**a.** **Presentation strategies:**

The Presentation layer is designed to be accessible using Desktop devices, since most users will access the system using a desktop, and the SPSO will also likely to use desktop for managing. The interface for student will show a dashboard showing the general statistics for that user, current printing queue of them, other functionalities like printing, balance management will be linked into the dashboard into a separate screen. The management interface for SPSO also includes a dashboard showing the overview, and the ability to see detailed information for a specific printing job or student.

**b.** **Data storage approach:**

The database will be using the SQL technique and divided into three main database: the database for student, the database for printer and the database for printing log. For the student, the database will store student id, username, password and the remaining paper that a student has. For the printer, it will store necessary information about each printer in Campus such as printer ID, printer location, printer’s brand, model, description. As for the printing log, each tuple will contain a printing information like how many pieces of paper with different size have been used for that printing session, the print date, page size (A4 or A3), student ID. One relationship between student entity and printing log entity to indicate which student has the associated printing history.

**c.** **API management:**

API management for the HCMUT Student Smart Printing Service (HCMUT\_SSPS) is crucial for ensuring secure and efficient communication between various components of the system. The API management system will provide endpoints for both web-based and mobile applications to interact with the core services of the SSPS. It will handle authentication and authorization, allowing only authenticated users, including students and the Student Printing Service Officer (SPSO), to access the system. API endpoints will enable students to submit print jobs, configure printing properties, and check their page balance. The SPSO will have the capability to manage printers, system configurations, and view printing logs. Additionally, the API management system will support reporting functionalities to generate monthly and yearly reports. It will enforce rate limiting and security measures to protect the system from misuse or unauthorized access. Overall, API management will be the gateway through which all interactions with the SSPS are controlled and monitored.