Week 12 Workshop Solution:
Below is a partial solution to the Sample Exam (Workshop Case Study).

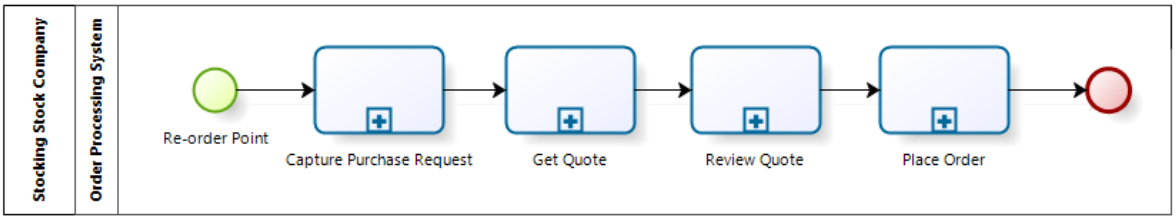
Note: Your final exam will begin with some short questions which will require a very short answer, in most instances it will require much shorter answer than you were required in your weekly assessable quizzes.

Followed by the short questions, you will be provided a small case study such as the one below for your workshops. Read this case study carefully and draw the various diagrams based on this case study.

Note: Answers have been provided below to the entire Stocking Stock Company, but the sample exam mainly asked questions about just one business process i.e. the "Submit Purchase Request" process only.

Step 2 – Level 1 Diagram

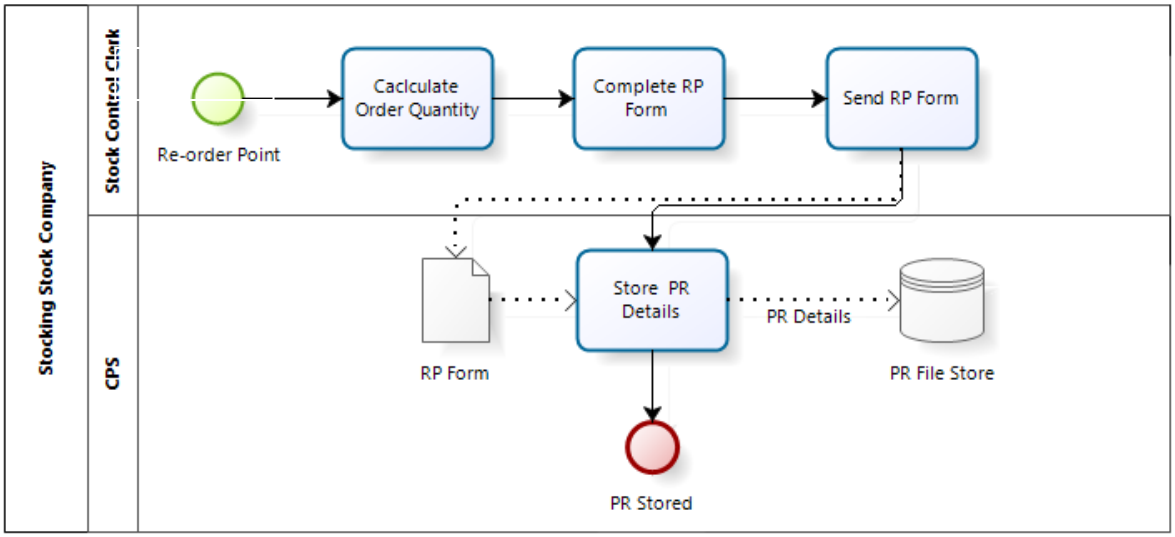
- Identify all the processes (main functionalities/features/work activities) within the System



Step 3 – Level 2 Diagrams

- Identify and model all sub-processes and tasks within each process identified at Level1
- For example, "01 Capture Purchase Request" process is detailed below
- The key is to identify and look for roles, departments, verbs or actions or step by step tasks in the process from start to end that are required to complete that process.

