Software Requirements Specification for

A smart printing service for students at HCMUT

Version 1.0.0 approved

Prepared by:

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Revision History

Name	Date	Reason For Changes	Version
Project 1	22/09/2024	Submit task 1.1 and 1.2	1.0.0
Project 1	01/10/2024	Submit task 1.3	1.0.1

1. Task 1: Requirement elicitation (1.1, 1.2)

1.1 Domain Context

The Student Smart Printing Service (HCMUT_SSPS) is a web-based and mobile-based printing service that has an objective to provide students with a convenient way to print their documents with printers located around the campuses. Each printer has its own ID, brand name, printer model, short description and the location. The system allows students to print their documents by uploading their files onto the system, they can choose the printer and edit the printing properties, the permitted file types are also limited and configured by SPSO. The system also logs the printing actions for students including student ID, printer ID, file name, printing start and end time, number of pages for each paper size. Besides, SPSO can view the printing history of all students and each student can view their history. For each semester, each student will be given the default number of A4-size pages and they can buy additional printing pages through some online payment systems, each student can only print when the number of printing pages does not exceed their balance and each A3 page is equal to 2 A4 pages. Moreover, SPSO can also manage the printer states such as add, enable and disable and SPSO can also change the default number of pages, the dates the system will give the default number of pages to all students as well as change the permitted file types. SPSO can view the report monthly and annually which is stored in the system. Finally, to use the system, all users have to be authenticated by HCMUT_SSO service.

1.2 Stakeholders and Needs

Students:

- Print a document by uploading a document file onto the system
- View printing log for a time period together with a summary of number of printed pages for each page size
- Buy some more using the feature buy printing page

Student printing service officer:

- Limit and configure the permitted file types
- View the printing history of all students or a student for a time period (date to date) and for all or some printers
- Manage the printers such as add/ enable/ disable a printer

- Manage other configurations of the system such as changing the default number of pages, the dates that the system will give the default number of pages to all students, the permitted file types accepted by the system.

- View the reports of the using of the printing system

1.3 Benefits of the System

For Students:

1. Convenient Document Printing:

- Students can upload documents, choose printing properties, and print at any available campus printer from anywhere using a web or mobile app.

- Flexible options for specifying paper size, number of copies, double-sided printing, etc., offer personalized printing.

2. Cost Management:

- The system tracks each student's print quota (pages) per semester, ensuring they don’t exceed their allowance.

- Students can purchase additional print pages as needed via an integrated online payment system like BKPay, making the process seamless.

3. Transparency and Tracking:

- Students can access their printing history, including the number of pages printed per size and logs of all previous printing actions.

- This helps students track their usage and ensure they stay within their budgeted print quota.

4. Multiple Access Points:

- The system is accessible via both web and mobile apps, providing students flexibility in managing their printing needs regardless of location.

5. Security and Authentication:

- Integration with the university’s Single Sign-On (HCMUT_SSO) ensures that only authorized users access the system, protecting student information and transactions.

For University Administration (SPSO):

1. Centralized Printer Management:

- The SPSO can add, enable, disable, or configure printers across campuses, making printer management streamlined and ensuring better resource allocation.

2. Configurable System Settings:

- The system allows customization of key parameters such as the default print allowance for students, acceptable file formats, and important operational dates, making the system adaptable to evolving needs.

3. Comprehensive Logging and Reporting:

- All student printing actions are logged, allowing the university to monitor usage and create accurate reports on the print system's performance, enabling better resource management.

- Monthly and yearly reports are generated automatically, providing insights into system usage without manual effort.

4. Enhanced Accountability:

- The detailed logs ensure transparency, allowing the SPSO to monitor student printing history and troubleshoot any discrepancies.

- This also helps in preventing misuse or overuse of resources.

5. Efficient Payment Integration:

- The integration with an online payment system (BKPay) simplifies the process of buying additional print pages, reducing administrative overhead for managing student printing balances.

1.4 Functional Requirements

Students:

1. Students can print documents by uploading files, choosing printers and specifying printing properties.

2. Students can view their own printing log

3. Students can view their number of printed pages for each page size

4. Students can buy more pages to print

5. Students can view how many pages they have left in their balance

Student Printing Service Officer (SPSO):

1. SPSO can view printing history of student(s) or printer(s)
2. SPSO can add, remove, enable, disable a printer
3. SPSO can change the number of default pages given to student each period
4. SPSO can change the date students are givens pages
5. SPSO can change the permitted file types
6. SPSO can view the report of the printing system

1.5 Non- Functional Requirements

The printing system is implemented as a web-based app and a mobile app.

The system is available 24/7, except for maintenance periods.

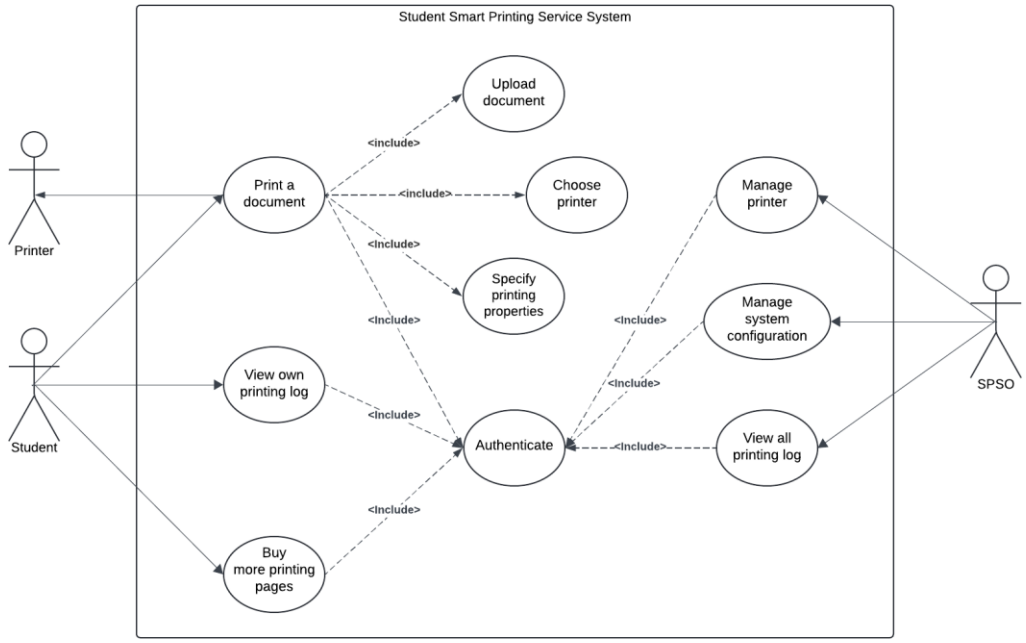
The system is available for multiple concurrent users but must ensure that each printer serves only 1 user at a time.

The HCMUT_SSO authentication service must authenticate all users before they use the system.

