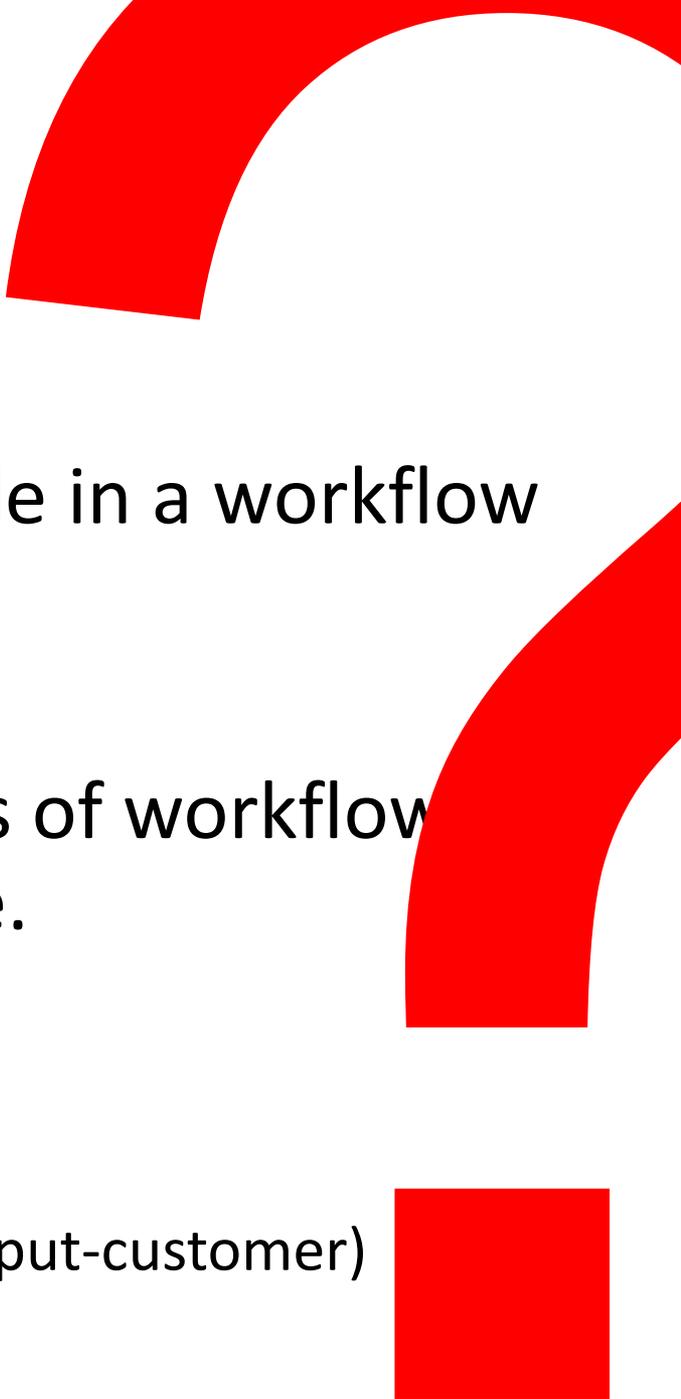
- How would you describe a process you routinely use to a friend who wanted to do the same thing?
- Is it easier to use words or draw a picture of the steps you take?
- What would some uses of this approach be?



# Workflow Diagrams

- One of a Business Analyst's key tools, especially for analyzing the as-is situation
- Great way to begin to understand process you are dealing with at high level
- Different levels of workflow can be used to explain the process to different audiences
- Can document Standard Operating Procedures (SOP's)
- Revising the flow to facilitate improvements is standard design technique

# Workflow Diagrams



- What would we want to include in a workflow diagram?
- There are many different types of workflow diagrams, we will focus on one.
  - **Swim Lane Flowcharting**
  - ANSI Flowcharting
  - UML Activity Diagrams
  - SIPOC (supplier-input-process-output-customer)
  - Use Case Diagram

## Flowchart Symbol Cheat Sheet

Flowchart Symbol	Name (Alternates)	Description
	Process	An operation or action step.
	Terminator	A start or stop point in a process.
	Decision	A question or branch in the process.
	Delay	A waiting period.
	Predefined Process	A formally defined sub-process.
	Alternate Process	An alternate to the normal process step.
	Data (I/O)	Indicates data inputs and outputs to and from a process.
	Document	A document or report.
	Multi-Document	Same as Document, except, well, multiple documents.
	Preparation	A preparation or set-up process step.
	Display	A machine display.
	Manual Input	Manually input into a system.
	Manual Operation	A process step that isn't automated.
	Card	A old computer punch card.

