



Faculty of Computer Science and Information Technology

***C2TRACK: CLEARANCE AND CHECKOUT TRACKING
SYSTEM FOR UITM CAMPUS 1 SAMARAHAN***

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C2track: Clearance and Checkout Tracking System for UiTM Campus 1 Samarahan

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DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Malaysia Sarawak. Except where due acknowledgements have been made, the work is that of the author alone. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.



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ABSTRACT

The *C2Track: Clearance and Checkout Tracking System* aims to streamline the student clearance and checkout process at UiTM Campus 1 Samarahan. The current manual system, which requires students to visit multiple departments to submit documents and settle fees, is inefficient and prone to delays. This project proposes a web-based solution to digitize and simplify the process, allowing students to track their clearance progress and fulfil requirements more conveniently. The system features a centralized platform for students to upload documents, view clearance status, and handle outstanding obligations. Administrative staff will benefit from tools to manage approvals, reducing paperwork and workload.

ABSTRAK

C2Track: Clearance and Checkout Tracking System bertujuan untuk mempermudah proses kelulusan dan pendaftaran keluar pelajar di UiTM Kampus 1 Samarahan. Sistem manual yang digunakan sekarang, yang memerlukan pelajar mengunjungi pelbagai jabatan untuk menyerahkan dokumen dan menyelesaikan bayaran, adalah tidak cekap dan sering menyebabkan kelewatan. Projek ini mencadangkan satu penyelesaian berasaskan web untuk mendigitalkan dan mempermudah proses tersebut, membolehkan pelajar menjejaki kemajuan kelulusan mereka dan memenuhi keperluan dengan lebih mudah. Sistem ini menawarkan platform berpusat di mana pelajar boleh memuat naik dokumen, melihat status kelulusan, dan menguruskan tanggungan yang belum selesai. Kakitangan pentadbiran juga akan mendapat manfaat daripada alat untuk menguruskan kelulusan, mengurangkan penggunaan kertas dan beban kerja.

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LIST OF ABBREVIATIONS

DFD	Data Flow Diagrams
ERD	Entity-Relationship Diagram
ID	Identification
IUKL	Infrastructure University Kuala Lumpur
JPEG	Joint Photographic Experts Group
PDF	Portable Document Format
PNG	Portable Network Graphic
UIM	Universiti Islam Malaysia
UiTM	Universiti Teknologi MARA
UM	Universiti Malaya
UNIMAS	Universiti Malaysia Sarawak

CHAPTER 1: INTRODUCTION

1.1 Background

Effective student administration is crucial for higher education because it gives students a smooth academic experience and enables colleges to efficiently handle important procedures. The student clearance and checkout procedure, which guarantees that students fulfil all requirements prior to departing the institution, is a crucial component of this administration. The clearance procedure at UiTM Campus 1 Samarahan is still done by hand, requiring students to go to several offices to turn in paperwork, pay fees, and get departmental permissions. Particularly at busy times like graduation, this manual procedure frequently results in inefficiencies, delays, and an increase in administrative workload. In a research, students are not prepared for balancing their work, family, and social lives with their studies in an online learning environment (Parkes et al., 2014).

Other organizations' current systems mostly use partial digitalization to handle clearance, but they frequently lack comprehensive reporting and intuitive dashboards, which reduces their usefulness and efficiency. Furthermore, these methods might not give students the most recent status updates, which would leave them confused or stressed out and unable to track their clearance progress.

To address these issues, the *C2Track: Clearance and Checkout Tracking System* proposes a fully digital solution that integrates a tracking feature, automated notifications, and a centralized user interface for both students and administrative staff. This system aims to streamline the clearance process, reduce manual work, and provide

a transparent, efficient experience for users. By modernizing UiTM's clearance process, *C2Track* is positioned to set a new standard in digital student administration.

1.2 Project Description

This project aims to develop a comprehensive system that will oversee the college checkout and student clearance procedures at UiTM Samarahan. The system's goal is to digitize and simplify the processes that students must undertake in order to graduate from college. Students will be able to handle their exit paperwork, pay any unpaid fees, and finish the entire college checkout process online with this platform. Reducing manual interventions and the amount of time needed for administrative chores are the goals.