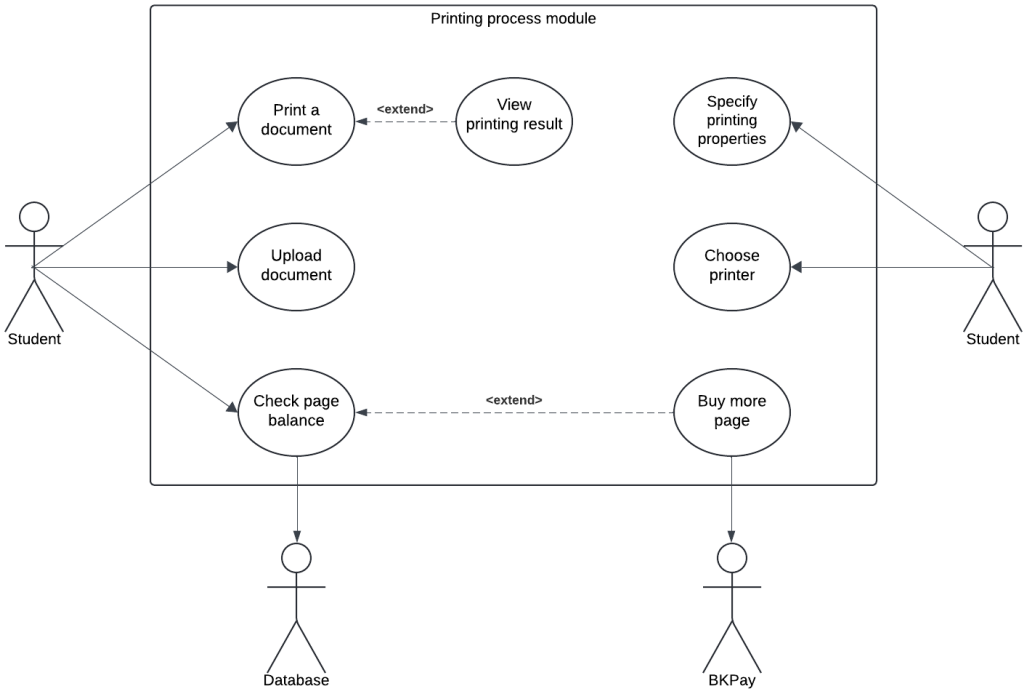
The payment method is made online, like BKPay

2. Use case Diagrams (1.3)

2.1 Use case Diagram for the Whole System



2.2 Use case Diagram for Printing Process Module



2.3 The Details of Use cases in Printing Process Module

1. Use case Print a document

Use case ID	UC-PPM-01
Use case name	Print a document
Created by	Đinh Bá Khánh
Created date	01/10/2024
Actors	Student, Database, BKPay
Description	The student requests the system to print his/her documents by choosing the printer based on its ID and then specify the printing properties such as paper size, number of pages, one-/double-size, number of copies, etc. The system will check if the student has enough available number of pages and the permitted file types and then it will print the documents for the student.
Trigger	The student wants to print the documents.
Preconditions	System checked page balance. Student must log into the system based on his/her ID. Student chose the printer. Student specified printing properties. Student uploaded documents onto the system
Postconditions	Printing histories are stored in the system. Documents are printed successfully.
Normal flow	1. The student logs into the system based on his or her ID. 2. The student uploads his or her documents onto the system. 3. The system checks if the file is uploaded successfully. 4. The student specifies printing properties. 5. The system checks the balance 6. Student choose the printer. 7. The system sends the document file to the selected printer. 8. The document is printed 9. The student views the result.
Alternative flow	Alternative 1: 5a. Student does not have sufficient page balance 5b. Student buys more pages
Exception	Exception 1: 5a. Student does not have sufficient page balance

	5b. Student cancel the printing process => Use case stops

2. Use case Upload document

Use case ID	UC-PPM-02
Use case Name	Upload document
Created by	Đặng Duy Tiến
Created date	01/10/2024
Actors	Students
Description	The system allows students to upload documents for printing
Trigger	Students want to upload documents
Preconditions	Students logged in the system
Postconditions	The uploading actions is saved in the system Documents is uploaded successfully
Normal flow	1. Students log into the system 2. Students choose permitted file types 3. Students upload the documents 4. Students check the uploading action
Alternative flow	None
Exception	Exception 1: 2a. Students cancel uploading => Use case stops Exception 2: 3a. File types are not permitted => Use case stops

3. Use case Specify printing property

Use case ID	UC-PPM-03
Use case name	Specify printing properties
Created by	Đào Thị Hà An

Created date	01/10/2024
Actors	Student
Description	The student configures the printing properties of the selected printer according to his/her preferences in order to print the uploaded document.
Trigger	Printer is ready to print and student wants to set the printing mode.
Preconditions	Student has logged in Student uploads the printing file of permitted type Student has chosen an available printer.
Postconditions	All (changed) properties are successfully applied to the printer.
Normal flow	1. Student selects the default settings. 2. Student submits the settings. 3. System invokes the “Check page balance” use-case (UC-PPM-05). 4. System shows the notification that all settings are valid.
Alternative flow	Alternative 1: 1a. Student changes one or more printing properties. => Continue at step 2 Alternative 2: 3a. Student buys extra printing pages => Continue at step 2 Alternative 3: 2a. Student cancels the printing process. => Use case stops
Exception	Exception 1: 3a. Student doesn’t have sufficient page balance 3b. Student changes some setting => Continue at step 2

4. Use case Choose printer

Use case ID	UC-PPM-04
Use case name	Choose printer
Created by	Bùi Phạm Thái An
Created date	01/10/2024
Actors	Student

Description	Student can choose which printer to use to print their document
Trigger	Student wants to print a document
Preconditions	Student has logged in Student is on printing window
Postconditions	Printer is selected
Normal flow	1. Student opens printer list 2. Student browses for printer 3. Student selects a printer 4. Student confirm the selection
Alternative flow	None
Exception	Exception 1: 3a. Student cancel the selection => Use case stops

