

# E-Catalog Software Requirements Specifications

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# 1. Introduction

## 1.1 Purpose

This SRS describes the functional and nonfunctional requirements for software release 1.0 of e-catalog, a web-based database system. This document is intended to be used by the members of the project team who will implement and verify the correct functioning of the system. Unless otherwise noted, all requirements specified here are committed for release 1.0.

## 1.2 Document Conventions

In this SRS file, font Arial is used. Size 20 is used for titles. Size 16 is used for subtitles. Size 11 is used for the body.

## 1.3 Project Scope

E-catalog will permit users to catalog items that are to be filed or stored away. This is an Internet-based browser application that manages the process of filing and retrieving documents. Users can add an unlimited amount of nested containers and use them to store files. E-catalog stores the name, description, categories, location and other attributes of the documents or objects. Then, e-catalog shall be able to search and locate them based on the inputted data at any time. The traditional document organization methods involve physically sorting documents by a predetermined criterion. E-catalog is intended to replace them by allowing the organization to be done digitally, thus making the physical filing less error-prone. Only the physical location of the document needs to be recorded correctly in the e-catalog so that the users can retrieve it in the future.

## 1.4 References

1. Beatty, Joy. Process Impact Intranet Development Standard, Version 1.3,  
[www.processimpact.com/corporate/standards/PI Intranet Development Standard.pdf](http://www.processimpact.com/corporate/standards/PI%20Intranet%20Development%20Standard.pdf)
2. Rath, Andrew. Process Impact Internet Application User Interface Standard, Version 2.0,  
[www.processimpact.com/corporate/standards/PI Internet UI Standard.pdf](http://www.processimpact.com/corporate/standards/PI%20Internet%20UI%20Standard.pdf)

## 2. Overall Description

### 2.1 Product Perspective

The e-catalog Database System is a new software system that helps users organize their physical files and documents. The current design is not meant to interact with any external entities in any predictable manner. The system is expected to be connecting with the external storage service ultimately but does not possess a definite system interface yet. The context diagram in Figure 1 illustrates external entities for release 1.0.

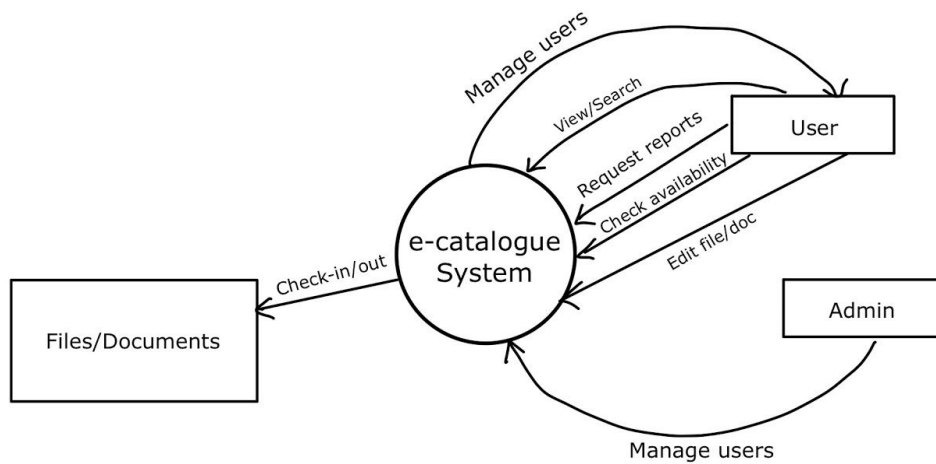


Figure 1: Context diagram

### 2.2 User Classes and Characteristics

There are two user classes, User and Admin. User can operate on documents and containers that are stored in e-catalog system. They may also make requests to check-in/out files or generate reports through the system. Admin is a derived class from User with higher privileges. In addition, Admin are allowed to manage User.

## 2.3 Operating Environment

OE-1: The e-catalog shall operate correctly with the following web browsers: Windows Internet Explorer versions 7, 8, 9, 10 and 11; Firefox versions 12 through 66; Google Chrome (all versions); and Apple Safari versions 4.0 through 8.0.

OE-2: The e-catalog shall permit user access by Android, iOS, and Windows smartphones and tablets.

## 2.4 Design and Implementation Constraints

CO-1: The system's design, code, and maintenance documentation shall conform to the *Process Impact Internet Development Standard, Version 1.3*[1]

CO-2: The system shall use the current corporate standard Oracle database engine.

