
Software Requirements Specification

for

Student Smart Printing Service

Version 5.0 approved

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Revision History

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All members	5/12/2024	Task 4 done	4.0
All members	12/12/2024	Task 5 done	5.0

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

1.1 Domain Context

Printing has long been an essential need in the learning process of students at universities, including students at HCMUT. They often need to print lecture slides, textbooks or old exam papers to study and prepare for exams since printed documents make it easier to take notes, and able to focus more than viewing online documents. Some professors may also require students to print the report for the evaluation of the course. As a result, printing becomes a necessary part of student life.

However, students often print at private printing facilities, as they have not received any support from the university. This can lead to several difficulties for both students and the university, such as:

- Most students do not know the location of printing facilities around the school, making it hard and time-consuming to find one immediately. Sometimes the students need to go off-campus to print documents.
- Using external printing services can lead to the disclosure of personal documents and information.
- The operation time of printing facilities is limited, which can lead to the long waiting time for printing, especially in the early morning
- Transferring files can cause file errors. Students also do not know which file formats are supported by the printer
- Printing parameters are often adjusted by the printing facility, sometimes not satisfying students' requirements.
- Payment for printing sometimes is expensive, especially when printing textbooks or long reports.
- Since printing is done by printing facilities, the number of printer is limited

To support students in the learning process, HCMUT intends to build a Student Smart Printing Service (HCMUT_SSPPS) for serving students in its campuses to print their documents. Students then access the service through a web-based app and a mobile app and print their own documents.

1.2 Stakeholders and Needs

Students, teachers, professors, staff (End-users):

- Upload a document file onto the system, choose a printer, and specify the printing properties such as paper size, pages (of the file) to be printed, one-/double-sided, number of copies, etc and print the document from anywhere.
- View printing history and log details (dates, printer used, number of pages, etc.). Monitor page balance. Purchase additional printing pages.

- Fast service with affordable price.

Student Printing Service Officer:

- Manage and configure the printing system.
- View the printing history.
- View the reports of the using of the printing system.

University Finance Department:

- Integrate the printing payment system with BKPay system.

IT department:

- Ensure the smooth operation, system security and privacy, and system uptime of the printing services. Provide technical support and troubleshooting for system bugs or issues. Integrate the printing authentication system with HCMUT_SSO authentication service.

University Administration:

- Set policies for the printing services.

University Guest and other:

- Has special access to the printing services if authorized by the University Administration.

1.3 Benefits of the System

Students, Teachers, and Staff (End-users):

- They can easily print documents from anywhere by uploading files, selecting printing properties, and choosing a printer. The system offers a convenient way to monitor page balances, view detailed printing logs, and purchase additional printing pages. It provides fast, affordable printing services with flexible printing options like paper size, one-/double-sided printing, and number of copies.

Student Printing Service Officer (SPSO):

- SPSS system allows the SPSO to add, enable, or disable printers as needed and monitor the entire campus printing activity. They can adjust system settings like permitted file types and student page allocations, making it adaptable to changing requirements. With access to detailed logs and usage reports, the SPSO can ensure smooth operation while tracking system usage and generating insights for future improvements.

University Finance Department:

- The integration of the BKPay system facilitates seamless online payments for purchasing additional printing pages, streamlining financial transactions related to printing services.

IT Department:

- The system enhances security with HCMUT_SSO authentication, while centralized printer management allows for efficient maintenance. Detailed logs help the IT department address issues promptly and scale the system as needed.

University Administration:

- They gain control over policy settings for the printing services, ensuring they align with university standards and student needs.

University Guests:

- With authorization, could be a temporary account or account provided from the Administration, guests can access the printing services, providing flexibility for non-HCMUT users.

1.4 Functional Requirements

Students:

- Students can access and view personal information.
- Students can select files from their devices and upload them to the system.
- Students can choose a specific printer based on their desired location.
- Students can choose the time to collect the printed document.
- The system must send an email notification to students once the print job is completed.
- Students have options to adjust print settings such as page size, specific pages to print, single-sided or double-sided printing, and the number of copies.
- The system must store all information about each student's print jobs, including student ID, printer ID, start and end times, and the number of pages printed for each page size.
- Students can access and review their previous print job details and filter data based on factors such as the time period or the printer used.
- The system must allocate a certain number of print pages to students at the beginning of each semester.
- Students can purchase additional print pages through the integrated electronic payment system.

Student Printing Service Officer (SPSO):

- SPSO has the right to access and view account information for all students.
- SPSO has the right to access and view information for all printers available in the system.
- SPSO can add, activate, or deactivate any printer in the system.
- SPSO can manage certain system configurations, including changing the number of print pages allocated to students on a regular basis, selecting the date for allocation, determining the file formats allowed for student uploads, and other configurations if necessary.
- The system must generate periodic statistical reports, both monthly and yearly, accessible only to SPSO.

University Finance Department:

- The system must integrate at least one electronic payment method.
- The system must send a payment receipt to students via email.
- The system must integrate with the BKPay system to process payments for additional printing pages.
- The system must provide real-time payment status updates from BKPay to confirm successful or failed transactions, allowing students to instantly use purchased printing pages.
- Upon successful payment through BKPay, the system must generate an official receipt and send it to the student via email for record-keeping purposes.
- The system must log all payment transactions made through BKPay, including details such as the student ID, amount paid, transaction time, and payment status, for auditing and financial reporting.
- The system must allow the University Finance Department to process refunds or resolve disputes related to payment errors, coordinating with BKPay for the necessary adjustments.

IT department:

- The IT department must ensure that the printing services maintain a minimum of 99.9% uptime.
- The IT department must implement robust security measures to protect sensitive student data, including personal and financial information.
- The IT department must integrate the printing system's authentication process with the HCMUT_SSO authentication service, ensuring that students use their university credentials for secure and unified access to the printing services.
- The IT department must provide technical support and timely troubleshooting for any system bugs or operational issues reported by users.
- The IT department must regularly update and maintain the printing services infrastructure.

- The system must keep detailed logs of user access and system operations, which the IT department must monitor to detect and respond to unauthorized access attempts or other security incidents.

University Administration:

- The University Administration must have the ability to define and manage user roles (e.g., students, staff, IT, SPSO) and assign permissions accordingly, ensuring proper access control to the printing system based on roles and responsibilities.
- The system must allow the University Administration to configure and enforce usage policies, such as the number of free print pages allocated to students each semester, restrictions on printing certain file types, or printing quotas based on academic levels.
- The system must generate detailed reports on printing-related expenses, revenue from additional page purchases, and overall usage patterns.
- The system must support audit trails that log key activities, including user print history, system access, and transaction data.
- The University Administration must be able to configure and manage automated notifications sent to students and staff regarding important events, such as page allocation, system downtime, or policy changes.
- The University Administration must have the ability to customize key settings of the printing system, such as print limits, default print settings, allowed printer locations, and system-wide policies to meet the needs of the institution.

Guests (Unauthenticated users):

- The system provides a homepage containing general information.
- Guests can view information about the system.
- Guests can explore key features of the system.
- Guests can view the system's user guide.
- Guests can contact support through the provided contact information on the system.
- Guests can log into the system to access services.
- The system must assign roles to logged-in users, including students, SPSO, and printer operators.

1.5 Non- Functional Requirements

Performance Requirements:

- The system must be able to handle 1000 print requests simultaneously.
- The response time from receiving the print request to executing it must not exceed 3 seconds.

- The system must support uploading files up to 100 MB, with the upload time not exceeding 5 seconds for smaller files (up to 5 MB) and scaling appropriately for larger files.
- The response time from successful payment completion to updating the user's balance must not exceed 15 seconds.
- The system must be scalable enough to support 5000 simultaneous accesses while maintaining optimal performance.

Reliability Requirements:

- The system must automatically back up student and transaction data daily to prevent data loss, and ensure that backup recovery is possible within 1 hour in case of a system failure.
- In case of a printer malfunction, the system must redirect active print jobs to alternative printers and notify the student of the change without data loss.

Compatibility Requirements:

- Web-based applications must be able to function on the latest versions of browsers.
- The user interface on the web platform must display well across various screen sizes (PC, tablet, phone, etc.).

Availability Requirements:

- The system must be available 24/7 for students to upload files, configure print jobs, and review print history, with exceptions only for scheduled maintenance.
- The average recovery time after a system failure must not exceed 30 minutes during the university's working hours.
- Maintenance windows must be scheduled during off-peak hours and should not exceed 2 hours per month, with advance notice provided to all users.

Security Requirements:

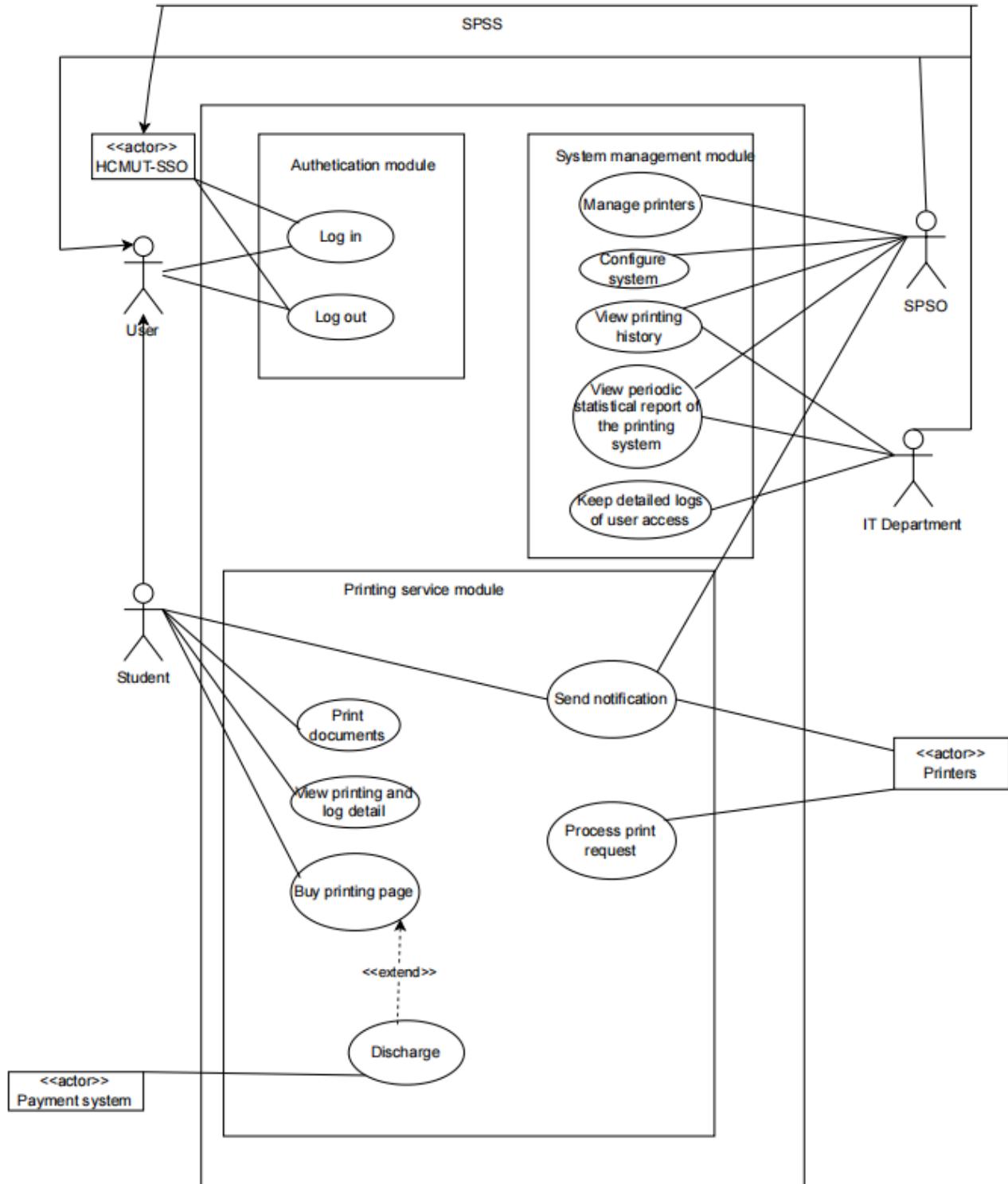
- All users must be authenticated through the HCMUT_SSO authentication service before using the system.
- The payment processing gateway must comply with PCI DSS standards.
- Only the document owner can access their documents stored on the system.

Usability Requirements:

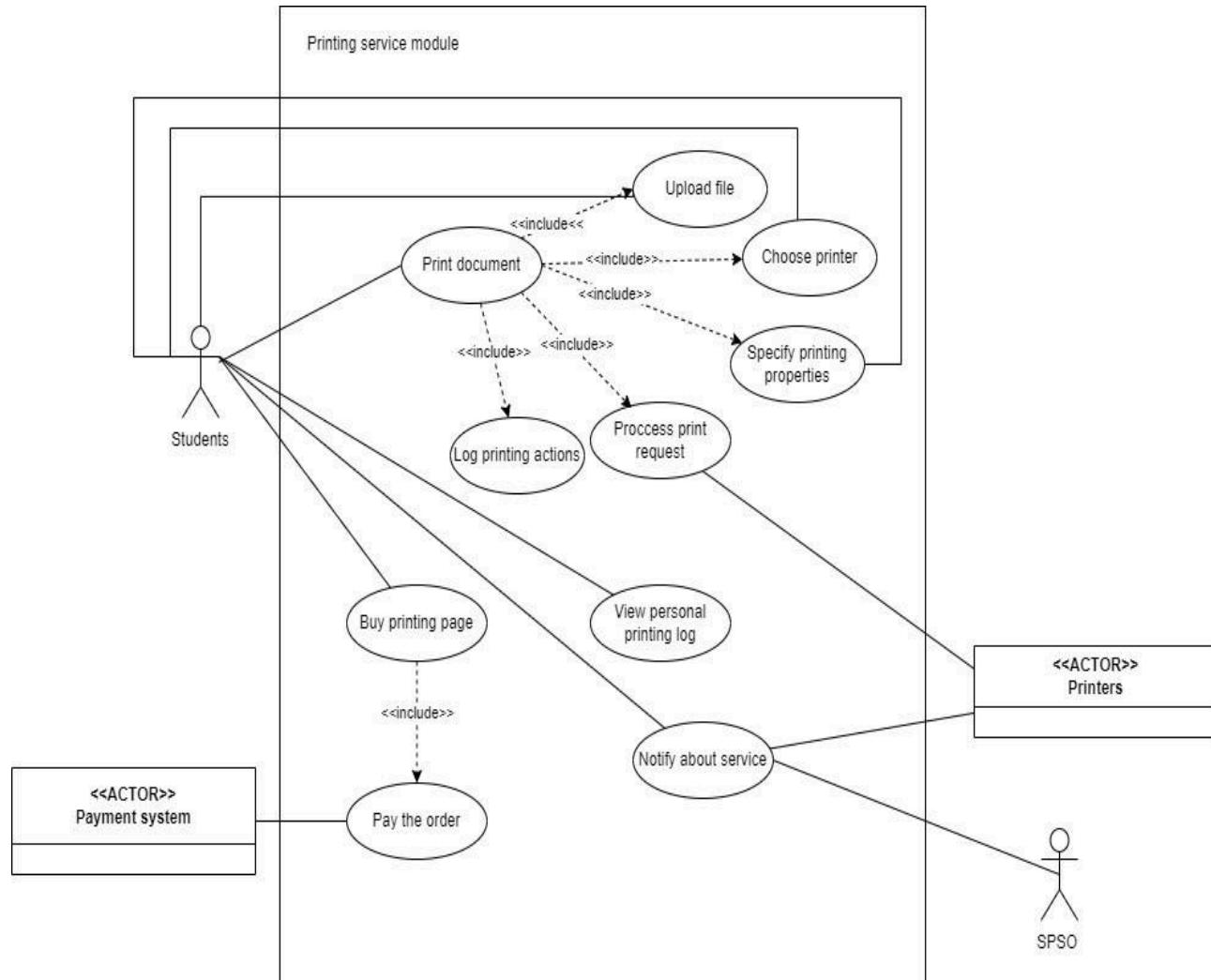
- The system must be available in 2 languages: Vietnamese and English (for abroad student)
- Ensure students, teachers and staff be able to use the service after 5 minutes guided

2. Use-case Diagrams (1.3)

2.1 Use-case Diagram for the Whole System



2.2 Use-case Diagram for printing service module



2.3 The Details of Usecases in Printing service Module

1. Print document

Name	Print document
Actor	Student
Description	Student performs a printing request to the system.
Trigger	Student indicates that he/she wants to request a printing process through a button on the User interface.
Preconditions	Printing system is available.

