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SOFTWARE ENGINEERING (CO3001)

Class: CC01 | Group: 7

A smart printing service for HCMUT students

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HO CHI MINH CITY, SEPTEMBER 2023



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1 List of member & workload

ID	Student ID	Full Name	Workload	Evaluation	Note
1	2152966	Dinh Việt Thành		16.66%	Leader
2	2152143	Dõ Duy Khương		16.66%	
3	2152591	Nguyễn Đình Thiên Huy		16.66%	
4	2153379	La Cảm Huy		16.66%	
5	2153488	Nguyễn Minh Khuê		16.66%	
6	2152040	Lê Hoàng Duy		16.66%	



2 Requirement elicitation

2.1 Domain context of the project

2.1.1 Project Overview

In the context of our program project, our domain resides within the educational realm of HCMUT, where we are developing an online printing service catering to all students across the campus network. This system is designed with the dual purpose of enhancing students' printing experiences and facilitating administrative tasks for school departments. To empower students with seamless printing capabilities, our system offers a feature-rich interface. Students can effortlessly locate printers situated throughout the campus, and access some details like printer ID, brand, and model. They can conveniently upload their documents, select their preferred printer, and fine-tune specific print settings such as page size, single or double-sided printing, and the number of copies they wish to produce. On the administrative front, the system equips Student Printing Service Officers (SPSOs) with valuable tools to manage and regulate printing activities. SPSOs can set constraints on student printing, including maximum page allowances per semester and approved file types for upload and printing. The system also diligently logs each student's printing history, simplifying tracking for both administrators and students alike. Furthermore, the system automates the generation and storage of periodic reports, with exclusive access granted to SPSOs for review. To ensure secure access, all students are required to authenticate through the HCMUT_SSO service before utilizing the web and application-based printing services.

2.1.2 Key stakeholders and their needs

During development for the Student Smart Printing Service (HCMUT_SSPPS) system, we will have several stakeholders, which include:

1. System design and development department:

The first group consists of the system management and control department, which is essential for maintaining and troubleshooting the system when issues arise during practical usage. They need to ensure the system is secure, reliable, and accessible to users.

2. Student Printing Server Officer (SPSO):

In addition, the Student Printing Server Officer (SPSO) also plays an important role in operating the system as well as providing printing services for students. SPSO requires a tool that can manage the printing service such as allowing what types of files are allowed to be uploaded, setting configurations for the printing service, and monitoring student printing activities through a log. And periodically report which printing services are used over a period of time. Printer management functions such as adding, turning on, and turning off printers are also essential needs.

3. Students:

Students are also considered an important stakeholder in the system because printing services are created to support them. They require a user-friendly system that allows them to print documents efficiently and directly through the app or the web. Specifically, their needs include the ability to locate active printers on campuses and specify printing options such as paper size, number of copies, etc. As well as payment services for additional purchases amount of paper that can be used in a semester.



4. The HCMUT_SSO authentication service:

One of the components of the main system is the authentication service, which can facilitate easy management and usage of the app for both Students and SPSO. This helps prevent external users from using the service and causing errors. This stakeholder needs to be implemented into the system to operate smoothly, and the system must also support data input in accordance with the format specified by the authentication service.

5. The Online payment system:

The final component for the student printing support service is the online payment system. To limit students from using the printing service excessively, the university has provided a partial fee for exceeding the printing limit. The online payment system is also a required part of the system, and the input data must be valid for the payment functions to complete the process of purchasing additional printing paper when the printing service exceeds the limit.

2.1.3 Benefits for stakeholders

The Student Smart Printing Service project (HCMUT_SSPPS) system offers significant benefits to both students and the university community. Firstly, users will enjoy enhanced convenience, with easy access to printers via the web or application, saving them valuable time and effort in the printing process. They can customize their printing preferences, including paper size, single or double-sided printing, and other properties, empowering them to optimize their printing experience and document format to suit their preferences. Additionally, the system provides a comprehensive view of their printing history, enabling users to track their usage, make informed decisions, and manage their printing costs effectively, thanks to the semester-specific page allocations provided by the school.

From the perspective of the Student Printing Service Officers (SPSOs), the system streamlines the management of the printing environment. SPSOs can efficiently monitor and adjust system configurations in line with the school's policies. They gain access to detailed logs and reports, simplifying the tracking of student printing activities and facilitating data-driven decision-making. Furthermore, SPSOs oversee financial transactions related to additional printing page purchases, ensuring sound financial management.

For HCMUT_SSO authentication service, this system serves as third-party software that utilizes the login functionalities provided by the university for student management. It facilitates easier access to the authentication API, eliminating the need for students to understand and authenticate using command-line prompts. It offers a user-friendly interface and environment for students.