1.3 Problem Statement

Currently, the student clearance and college checkout processes at UiTM Samarahan involve manual procedures, requiring students to physically visit various departments and offices. This leads to inefficiencies, delays, and potential errors. Many students struggle to track the status of their clearance, which increases stress, especially during peak times such as graduation. Administrative staff also face challenges in managing large volumes of clearances efficiently. Moreover, the lack of updates causes confusion and delays in resolving critical matters such as outstanding fees or the return of university property.

1.4 Objectives

The objectives of this project are:

1. To develop a system for UiTM student's clearance and college checkout process throughout their study at Samarahan Campus

2. To enable tracking feature on the status of student's clearance and outstanding fees.
3. To test the functionality of the C2Track before it can be deployed to the user.

1.5 Methodology



Figure 1.1 Waterfall Model

The development of the **C2Track: Clearance and Checkout Tracking System for UiTM Samarahan** will follow the Waterfall methodology, which ensures a structured and sequential approach. The waterfall model is the first and earliest approach used in SDLC for the development of software products in this model that do not overlap (Khan, S.M. 2023). This methodology divides the project into distinct phases, where each phase must be completed before moving to the next.

The first phase involves gathering system requirements from UiTM administrative staff and students. These requirements include functional components such as a student dashboard, document submission module, and admin tools for clearance processing. The requirements are documented comprehensively to ensure clarity and alignment with project objectives.

Next, the system design phase defines the architecture of the application. Key artifacts, such as the Context Diagram, Data Flow Diagrams (DFD), and Entity-Relationship Diagram

(ERD), are created to visualize system interactions. Wireframes and mockups for the student dashboard and admin interface are also developed during this phase.

In the implementation phase, the system components are developed using web development tools like HTML, CSS, JavaScript, PHP, and MySQL. This phase involves coding each module, such as student clearance submission, tracking dashboards, and admin review tools, ensuring the system operates as designed.

The testing phase follows, during which the system undergoes thorough testing to identify and fix any issues. Unit testing ensures individual components function correctly, while integration testing verifies that the system works seamlessly as a whole. User Acceptance Testing (UAT) is conducted with UiTM students and administrative staff to confirm the system meets their needs.

Once testing is complete, the deployment phase begins. The system is installed on the server and made accessible to users. Final documentation is prepared, and training sessions are conducted for administrative staff.

Lastly, the maintenance phase ensures the system remains operational post-deployment. Regular updates, bug fixes, and enhancements are implemented based on user feedback to sustain system performance and relevance.

This sequential approach ensures that each phase is thoroughly executed, minimizing risks and delivering a high-quality system that meets UiTM's clearance and checkout management needs.

1.6 Project Scope

The scopes of the project are:

1. User Access:

- **Students:** Access to the system will be limited to UiTM Samarahan students who require clearance or checkout services. They will have a personalized dashboard to manage their clearance status, submit required documents, and settle outstanding fees.
- **Administrative Staff:** The system will provide administrative staff with a centralized interface to review and approve clearance requests, manage outstanding fees, and track overall clearance progress.

2. Functionalities:

- **Document Submission:** Students can upload necessary clearance documents directly to the system, which will store and organize submissions for easy access by administrative staff.
- **Status Tracking:** The system will update the status of clearance requests, allowing students to monitor their progress and receive notifications for pending tasks or approvals.
- **Automated Notifications:** Both students and staff will receive notifications on pending tasks, completed clearances, and other essential updates, reducing manual follow-ups.

1.7 Significance of the Project

The significance of this project lies in its contribution to improving digital transformation in university administrative systems. Many educational institutions still rely on manual clearance processes, which are inefficient, time-consuming, and prone to errors. By developing the C2Track system, this project sets a new standard for digital clearance systems in academic institutions, reducing administrative workload and enhancing student experience.

Additionally, this project contributes to the field of educational technology and system automation, demonstrating how institutions can leverage web-based solutions to improve operational efficiency. The implementation of automated notifications and tracking features serves as a model for other universities looking to modernize their clearance and checkout processes.

Beyond UiTM, the findings from this project can be used as a reference for future research on improving administrative digitalization in universities. The system's success could lead to further developments in student services automation, improving not only clearance procedures but also other academic and administrative processes.