CO-3: All HTML code shall conform to the HTML 5.0 standard.

## 2.5 Assumptions and Dependencies

AS-1: The physical storage run 24/7 and it reflects all changes made in the system correctly with latency smaller than 5 minutes.

AS-2: The operation of the e-catalog depends on locations and status inputted by the user for each item in the system are accurate.

### 3. Use Cases

#### Use Case Descriptions

<b>Name:</b> Sign Up	<b>Priority:</b> High	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User submit information required for sign-up <b>Overview:</b> This use case details the steps taken by the actor to sign up for a new account <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1. Selects to sign-up		
	2.return a sign-up form	
3. Submit information required for sign-up		
	4.Validate email with an external database	
		5. Confirm email has not been registered before. New account created
	6.return success notification	
Exception: invalid email Step 5-6		
		5.No new account created
	6.return error notification	

<b>Name:</b> Log In	<b>Priority:</b> High	<b>ID:</b> UCX
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<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User selects login button <b>Overview:</b> This use case details the steps taken by the actor to log in <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1. Selects to login		
	2.Prompts User with login page	
3.Enter login information		
	4.Validates login information with the database	
		5.confirms user exists and password matches
	6.Presents user with Registered user view	
Exception: bad password Step 5-6		
		5.username and password mismatches
	6.return error notification	
Alternative: forget password Step 7-12		
7. Request to reset password		
		8. Fetch the registered email address
	9. Send an email to the registered email address with a password reset link	
10. Click the link and enter		



the new password		
	11. Validates login information with the database	
		12. Update the password

<b>Name:</b> Reset Password	<b>Priority:</b> High	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User selects “forget password” button <b>Overview:</b> This use case details the steps taken by the actor to reset password <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1.selects to forget password		
	2.prompts user to enter the email address used to register the account	
3. Enters email address and selects next		
	4. Check if user entered a valid email, sends a password reset link to user’s email	
5. Enter new passwords and selects confirm		
	6. New password created	

<b>Name:</b> Log Out	<b>Priority:</b> High	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog		

<b>Actors:</b> user, System, External Database <b>Event:</b> User selects logout button <b>Overview:</b> This use case details the steps taken by the actor to log out <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1.selects to log out		
	2.Log out, presents user with unregistered user view	

<b>Name:</b> Add a Label	<b>Priority:</b> Medium	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User is adding a label to an object <b>Overview:</b> This use case details the steps taken by the actor to add a label <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External Database
1. Submits intention to add new label/keyword to an object		
	2. Checks for the object	
		3. The object exists
	4. Checks for label	
		5. Label does not exist
	6. Adds label	
		7. Label is added to the item.
Exception 1: The object does not exist		

		3. Object does not exist
	4. Return an error message to user	

<b>Name:</b> Add a Label	<b>Priority:</b> Medium	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User is adding a label to an object <b>Overview:</b> This use case details the steps taken by the actor to add a label <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External Database
1. Submits intention to add new label/keyword to an object		
	2. Checks for the object	
		3. The object exists
	4. Checks for label	
		5. Label does not exist
	6. Adds label	
		7. Label is added to the item.
Exception 1: The object does not exist		
		3. Object does not exist
	4. Return an error message to user	

<b>Name:</b> Modify/Delete a label/keyword	<b>Priority:</b> Medium	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database		

<b>Event:</b> User submits the info required for modifying/deleting a label/keyword <b>Overview:</b> This use case details the steps taken by the actor to modify/delete a label/keyword <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External Database
1. Submits intention to modify/delete a label/keyword of an object		
	2. Checks for the object	
		3. The object exists
	3. Checks for label	
		4. Label exists
	5. Notifies user that label exists and prompts user to modify/delete	
6. Conducts modifications/deletion.		
	7. Modifies/deletes label	
		8. Label is modified/deleted.
Exception 1: The object does not exist		
		3. Object does not exist
	4. Return an error message to the user	

<b>Name:</b> Add a container	<b>Priority:</b> High	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User adding a container <b>Overview:</b> This use case details the steps taken by the actor to add a container <b>References:</b>		

<b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1. Submits intention to add a container		
	2. Checks for container	
		3. The container does not exist
	4. Adds container	
		7. Container is added.

<b>Name:</b> Edit a container	<b>Priority:</b> High	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User editing a container <b>Overview:</b> This use case details the steps taken by the actor to edit a container <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1. Submits intention to modify a container		
	2. Checks for container	
		3. Container exists
	4. Notifies the user that the container exists and prompts user to modify	
5. Conducts modifications.		
	6. Modifies the container	
		7. The container is modified.

