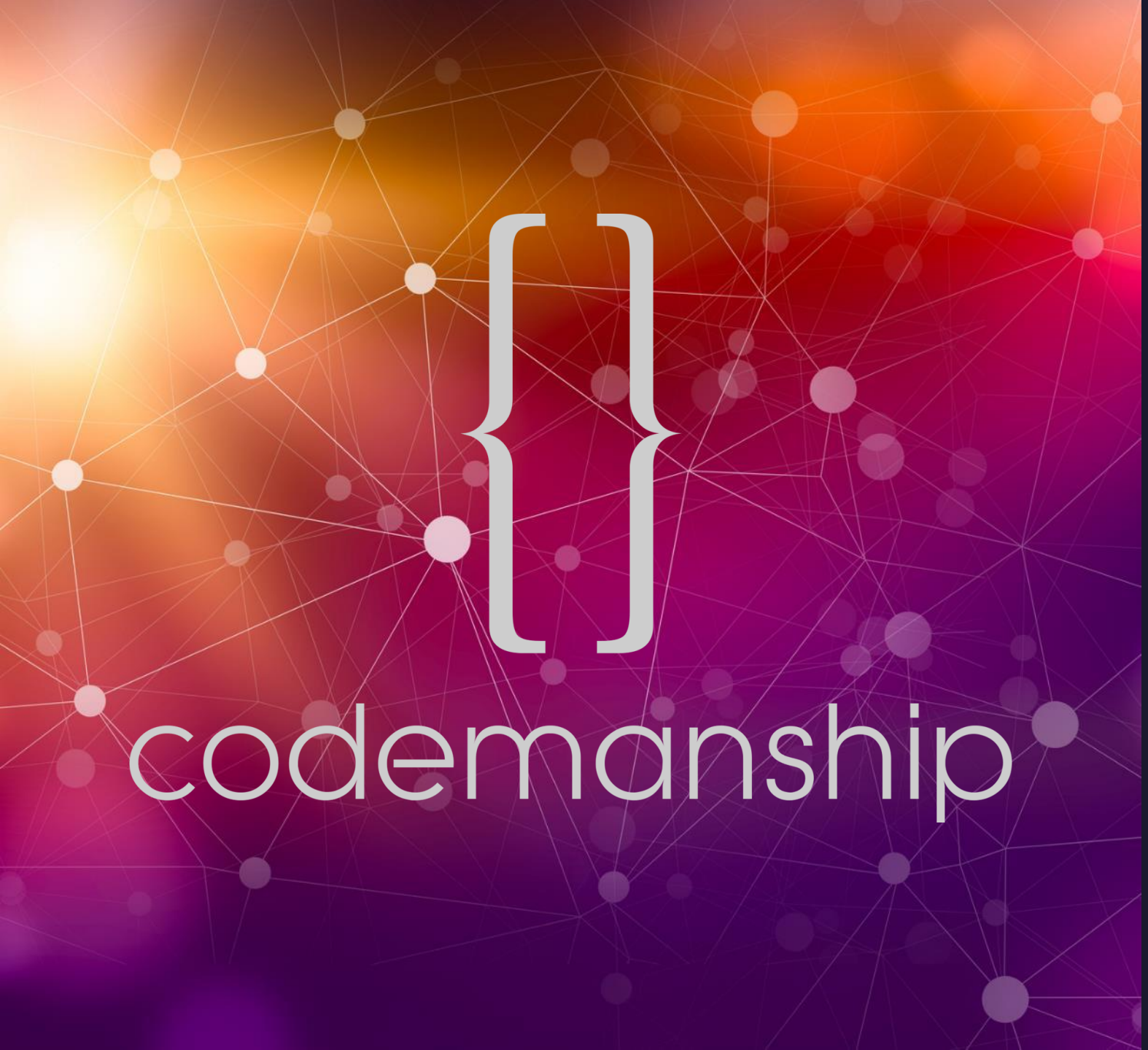
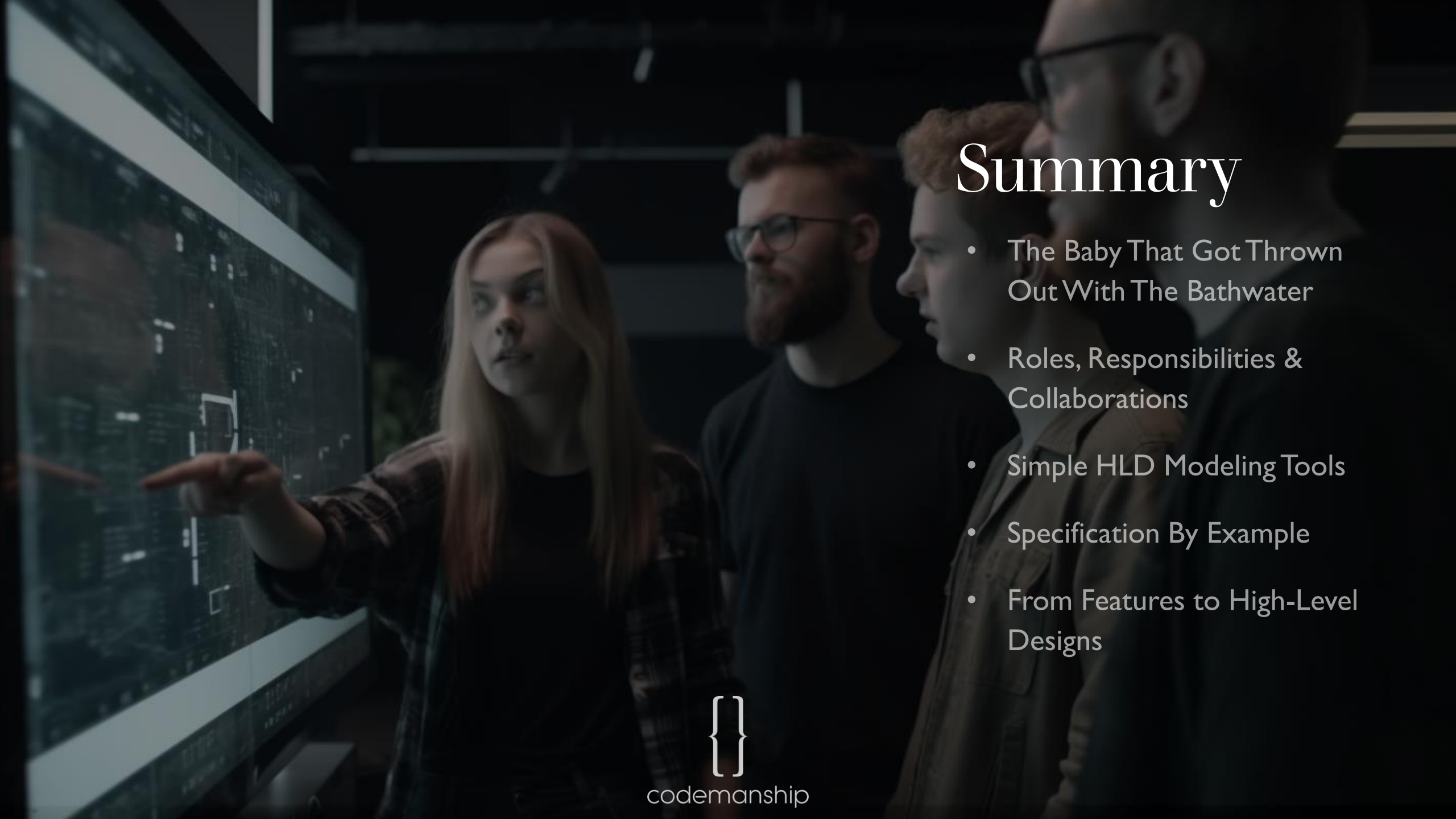