1.8 Project Schedule

The Final Year Project 1 started on 10 October 2024 and will finish on 12 January 2025. Table 1.1 shows the project schedule for this project: In addition, the Gantt Chart for this schedule is attached to Appendix A

Table 1.1 Project schedule for Final Year Project 1

Agenda	Start date	End
Submission of the Approved Brief Proposal	10 October 2024	20 October 2024
Feedback and Comment from Reviewer/Examiner	21 October 2024	28 October 2024
Submission of Full Proposal	29 October 2024	14 November 2024
Submission of Chapter 1	15 November 2024	21 November 2024
Submission of Chapter 2	22 November 2024	13 December 2024
Submission of Chapter 3	14 December 2024	5 January 2025
Submission of FYP 1 Final report & Paper for assessment	6 January 2025	17 January 2025
Submission fyp revised structure	17 January 2025	1st April 2025
Submission 1st draft Chapter 4	1st April	15 May 2025
Submission of first draft Chapter 5,6 and abstract	15 May	31 May 2025
Submission of draft fyp 2 full report [Chapter 1-6]	31 May	10 June 2025

Submission of report [report, document related to project for assessment]	10 June	23 June 2025
Final date examiner to give comment	23 June 2025	4 July 2025
Mark submission by supervisor	4 July 2025	10 July 2025
Final submission final report after amendment	10 July 2025	28 July 2025

1.9 Project Outcome

The project will result in the development of a web-based application serving two primary user groups: students and administrative staff. Students will have access to a personalized clearance dashboard, where they can submit required documents, check the status of their clearance, and pay any outstanding fees. The system will automatically update students on pending tasks or departments that still require their attention. For administrative staff, the platform will offer a centralized system to track and approve student clearances, reducing paperwork and manual processes. This will enhance efficiency and transparency, leading to a more seamless experience for both students and staff.

1.10 Project outline

Chapter 1: Introduction

The C2Track: Clearance and Checkout Tracking System is described in this chapter. It contains a detailed description of the issue that explains the difficulties with the manual checkout and clearance procedures that are currently in place at UiTM Campus 1

Samarahan. The project's goals, scope, and importance are also covered in this chapter, with a focus on how it could enhance user experience and administrative effectiveness. The projected results, project timeline, report outline, and the technique utilized to construct the system are all briefly described. These elements lay the groundwork for the chapters that follow.

Chapter 2: Literature Review

This chapter analyzes user requirements collection techniques and examines comparable current systems. Existing systems are compared in order to emphasize their benefits, functions, and shortcomings. The study offers a clear knowledge of the essential elements that the suggested C2Track system must incorporate. It also assesses the benefits and limitations of existing systems, providing information to improve and innovate the features and design of the new system.

Chapter 3: Requirement Analysis and Design

The project's detailed requirement definition will be established in this chapter. Techniques include market analysis, client feedback, interviews, and literature sources can be used to fine-tune the project requirements. The requirements derived from these methodologies must be clearly stated, prioritized, indicated, and documented. The developed and justified design must satisfy the specified requirements (description, conceptual design, design communication, and how and why the design was made).

Chapter 4: System Implementation

This chapter outlines the actual development and construction of the C2Track system. It details the tools and programming technologies used, such as PHP, MySQL, HTML, CSS, and JavaScript. It also presents the implementation of each functional

module including the student and admin interfaces. Screenshots and system hierarchy diagrams are included to demonstrate the system structure and workflow. Each component is explained in relation to how it meets the project requirements defined earlier.

Chapter 5: Testing

This chapter explains the various testing techniques applied to verify and validate the C2Track system. It includes functionality, reliability, efficiency, usability, maintainability, and portability testing. Test plans, procedures, and results are documented in detail to ensure the system meets performance expectations. The testing process also highlights any bugs or issues encountered and how they were resolved to ensure system robustness and stability.

Chapter 6: Conclusion and Recommendation

The final chapter summarizes the project outcomes and evaluates whether the objectives were achieved. It discusses the system's contributions to solve the original problems faced in manual clearance and checkout. Limitations identified during development and testing are acknowledged, and suggestions for future improvements and system expansion are proposed. The chapter concludes by reflecting on the overall project experience and learnings gained throughout the development lifecycle.