01 Capture/Submit Purchase Request (PR)



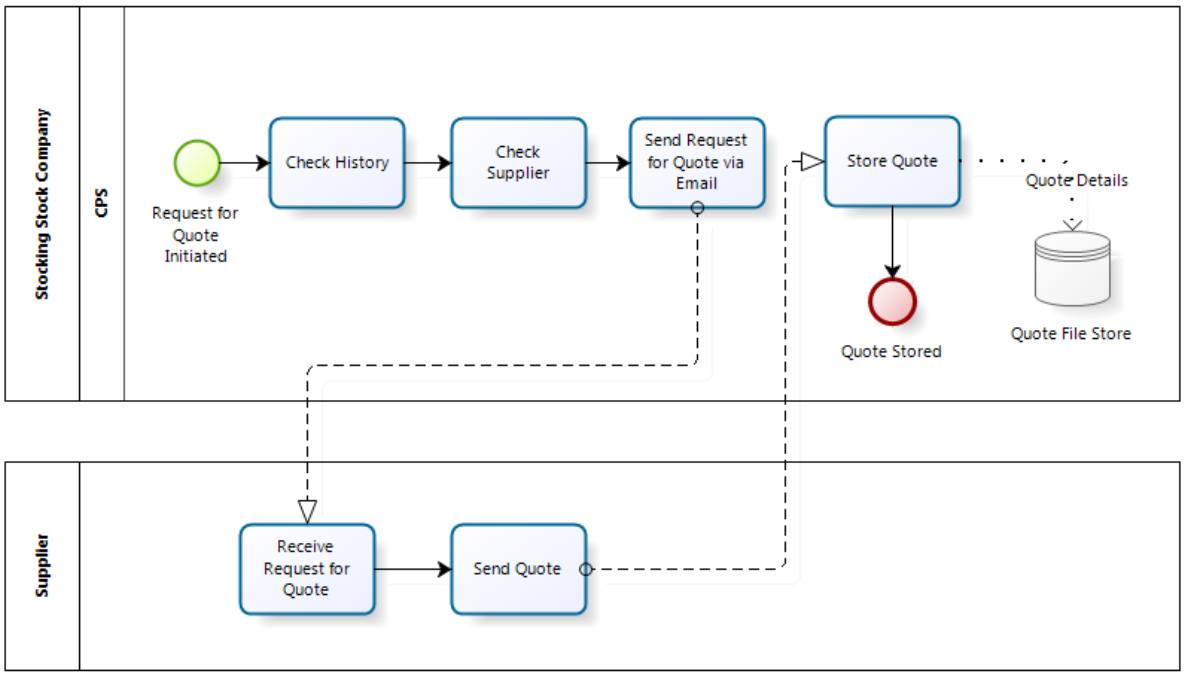
Process Assumption Examples:

- PR is submitted and stored by using a paper based PR form

Process Recommendations Examples:

- Each PR can be reviewed from completeness and correctness perspectives before it is actually stored in a PR file
- PR can be submitted via an online PR form, which will reduce the process time by approx. 10% (e.g. make an estimate)
- PR can be automatically reviewed or checked for any omissions or errors related to completeness and correctness
- PR can be automatically stored in a PR file

02 Get Quote (Wasn't asked in the sample exam)



Homework: Detail "03 Review Quote" and "04 Place Order" processes as per above examples.

Stock Control Clerk User Story 1

As a Stock Control Clerk, I want to submit a purchase request to Purchase Officer via the online system, so that I can communicate my request to purchase new items to the Purchase Officer.

Purchase Officer User Story 2 **(Wasn't asked in the sample exam)**

As a Purchase Officer, I want to send a quote request via the online system to three suppliers, so that I can know the price of the potential purchase order items.

User Stories and Use Cases

Stocking Stock Company Case Study

Stock Control Clerk User Story 1

As a Stock Control Clerk, I want to submit a purchase request to Purchase Officer via the online system, so that I can communicate my request to purchase new items to the Purchase Officer.