As for the online payment system, it will serve as a bridge for transferring funds between students' bank accounts and the university's accounts, making it more convenient and time-saving for students to make payments. This eliminates the need to visit payment offices to complete transactions. Similar to the authentication system, the application will become a tool to assist students in using payment functions and formatting input data for payment APIs.



2.2 Functional and non-functional requirements

Based on the provided project description, we can infer the following functional and non-functional requirements for the Student Smart Printing Service (HCMUT_SSPS):

2.2.1 Functional requirements

1. For Students:

- Students should be able to log in to the application.
- Students should be able to upload document files for printing.
- Students should be able to choose a printer from the available options.
- Printing properties such as paper size, pages to be printed, one/double-sided printing, and number of copies should be selectable.
- Students should be able to view their printing history for a specified time period, including a summary of the number of printed pages for each page size.
- Each student should have a default number of A4-size pages for printing each semester.
- Students should be able to purchase additional pages through an online payment system.

2. For Student Printing Service Officer (SPSO):

- The system should log printing actions, including student ID, printer ID, file name, printing start and end time, and number of pages for each page size.
- The SPSO should be able to view the printing history (log) of all students or a specific student for a specified time period and for all or selected printers.
- The SPSO should be able to add, enable, and disable printers.
- Permitted file types for printing should be limited and configurable by the SPSO.
- The SPSO should be able to configure system settings, such as the default number of pages, dates for providing default pages to students, and permitted file types.
- The reports of the using of the printing system are generated automatically at the end of each month and each year and are stored in the system, and can be viewed by the SPSO anytime.

3. HCMUT_SSO authentication service:

- The HCMUT_SSO authentication service requests the student's username and password for logging into the application.
- All users have to be authenticated by the HCMUT_SSO authentication service before using the system.

4. Online payment system:

- The system should deduct the appropriate number of pages from a student's account balance when printing, considering A3 pages as equivalent to two A4 pages.
- The feature "Buy Printing Pages" of the system allows students to purchase additional pages, and they can make the payment through online payment systems like the university's BKPay system.



2.2.2 Non-Functional requirements

1. Usability:

- The users should be able to use the web effectively after 1-2 hours of training.
- The system should be available in both English and Vietnamese.
- The web should have 2 interfaces for students and SPSO.
- The system should have an intuitive and easy-to-use interface for students to navigate and interact with. To evaluate, we are using Usability Score (e.g., measured through user surveys or usability testing), and the target is at least 85% of users should rate the interface as "easy to use" or "very easy to use" in user satisfaction surveys.

2. Performance:

- Time for login should be less than 5 seconds.
- The system should provide quick responses when students perform actions like file uploads, printer selection, and specifying printing properties. The metric to evaluate it would be using Average Response Time (measured in milliseconds). The system should respond to user actions within 5 seconds on average.

3. Reliability:

- The failure rate of real-time access is 0.005 (5 fail access out of 1000 access).
- The system must work at all time.

4. Security:

- Alert for server infiltration.
- The integrity of data should be ensured, such as user information and other critical data, and minimize the risk of data loss or corruption.

5. Scalability:

- The system should be able to handle a large number of concurrent print requests, especially during peak times. To satisfy this requirement, we can use some metrics, for example, Concurrent Request Handling Capacity (measured as the maximum number of simultaneous print requests),...