<b>Name:</b> Remove a container	<b>Priority:</b> Medium	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User removing a container <b>Overview:</b> This use case details the steps taken by the actor to delete a container <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1. Submits intention to delete a label/keyword		
	2. Checks for container	
		3. The container exists and it is empty
	4. Notifies the user that container exists and it's empty. Prompts user to delete it	
5. Conducts deletion.		
	6. Deletes the container	
		7. The container is deleted.
Alternative 1: The container exists and it has objects in it		
		3. The container exists and it has objects in it.
	4. Notifies the user that the container has objects in it. Prompts the user to move the objects or delete the objects in it.	
5. Conducts deleting the container while moving/deleting the objects		

	6. Deletes the container and move/delete the objects	
		7. The container is deleted. The objects are moved/deleted.

<b>Name:</b> Add an item	<b>Priority:</b> High	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User adding an item <b>Overview:</b> This use case details the steps taken by the actor to add an item <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1. Submits intention to add an item		
	2. Checks item	
		3. The item does not exist
	4. Adds item	
		7. Item is added.
Exception 1: The item is already in the database		
		3. The item is already in the database
	4. Return an error message to user	

<b>Name:</b> Edit an item	<b>Priority:</b> High	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User editing an item		

<b>Overview:</b> This use case details the steps taken by the actor in editing an item <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1. Submits intention to edit an item		
	2. Checks for item	
		3. Item exists
	4. Notifies the user that the item exists and prompts user to modify	
5. Conducts modifications.		
	6. Modifies the item	
		7. The item is modified.

<b>Name:</b> Remove an item	<b>Priority:</b> High	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User removing an item <b>Overview:</b> This use case details the steps taken by the actor to remove an item <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1. Submits intention to delete an item		
	2. Checks for item	
		3. The item exists
	4. Notifies the user that container exists. Prompts	



	user to delete it	
5. Conducts deletion.		
	6. Deletes the item	
		7. The item is deleted.
Alternative 1: The item does not exist		
		3. The item does not exist
	4. Return an error message to user	

<b>Name:</b> Check-In an item	<b>Priority:</b> Medium	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User selects to check in <b>Overview:</b> This use case details the steps taken by the actor to check in an item <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1.selects to check in		
	2.prompt user to select the item to check in	
3.select an item to check in		
	3.update item status to available, update activity log, return success message	

<b>Name:</b> Checkout an item	<b>Priority:</b> Medium	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User selects to check out an item <b>Overview:</b> This use case details the steps taken by the actor to check out an item		

<b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1.selects to check out an item		
	2. update item status to checked-out, update activity log, return success message	
Exception: item is unavailable Step 1		
	2.return error notification	

<b>Name:</b> View item information	<b>Priority:</b> High	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User selects to view item information <b>Overview:</b> This use case details the steps taken by the actor to view item information <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1.selects an item to view more information		
	2. Check if the user has the privilege to view the information	
	3. Presents item attributes to user	
Exception: User does not have the privilege to view the information		
	4. Return error message	

<b>Name:</b> Search by label	<b>Priority:</b> High	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User selects to search by label <b>Overview:</b> This use case details the steps taken by the actor to search by label <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1.selects one or more labels		
	2. Presents item filtered by selected labels	

<b>Name:</b> Search by keywords	<b>Priority:</b> High	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User selects to search by keywords <b>Overview:</b> This use case details the steps taken by the actor to search by keywords <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1. Types keywords in search bar and select search button		
	2. Presents item filtered by entered keywords	

<b>Name:</b> Sort search results	<b>Priority:</b> High	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database		

<b>Event:</b> User selects to sort search results <b>Overview:</b> This use case details the steps taken by the actor to sort search results <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1. Select sort icon		
	2. Presents sort options in a list	
3. Select a sort by option		
	4. Presents sorted search results	

<b>Name:</b> Associate label to an item	<b>Priority:</b> High	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User selects to associate label to an item <b>Overview:</b> This use case details the steps taken by the actor to associate a label to an item <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1. selects to associate label to an item		
	2. prompt user to select the label(s) with which to associate the item	
3. select label(s)		
	4. associates the selected label(s) to the item, return success message	

<b>Name:</b> Manage user roles	<b>Priority:</b> Low	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> Admin selects to manage user roles <b>Overview:</b> This use case details the steps taken by the actor to manage user roles <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1.selects to manage user role for a specific user		
	2. Display available roles	
3. Select roles		3. Store the report
	4. return confirmation and display updated roles	