- Submit Purchase Request (Main Use Case)
    - Calculate New Quantity (Includes)
        - Check Sale History (Further Includes)
    - Notify Purchase Officer via email (Includes)
    - Print Purchase Request Receipt (Extends)?
    - Brainstorm alternative scenarios

Purchase Officer User Story 2 **(Wasn't asked in the sample exam)**

As a Purchase Officer, I want to send a quote request via the online system to three suppliers, so that I can know the price of the potential purchase order items.

- Send Quote Request (Main Use Case)
    - Select Suppliers (Includes)
        - Check Purchase History (Further Includes)
    - Print Quote Request (Extends)?
    - Brainstorm alternative scenarios

Scroll down for use case narrative for Submit Purchase Request.

Note, you must write the narratives for the remaining use cases.

You have to write a narrative for every use case that you have identified.

Use Case Narrative (Example Solution)

Use Case Name: Submit Purchase Request

Use Case ID	UC101: Submit Purchase Request
User Story	As a Stock Control Clerk, I want to submit a purchase request to Purchase Officer via the online purchase system, so that I can communicate my request to purchase new items to the Purchase Officer.
Goal	Submit purchase request online for new stock items
Priority	H
Actors	Primary Actor – Stock Control Clerk Secondary Actor – Purchase Officer, Sales System, Printing System, Email System
Pre-conditions	The Stock Control Clerk has access to the Online Purchase System.
Post-conditions	The Stock Control Clerk has successfully submitted purchase request via the Online Purchase System.
Trigger	The Stock Control Clerk launches the Online Purchase System via their internet browser.
Main Flow	1. The online purchase (OP) system displays the landing page and displays the button to initiate a purchase request. 2. The Stock Control Clerk clicks on the button to initiate the purchase request process. 3. The OP system displays the available list of items with an option to calculate new quantity to be ordered. 4. The Stock Control Clerk selects the desired item(s) and presses the "Calculate New Quantity" option. Please see **"UC102: Calculate New Quantity".** 5. The OP system displays the desired item(s) with its quantity on a confirmation screen. The OP system allows the option to proceed with order, or add more items. **6.** The Stock Control Clerk presses the button to proceed with the order. If "Add more items" is selected, then refer to **Alternate Flow 1: "Add more items".** 7. The Stock Control Clerk completes the online purchase request form with additional contact details and presses the submit button. If the form is not fully completed, then refer to **Alternate Flow 2: "Incomplete Form"**.

	8. The OP system stores the purchase request details and notifies the Purchase Officer about the new request via the "Email System". Please see **"UC104: Notify Purchase Officer".** 9. The Stock Control Clerk chooses to "Print Purchase Request Receipt". Please see **"UC105: Print Purchase Request Receipt"** for receipt printing process details. 10. The use case ends.
Exceptions	**Exception 1.** Step 7: System is unavailable when Stock Control Clerk attempts to submit purchase request form. OP system should save the session and restart. **Exception 2.** Steps 1-10: Stock Control Clerk closes the browser window anytime, and then the OP system blocks the transaction at that point in time and log the activity. **Exception 3.** Step 10: Printer does not respond.
Includes/Extends/Inherits	Includes "**UC102: Calculate New Quantity"** Includes **"UC104: Notify Purchase Officer"** Extended by **"UC105: Print Purchase Request Receipt"**
Supporting Information	Purchase request information needs to be stored on a central server.
Non-functional Requirements	Performance: All pages must load and display within two (2) seconds of a button click at least 97% of the time.

Alternate Flow 1	"Add more items"
Trigger	Stock Control Clerk presses the button to "Add more items" to the purchase request form.
Step	1. The OP system displays a landing page containing the previously-selected item(s) and quantity, plus listing all other available items to be added. 2. Re-join Step 4 of **Main Flow**. .
Post conditions	The OP system successfully displays a landing page containing items already selected, and new items to be added.
Exceptions	**Exception 1.** Steps 1-2: Stock Control Clerk closes the browser window anytime, and then the OP system blocks the transaction at that point in time and logs the activity. **Exception 2.** Step 1: The OP system displays an error message "There are no more additional items to be added", and exits the alternate flow.