High-Level Design

A Test-Driven Approach



Summary

- The Baby That Got Thrown Out With The Bathwater
- Roles, Responsibilities & Collaborations
- Simple HLD Modeling Tools
- Specification By Example
- From Features to High-Level Designs

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The Baby That Got Thrown Out With The Bathwater

How Jumping Straight Into Code Created an Epidemic of God Modules

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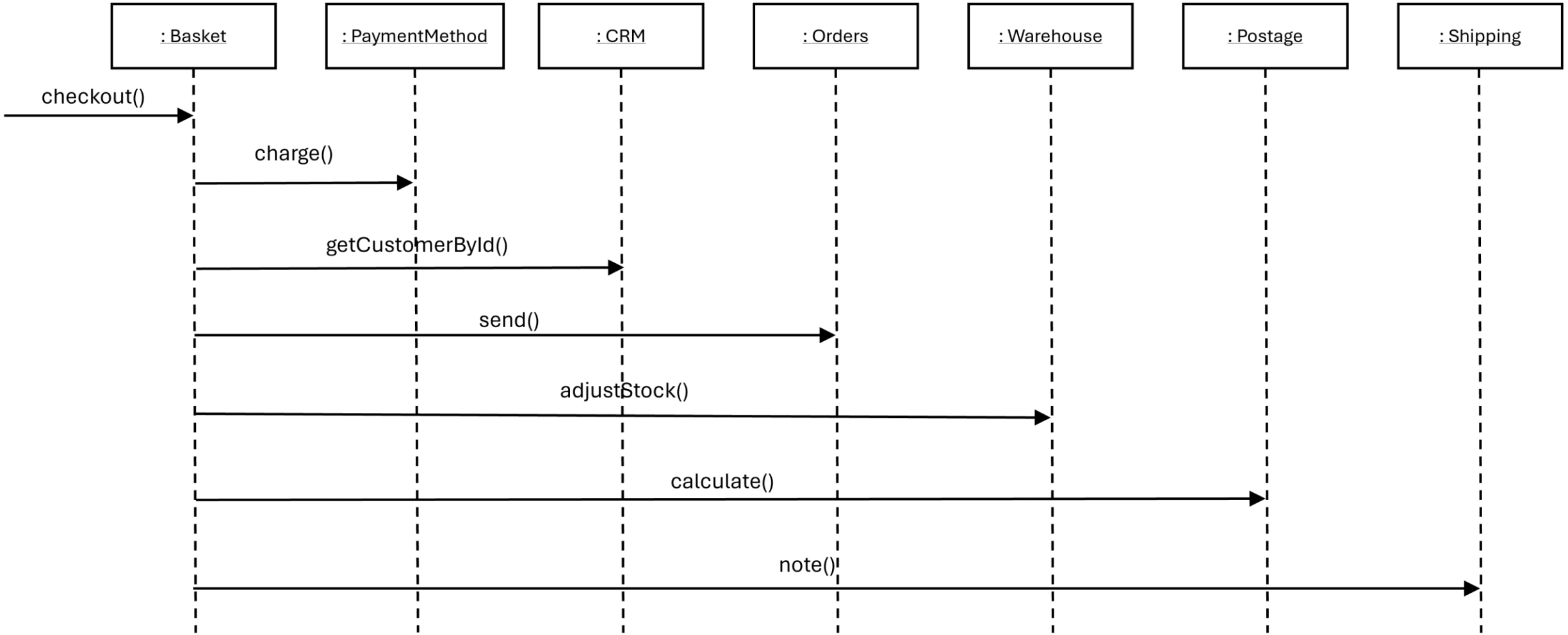

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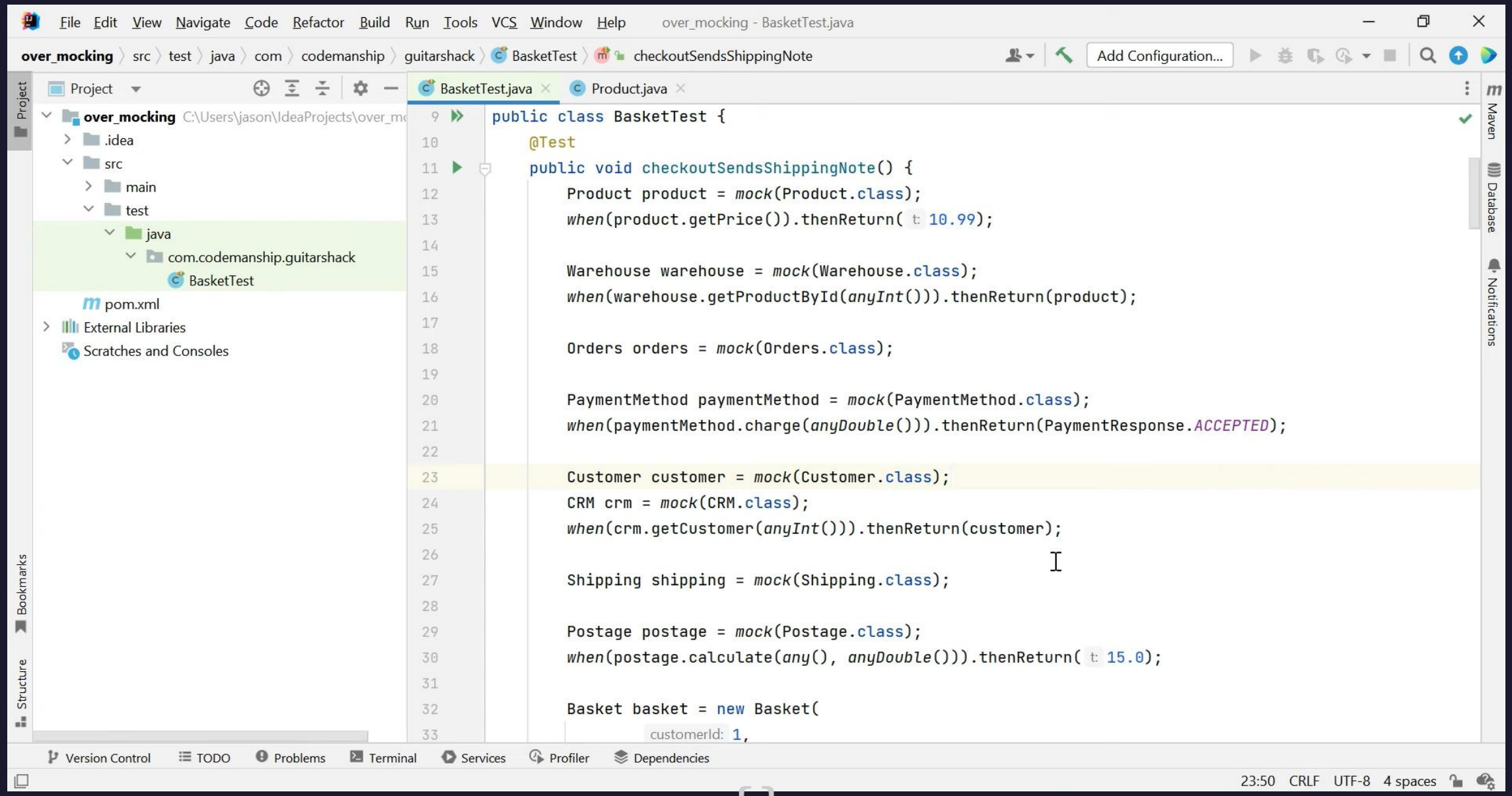