	<p>Student is logged in.</p> <p>Student has enough printing credit.</p>
Postconditions	Printing service is requested successfully and put in the queue for printing.
Normal flow	<ol style="list-style-type: none"> 1. Student upload file(s) onto the printing system, the printing system will store the uploaded file(s). 2. Student chooses which printer to print. 3. Student specifies the printing properties: number of pages, layout, color. 4. After configuring, the printing system will show the preview of the document to student, and how much printing credit it cost. 5. Student use available printing credit to pay for the service. If the printing credit is not enough, student can proceed to BKpay, or the printing service will be cancelled. 6. The printing system accepts the printing request, put the printing request to the queue, and notify the student about the details of the printing order, estimate when the printing will be finished. 7. The printing service is finished, student can collect the printing order.
Exception	<p><i>Exception 1:</i> at step 4</p> <p>4a. The system checks the remaining amount of paper and notifies the students to purchase more if it runs out.</p>

2. View personal printing log

Use Case	View Personal Printing Log
Description	Allows a student to view their own printing history and a summary of printed pages (e.g., total pages, A4, A3, etc.) for a selected time period.
Actor	Student
Triggers	The user selects the option to view their printing log from the

	dashboard or menu.
Preconditions	The student is authenticated by the HCMUT_SSO system. The student has logged printing actions in the system.
Postconditions	The system displays the printing history for the selected time period. The system shows a summary of printed pages categorized by page size.
Normal Flow	<ol style="list-style-type: none"> 1. The student logs into the system. 2. The student navigates to the "View Personal Printing Log" option. 3. The system prompts the student to input a time period for the log. 4. The student selects the start and end dates. 5. The system retrieves and displays the printing history of the student for the selected period. 6. The system shows a summary of printed pages, divided by page size (e.g., A4, A3).
Alternative Flows	<p><i>Alternative flow 1:</i> at step 5</p> <p>5a. If there are no logs for the specified period, the system informs the student and displays a message such as "No printing history available for this period."</p>
Exceptions	<p><i>Exception 1:</i> at step 5</p> <p>5a. The system may fail to retrieve data if there are connection issues or database problem. In this case, an error message is displayed.</p>

3. Notify about service

Use Case	Notify About Service
Description	The system sends notifications to students and SPSO about important events related to the printing service, such as job completion, system maintenance, or service disruptions.
Actor	Students, SPSO.
Triggers	A printing job is completed. Scheduled maintenance or service downtime is announced. Any changes in policies or system status that need to be communicated.
Preconditions	The student or SPSO must be logged into the system. The system must have the correct contact information (email) for the

	user.
Postconditions	The student or SPSO receives a notification via email or system alerts.
Normal Flow	<ol style="list-style-type: none"> 1. The system detects a relevant event (e.g., print job completion, system maintenance). 2. The system retrieves the necessary contact information for the student or SPSO. 3. The system sends an email or in-system notification to the student or SPSO. 4. The student or SPSO receives the notification and takes necessary actions if required.
Alternative Flows	<p><i>Alternative flow 1:</i> at step 3:</p> <p>3a. If the system cannot send the notification due to incorrect contact details or system error, it retries or logs the issue for later resolution.</p>
Exceptions	<p><i>Exception 1:</i> at step 3:</p> <p>3a. Notification fails due to incorrect email or system error.</p> <p>3b. Student or SPSO is unable to access the email or system notification.</p>

4. Upload file

Use-case name	Upload file
Actor	Student
Triggers	Student click on the button “Upload file”
Description	Student upload file in order to print documents
Preconditions	<ol style="list-style-type: none"> 1. Student’s device is able to connect with the system 2. Student has logged in SPSS
Postconditions	File is uploaded successfully
Normal flow	<ol style="list-style-type: none"> 1. Student click on upload file section 2. System opens an interface for selecting a file to upload 3. Student selects file to upload

	4. Student presses confirm button
Alternative flows	<p><i>Alternative flow 1:</i> at step 3</p> <p>3a. Student can choose file from own device or cloud.</p> <p>3b. Student can drag file from own device into upload file section</p>
Exceptions	<p><i>Exception 1:</i> at step 3</p> <p>3a. The file upload process failed due to invalid file format. System sends notifications for student to reupload.</p>

5. Choose printer

Use Case	Choose printer
Description	Allows a student to see which printer is available and choose printing module
Actor	Student
Triggers	The student chooses the campus and the printer.
Preconditions	<p>The student has log in to the system and choose printing service</p> <p>The student is authenticated by the HCMUT_SSO system.</p>
Postconditions	The selected printer is assigned to process following printing request
Normal Flow	<ol style="list-style-type: none"> 1. The student navigates to the printing module. 2. The system display available printer 3. The student selects one of available printers. 4. The system validates the request 5. The student confirms choosing selected printer. 6. The printer is selected to process following task
Alternative Flows	<p><i>Alternative 1:</i> at step 3</p> <p>3a. If there are no available printer for a period (out of ink, under maintenance), system will show a notice out of service.</p> <p>3b. If all the printer is busy for a short time, students can</p>

	request a printing service in advance. The requests will be pushed in the waiting queue.
Exceptions	<p><i>Exception 1:</i> at step 5</p> <p>5a. If there is a connection issue, the system displays an error message and the process is halted.</p>

6. Specify printing properties

Use Case	Specify Printing Properties
Description	Allows a student to specify various properties for their print job, such as paper size, number of copies, single/double-sided, specific pages to print, etc.
Actor	Student
Triggers	The student clicks on the Printing Specifications button.
Preconditions	<p>The student has uploaded a document file and chosen a printer, prompting the system to request the specification of printing properties.</p> <p>The student is authenticated by the HCMUT_SSO system.</p> <p>The student has uploaded a document file to the system.</p> <p>The student has chosen a printer.</p>
Postconditions	The system applies the specified printing properties to the chosen document and prepares for printing.
Normal Flow	<ol style="list-style-type: none"> 1. The student uploads a document and selects a printer. 2. The system prompts the student to specify the printing properties. 3. The student specifies properties such as paper size (e.g., A4, A3), number of copies, pages to print, single- or double-sided printing, etc. 4. The system validates the properties. 5. The student confirms the settings. 6. The system processes the print request using the specified properties.
Alternative Flows	<p><i>Alternative flow 1:</i> at step 5</p> <p>5a. If the student selects invalid properties (e.g., unsupported paper type, configured by SPSO, size or page range), the</p>

	<p>system displays an error and prompts for correction.</p> <p><i>Alternative flow 2:</i> at step 6</p> <p>6a. If the student leaves the properties unspecified, the system applies default settings (e.g., A4, single-sided, all pages).</p>
Exceptions	<p><i>Exception 1:</i> at step 8</p> <p>8a. If there is a connection issue or the printer is unavailable, the system displays an error message and the process is halted.</p>

7. Log printing actions

Name	Log printing actions
Actor	Student
Description	Student views the history of his/her printing requests.
Trigger	Student clicks on "View Printing History" in the User interface.
Preconditions	<p>Printing system is available.</p> <p>Student is logged in.</p>
Postconditions	<p>Student can view a list of his/her previous printing requests.</p> <p>Student can see details about each request.</p>
Normal flow	<ol style="list-style-type: none"> 1. Student clicks on "View Printing History" in the User interface. 2. The User interface send a query to the backend to retrieves the student's printing history from the database. 3. The User interface displays a list of student's printing requests. 4. Student can click on the request to view more details.
Alternative Flows	<p><i>Alternative flow 1:</i> at step 2</p> <p>2a. Network error: If there is a network error while retrieving the student's printing history, display an error message.</p>

	<p>2b. Server error: If there is a server error while retrieving the student's printing history, display an error message.</p> <p><i>Alternative flow 2: at step 3</i></p> <p>3a. No printing history: If the user has no previous printing requests, the app displays a message indicating that there is no history to view.</p>
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8. Process print request

Name	Process printing request
Actor	Student
Description	The system processes the request, prints the document, and notifies the user of the completion.
Trigger	The queue for printing documents is not empty.
Preconditions	Printing system is available. The printer of the request is available.
Postconditions	The document(s) is finished printing.
Normal flow	<ol style="list-style-type: none"> 1. The system periodically checks the printing queue, if the queue is not empty, the system takes the first document in the queue and proceeds to the next step, else the system remains in idle mode. 2. The system validates the printing request, checks printer availability, and prepares the document for printing. 3. The system sends the document to the selected printer. 4. The printer receives, processes, and prints the document. 5. Once the printer is complete, the system performs a callback to the user interface.
Alternative Flows	<p><i>Alternative flow 1: at step 2</i></p> <p>2a. No available printers: If there are no available printers, the system performs a callback which sends an error</p>

	<p>message to the user and suggests alternative options.</p> <p><i>Alternative flow 2:</i> at step 3</p> <p>3a. Document format not supported: If the document format is not supported by the printing service, the system performs a callback which sends an error message and suggests converting the document to a supported format.</p>
Exceptions	<p><i>Exception 1:</i> at step 4</p> <p>4a. Printer failure: If the printer fails during the printing process, the system displays an error message and suggests trying again later or selecting a different printer. The system also notifies the SPSO.</p>

9. Buy printing page

Name	Buy printing page
Actor	Student
Description	The system allows students to purchase additional printing pages through the printing service module.
Trigger	The student needs to purchase additional printing pages.
Preconditions	The student is logged into the printing service system.
Postconditions	The student's account is updated with the purchased printing pages.
Normal flow	<ol style="list-style-type: none"> 1. The student accesses the "Buy Printing Page" option in the printing service module. 2. The system displays available printing page packages and prices. 3. The student selects a desired package. 4. The system verifies the selection and prompts for payment. 5. The student confirms the purchase.
Alternative Flows	<i>Alternative flow 1:</i> at step 1

	<p>1.a. The student prints documents and lacks printing pages:</p> <ul style="list-style-type: none"> The system notifies the student of the paper shortage. The student chooses the “<i>Buy printing page</i>” option. <p><i>Alternative flow 2:</i> at step 3</p> <p>3.a. Student Requests More Information:</p> <ul style="list-style-type: none"> The system provides additional details about each package. The student reviews the information and selects a package.
Exceptions	<p><i>Exception 1:</i> at step 4</p> <p>4.a. Package Unavailable:</p> <ul style="list-style-type: none"> The system notifies the student that the selected package is unavailable. The student selects an alternative package or cancels the request.

10. Pay the order

Name	Pay the order
Actor	Student, Payment System
Description	The system handles the payment process for purchasing printing pages, ensuring secure and efficient transactions.
Trigger	The student initiates the payment process for a printing page order.
Preconditions	The student has selected a printing package to purchase.
Postconditions	The payment is processed, and printing pages are added to the student's account.
Normal flow	<ol style="list-style-type: none"> The student is redirected to the payment system. The payment system displays available payment options.

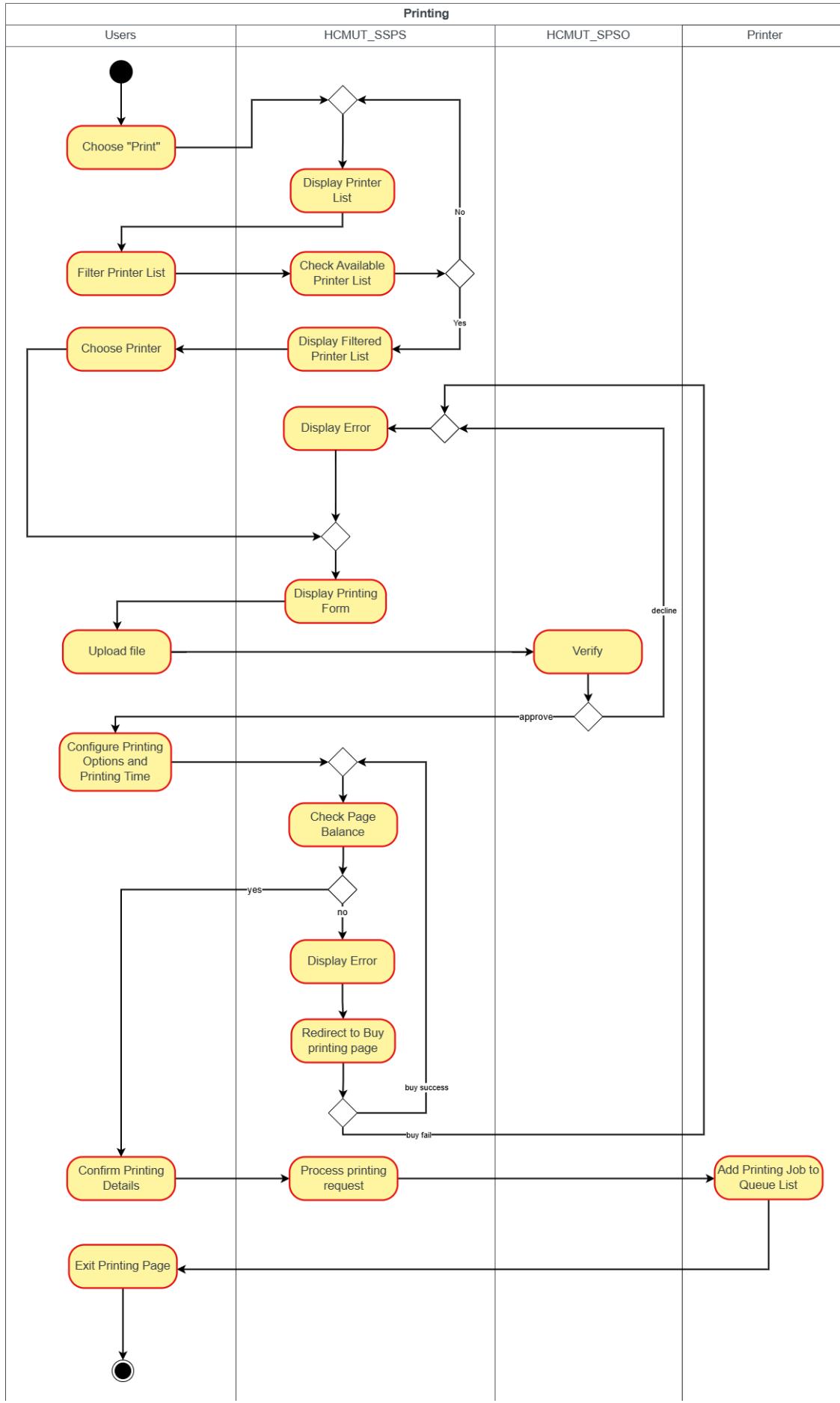
	3. The student selects a payment method and enters necessary details. 4. The payment system processes the transaction. 5. The system confirms the successful payment and updates the student's account.
Alternative Flows	None
Exceptions	<i>Exception 1:</i> at step 4 4.a. Payment Failure: <ul style="list-style-type: none"> · The system notifies the student of the payment failure. · The student is prompted to retry with the same or a different payment method.

3. System Modeling

3.1. Activity Diagram in Printing Service Module

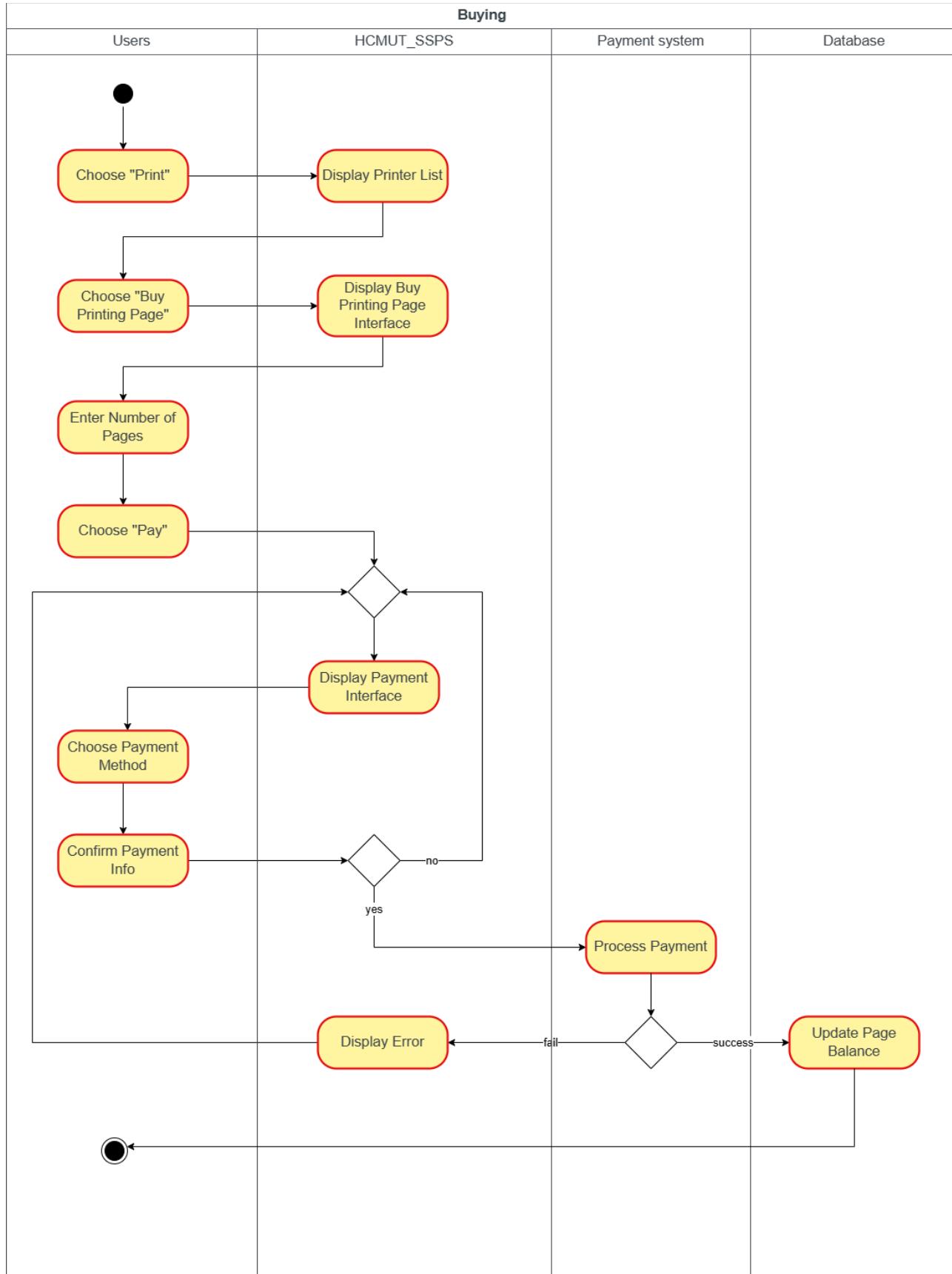
Print Document:

First, the customer selects the "Print Now" button on the navigation bar, and the system will display a list of printers. The customer will then filter the printers by location, building, and room. The system will check whether the printers that meet the filter criteria are available (not under maintenance). If no available printers meet the criteria, the system will return to displaying the list of printers. Otherwise, the system will show the list of printers that meet the criteria. Here, the customer will choose a printer, after which the system will display a form, and the customer will upload the file to be printed to the system. The content validation system will check if the file is valid. If the file is invalid, the system will report an error on the screen, and the user will need to upload the file again. Conversely, if the content validation is successful, the customer will enter information about the number of pages to print, print time, and print format. The system will then check if there is enough paper for the customer's print job. If not, it will notify the customer to reduce the number of pages or purchase more paper. Otherwise, the customer will confirm their print action, and the system will process it, then add the customer's printing information to the queue for processing.