1.11 Project Summary

Inefficiencies in the manual clearance and checkout procedures at UiTM Campus 1 Samarahan are addressed by the C2Track: Clearance and Checkout Tracking System. This idea suggests a web-based platform that allows students to follow their progress, upload documents, and pay fees in order to manage their clearance. Tools that expedite approvals and cut down on paperwork are advantageous to administrative personnel. Web technologies like HTML, CSS,

JavaScript, PHP, and MySQL are used in this project, which was developed utilizing the Agile process. The project is to establish a fresh standard in digital student administration, streamline administrative procedures, and enhance user experience. A working system that lessens student stress and delays while increasing administrative staff efficiency and transparency is one of its anticipated results. With a strong emphasis on innovation and user-centered design, the timeline and milestones guarantee organized development, testing, and deployment. In the end, C2Track wants to update UiTM's approval processes and offer a scalable solution for expansion in the future.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

In Chapter 2, the literature review focuses on analyzing and comparing published materials, systems, and applications similar to the proposed *C2Track: Clearance and Checkout Tracking System*. This chapter examines various existing tools and systems with comparable functionalities, aiming to identify strengths and limitations that can guide the development of a higher-quality solution. Based on feedback collected from interviews with targeted users, three primary methods and systems commonly used for clearance and tracking purposes have been identified. These systems serve as references for functionalities relevant to the proposed project. A detailed comparison between the existing methods, systems, and the proposed *C2Track* application will also be presented to highlight improvements and innovations introduced by the project. Literature reviews perform a vital function in organizational studies by consolidating scattered knowledge in a domain and repackaging a field's insights into a more useful summary according to Baumeister R. F. and Leary M. R. (1997).

The methods and systems currently used for clearance and checkout processes at institutions such as Infrastructure University Kuala Lumpur(IUKL), Universiti Islam Malaysia(UIM) and Universiti Malaya(UM) vary significantly. These institutions employ a mix of digital form and manual methods to manage student clearances. Interviews conducted with students and administrative staff reveal the reliance on partially digitized systems or manual processes, such as pen-and-paper documentation, creating inefficiencies and delays.

2.2 Review of Existing System

Upon conducting several interviews with targeted users for this system, there are a few existing methods and tools that are currently being used by them. The information of the current method will be compared to this application to further improve the application and increasing

the quality of the proposed tool. Furthermore, this review will help to achieve the objectives and overcoming the problem statement of the proposed application.

2.3 Infrastructure University Kuala Lumpur Clearance Form

The first existing system that is going to be review is the clearance form from Infrastructure University Kuala Lumpur (IUKL). Infrastructure University Kuala Lumpur (IUKL) is a private university located in Malaysia. It is a renowned institution dedicated to providing quality education in the fields of infrastructure, engineering, technology, and related disciplines. Established in 1998, IUKL emphasizes practical and industry-relevant learning, aiming to produce highly skilled professionals equipped to meet the growing demands of infrastructure development and management

2.3.1 Overview of Infrastructure University Kuala Lumpur Clearance Form

The university clearance form provided by Infrastructure University Kuala Lumpur is a traditional as in Appendix B, paper-based form designed to facilitate the clearance process for students prior to graduation. It requires students to obtain physical signatures from various departments, such as the library, student affairs, international student centre and bursary department. It also incorporates sections for graduation status verification, returning of robes, and final approval by the registrar's office.

2.3.2 Advantages and disadvantages of Infrastructure IUKL Clearance Form

Table 2.1 Advantages and disadvantages of Infrastructure University Kuala Lumpur Clearance Form

No	Advantages	Disadvantages
1	Simplicity: The form is straightforward and easy to understand, with clearly defined sections for each department's clearance requirements.	Time-Consuming: Students need to visit multiple departments in person, which can lead to delays, especially during peak periods.
2	No Need for Technical Infrastructure: Since it is a physical document, there is no reliance on internet connectivity, software, or hardware, making it accessible to all students regardless of technological resources.	Prone to Human Error: Manual documentation increases the risk of errors such as missing signatures, misplaced forms, or overlooked requirements.
3	Low Initial Cost: Printing and distributing forms incur minimal costs compared to developing and maintaining an online system.	Lack of Transparency: Students may find it difficult to track their progress in real-time, leading to uncertainty and repeated follow-ups.
4	Human Oversight: Every clearance step involves face-to-face interaction, which allows staff to provide personalized assistance and address individual issues.	Inefficient Record Keeping: Paper-based systems are harder to archive and retrieve compared to digital databases.

2.4 Universiti Islam Malaysia Clearance Form

The second existing system that im going to review is the clearence form from Universiti Islam Malaysia (UIM). Universiti Islam Malaysia is a premier institution of higher learning dedicated to promoting Islamic knowledge, values, and education. Established to integrate Islamic principles with academic excellence, UIM offers a diverse range of programs that emphasize both religious and secular studies.