5. Use case Check page balance

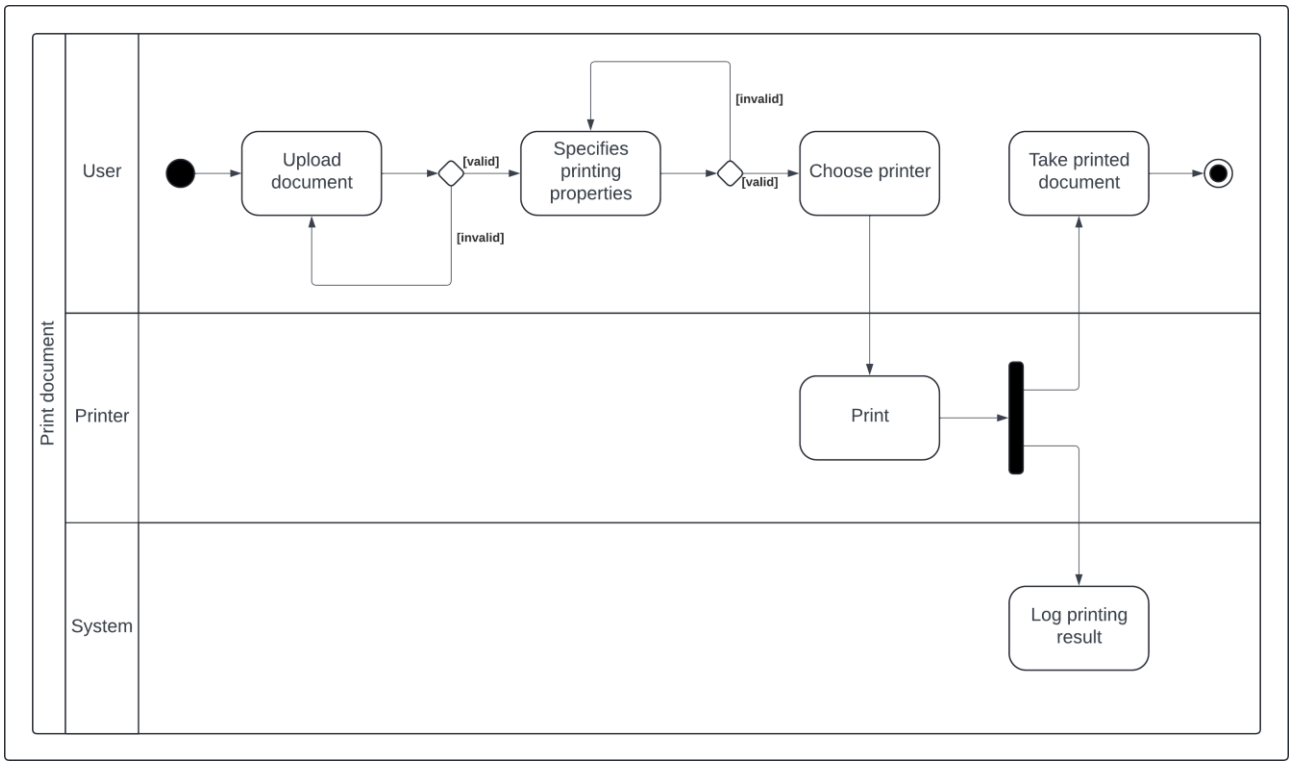
Use case ID	UC-PPM-05
Use case name	Check page balance
Created by	Cao Quế Phương
Created date	01/10/2024
Actors	Student, SPSS
Description	The student checks their remaining page balance for printing. The balance is displayed in terms of A4 pages, with conversions for A3 pages (1 A3 = 2 A4 pages). Students can use this information to determine if they need to purchase more pages.
Trigger	The student wants to print the documents.
Preconditions	Student has logged in The student has been allocated a page balance for the current semester.
Postconditions	The system displays the current page balance to the student, broken down by A4 pages (and A3 equivalents if applicable).
Normal flow	1. The student logs into the system. 2. The student navigates to the "Check Page Balance" feature.

	3. The system retrieves the student's current page balance from the database. 4. The system displays the remaining page balance to the student. 5. The student can proceed with printing or purchasing additional pages.
Alternative flow	Alternative 1: 5a. Student has a balance of 0 pages 5b. System displays a message indicating that the student has no remaining pages and must purchase more to continue printing.
Exception	Exception 1: 5a. System is unable to retrieve the balance 5b. An error message is displayed => Use case stops Exception 2: 5a. Student does not have enough page balance 5b. The system displays an error => Use case stops