Alternate Flow 2	"Incomplete Form"
Trigger	All the required fields on the submitted purchase request form are not

	completed.
Step	1. The OP system takes the Stock Control Clerk to the incomplete online purchase request form page. 2. The OP system displays the error message "Please complete the fields marked in red colour" on the top of the form page. 3. Re-join at Step 7 in the Main Flow. .
Post-conditions	The OP system successfully displays the error message.
Exceptions	**Exception 1.** Steps1-3: Stock Control Clerk closes the browser window anytime, and then the OP system blocks the transaction at that point in time and logs the activity.

Use Case Name: Calculate New Quantity

Use Case ID	UC102: Calculate New Quantity
User Story	As a Stock Control Clerk, I want to calculate the new quantity of an item so that I can complete the purchase request form.
Goal	Calculate new quantity of item to be ordered.
Priority	H
Actors	Primary Actor – Stock Control Clerk Secondary Actor – Sales System
Pre-conditions	The Stock Control Clerk has access to the Online Purchase System and is already logged in.
Post-conditions	The Stock Control Clerk has successfully calculated the new quantity of an item to be ordered based on past sales.
Trigger	The Stock Control Clerk selects the desired item and presses the "Calculate New Quantity" option.
Main Flow	11. The online purchase (OP) system displays the landing page for the selected item and a button to initiate checking the item's past sales. 12. The Stock Control Clerk clicks on the button to check the past sales of the item via the "Sales System". See **"UC103: Check Sales History".** 13. The OP system displays two options: - "Use average sales figure as new order quantity", OR - "Enter your own quantity". 14. The Stock Control Clerk clicks on the button to "Use average sales figure as new order quantity". **Alternate Flow 1: "Enter your own quantity".** 15. The OP system displays a confirmation screen with the new order quantity for the item.

	16. The Stock Control Clerk presses the confirmation button. 17. The OP system displays a success screen and adds the new ordered quantity for the selected item to the purchase request form. 18. Re-join Step 6 of **"UC101: Submit Purchase Request"**
Exceptions	**Exception 1.** Steps 4-8: Stock Control Clerk closes the browser window anytime, and then the OP system blocks the transaction at that point in time and log the activity.
Includes/Extends/Inherits	Includes **"UC103: Check Sales History".**
Supporting Information	See "Data Validation" document for requirements on data fields.
Non-functional Requirements	Performance: All pages must load and display within two (2) seconds of a button click at least 97% of the time.

Alternate Flow 1	"Enter your own quantity"
Trigger	Stock Control Clerk clicks on the button to "Enter your own quantity".
Step	3. The OP system displays the "Enter your own quantity" landing page. 4. The Stock Control Clerk enters their custom quantity of item to be ordered. **Alternate Flow 2: "Invalid Amount Entered".** 5. Re-join step 5 of the **Main Flow.**
Post conditions	The OP system successfully accepts the entered quantity of new item to be ordered.
Exceptions	**Exception 1.** Steps 1-2: Stock Control Clerk closes the browser window anytime, and then the OP system blocks the transaction at that point in time and logs the activity.

Alternate Flow 2	"Invalid Amount Entered"
Trigger	An invalid amount is entered into the custom quantity field.
Step	1. The OP system displays the message "Error: Invalid amount entered. Please enter numerical digits only". 2. The Stock Control Clerk presses the proceed button. 3. Re-join Step 1 of **Alternate Flow 1: "Enter your own quantity".**
Post-conditions	The OP system successfully displays the error message.
Exceptions	