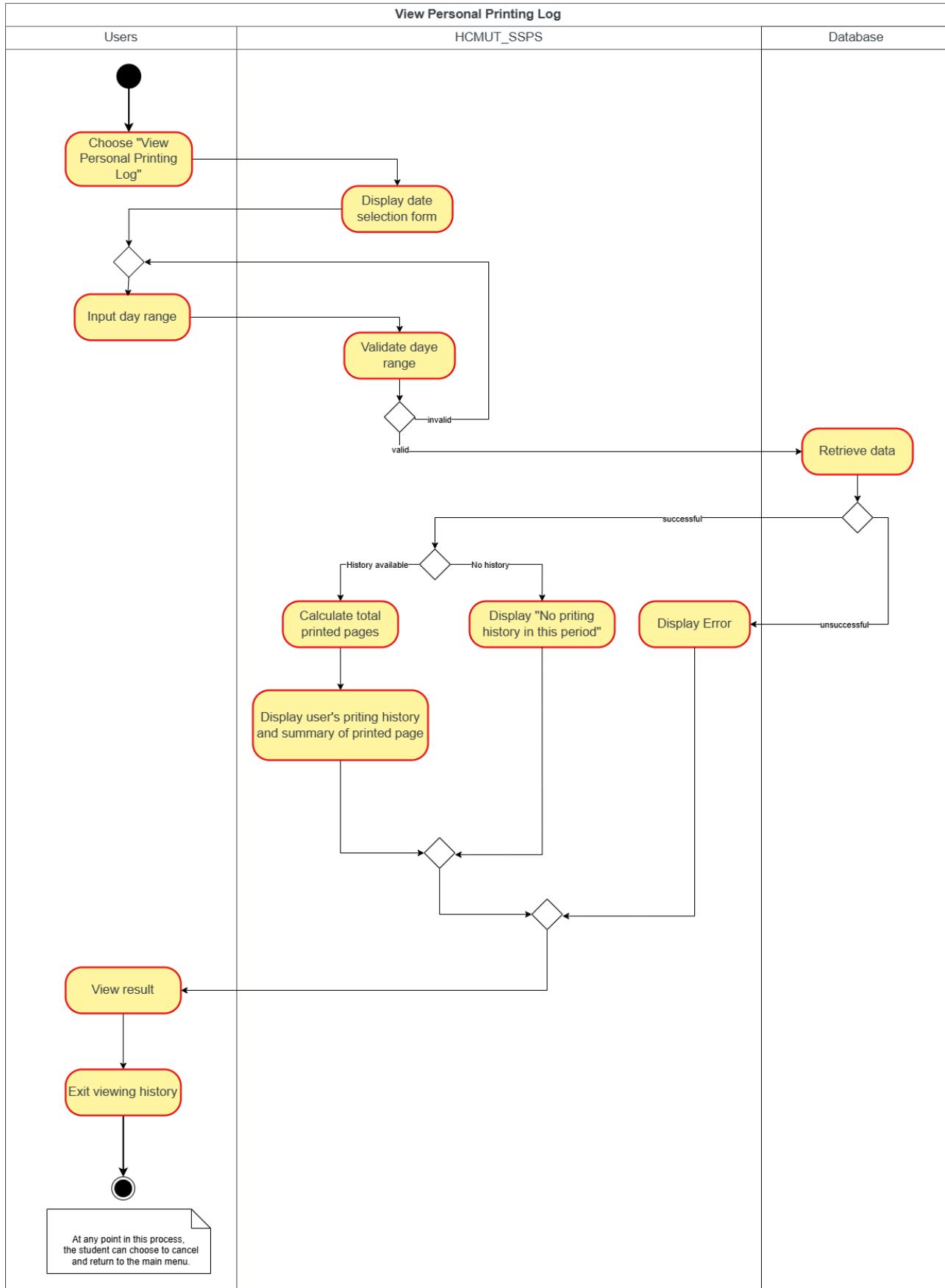
Buy Printing Page:

On the "Print Now" screen, the customer selects "Buy printing page," and the system will display the paper purchase screen. Next, the customer will enter the quantity of paper to buy and choose a payment method. The payment system will then process the transaction; if it fails, the system will display an error on the screen. Otherwise, the customer's paper quantity will be updated.



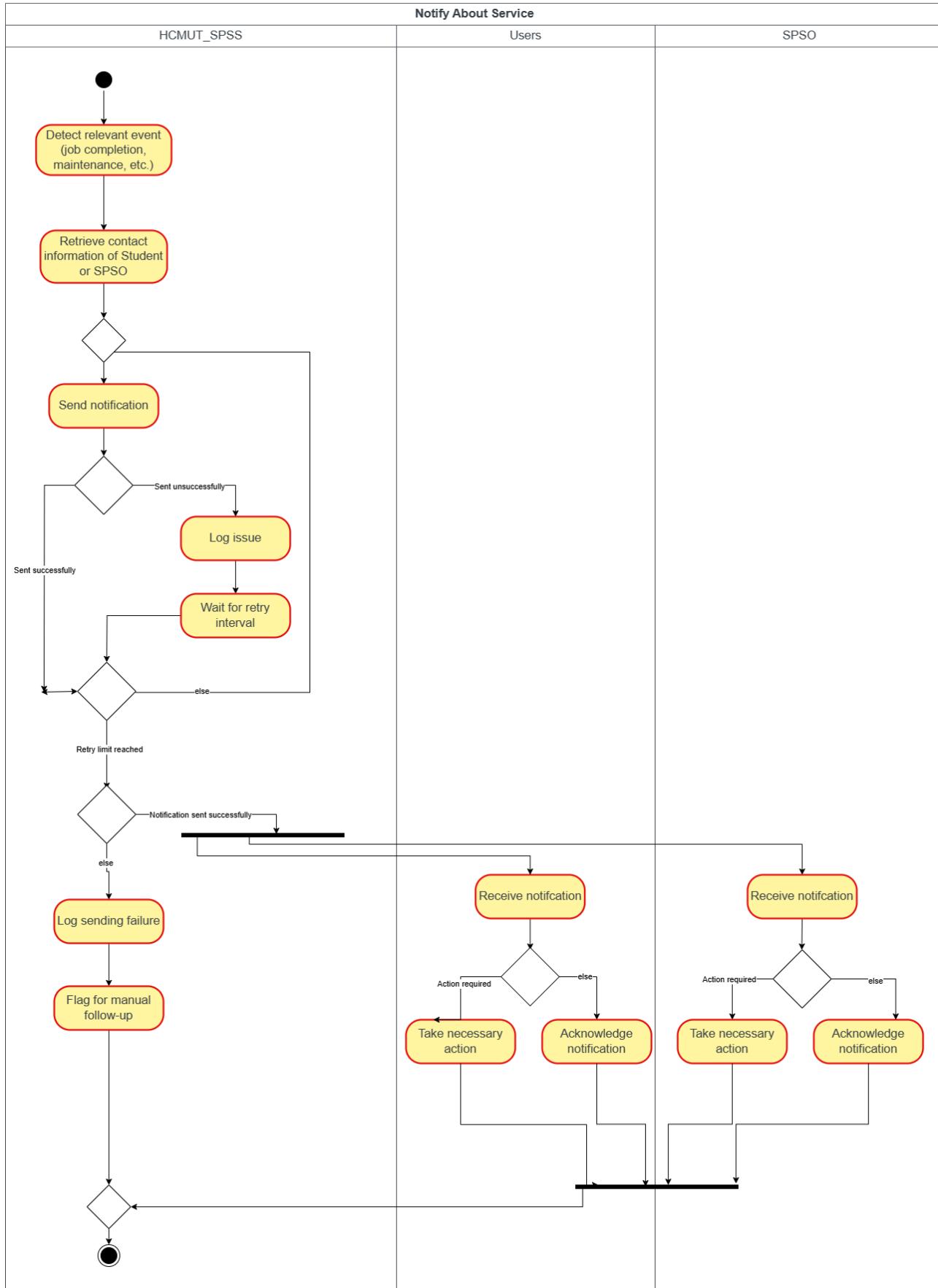
View Personal Printing Log:

The process begins when user chooses to "View Personal Printing Log". The system then displays a date selection form where the user inputs a day range. The input is validated, and if invalid, the user is prompted to input the range again. Once a valid date range is entered, the system retrieves data from the database. If the retrieval is successful, the system checks if there's printing history available for the specified period. If history exists, it calculates the total printed pages and displays the user's printing history with a summary. If no history is found, it displays a "No printing history in this period" message. In case of an unsuccessful data retrieval, an error is displayed. After viewing the results, the user can exit the viewing history. Throughout the process, there are decision points that guide the flow based on input validity, data retrieval success, and history availability. At any point, the user can choose to cancel the process and return to the main menu.



Notify About Service:

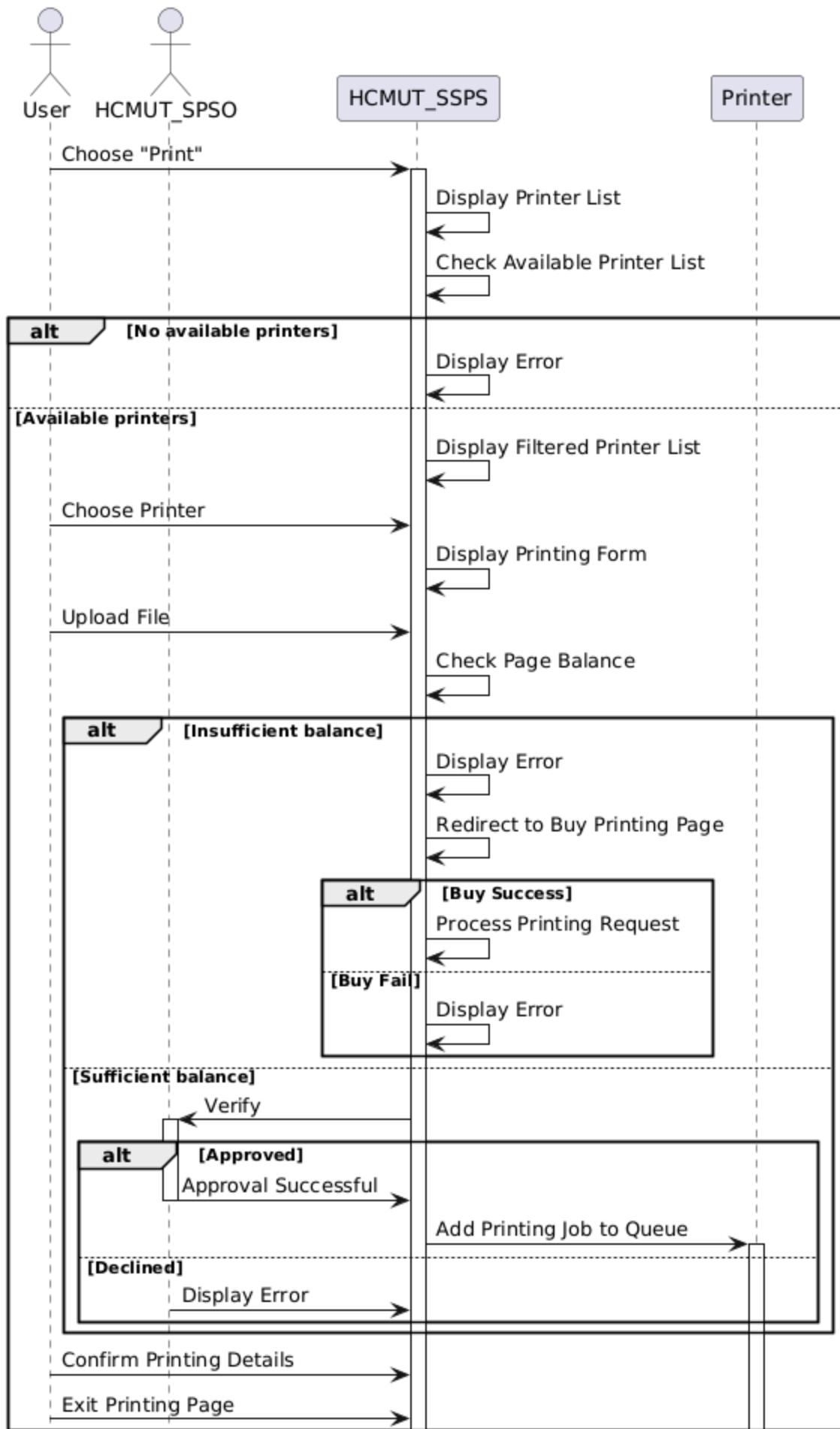
The "Notify About Service" process involving three entities: HCMUT_SPSS, Users, and SPSO. The process begins when HCMUT_SPSS detects a relevant event such as job completion or maintenance. It then retrieves contact information for the Student or SPSO and attempts to send a notification. If the notification fails, the system logs the issue and waits for a retry interval before attempting to resend. This retry loop continues until either the notification is sent successfully or a retry limit is reached. If all retry attempts fail, the system logs the sending failure and flags the issue for manual follow-up. When the notification is successfully sent, it's received by both Users and SPSO. For each recipient, there's a decision point to determine if action is required. If action is needed, they take the necessary action; otherwise, they simply acknowledge the notification. After the notifications have been handled by both Users and SPSO, or after the system has flagged a failed notification for manual follow-up, the process is done.



3.2. Sequence Diagram in Printing Service Module

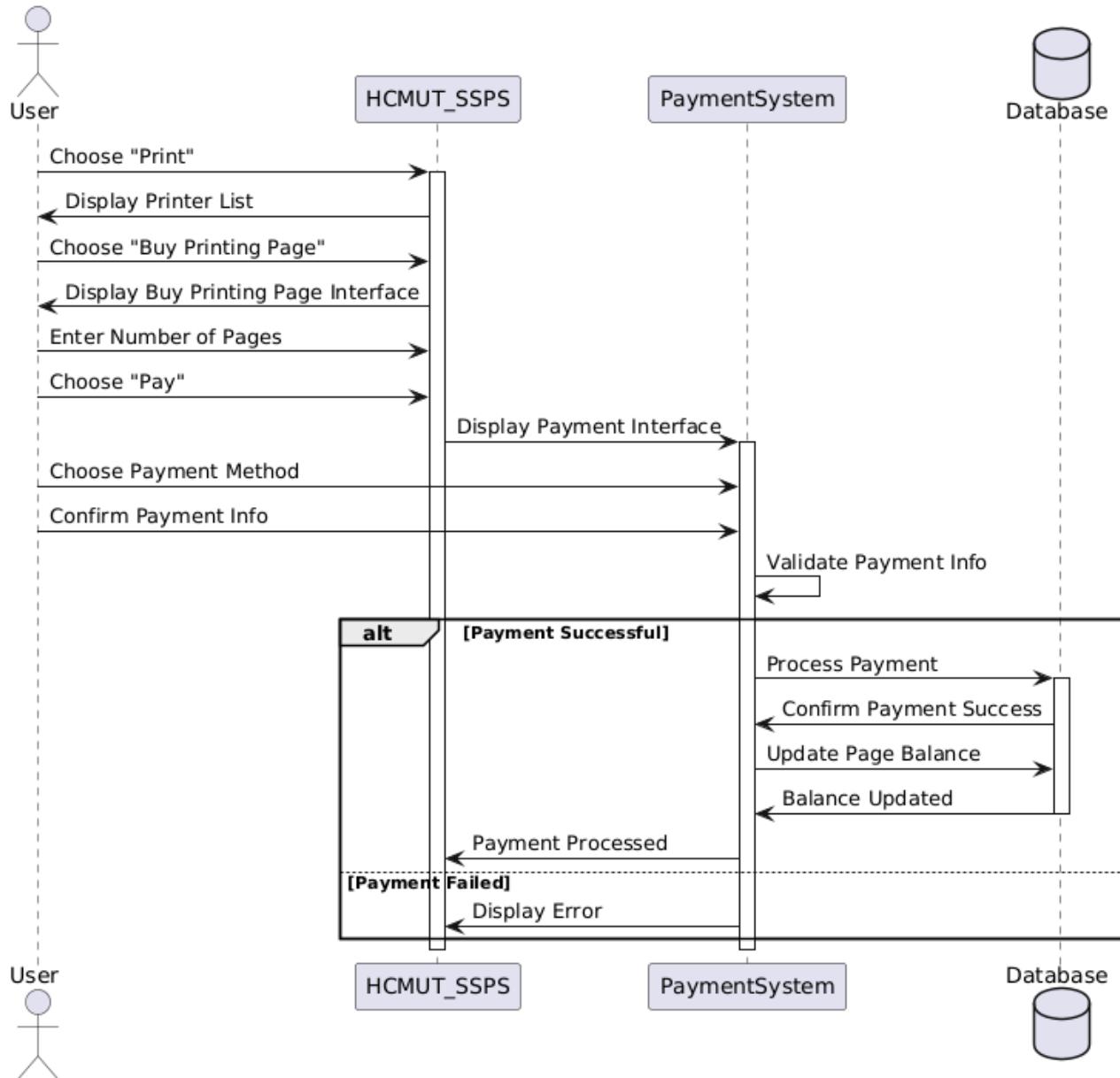
Print Document:

The sequence diagram illustrates the PrintDocument module's workflow, where a user selects a printer and uploads a document for printing. The system displays a list of available printers and checks for their status. If no printers are available, an error is displayed. If available, the user selects a printer, uploads the file, and the system checks their print balance. If the balance is insufficient, the user is redirected to buy more print credits. Upon successful balance verification, the system processes the print request, with the SPSO approving or rejecting it. Approved print jobs are added to the printer queue.



Buy Printing Page:

The BuyPrintingPage module sequence diagram illustrates the process of purchasing printing pages. Initially, the user selects the "Print" option, followed by choosing to buy printing pages. The system displays a purchase interface where the user enters the desired number of pages and selects a payment method. After confirming payment details, the payment system validates the information. If the payment is successful, the system processes the transaction, updates the user's page balance in the database, and confirms the successful purchase. Conversely, if the payment fails, an error message is displayed to the user, prompting them to rectify the issue. This module streamlines the buying process, ensuring users can efficiently acquire printing resources.



View personal printing log:

The View personal printing log process involves three main entities: User, HCMUT_SSPPS, and Database.

The process begins when the user selects the "View personal printing log" option.

HCMUT_SSPPS displays a date selection form to the user, then the user inputs a date range.

The HCMUT_SSPPS validates the date range. If the date range is invalid, HCMUT_SSPPS displays the date selection form again, allowing the user to re-enter the dates.

If the date range is valid, HCMUT_SSPPS retrieves printing data within the specified date range from the Database. If the retrieval fails, HCMUT_SSPPS displays an error to the user.

If the data is retrieved successfully, HCMUT_SSPPS then checks if any history is available:

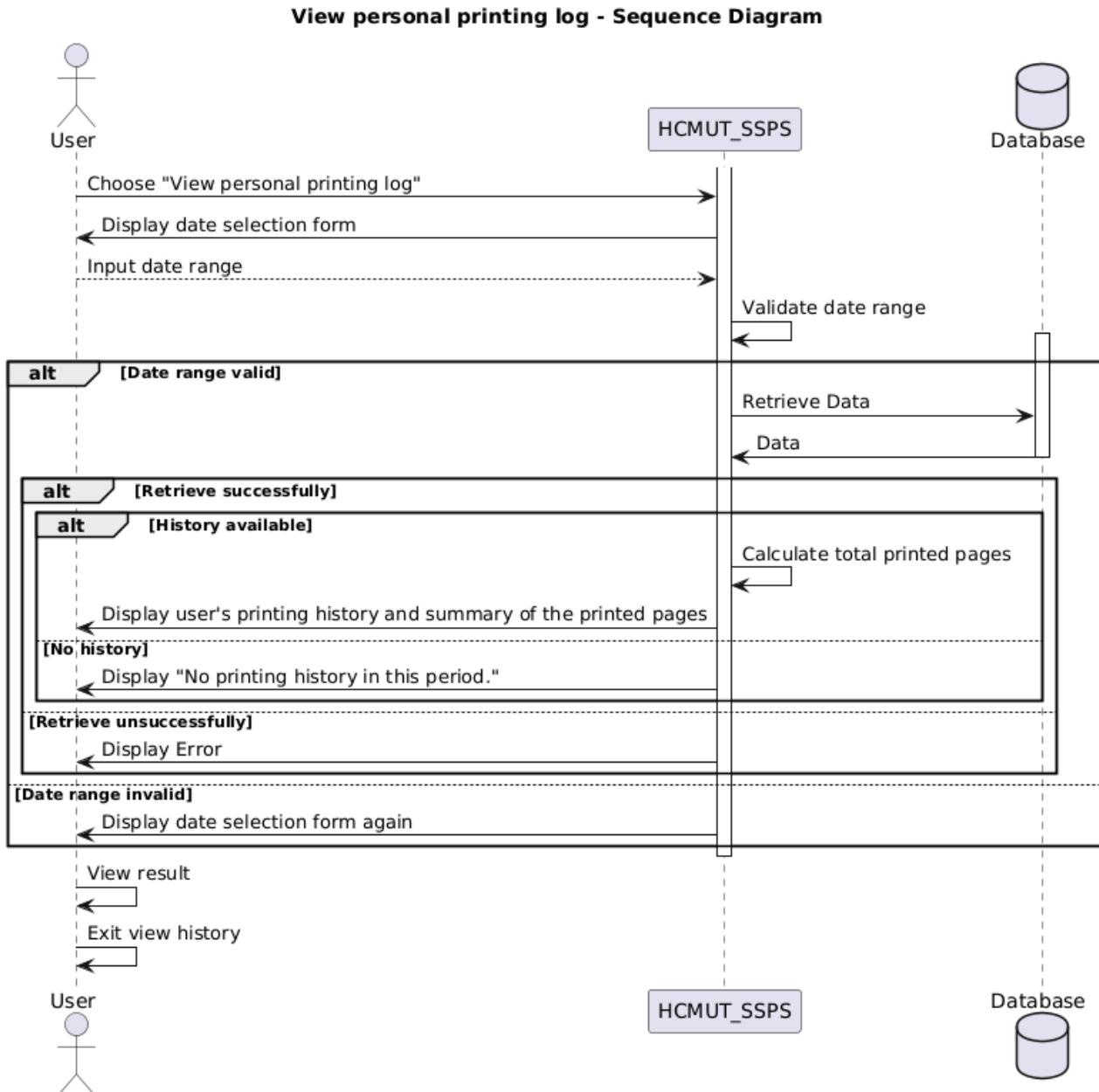
- History Available:

- + HCMUT_SSPPS calculates the total number of printed pages.
- + It then displays the user's printing history along with a summary of the printed pages.