3. Task 2: System modelling

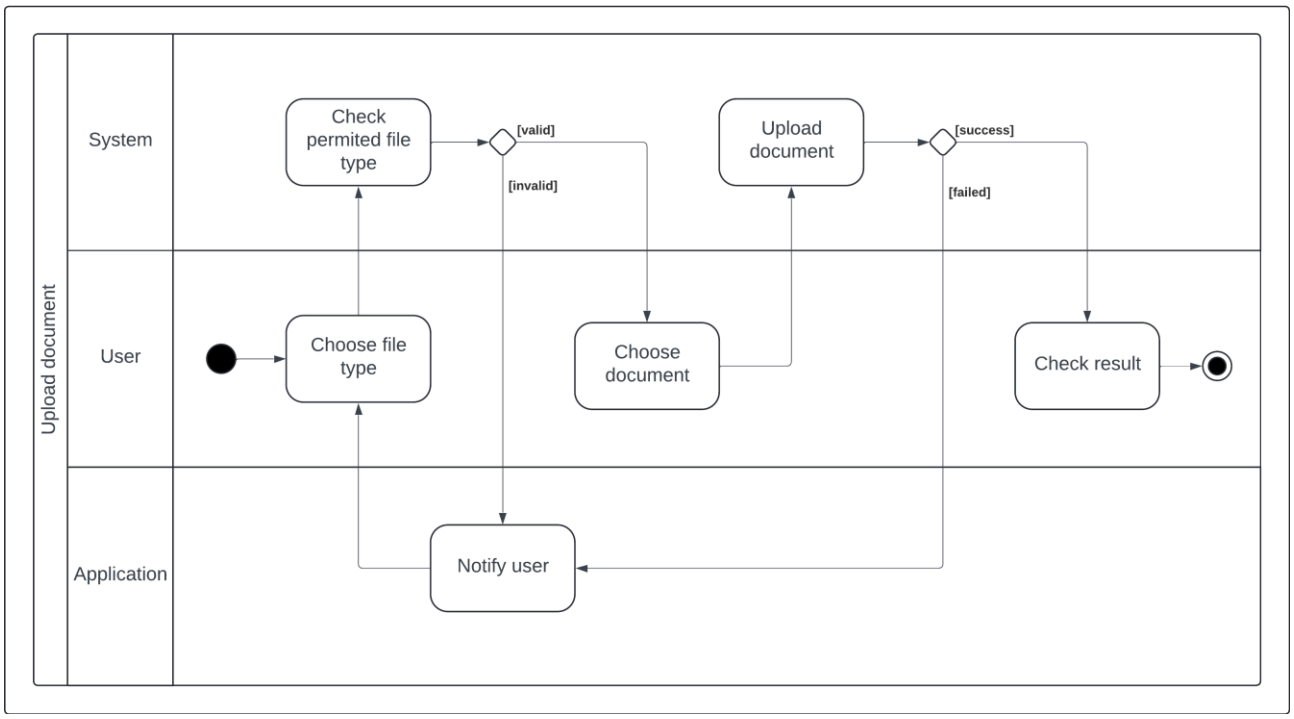
3.1 Activity diagrams

1. Print document



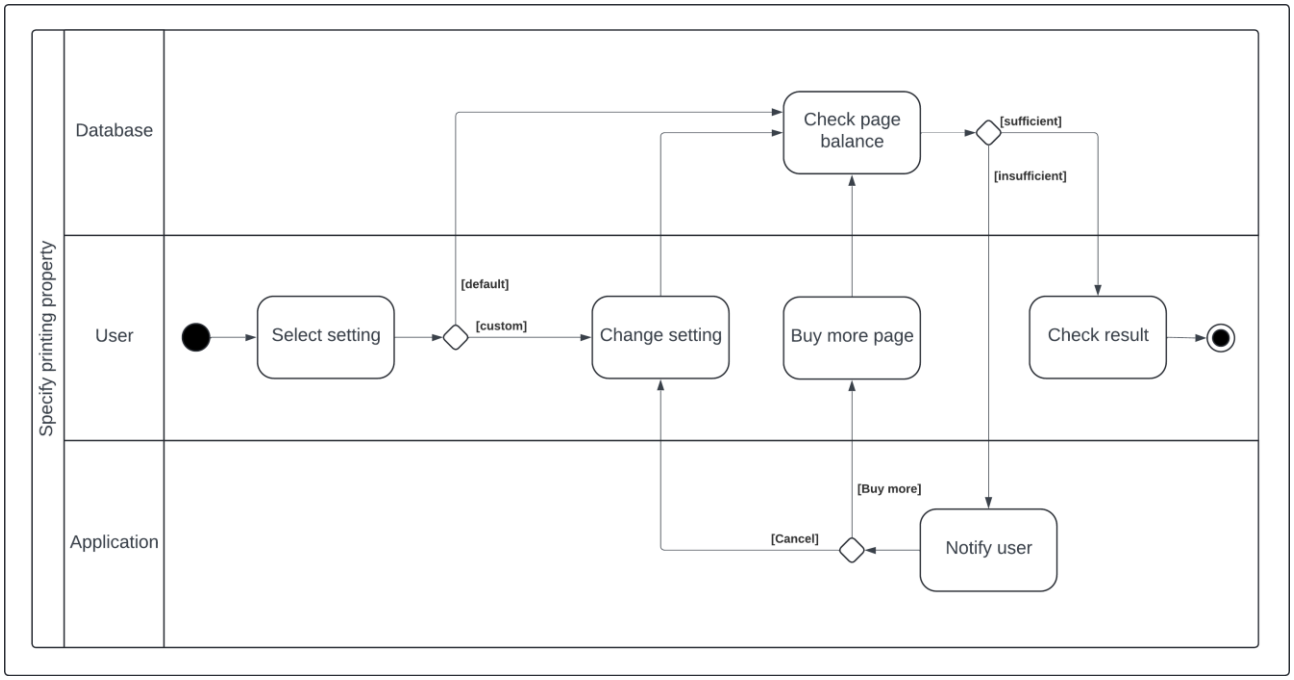
This diagram represents the steps which students need to follow to print a document. The process begins with a student uploading a document. If the document is valid, the student then needs to specify printing properties. If the properties are valid, the student then chooses a printer. While the printer is printing the document, the system will log this printing session. The process ends when the student has received the printed document.

2. Upload document



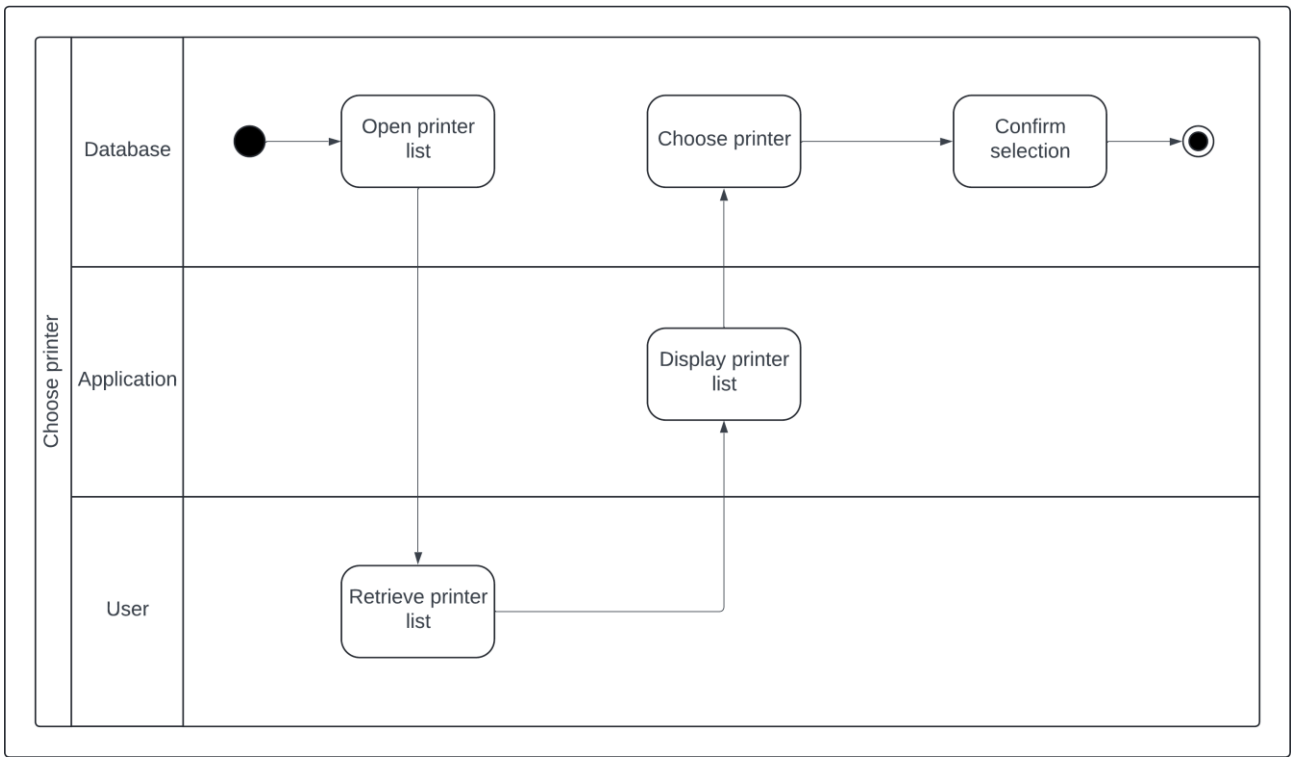
This diagram shows the activities performed by the student and system while uploading documents. The process begins with a student choosing the file type. If the file type is allowed (configured by SPSO), the student can then choose and upload the document. The process ends after the student checks and confirms the document has been uploaded.

3. Specify printing properties



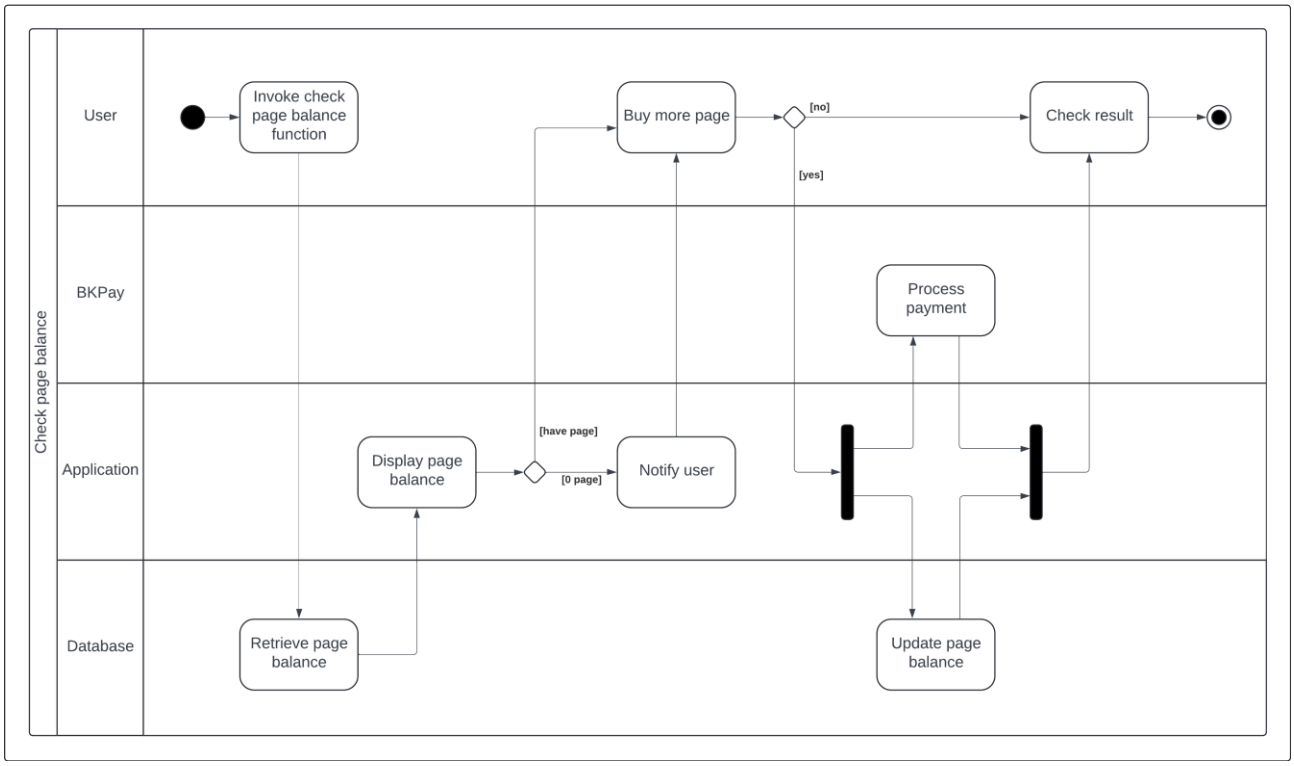
This diagram represents the specify printing properties process. The process begins when a student chooses which setting to apply, if they choose default setting, the system will invoke the check page balance process, otherwise they need to specify the reference (page size, page number, number of copies, etc.) before the system checks page balance. The process ends with the student confirming the correct properties.