2.3 Use-case diagram for whole system

2.3.1 Use-case diagram

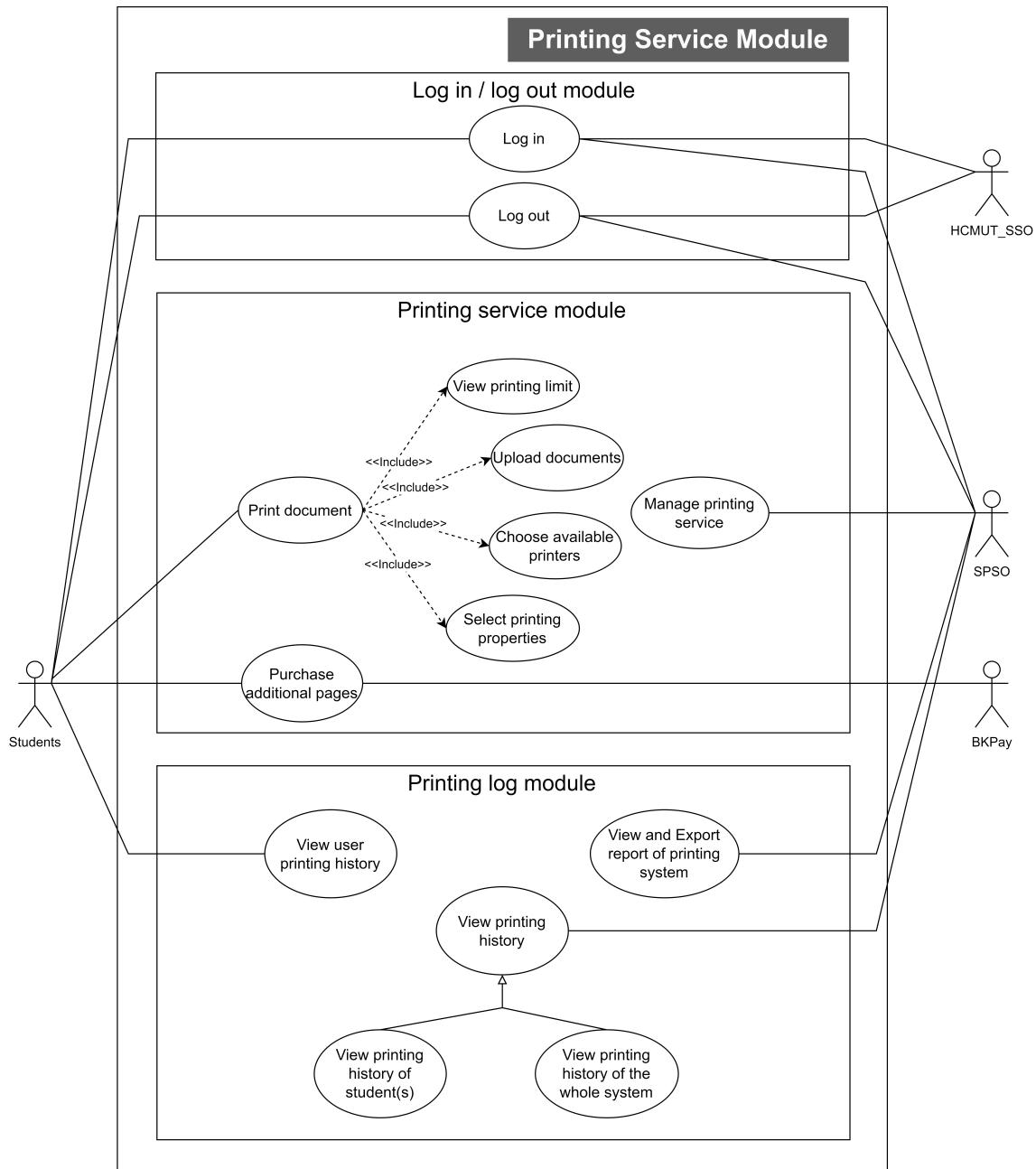


Figure 1: The use-case diagram for the whole system

For further inspection, please visit [this site](#).



2.3.2 Table description

Table of actors:

Actor ID	Actor	Description
1	Students	Students at HCMUT
2	SPSO	Student Printing Service Officer
3	BKPay	Payment system of HCMUT
4	HCMUT_SSO	Authentication Service of HCMUT_SSO

Table of use-cases:

ID	Use-case name	Description
1	Log in	Used by Students and SPSO to log in to SSPS
2	Log out	Used Students and SPSO to log out to SSPS
3	Print documents	Used by students to print documents
4	Upload documents	Used by students to upload the documents they want to print
5	Choose available printer	Used by students to choose the printer to be used among the available ones
6	Select printing properties	Used by students to choose desired printing properties such as paper size, one-/double-sided,etc
7	View printing limit	Used by students to check the number of remaining free pages
8	Purchase additional pages	Used by Students to purchasing additional pages once they reach the limit
9	Manage printing service	Used by SPSO to manage the configuration of the system
10	View user printing history	Used by students to view printing history for a time period
11	View printing history	Used by SPSO to view the printing history



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ID	Use-case name	Description
12	View printing history of a student	Used by SPSO to view the printing history of one/several student(s)
13	View printing history of the whole system	Used by SPSO to view the printing history of the whole system
14	Export report of printing system	Used by SPSO to export the report of the whole system