Use Case Name: Check Sales History

Use Case ID	UC103: Check Sales History
User Story	As a Stock Control Clerk, I want to check the past sales history of a product over the last 12 months so that I can decide on a new quantity to be ordered.
Goal	Check Sales History of a selected product.
Priority	H
Actors	Primary Actor – Stock Control Clerk Secondary Actor – Sales System
Pre-conditions	The Stock Control Clerk has access to the Online Purchase System and is already logged in.
Post-conditions	The Stock Control Clerk has successfully viewed the past sales history for a selected product.
Trigger	The Stock Control Clerk selects the "Check Sales History" button on a selected product.
Main Flow	19. The Sales system displays the landing page for the selected product's sales history. The system also displays options to view sales over the last 12 months, OR over all time. 20. The Stock Control Clerk clicks on the button to "View Sales over the last 12 months". Alternate Flow 1: **"View Sales over All Time**". 21. The Sales system displays the product's monthly sales figures and average sales over 12 months, and an option to proceed when ready. 22. The Stock Control Clerk presses the proceed button. 23. Re-join Step 3 of **"UC102: Calculate New Quantity".**
Exceptions	**Exception 1.** Step 3: Sales system displays error message regarding no available sales data for that product, and exits the use case.
Includes/Extends/Inherits	
Supporting Information	Data fields to be displayed in Step 3: - Monthly sales total - Yearly sales total - Average monthly total
Non-functional Requirements	Performance: Sales system must retrieve and display product's past sales within maximum of two (2) seconds after a button click at least 97% of time.

Alternate Flow 1	"View Sales over All Time"
Trigger	Stock Control Clerk clicks on the button to "View Sales over All Time".
Step	6. The Sales system displays the full sales history for the selected product, including all available yearly sales. 7. The Stock Control Clerk selects the option to proceed 8. Re-join step 5 of the Main Flow.
Post-conditions	The Sales system successfully displays the full sales history for the selected product.
Exceptions	**Exception 1.** Step 3: Sales system displays error message regarding no available sales data for that product, and exits the use case.

Use Case Name: Notify Purchase Officer

Use Case ID	UC104: Notify Purchase Officer
User Story	As a Purchase Officer, I want to be notified when a new purchase request form is submitted by the Stock Control Clerk, so that I can review the form.
Goal	Notify Purchase Officer when a new purchase request form is available for review.
Priority	H
Actors	Primary Actor – Purchase Officer Secondary Actor – Stock Control Clerk
Pre-conditions	The Purchase Officer has access to the email system and is logged in.
Post-conditions	The Purchase Officer has been notified of a new Purchase Request form available for review.
Trigger	The Stock Control Clerk completes the online purchase request form and presses the 'submit' button.
Main Flow	1. The online purchasing (OP) system stores the purchase request details in a 'Purchase Request File'. 2. The OP system sends an email to the Purchase Officer notifying them of a purchase request that is now available. The email also includes a direct link to the file. 3. The Purchase Officer views the email and follows the link to review the new purchase request file.
Exceptions	**Exception 1.** Step 2: Email system is down. OP system should log the event and re-try sending the email notification within 2hrs of initial failure. **Exception 2.** Step 3: Link to Purchase Request File contained in the email is invalid.

Includes/Extends/Inherits	
Supporting Information	
Non-functional Requirements	Performance: Email system must send notification to Purchase Officer within five (5) minutes from when the details are stored in the Purchase Request File.

