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Title: Procurement System

Project Summary:

This project is to build a procurement system that manages the creation, approval, execution and tracking of purchase orders. The system will allow employees that need to purchase items for work to submit a purchase order describing what they need and why. The order will first be routed to the employee's manager to evaluate whether the order should be approved. If the order is approved, it is routed to a procurement officer who selects a vendor and purchases the item. The system collects data about the status of the purchase order including the cost of the items purchased, expected and actual delivery dates for the item and any defective items that are received. This data allows actors in the organization to track the status of orders, but also enables the aggregation of data across the whole organization such as overall spending and vendor performance that can be used to make the procurement process more efficient.

Project Requirements:

Business Requirements				
ID	Requirement	Topic Area	User	Priority
BR-01	All applications in the organization should use the user's company email as her login name.	Security	All users	High
BR-02	All applications in the organization should be runnable only on company computers.	Security	All users	High
BR-03	All applications in the organization should pull basic user data from the Global User Directory and not copy it into an application-specific database.	Security/Data Integrity	All users	High
BR-04				

User Requirements				
ID	Requirement	Topic Area	User	Priority
US-01	As an employee, I want to be able to create and save a purchase orders to request items I need to support my work.	Order Submission	Employee	High
US-02	As an employee, I want to be able to cancel a purchase order that has not yet been executed to avoid wasting the organization's money on items I no longer need. My manager and procurement staff should also be able to cancel the order on my behalf.	Order Submission	Employee, Manager, Procurement Officer, Procurement Manager	High
US-03	As an employee, I want to be able to edit an application form that has not yet been submitted or that has been rejected by my manager in order to fix errors.	Order Submission	Employee	Medium
US-04	As an employee, I want to submit the order so that it can be reviewed and executed.	Order Submission	Employee	High
US-05	As an employee, when I receive a defective item during the procurement process, I want to be able to report the defect so the item can be replaced.	Item Delivery	Employee	Medium
US-06	As a manager, I want to be able to see the purchase orders submitted by my employees and to approve or reject them in order to make sure all purchases are appropriate.	Order Review	Manager	High
US-07	As a procurement officer, I want to be able to choose the	Purchasing	Procurement Officer	Medium

	vendor for an order from a system-generated list of vendors that sell the order's items.			
US-08	As a procurement officer, if there is no vendor in the system capable of handling an order, I want to be able to add a new vendor into the system in order to execute the order.	Purchasing	Procurement Officer	Medium
US-09	As a procurement officer, I want to update the purchase order with cost information, shipping number and scheduled delivery date after ordering the product from the vendor so this data is available to other actors.	Purchasing	Procurement Officer	Medium
US-10	As a procurement department manager, I want to review the performance of vendors and select which vendors are preferred to allow procurement officers to easily find and use the best vendors.	Vendor Review	Procurement Manager	Medium
US-11	As a receiving department worker, I want to log the purchased items that have been received and at what time in each procurement so that other actors will know the items have been received.	Item Delivery	Receiving Department Worker	High
US-12	As a receiving department worker, I want to close the purchase order once the item has been delivered to the employee so that I can organize the work that have been finished.	Item Delivery	Receiving Department Worker	Medium

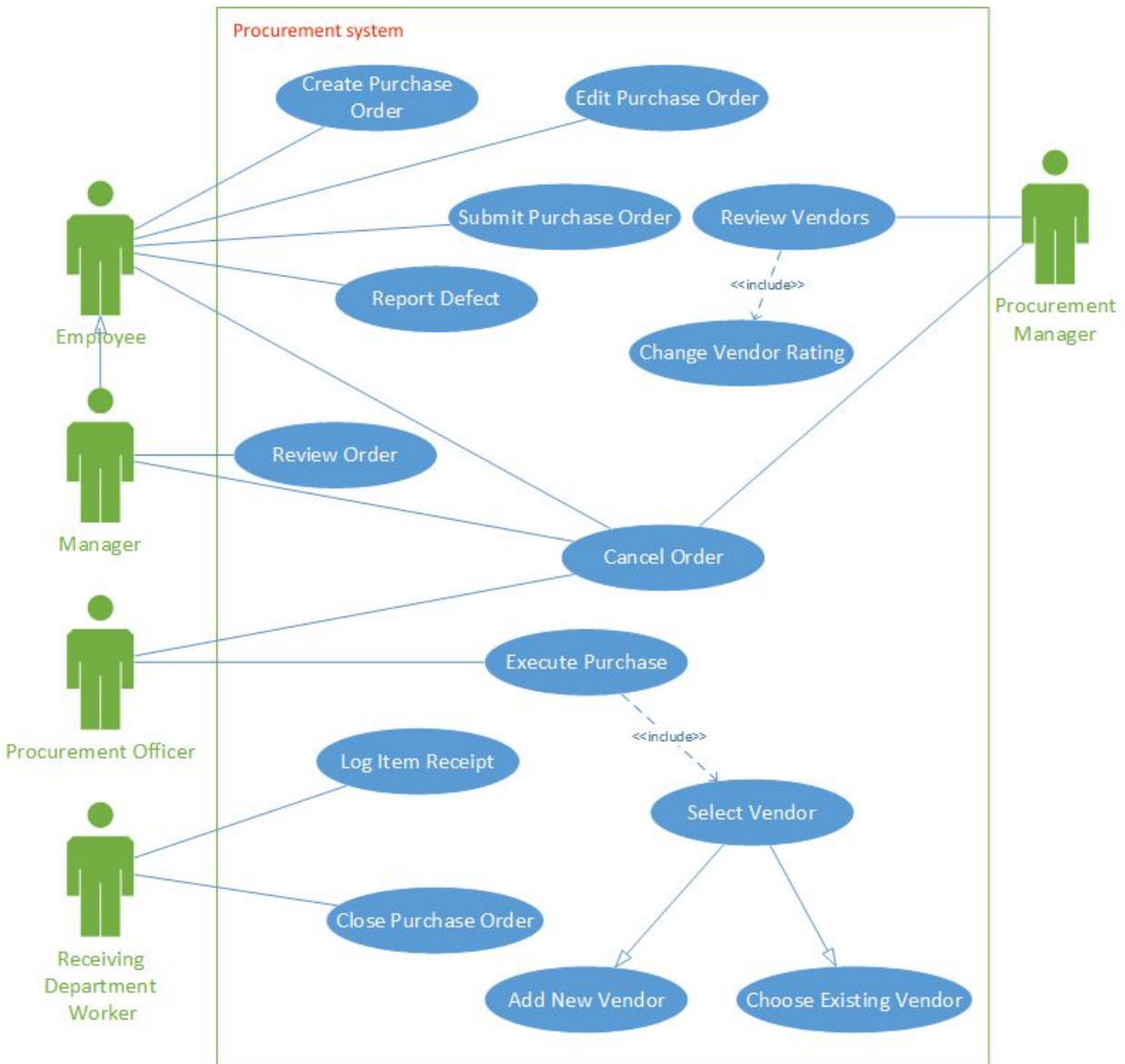
Functional Requirements				
ID	Requirement	Topic Area	User	Priority
FR-01	The system shall not allow any employee below the director level to approve his own purchase orders.	Accounting	All	High
FR-02	When creating or updating a purchase order populate the "Last Modified By" field with the current user's ID and the "Last Modified Date" field with the current date.	Audit Trail	All	Medium

Non-functional Requirements				
ID	Requirement	Topic Area	User	Priority
UFR-01	Each page in the system must load in less than two seconds.	Performance		High
UFR-02	The system must be implemented in Java.	Technology		High
UFR-03	The system must use a relational database for data storage.	Technology		High

Use case:

Actors: Employee, manager, procurement officer, receiving department worker, procurement manager.