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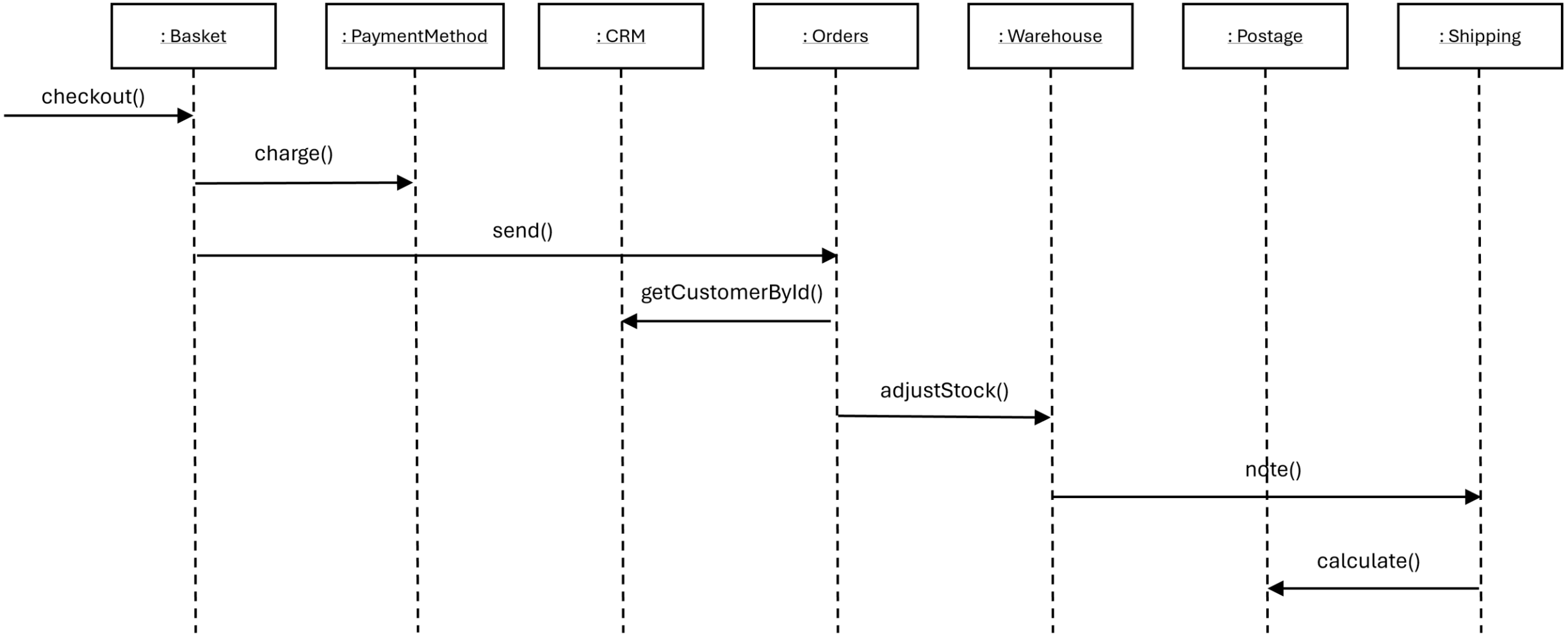

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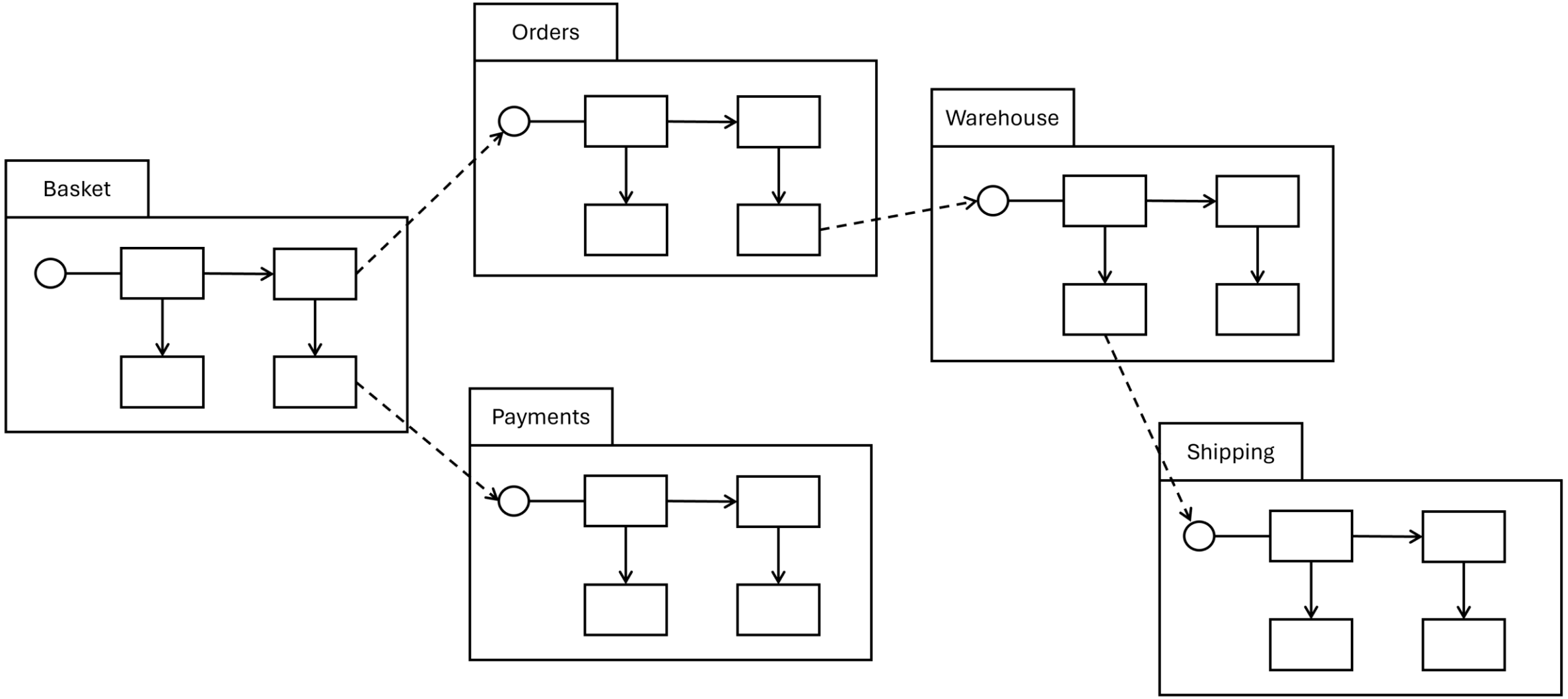

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Roles, Responsibilities & Collaborations

