National College of Ireland

Object Oriented Software Engineering
Project Part 1

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Abstract

The aim of this project, as per the OOSE project guidelines, is to:

1. Identify and describe the actors and construct a use case model.

2. Describe in detail one distinct use case from the use case model.

3. Create a conceptual class diagram modelling the architecture of the proposed system.
    - The conceptual class diagram should demonstrate the use of many of the following: attributes, relationships, navigability, association class, multiplicity, and composition.

4. Create a glossary that lists and defines all project-related terminology that requires clarification.

5. Draw a system sequence diagram from the conceptual class diagram.

6. Develop contracts for a minimum of two of the system operations.

7. Using design patterns, create communication diagrams based on the above two contracts.

We will first give a short introduction what online publishing systems are, how they work, its advantages, disadvantages and why it is popular with modern authors.

Introduction to Online Book Publishing Systems

Online book publishing, also called digital or electronic publishing, refers to the digital publication of electronic books, magazines. This term can also be applied to online libraries and catalogues. Users of this system can also use it to edit their publishing as they please.

The first use of digitized books was documented in 1971, when a University of Illinois student Michael E. Hart started a volunteer project called Project Gutenberg, an effort to "encourage the creation and distribution of eBooks". It is the oldest digital library running up to this day, attempting to make the books free, in lasting, computer-readable formats. This library has grown to 60,000 free books. Blodget (2010)

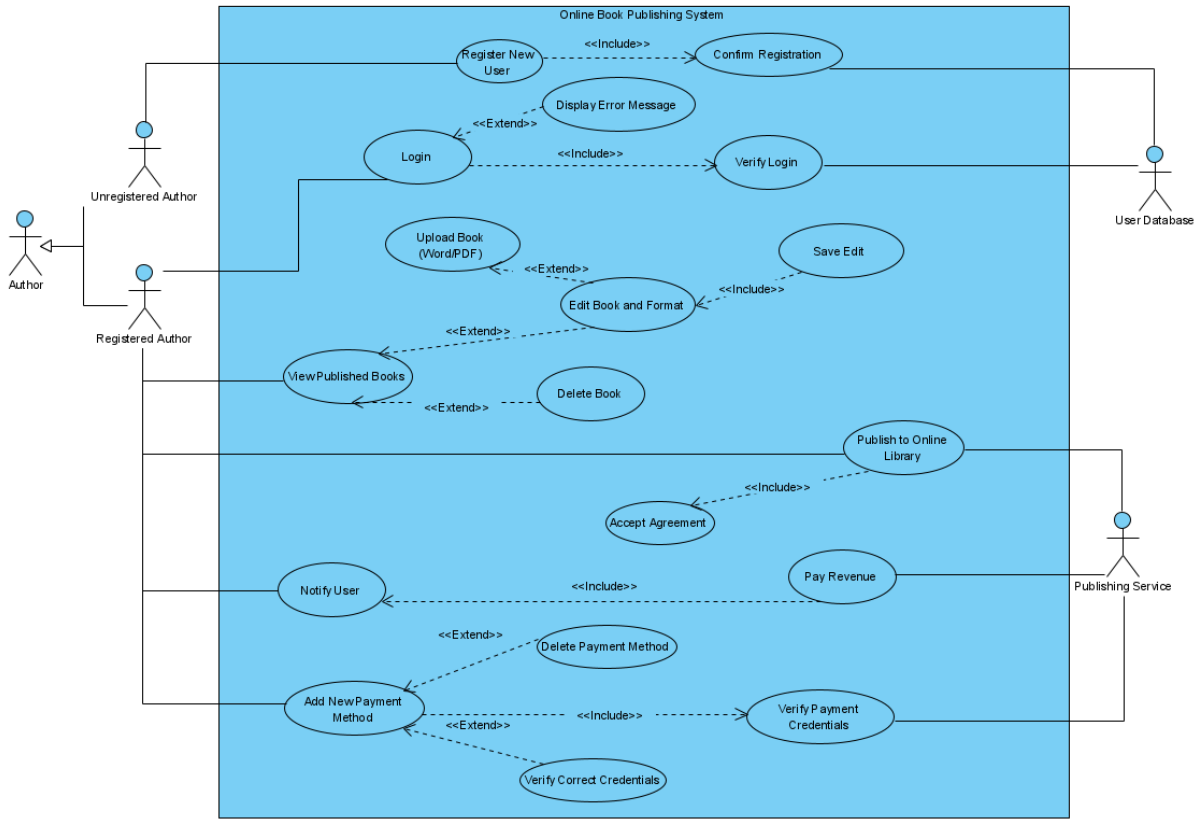
Hart's efforts helped to popularize digitization of books throughout the world. In 1992, the National Library of France (Bibliothèque nationale de France) launched a vast digitization program under the blessing of French president Francois Mitterrand. Tasrot-Gillery (2015)