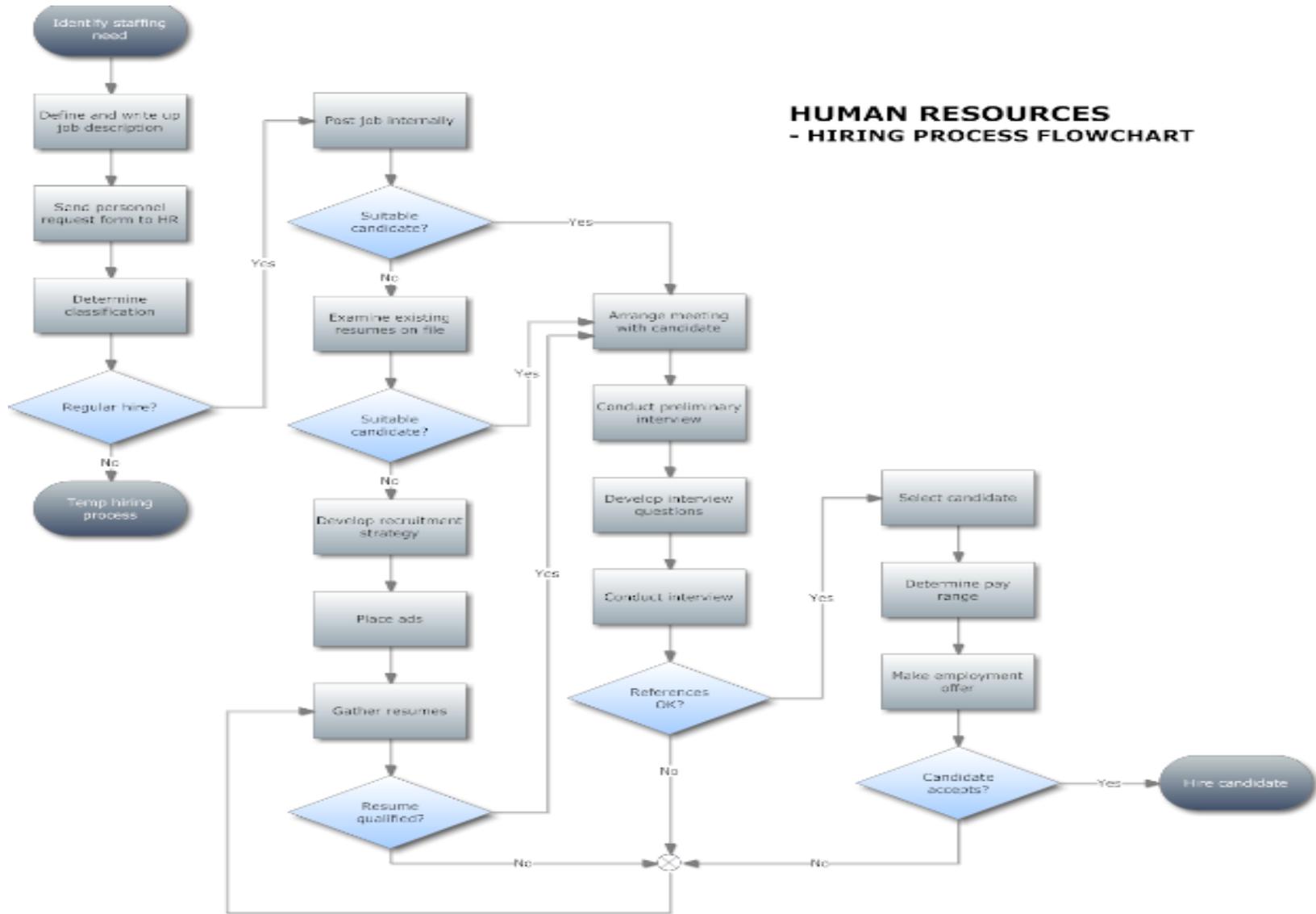
## Flow Chart Symbols

# Flow Chart Symbols

	Punched Tape	An old computer punched tape input.
	Connector	A jump from one point to another.
	Off-Page Connector	Continuation onto another page.
	Transfer	Transfer of materials.
	Or	Logical OR
	Summing Junction	Logical AND
	Collate	Organizing data into a standard format or arrangement.
	Sort	Sorting of data into some pre-defined order.
	Merge (Storage)	Merge multiple processes into one. Also used to show raw material storage.
	Extract (Measurement) (Finished Goods)	Extract (split processes) or more commonly - a measurement or finished goods.
	Stored Data	A general data storage flowchart symbol.
	Magnetic Disk (Database)	A database.
	Direct Access Storage	Storage on a hard drive.
	Internal Storage	Data stored in memory.
	Sequential Access Storage (Magnetic Tape)	An old reel of tape.
	Callout	One of many callout symbols used to add comments to a flowchart.
	Flow Line	Indicates the direction of flow for materials and/or information.

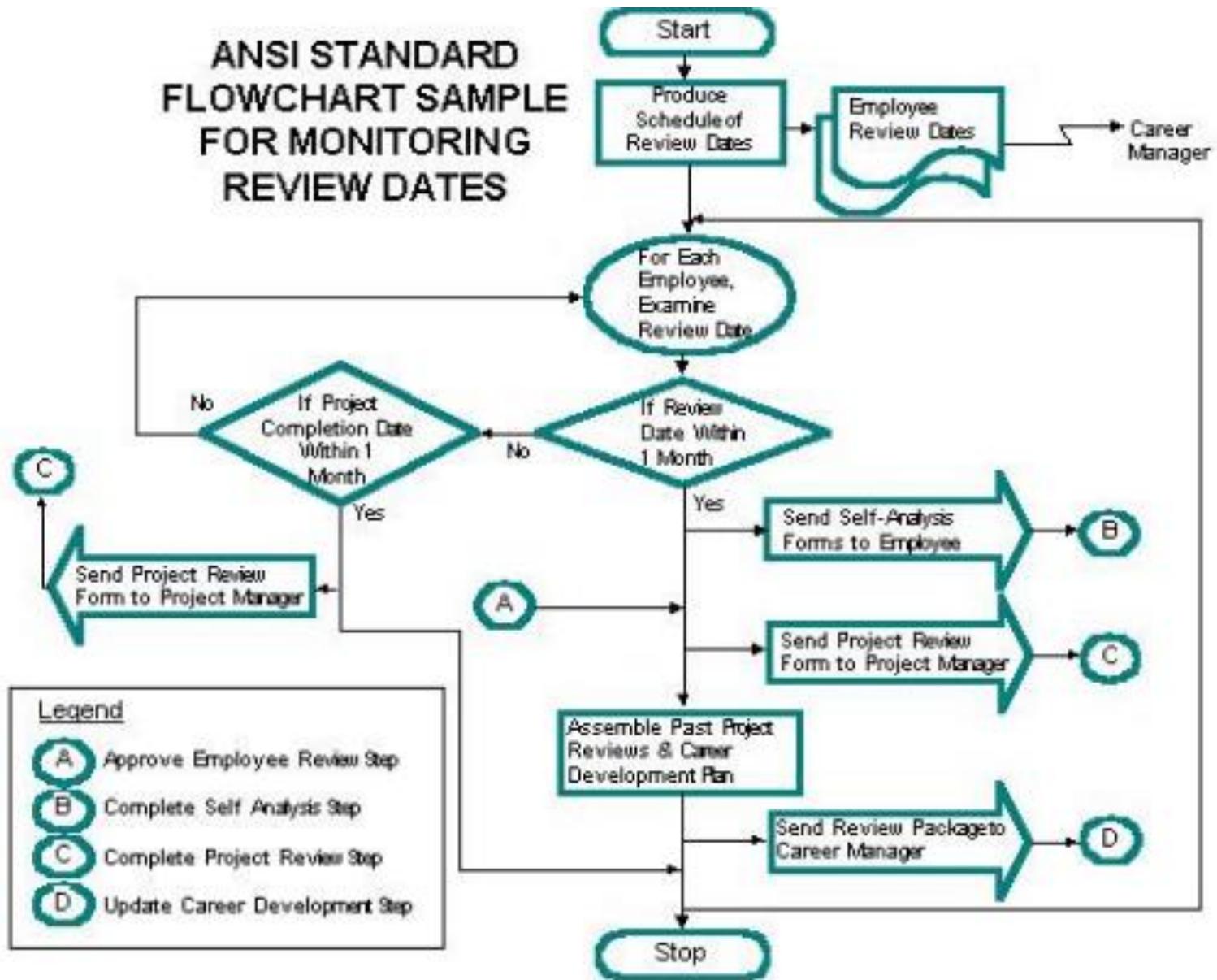
# Flowchart

[Samples links:](#)