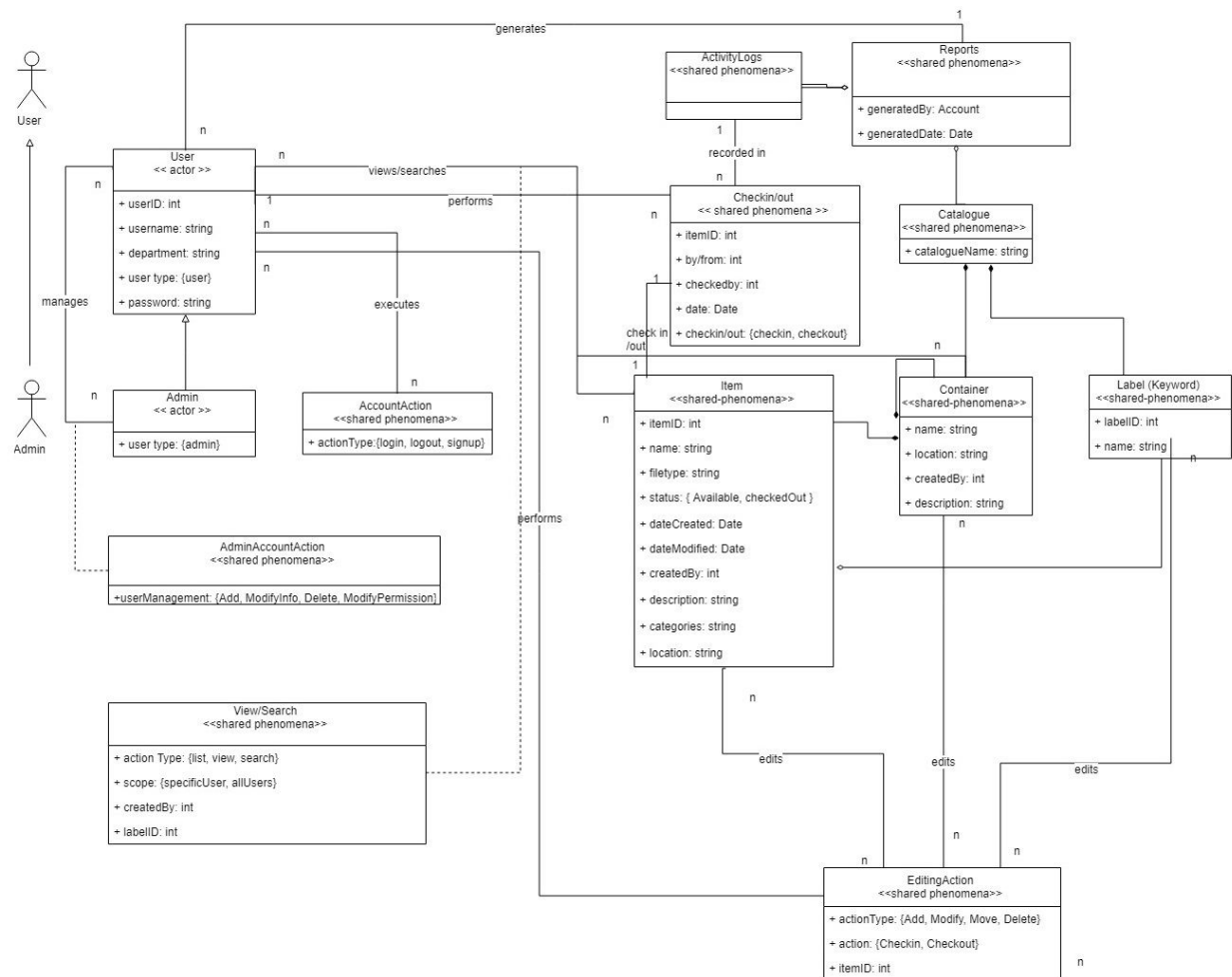
<b>Name:</b> Generate a report	<b>Priority:</b> Low	<b>ID:</b> UCX
<b>Authors:</b> Bargain Bin <b>System:</b> e-catalog <b>Actors:</b> User, System, External Database <b>Event:</b> User selects to generate a report <b>Overview:</b> This use case details the steps taken by the actor to generate a report <b>References:</b> <b>Related Use Cases:</b>		
<b>Typical Scenario:</b>		
User	System	External System
1.selects to generate a report		
	2. Generate report	
		3. Store the report
	4. return generated report to	

	user	
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## 4. Data Requirements

### 4.1 Domain Model

Figure 2 below illustrates the domain model for the e-catalog system.