In December 2004, Google created Google Books, a project to digitize books with robotic scanners from 100 countries with over 400 languages. As of 2019 and in celebration of 15 years since the project was launched, Google had announced that Google Books had more than 40 million digital books. Dunbar (2020)

The electronic publishing process has some similarities to the traditional publishing process, but it does not require a printing press and no physical distribution is required. Distribution of eBooks through software applications or "apps" has become popular in the early 2010s, due to rapid adoption of smartphones and tablets. Online publishing websites and apps have built in apps or plugins that convert Word or PDF files to HTML or the '.epub' extension, which is widely used by online book publisher apps like iBooks Author or Kindle Direct Publishing. This means that authors can publish their manuscripts quickly and effectively. During 2017, Amazon released Kindle Create, a platform that allows conversion of Word/PDF files to Kindle-compatible files. Heyman (2015)

There is a bit a downside however, as some self-publishing platforms like Kindle Direct Publishing would ask for a fee or a percentage of their earnings from the book. According to CEO of Amazon Jeff Bezos, Amazon offers a program that gives 70% of the royalties collected from book sales to the publishers. In 2019, $300 million was given to publishers from these royalties. Cook (2015)

Task 1 – Use Case Diagram



- **Diagram summary**

Log in/Register

Starting from the top of the diagram, we have the login system. The author is split into two separate actors, in an inheritance relationship; the unregistered user and the registered user. An unregistered user must register if he wants to access the publishing system. When the user registers, the registration details are confirmed by the database and the user can login using their new credentials. If the one or more of the login details are incorrect, the user will be displayed an error message. When the details are correct, the database verifies the login, and the user will be taken to the main menu of the publishing system.

Viewing, uploading, editing, and publishing new books

From the login screen, the user/author is taken to the section where he can view the books he has published (View Published Books), which is the main menu. From there, the user can upload a new book, edit, and format existing published books and delete books from the list. The process of uploading a new book consists of uploading a Word/PDF file that contains a manuscript for the book, the user can edit or format the upload using the built-in editor. When the author is finished, he must save his changes and after saving he is taken to the terms & conditions page. After reading these, the user must agree by clicking the "Accept Agreement" button. The automated publishing service confirms that the agreement has been accepted by the user. The publishing service then publishes the book to the online library where readers/customers can access the book. The publishing service will also apply a standard format for every eBook that is published. This is a process where trademarks and watermar of the publishing company are applied and are visible in the book.

- **Diagram summary**

Revenue Payment

As per the agreement, the author will be paid 75% of royalties/revenue from all book sales. The revenue payment option will be a separate menu where the total revenue count is shown to the author, and the author can add a new payment method or delete an existing one. After the author has added his/hers preferred payment method, the publishing system verifies the credentials to see if these are correct. If not, an error message will be displayed a message “Incorrect Payment Details”. After the credentials are verified, the money is transferred to the author.

Task 2 – Summary of Diagram

The two use cases we choose to describe is the “View Published Books” and “Publish New Book” as we believe the two use cases are the most important when it comes to designing the online book publishing system.