2.4 Printing service module use-case diagram

2.4.1 Use-case diagram

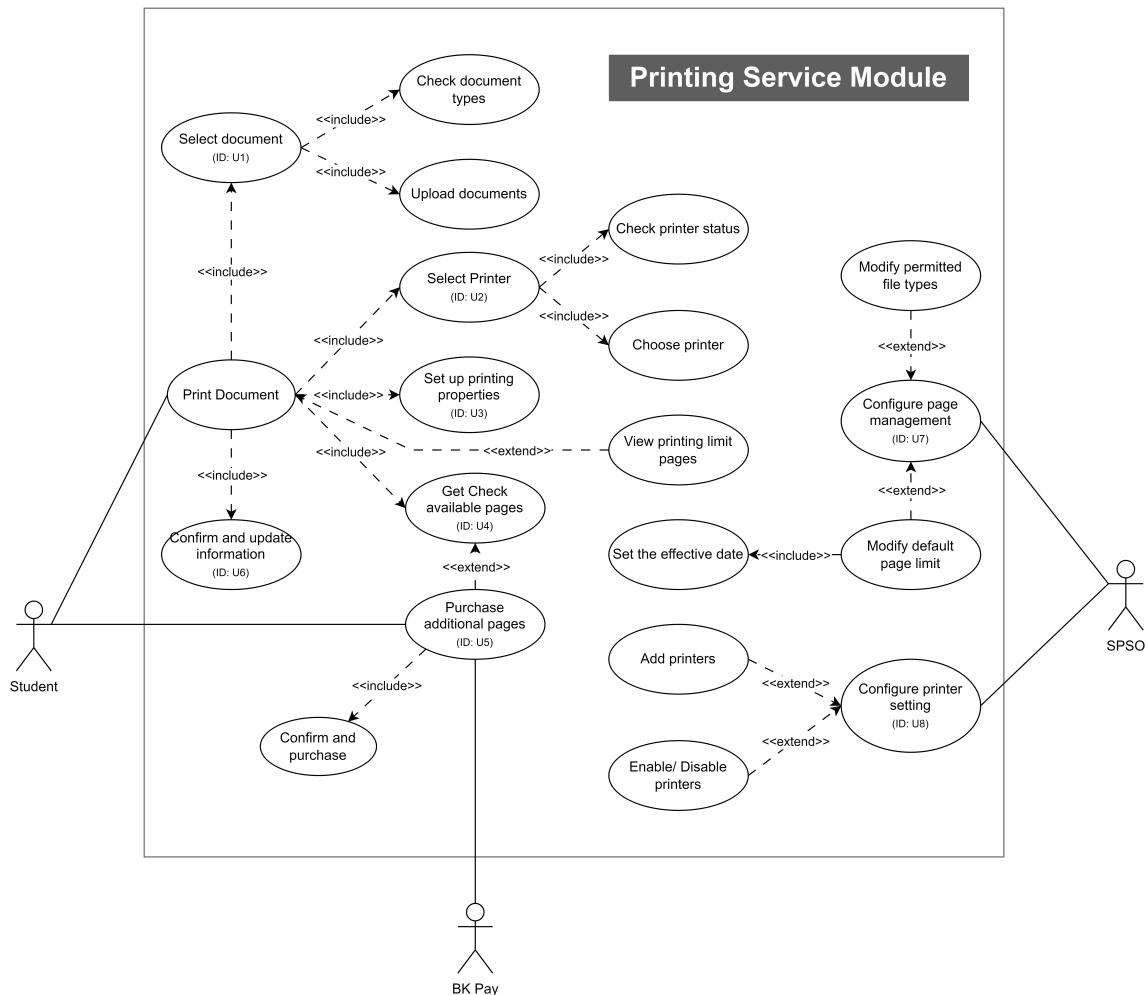


Figure 2: The use-case diagram for Printing service module

For further inspection, please visit [this site](#).



2.4.2 Table description

2.4.2.1 Upload Document Files

Use-case ID Use-case Name	U1 Upload Document Files
Use-case overview	This use case allows a student to upload a document file for printing to the HCMUT_SSPS system.
Actors	Student
Trigger	Student chooses the “Upload file” on the navigation bar.
Pre-conditions	<ul style="list-style-type: none">- The student has logged into the HCMUT_SSPS system.- The student has the necessary permission to upload documents.- The system and database are available.- The internet is available.
Post-conditions	The document file is successfully uploaded.
Normal flow	<ol style="list-style-type: none">1. The student selects the "Upload file" option in the user interface.2. The system presents a file upload interface, allowing the student to browse, select and confirm the desired document file from their local device.3. The system validates the file to ensure it meets the permitted file types and any other defined constraints.4. The system initiates the upload process, indicating the progress to the student.5. Once the upload is complete, the system confirms the successful upload.
Alternative flow	3a. If the selected file does not meet the permitted file types: The system displays an error message to the student, indicating that the file type is not allowed. The student is prompted to select a file with an acceptable file type.
Exception flow	If there is an unexpected system error (connection lost) during the upload process: The system displays an error message to the student, indicating the issue. The student can retry the upload.