The Essence of High-Level Design

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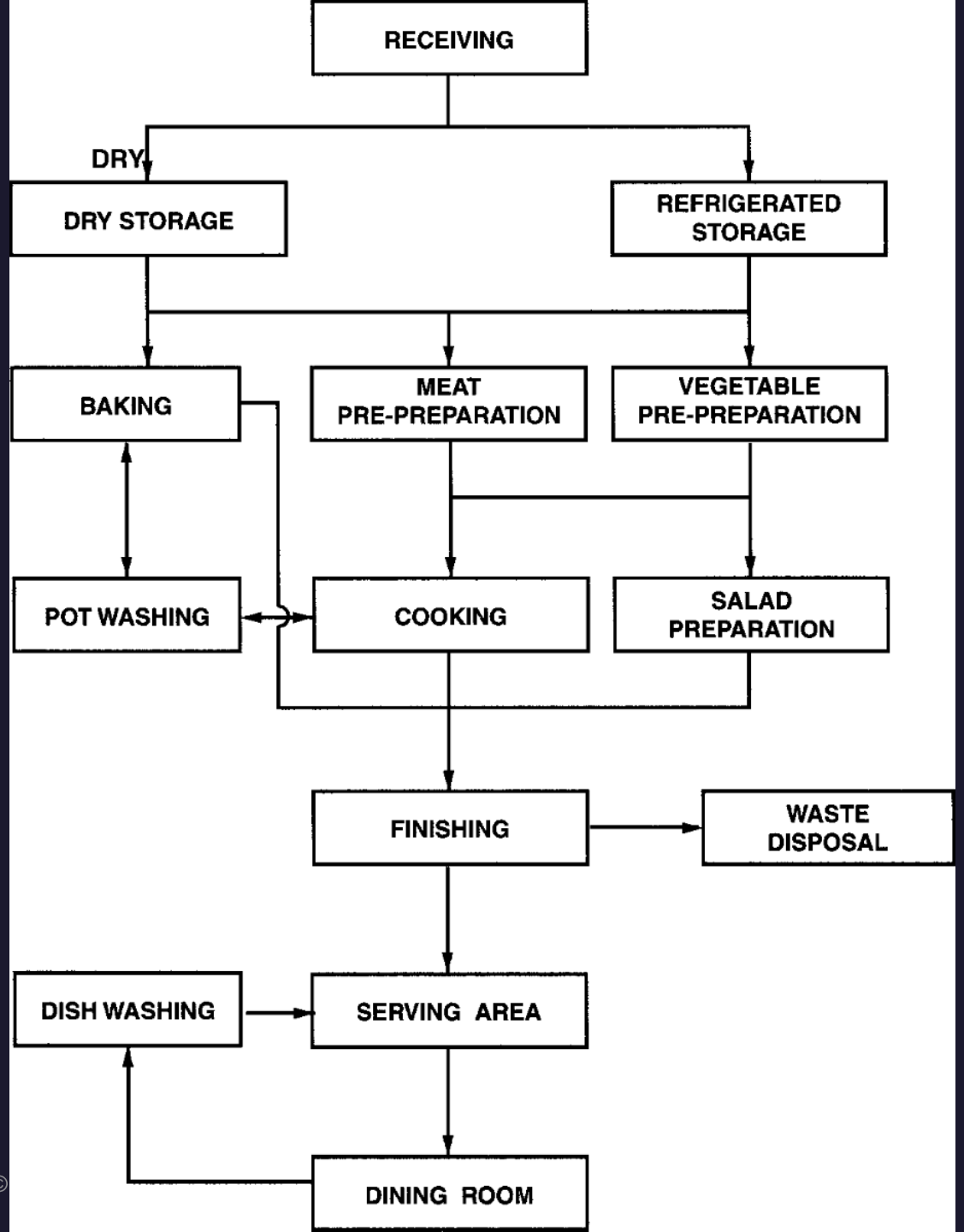
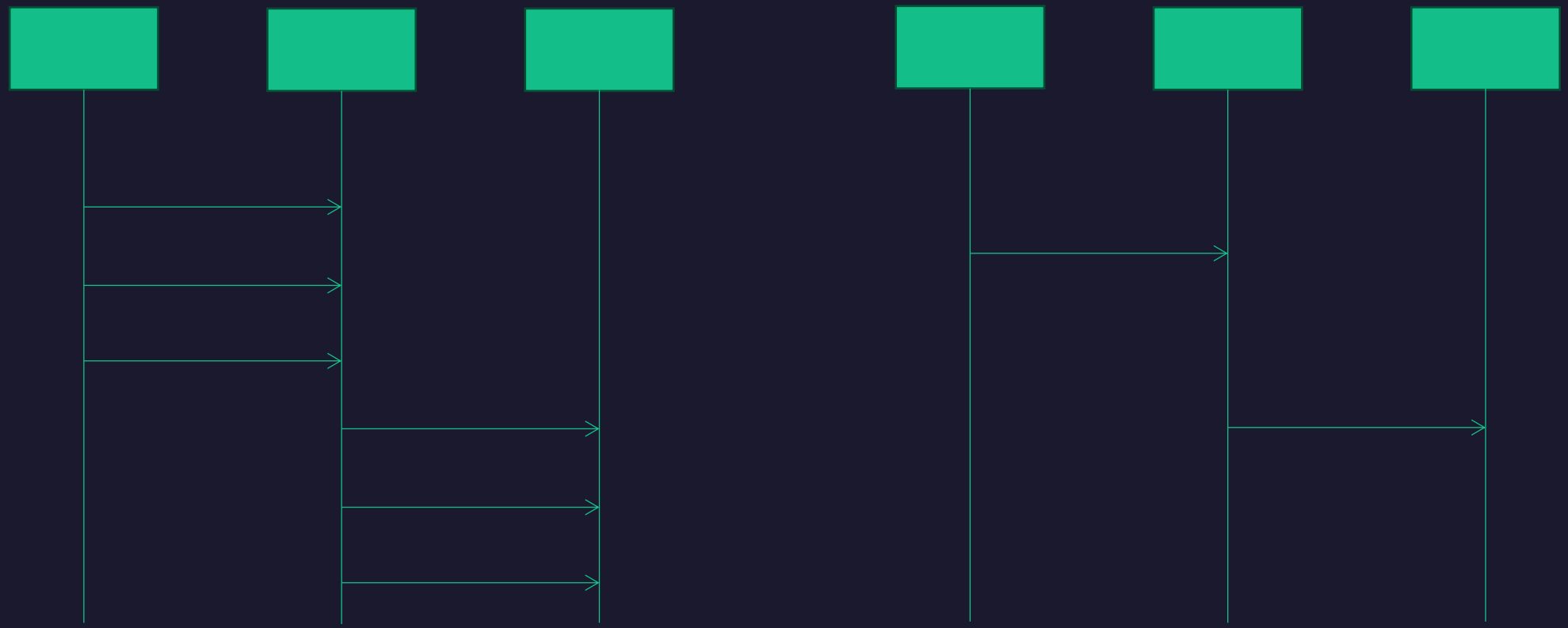

RECEIVING
DRY
DRY STORAGE
REFRIGERATED STORAGE
BAKING
MEAT PRE-PREPARATION
VEGETABLE PRE-PREPARATION
POT WASHING
COOKING
SALAD PREPARATION
FINISHING
WASTE DISPOSAL
DISH WASHING
SERVING AREA
DINING ROOM

©



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Simple High-Level Design Tools