Use case overview:



Use case documents:

User Case ID:	US-01
Use Case Name:	Create Purchase Order
Description:	Employee can create a purchase order to acquire items needed to perform their job functions. If needed, they can save an order without submitting it and continue working on it at a later time.

Actors:	Employee		
Pre-conditions:	The employee requires an item.		
Post-conditions:	The order has been created.		
Frequency of use:	High.		
Flow of Events:		Actor Action	System Response
	1.	Login to procurement system by username and password	Check validation
	2.	Click "Create Purchase Order" from the main menu	Displays form controls for entering order details
	3.	Fill in application	
	4.	Click "Save Order" button	The order is saved in the database.
Variations:	Wrong username or password		
Exceptions:			
Developer Notes:			

User Case ID:	US-02
Use Case Name:	Cancel Order
Description:	Employee can cancel the order if it no longer needed, Manager if the order is not approved, or Procurement Officer/Procurement Manager can cancel the order if is not correct.

Actors:	Employee, Manager, Procurement Officer and Procurement
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	Manager		
Pre-conditions:	A purchase order has been created by has not yet reached “Ordered” status		
Post-conditions:	The order has a status of “Cancelled”		
Frequency of use:	Medium.		
Flow of Events:		Actor Action	System Response
	1.	Employee logs into procurement system by username and password	Check validation
	2.	Click “My Purchase Orders”	Application displays a listing of employee’s purchase orders.
	3.	Select a purchase order	
	4.	Click “Cancel Order” button.	Order’s status is set to canceled and order is no longer editable
Variations:	<ol style="list-style-type: none"> 1. Managers can perform this use case by selecting a purchase order from the listing in the “Review Orders” screen. 2. Procurement personnel can perform this use case by selecting a purchase order from the listing the “Process Orders” screen. 		
Exceptions:			
Developer Notes:			

User Case ID:	US-03
Use Case Name:	Edit Purchase Order
Description:	An employee can edit information in existing purchase order that they created before.

Actors:	Employee		
Pre-conditions:	Need to change that order.		
Post-conditions:	The order has been modified.		
Frequency of use:	Medium. When employee need to modified their application.		
Flow of Events:		Actor Action	System Response
	1.	Login to procurement system by by username and password	Check validation
	2.	Click “My Purchase Orders” from the menu	Displays a list of the employee’s purchase orders
	3.	Choose the desired order	Displays a form to edit the order
	4.	Fill in application.	
	5.	Click “Save Order” button	Saves the updated order to the database
Variations:	Wrong username or password		
Exceptions:			
Developer Notes:			

User Case ID:	US-04
Use Case Name:	Submit Purchase Order
Description:	When employee finish their application form, Employee can submit application.

Actors:	Employee
Pre-conditions:	The application is filled out.
Post-conditions:	The order has been stored in system and system would notify

	manager this application is completed by email.		
Frequency of use:	Frequently.		
Flow of Events:		Actor Action	System Response
	1.	Login to procurement system by by username and password	Check validation
	2.	Choose the application	Application selected
	3.	Click "Submit Purchase Order"	List in the order list and send notification to manager
Variations:	Wrong username or password		
Exceptions:			
Developer Notes:			

User Case ID:	US-05
Use Case Name:	Report Defect
Description:	When an employee receives a defective item from a vendor as the result of the procurement process, he can log the defect in the system.

Actors:	Employee		
Pre-conditions:	Employee has received items requested via a purchase order. One or more items is defective.		
Post-conditions:	The defect has been logged in the system.		
Frequency of use:	Low. This use case is only required when a defective item is received from a vendor.		
Flow of Events:		Actor Action	System Response

	1.	Login to procurement system by work email	Check validation
	2.	Click “My Purchase Orders” from the menu	Display a listing of purchase order the current employee has created
	3.	Select the purchase order containing the defective item	Display the details of the purchase order
	4.	Enter an explanation of the defect	
	5.	Click the “Report Defect” button	Stores the defect information
Variations:			
Exceptions:			
Developer Notes:			

User Case ID:	US-06
Use Case Name:	Review Order
Description:	After employee submit their application form, Manager can determine whether the application is approved or not.

Actors:	Manager
Pre-conditions:	The application is submitted.
Post-conditions:	The order is either approved or denied. If the order is approved, procurement officer would receive a notified email . Else, if the order is denied, the application would be deleted from system.
Frequency of use:	Frequently.

Flow of Events:		Actor Action	System Response
	1.	Login to procurement system with username and password	Check validation
	2.	Click “Review Purchase Orders” from the menu	Display a listing of purchase order the current employee has created
	3.	Select the purchase order that have not been determined approved or denied yet.	Load purchase order from system.
	4.	Make decisions about the application.	The application would be deleted if the decision is denied. Otherwise, procurement officer would receive a notified email
Variations:	Wrong username or password		
Exceptions:			
Developer Notes:			

User Case ID:	US-07
Use Case Name:	Select Vendor
Description:	A procurement officer selects the vendor for the purchase order based on the order’s items.

Actors:	Procurement Officer
Pre-conditions:	A purchase order has been approved.
Post-conditions:	The order has been associated with a vendor and the procurement officer is ready to purchase the order’s items.

Frequency of use:	High. This use case must be performed for every purchase order that results in a purchase.		
Flow of Events:		Actor Action	System Response
	1.	Login to procurement system by work email	Check validation
	2.	Click “Review Orders” in the menu	Display a list of purchase orders in “Approved” status
	3.	Select a purchase order	Display order details and a list of vendors for the order’s item type
	4.	Click on a vendor in the list	Update the order with the vendor information
Variations:	If the system does not contain a suitable vendor for the order, the procurement officer can input a new vendor and associate it with the order. This vendor will also be available for future orders.		
Exceptions:			
Developer Notes:			

User Case ID:	US-08
Use Case Name:	Add Vendor
Description:	Procurement officer adds a new vendor to the vendor database.

Actors:	Procurement Officer
Pre-conditions:	None. The procurement officer can add a vendor in the middle of the “Execute Order” workflow, but they can also do so independently.
Post-conditions:	A new vendor has been added to the database.
Frequency of use:	Low. This use case will be performed only if another needs to

	be added to fulfill an order, current vendors have low ratings, etc.		
Flow of Events:		Actor Action	System Response
	1.	Login to procurement system by work email	Check validation
	2.	Click “Add Vendor” in the menu	Display a form to add a vendor that includes the vendor name.
	3.	Fill in and submit vendor information	Store vendor information in database.
Variations:	The same workflow can be performed in the middle of the “Execute Purchase” workflow		
Exceptions:			
Developer Notes:			

User Case ID:	US-09
Use Case Name:	Execute Purchase
Description:	After ordering items associated with a purchase order, a procurement officer can update the order with the items’ final cost, tracking number and expected delivery date and move the order to “Ordered” status.

Actors:	Procurement Officer
Pre-conditions:	A purchase order has been approved and a vendor has been associated with it. The items associated with the purchase order have been ordered from the vendor.
Post-conditions:	The order has been updated with purchase details and its status has been moved to “Ordered”.
Frequency of use:	High. This use case must be performed for every purchase order that results in a purchase.