2.4.2.2 Printer Selection

Use-case ID Use-case Name	U2 Printer Selection
Use-case overview	This use case allows a student to select a printer from the available options in the HCMUT_SSPS system.
Actors	Student
Trigger	Student chooses the “Select printer” in the user interface.
Pre-conditions	<ul style="list-style-type: none">- The student has logged into the HCMUT_SSPS system.- The student has uploaded a document file for printing.- The system and database are available.- The internet is available.
Post-conditions	The student has successfully selected a printer for their printing job.
Normal flow	<ol style="list-style-type: none">1. After uploading a document file, the system presents the student with a printer selection interface.2. The system displays a list of available printers, including their ID, brand/manufacturer name, printer model, and location.3. The student reviews the printer options and selects a preferred printer for their printing job.4. The system confirms the printer selection and notifies the student that the selection has been successfully submitted.
Alternative flow	2a. If there are no available printers: The system displays a message to the student indicating that there are no printers currently available for printing. The student is advised to try again later or contact the Student Printing Service Officer (SPSO) for assistance.
Exception flow	If there is an unexpected system error (connection lost) during the selection process: The system displays an error message to the student, indicating the issue. The student can retry the selection.



2.4.2.3 Printing Properties Selection

Use-case ID Use-case Name	U3 Printing Properties Selection
Use-case overview	This use case allows a student to select printing properties for their document in the HCMUT_SSPPS system.
Actors	Student
Trigger	Student chooses the “Select printing properties” in the user interface.
Pre-conditions	<ul style="list-style-type: none">- The student has logged into the HCMUT_SSPPS system.- The student has selected a printer for their printing job.- The system and database are available.- The internet is available.
Post-conditions	The student has successfully selected the desired printing properties for their document.
Normal flow	<ol style="list-style-type: none">1. After selecting a printer for the printing job, the system presents the student with options to configure printing properties.2. The system displays the available printing property options, including:<ul style="list-style-type: none">- Paper size (such as A4, A3, letter, etc.)- Number of pages (of the file) to be printed.- Single-sided or double-sided printing.- Number of copies to be printed.3. The student selects the available printing property options.4. The system validates the selected printing properties to ensure they are valid and supported by the selected printer.5. The system confirms the selected printing properties.
Alternative flow	4a. If any of the selected printing properties are not valid or not supported, the system displays an error message and prompts the student to make appropriate changes.
Exception flow	If there is an unexpected system error (connection lost) during the selection process: The system displays an error message to the student, indicating the issue. The student can retry the selection.



2.4.2.4 Checking Available Pages

Use-case ID Use-case Name	U4 Checking Available Pages
Use-case overview	This use case allows a student to check the number of available pages for printing in their account within the HCMUT_SSPPS system.
Actors	Student
Trigger	Student chooses the “Checking Available Pages” in the user interface.
Pre-conditions	<ul style="list-style-type: none">- The student has logged into the HCMUT_SSPPS system.- The student has selected printing properties.- The system and database are available.- The internet is available.
Post-conditions	The student is presented with the number of available pages for printing in their account.
Normal flow	<ol style="list-style-type: none">1. The student selects the "Check Available Pages" option in the user interface.2. The system retrieves the student's account information and displays the current number of available pages for printing.3. The system presents the available pages information to the student, specifying the number of A4-size pages remaining for the current semester. If the available pages are greater than or equal to the number of pages student desire to print, go to U6; else, go to U5.4. The system also provides information regarding any additional purchased pages and their corresponding balance.
Alternative flow	None.
Exception flow	If there is an unexpected system error (connection lost) during the checking available pages process: The system displays an error message to the student, indicating the issue. The student can retry the process.



2.4.2.5 Purchase Additional Pages

Use-case ID Use-case Name	U5 Purchase Additional Pages
Use-case overview	This use case allows a student to purchase additional pages if needed for printing in the HCMUT_SSPS system.
Actors	Student, BKPay
Trigger	Student chooses the "Purchase Additional Pages" in the user interface.
Pre-conditions	<ul style="list-style-type: none">- The student has logged into the HCMUT_SSPS system.- The student has checked the available pages and determined the need for additional pages.- The system and database are available.- The internet is available.
Post-conditions	The student has successfully purchased additional pages, and the corresponding page balance is updated in their account.
Normal flow	<ol style="list-style-type: none">1. The student selects the "Purchase Additional Pages" option in the user interface.2. The system presents the student with available page packages for purchase, displaying information about each package, including the number of pages included and the cost.3. The student selects the desired page package for purchase.4. The system initiates the payment process, integrating with a payment gateway or system.5. The student provides the necessary payment information and completes the transaction.6. The system prompts the student to confirm the purchase.7. The student confirms the purchase.8. The system verifies the payment and updates the student's account balance with the purchased pages.9. The system notifies the student that the purchase was successful, displaying the updated page balance.
Alternative flow	If the student decides not to proceed with the purchase: The student can cancel the transaction at any point before confirming the purchase, and the system will return to the previous state without making any changes.
Exception flow	If there is an issue with the payment processing or verification: The system displays an error message to the student, indicating the issue. The student can retry the payment process.