- No History:

- + HCMUT_SSPPS displays a message stating "No printing history in this period."

The user then can view the result and exit the view history.



Notify about service:

The Notify about service process involves four main entities: User, SPSO, HCMUT_SSPPS, and Database.

The process begins when HCMUT_SSPPS detects an event that requires notification.

HCMUT_SSPPS retrieves the necessary contact information for the User or SPSO from the Database.

HCMUT_SSPPS attempts to send a notification to the User or SPSO.

If the notification is successfully sent:

- If Action Required: The User or SPSO takes the necessary action upon receiving the notification.

- If Action Not Required: The User or SPSO acknowledges the notification.

If Notification Sent Unsuccessfully:

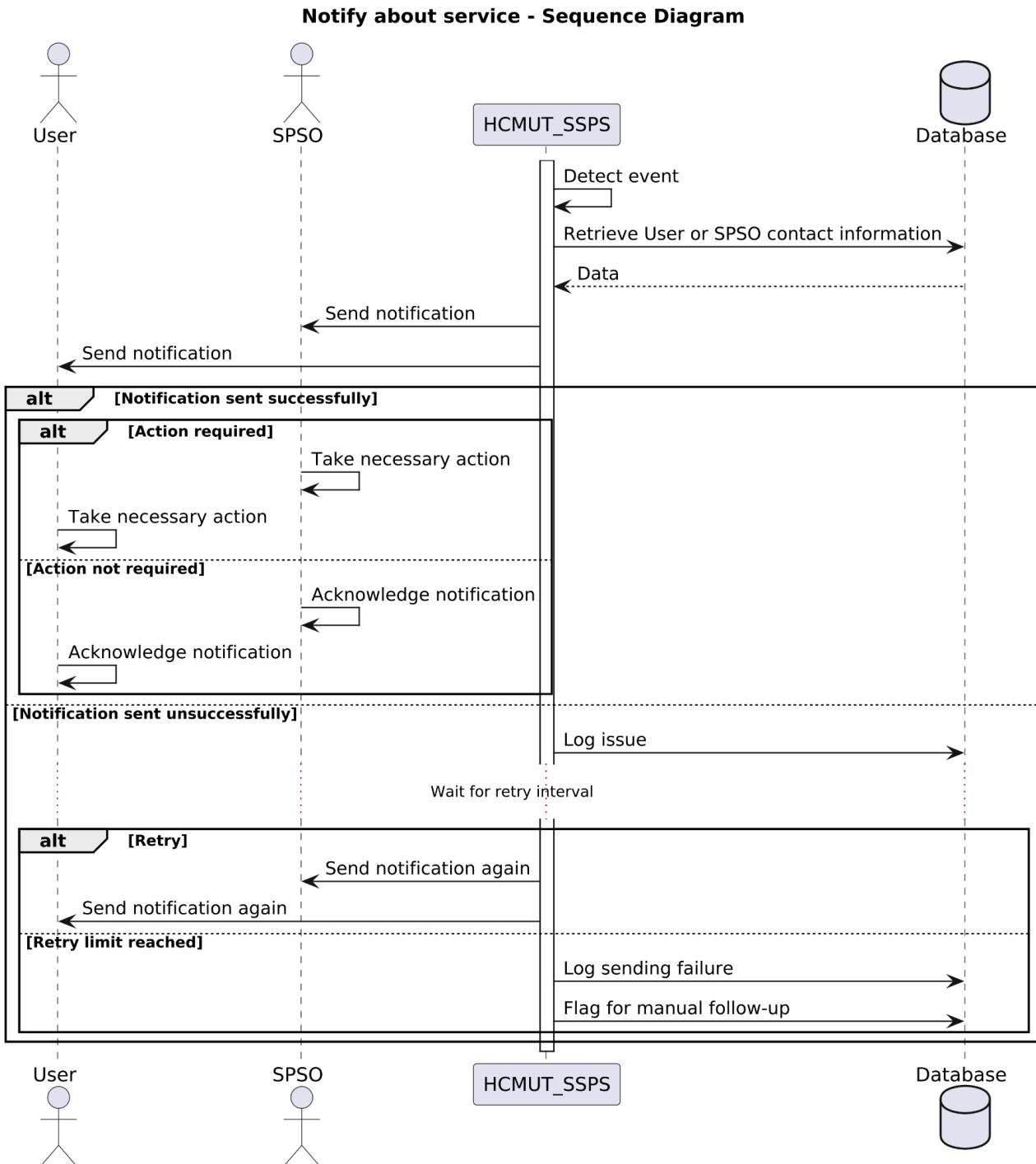
- The system logs the issue and waits for a retry interval.

- Retry:

- + The system will attempt to resend the notification.

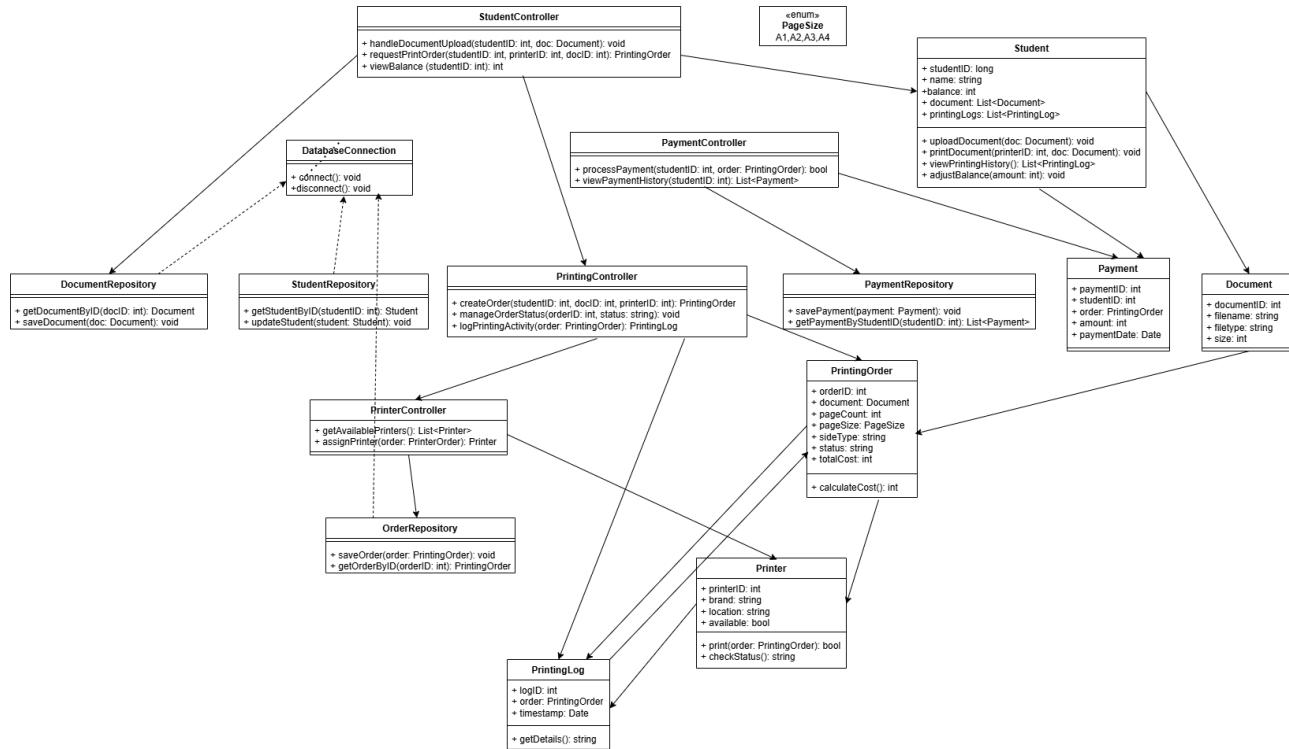
- Retry Limit Reached:

- + If retries continue to fail and the limit is reached, the system logs the failure and flags the event for manual follow-up.



3.3. Class Diagram in Printing Service Module

Link [drive](#) for more information



3.3.1. Entities

a. Student

Attributes:

- studentID: Unique identifier for the student.
- name: Name of the student.
- balance: Account balance available for printing.
- documents: A list of documents owned by the student.
- printingLogs: A list of printing activities related to the student.

Methods:

- uploadDocument(doc: Document): Allows the student to upload a document.
- printDocument(printerID, doc): Initiates the printing process for a document using a specified printer.
- viewPrintingHistory(): Retrieves the student's printing logs.
- adjustBalance(amount): Adjusts the student's account balance.

b. Document

Attributes:

- documentID: Unique identifier for the document.
- filename: Name of the document file.
- filetype: File type of the document.
- size: Size of the document in bytes.

c. PrintingOrder:

Attributes:

- orderID: Unique identifier for the printing order.
- document: The document associated with the printing order.

- pageCount: Number of pages to print.
- pageSize: Size of the paper (e.g., A1, A2, A3, A4).
- sideType: Specifies single- or double-sided printing.
- status: Status of the printing order (e.g., pending, completed).
- totalCost: Total cost for the printing job.

Methods:

- calculateCost(): Computes the cost of the printing job.

d. Printer:

Attributes:

- printerID: Unique identifier for the printer.
- brand: Brand of the printer.
- location: Location of the printer.
- available: Availability status of the printer.

Methods:

- print(order): Initiates the printing of the specified order.
- checkStatus(): Returns the printer's current status.

e. PrintingLog:

Attributes:

- logID: Unique identifier for the printing log.
- order: The associated printing order.
- timestamp: Date and time of the log entry.

Methods:

- getDetails(): Retrieves details of the log entry.

f. Payment:

Attributes:

paymentID: Unique identifier for the payment.

- studentID: Identifier of the student who made the payment.
- order: The associated printing order.
- amount: Payment amount.
- paymentDate: Date of the payment.

g. Enum PageSize:

Values: Defines standard paper sizes (A1, A2, A3, A4).

3.3.2. Controllers

a. StudentControllers:

Methods:

- handleDocumentUpload(studentID, doc): Manages document upload requests from students.
- requestPrintOrder(studentID, printerID, docID): Handles print order requests from students.
- viewBalance(studentID): Fetches the current balance of a student.

b. PrinterController:

Methods:

- getAvailablePrinters(): Retrieves a list of available printers.
- assignPrinter(order): Assigns a printer to a printing order.

c. PaymentController:

Methods:

- processPayment(studentID, order): Processes payments for printing orders.
- viewPaymentHistory(studentID): Retrieves payment history for a student.

d. PrintingController:

Methods:

- createOrder(studentID, docID, printerID): Creates a new printing order.
- manageOrderStatus(orderID, status): Updates the status of a printing order.
- logPrintingActivity(order): Logs printing activities.

3.3.3. Repositories

a. DatabaseConnection:

Methods:

- connect(): Establishes a database connection.
- disconnect(): Closes the database connection.

b. StudentRepository:

Methods:

- getStudentByID(studentID): Retrieves a student by ID.

- updateStudent(student): Updates a student's data.

c. DocumentRepository:

Methods:

- getDocumentByID(docID): Retrieves a document by ID.
- saveDocument(doc): Saves a document to the database.

d. OrderRepository:

Methods:

- saveOrder(order): Saves a printing order to the database.
- getOrderByID(orderID): Retrieves a printing order by ID.

e. PaymentRepository:

Methods:

- savePayment(payment): Records a payment in the database.
- getPaymentsByStudentID(studentID): Fetches all payments made by a student.

3.3.4. Relationships

- Student is associated with multiple Document, PrintingLog, and Payment entities.
- Document is part of PrintingOrder.
- PrintingOrder is linked to a Printer and PrintingLog.
- Repositories interact with entities to perform database operations, and controllers use repositories to execute business logic.

3.4. MVP 1 for Printing Service Module

Link [figma](#) for more information

Printing Service

The screenshot shows the 'In ấn' (Printing) section of the service. At the top, there's a header bar with the service logo and navigation links: Trang chủ (Home), In ấn (Printing), Lịch sử in ấn (Print history), Thanh toán (Payment), and a user profile icon.

The main area displays two printer options:

- Cơ sở Lý Thường Kiệt**
 - Máy dùng được: 10
 - Máy sẵn sàng: 2[In](#)
- Cơ sở Dĩ An**
 - Máy dùng được: 14
 - Máy sẵn sàng: 6[In](#)

At the bottom, there's a footer with the BK TP.HCM logo, the service name 'Student Smart Printing Service', and contact information: Thông tin liên hệ và hỗ trợ, phone number (028) 38 651 670, and email hcmut.spss@hcmut.edu.vn.

Show available printers in campus 1

The screenshot shows the 'In ấn' (Printing) section of the service. It displays a grid of nine printer cards, each with a blue rounded rectangle background and white text. Each card contains the printer's name, location, queue count, and a 'Chọn' (Select) button.

Máy	Phòng	Hàng đợi	Thao tác
001	B4.301	5	Chọn
003	B1.203	3	Chọn
006	C4.301	0	Chọn
008	C5.101	6	Chọn
009	C6.601	7	Chọn
010	B4.301	3	Chọn
013	C5.401	6	Chọn
014	C6.602	6	Chọn
016	B4.201	5	Chọn

At the top right, there is a 'Filter by' button. At the bottom right, there is a page navigation bar with buttons for 1, 2, 3, and 'Last'. The footer contains the BK logo and contact information: 'Thông tin liên hệ và hỗ trợ', phone number '(028) 38 651 670', and email 'hcmut.spss@hcmut.edu.vn'.

Filter to select printer

Student Smart Printing Service

In ấn
Cơ sở Lý Thường Kiệt

Filter by

Loại máy in	Vị trí	Sắp xếp theo	
<input checked="" type="checkbox"/> Máy có sẵn	<input type="checkbox"/> A1 <input type="checkbox"/> A2 <input checked="" type="checkbox"/> A3 <input type="checkbox"/> A4 <input type="checkbox"/> A5	<input type="checkbox"/> B1 <input type="checkbox"/> B2 <input checked="" type="checkbox"/> B3 <input type="checkbox"/> B4 <input type="checkbox"/> B6	<input type="checkbox"/> C1 <input type="checkbox"/> C2 <input type="checkbox"/> C3 <input type="checkbox"/> C4 <input type="checkbox"/> C5

Chọn

Máy 001 Phòng: B4.301 Hàng đợi: 0 Thông tin thêm Chọn	Máy 003 Phòng: B1.203 Hàng đợi: 0 Thông tin thêm Chọn	Máy 006 Phòng: C4.301 Hàng đợi: 1 Thông tin thêm Chọn
Máy 008 Phòng: C5.101 Hàng đợi: 6 Thông tin thêm Chọn	Máy 009 Phòng: C6.601 Hàng đợi: 7 Thông tin thêm Chọn	Máy 010 Phòng: B4.301 Hàng đợi: 7 Thông tin thêm Chọn
Máy 013 Phòng: C5.401 Hàng đợi: 8 Thông tin thêm Chọn	Máy 014 Phòng: C6.602 Hàng đợi: 8 Thông tin thêm Chọn	Máy 016 Phòng: B4.201 Hàng đợi: 10 Thông tin thêm Chọn

1 2 3 Last

Thông tin liên hệ và hỗ trợ
 ☎ (028) 38 651 670
 📩 hcmut.spss@hcmut.edu.vn

Student Smart Printing Service

Upload file and configure printing properties

Student Smart Printing Service

Trang chủ In ấn Lịch sử in ấn Thanh toán

In ấn

Tải file cần in

Drop file here to upload
or
Upload

Số lượng giấy còn dư: 10 tờ A4

Thông số in

Trang: Tất cả
Layout: Chân dung
Kích thước: A4
Một mặt/hai mặt: Một mặt
Tỉ lệ: Mặc định
Số lượng bản in: Nhập số lượng bản in

In

Thông tin liên hệ và hỗ trợ
(028) 38 651 670
hcmut.spss@hcmut.edu.vn

BK
TPHCM

Student Smart Printing Service

Buy more printing pages

The screenshot shows a web application interface for a printing service. At the top, there is a header bar with the logo "Student Smart Printing Service". Below the header, there is a navigation menu with four items: "Trang chủ", "In ấn", "Lịch sử in ấn", and "Thanh toán". On the right side of the header, there is a user icon.

The main content area is divided into two sections:

- In ấn** (Printing):
Sub-section: **Mua giấy in** (Buy paper).
Options:
 - Kích thước A4: (21 x 29,7) with a green "+" button.
 - Kích thước A3: (29,7 x 42) with a green "+" button.
- Thông tin giao dịch** (Transaction information):
 - Tổng cộng: 20.000VND
 - Phương thức thanh toán: Thẻ (Card) with a dropdown arrow.

A large blue button labeled "Thanh toán" (Pay) is located at the bottom right of the main content area.

At the bottom of the page, there is a footer section with the BK logo (Blue Kite logo) and the text "Student Smart Printing Service". To the right, there is contact information: "Thông tin liên hệ và hỗ trợ" (Contact information and support), phone number "(028) 38 651 670", and email "hcmut.spss@hcmut.edu.vn".

Upload file successfully

Student Smart Printing Service

Trang chủ In ấn Lịch sử in ấn Thanh toán

In ấn

Tải file cần in

PDF test.pdf

Số lượng giấy còn dư: 20 tờ A4

Thông số in

Trang: Tất cả

Layout: Chân dung

Kích thước: A4

Một mặt/hai mặt: Một mặt

Tỉ lệ: Mặc định

Số lượng bản in: 1

Số trang: 20

In

Thông tin liên hệ và hỗ trợ

(028) 38 651 670

hcmut.spss@hcmut.edu.vn

BK
TPHCM

Student Smart Printing Service

Send printing request

Student Smart Printing Service

Trang chủ In ấn Lịch sử in ấn Thanh toán

In ấn

Yêu cầu in của bạn đã được xử lý. Vui lòng đến phòng B4.301 để nhận tài liệu in.