2.4.1 Overview Universiti Islam Malaysia Clearance Form

The Universiti Islam Malaysia (UIM) Clearance Form, as in Appendix C, is a structured document designed to ensure that students fulfill all necessary requirements before graduation. It involves coordination between multiple departments, requiring physical signatures and departmental stamps for authorization. The form covers areas such as library clearance, student affairs and alumni tracer studies, international student affairs (if applicable), and financial settlements. The final clearance is reviewed and approved by the Academic Vice President.

2.4.2 Advantages and Disadvantages of Universiti Islam Malaysia Clearance Form

Table 2.2 Advantages and Disadvantages of Universiti Islam Malaysia Clearance Form

No	Advantages	Disadvantages
1	Comprehensive Process: The form provides a step-by-step approach, ensuring all critical departments are included in the clearance process.	Standardized Format: A consistent structure minimizes confusion and ensures uniformity across student submissions
2	Clarity: Clear sections for each department with designated areas for signatures, stamps, and remarks help streamline the process.	Prone to Errors and Delays: Misplaced forms, missing signatures, or incomplete information can lead to delays in the graduation process.
3	Customizable for International Students: It includes a specific section for international students, catering to their unique needs.	Limited Accessibility: Students unable to visit the campus physically face significant challenges in completing the process.
4	Standardized Format: A consistent structure minimizes confusion and ensures uniformity across student submissions	Environmental Impact: As a paper-based system, it contributes to paper waste and lacks environmental sustainability.

2.5 Universiti Malaya

The third existing system that im going to review is the clearence form from Universiti Malaya (UM), as in Appecdix D. Universiti Malaya (UM) is Malaysia’s oldest and most prestigious public research university, established in 1949. Located in Kuala Lumpur, UM is renowned for its high academic standards, cutting-edge research, and diverse range of programs

in various disciplines. The university is committed to providing quality education and producing wellrounded graduates equipped to contribute to national and global development.

2.5.1 Overview Universiti Malaya Clearance Form

The Universiti Malaya Check-Out Form is a structured paper-based document used to facilitate the student check-out process at residential colleges. It is designed to ensure that students leave their accommodations in good condition, fulfill their responsibilities, and verify the return of college property, such as room keys. The form is divided into three main sections. The first section, Student Information, collects personal and academic details, including the student's name, ID number, room number, and the date and time of check-out. This information aids in efficient identification and tracking.

The second section, Key and Goods/Equipment Information, records the status of room keys, indicating whether they have been returned to a staff member or a duty officer, and documents the condition of goods and equipment in the room, specifying if they were removed, left behind, or cleaned.

Finally, the Verification Section provides a space for the student to confirm their compliance with the check-out process through their signature and includes an area for the Master of the Residential College to verify and approve the check-out. This form ensures accountability, proper handling of university assets, and an organized approach to managing student departures from residential colleges.

2.5.2 Advantages and Disadvantages of Universiti Malaya Clearance Form

Table 2.3 Advantages and Disadvantages of Universiti Malaya Clearance Form

No	Advantages	Disadvantages
1	Clear Structure: The form is well-organized, ensuring all necessary information is captured systematically.	Manual Process: The form appears to be paper based, which can lead to inefficiencies in filing, retrieval, and data tracking.
2	Accountability: Ensures students are responsible for their personal belongings and the cleanliness of their rooms.	Limited Guidance: It does not provide detailed instructions for students unfamiliar with the process, which could lead to errors or delays.
3	Flexibility: Offers multiple options for key return, accommodating students' varying circumstances.	Lack of Digital Integration: No mention of integration with digital systems (e.g., online submissions or databases) limits accessibility and convenience
4	Verification: Includes a verification step, ensuring compliance and final approval by the college authorities.	Ambiguity in Some Sections: Certain fields, like the "Goods/Equipment" section, lack space for additional explanations or details (e.g., describing items left behind).