2.4.2.6 Print and Update Printing Information

Use-case ID Use-case Name	U6 Print and Update Printing Information
Use-case overview	This use case allows a student to print document file in the HC-MUT_SSPPS system.
Actors	Student
Trigger	Student chooses the “Print” in the user interface.
Pre-conditions	<ul style="list-style-type: none">- The student has logged into the HCMUT_SSPPS system.- The student has selected printing properties and has available pages to print.- The system and database are available.- The internet is available.
Post-conditions	The document is successfully printed by the selected printer.
Normal flow	<ol style="list-style-type: none">1. The student confirms the printing request.2. The system processes the printing request, sends the document file to the selected printer, and starts the printing job.3. The system deducts the appropriate number of pages from the student's account balance.4. The system logs the printing action, recording the student ID, printer ID, file name, printing start time, and the number of pages for each page size.5. The system notifies the student that the printing job has been successfully submitted and is in progress.6. The printer receives the print request, processes the document file, and prints the document according to the specified printing properties.7. The printed document is delivered to the output tray of the printer.8. The student retrieves the printed document from the printer's output tray.
Alternative flow	None.
Exception flow	If there is a technical error during the printing process: The system displays an error message to the student, indicating the issue. The student can retry the printing process.



2.4.2.7 Configure Page Management

Use-case ID Use-case Name	U7 Configure Page Management
Use-case overview	This use case allows the SPSO to configure the page management settings in the HCMUT_SSPPS system.
Actors	SPSO
Trigger	SPSO chooses the “Configure Page Management” in the user interface.
Pre-conditions	<ul style="list-style-type: none">- The SPSO has logged into the HCMUT_SSPPS system.- The system and database are available.- The internet is available.
Post-conditions	The page management settings are successfully configured and updated in the system.
Normal flow	<ol style="list-style-type: none">1. The SPSO selects the "Configure Page Management" option in the user interface.2. The system presents the SPSO with the current page management settings, including 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, and any other relevant configurations.3. If the SPSO wants to update any settings, the system provides editable fields or options next to each relevant attribute.4. The system confirms the updated page management settings.5. The system applies the updated page management settings to all relevant processes and functionalities within the HCMUT_SSPPS system.
Alternative flow	<ol style="list-style-type: none">3a. If the SPSO decides not to make any changes: The SPSO can navigate away from the page management configuration section without making any updates, and the system will retain the current page management settings.
Exception flow	If there is an unexpected system error (connection lost) during the configuration process: The system displays an error message to the SPSO, indicating the issue. The SPSO can retry the configuration process.



2.4.2.8 Configure Printer Setting

Use-case ID Use-case Name	U8 Configure Printer Setting
Use-case overview	This use case allows the SPSO to configure the printer settings in the HCMUT_SSPPS system.
Actors	SPSO
Trigger	SPSO chooses the "Configure Printer Setting" in the user interface.
Pre-conditions	<ul style="list-style-type: none">- The SPSO has logged into the HCMUT_SSPPS system.- The system and database are available.- The internet is available.
Post-conditions	The printer settings are successfully configured and updated in the system.
Normal flow	<ol style="list-style-type: none">1. The SPSO selects the "Configure Printer Settings" option in the user interface.2. The system presents the administrator with the current printer settings, including the list of available printers and other relevant configurations.3. The SPSO makes the necessary changes (add/enable/disable printers) to the printer settings.4. The system confirms the updated printer settings.5. The system applies the updated printer settings to all relevant processes and functionalities within the HCMUT_SSPPS system.
Alternative flow	<p>3a. If the SPSO decides not to make any changes: The SPSO can navigate away from the printer setting configuration section without making any updates, and the system will retain the current page management settings.</p> <p>3b. The SPSO can enable or disable all printers by choosing "Enable all printers" or "Disable all printers" button.</p>
Exception flow	If there is an unexpected system error (connection lost) during the configuration process: The system displays an error message to the SPSO, indicating the issue. The SPSO can retry the configuration process.