# ANSI STANDARD FLOWCHART SAMPLE FOR MONITORING REVIEW DATES

Flow Chart  
Example

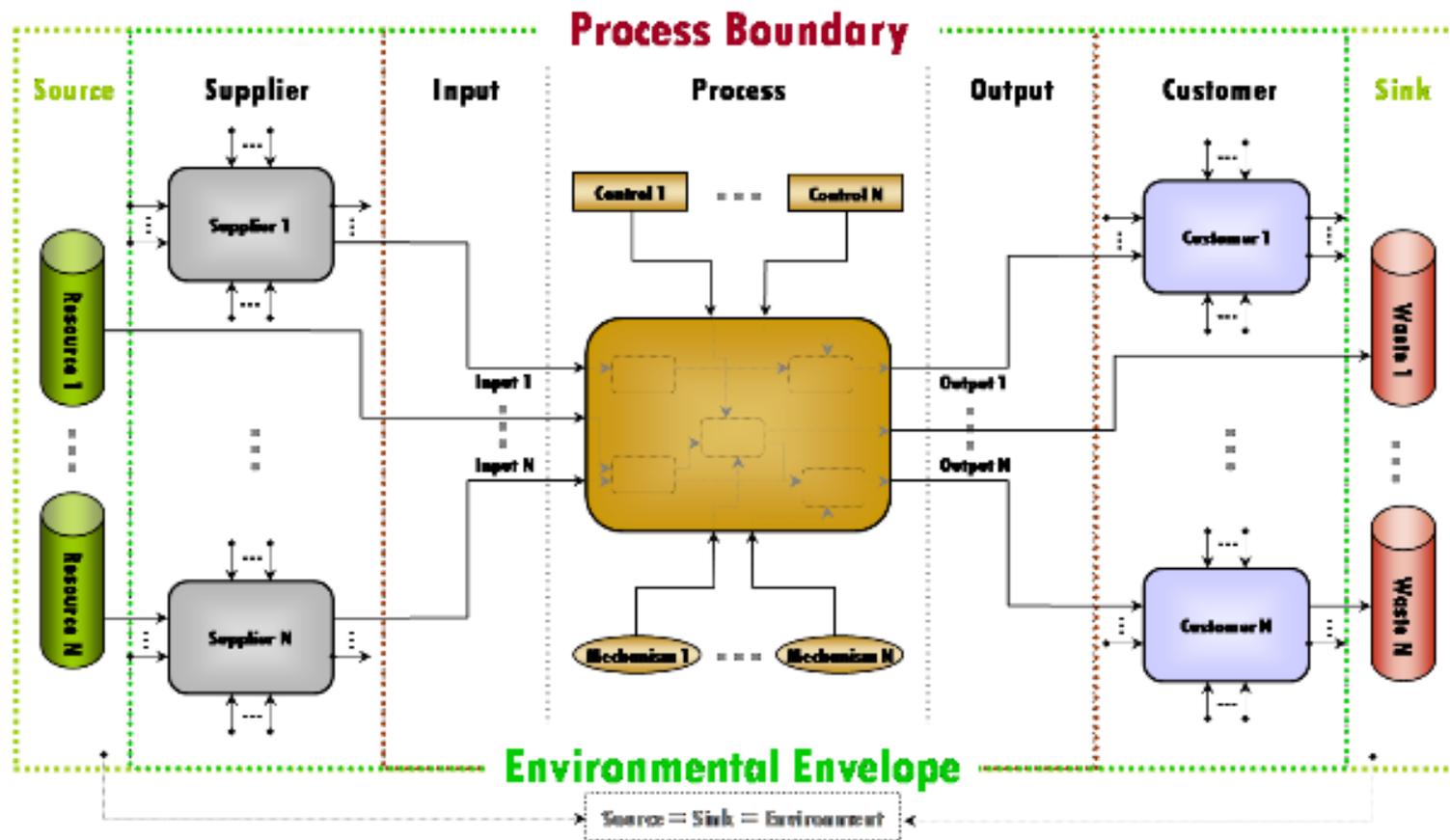




# SIPOC (supplier-input-process-output-customer)

[Samples links:](#)

## Sustainable Systems/Source-Sink (SS) SIPOC Diagram [IDEFO notation]



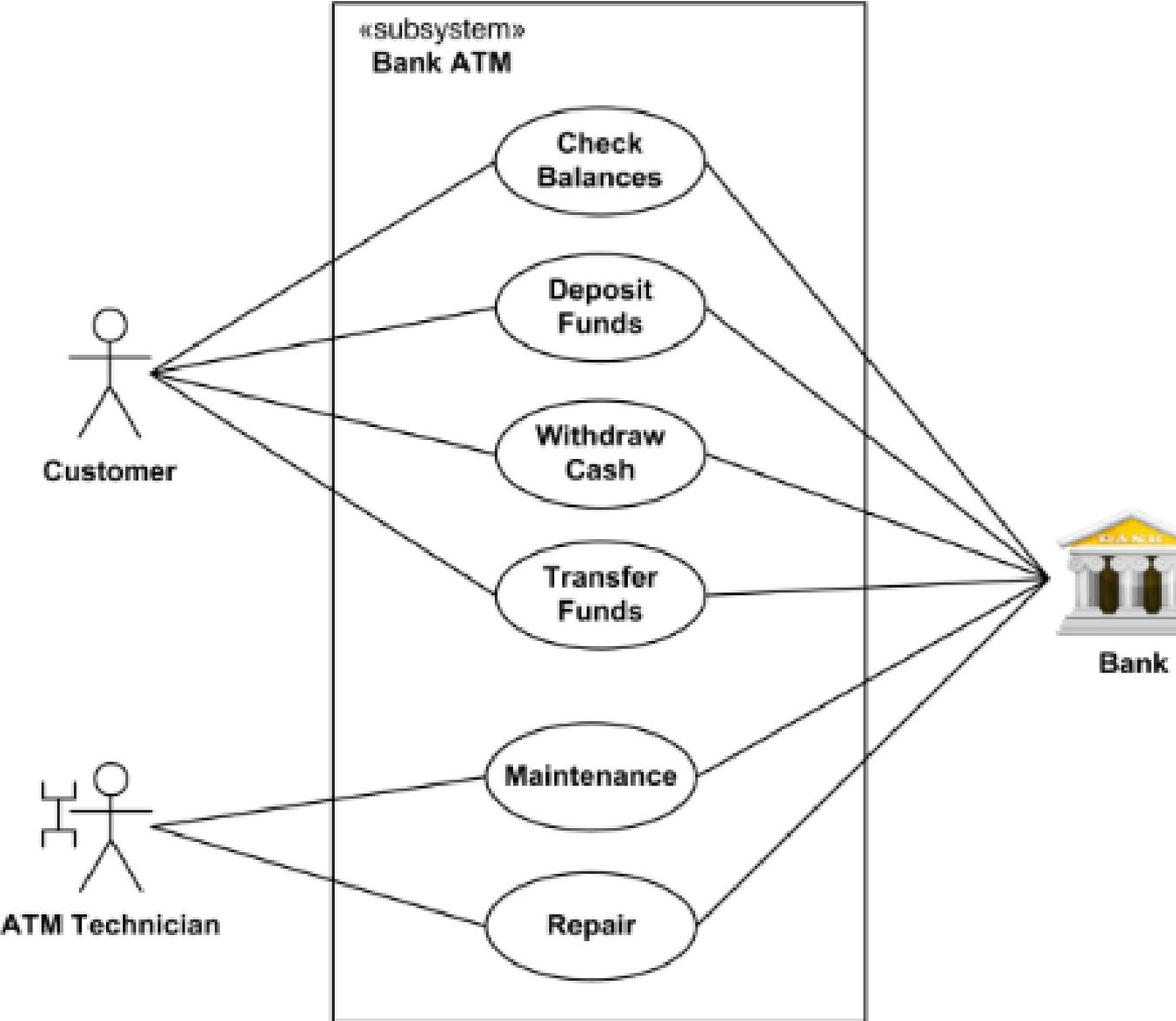
### Key Questions

- Are all outputs accounted? (Product, packaging, waste, effluent)
- Do all outputs have a customer? No = waste stream: Apply Lean thinking & Cradle-to-Cradle design.
- At what rate can a Source provide a resource? Sustainable = Aggregate Resource Consumption Rate  $\leq$  Production Rate.
- At what rate can a Sink take up waste? Sustainable = Aggregate Waste Production Rate  $\leq$  Recycling Rate.
- Where does flow end? SIPOC makes it appear linear, but all system flows are circular.