**Figure 2:** Domain model for e-catalog system

Every object in the model has a unique ID number identifier as its primary key to ensure that any two objects can be differentiated.

A more detailed overlook of the systems data fields can be found in the data dictionary in section 4.2.

## 4.2 Data Dictionary

Data Element	Description	Data Type	Value Limitations
userID	Unique numeric identifier for a user; used by the system.	int	Unique
username	Unique alphanumeric identifier for a user; used to log in.	string	Unique
department	Used to categorize users based on their department in an organization.	string	
userType	Identifies if a user is an Administrator, and should thus have admin privileges.	string	{“user”, “admin”}
itemID	Unique numeric identifier for an item.	int	Unique
name	Alphanumeric identifier for an item/container; used by users to identify items.	string	
filetype	Describes the file type of the item for easier identification.	string	
status	Indicates an item’s availability.	string	{“available”, “checkedOut”}
dateCreated	Timestamp of the time the item was added to the e-catalog.	Date	
dateModified	Timestamp of the last time the item was last interacted with.	Date	
createdBy	The userID of the user who first added the item/container to the e-catalog.	int	
description	Text description of the item/container to allow users a better understanding of the object.	string	

categories	A list of labels/categories relating to the item; used to search for the item.	List<string>	
location	The physical location of the item/container to be used to physically retrieve the item for use.	string	
labelID	Unique numeric index for a label; used by the system to organize labels	int	Unique
name (label)	Unique label value used to categorize and identify items	string	Unique
checkedBy	The userID of the user who is conducting the check-in or checkout action.	int	

## 4.3 Reports

### 4.3.1 Catalog Overview Report

Report Title	Catalog Overview
Report Purpose	Patron wants to see an overview of the current catalog
Priority	Medium
Report Users	Patrons
Data Sources	Database of all current items, and activity log
Frequency and Disposition	Generated on demand by patrons. Displayed on the webpage and can be downloaded.
Header and Footer	Header includes report name and date generated. Footer shows page number.
Report Body	<ol style="list-style-type: none"> <li>1. Total number of items</li> <li>2. Item availability pie chart(checked-out vs available)</li> </ol>



	<ol style="list-style-type: none"> <li>Total number of users</li> <li>Analysis - most popular label, containers</li> </ol>
Interactivity	No
Security Access Restrictions	Available to all users

#### 4.3.2 Item History Report

Report Title	Item History
Report Purpose	User wants to view the history of modifications and interactions made with a certain document or item.
Priority	Medium
Report Users	User
Data Sources	Activity log
Frequency and Disposition	Generated on demand by user. Displayed on the webpage and can be downloaded.
Header and Footer	Header includes report name and date generated. Footer shows page number.
Report Body	<ol style="list-style-type: none"> <li>Item name</li> <li>Item location</li> <li>Associated labels</li> <li>Checked-in/out status</li> <li>Item activity history</li> </ol>
Interactivity	Users can expand section 5 by clicking to view more older activity entries.
Security Access Restrictions	Accessible to all users

#### 4.3.3 User History Report

Report Title	User History
Report Purpose	Admin user wants to view the activity history

	of a specific user
Priority	Medium
Report Users	Admin user
Data Sources	Activity log
Frequency and Disposition	Generated on demand by admin user. Displayed on the webpage and can be downloaded.
Header and Footer	Header includes report name and date generated. Footer shows page number.
Report Body	<ol style="list-style-type: none"> <li>1. User name</li> <li>2. List of Objects and Containers created by this user</li> </ol>
Interactivity	No
Security Access Restrictions	Admin users only

## 4.4 Data Acquisition, Integrity, Retention, and Disposal

DA-1: The e-catalog shall acquire initial admin user data provided by Patrons

DA-2: The e-catalog shall acquire document inventory data via Patrons adding items to the system

DI-1: The e-catalog shall backup document inventory every night

## 5. External Interface Requirements

### 5.1 User Interfaces

UI-1: The e-catalog screen displays shall conform to the *Process Impact Internet Application User Interface Standard, Version 2.0*[2]

UI-2: The system shall provide a help link from each displayed web page to explain how to use that page.

UI-3: The system shall provide a home link from each displayed web page to jump back to the home page.