2.5 Printing log module use-case diagram

2.5.1 Use-case diagram

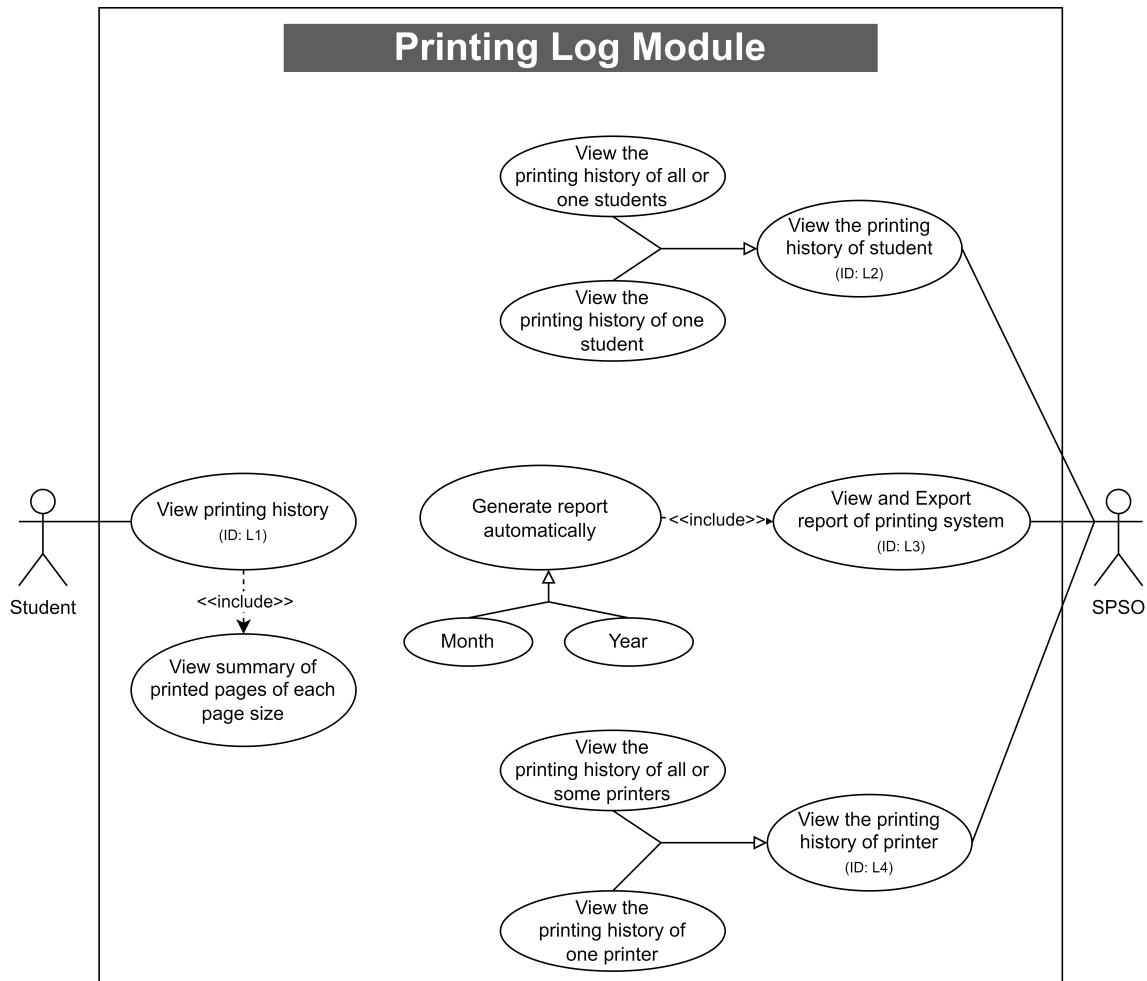


Figure 3: The use-case diagram for Printing Log module

For further inspection, please visit [this site](#).



2.5.2 Table description

2.5.2.1 View Printing History

Use-case ID Use-case Name	L1 View Printing History
Use-case overview	This use case allows a student to view their printing history in the HCMUT_SSPPS system.
Actors	Student
Trigger	Student chooses the "View Printing History" in the user interface.
Pre-conditions	- The student has logged into the HCMUT_SSPPS system. - The system and database are available. - The internet is available.
Post-conditions	The student can review their printing history.
Normal flow	1. The student selects the "View Printing History" option in the user interface and chooses the time period. 2. The system presents the student with a list or summary view of their printing history, including details such as printing dates, document names, printer used, summary of printed pages of each page size, and any associated costs. 3. If the student wants to view more detailed information about a specific printing activity, they can select the corresponding record or click on a "Details" button. 4. The system expands the selected record or displays a new page with detailed information about the printing activity. Detailed information may include additional attributes such as printing start time, printing end time, printing status, and any relevant notes or comments. 5. The student can navigate back to the summary view or list to continue reviewing other printing activities. 6. The student completes their review of the printing history.
Alternative flow	2a. If the student's printing history is empty: The system displays a message indicating that the student has no printing history available.
Exception flow	If there is an unexpected system error (connection lost) while retrieving or displaying the printing history: The system displays an error message to the student, indicating the issue. The student can retry the process.