Visualising Roles, Responsibilities & Collaborations

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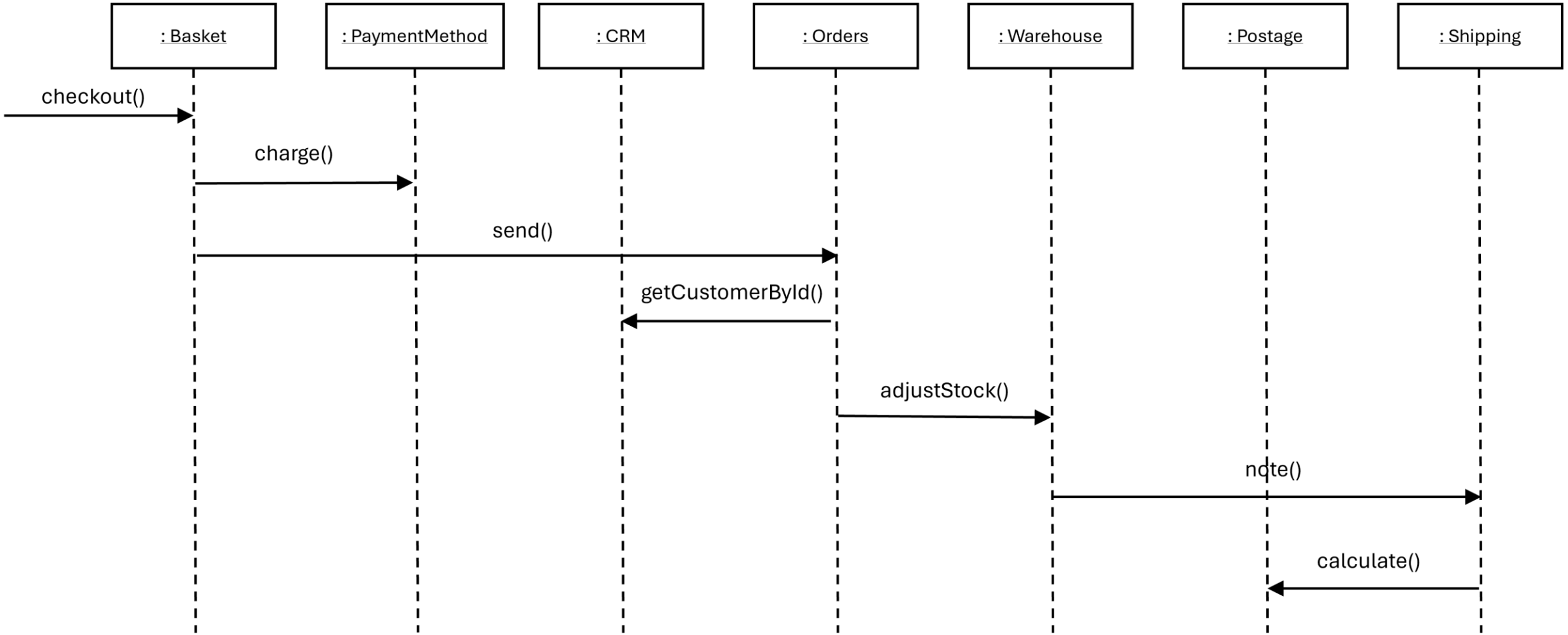

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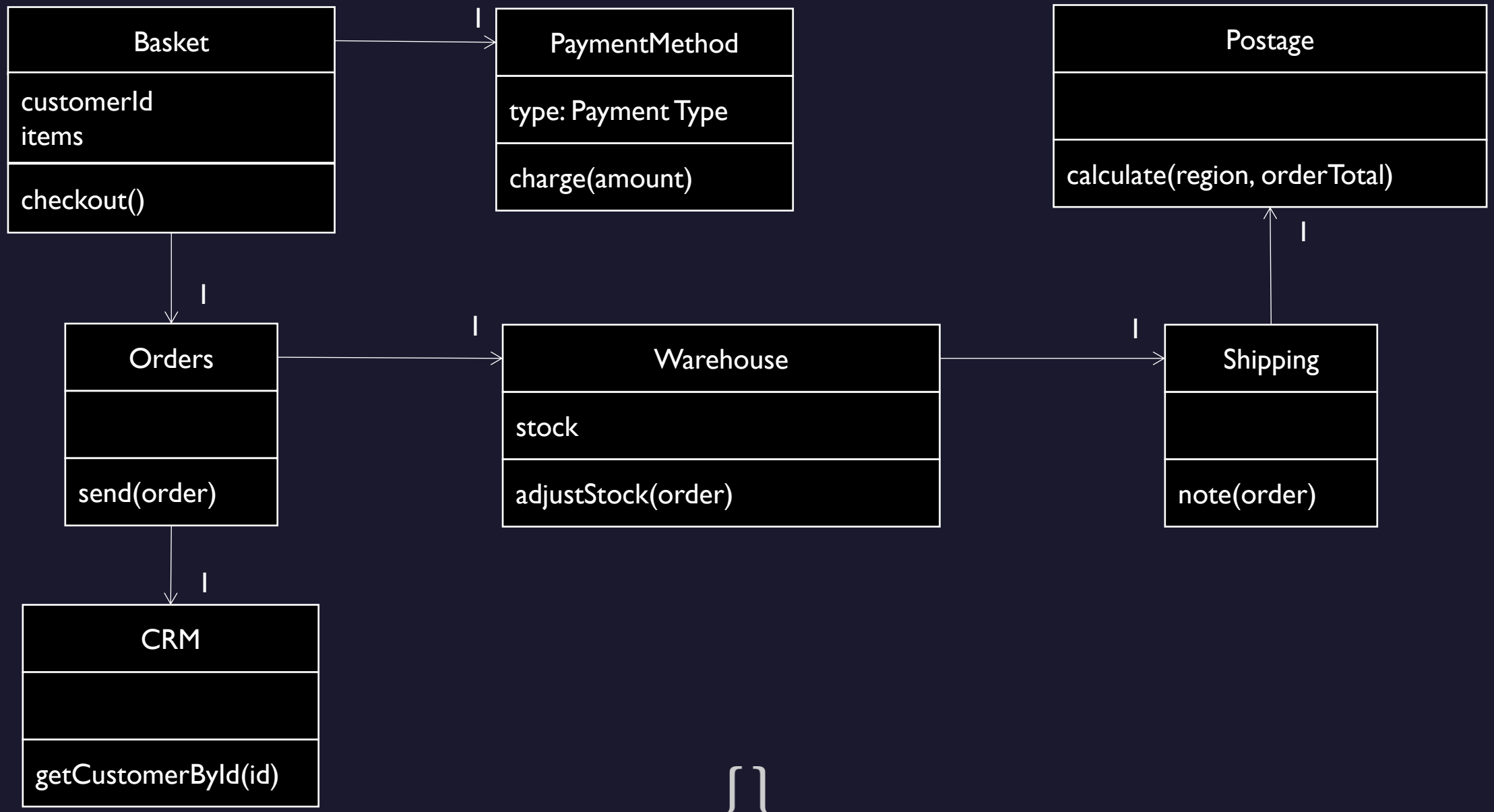

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Basket

knows

* Customer id
* items

does

* checkout

Orders

Payment Method

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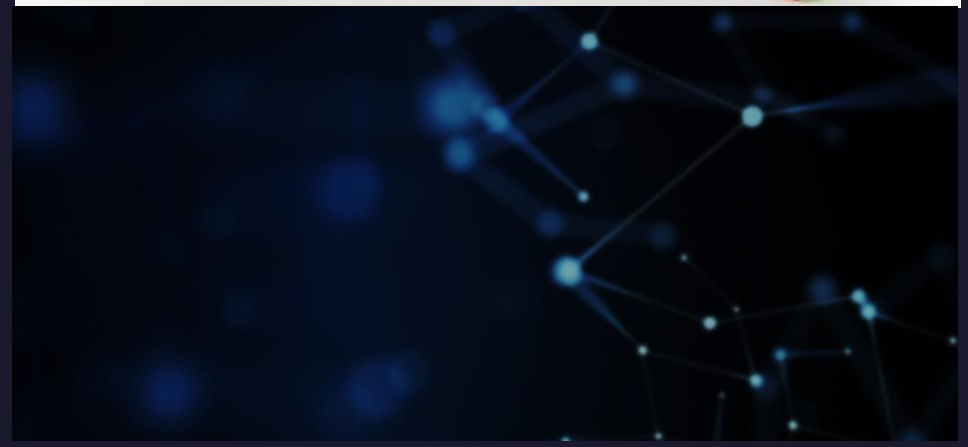
Specification By Example