4. Choose printer



This diagram shows the step when students want to choose a printer. The process begins when a student opens the printer page. The application will retrieve the printer list from the database and display it to the student. The student can browse and choose the printer they want. The process ends when the student confirms their selection.

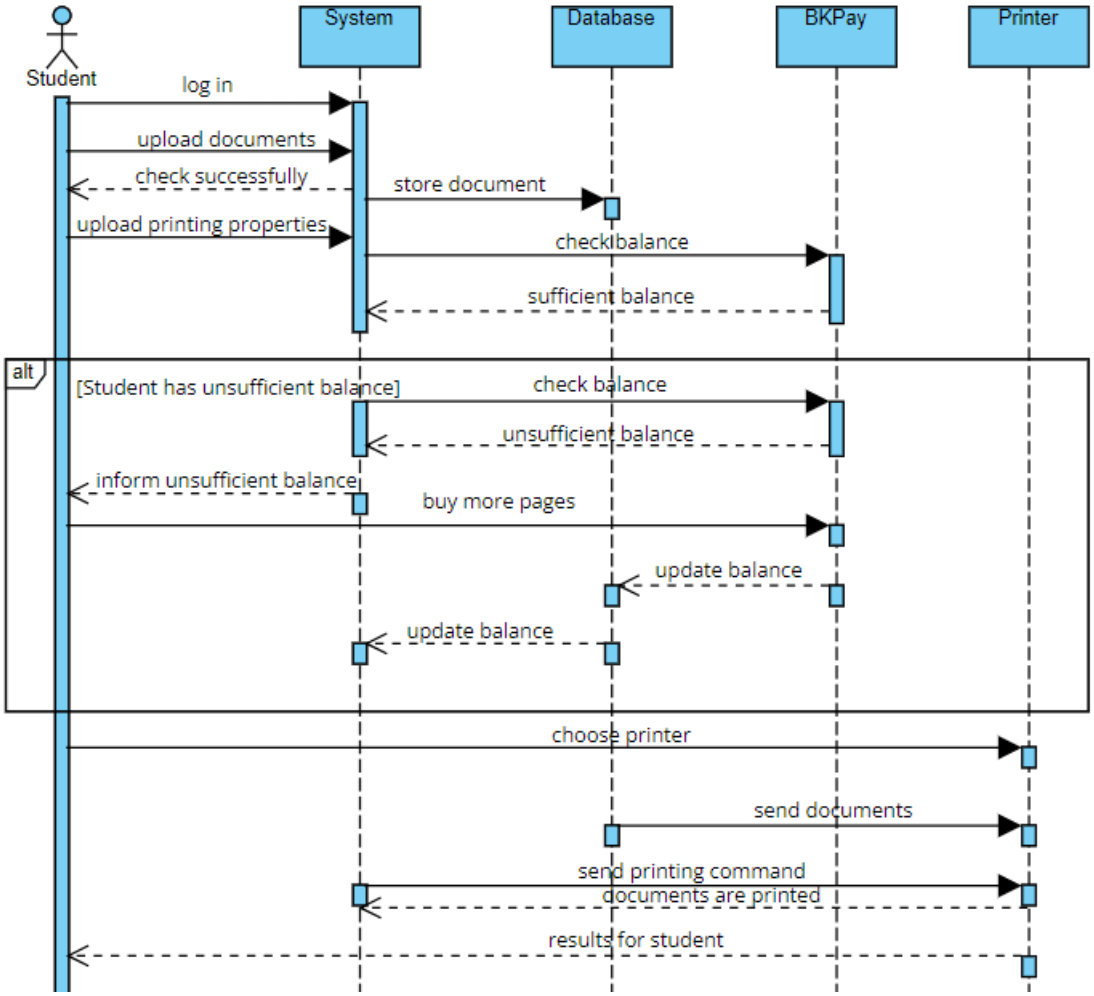
5. Check page balance



This diagram represents the process the system checks and the process to buy more pages from students. The activity starts when the check page balance function is invoked. The application then retrieves page balance of the students and displays it. If the page balance is 0 it will also notify the student. The student can then choose to buy more pages. If they do, the BKPay system will process the billing and the system will update the student's page balance. The process ends after the student has checked the result.