2.6 Feature Comparison Table

Table 2.4 Comparison with selected system and proposed system

System Features	Infrastructure University Form	Universiti Islam Malaysia Form	Universiti Malaya Check- Out Form	Proposed System: C2Track System
Process Type	Paper-based	Paper-based	Paper-based	Automated
Student Information Collection	✓	✓	✓	✓
Departmental Signatures	✓	✓	✓	✗
Asset Management	✗	✓	✓	✓
Progress Tracking	✗	✗	✗	✓
Key Return Verification	✗	✗	✓	✓
Environmentally Friendly	✗	✗	✗	✓
Remote Accessibility	✗	✗	✗	✓
Notification	✗	✗	✗	✓
Cost Efficiency	✓	✓	✓	✗

2.7 Feature Review for Proposed Application

After conducting multiple interviews with targeted users and performing a comparison of similar features across existing methods and tools, the proposed application's feature review for the *C2Track* system is as follows:

In essence, the proposed *C2Track* application will streamline the clearance and checkout process for students by automating key steps and minimizing manual errors. The system will allow students to initiate their clearance requests and track the progress, ensuring that they are aware of pending approvals and tasks. To enhance productivity and efficiency, the application will organize the clearance process by dividing it into distinct categories such as finance, and residential clearance. Each category will include subsections that display detailed requirements, with a hyperlink provided for students to access the finance section to settle payments.

Notifications are another crucial feature of the *C2Track* system. Users will receive notifications once they have completed their tasks, providing confirmation and assurance that their actions have been recorded. This feature will ensure that students remain on track with their clearance requirements without constant manual follow-ups. Additionally, the application will allow administrators and students to add comments to specific clearance tasks, facilitating better communication and enabling quick resolution of issues.

This *C2Track* system will be a web-based system as it will follow the portal of UiTM as it be. It will be one of a subcategory on UiTM student portal where students need to login and enter their matric number and password to the student portal to access the *C2Track* system.

Overall, the *C2Track* system will not only simplify the clearance and checkout process but also enhance user experience through its intuitive design and comprehensive features, ensuring that students can complete their tasks efficiently and without unnecessary stress.

2.8 Summary

In summary, this chapter explained the proposed system literature review. In this chapter 2, the features of multiple clearance and checkout systems has been explored and compared, including the traditional paper-based forms used by Infrastructure University Kuala Lumpur, Universiti Islam Malaysia, and Universiti Malaya, alongside the proposed *C2Track* system. The traditional systems are straightforward and effective in their respective contexts but are constrained by manual processes, time limit and paper waste. The *C2Track* system, on the other hand, offers a modern digital solution that enhances efficiency, reduces errors, and provides improved user experience. By incorporating features such as progress tracking, hyperlinks for financial settlements, notifications for task completion, and a visually intuitive dashboard, the system addresses the limitations of existing methods while ensuring the security and privacy of user data. Although it requires higher initial investment and training, the *C2Track* system's long-term benefits make it a superior choice for managing university clearance and checkout processes in a scalable and environmentally friendly manner.

CHAPTER 3: REQUIREMENTS ANALYSIS AND DESIGN

3.1 Introduction

As mentioned in chapter 1, the waterfall model has been chosen as software development methodology for proposed application. It is a linear sequential development models that is easy to understand and use. Pal (2017) states that the timescales are kept when using waterfall model because each phase has clearly defined initial point and end point. The methodology for this project will be the main topic of this chapter. Methodology is an early stage of the application development process and consists of a number of phases. A survey aimed at the intended users about the suggested application and existing productivity tools has been examined. In order to learn more about how to make the planned project better, this survey asked customers about the issues they were having with their present system. This chapter will also outline the requirements that must be demonstrated and planned in order to meticulously direct the development towards the project's intended goal.

3.2 Requirement Analysis

The process of determining the needs of users for a proposed or updated application is known as user requirement analysis. It covers every action taken to ascertain the needs of different stakeholders. Therefore, the process of analyzing, recording, verifying, and overseeing software or system requirements is referred to as "requirements analysis."

3.2.1 Method of gathering requirement

The method of that has been chosen is interviews. The purpose of conducting interviews is to gather detailed insights and feedback directly from stakeholders, including students and administrative staff, who are directly involved in the clearance and checkout processes at UiTM Campus 1 Samarahan. By engaging participants through interviews, the aim is to identify the specific challenges they face with the current manual or semi-digital system and to understand

their expectations and requirements for the proposed *C2Track: Clearance and Checkout Tracking System*.

The interviews are conducted with targeted participants selected from different roles to ensure diverse perspectives are captured. These include students from various academic levels and administrative staff responsible for managing the clearance process. The structured interview questions are designed to elicit detailed responses about their pain points, desired system functionalities, and expectations from the new system.

3.2.2 List of required requirements for the system

After conducting interviews with the targeted user, a college's admin staff at UiTM Campus 1, valuable insights were gathered regarding the clearance and checkout process. The interview consisted of 7 questions designed to understand the challenges faced and expectations for the proposed *C2Track: Clearance and Checkout Tracking System*.