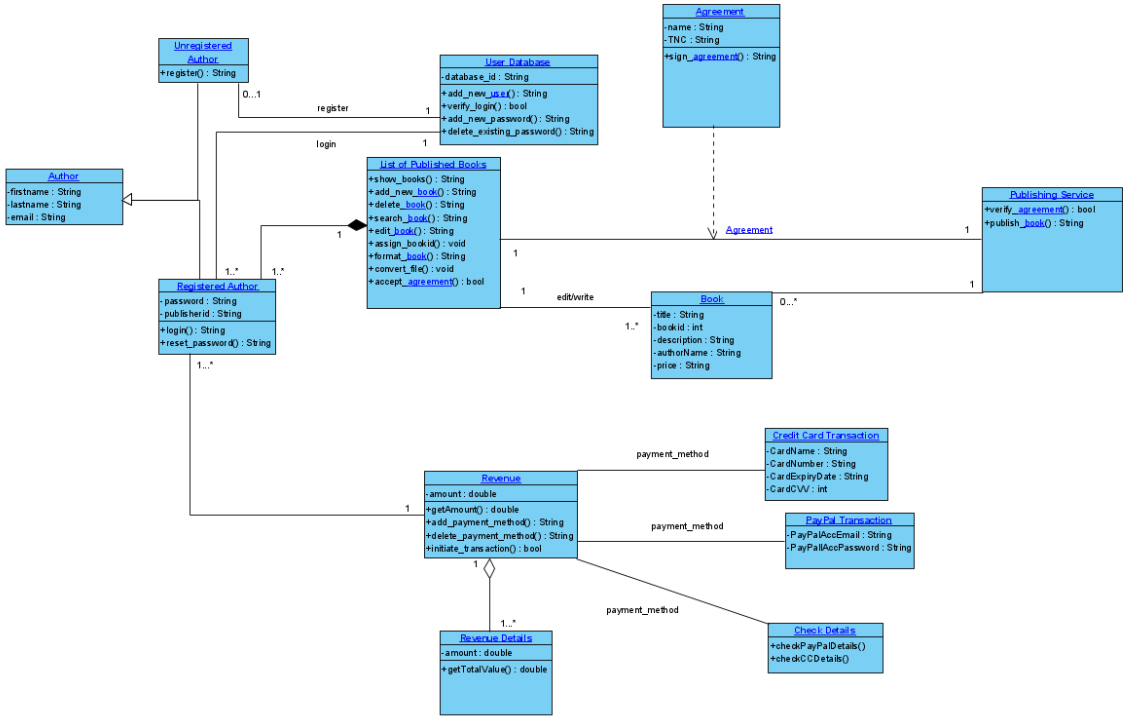
View Published Books

This is a function which allows the user to view what books they have published in the online library, along with other functions which allow the user to edit their books, upload a new file which could be an edited version of the manuscript or a new cover image, delete their books from the list, promote and advertise their books by paying for a subscription which allows the books to be seen by more users by putting them on the top of the online library book list, and publish their edits to the online library once the built-in publishing system has verified and applied the changes.

Publish to Online Library

This function is a little bit different from the previous one because you are uploading an entirely new manuscript into the online library. The reason why this differs from the previous one is because every time a new book is being published, a user can upload a Word or a PDF file. This format will be verified by the system and the book can be uploaded. There is also an agreement that needs to be read and agreed to by the user. This agreement outlines the rules and regulations that need to be followed by the user and the policy regarding the split of the revenue between the user and the online library service. When this agreement is agreed by the user, the agreement is verified, and the book is published by the online publishing service to the online library for readers. All published books must be converted to a readable format, and the publishing service automatically applies that format whenever a book is published.

Task 3 – Class Diagram



- **Class Relationships**

Author – Unregistered Author/Registered Author: Inheritance relationship.

Revenue – Revenue Details: Aggregation. When an author has published his book and set a price for it, the author will receive revenue from these sales, and the money generated will be display on the revenue section.

Registered Author – List of Published Books: Composition, since the books need to be displayed for the author with the options to edit, delete or search the books.

All other classes are all normal associations.

- **Classes Explained**

Author: The user of the program, i.e., the author. The author has a first name, last name, email, password, and a unique publisher id and userid all classified as private attributes.

Unregistered Author: A user that has not registered on the publishing system. The user can inherit all the user attributes once he/she is registered. The operation register(); should allow the user to register to the system.

Registered Author: A user that has registered on the publishing system. The user can inherit all the user attributes. Only the registered user can use the publishing system. The user can login or reset his password using the relevant operations (login() and reset_password()).

User Database: The user database stores all user data within itself. The database will have a unique name attribute (database_name). The user database also holds the task of adding new user information (add_new_user()), verifying correct login credentials written by the user (verify_login()), adding a new password (add_new_password()), and deleting the existing password (delete_existing_password()).

List of Published Books: A list of books which have been published by the author. This is considered the main menu once the user has logged in, and it has a wide range of functionalities, as seen on the class diagram, from showing the user the list of books (show_books()), to accepting the mandatory agreement (accept_agreement()).

Agreement: An agreement list that contains the terms and conditions of the publishing service that the author has agreed with. If the author does not agree, he cannot publish any books on the platform. The agreement has a name and TNC (terms and conditions) attributes, with the option to accept/sign the agreement (sign_agreement()).

Book: The details concerning the book(s) the author has published. The book has a title, a unique book ID number, description/summary, the author's name, and its price.

Publishing Service: The publishing service where the books are published by an automated process. The publishing service has a name attribute, and it can verify whether the agreement has been signed by the author (verify_agreement()), and publish_book(), for the books to be published.

Revenue: The revenue that is generated from the sales of the author's books. Here, the author can see the amount that they have generated from book sales. They can also add a new payment method or delete an existing one.

Revenue Details: This is where the revenue details are shown. A date for each revenue payment is set with an amount the author is paid.