UI-4: The system shall provide a sign in (or view account in the case that user has already signed in) and sign out link from each displayed web page.

UI-5: In the Welcome page, the system shall provide a sign-up link. With permission from an admin, the user is able to sign up.

UI-6: The webpage shall permit complete navigation and file/label/container selection by using mouse alone, in addition, to use mouse and keyboard combinations.

UI-7: The fonts shall be Arial with size 14. (Optional in bold, italic or underline)

UI-8: The colour of font shall be black, specifically, shall be #000000.

UI-9: The colour of the background shall be white, specifically, shall be #FFFFFF.

## 5.2 Software Interfaces

Not applicable.

# 6. Quality Attributes

## 6.1 Usability

The user interface should be highly readable. Appropriate hierarchy, a contrast of colour, and a legible text layout should be considered. To make it intuitive for the client, all buttons and display messages should be short (no more than 3 lines of text), precise, and match with their corresponding function. Operations with severe or irreversible consequences should warn the users and ask for confirmation. Average users should fully understand the basic functionality within 30 minutes.

## 6.2 Performance

The e-catalog web application daily operation should have a local response time smaller than 100 ms. Given an adequate internet connection, information for an individual item should be retrieved within 300 ms. Most reports, such as the Item History Report should take no more than

2000 ms to display initial data. Large reports like the Catalog Overview Report will potentially contain a much larger pool of information and should be generated in approximately 5000 ms.

## 6.3 Security

The e-catalog application needs to handle individual logins and passwords securely by saving passwords in encrypted hashed form.

# 7. Internationalization and Localization requirements

## 7.1 Localization

- Able to change the format of the date. For example, (YY)YY/MM/DD and MM/DD/(YY)YY and DD/MM/(YY)YY
- Able to change the format of the date
- Able to change the calendar system
- Date and time are numerical
- Has multiple languages. For example, English, French, Traditional Chinese, Spanish

## 7.2 Internationalization

- Use Unicode to encode and represent characters.
- Add CSS that supports different writing systems. For example Chinese characters and Latin characters
- When checking the availability of documents, use red for checked out (which means unavailable) and green for available.
- Make “submit” button be green and make “cancel” button be red.

# 8. Other Requirements

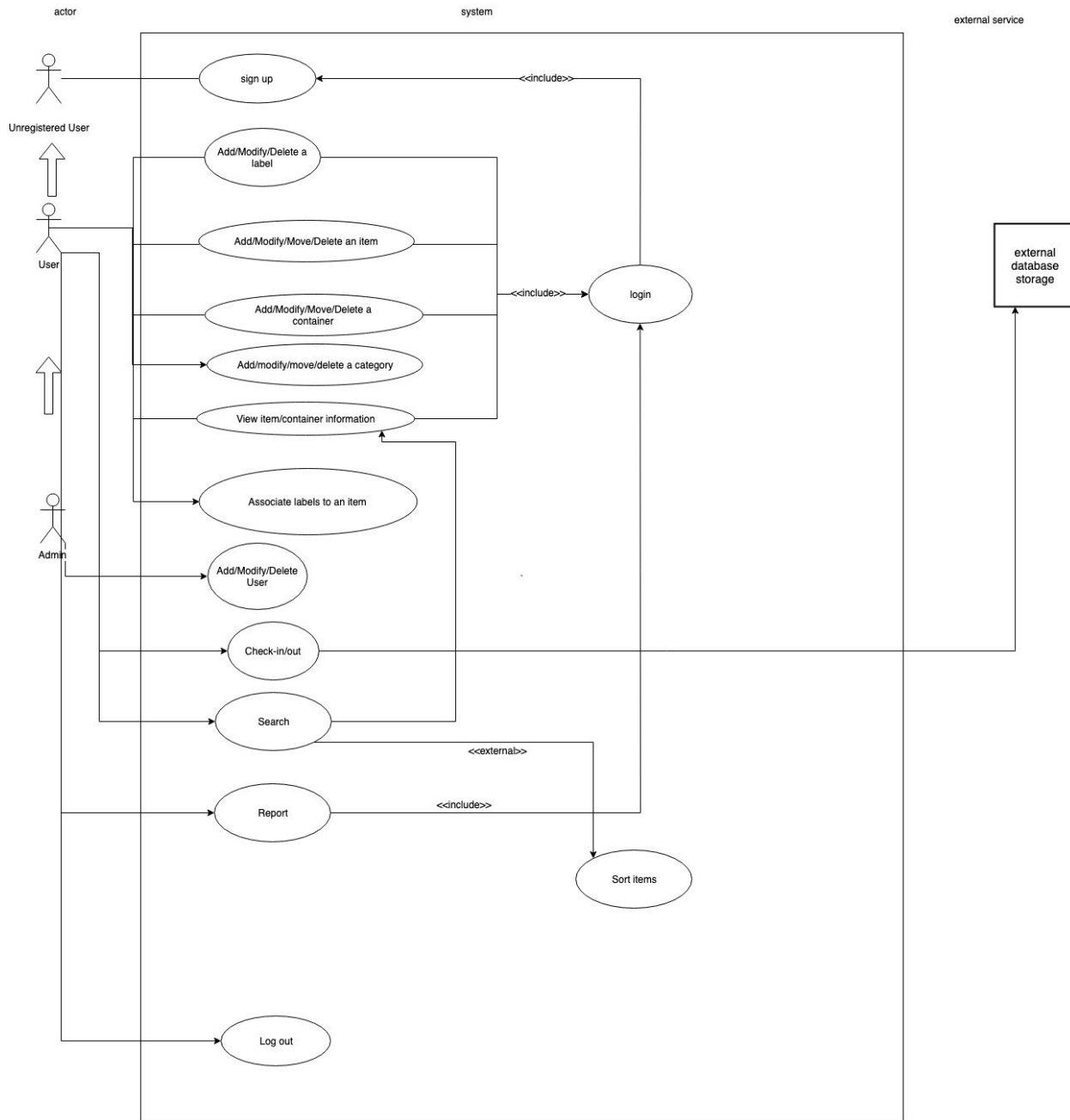
Not applicable.