Trang chủ

BK
TPHCM

Student Smart Printing Service

Thông tin liên hệ và hỗ trợ

📞 (028) 38 651 670

✉️ hcmut.spss@hcmut.edu.vn

Show personal printing log

Student Smart Printing Service

Trang chủ In ấn Lịch sử in ấn Thanh toán

Lịch sử in ấn

Thời gian

Ngày bắt đầu: dd/mm/yyyy

Ngày kết thúc: dd/mm/yyyy

Tìm kiếm

Lịch sử in

Thời gian	Máy in	Tên file in	Kích thước in	Số lượng giấy

Số lượng giấy đã in

Giấy A4: N/A

Giấy A3: N/A

Thông tin liên hệ và hỗ trợ

📞 (028) 38 651 670

✉️ hcmut.spss@hcmut.edu.vn

BK
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Student Smart Printing Service

Specify day range for system to show your personal printing log

The screenshot shows the 'Student Smart Printing Service' application. At the top, there is a navigation bar with icons for home, print, history, and calculation, along with a user profile icon. Below the navigation bar, the main title 'Lịch sử in ấn' (Print History) is displayed, followed by a subtitle 'Thời gian' (Time). There are date pickers for 'Ngày bắt đầu' (Start Date) set to '27/04/2024' and 'Ngày kết thúc' (End Date) set to '18/10/2024'. A blue button labeled 'Tim kiếm' (Search) is positioned below the date range. The main content area displays a table titled 'Lịch sử in' (Print History) with columns: Thời gian (Time), Máy in (Printer), Tên file in (File Name), Kích thước in (Size), and Số lượng giấy (Number of Sheets). The table lists several entries from June to September 2024. At the bottom left, it shows 'Số lượng giấy đã in' (Printed paper count) with 'Giấy A4: 110' and 'Giấy A3: 80'. On the right, there is a page navigation bar with buttons for 1, 2, 3, and 'Last'. The footer features the BK TP.HCM logo and the text 'Student Smart Printing Service'.

Thời gian	Máy in	Tên file in	Kích thước in	Số lượng giấy
17/06/2024 10:30 - 11:00	002	congnghephanmem.pdf	A4	10
05/09/2024 10:30 - 11:00	002	congnghephanmem5.pdf	A3	5
05/09/2024 10:30 - 11:00	002	congnghephanmem4.pdf	A4	20
05/09/2024 10:30 - 11:00	002	congnghephanmem4.pdf	A3	10
06/09/2024 10:25 - 10:30	002	congnghephanmem3.pdf	A3	30
07/09/2024 12:30 - 13:00	001	congnghephanmem2.pdf	A4	10
17/09/2024 10:30 - 11:00	010	congnghephanmem2.pdf	A4	10
17/09/2024 1:35 - 2:00	012	congnghephanmem1.pdf	A4	10

Số lượng giấy đã in
Giấy A4: 110
Giấy A3: 80

Thông tin liên hệ và hỗ trợ

(028) 38 651 670
hcmut.spss@hcmut.edu.vn

Not exist personal printing log

The screenshot shows the 'Lịch sử in ấn' (Print History) section of the service. It includes a search bar with date range filters (27/04/2024 to 17/10/2024), a search button ('Tim kiem'), and a table for viewing print logs. A modal dialog box titled 'Thông báo lỗi' (Error Notification) is displayed, stating 'Lỗi truy vấn, vui lòng thử lại' (Query error, please try again). At the bottom, there's a section for 'Số lượng giấy đã in' (Printed paper count) showing values for A4 and A3 paper sizes.

Student Smart Printing Service

Trang chủ In ấn Lịch sử in ấn Thanh toán

Lịch sử in ấn

Thời gian

Ngày bắt đầu: 27/04/2024

Ngày kết thúc: 17/10/2024

Tìm kiếm

Lịch sử in

Thời gian	Máy in	Chỉ số	Số lượng giấy

Số lượng giấy đã in

Giấy A4: NA

Giấy A3: NA

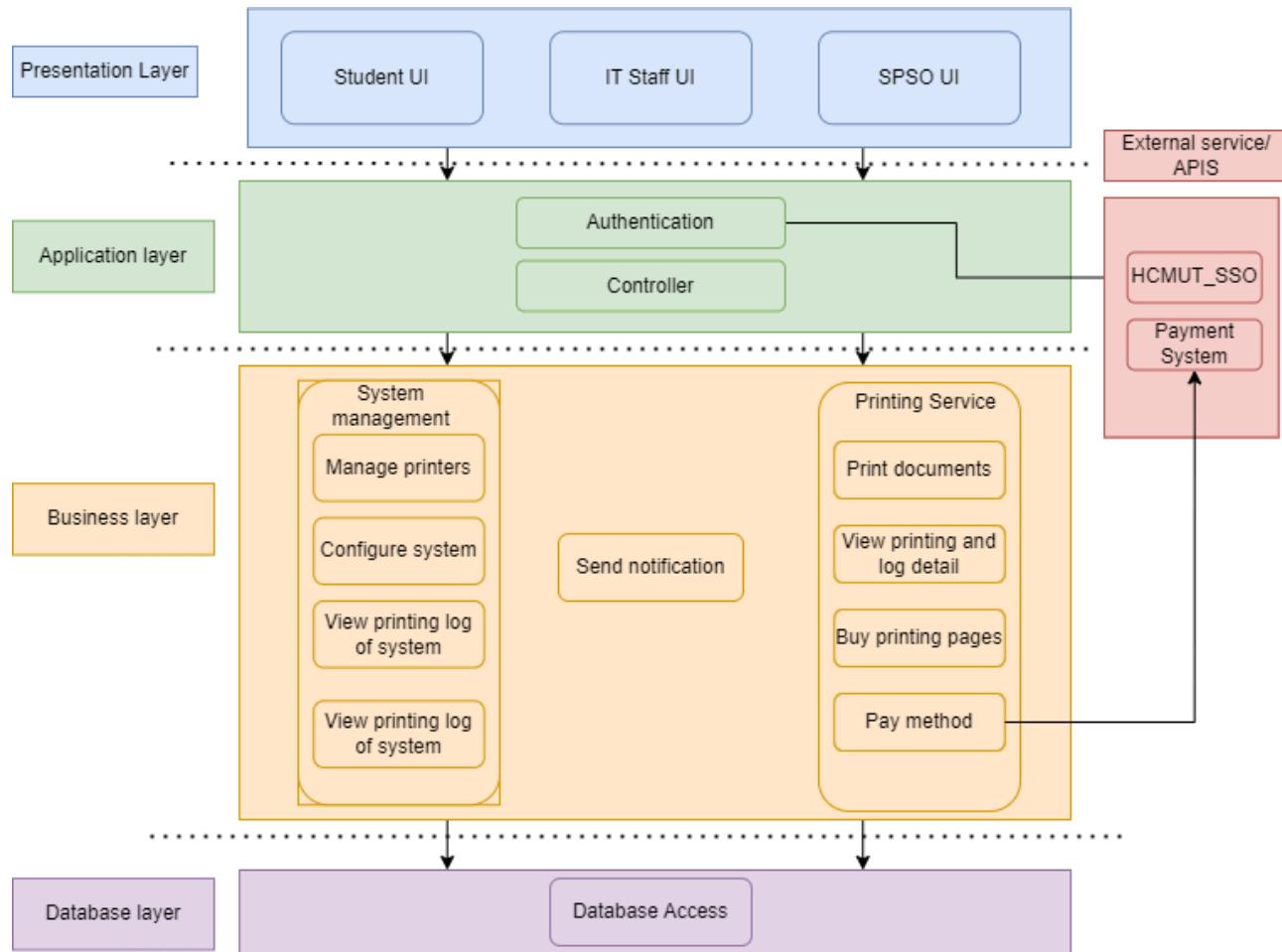
Thông tin liên hệ và hỗ trợ

(028) 38 651 670

hcmut.spss@hcmut.edu.vn

4. Architecture Design

4.1. Architecture diagram



Presentation strategy:

To present the User Interface (UI) for the Smart Student Printing Service, we will implement the following strategies:

Student Interface

Minimalist and Intuitive Design: Use recognizable icons and buttons to allow students to quickly select print options or view their printing history.

Quick Access: Provide direct links to frequently used functions like printing documents, buy printing pages, and viewing log details.

Responsive Design: Ensure the interface works well on various devices.

IT Staff Interface

Advanced Management Tools: Offer detailed dashboards for system management and configuration, including printer monitoring and issue management.

Reporting and Analytics: Display performance reports and detailed logs to support decision-making.

SPSO Interface

Service Integration: Easily connect with external services and APIs such as payment systems and HCMUT_SSO authentication.

Operational Management: Provide tools to efficiently manage printing services and handle payments.

Presentation Strategy

Consistency: Use a unified design language across all interfaces to ensure a seamless user experience.

Real-Time Feedback: Offer real-time notifications and updates so users are always informed about the status of their print requests.

Help and Support: Integrate guides and online support to assist users in becoming familiar with the system.

This strategy aims to optimize the user experience, ensuring they can perform tasks easily and efficiently.

Data storage approach:

To store data for the HCMUT Student Smart Printing Service, a relational database would work well, as it can manage structured data and relationships between entities. Core tables could include *Printers*, *Students*, *PrintJobs*, *SPSOSettings*, *Payments*. Each printer's details (ID, brand, model, description and location) would be stored in the *Printers* table. The *Students* table would maintain individual records for each student, including their IDs, name along with current page balances. The *PrintJobs* table would capture each print request, including the student ID, selected printer ID, document properties, start/end printing times, and page counts, which later servers for viewing Printing logs from Student and SPSO. The *SPSOSettings* table would store configurable data like permitted file types and default page allocations. The *Payments* table could handle transactions for additional pages purchased by students and can be used for transaction history later.

For this project, PostgreSQL would be ideal due to its robust support for relational data integrity, ACID compliance, advanced indexing, and reporting functionalities, which will be useful for monthly and yearly reports. Additionally, PostgreSQL offers flexibility with JSON columns, which could help handle any unstructured or evolving data attributes.

External service/ APIs management:

The API offers a comprehensive set of services including authentication, file management, printer access, user information, payment processing, notification creation, and logging functionalities:

- Auth Module: Endpoints for user signup (`POST /auth/signup`), login (`POST /auth/login`), and logout (`POST /auth/logout`) with responses that include status and tokens for secure access.
- File Module: Operations for uploading (`POST /file/upload`), downloading (`GET /file/download`), deleting (`DELETE /file/delete`), and listing files (`GET /file/list`) with secure token-based control.
- Printer Module: View available printers (`GET /printer/available`), submit print jobs (`POST /printer/print`), and track print job status (`GET /printer/print/status`). Retrieve all print orders using (`GET /printer/print/all`).
- User Module: Retrieve user information with `GET /user/info`, which provides details like username, email, balance, and creation time.
- Payment Module: Create payments using `POST /payment/create`, which returns a payment ID and a temporary redirect URL for further processing.
- Notification Module: Create custom notifications via `POST /notification/create` for user alerts.
- Log Module: Access logs for payments (`GET /log/payment`), print orders (`GET /log/print_order`), and file actions (`GET /log/file`), all supporting date range filters.

Basic API documentation

AUTH

Signup

`POST /auth/signup`

Description: Registers a new user.

Request Body:

```
{  
    "username": "string",  
    "email": "string",  
    "password": "string"  
}
```

Response:

Success:

```
{  
    "status": "success",  
    "token": "token"  
}
```

Fail:

```
{
```

```
        "status": "error",
        "error": "Description of the error"
    }
```

Login

POST /auth/login

Description: User login with username and password.

Request Body:

```
{
    "email": "string",
    "password": "string"
}
```

Response:

Success:

```
{
    "status": "success",
    "token": "token"
}
```

Fail:

```
{
    "status": "error",
    "error": "Description of the error"
}
```

Logout

POST /auth/logout

Description: User logout.

Request Body:

```
{
    "token": "token"
}
```

Response:

Success:

```
{
    "status": "success",
    "token": "token"
}
```

Fail:

```
{
    "status": "error",
    "error": "Description of the error"
}
```

-----FILE-----

Upload file to the server

POST /file/upload

Description: Upload file to the server.

Request Body:

```
{  
    "token": "token",  
    "file": "file"  
}
```

Response:

Success:

```
{  
    "status": "success",  
    "file_id": int  
}
```

Fail:

```
{  
    "status": "error",  
    "error": "Description of the error"  
}
```

Download file from the server

GET /file/download

Description: Download file from the server.

Request Body:

```
{  
    "token": "token",  
    "file_id": int  
}
```

Response:

Success:

```
{  
    "status": "success",  
    "file": "file"  
}
```

Fail:

```
{  
    "status": "error",  
    "error": "Description of the error"  
}
```

Delete file from the server

DELETE /file/delete

Description: Delete file from the server.

Request Body:

```
{  
    "token": "token",  
    "file_id": int  
}
```

Response:

Success:

```
{  
    "status": "success"  
}
```

Fail:

```
{  
    "status": "error",  
    "error": "Description of the error"  
}
```

Get file list from the server

GET /file/list

Description: Get file list from the server.

Request Body:

```
{  
    "token": "token"  
}
```

Response:

Success:

```
{  
    "status": "success",  
    "files": [  
        {  
            "id": int,  
            "name": "string",  
            "size": int,  
            "type": "string",  
            "created_time": datetime  
        },  
        ...  
    ]  
}
```

Fail:

```
{  
    "status": "error",  
}
```

```
        "error": "Description of the error"
    }
```

-----PRINTER-----

Get available printers

GET /printer/available

Description: Get available printers.

Request Body:

```
{
    "token": "token",
    "campus": int
}
```

Response:

Success:

```
{
    "status": "success",
    "data": {
        "printers": [
            {
                "id": int,
                "name": "string",
                "room": "string",
                "wait_list": int,
                "printer_type": "string",
                "location": "string",
            },
            ...
        ]
    }
}
```

Fail:

```
{
    "status": "error",
    "error": "Description of the error"
}
```

Print file

POST /printer/print

Description: Print file.

Request Body:

```
{
    "token": "token",
    "file_id": int,
```

```
"printer_id": int,  
"page_range": [int, int],  
"layout": "string",  
"size": "string",  
"one_sided": bool,  
"ratio": "string",  
"copies": int  
}
```

Response:

Success:

```
{  
    "status": "success",  
    "print_order_id": int  
    "expected_wait_time": int,  
}
```

Fail:

```
{  
    "status": "error",  
    "error": "Description of the error"  
}
```

Get print order status

GET /printer/print/status

Description: Get print status of the file.

Request Body:

```
{  
    "token": "token",  
    "print_order_id": int  
}
```

Response:

Success:

```
{  
    "status": "success",  
    "print_order_id": int,  
    "printer_id": int,  
    "file_id": int,  
    "page_range": [int, int],  
    "layout": "string",  
    "size": "string",  
    "one_sided": bool,  
    "ratio": "string",  
    "copies": int,  
    "created_time": datetime,
```

```

    "expected_wait_time": int,
    "completed": bool
}
```

Get all print orders

GET /printer/print/all

Description: Get all print orders.

Request Body:

```
{
    "token": "token"
}
```

Response:

Success:

```
{
    "status": "success",
    "print_orders": [
        {
            "id": int,
            "print_order_id": int,
            "printer_id": int,
            "file_id": int,
            "page_range": [int, int],
            "layout": "string",
            "size": "string",
            "one_sided": bool,
            "ratio": "string",
            "copies": int,
            "created_time": datetime,
            "expected_wait_time": int,
            "completed": bool
        },
        ...
    ]
}
```

Fail:

```
{
    "status": "error",
    "error": "Description of the error"
}
```

-----USER-----

Get user info

GET /user/info

Description: Get user info.

Request Body:

```
{
    "token": "token"
}
```

Response:

Success:

```
{
    "status": "success",
    "user": {
        "id": int,
        "username": "string",
        "email": "string",
        "created_time": datetime,
        "balance": int
    }
}
```

Fail:

```
{
    "status": "error",
    "error": "Description of the error"
}
```

-----PAYMENT-----

Create payment

POST /payment/create

Description: Create payment.

Request Body:

```
{
    "token": "token",
    "amount": int,
    "description": "string",
    "payment_type": "string",
}
```

Response:

Success:

```
{
    "status": "success",
    "payment_id": int
    "redirect_url": "string"
    "redirect_url_expires": datetime
}
```

Fail:

```
{  
    "status": "error",  
    "error": "Description of the error"  
}
```

-----NOTIFICATION-----

Create notification

POST /notification/create

Description: Create notification.

Request Body:

```
{  
    "token": "token",  
    "title": "string",  
    "content": "string",  
    "type": "string",  
    "link": "string",  
    "image": "string",  
    "notification_time": datetime  
}
```

Response:

Success:

```
{  
    "status": "success",  
    "notification_id": int  
}
```

Fail:

```
{  
    "status": "error",  
    "error": "Description of the error"  
}
```

-----LOG-----

Get payment log

GET /log/payment

Description: Get payment log.

Request Body:

```
{  
    "token": "token",  
    "date_range": [datetime, datetime]  
}
```

Response:

Success:

```
{  
    "status": "success",  
    "payment_logs": [  
        {  
            "id": int,  
            "payment_id": int,  
            "amount": int,  
            "description": "string",  
            "payment_type": "string",  
            "created_time": datetime  
        },  
        ...  
    ]  
}  
Fail:  
{  
    "status": "error",  
    "error": "Description of the error"  
}
```

Get print order log

GET /log/print_order

Description: Get print order log.

Request Body:

```
{  
    "token": "token",  
    "date_range": [datetime, datetime]  
}
```

Response:

Success:

```
{  
    "status": "success",  
    "print_order_logs": [  
        {  
            "id": int,  
            "print_order_id": int,  
            "printer_id": int,  
            "file_id": int,  
            "page_range": [int, int],  
            "layout": "string",  
            "size": "string",  
            "one_sided": bool,  
            "ratio": "string",  
        }  
    ]  
}
```

```

        "copies": int,
        "created_time": datetime,
        "expected_wait_time": int,
        "completed": bool
    },
    ...
]
}
Fail:
{
    "status": "error",
    "error": "Description of the error"
}

```

Get file log

GET /log/file

Description: Get file log.

Request Body:

```
{
    "token": "token",
    "date_range": [datetime, datetime]
}
```

Response:

Success:

```
{
    "status": "success",
    "file_logs": [
        {
            "file_id": int,
            "name": "string",
            "size": int,
            "type": "string",
            "created_time": datetime
        },
        ...
    ]
}
```

Get printer log

GET /log/printer

Description: Get printer log.