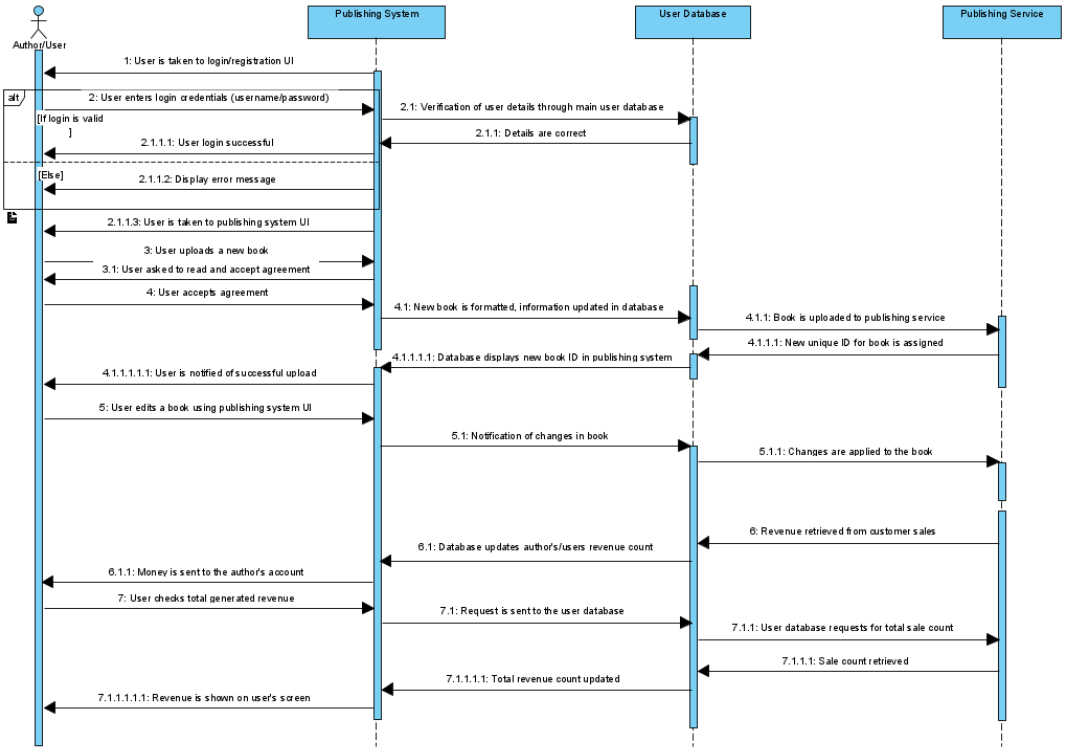
CreditCard/PayPal Transaction: The two transaction methods, either done by credit card or PayPal, with the relevant payment details.

Check Details: This class will check if the payment credentials are correct.

Task 4 – Glossary

Name ▲	Aliases	Labels	Description
Agreement			An agreement signed by the author. The author must agree to the rules, terms, and conditions before publishing a book.
Author			The user/author who uses the publishing system to publish their books.
Book			The books that the author has published.
Check Details	Payment Detail Verification		Verification of correct payment details.
Credit Card Transaction	Credit Card		Activated when the user/author wants their revenue transactions happen via credit card, given the details are correct.
List of Published Books	User Interface		A list of all the books the author has published, along with the options to delete or edit these books.
PayPal Transaction	PayPal		Activated when the user/author wants their revenue transactions happen via PayPal, given the details are correct.
Publishing Service			An automated service that formats and publishes books to the online library.
Registered Author			An author that has registered on the service.
Revenue	Total Sales, Money Earned		Total revenue generated from the author's book sales, transactions are expected to reach the author's bank/PayPal account in 24 hours.
Revenue Details			Details about the transaction of revenue.
Unregistered Author			An author that has not registered on the service.
User	Author, Uploader		The user is the author who uses the publishing system to publish their books.
User Database	User Account Control, User List		A database for storing the login data of registered users.