Flow of Events:		Actor Action	System Response
	1.	Login to procurement system by work email	Check validation
	2.	Click “Review Orders” in the menu	Display a list of purchase orders in “Approved” status
	3.	Select a purchase order	Display order details and controls for entering purchase data
	4.	Input purchase data and click the “Items Ordered” button	Save the purchase data and update the order status to “Ordered”
Variations:			
Exceptions:			
Developer Notes:			

User Case ID:	US-10
Use Case Name:	Review vendors
Description:	A procurement manager can view a list of vendors that have been used in the past along with performance metrics. The manager can add and remove “Preferred” status to each vendor.

Actors:	Procurement Manager
Pre-conditions:	The system has been used to complete multiple purchase orders.
Post-conditions:	Vendor statuses have been updated if desired.
Frequency of use:	Low. The vendor status only needs to be updated periodically when enough new data has been accumulated to possibly cause a change in vendor status.

Flow of Events:		Actor Action	System Response
	1.	Login to procurement system by work email	Check validation
	2.	Click “Review Vendors” in the menu	Calculates timeliness and quality metrics for each vendor and displays a listing of vendors with their metrics and “Preferred” status.
	3.	Optional: Click on a vendor to toggle the vendor’s “Preferred” status	Updates vendor status
	4.	Optional: Click the “Save Changes” button	Saves all vendor status changes
Variations:			
Exceptions:			
Developer Notes:			

User Case ID:	US-11
Use Case Name:	Log Item Receipt
Description:	When a receiving department worker at the facility of the requesting employee receives the items on a purchase order, he marks the item as received and logs the receipt time.

Actors:	Receiving Department Worker
Pre-conditions:	The ordered items associated with the purchase order have arrived at the requesting employee’s facility. The purchase order is in “Ordered” state.
Post-conditions:	The order is in “Received” state.
Frequency of use:	High. This use case must be performed for every purchase

	order that results in items being purchased.		
Flow of Events:		Actor Action	System Response
	1.	Login to procurement system by work email	Check validation
	2.	Click “Order Receiving” in the menu	Display a list of purchase orders in “Ordered” or “Received” state
	3.	Choose a purchase order with “Ordered” status	Display purchase order details
	4.	Input the receipt time and click “Log Item Receipt” button	Set order status to “Received”
Variations:			
Exceptions:			
Developer Notes:			

User Case ID:	US-12
Use Case Name:	Close Purchase Order
Description:	Once a receiving department worker at the facility of the requesting employee has received the items on a purchase order and has delivered it to the requesting employee, the receiving working marks the purchase order as closed.

Actors:	Receiving Department Worker
Pre-conditions:	The ordered items associated with the purchase order have arrived at the requesting employee’s facility. The items have been delivered to the requesting employee. The purchase order is in “Received” state.
Post-conditions:	The order is in “Closed” state.

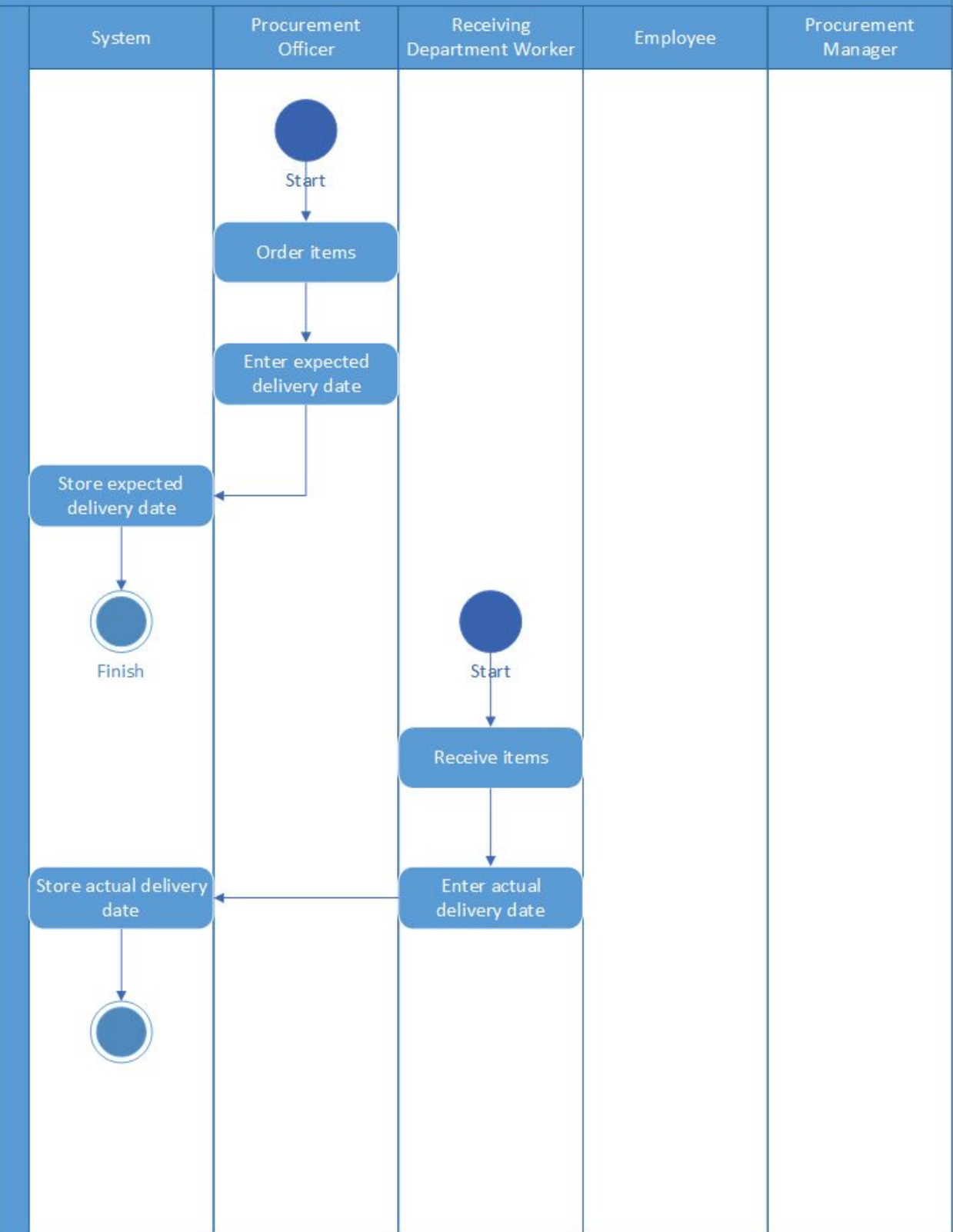
Frequency of use:	High. This use case must be performed for every purchase order that results in items being purchased.		
Flow of Events:		Actor Action	System Response
	1.	Login to procurement system by work email	Check validation
	2.	Click “Order Receiving” in the menu	Display a list of purchase orders in “Ordered” or “Received” state
	3.	Choose a purchase order with “Received” status	Display purchase order details
	4.	Input delivery time and click “Close Order” button	Set order status to “Closed”.
Variations:			
Exceptions:			
Developer Notes:			

Activity Diagrams:

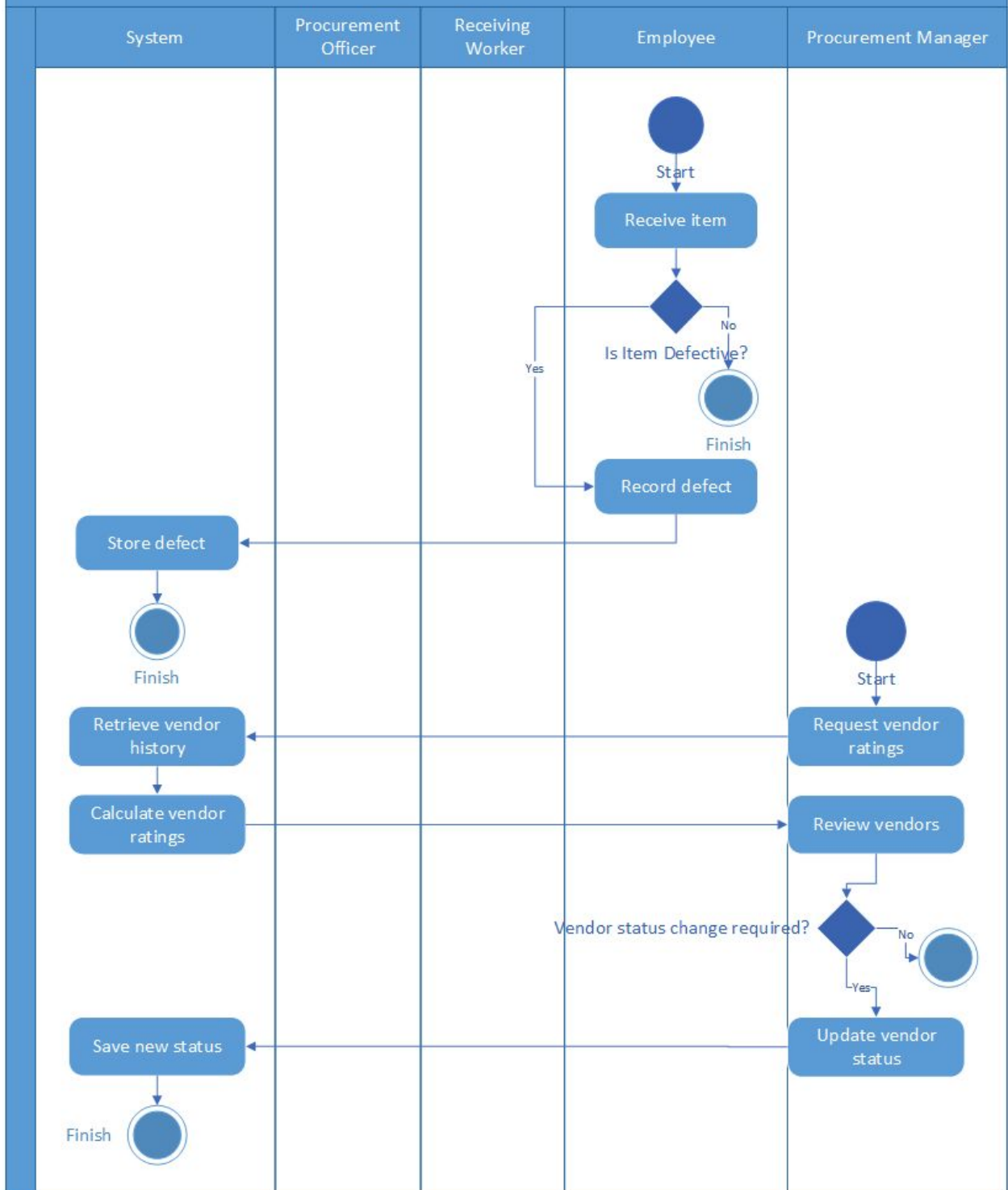
Use Case US-10: Review Vendors (Douglas Falconieri)

Note that in addition to use case US-10, this diagram also contains portions of the prerequisite use cases US-5, US-9 and US-11. Portions of these use cases are included in order to show how the three pieces of data necessary to track vendor performance (estimated delivery date, actually delivery date and defect reporting) are entered into the system through the interactions of several actors.

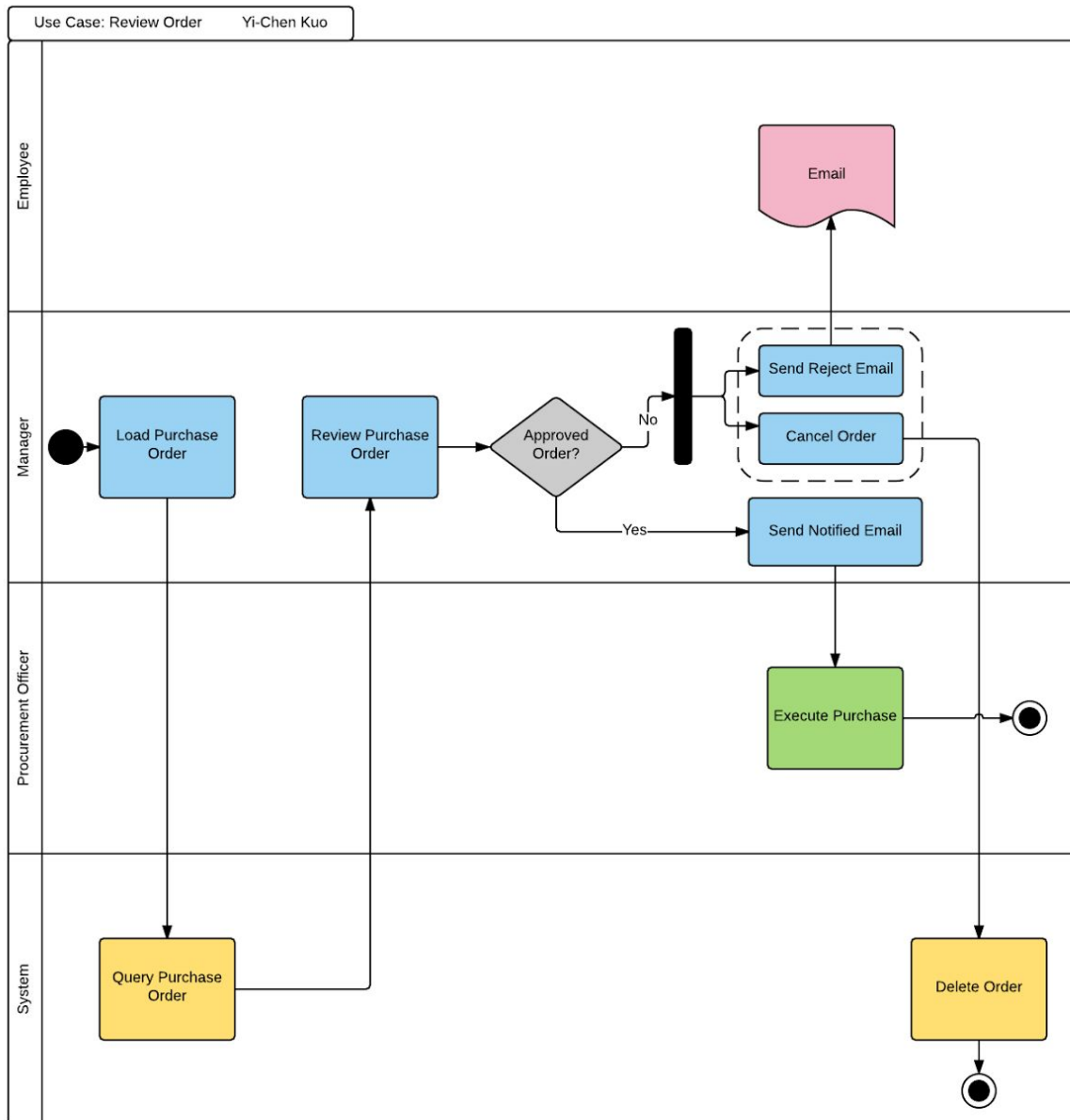
US-10: Review Vendors (Part 1 of 2)