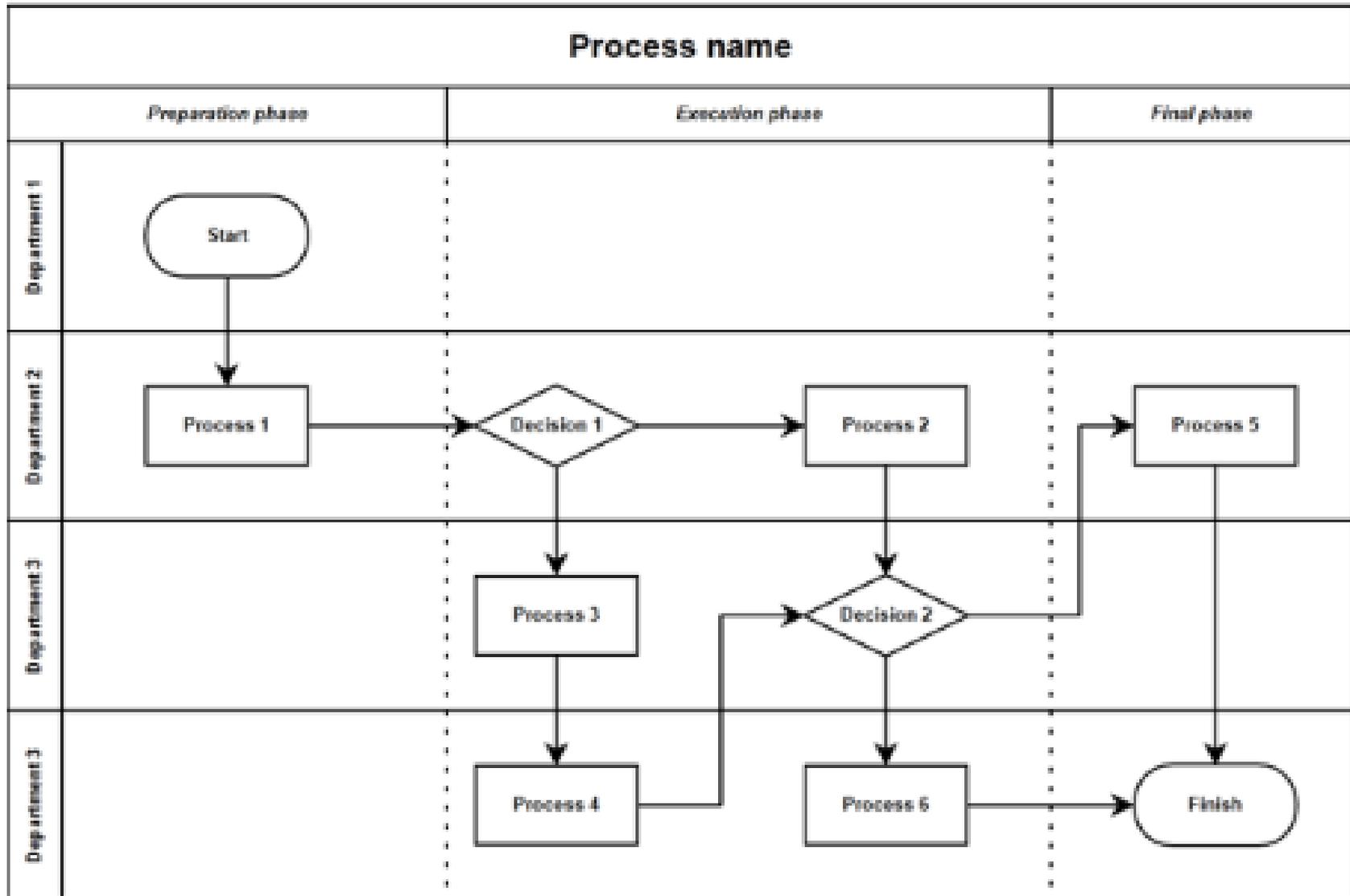
# Use Case Diagram

[Samples links:](#)



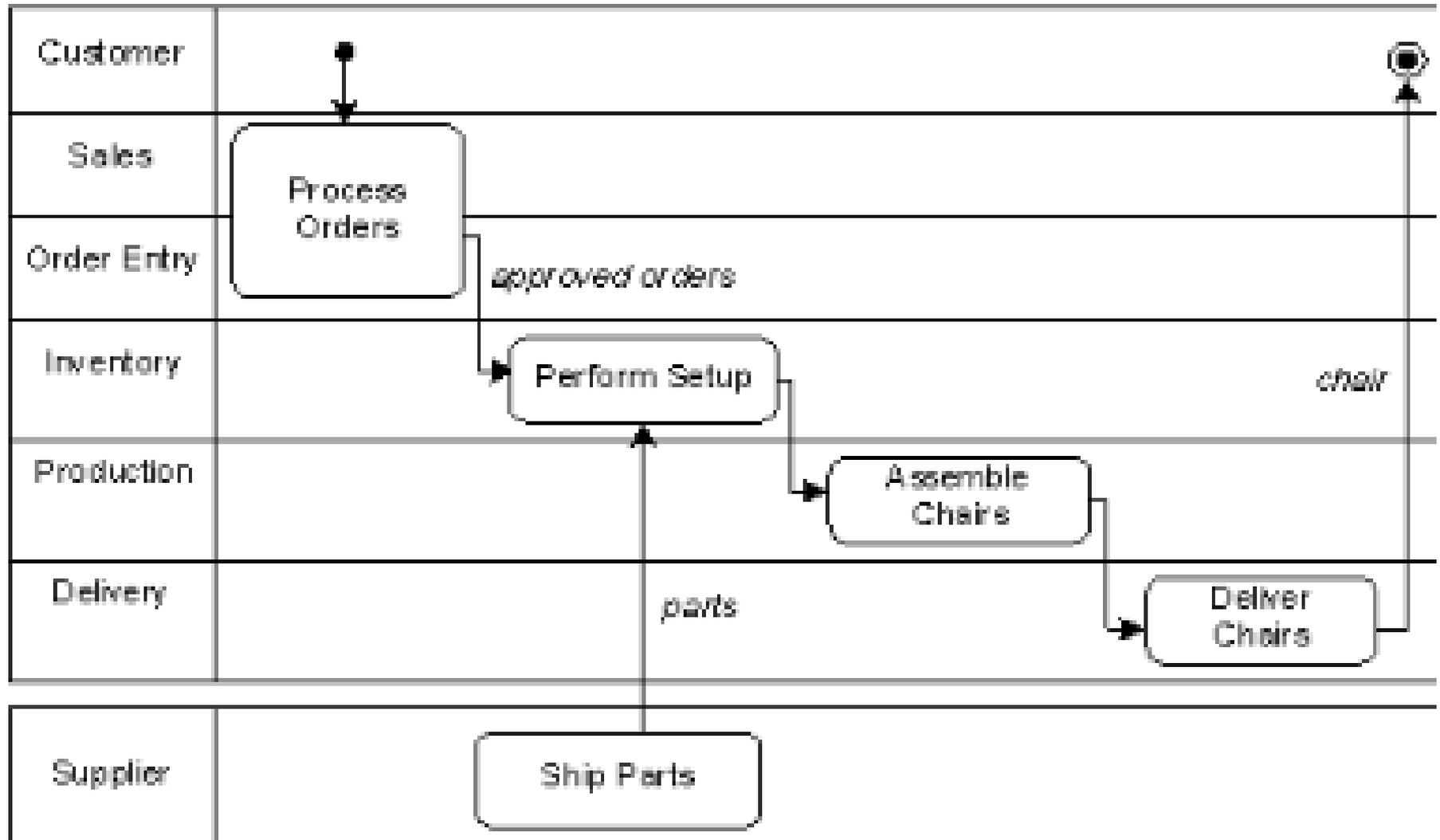
# Swim Lane Diagram

[Samples links:](#)