Task 5 – System Sequence Diagram



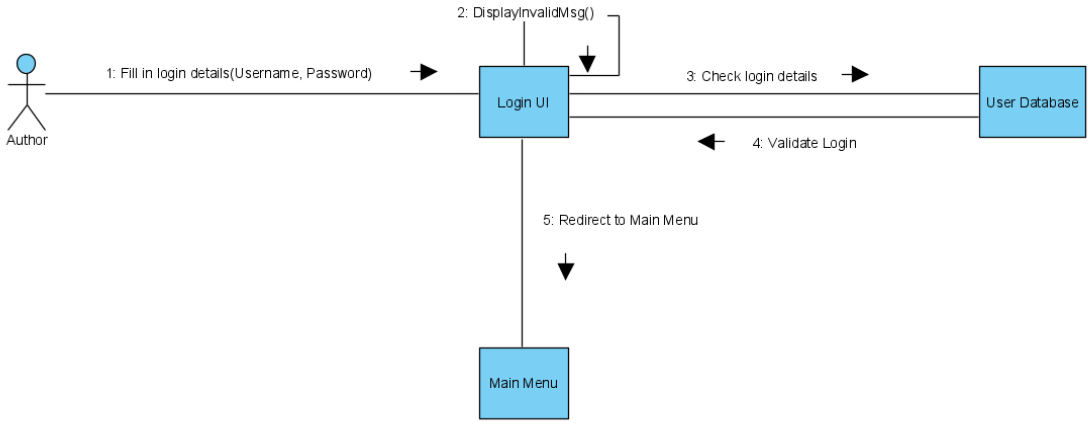
Task 6 – Operation Contracts

Operation: login(login:email, login:password, qty: String)
Cross Reference(s): Login (Use Case)
Preconditions:
The author must be a registered user, user asked for login details before system starts
Postconditions:
login.email and login.password instances created;
login.email and login.password associated with user database
login.email and login.password associated with user based on userid match
verify_login(); was set to True

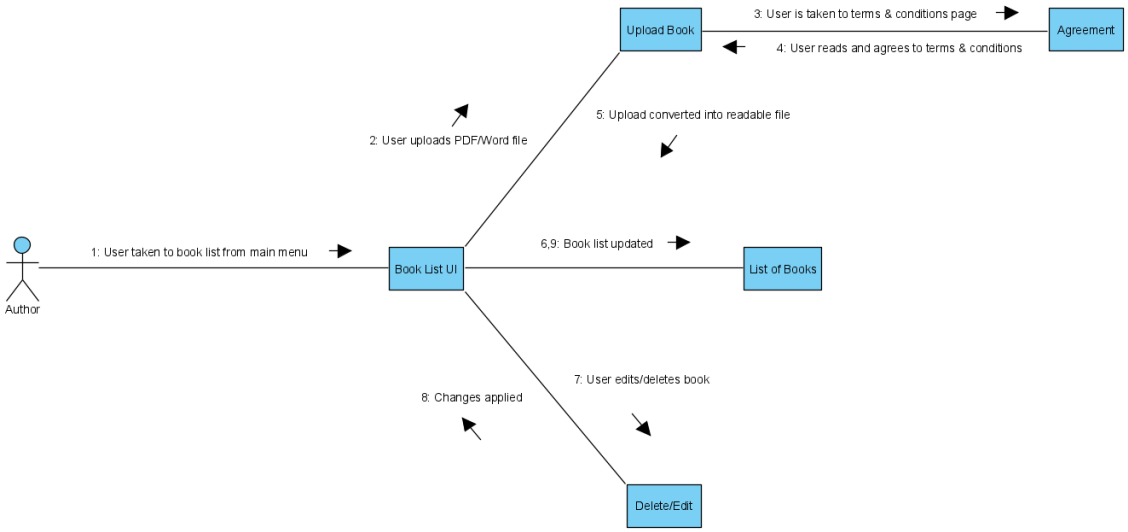
Operation: show_books(show_books:ListofPublishedBooks qty: String)
Cross Reference(s): View Published Books
Preconditions:
User must login to the system first
Postconditions:
show_books instance lpb created
show_books was associated with Book
Instances lpb.editbook, lpb.deletebook, lpb.searchbook, lpb.addbook, lpb.showbooks, lpb.convertfile, lpb.acceptagreement, lpb.assignbookid are created
Instances lpb.acceptagreement, lpb.assignbookid associated with Publishing Service
lpb.edit, lpb.delete, lpb.searchbook, lpb.addbook, lpb.showbooks, lpb.convertfile associate with Book and Publishing Service
verify_agreement(); was set to True

Task 7 – Communication Diagrams

Login Menu



View Published Books



Conclusions

- Diagrams

  The diagrams represent the publishing system program from the author's perspective; there are no readers/customers involved in the process of publishing a book, which is the purpose of the publishing system. From our perspective, once a book is published to the online library, another program would need to be developed, which will allow readers to read the books, and similarly, separate UML diagrams would need to be created for this process.

  The publishing service is assumed to be an automated service that is maintained by workers of the company/library in this case.

  In the system sequence diagram, the login process is a loop process because the user can input the wrong credentials; therefore, the user will be shown an error message and he/she will be taken back to the login screen.

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