Request Body:

```
{
```

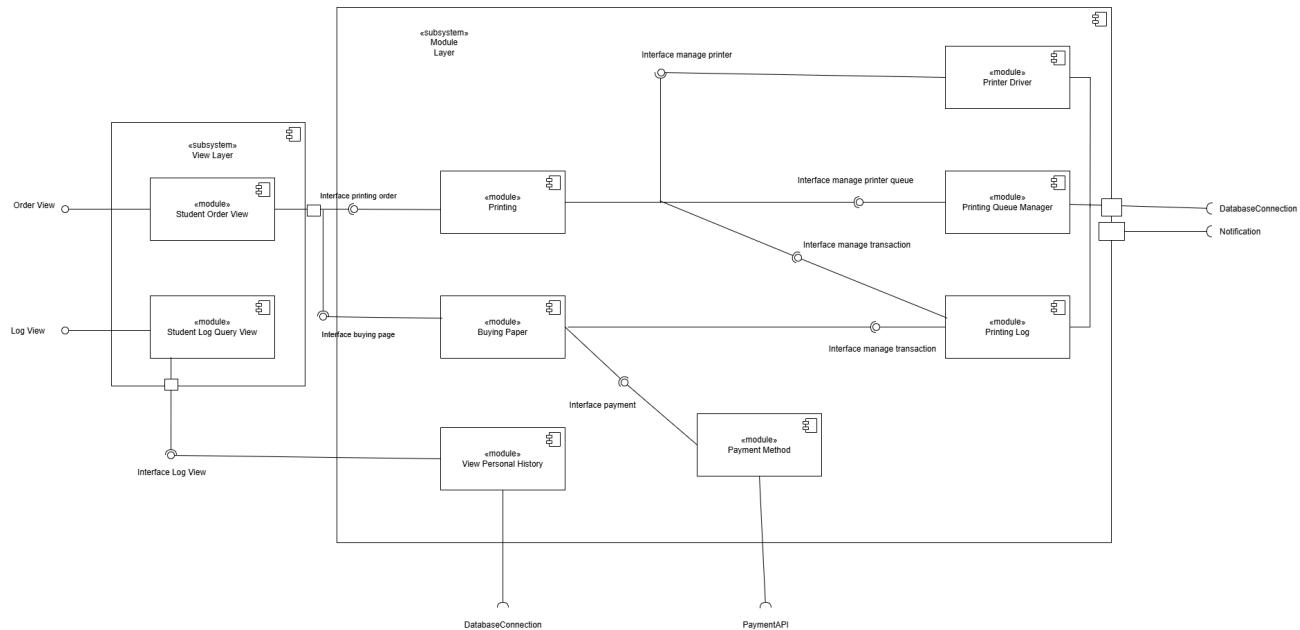
```

    "token": "token",
    "date_range": [datetime, datetime]
}
Response:
Success:
{
    "status": "success",
    "printer_logs": [
        {
            "order_id": int,
            "printer_id": int,
            "file_id": int,
            "created_time": datetime,
        },
        ...
    ]
}
Fail:
{
    "status": "error",
    "error": "Description of the error"
}

```

4.2. Component diagram

[Link](#) for more information



This component diagram illustrates the structure and interaction of various modules within a system designed for managing printing operations, paper purchases, and transaction logs. The system is organized into distinct layers:

1. **View Layer:** This layer provides the user interfaces for interacting with the system. It includes:
 - Student Order View:** Interface where users can order printing services.
 - Student Log Query View:** Interface for users to query their transaction history.
2. **Module Layer:** Contains core modules responsible for handling printing operations, managing the queue, processing payments, and logging transactions.
 - Printing:** Manages the overall printing process.
 - Buying Paper:** Handles the process of purchasing additional printing pages.
 - Printing Queue Manager:** Manages the order and flow of print jobs in the queue.
 - Printer Driver:** Communicates with the physical printer hardware.
 - Printing Log:** Records transaction details related to printing operations.
 - View Personal History:** Allows users to view their personal transaction history.
3. **Payment Method:** This module is connected to an external **Payment API** to process payments securely and handle payment-related data.
4. **Database Connection and Notification:** External connections for data storage and notifications. The **DatabaseConnection** links the system to a database for storing user balances, print history, and other persistent data. The **Notification** service can be used to alert users of specific events or errors in the system.

Interfaces between modules (such as **Interface printing order**, **Interface manage printer queue**, **Interface payment**) define communication pathways that allow each component to interact seamlessly with others. This modular design enhances the system's flexibility, maintainability, and scalability.

5. Implementation – Sprint 1

5.1. Setting up an online repository

Our team setup Github for version control: <https://github.com/edithh81/CO3001>

5.2. Adding documents, materials and folders for Requirement, System modeling and Architectural design. Use Github to report the changes to these files.

5.2.1. Documents for Requirement, System modeling and Architectural design in Github repository

The screenshot shows a GitHub repository page for 'CO3001 / docs / materials.md'. The file contains the following content:

```

Requirement

- Requirement documents

System modelling

- Activity Diagram
- Sequence Diagram
- Class Diagram

Architectural design

- Architecture diagram
- Component diagram

```

5.2.2. Commits log on Github for version control

The screenshot shows a GitHub commit history for the 'main' branch. The commits are as follows:

- Commits on Nov 24, 2024
 - Update materials.md** (Verified) ed3d325 authored 3 minutes ago
 - Update materials.md** (Verified) a2c6de9 authored 3 minutes ago
 - Update materials.md** (Verified) 86b4a7f authored 4 minutes ago
 - Update materials.md** (Verified) 507b410 authored 4 minutes ago
 - Update materials.md** (Verified) 563c050 authored 6 minutes ago
 - Update mockup.md** (Verified) cc64a2a authored 31 minutes ago
 - Update README.md** (Verified) c52e16a authored 2 hours ago
 - Update README.md** (Verified) a84f958 authored 2 hours ago

Using the command `git log > log.txt`, we create a file containing details about commits:
[log.txt](#)

5.3. Usability test with the user interface developed in MVP 1

5.3.1. Recruit participants/ testers.

The participants are students studying at Ho Chi Minh City University of Technology.

5.3.2. Define tasks

3 tasks corresponding to 3 main functions of the system of printing module:

- You are a student at Ho Chi Minh City University of Technology, you need to print a PDF document, including 20 pages, printed on 1 side, at Ly Thuong Kiet campus. Please perform a new printing transaction. (Flow Printing)
- You are a student at Ho Chi Minh City University of Technology, your account is almost out of printing paper, you need to buy 1 more sheet of A4 paper, 2 sheets of A5 paper, pay by card. Please make a paper purchase transaction. (Flow Buying Paper)
- You are a student at Ho Chi Minh City University of Technology, you need to see the number of pages you have printed in the past month. Please perform the task of viewing printing history (Flow Viewing Printing Log)

5.3.3. Define test strategy

Quantitative, remote unmoderated testing: using Google form with attached Figma protocol for testing

5.3.4. Process of testing

The structure of testing form:

1. Evaluation of given tasks above
2. Personal information

The tasks were evaluated using the following questions:

- On a scale of 1 to 10, what do you think about the interface design? (1-Unsatisfied, 10-Very satisfied)
- Have you been able to successfully perform the task?
- On a scale of 1 to 10, what do you think about the difficulty of performing the task? (1-Too difficult, 10-Very easy)
- Did you have any difficulties performing the task?

5.3.4. Feedback from testers.

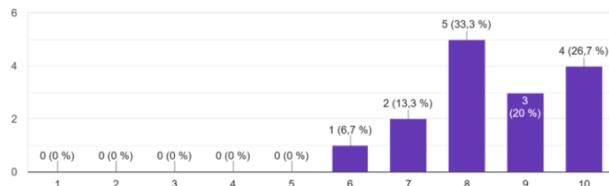
Link to the results of testing form:

<https://docs.google.com/spreadsheets/d/1P5qBsqULVv5je-JcWAZfgJsz2UX2PtEcjtHIU0theLA/edit?usp=sharing>

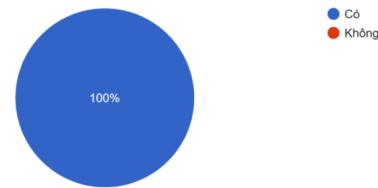
Summary of testing results:

- Duration: 3 days from 22/11/2024 - 24/11/2024
- Total number of participants: 15, Including: 2 freshmans, 3 sophomores, 10 juniors. Out of 15 participants, there are 12 students are CSE students, and 2 students are studying other majors
- First task evaluation: Printing task

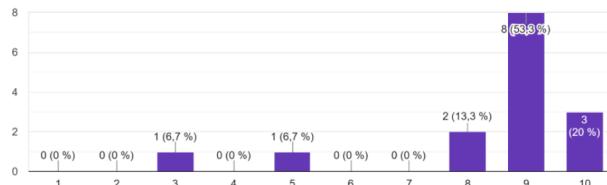
Trên thang điểm từ 1 đến 10, bạn nghĩ sao về thiết kế giao diện in ấn?
15 Antworten



Bạn có thực hiện thành công được kịch bản in ấn như trên không?
15 Antworten



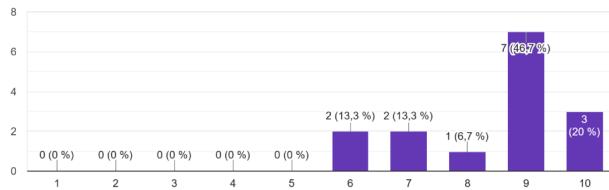
Trên thang điểm từ 1 đến 10, bạn nghĩ sao về độ khó khi thực hiện thao tác in ấn?
15 Antworten



- About user interface: The average score is 8.467. The highest score is 10, lowest score is 6
- About task success: 100% participants can perform the task.
- About usability: The average score for usability is 8.4. The highest score is 10, lowest score is 3. No feedback about difficulty encountered during the task
- Second task evaluation: Buying paper task

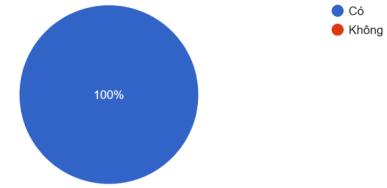
Trên thang điểm từ 1 đến 10, bạn nghĩ sao về thiết kế giao diện mua giấy?

15 Antworten



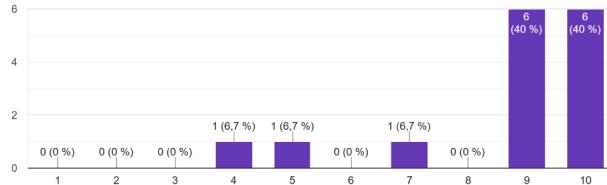
Bạn có thực hiện thành công được kịch bản mua giấy như trên không?

15 Antworten



Trên thang điểm từ 1 đến 10, bạn nghĩ sao về độ khó khi thực hiện thao tác mua giấy?

15 Antworten



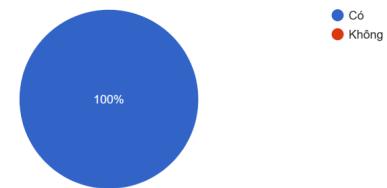
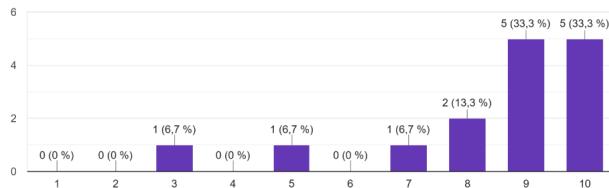
- About user interface: The average score is 8,467. The highest score is 10, lowest score is 6
- About task success: 100% participants can perform the task.
- About usability: The average score for usability is 8.667. The highest score is 10, lowest score is 4. No feedback about difficulty encountered during the task
- Third task evaluation: Viewing printing log task

Trên thang điểm từ 1 đến 10, bạn nghĩ sao về thiết kế giao diện xem lịch sử in?

15 Antworten

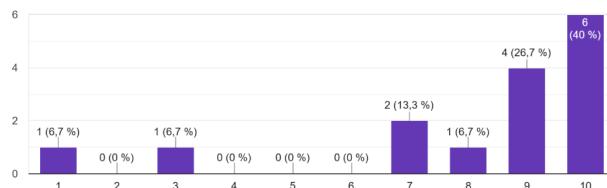
Bạn có thực hiện thành công được kịch bản xem lịch sử in như trên không?

15 Antworten



Trên thang điểm từ 1 đến 10, bạn nghĩ sao về độ khó khi thực hiện thao tác xem lịch sử in?

15 Antworten



- About user interface: The average score is 8,4. The highest score is 10, lowest score is 3
- About task success: 100% participants can perform the task.

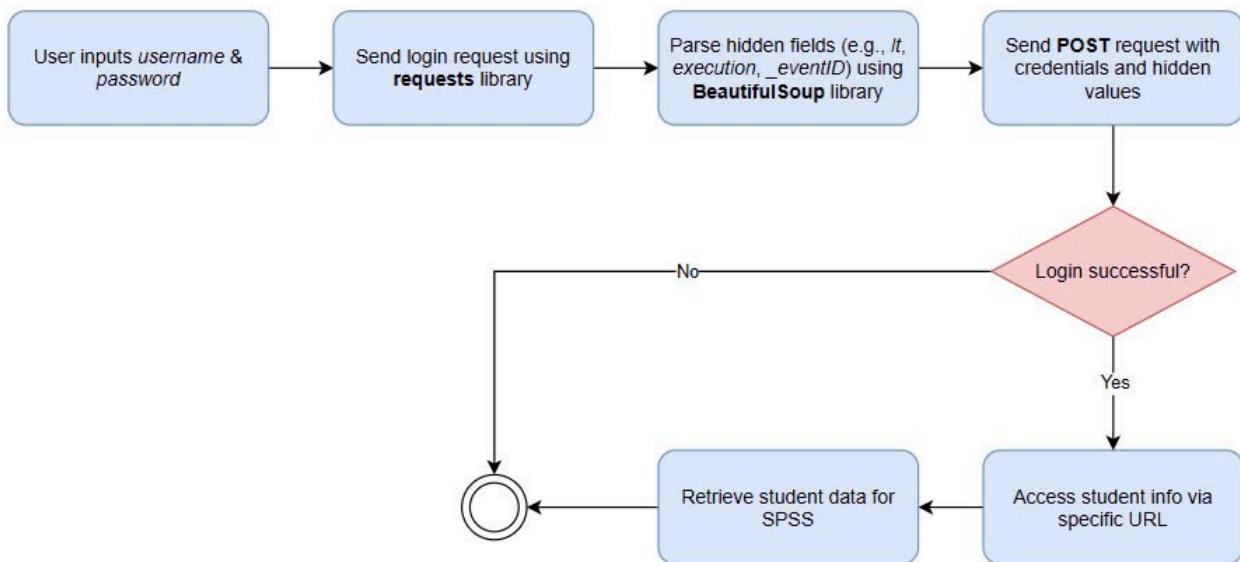
- About usability: The average score for usability is 8.133. The highest score is 10, lowest score is 1. No feedback about difficulty encountered during the task
- Conclusion
 - The user interface generally meets the needs of users and helps most users to be able to successfully perform the main functions of the SPSS system.
 - The most difficult to use function is viewing the printing log while the easiest to use function is buying paper.
 - Although 100% of testers can perform given tasks, the satisfaction with user interface is low, with the minimum evaluation score being 1.

6. Implementation - Sprint 2

6.1. Develop MVP2

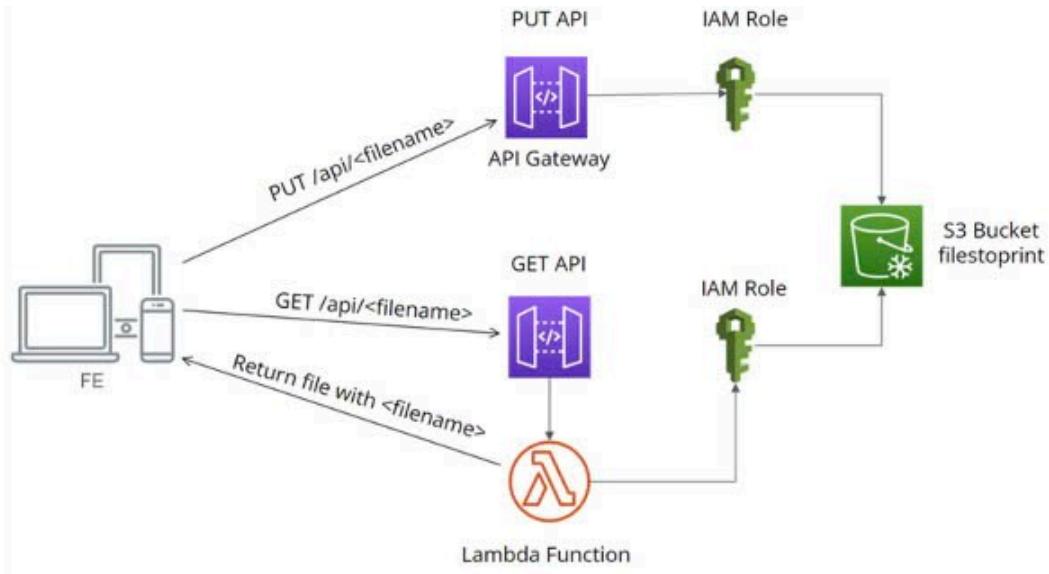
6.1.1. Key technique

Access student info authentication via HCMUT-SSO:



With this authentication, it only allows HCMUT students to log in our service.