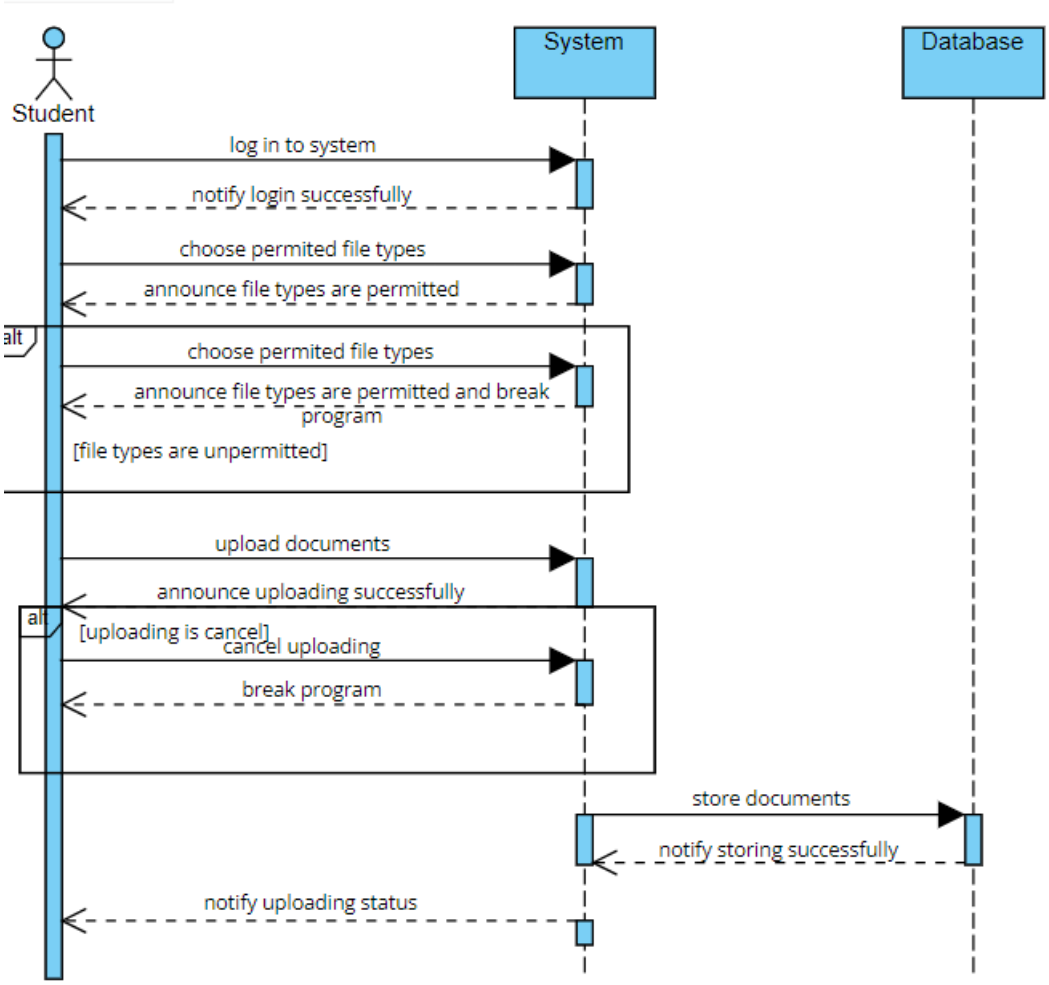
3.2 Sequence diagrams

1. Print document



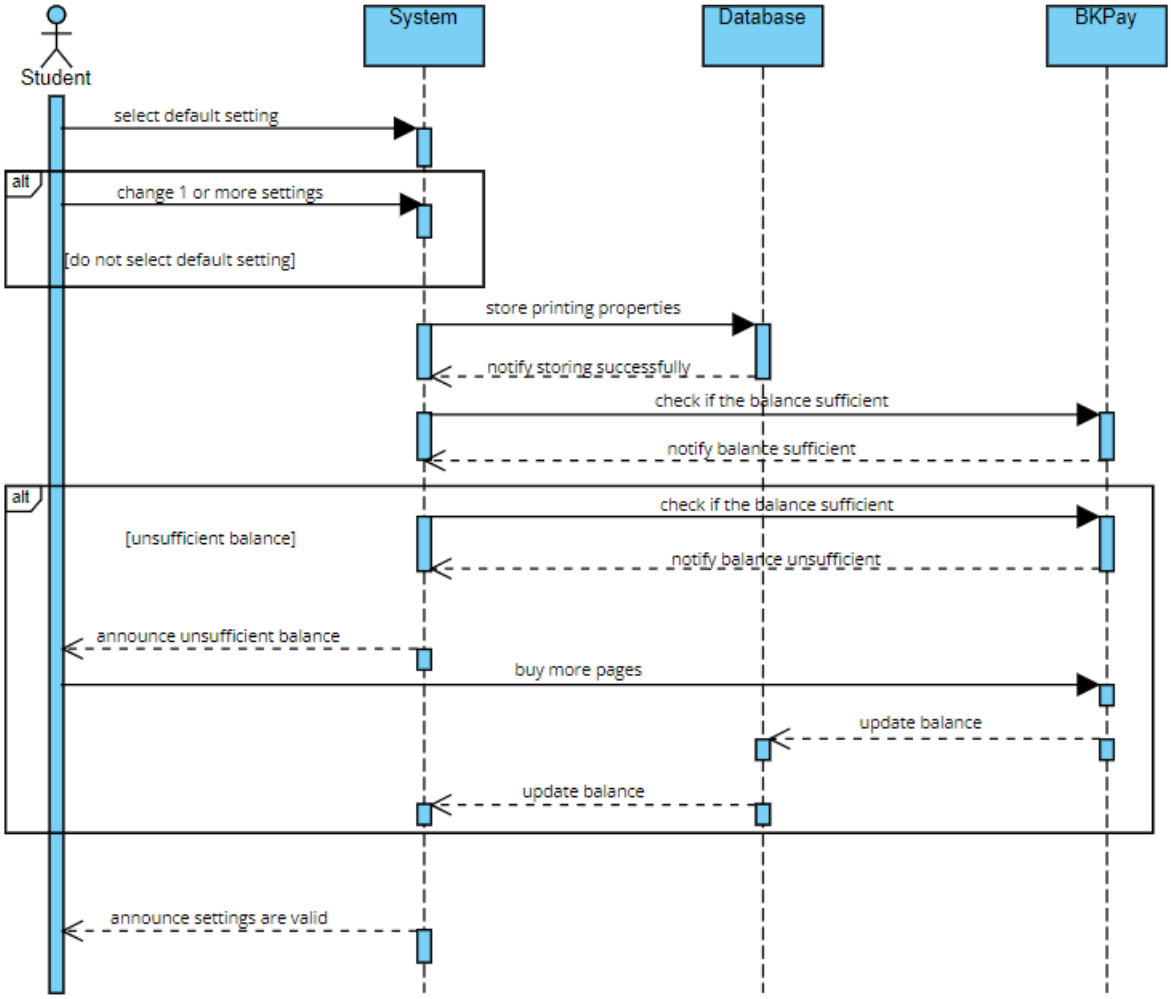
This sequence diagram illustrates the use case of printing a document. The key participants are Student (User), System, Database, BKPay and Printer. The sequence starts when the student logs in to the system. Then the system will check the information, if correct then the student subsequently uploads printing properties and then the system will check the balance and if it is sufficient, it will print the document, completing the use case.

2. Upload document



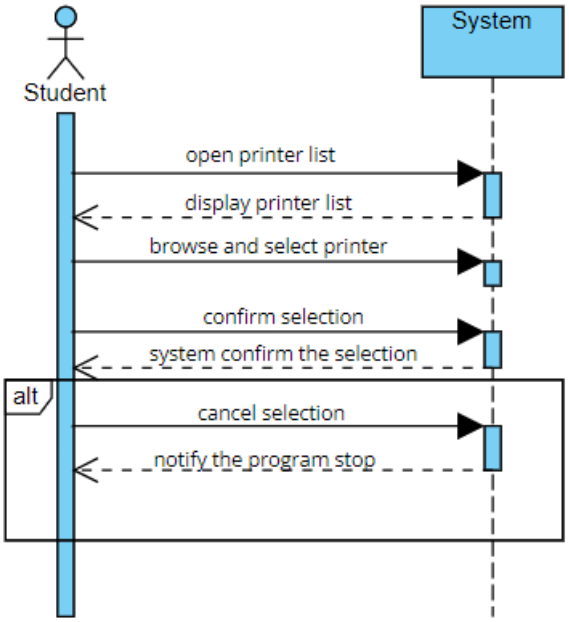
This sequence diagram illustrates the use case of uploading documents. The key participants are Student, System and Database. The sequence starts when the student logs in to the system. If log in successfully, then they choose the permitted file types and then upload the document, completing the use case.