US-10: Review Vendors (Part 2 of 2)



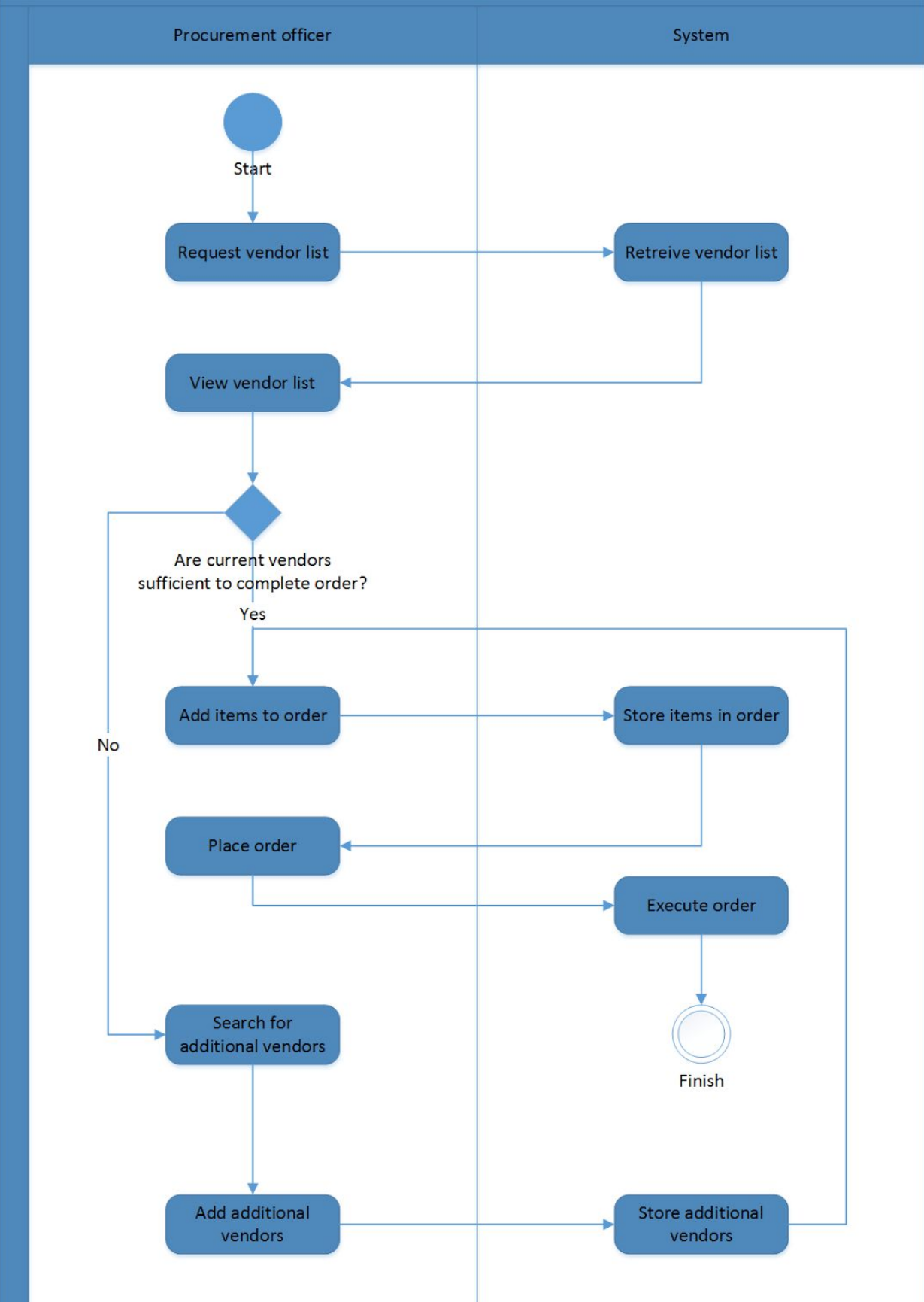
Use Case US-06: Review Order (Yi-Chen Kuo)



Use Case US-09: Execute Purchase (Walid Sharif)

This use case includes portions of US-07 and US-08 as the use case “Execute Order” includes selecting a vendor.

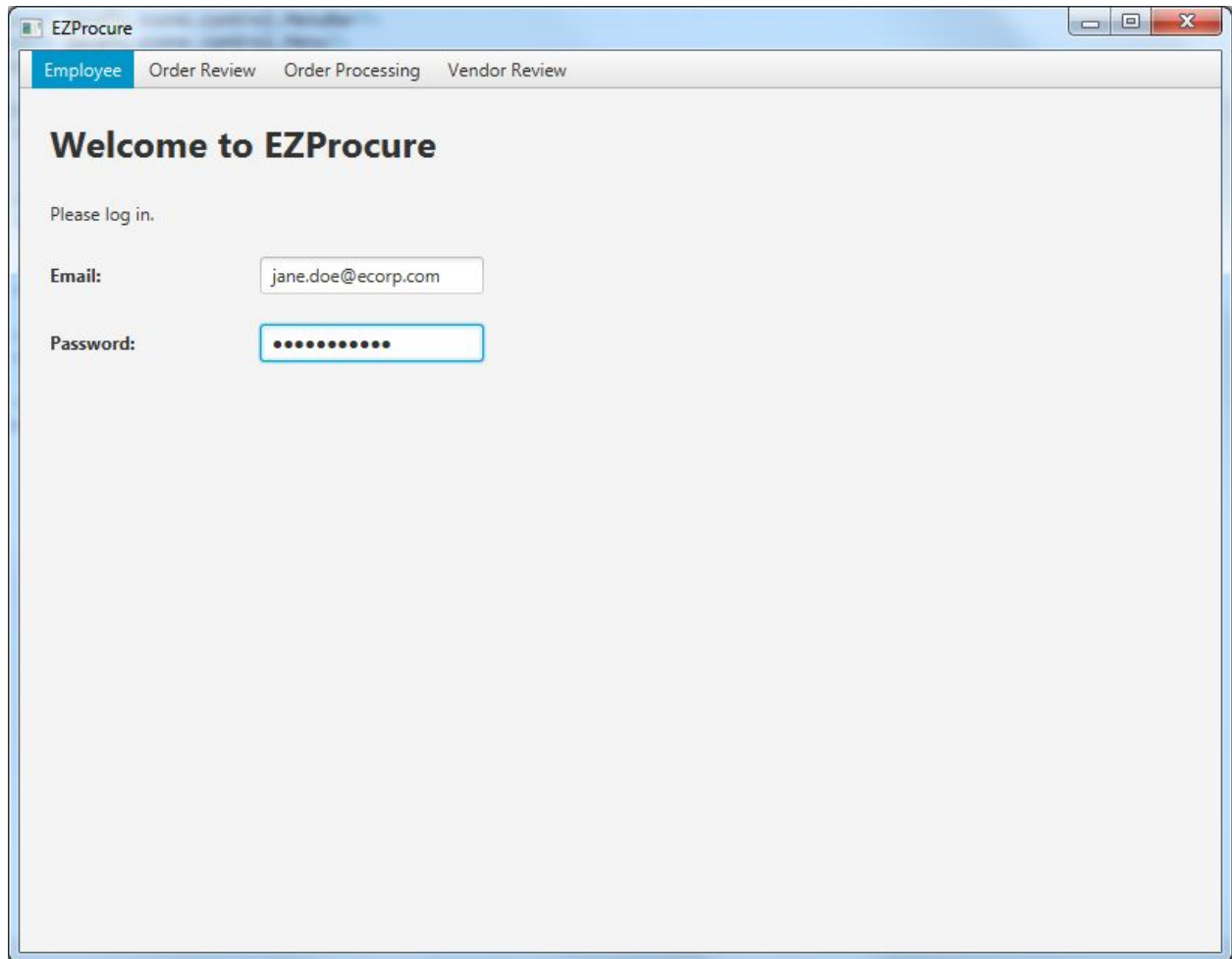
US-09: Execute Purchase



Screen Mockups:

The following section shows some concepts for how our application will look. The application will use a menu bar to allow users to navigate between screens. Each user will only see the menu items that she has access to based on her roles.

Welcome Screen and Menus



The image is a mockup of a web application window titled "EZProcure". The window has a standard Windows-style title bar with minimize, maximize, and close buttons. Below the title bar is a horizontal menu bar with four items: "Employee" (highlighted in blue), "Order Review", "Order Processing", and "Vendor Review". The main content area of the window has a light gray background. At the top of this area, the text "Welcome to EZProcure" is displayed in a bold, black font. Below this, the text "Please log in." is shown. There are two input fields: one for "Email:" containing the text "jane.doe@ecorp.com" and one for "Password:" containing ten black dots. The "Employee" menu item is currently selected.

EZProcure

Employee Order Review Order Processing Vendor Review

Welcome to EZProcure

Please log in.

Email: jane.doe@ecorp.com

Password:

Create Purchase Order Screen

EZProcure

Employee | Order Review | Order Processing | Vendor Review

Create Purchase Order

Item Category: Electronics

Item: Laptop

Item (if not in list):

Quantity: 1

Facility: Boulder

Office/Room Number: 302

Justification:

My current laptop is too old to run the latest version of our CAD software.

Save Submit

My Purchase Orders Listing Screen

EZProcure

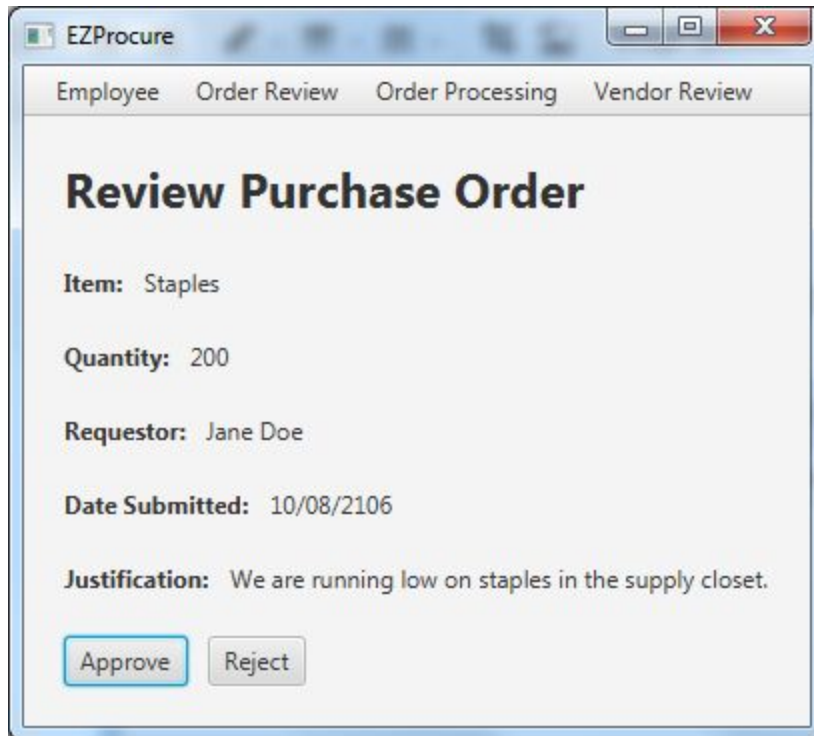
Employee | Order Review | Order Processing | Vendor Review

My Purchase Orders

Item	Qty	Status	Exp. Delivery Date	
Staples	200	Approved	10/20/2016	
Tablet	1	Shipped	10/23/2016	

[View Details](#)

Manager Purchase Order Review Screen



The image shows a screenshot of a web application window titled "EZProcure". The window has a standard Windows-style title bar with minimize, maximize, and close buttons. Below the title bar is a navigation menu with four tabs: "Employee", "Order Review", "Order Processing", and "Vendor Review". The "Order Review" tab is currently selected. The main content area of the window is titled "Review Purchase Order" in a large, bold font. Below this title, there are several fields displaying order details: "Item: Staples", "Quantity: 200", "Requestor: Jane Doe", and "Date Submitted: 10/08/2106". A "Justification" field contains the text "We are running low on staples in the supply closet." At the bottom of the form, there are two buttons: "Approve" and "Reject". The "Approve" button is highlighted with a blue border, indicating it is the active or default action.