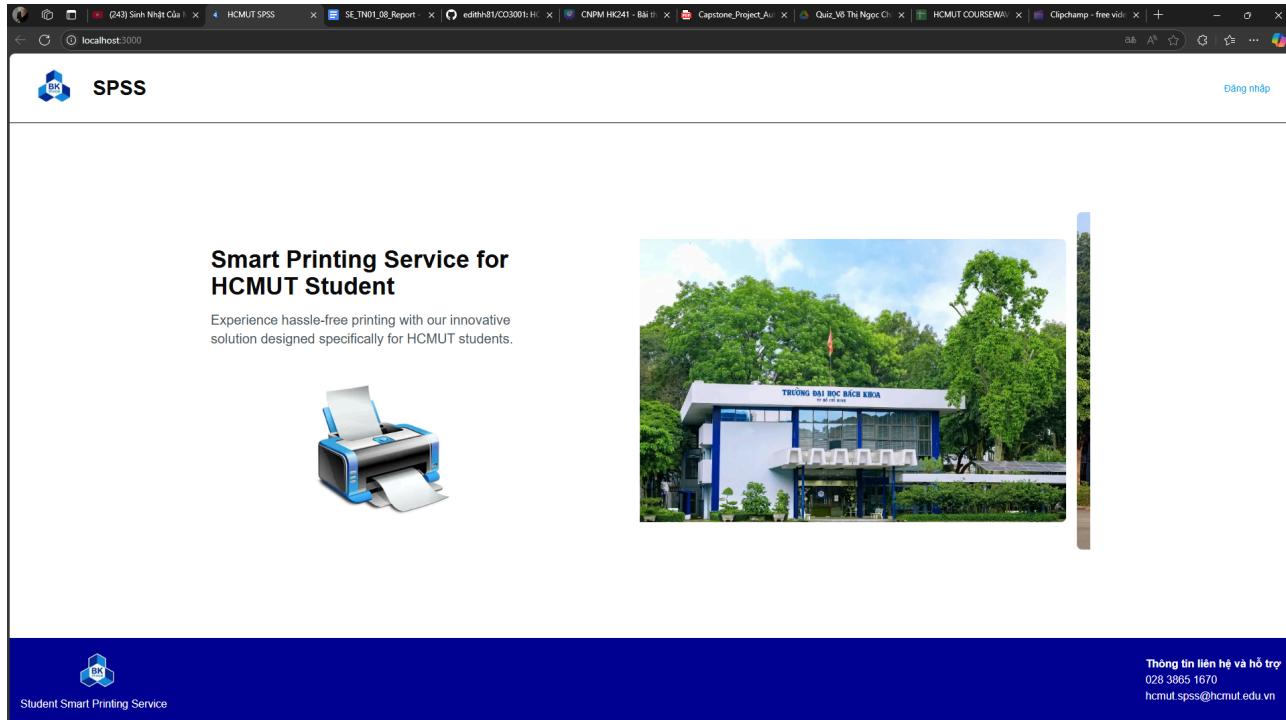
Upload and download file with AWS:



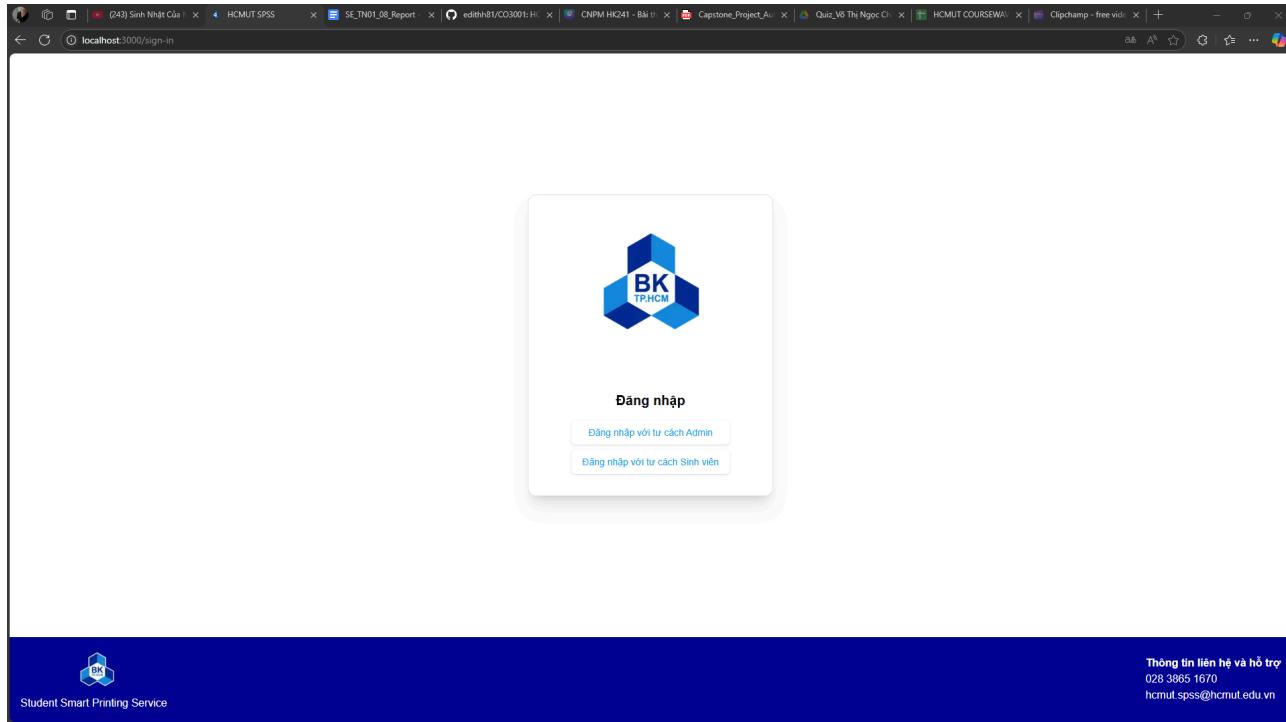
6.1.2. Implementation

See full demo via [link](#)

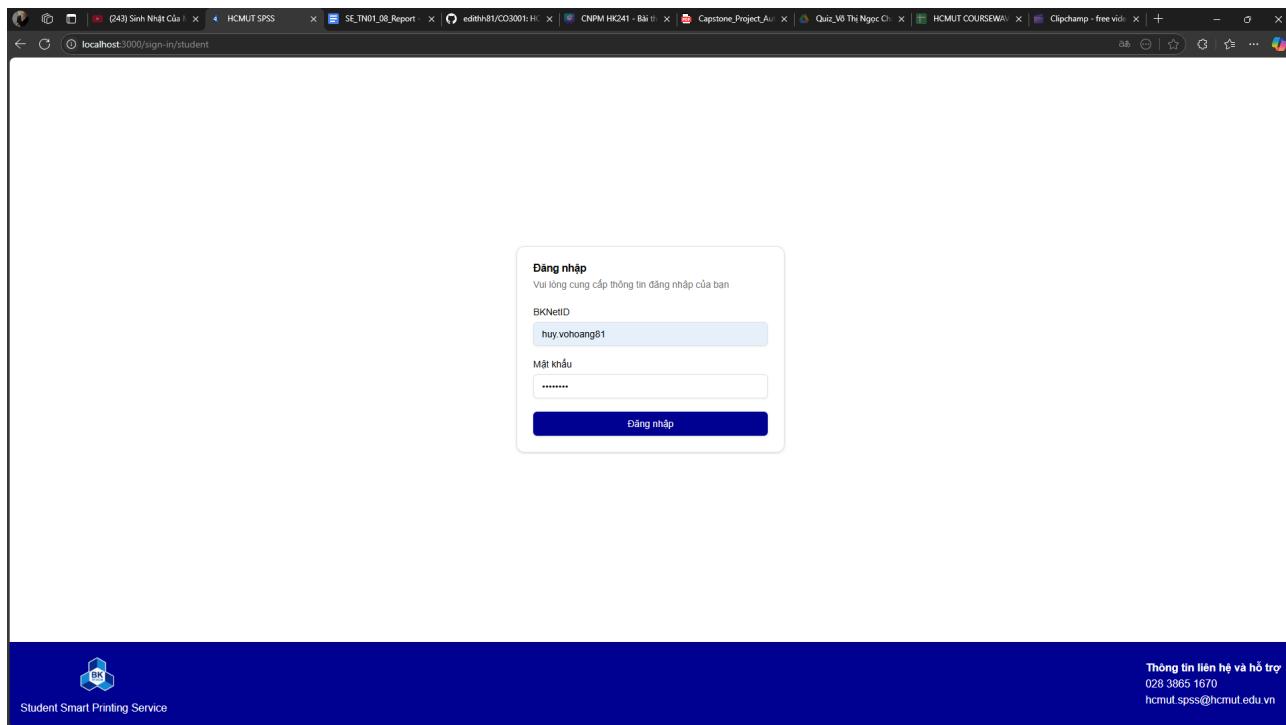
Landing page



Login page



Login with student role. It only allows HCMUT students access our website so each student need to fill in the information with their BkNetID account.



Homepage after login successfully

Student can choose the campus then access the printer list page

In ấn

Chọn máy in

Sắp xếp theo: Mặc định

Máy in 41 Phòng: B3-102 Hàng đợi: 2 Thông tin thêm Chọn	Máy in 44 Phòng: A5-104 Hàng đợi: 2 Thông tin thêm Chọn	Máy in 45 Phòng: C5-201 Hàng đợi: 4 Thông tin thêm Chọn	Máy in 46 Phòng: C6-202 Hàng đợi: 1 Thông tin thêm Chọn
Máy in 47 Phòng: B1-301 Hàng đợi: 0 Thông tin thêm Chọn	Máy in 49 Phòng: B9-401 Hàng đợi: 0 Thông tin thêm Chọn	Máy in 62 Phòng: C6-102 Hàng đợi: 0 Thông tin thêm Chọn	Máy in 63 Phòng: C1-101 Hàng đợi: 0 Thông tin thêm Chọn

< Previous 1 2 Next >

Thông tin liên hệ và hỗ trợ
028 3865 1670
hcmut.spss@hcmut.edu.vn

Student Smart Printing Service

In ấn

Chọn máy in

Sắp xếp theo: Mặc định

Máy in 41 Phòng: B3-102 Hàng đợi: 2 Thông tin thêm Chọn	Máy in 44 Phòng: A5-104 Hàng đợi: 2 Thông tin thêm Chọn	Máy in 45 Phòng: C5-201 Hàng đợi: 4 Thông tin thêm Chọn
Máy in 47 Phòng: B1-301 Hàng đợi: 0 Thông tin thêm Chọn	Máy in 49 Phòng: B9-401 Hàng đợi: 0 Thông tin thêm Chọn	Máy in 62 Phòng: C6-102 Hàng đợi: 0 Thông tin thêm Chọn
Mẫu máy in: Samsung Xpress SL-M2020W Loại máy in: Đen trắng, Màu Chức năng: In 1 mặt, In 2 mặt		

< Previous 1 2 Next >

Thông tin liên hệ và hỗ trợ
028 3865 1670
hcmut.spss@hcmut.edu.vn

Student Smart Printing Service

After choose the printer, student can upload file and place their order

The screenshot shows a web browser window with the URL localhost:3000/printers/cs1/upload/45. The page has a dark blue header with the SPSS logo and navigation links: Trang chủ, Lịch sử in ấn, Lịch sử mua giấy, and Mua thêm giấy. On the right side of the header is a user profile icon.

The main content area contains a form titled "Chọn file và chỉnh sửa". It includes fields for selecting a file (with a note that PDF, DOC, and DOCX files are allowed), choosing paper size (A4), print type (One-sided), and color (Black and white). Below these are fields for "Trang cần in" (All pages) and "Số bản in" (1). A "Thông tin thêm" (Additional information) field is also present. At the bottom are two buttons: "Mua thêm giấy" and "Đặt đơn in".

The footer features the BK logo and the text "Student Smart Printing Service". On the right, there is contact information: "Thông tin liên hệ và hỗ trợ", phone number 028 3865 1670, and email hcmut.spss@hcmut.edu.vn.

This is a detailed view of the "Chọn file và chỉnh sửa" form. It shows that a file named "dbs_final211.pdf" has been selected. The print settings remain the same: A4 paper, one-sided, black and white, all pages, and one copy. The "Thông tin thêm" field is empty. At the bottom, a note states "Số lượng giấy còn lại cho A4: 39" and a red warning message says "Số lượng giấy cần in: 39". The "Mua thêm giấy" and "Đặt đơn in" buttons are at the bottom.

Also, they can specify the printing option

Chọn cỡ giấy

A4

Loại in

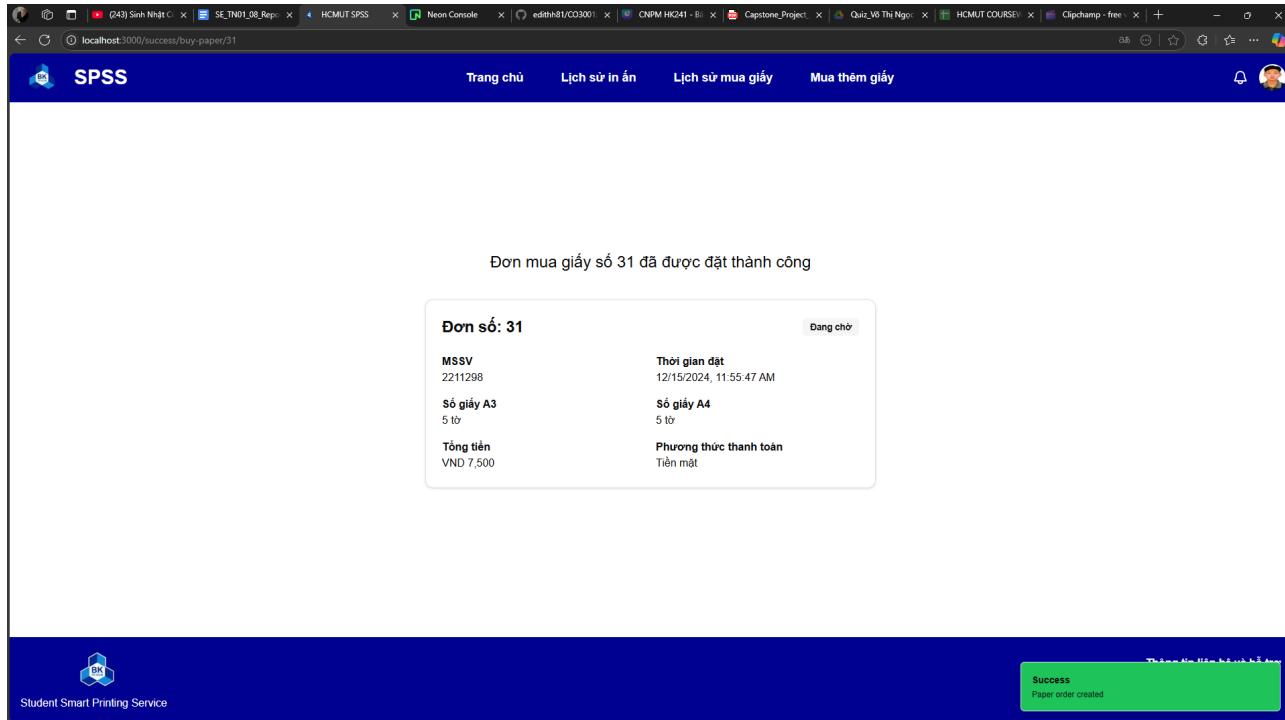
Hai mặt

Màu

Màu

If they do not have enough page for printing, they can purchase for more

The screenshot shows a web browser window with multiple tabs open at the top. The main content area displays a form titled "Mua thêm giấy in". The form has two sections: "Chọn số lượng các loại giấy" (Select quantity of paper types) and "Thông tin thanh toán" (Payment information). In the first section, there are two rows for "Số giấy A4" (A4 paper) and "Số giấy A3" (A3 paper), each with a quantity input field set to 5. In the second section, the total amount is listed as "Tổng số tiền: 7,500 VND" and the payment method is set to "Tiền mặt" (Cash). A blue button labeled "Đặt mua giấy" (Buy paper) is at the bottom right. The footer of the website includes the logo "Student Smart Printing Service" and contact information: "Thông tin liên hệ và hỗ trợ", "028 3865 1670", and "hcmut.spss@hcmut.edu.vn".



Students can view the old printing or buy paper history. They can specify the range to view the history

The screenshot shows a web browser window with multiple tabs open. The active tab displays the "Lịch sử in ấn" (Print History) section. It includes search filters for "Thời gian" (Time) and buttons for "Tìm kiếm" (Search) and "Đặt lại" (Reset). Below this is a table titled "Lịch sử in" (Print History) with the following data:

Đơn in	Thời gian	Cơ sở	Máy in	Tên file in	Kích thước in	Số lượng giấy	Trạng thái	Chi tiết
94	04/12/2024 12:37	Lý Thường Kiệt	46	10_hehe.pdf	A4	3	Chờ xác nhận	Xem
87	03/12/2024 23:21	Đĩ An	65	TN01_08.pdf	A4	10	Đã hoàn thành	Xem
86	03/12/2024 23:21	Đĩ An	65	TN01_08.pdf	A4	10	Đã hoàn thành	Xem
85	03/12/2024 23:21	Đĩ An	65	TN01_08.pdf	A4	10	Đã hoàn thành	Xem

Below the table, there are two sections: "Số lượng giấy đã in" (Printed paper count) showing "Giấy A4: 33" and "Giấy A3: 0"; and "Số lượng giấy còn lại" (Remaining paper count) showing "Giấy A4: 3" and "Giấy A3: 24".

Lịch sử in ấn

Thời gian

Ngày bắt đầu: Ngày kết thúc:

[Tìm kiếm](#) [Đặt lại](#)

Lịch sử in

Đơn in	Thời gian	Cơ sở	Máy in	Tên file in	Kích thước in	Số lượng giấy	Trạng thái	Chi tiết
94	04/12/2024 12:37	Lý Thường Kiệt	46	10_hehe.pdf	A4	3	Chờ xác nhận	Xem
87	03/12/2024 23:21	Dĩ An	65	TN01_08.pdf	A4	10	Đã hoàn thành	Xem
86	03/12/2024 23:21	Dĩ An	65	TN01_08.pdf	A4	10	Đã hoàn thành	Xem
85	03/12/2024 23:21	Dĩ An	65	TN01_08.pdf	A4	10	Đã hoàn thành	Xem

1

localhost:3000/history/buy-paper

SPSS

Trang chủ | Lịch sử in ấn | Lịch sử mua giấy | Mua thêm giấy

Lịch sử mua giấy

Thời gian

Ngày bắt đầu: Ngày kết thúc:

[Tìm kiếm](#)

Lịch sử mua giấy

Đơn mua	Thời gian	Sinh viên	Giấy A4	Giấy A3	Tổng tiền	Trạng thái	Phương thức	Chi tiết
2	30/11/2024 15:54	2211298	2	0	6,000 VND	Đã hoàn thành	Tiền mặt	Xem

1

Tổng số giấy đã mua

Giấy A4: 2

Giấy A3: 0

BK

Student Smart Printing Service

Thông tin liên hệ và hỗ trợ
028 3865 1670
hcmut.spss@hcmut.edu.vn

Students can view their old order

The screenshot shows a web browser window with multiple tabs open. The active tab displays a success message: "Đơn in số 87 đã được đặt thành công". Below this, a summary of the print job is shown in a card format:

Đơn số: 87		A4
Sinh viên 2211298	Mã máy in 65	Dã hoàn thành
File TN01_08.pdf		pdf
Loại in Hai mặt	Màu Trắng đen	
Các trang cần in Tất cả	Số bản in 1	
Tổng số trang cần in 10	Trạng thái Đã hoàn thành	
Ngày đặt in 12/3/2024, 11:21:51 PM	Cơ sở ĐI An	
Thông tin thêm in lẻ gium		

At the bottom of the page, there is a footer with the logo "Student Smart Printing Service" and contact information: "Thông tin liên hệ và hỗ trợ 028 3865 1670 hcmut.spss@hcmut.edu.vn".