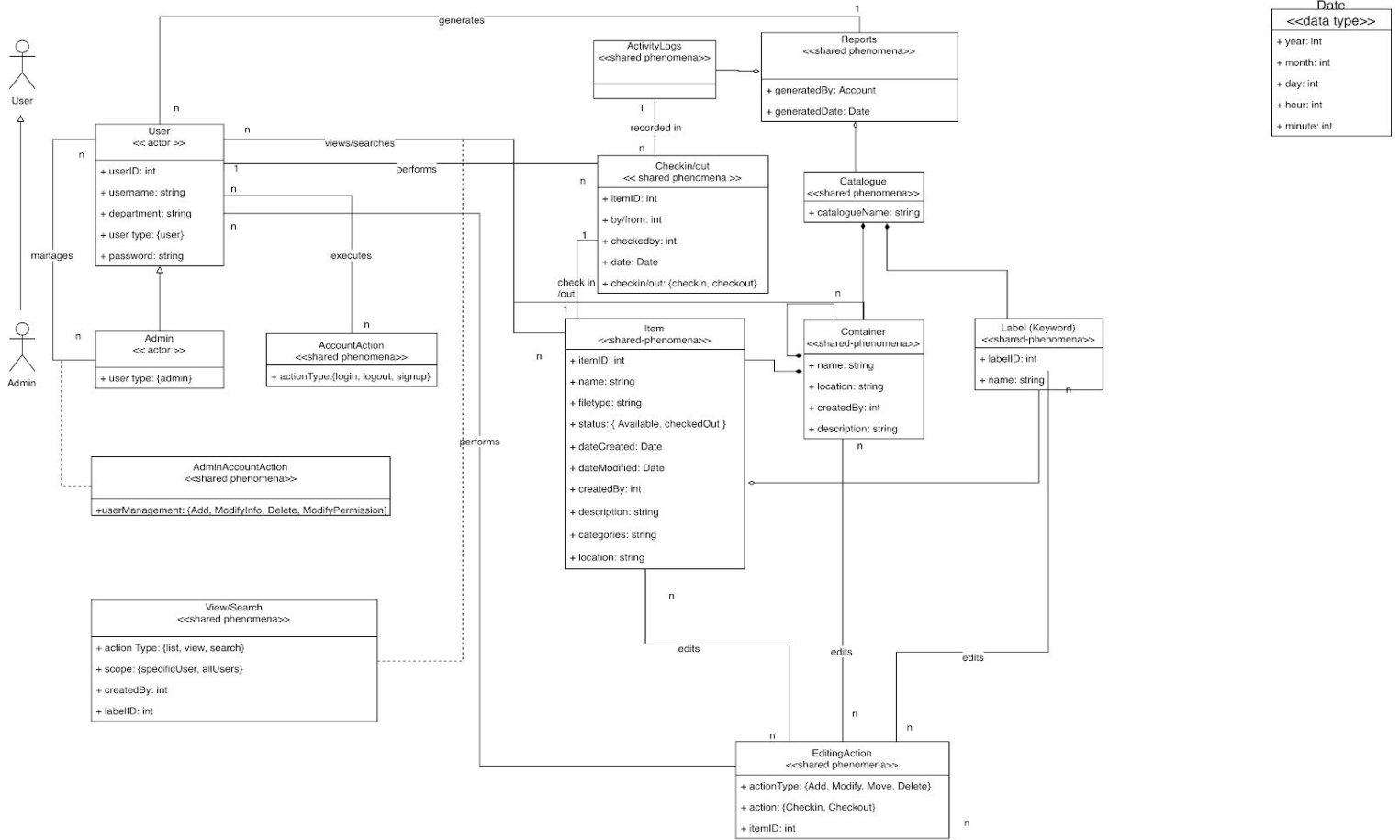
## Appendix A: Glossary

Item: acronym for file for our purpose as file is the only item type in our scope, may expand later

Object: the collective term used for files and containers, may expand later

## Appendix B: Analysis Models





```

    usecaseDiagram
        actor User
        actor Admin

        subgraph Authentication
            Welcome
            CreateAccount[Create Account]
            CreateAdmin[Create Admin Account]
            PasswordRecovery[Password Recovery]

            Welcome -- "submit [valid account credential] / add account to database" --> CreateAccount
            CreateAccount -- "submit [invalid account credential]" --> CreateAccount
            CreateAccount -- "cancel" --> Welcome
            Welcome -- "Sign up as a general user" --> CreateAccount
            Welcome -- "Sign up as an admin" --> CreateAdmin
            CreateAdmin -- "submit [invalid admin credential]" --> CreateAdmin
            CreateAdmin -- "cancel" --> Welcome
            Welcome -- "submit [valid admin credential] / add admin to database" --> CreateAdmin
            Welcome -- "Login [incorrect user credential]" --> Welcome
            Welcome -- "Login [correct user credential; cache found] / start tracking user activity log" --> Home
            Welcome -- "Login [correct user credential; no cache found on local device] / start tracking user activity log" --> Home
            Welcome -- "password reset" --> PasswordRecovery
            PasswordRecovery -- "forgot password" --> Welcome
        end

        subgraph HomeManagement
            Home
            DisplayUser[Display User]
            DisplaySearch[Display search result]
            ItemInfo[Item Information]
            LabelMgmt[Label Management]
            LabelEdit[Label Edition]