Pinning Down Requirements With Test Cases



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```
Feature: Checkout

Scenario: UK Customer, Payment accepted
Given A basket for a <customer id> with one or more <items>
And The Customer's <country> is the UK
And Their payment method has <credit> >= basket total + <shipping>
When They check out
Then The <total> of items in the basket is calculated
And The customer's <name> and <address> is retrieved using their <customer id>
And <shipping> is calculated for the customer's <country> and basket <total>
And Their payment method is <charged> the basket <total> + <shipping>
And An <order> is created for that customer at that <address> with the basket <items>
And The warehouse stock of each item <product> in the basket is adjusted by the item <quantity>


Examples:
  | customer id | items                                    | name         | address                          | country | credit | shipping
  | 12          | [{ product: {price: 100.01}, quantity: 1}] | Jason Gorman | 10 Acacia Drive, London, SW19 5RT | UK      | 100.01 | 0.0
  | 12          | [{ product: {price: 100.00}, quantity: 1}] | Jason Gorman | 10 Acacia Drive, London, SW19 5RT | UK      | 104.99 | 4.99
```

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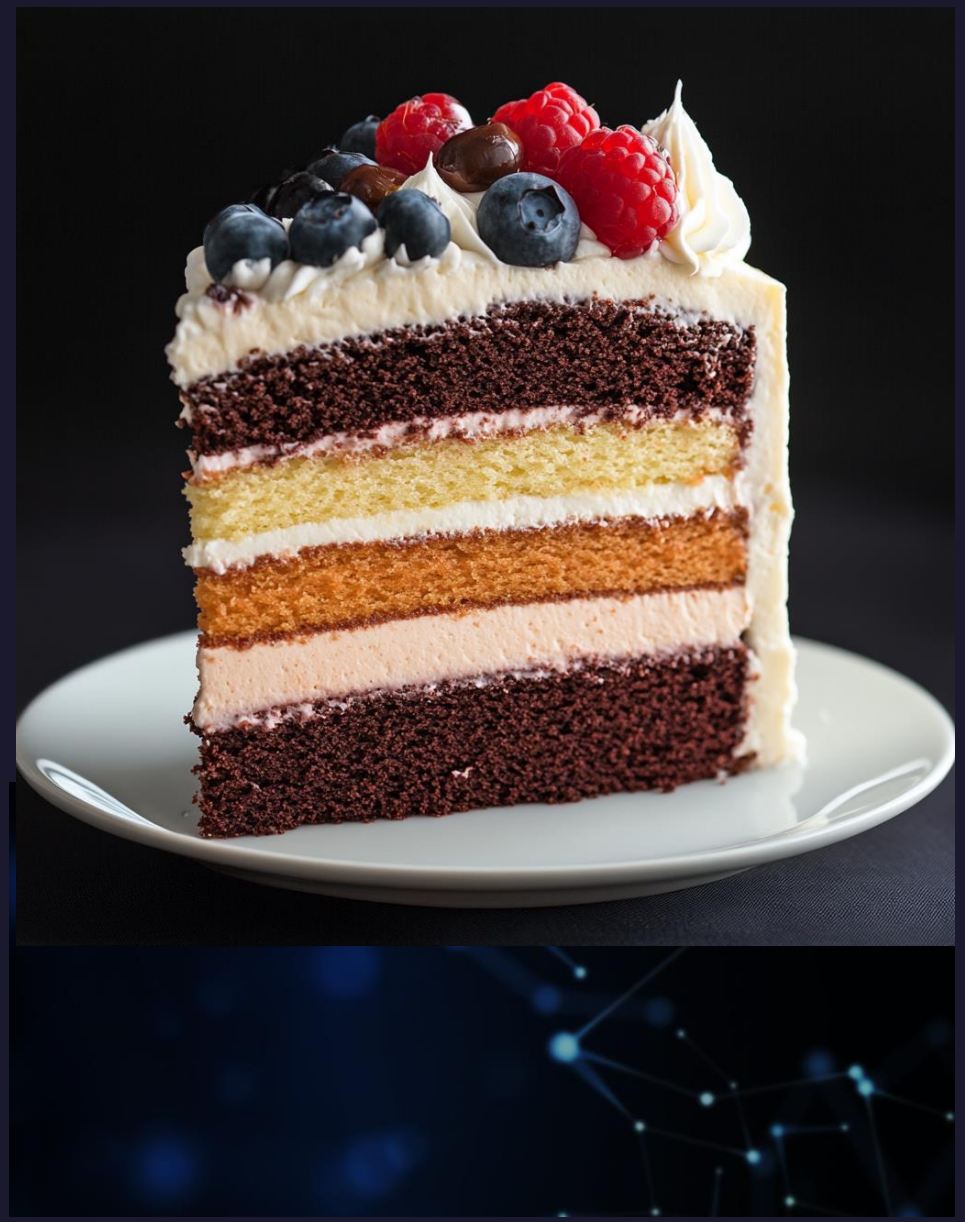
From Features To High-Level Designs

Mapping Roles, Responsibilities & Collaborations One Slice At A Time