# Swim Lane Diagram

Ergo Chair Value Chain: Order Fulfillment Process



Think: Actors [who]  
Actions [what]  
Decisions  
Sequence [when]  
Space [where]  
RELATIONSHIPS

# Swim Lane Process Mapping

1. Name the process - subject+verb+object
1. What's the business event that initiates the process?
1. What's the outcome of the process?

# Swim Lane Process Mapping

1. Name the process - subject+verb+object

Warehouse Receives Materials

1. What's the business event that initiates the process?

Receive Materials

1. What's the outcome of the process?

Materials are Stored

# ABC Assembly Company

## Material Delivery Process

- Manufacture delivers and unloads materials at the ABC Assembly Company Loading Dock
- Receiving Clerk receives invoice paper work describing delivered materials and creates new entries of the materials in the Warehouse Management System
- Receiving Clerk send memo via hardcopy to the Warehouse Foreman indicating the new materials have arrived on the loading doc and are ready to be stored in the proper material bin locations which will later be used in the assemble process by the production teams.
- The Warehouse Foreman performs a visual scan of the location bins to determine where to store the arriving materials. The location for storage is critical as there are physical weight limitations on the quantity of material store in each bin and the material has expiration dates that require first in first out usage during manufacturing
- The Warehouse Foreman make the material location determinations and then will verbally tell the Forklift Driver where to place the newly arrived materials
- When the Forklift Driver has completed storing all the new materials in the verbally assigned bin location(s), they will then verbally communicate to the Warehouse Foreman the storage locations
- The Warehouse Foreman will log into the Warehouse Management System to update the new entries that the Receiving Clerk initially entered into the system with the storage locations
- The Receiving Clerk will periodically check the Warehouse Management System confirm the bin locations have been updated by the Warehouse Foreman
- The Material Delivery Process is completed

# Swim Lane Workflow Exercise

- With your teammates,
- Take 15 minutes to imagine the steps of the steps a warehouse goes through when it receives material from its suppliers
- Sketch it out if you can
- Be ready to share your ideas

# Swim Lane Process Mapping

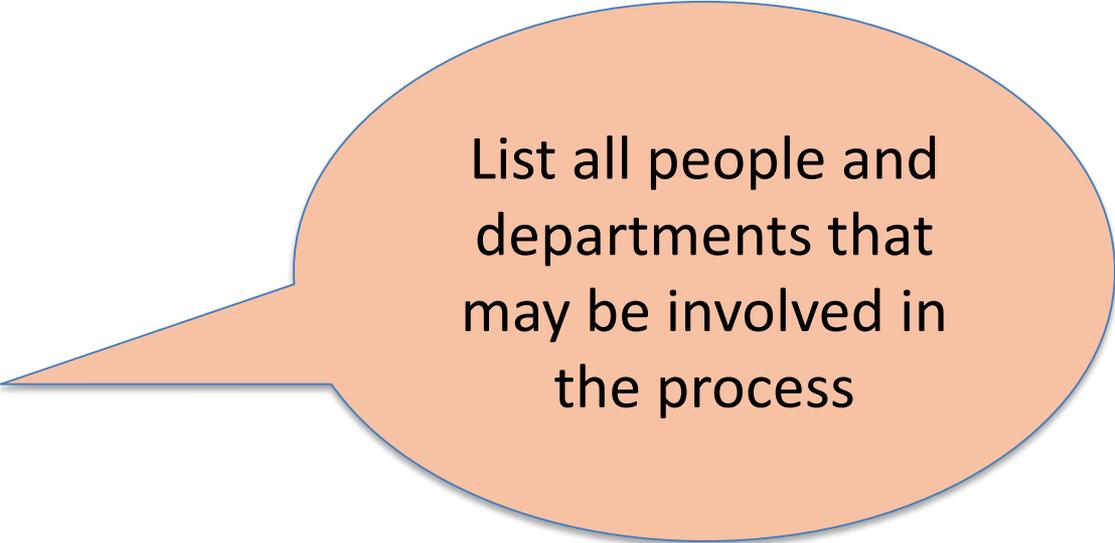
Receiving  
Dock

Receiving  
Clerk

Forklift  
Driver

Warehouse  
Foreman

Data  
Processing



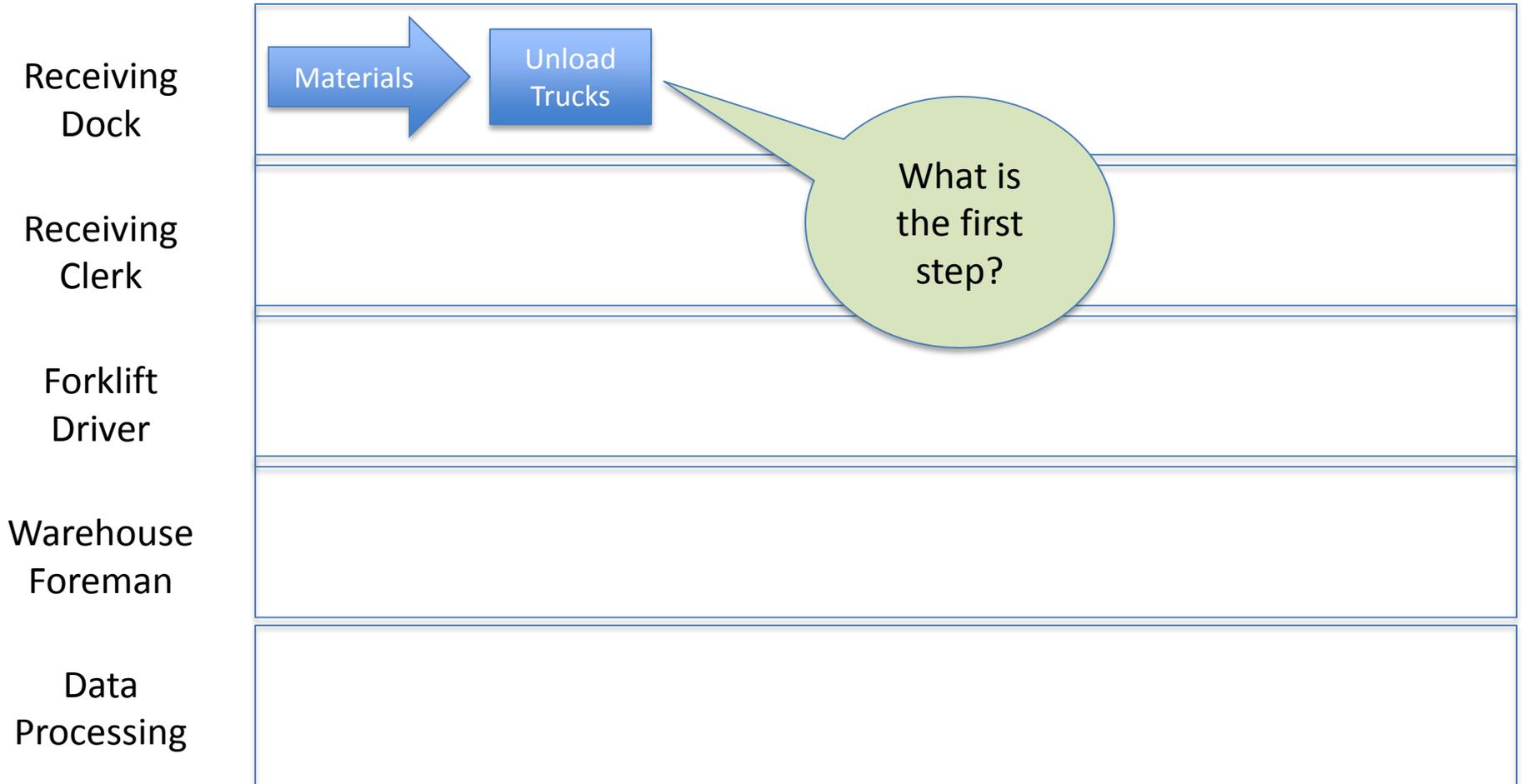
List all people and  
departments that  
may be involved in  
the process