            LabelCreate[Label Creation]
            ItemAddForm[Item Addition Form]

            Home -- "search by keyword" --> DisplaySearch
            DisplaySearch -- "cancel search" --> Home
            DisplaySearch -- "filter" --> DisplaySearch
            DisplaySearch -- "sort" --> DisplaySearch
            DisplaySearch -- "view item" --> ItemInfo
            ItemInfo -- "cancel view" --> DisplaySearch
            ItemInfo -- "edit/check in/check out item" --> ItemInfo
            ItemInfo -- "submit edition" --> ItemInfo
            ItemInfo -- "cancel" --> ItemInfo
            ItemInfo -- "associate labels to item" --> LabelMgmt
            LabelMgmt -- "search" --> LabelMgmt
            LabelMgmt -- "manage labels" --> LabelMgmt
            LabelMgmt -- "edit label" --> LabelEdit
            LabelEdit -- "submit edition" --> LabelMgmt
            LabelEdit -- "cancel edition" --> LabelMgmt
            LabelMgmt -- "create label" --> LabelCreate
            LabelCreate -- "cancel add" --> LabelMgmt
            LabelCreate -- "submit addition" --> LabelMgmt
            Home -- "add item" --> ItemAddForm
            ItemAddForm -- "submit/update" --> Home
            Home -- "view containers" --> DisplayUser
            DisplayUser -- "edit user permission" --> DisplayUser
            DisplayUser -- "manage role" --> DisplayUser
            DisplayUser -- "delete user" --> DisplayUser
            DisplayUser -- "save" --> DisplayUser
            DisplayUser -- "discard" --> DisplayUser
            DisplayUser -- "Finish" --> Home
            Home -- "view objects" --> DisplaySearch
            Home -- "view labels" --> LabelMgmt
            Home -- "cancel" --> ItemAddForm
        end

        Home -- "logout" --> Welcome
    
```

terminology: item can be either a container or an object