The results of the interview, as shown in Table 3.1 revealed that the current manual process is inefficient, timeconsuming, and prone to errors, especially during peak periods. The college's admin staff at UiTM Campus 1 emphasized the need for a centralized system with features like tracking, automated notifications, and streamlined document submission to improve the process. Additionally, she highlighted that real-time updates and accessible reports for monitoring clearance statuses would significantly reduce delays and administrative workloads.

The feedback from the interview confirms that a well-designed clearance tracking system will positively impact the productivity and efficiency of the clearance process. Based on these findings, the development of *C2Track* will proceed, incorporating features that address the identified challenges and meet the expectations of the administrative staff.

Table 3.1 Interview question and answer

No.	Question	Admin's Answer	Student's Answer
1	What are the current challenges you face in managing the clearance and checkout process?	"The main challenge is the manual process, which is time-consuming and prone to errors. Students often forget to submit required documents or complete their tasks, leading to delays."	"The process is confusing and time-consuming. It's difficult to know which documents are required and where to submit them. Having to visit multiple offices is frustrating."
2	How do you keep track of students' clearance status currently?	"We maintain a manual record in spreadsheets and paper forms, which makes it difficult to monitor progress, especially during peak periods like semester breaks."	"We have no real way to track the status of our clearance. We have to keep asking or wait for updates, which can be inconsistent and stressful."
3	What features do you think would make the clearance process more efficient?	"A centralized system with tracking, notifications for pending tasks, and an easy way to approve or reject requests would be ideal."	"A system that tells us exactly what we need to do, shows our progress, and notifies us about pending tasks would make the process much easier."
4	What is your preferred method for receiving documents from students?	"Online document submission would be best, as it reduces paperwork and allows us to access files from anywhere."	"Submitting documents online would be great. It's much easier than printing everything out and running between departments."
	How do you communicate clearance status updates to students currently?	"We send emails or rely on students to check in person. Sometimes, they need to visit multiple times to get updates."	"Sometimes, I don't get emails, and I have to visit the office repeatedly to get updates. It would be better to get notifications directly in a system."

6	What would motivate you to adopt a digital clearance system?	"It would save time, improve efficiency, and ensure transparency for both students and staff."	"It would be much less stressful and timeconsuming. We wouldn't have to guess what's required or keep following up in person."
7	What other features would you like to see in a clearance	"Automated notifications for students and reminders for staff, integration with existing systems, and the ability to customize clearance	"A progress tracker, clear instructions, and reminders about pending tasks or deadlines would be very helpful. A chat feature to ask
	system to make your work easier?	requirements for different departments."	questions directly would also save a lot of time."

3.2.3 Functional Requirements

This project is a clearance and checkout tracking system designed for targeted users, such as students and administrative staff. It enables students to manage their clearance requests, track progress, and upload required documents, while administrative staff can review, approve, and monitor clearance statuses. The test of functional requirements for this systems is shown in Table 3.2

Table 3.2 Functional requirements

No.	Requirement	Description
1	Centralized Request Submission	The system must allow students to submit clearance requests and upload required documents online, reducing manual paperwork and delays.
2	Status Tracking	Students must be able to track the status of their clearance requests through a progress dashboard.
3	Document Validation	Admins should be able to review uploaded documents and provide approvals or rejections with comments.
4	Integrated Communication System	The system must provide a chat or inquiry feature to enable students to ask questions and for admins to respond directly within the platform.
5	Progress Dashboard for Students	The system should include a user-friendly dashboard for students to see their pending and completed tasks clearly.
6	Online photos Submission	Students should be able to upload documents directly through the system in commonly used formats (e.g., PNG, JPEG).

These functional requirements ensure the C2Track system addresses the needs of its users effectively, streamlining the clearance process for both students and administrative staff.

3.2.4 Non-Functional Requirements

The non-functional requirements define the quality attributes of the *C2Track* system, ensuring its usability, performance, and security for both students and administrative staff.

Performance Constraints

1. The system should handle multiple users simultaneously
2. Clearance requests should be processed and updated after submission or review.
3. Notifications should be sent to users about the status changes.

Operating Constraints

1. The system should require minimal storage and processing power to run efficiently on common devices used by students and administrative staff.
2. It must be accessible through major web browsers (e.g., Chrome, Firefox, Safari) without additional plugins.