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does

* Calculate total of items

does

* Retrieve customer's name & address

does

* Calculate shipping

does

* Charge basket total + shipping

does

* Create order

does

* Adjust product stock

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knows

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* customer id

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* Calculate total of items
* checkout

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* customers

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does

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knows

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does

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* stock

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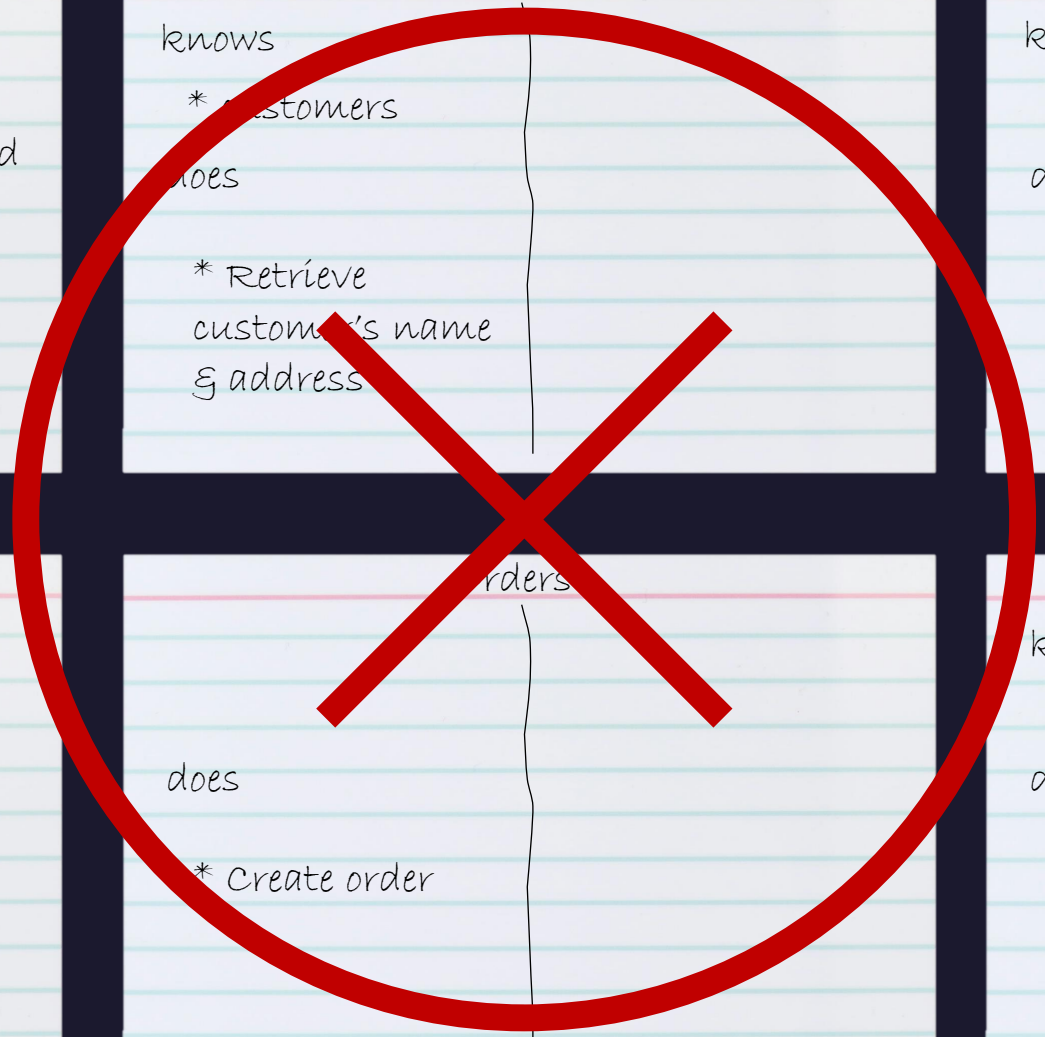

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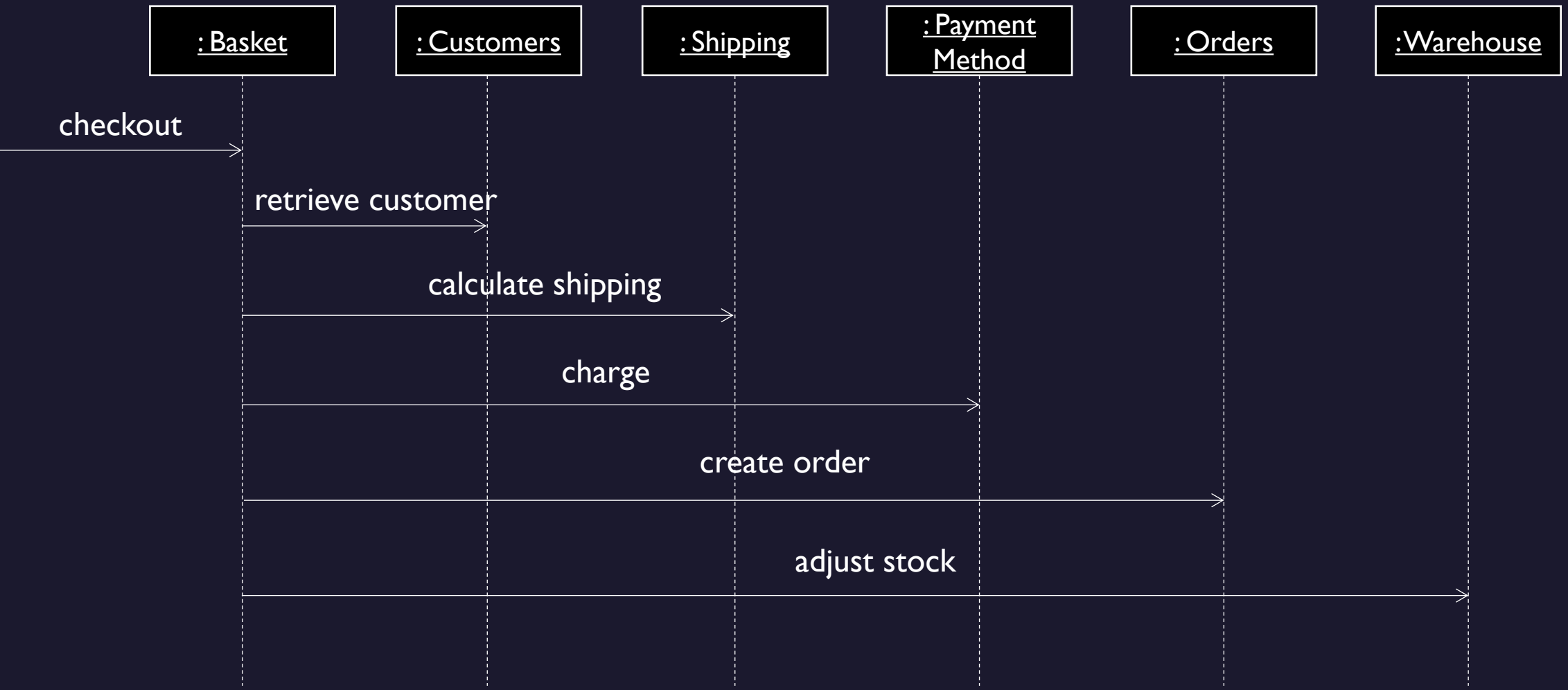

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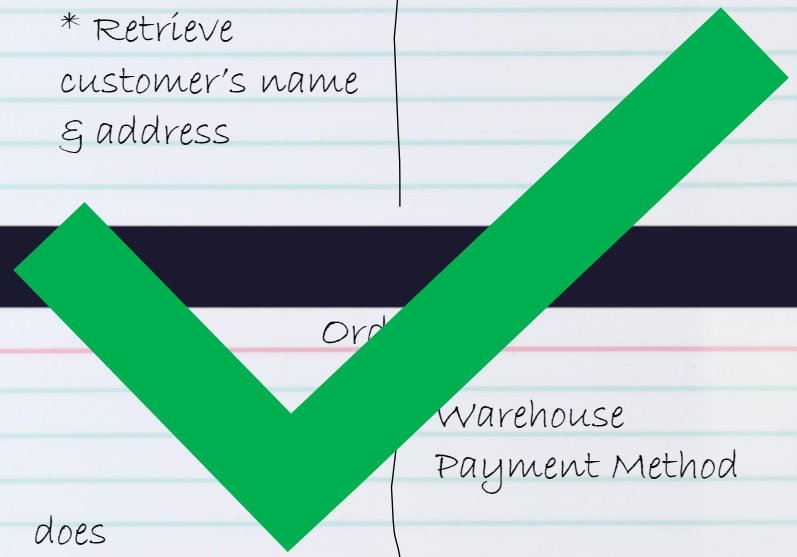

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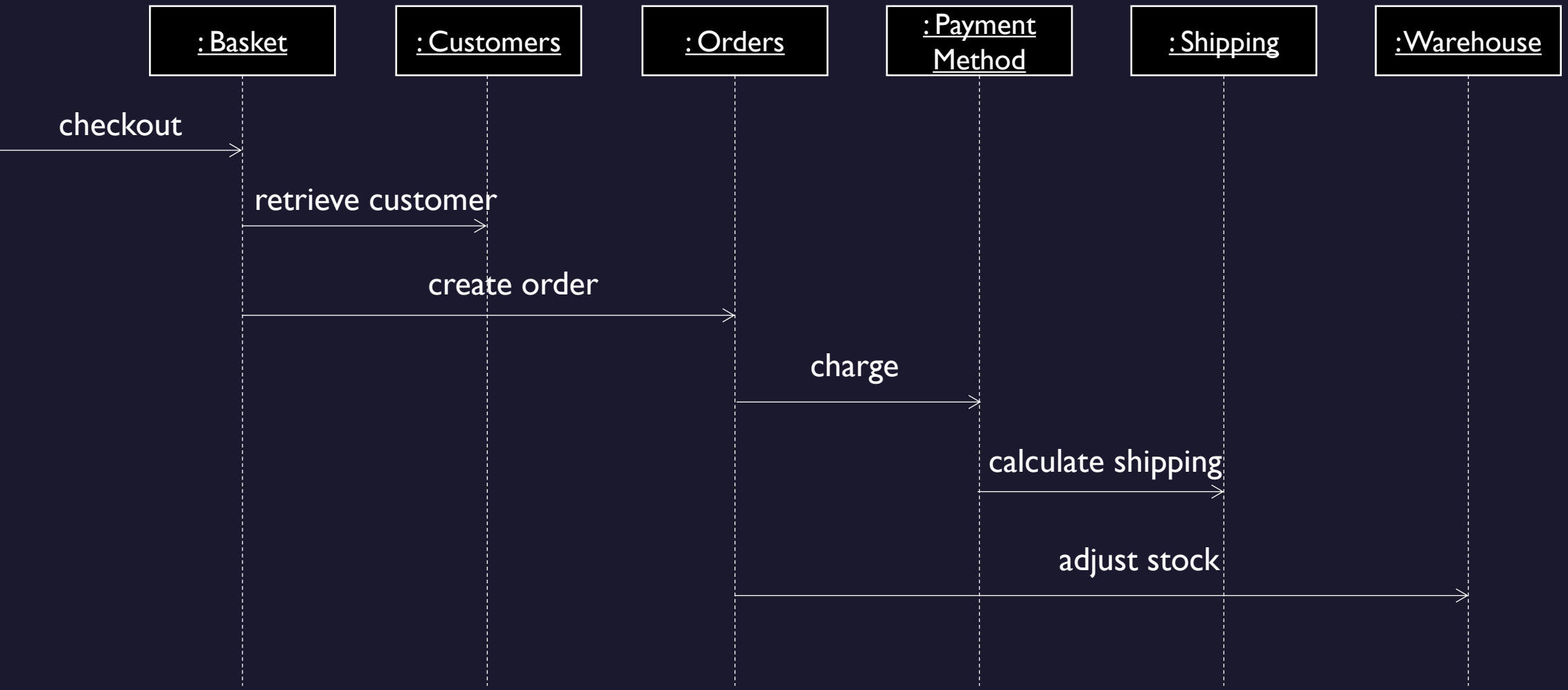

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Business Requirements

Guitar Shack

Guitar Shack Sales System

- You are tasked with developing a sales and stock control system for a guitar shop
- The initial system will have functionality in three areas:
  - Orders
  - Warehouse
  - Sales History
  - Shipping

Order Features