3. Specify printing properties



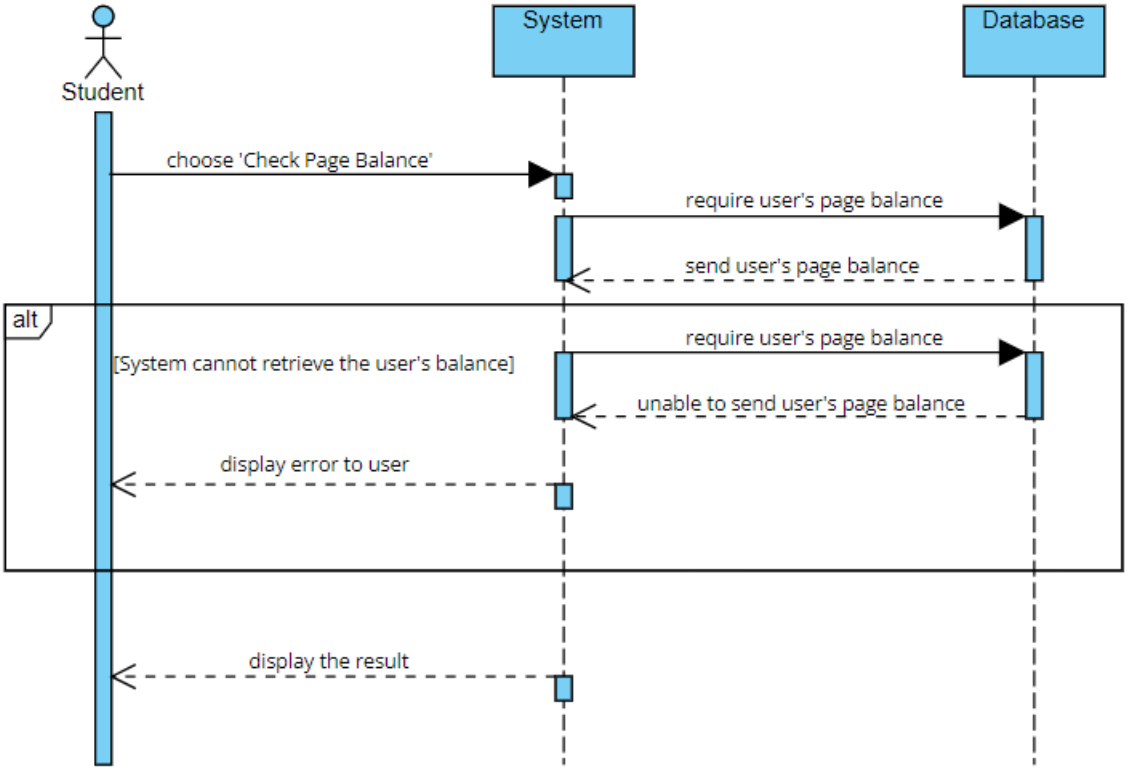
This sequence diagram illustrates the use case of specifying printing properties. The key participants are Student, System, Database and BKPay. The sequence starts when the student selects settings and the system will store the properties into the database, the system will also check the balance, if the balance is sufficient, they will announce the settings are valid, completing the use case.

4. Choose printer



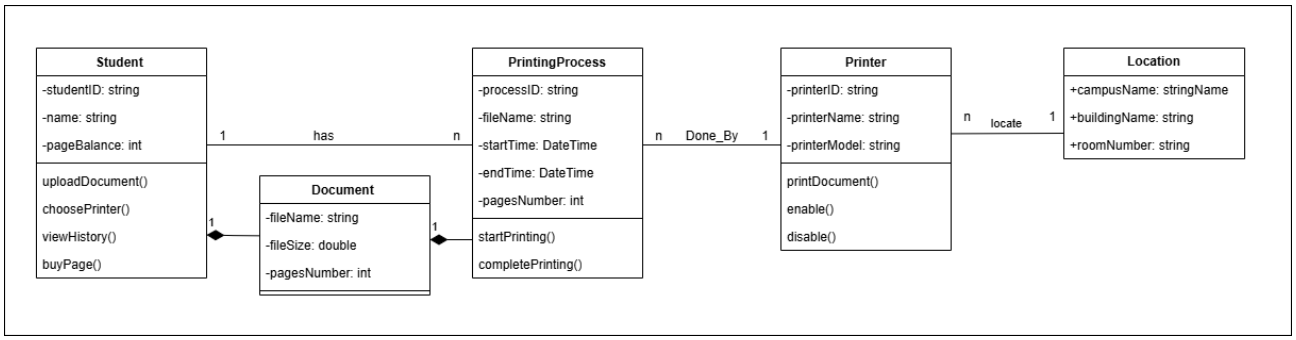
This sequence diagram illustrates the use case of choosing a printer. The key participants are Student and System. The sequence starts when the student opens the printer list, and browses then selects the printer. The system then announces that they confirm the selection, completing the use case.

5. Check page balance



This sequence diagram illustrates the use case of checking page balance. The key participants are Student, System and Database. The sequence starts when the student chooses the ‘Check Page Balance’ option. The system will require the database to send the user’s balance, after they send the balance, the system will display it to the user, completing the use case.

3.3 Class diagram



3.4 Wireframe

The following designs are UI for students' account

Trang chủ >> In tài liệu

Tải tệp lên: Software Engineering.pdf

Chọn máy in: B4-02

Cài đặt thuộc tính:

Số bản in: 1

Hướng giấy:	Dọc	In 1 mặt/ In 2 mặt:	In 1 mặt
Kích thước:	A4	In theo bộ hoàn chỉnh/ In không theo thứ tự:	In theo bộ hoàn chỉnh
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Bản xem trước