2.5.2.2 View the History of Student

Use-case ID Use-case Name	L2 View the history of student
Use-case overview	This use case allows the SPSO to view the printing history of student in the HCMUT_SSPOS system.
Actors	SPSO
Trigger	SPSO chooses the "View Student Printing Log" in user interface.
Pre-conditions	- The SPSO has logged into the HCMUT_SSPOS system. - The system and database are available. - The internet is available.
Post-conditions	The SPSO can review the printing history of the selected student or all students.
Normal flow	1. The SPSO selects the "View Student Printing Log" in the user interface and chooses the time period. 2. The system presents the SPSO with a search field or a list of students to choose from. 3. The SPSO enters the student's ID, name, selects the student from the list, or enters "All Students" to display all students. 4. The system presents the SPSO with a list or summary view of the student's printing history, including details such as printing dates, document names, printer used, number of pages, and any associated costs. 5. If the SPSO wants to view more detailed information about a specific printing activity, they can select the corresponding record or click on a "Details" button. 6. The system expands the selected record or displays a new page with detailed information. Detailed information may include additional attributes such as printing start time, printing end time, printing status, and any relevant notes or comments. 7. The SPSO can navigate back to the summary view or list to continue reviewing other printing activities of the selected student. 8. The SPSO completes review of the student's printing history.
Alternative flow	2a. If the selected student's printing history is empty: The system displays a message indicating that the student has no printing history available.
Exception flow	If there is an unexpected system error (connection lost) while retrieving or displaying the printing history: The system displays an error message to the SPSO, indicating the issue. The SPSO can retry the process.



2.5.2.3 View and Export report of Printing System

Use-case ID Use-case Name	L3 View and Export report of printing system
Use-case overview	This use case allows the SPSO to view and export reports containing data and statistics related to the printing system's history in the HCMUT_SSPPS.
Actors	SPSO
Trigger	SPSO chooses the "View Reports" in the user interface.
Pre-conditions	- The SPSO has logged into the HCMUT_SSPPS system. - The system and database are available. - The internet is available.
Post-conditions	The SPSO can view and export reports of the printing system's history.
Normal flow	1. The SPSO selects the "View Reports" option in the user interface. 2. The system presents the SPSO with a list of available reports or report categories which are generated automatically at the end of each month and each year. 3. The SPSO selects a specific report or report category from the list related to the printing system's history. 4. The system generates the selected report or displays a list of available reports within the category. 5. The SPSO selects the desired report from the list. 6. If the SPSO wants to export the report, the system provides an option to export the report in a preferred format such as PDF, CSV, or Excel. 7. The SPSO selects the desired export format. 8. The system generates the report in the selected format and initiates the download process. 9. The SPSO saves the exported report to a local or designated location.
Alternative flow	2a. If the selected report or report category does not exist or is unavailable. The system displays a message indicating that the requested report is not available or that no reports exist within the selected category.
Exception flow	If there is an unexpected system error (connection lost) during the generating or displaying of the report: The system displays an error message to the SPSO, indicating the issue. The SPSO can retry the configuration process.



2.5.2.4 View the History of Printer

Use-case ID Use-case Name	L4 View the history of printer
Use-case overview	This use case allows the SPSO to view the printing history of printer in the HCMUT_SSPPS system.
Actors	SPSO
Trigger	SPSO chooses the "View Printer Printing Log" in the user interface.
Pre-conditions	- The SPSO has logged into the HCMUT_SSPPS system. - The system and database are available. - The internet is available.
Post-conditions	The SPSO can review the printing history of the selected printer or all printers.
Normal flow	<ol style="list-style-type: none">1. The SPSO selects the "View Printer Printing Log" in the user interface and chooses the time period.2. The system presents the SPSO with a search field or a list of printers to choose from.3. The SPSO enters the printer's ID, name, selects the printer from the list, or enters "All Printers" to display all printers in the list.4. The system presents the SPSO with a list or summary view of the printer's printing history, including details such as printing dates, document names, student used, number of pages, and any associated costs.5. If the SPSO wants to view more detailed information about a specific printing activity, they can select the corresponding record or click on the "Details" button.6. The system expands the selected record or displays a new page with detailed information about the printing activity. Detailed information may include additional attributes such as printing start time, printing end time, printing status, and any relevant notes or comments.7. The SPSO can navigate back to the summary view or list to continue reviewing other printing activities of the selected printer.8. The SPSO completes review of the printer's printing history.
Alternative flow	2a. If the selected printer's printing history is empty: The system displays a message indicating that the printer has no printing history available.
Exception flow	If there is an unexpected system error (connection lost) while retrieving or displaying the printing history: The system displays an error message to the SPSO, indicating the issue. The SPSO can retry the process.