# Swim Lane Process Mapping

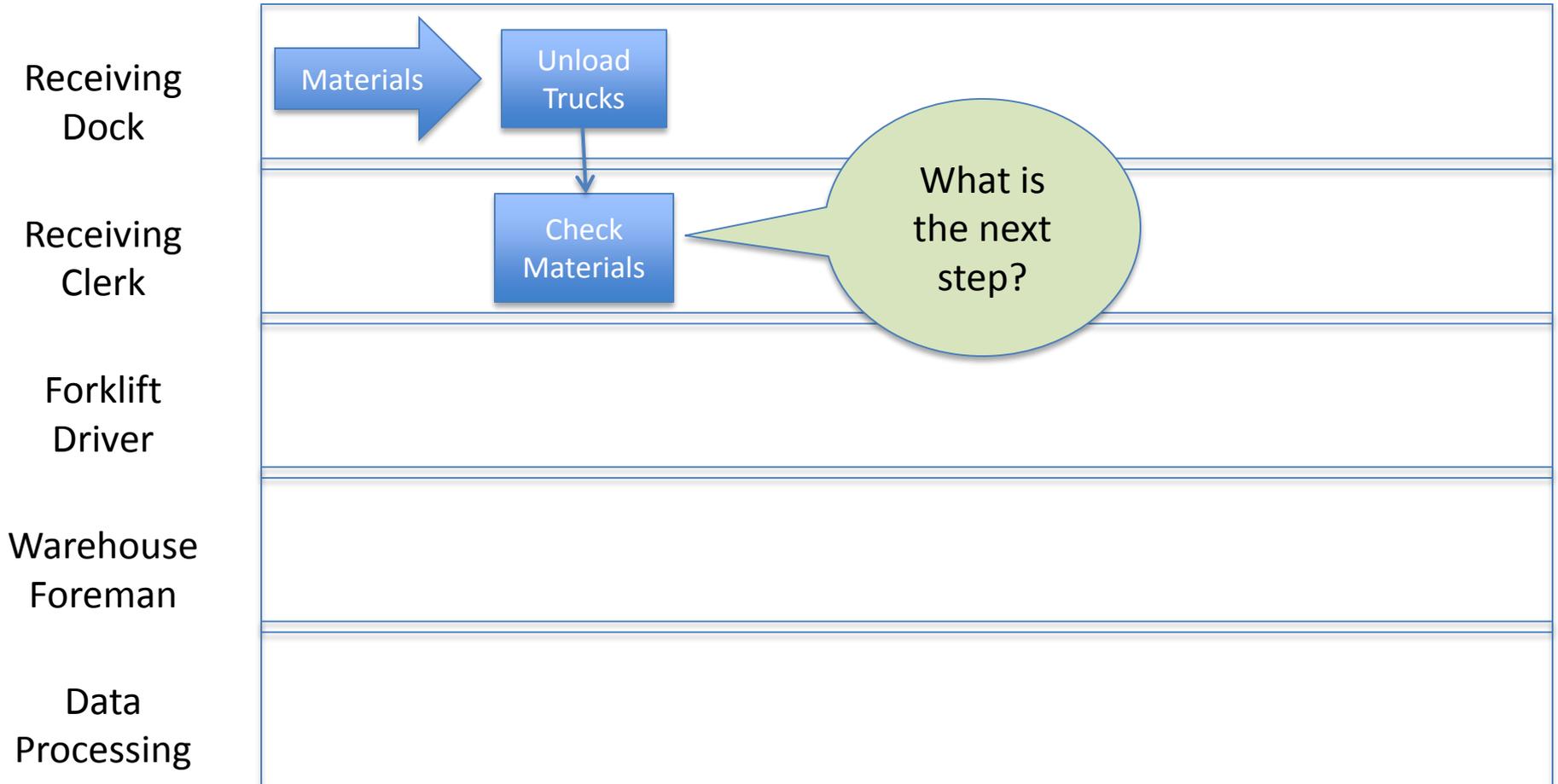


Draw a lane next to each person

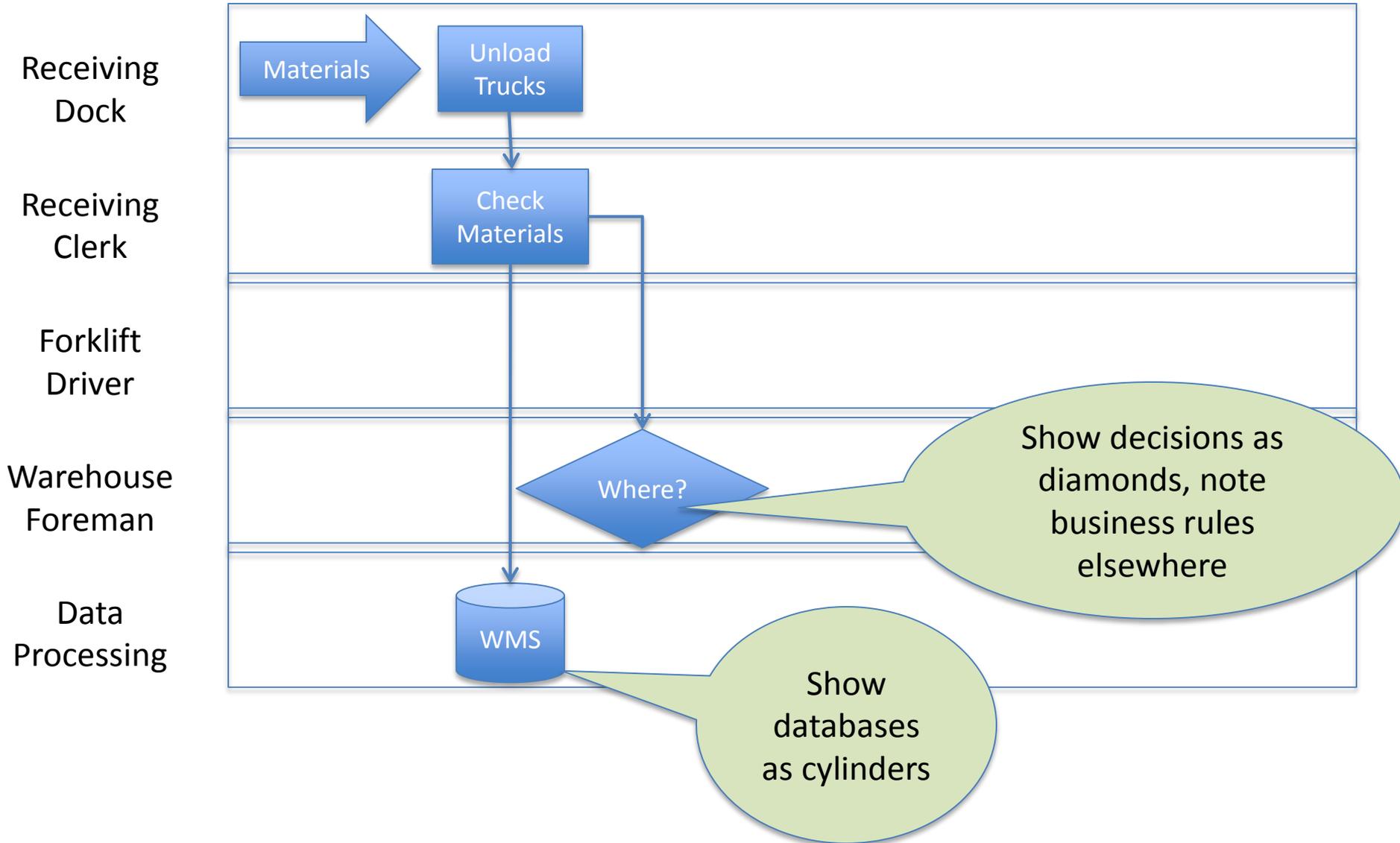
# Swim Lane Process Mapping



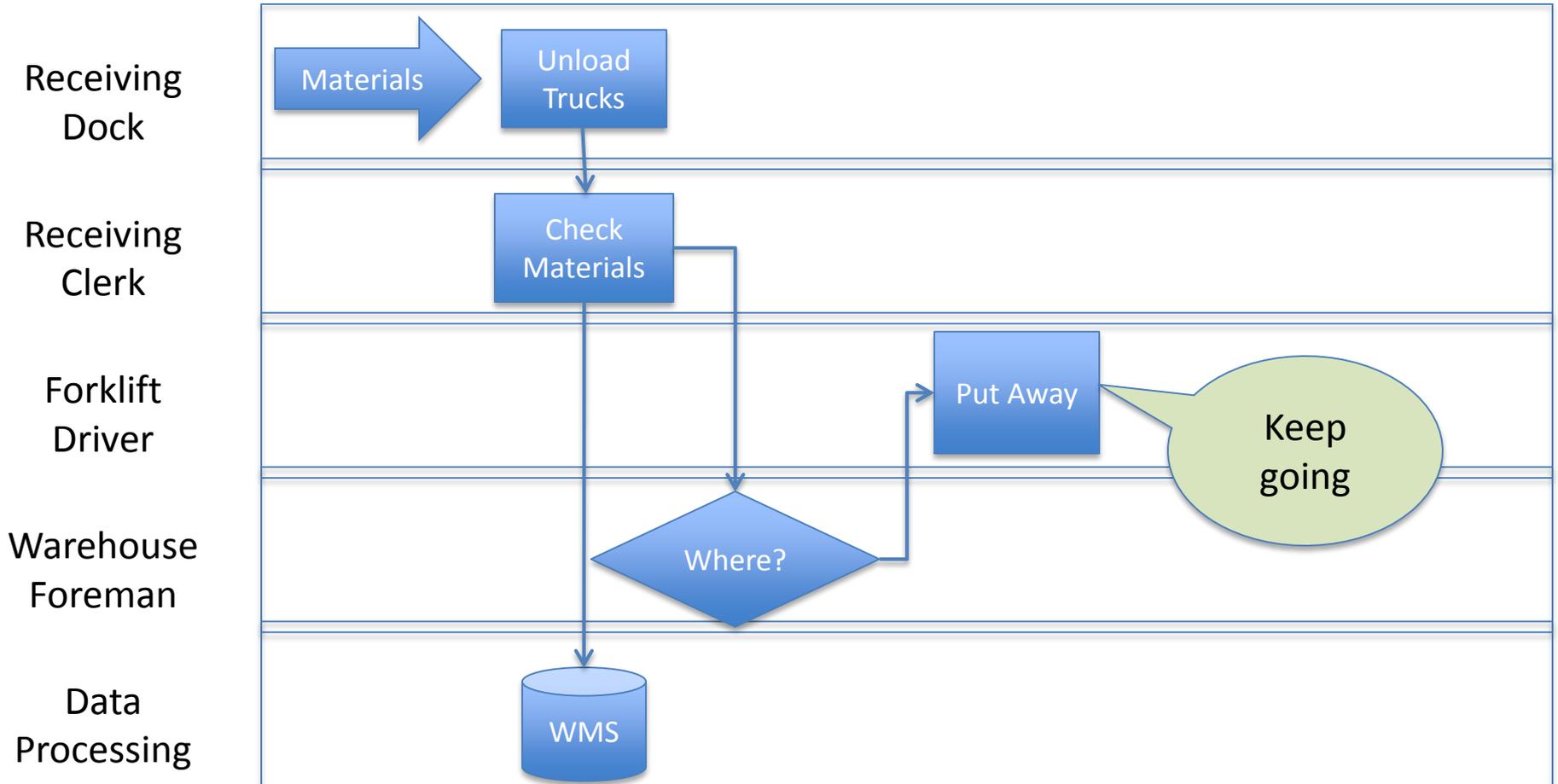
# Swim Lane Process Mapping



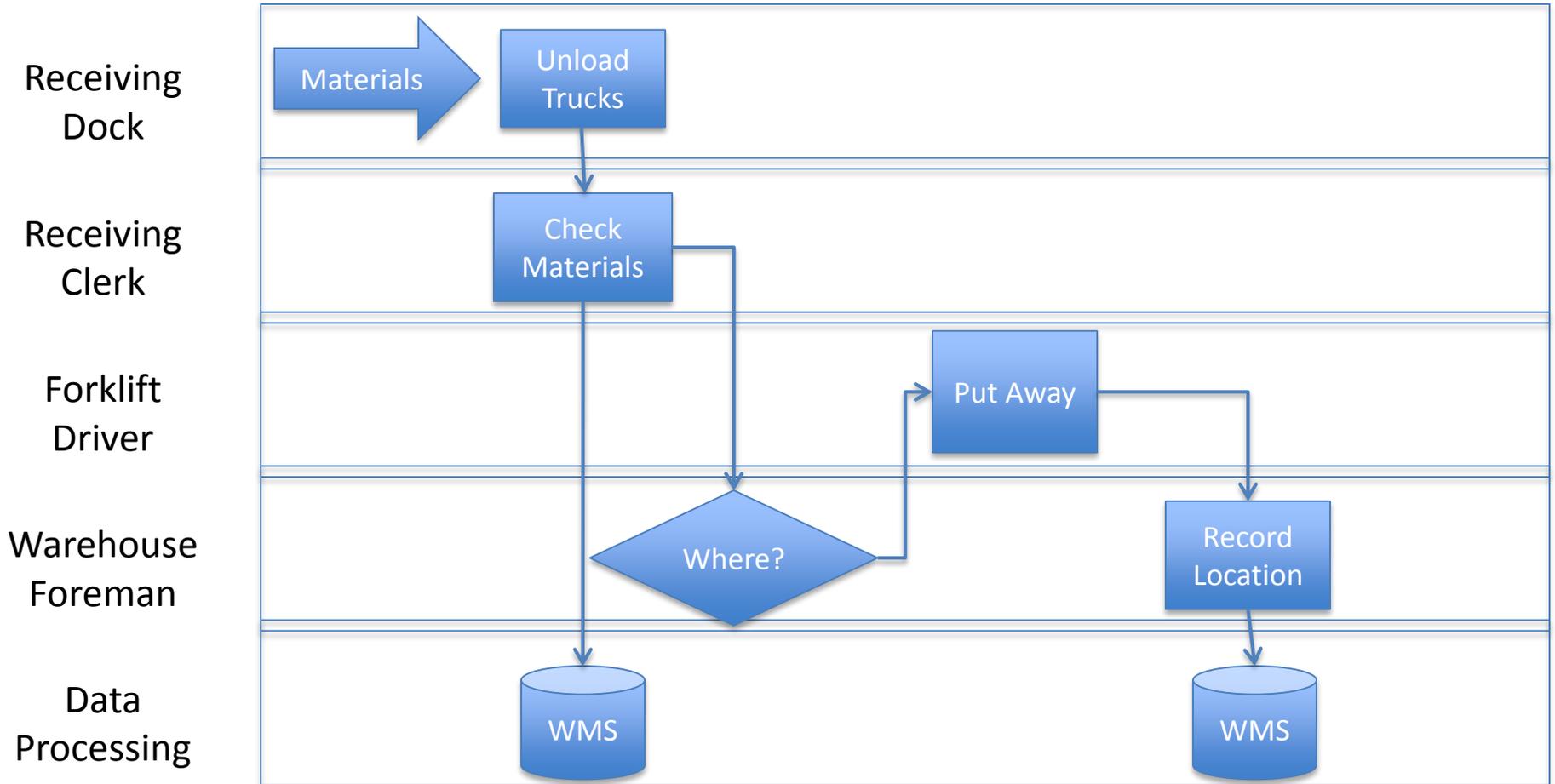