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Trang chủ >> Mua thêm trang

Giá tiền hiện tại:	300đ / trang A4
Hình thức thanh toán:	Chuyển khoản online

Số trang giấy A4 muốn mua: 50

Lưu ý: nhập số chẵn

Tổng cộng: **15,000 đ**

Thanh toán


Trang chủ >> In tài liệu
Tải tệp lên:
Chọn máy in:
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P. 301, H6
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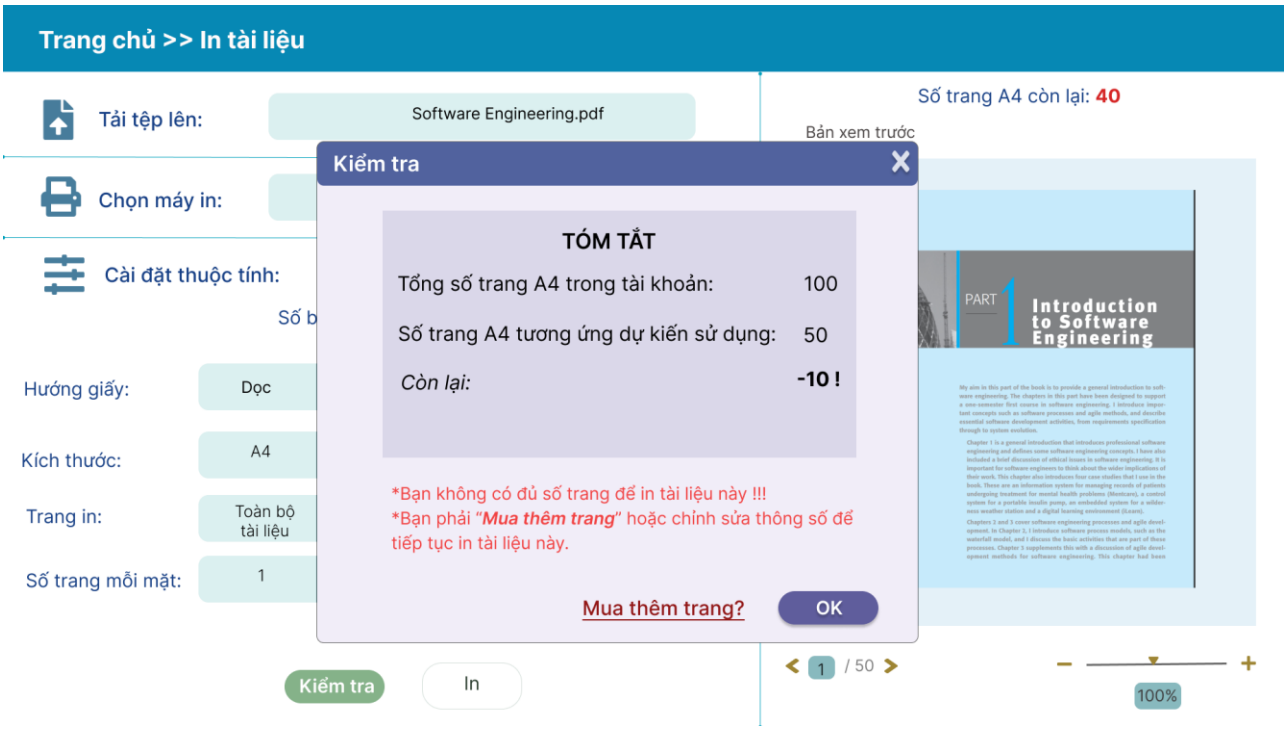
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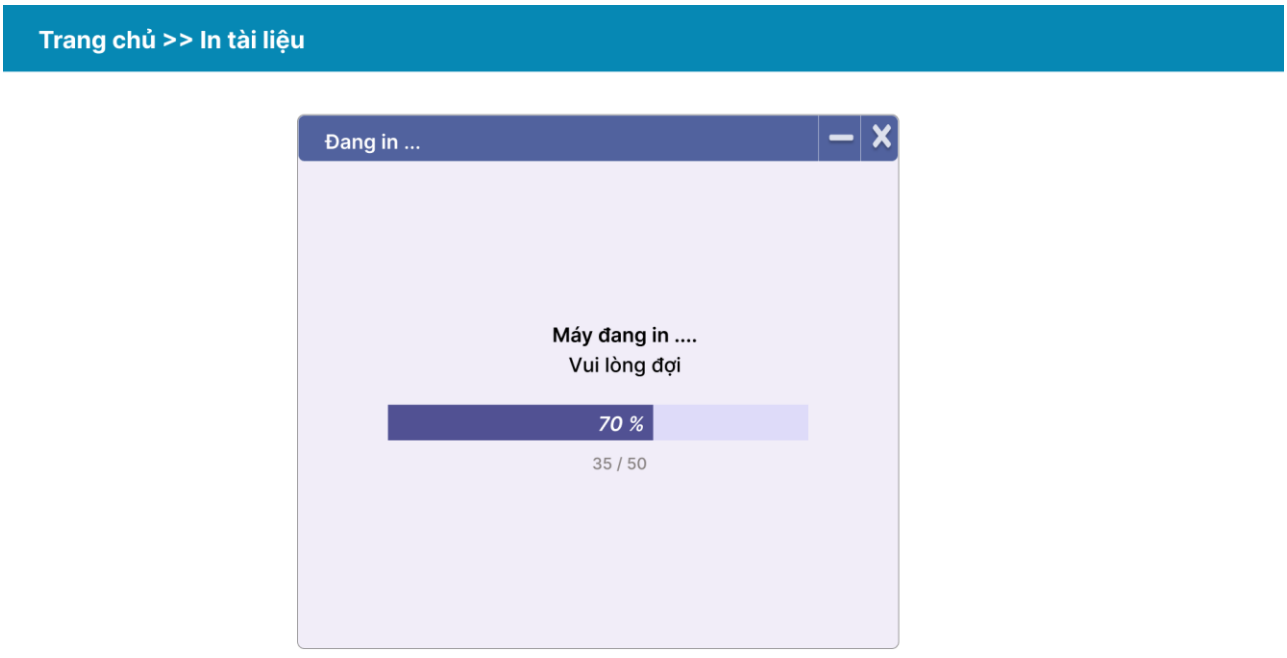
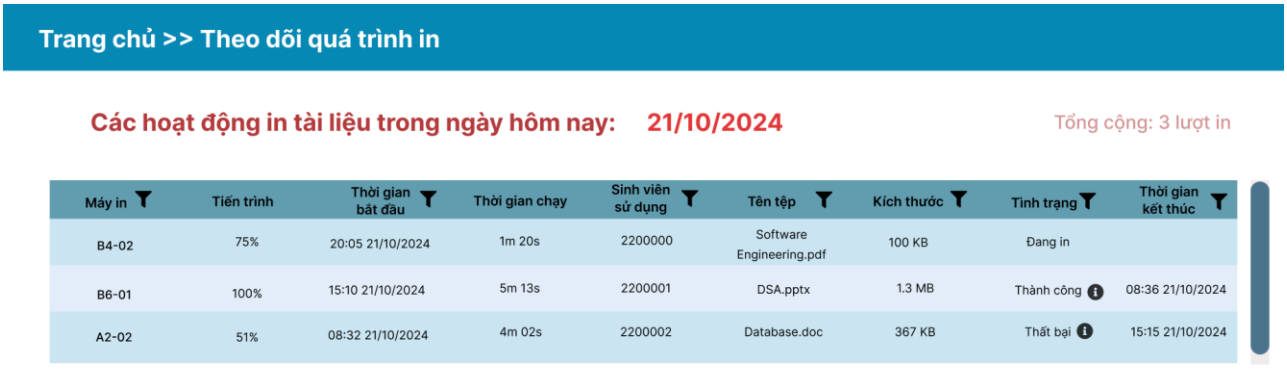
TÓM TẮT
Tổng số trang A4 trong tài khoản: 100
Số trang A4 tương ứng dự kiến sử dụng: 50
Còn lại: -10 !
*Bạn không có đủ số trang để in tài liệu này !!!
*Bạn phải "Mua thêm trang" hoặc chỉnh sửa thông số để tiếp tục in tài liệu này.
Mua thêm trang?
OK
PART 1
Introduction to Software Engineering
1 / 50
100%


Trang chủ >> In tài liệu
Đang in ...
Máy đang in ....
Vui lòng đợi
70 %
35 / 50

The following designs are for SPSO to manage students and printers



Users need to authenticate using the central HCMUT_SSO authentication service