EZProcure

Employee Order Review Order Processing Vendor Review

Review Purchase Order

Item: Staples

Quantity: 200

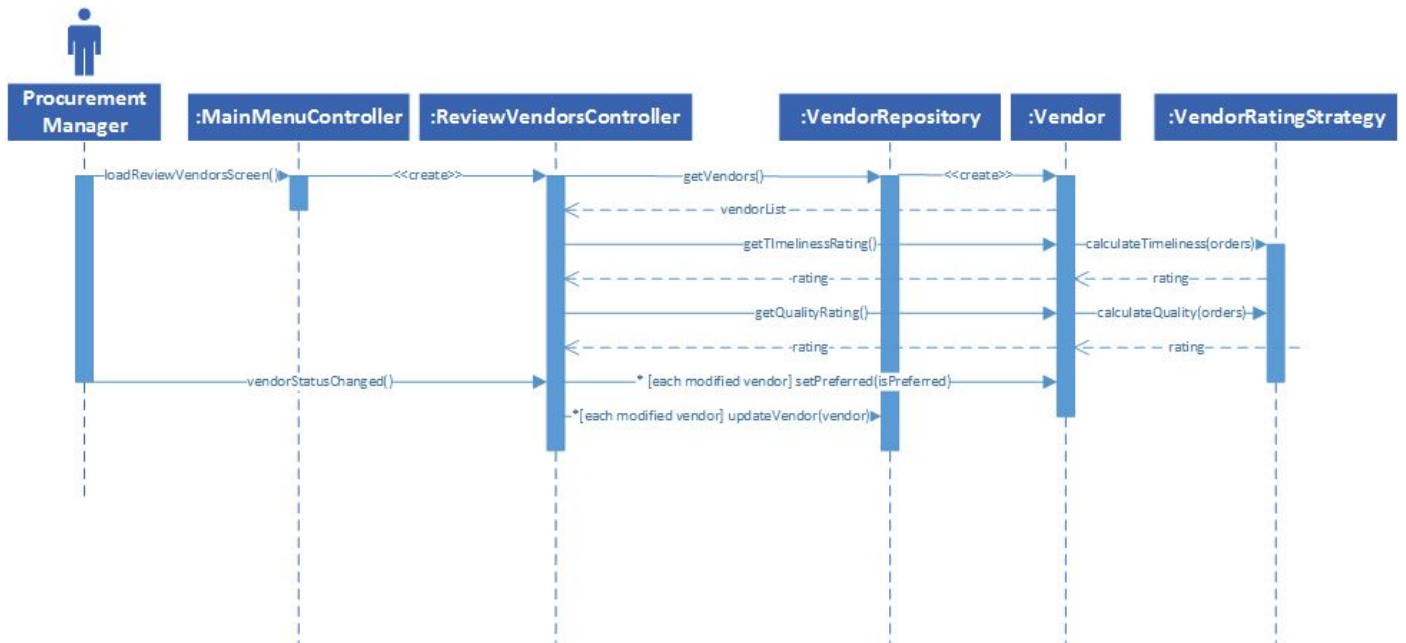
Requestor: Jane Doe

Date Submitted: 10/08/2106

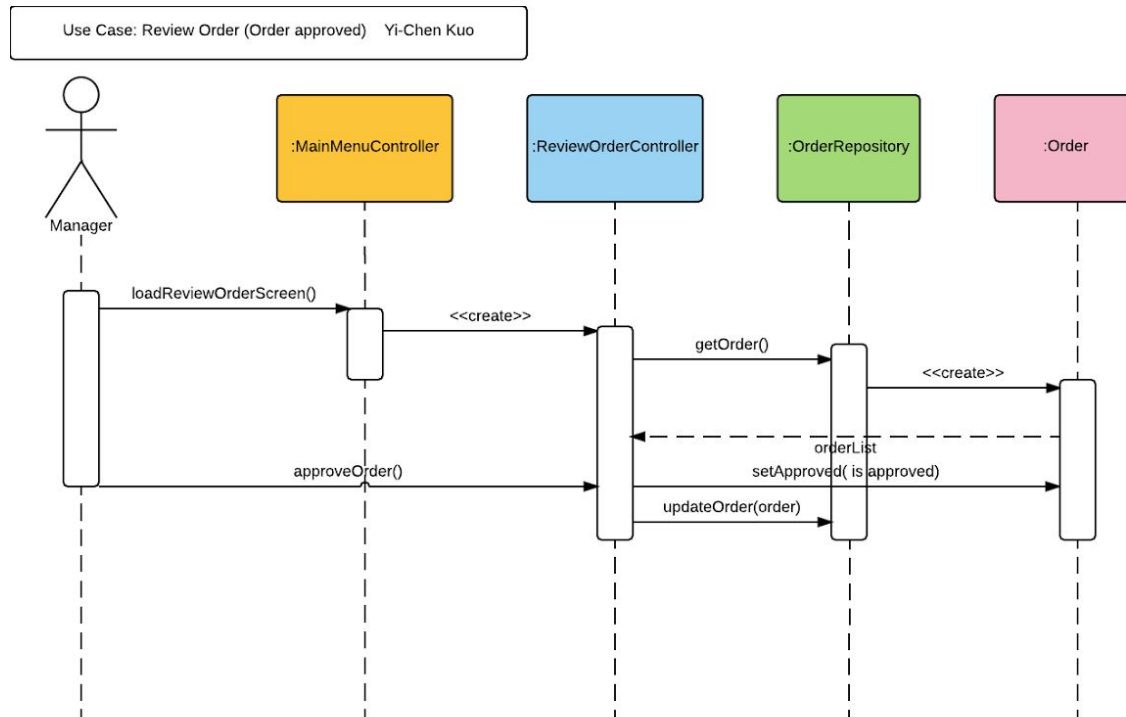
Justification: We are running low on staples in the supply closet.

User Interactions

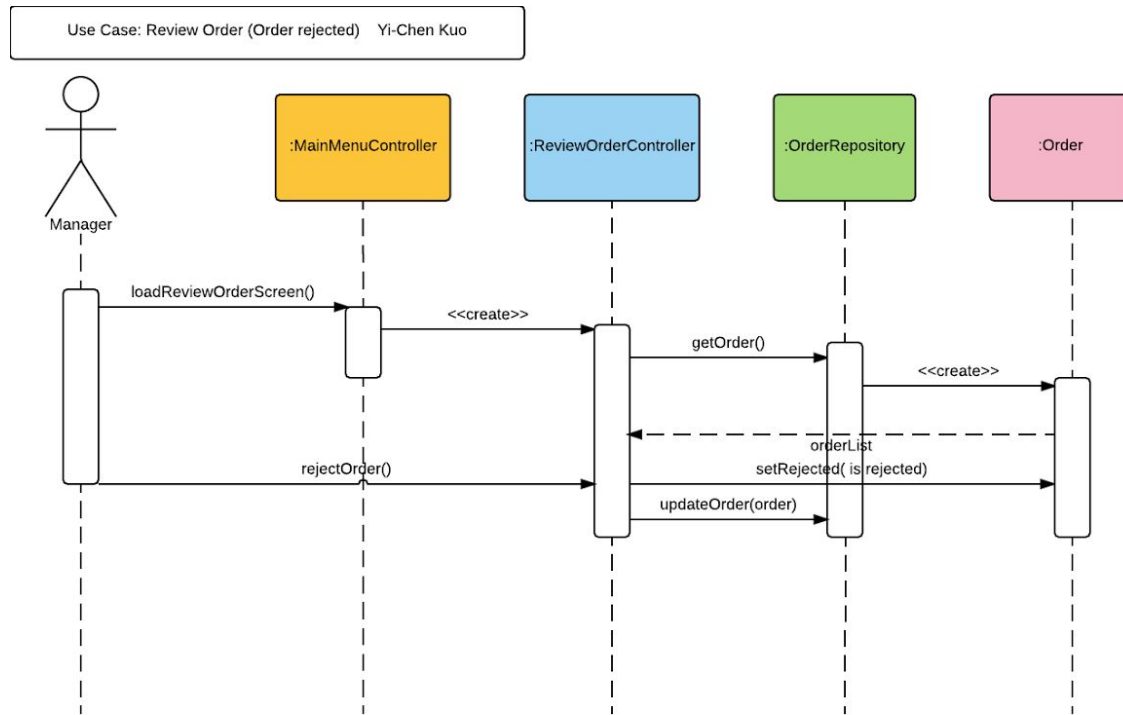
Use Case US-10: Review Vendors (Doug Falconieri)