# Swim Lane Process Mapping



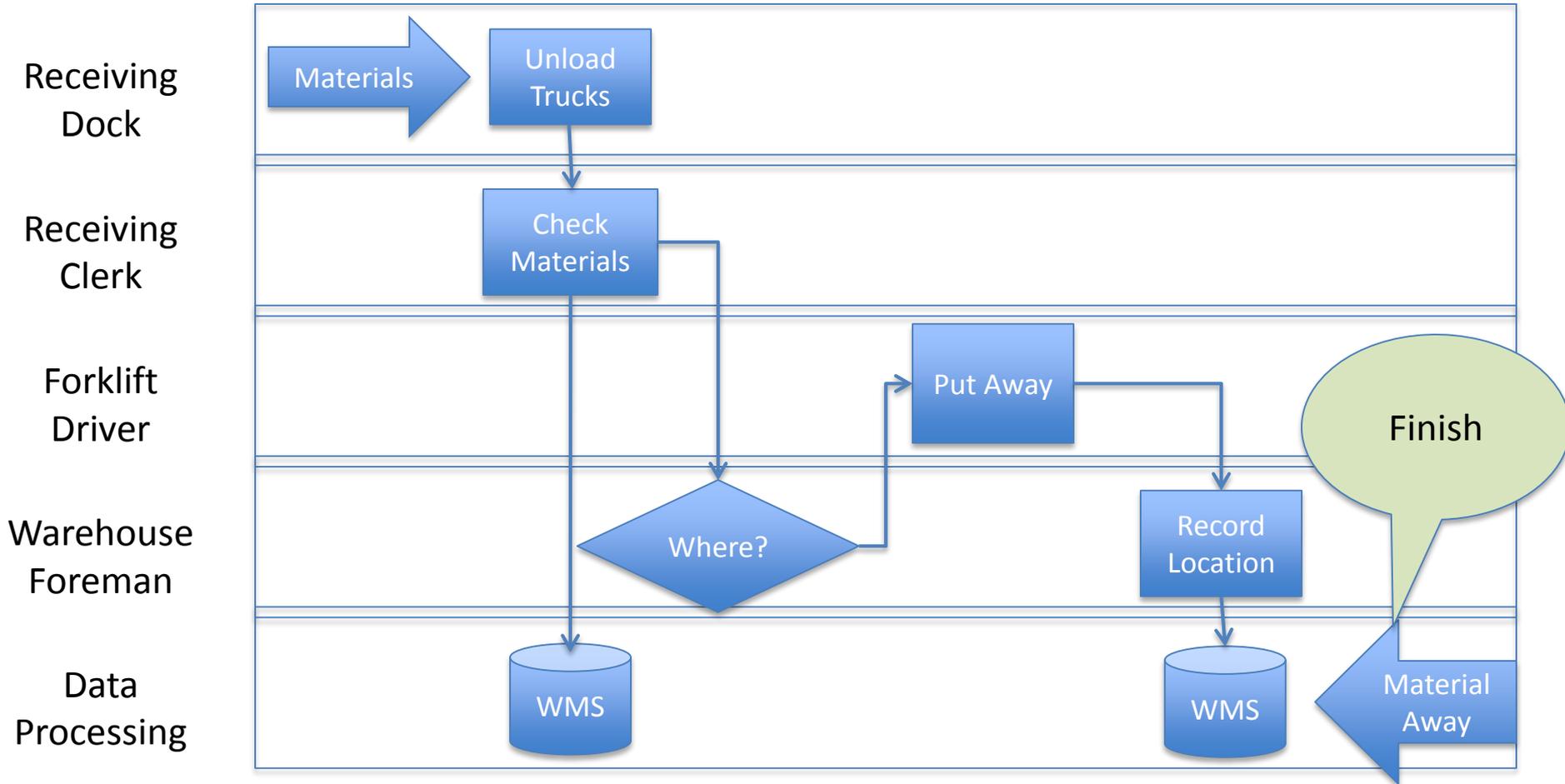
# Swim Lane Process Mapping



# Swim Lane Process Mapping



# Swim Lane Process Mapping



# Individual Case Assignment:

## Sales Order Case

## Develop Swim lane Process flow

Links to documents on the MIS 3504 Blog site

[Case background \(Sales Order\)](#)

[Swim Lane Template](#)

Due class 6, March 12th

# Exercise: draw the sales process described in the sales order case

- Actors – Who are all of the people/departments involved?
- Actions – What are the steps they perform in the process?
- Sequence – Map the process in sequence using the swim lane method.