When their order is completed, they can get notification

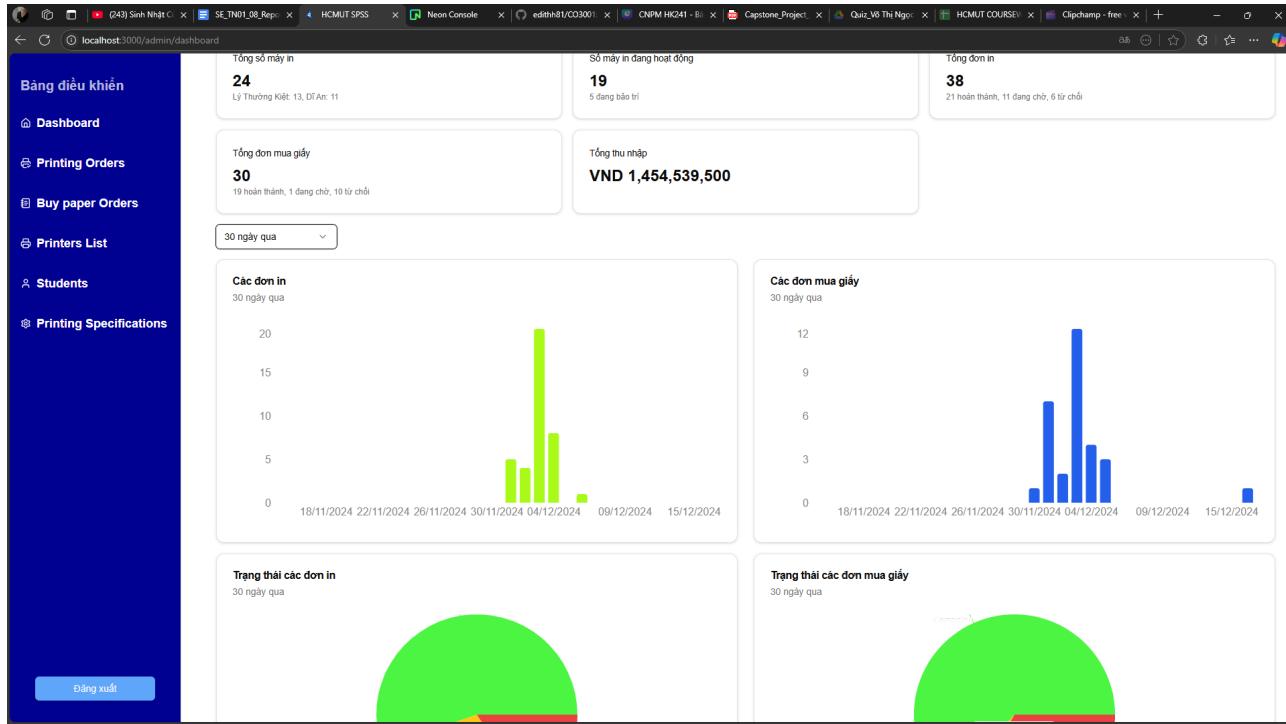
The notification message is titled "Thông báo" and contains the following content:

File "TN01_08.pdf" của bạn đã hoàn thành. Chú thích
của nhân viên: . Vui lòng đến phòng: H1-203 của máy in 03/12/2024 16:24
tại cơ sở: cs2 để nhận.

File "TN01_08.pdf" của bạn đã hoàn thành. Chú thích
của nhân viên: . Vui lòng đến phòng: H1-203 của máy in 03/12/2024 16:24
tại cơ sở: cs2 để nhận.

File "TN01_08.pdf" của bạn đã hoàn thành. Chú thích
của nhân viên: . Vui lòng đến phòng: H1-203 của máy in 03/12/2024 16:24
tại cơ sở: cs2 để nhận.

We are also implementing the admin functionality on our website.



Admin can view full of printing and buy paper history

The image contains two screenshots of a web-based administration system for a student smart printing service. Both screenshots feature a dark blue sidebar on the left with white text and icons, listing various administrative functions: Dashboard, Printing Orders, Buy paper Orders, Printers List, Students, and Printing Specifications. A blue button labeled "Đăng xuất" (Logout) is located at the bottom of the sidebar.

Screenshot 1: Printing History (Các đơn in)

This screenshot shows a table titled "Các đơn in" (Print Orders). The table has columns for "Tất cả đơn" (All orders), "Tên file" (File name), "Chi tiết" (Details), "Tổng giấy in" (Total printed pages), "Trạng thái" (Status), and "Thời gian" (Time). The data includes numerous entries for different PDF files, such as "Blockchain_Fundamentals.pdf", "Database_Assignment_2.pdf", and "SEM241_HCMUT_MATHS4CS__0552". The status column shows various states like "Đang đợi" (Pending), "Đã hoàn thành" (Completed), and "Bị từ chối" (Rejected).

Tất cả đơn	Tên file	Chi tiết	Tổng giấy in	Trạng thái	Thời gian	
213046	Blockchain_Fundamentals.pdf	all, A4, single, bw, 1 copies	47	Đang đợi	12/6/2024, 9:54:16 PM	
95	2213046	Database_Assignment_2.pdf	all, A4, single, bw, 1 copies	30	Đã hoàn thành	12/4/2024, 1:37:59 PM
94	2211298	10_hehe.pdf	all, A4, double, bw, 1 copies	3	Đang đợi	12/4/2024, 12:37:06 PM
93	2213046	Database_Assignment_2.pdf	1-10,12-15, A4, double, bw, 5 copies	35	Đang đợi	12/4/2024, 12:09:47 PM
92	2213795	s3.png	all, A4, single, color, 1 copies	1	Đang đợi	12/4/2024, 10:12:31 AM
91	2213046	Lab-01.pdf	1-2,3-4, A4, single, bw, 10 copies	40	Đang đợi	12/4/2024, 10:06:57 AM
90	2213046	DE6FINAL_TV(1).pdf	1-2, 3-4, A4, single, bw, 10 copies	40	Đã hoàn thành	12/4/2024, 8:50:42 AM
89	2213046	Lab-01.pdf	all, A4, single, bw, 1 copies	4	Đang đợi	12/4/2024, 7:16:35 AM
88	2210140	New Project (5).png	all, A3, single, bw, 1 copies	1	Đang đợi	12/4/2024, 5:15:04 AM
82	2213046	DE6FINAL_TV(1)-d4fda4f2f4-1.pdf	all, A4, single, bw, 1 copies	4	Đang đợi	12/3/2024, 11:12:37 PM
81	2210140	quizz.pdf	all, A4, single, bw, 1 copies	11	Đã hoàn thành	12/3/2024, 10:56:52 PM
80	2210140	quizz.pdf	all, A4, single, bw, 1 copies	11	Đã hoàn thành	12/3/2024, 10:56:51 PM
79	2210140	quizz.pdf	all, A4, single, bw, 1 copies	11	Bị từ chối	12/3/2024, 10:56:50 PM
78	2213046	DE6FINAL_TV(1).pdf	1-2,4-5, A3, double, bw, 1 copies	2	Đã hoàn thành	12/3/2024, 10:14:19 PM
77	2213046	option2.pdf	1-5, A4, double, bw, 1 copies	3	Đã hoàn thành	12/3/2024, 8:55:49 PM
76	2213046	option2.pdf	all, A4, single, bw, 1 copies	9	Bị từ chối	12/3/2024, 8:31:03 PM
75	2213046	pdf-sample.pdf	all, A4, single, bw, 1 copies	1	Đang đợi	12/3/2024, 8:18:52 PM
74	2210140	SEM241_HCMUT_MATHS4CS__0552	all, A4, single, bw, 1 copies	10	Bị từ chối	12/3/2024, 6:57:26 PM
73	2210140	SEM241_HCMUT_MATHS4CS__0552	all, A4, single, bw, 1 copies	10	Đã hoàn thành	12/3/2024, 6:57:25 PM
72	2210140	SEM241_HCMUT_MATHS4CS__0552	all, A4, single, bw, 1 copies	10	Bị từ chối	12/3/2024, 6:57:25 PM
74	2210140	SEM241_HCMUT_MATHS4CS__0552	all, A4, single, bw, 1 copies	40	Đã hoàn thành	12/3/2024, 6:56:48 PM

Screenshot 2: Buying History (Đơn mua giấy)

This screenshot shows a table titled "Đơn mua giấy" (Paper Purchase Orders). The table has columns for "Mã đơn mua", "Sinh viên", "A3", "A4", "Tổng cộng", "Trạng thái", "Ngày", "Phương thức thanh toán", "Hành động", and "Chỉnh sửa trạng thái". The data includes multiple entries for different students, such as "2211298" and "2213046", with various purchase amounts and payment methods like "Tiền mặt" and "BKPay". The status column shows "Đang chờ" (Pending), "Đã hoàn thành" (Completed), and "Bị từ chối" (Rejected).

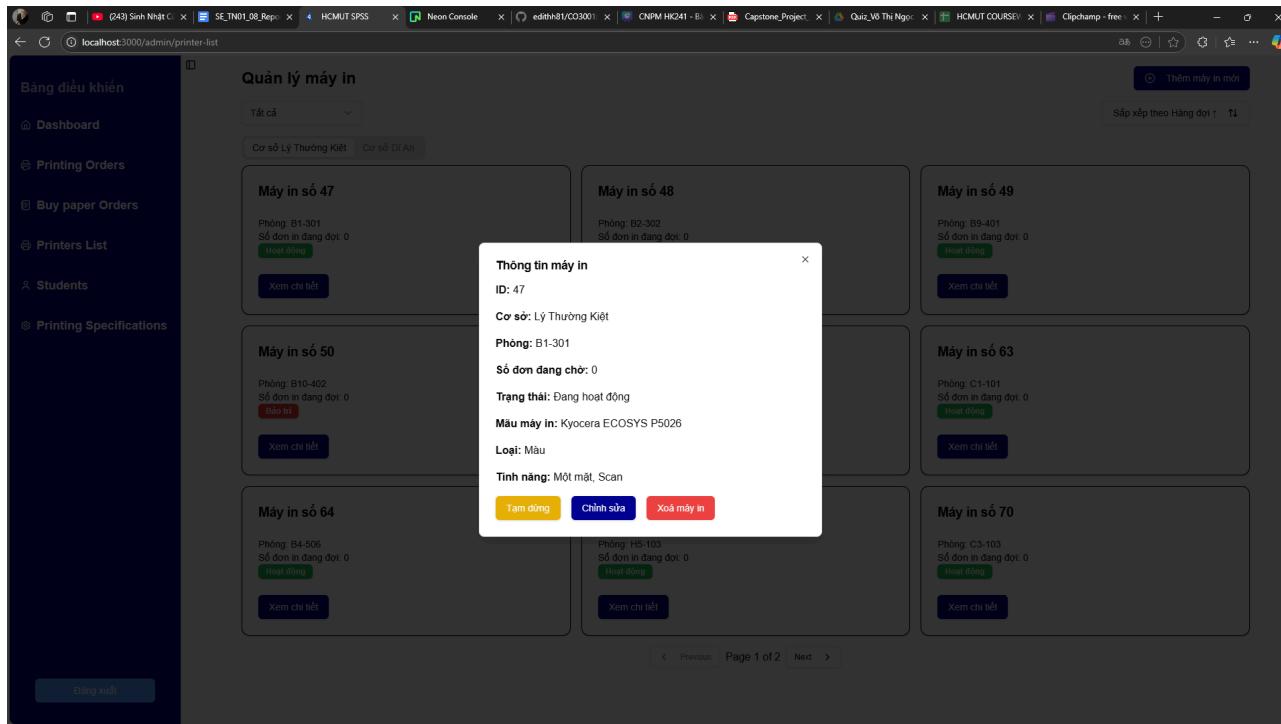
Mã đơn mua	Sinh viên	A3	A4	Tổng cộng	Trạng thái	Ngày	Phương thức thanh toán	Hành động	Chỉnh sửa trạng thái
31	2211298	5	5	7500	Đang chờ	12/15/2024, 11:55:47 AM	Tiền mặt	✓ ✗	Đang chờ
30	2213046	4	5	6500	Đã hoàn thành	12/5/2024, 8:48:33 AM	Tiền mặt	-	Đã hoàn thành
29	2213046	-	-	0	Đã hoàn thành	12/5/2024, 8:48:17 AM	Tiền mặt	-	Đã hoàn thành
28	2213046	6	5	8500	Đã hoàn thành	12/5/2024, 8:47:46 AM	Tiền mặt	-	Đã hoàn thành
27	2213046	10	6	13000	Đã hoàn thành	12/4/2024, 1:39:41 PM	Tiền mặt	-	Đã hoàn thành
26	2213046	9	5	11500	Đã hoàn thành	12/4/2024, 12:10:07 PM	Tiền mặt	-	Đã hoàn thành
25	2213046	10	5	12500	Đã hoàn thành	12/4/2024, 10:07:22 AM	Tiền mặt	-	Đã hoàn thành
24	2213046	5	5	7500	Đã hoàn thành	12/4/2024, 8:51:11 AM	Tiền mặt	-	Đã hoàn thành
23	2210140	-	2000000	1000000000	Đã hoàn thành	12/3/2024, 10:53:06 PM	Tiền mặt	-	Đã hoàn thành
22	2210140	-	900000	45000000	Bị từ chối	12/3/2024, 10:52:41 PM	Tiền mặt	-	Bị từ chối
21	2210140	-	8400	4200000	Bị từ chối	12/3/2024, 10:52:26 PM	Tiền mặt	-	Bị từ chối
20	2210140	3	5	5500	Bị từ chối	12/3/2024, 10:51:03 PM	BKPay	-	Bị từ chối
19	2213046	10	4	12000	Đã hoàn thành	12/3/2024, 10:14:51 PM	Tiền mặt	-	Đã hoàn thành
18	2213046	5	10	10000	Đã hoàn thành	12/3/2024, 8:56:17 PM	Tiền mặt	-	Đã hoàn thành
17	2213273	-	-	0	Bị từ chối	12/3/2024, 8:47:30 PM	Tiền mặt	-	Bị từ chối

Admin can modify all printers.

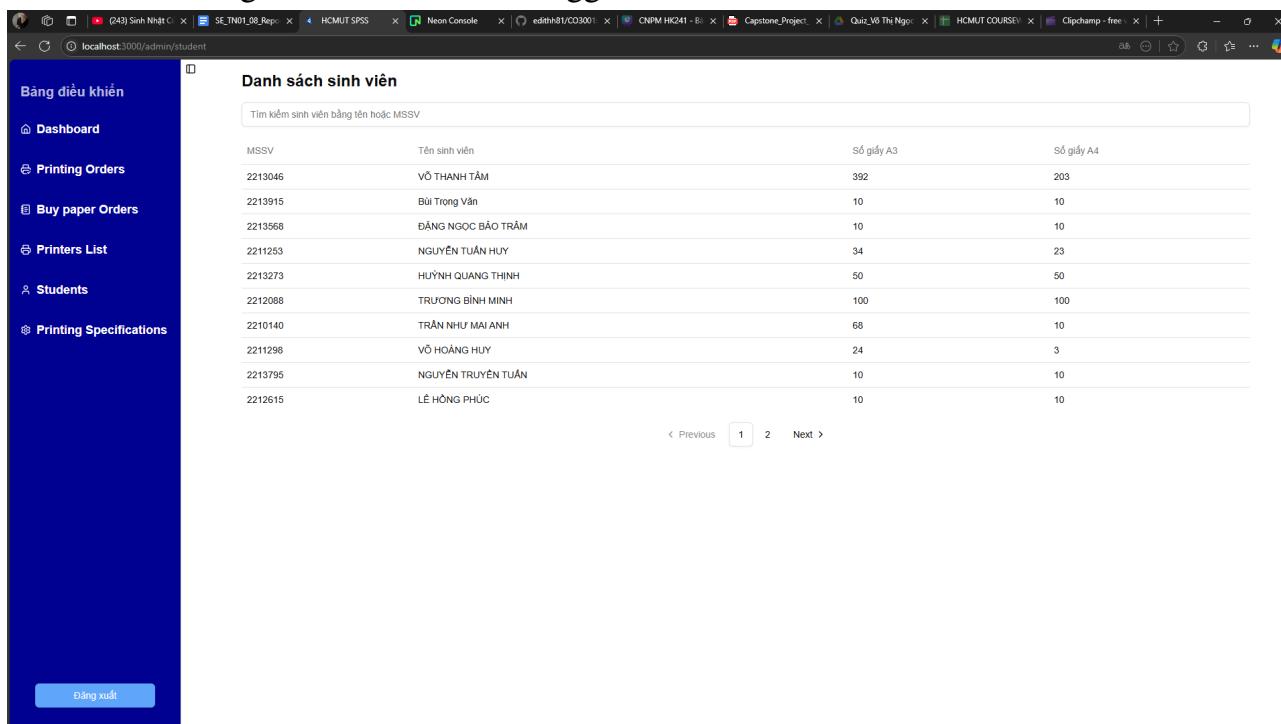
The screenshot shows a web-based administration interface for managing printers. On the left, there's a sidebar with navigation links: Bảng điều khiển, Dashboard, Printing Orders, Buy paper Orders, Printers List, Students, and Printing Specifications. Below these is a blue button labeled Đăng xuất (Logout). The main area is titled 'Quản lý máy in' (Printer Management) and contains a grid of printer cards. Each card displays the printer number (e.g., Máy in số 47, 48, 49, 50, 62, 63, 64, 67, 70), its location (e.g., Phòng: B1-301, B2-302, B2-401, B10-402, C6-102, C1-101, B4-506, H5-103, C3-103), the number of pending jobs (e.g., Số đơn in đang đợi: 0, 0, 0, 0, 0, 0, 0, 0, 0), and two buttons: 'Hoạt động' (Active) and 'Bảo trì' (Maintenance). There are also 'Xem chi tiết' (View details) buttons. At the top right, there are buttons for 'Thêm máy in mới' (Add new printer) and 'Sắp xếp theo Hàng đợi ↑' (Sort by Pending jobs ↑). Below the grid, there are navigation buttons for Page 1 of 2.

Admin can add a new printer or change functionality of any printer

This screenshot shows the same interface as above, but with a modal window open over the printer list. The modal is titled 'Thêm máy in mới' (Add new printer) and contains fields for 'Cơ sở' (Facility) set to 'Lý Thường Kiệt', 'Phòng' (Room) set to 'A2-102', 'Mẫu máy in' (Printer model) set to 'HP Laser', 'Loại' (Type) with 'Trắng đen' (Black and white) checked and 'Màu' (Color) checked, 'Tính năng' (Features) with 'Một mặt' (Single-sided), 'Hai mặt' (Double-sided) checked, and 'Scan' checked, and a 'Thêm máy in' (Add printer) button. The background grid of printers is partially visible.



Admin can manage all of student who logged in website



Admin can specify the printing option

Bảng điều khiển

Chỉnh sửa thông số in ấn

Số trang A4 mặc định: 10
Số lượng trang A4 mặc định được cấp cho sinh viên mỗi lần reset và lần đầu đăng nhập.

Số trang A3 mặc định: 10
Số lượng trang A3 mặc định được cấp cho sinh viên mỗi lần reset và lần đầu đăng nhập.

Ngày bắt đầu: December 7th, 2024
Ngày bắt đầu việc cấp mới lượng giấy cho sinh viên sau một khoảng thời gian.

Ngày kết thúc: December 27th, 2024
Ngày kết thúc việc cấp mới lượng giấy cho sinh viên sau một khoảng thời gian.

Tần suất cấp mới: Hàng tháng
Tần suất cấp mới lượng giấy cho sinh viên.

Các file được phép yêu cầu in:
Chọn các loại file mà sinh viên được phép tải lên.

PDF DOC DOCX
 JPG PNG

Lưu cài đặt

6.2. Demonstrate the whole project from Task 1 to Task 5

Slide for our presentation