Use Case Name: Print Purchase Request Receipt

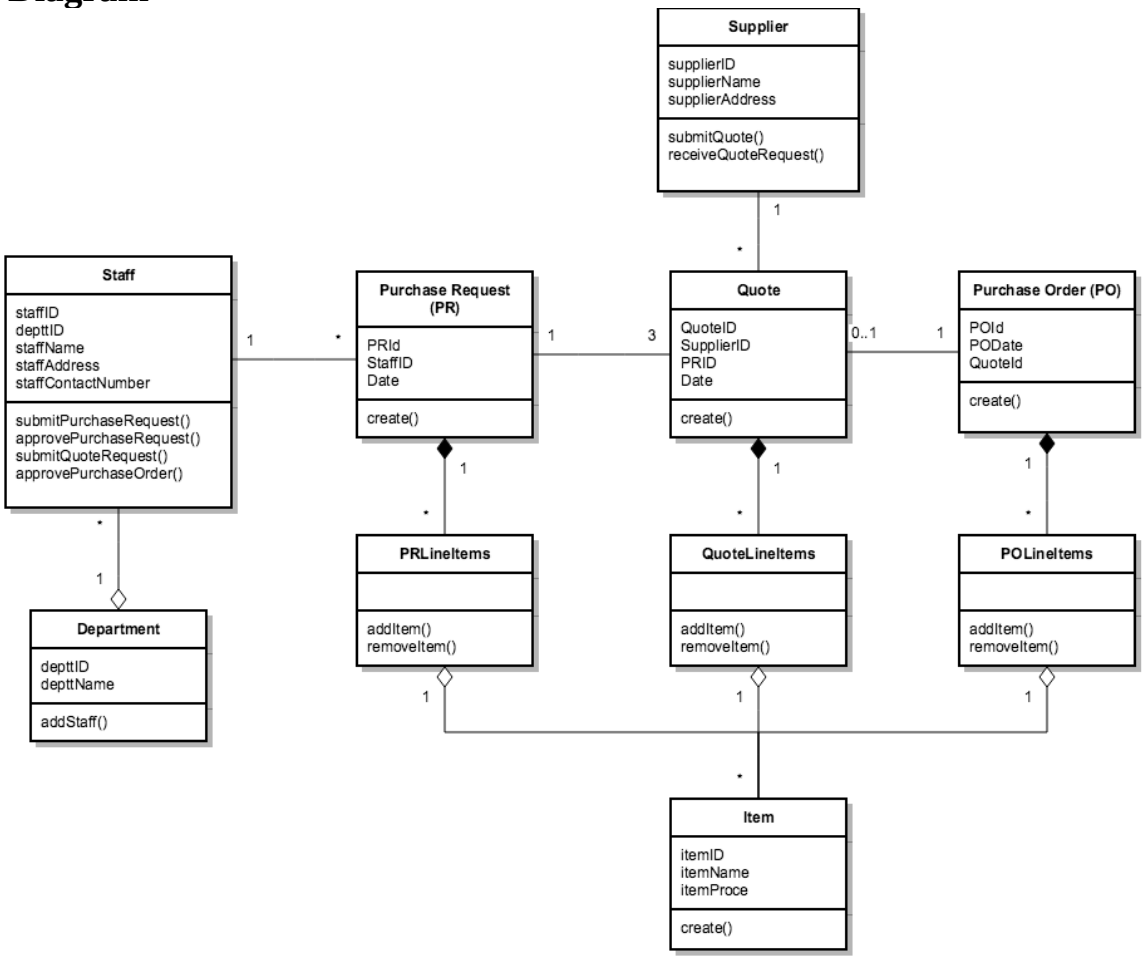
Use Case ID	UC105: Print Purchase Request Receipt
User Story	As a Stock Control Officer, I want to print a Purchase Request receipt, so that I have a record of my submission.
Goal	Print receipt for Purchase Request.
Priority	H
Actors	Primary Actor – Stock Control Clerk Secondary Actor – Printing system
Pre-conditions	The Stock Control Clerk has access to the Online Purchase System.
Post-conditions	The receipt for Purchase Request has been printed successfully.
Trigger	The Stock Control Clerk selects the "Print Purchase Request Receipt" button.
Main Flow	4. The online purchasing (OP) system displays a Print Preview of the receipt. The receipt contains the "Receipt Data" defined in the Supporting Information. 5. The Stock Control Clerk chooses to "Proceed" with the print preview. If "Cancel" is selected, then refer to **Alternate Flow 1: "Cancel printing".** 6. The OP system displays the standard operating system print dialog containing options for number of copies, paper type etc. 7. The Stock Control Clerk chooses the relevant options and presses the "Start Printing" button. If "Cancel" is selected, then refer to **Alternate Flow 1: "Cancel printing".** 8. The OP system prints the purchase request receipt(s) successfully.
Exceptions	**Exception 1.** Step 5: Printer is unresponsive. OP system to retry printing within two (2) minutes of last attempt, and exit after five (5) failed attempts.