- **Add item** – add an item to an order. An order item has a product and a quantity. There must be sufficient stock of that product to fulfil the order
- **Total including shipping** – calculate the total amount payable for the order, including shipping to the address
- **Confirm** – when an order is confirmed, the stock levels of every product in the items are adjusted by the item quantity, and then the order is added to the sales history.

Warehouse Features

- **Check stock** – for a specified product, get the current stock level
- **Adjust stock** – deduct a quantity from a product's stock level
- **Receive stock** – add new stock to a product, and if the product is new, add it to the catalogue first
- **Restock Alerts** – when stock's adjusted, if that product has reached its restock threshold, where we'll need to order more to avoid running out before more stock arrives from the manufacturer, an alert is sent to the warehouse manager. Use the product's sales history and its restock lead time to calculate what the restock level should be.

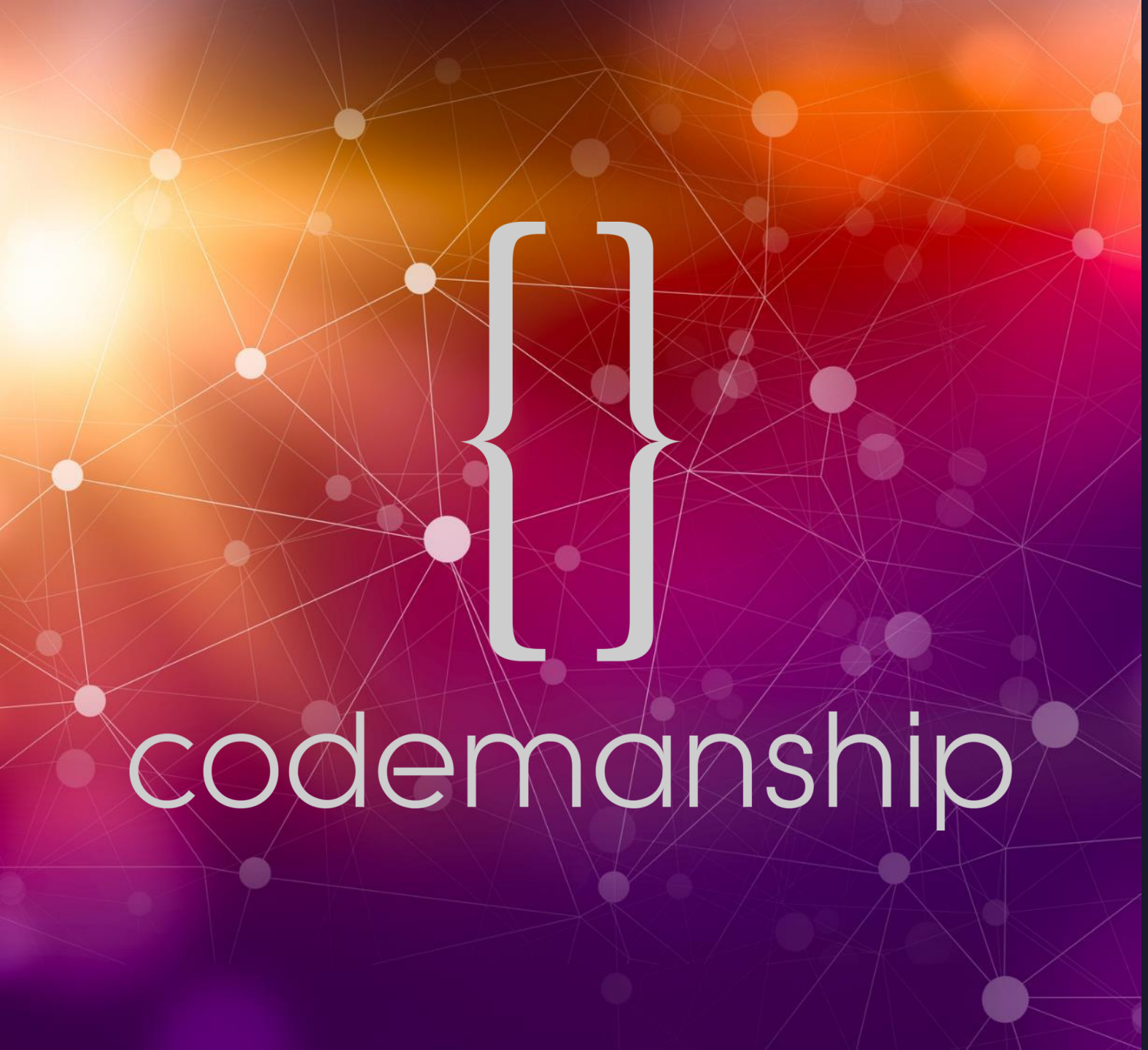
Sales History Features

- **List orders of a specific product** (optionally within a date range)
- **List orders shipped to an address**

Shipping

- **Shipping charges for orders are calculated as follows:**

Region	Order total > £100	Order total <= £100
UK	FREE	£4.99
EU	£4.99	£7.99
OTHER	£7.99	£12.99



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