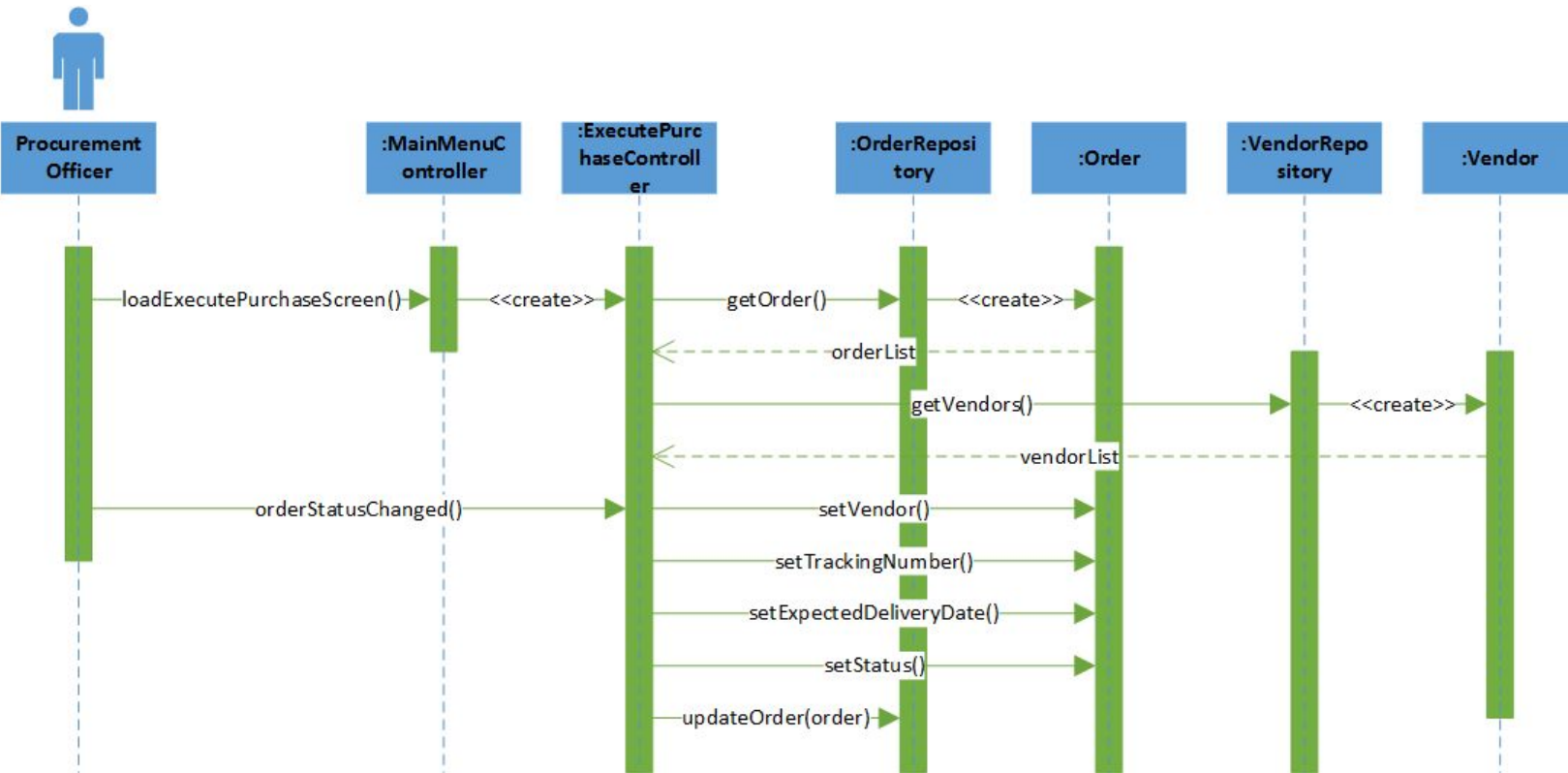
Use Case US-06: Review Order (Order approved) (Yi Chen Kuo)



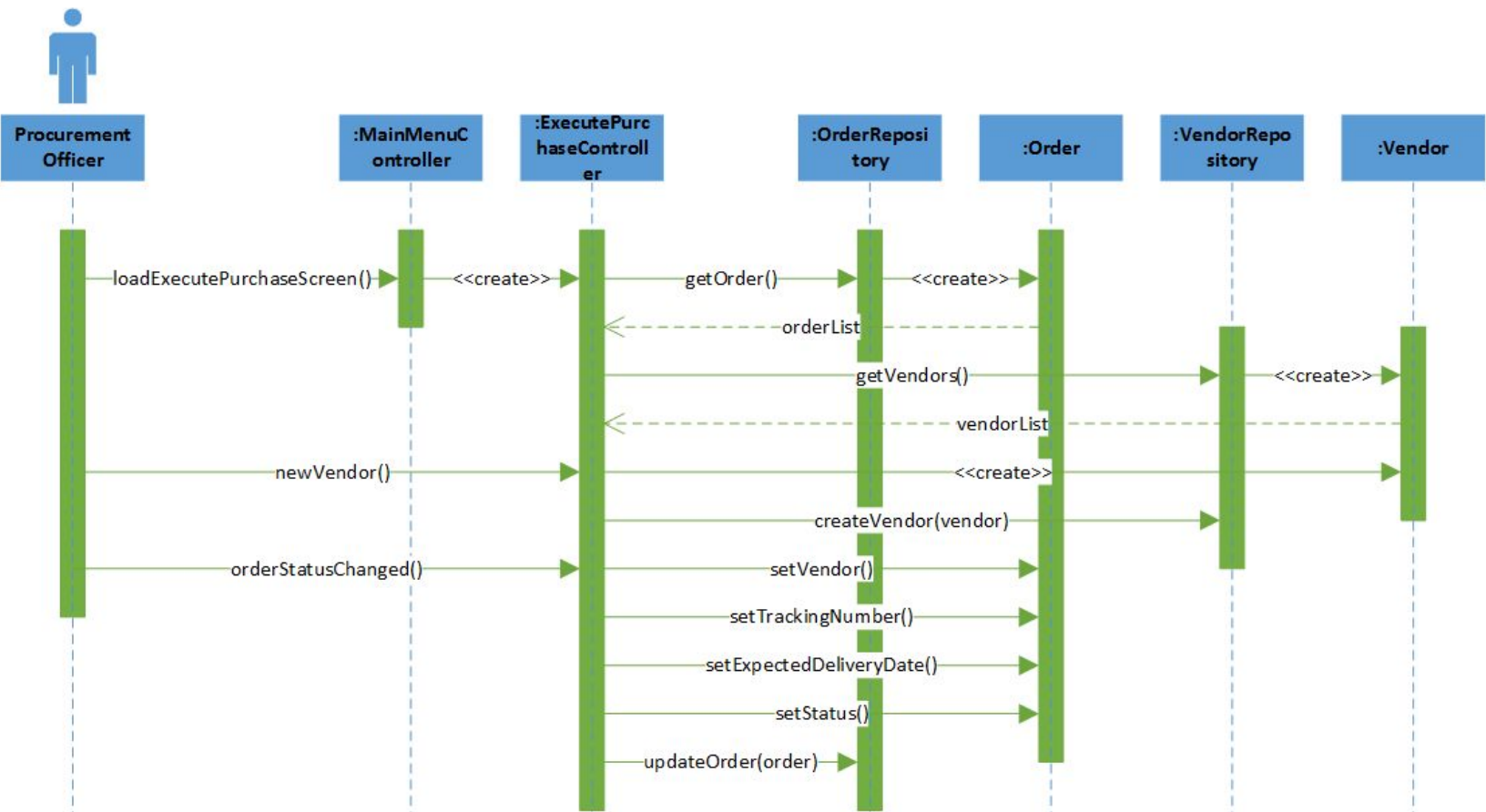
Use Case US-06: Review Order (Order rejected) (Yi Chen Kuo)



Use Case US-09: Execute Purchase (Choose Existing Vendor) (Walid Sharif)



Use Case US-09: Execute Purchase (Add New Vendor) (Walid Sharif)



Data Storage

We will be using a relational database such as MySQL to store the data. For example, we will store all vendors in a Vendors table and all orders in an Orders table. We will use the Hibernate object-relational mapping framework for all interactions between the database and the application. We will use the Facade design pattern to hide the implementation details of data storage from the user interface portion of the application.

Class Diagram