	Exception 2. Steps 1-5: Stock Control Clerk closes the browser window anytime. OP system to save a copy of the receipt in a "Receipt History" file, and save the session and restart.
Includes/Extends/Inherits	Extends **"UC101: Submit Purchase Request".**
Supporting Information	Data contained within the receipt will include: - Time of purchase request submission - Summary of items ordered and respective quantities - Name of Stock Control Clerk who submitted the order.
Non-functional Requirements	Performance: Printer to add receipt to the printer queue within one (1) minute of "Start Printing" button being clicked.

Alternate Flow 1	"Cancel Printing"
Trigger	Stock Control Clerk presses the button to "Cancel" the printing of the receipt.
Step	9. The OP system displays a confirmation message: "Are you sure you want to cancel printing the purchase request receipt? Yes/No". 10. If Stock Control Clerk selects "Yes", then exit the use case. If Stock Control Clerk selects "No", then re-join at Step 3. .
Post-conditions	The OP system successfully displays a confirmation message to the Stock Control Clerk.
Exceptions	

Homework: Same as above, using the use case narrative template, write the narrative for the "Send Quote Request" use case and its included and extended use cases.

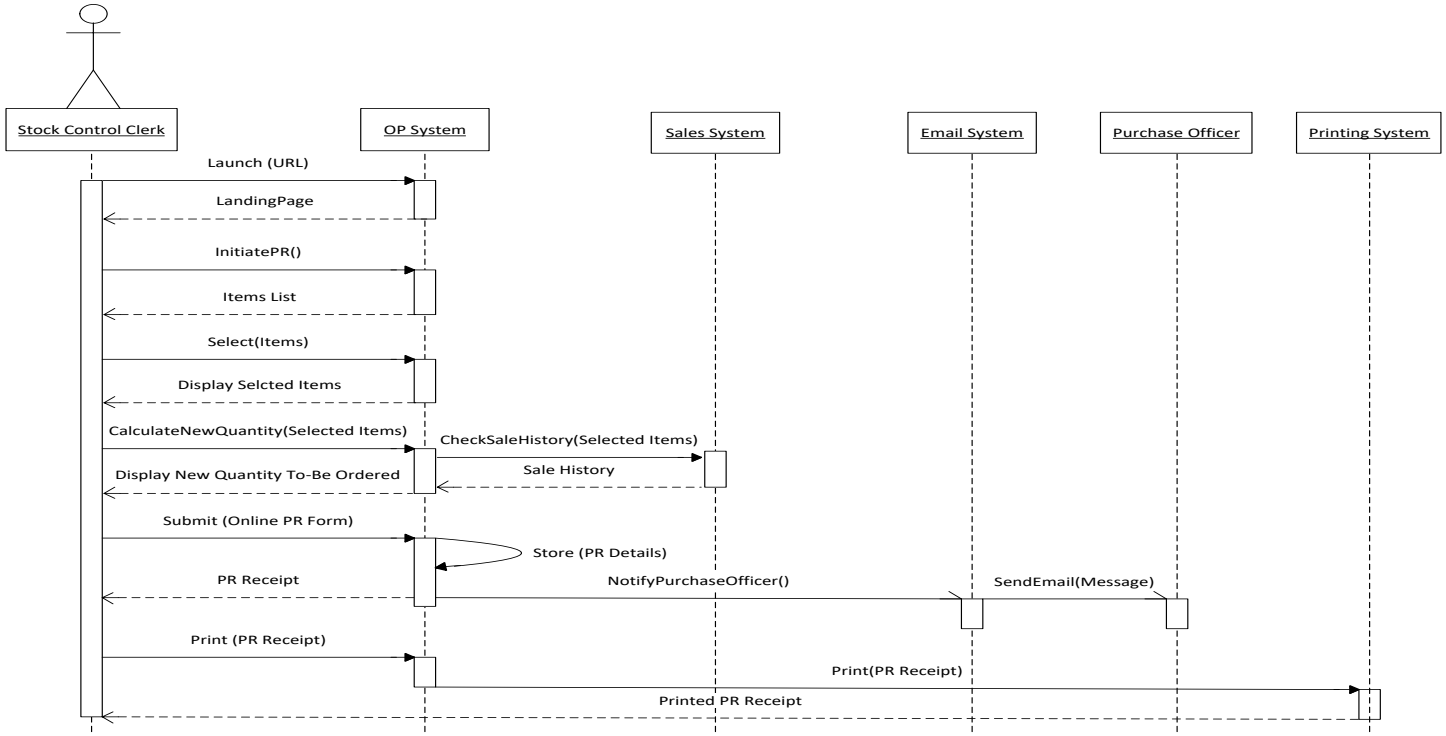
Class Diagram



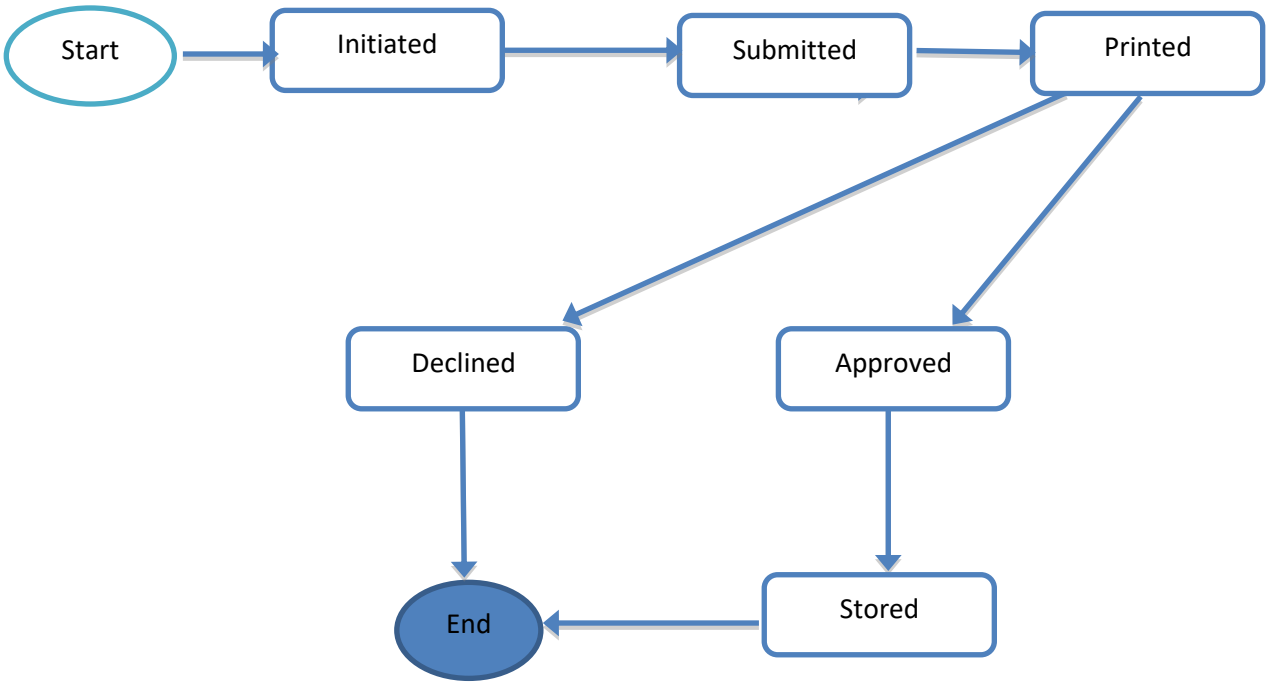
Note: Attributes and operations for some classes are missing. You do need to provide them for each class (do it as homework).

Assumption: This class diagram is only using the filled black diamond symbol for the list or catalogue types of relationships. Other strong relations (e.g. such as relationship between PurchaseRequest and PRLineItem classes) in the class diagram can also be modelled using the filled black diamond symbol.

Submit Purchase Request –Sequence Diagram



State Transition Diagram for "PurchaseRequest" object



Question: What's missing?

Answer: Events that trigger these states to change are missing.

Home work: Please add these events.