Interface Constraints

1. The user interface should be intuitive and user-friendly, enabling students and staff to complete tasks with minimal training.
2. The system should follow consistent design principles to ensure a seamless user experience.

These non-functional requirements ensure that the *C2Track* system is efficient, secure, and user-friendly, providing a reliable experience for both students and administrative staff.

3.3 System Design

The process of defining system elements, including modules, architecture, components, and their interfaces, as well as system data based on particular is known as system design. Finding, developing, and designing a system that satisfies the particular objectives and anticipations of a business or group. Context diagram, Data flow diagram level-0 and level-1, Entity Relationship diagram, data dictionary and interface design sketch are all part of this project's object-oriented design.

3.3.1 Context diagram

A context diagram is a high-level visual representation that outlines the boundaries of a system and its interactions with external entities. It shows the system as a single process, illustrating inputs, outputs, and relationships with external stakeholders, providing a clear overview of the system's scope and context.

The context diagram for the C2Track: Clearance and Checkout Tracking System illustrates the high-level interactions between the system and its two primary external entities: students and administrative staff. It provides a clear overview of the roles and data exchanges involved in the clearance and checkout process, simplifying the understanding of the system's scope and functionality.

The students represent one of the key external entities interacting with the system. They use the C2Track system to manage their clearance requests, upload required documents and track their progress. The diagram highlights the data flows between the students and the system, such as the ability to log in, submit clearance applications, and receive status updates on their requests. This ensures that students can stay informed about their clearance progress without needing to contact administrative staff repeatedly.

The administrative staff represent the second external entity interacting with the system. Their primary role is to review and process the clearance requests submitted by students. The context diagram illustrates that admins can log in to the system, review applications, and provide updates on the approval status of clearance requests. By doing so, they can manage student applications more efficiently and provide timely responses to clearance requests.

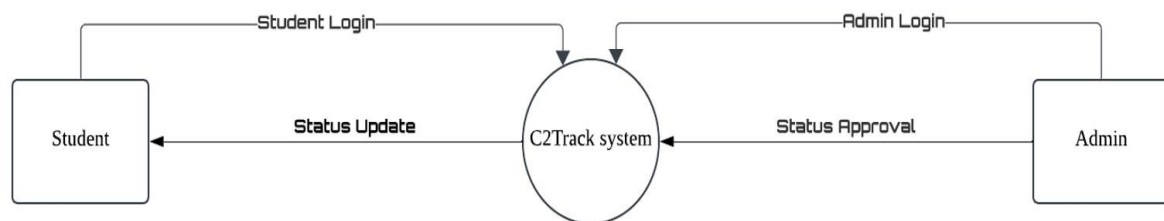


Figure 3.1 Context diagram

3.3.2 Data flow diagram level-0

Data Flow Diagram (DFD) is widely used for structured software analysis and design (Li Q.,Chen L. Y. 2009). The Data Flow Diagram (DFD) Level 0 for the C2Track: Clearance and Checkout Tracking System provides a detailed representation of the system's processes, external entities, and data flows. It outlines the interactions between the system's key components: students, administrative staff, and the processes that facilitate clearance and checkout management.

The diagram begins with the Students, who act as external entities interacting with the system. Students initiate the process by logging into the system through the Login process (Process 1.0). This allows them to access their accounts securely and begin the clearance

application process. The login process also facilitates a connection with the Admin, enabling them to log in to the system for administrative tasks.

The core process for students is the Application process (Process 2.0), where they submit their clearance requests, including room checkouts, payment clearance, and any other required information. This process collects the necessary data from students and ensures it is directed to the appropriate channels within the system for further processing.

The Approve Application process (Process 3.0) is primarily managed by the Admin. Once the application data is submitted, the Admin reviews and approves or rejects the requests. This process ensures that applications are validated and meet all clearance requirements. Approval decisions are then sent back to the application process and ultimately to the students.

Throughout the system, status updates are a crucial feature. These updates are managed by the Report Status process (Process 1.0), which communicates with both students and the admin. Students receive updates on their application status, ensuring transparency and enabling them to track the progress of their clearance process in real-time.

The DFD Level 0 highlights the systematic flow of information within the C2Track system, emphasizing the seamless integration between students, administrative staff, and the clearance processes. By automating these interactions, the system aims to enhance efficiency, reduce errors, and provide a streamlined experience for all users.

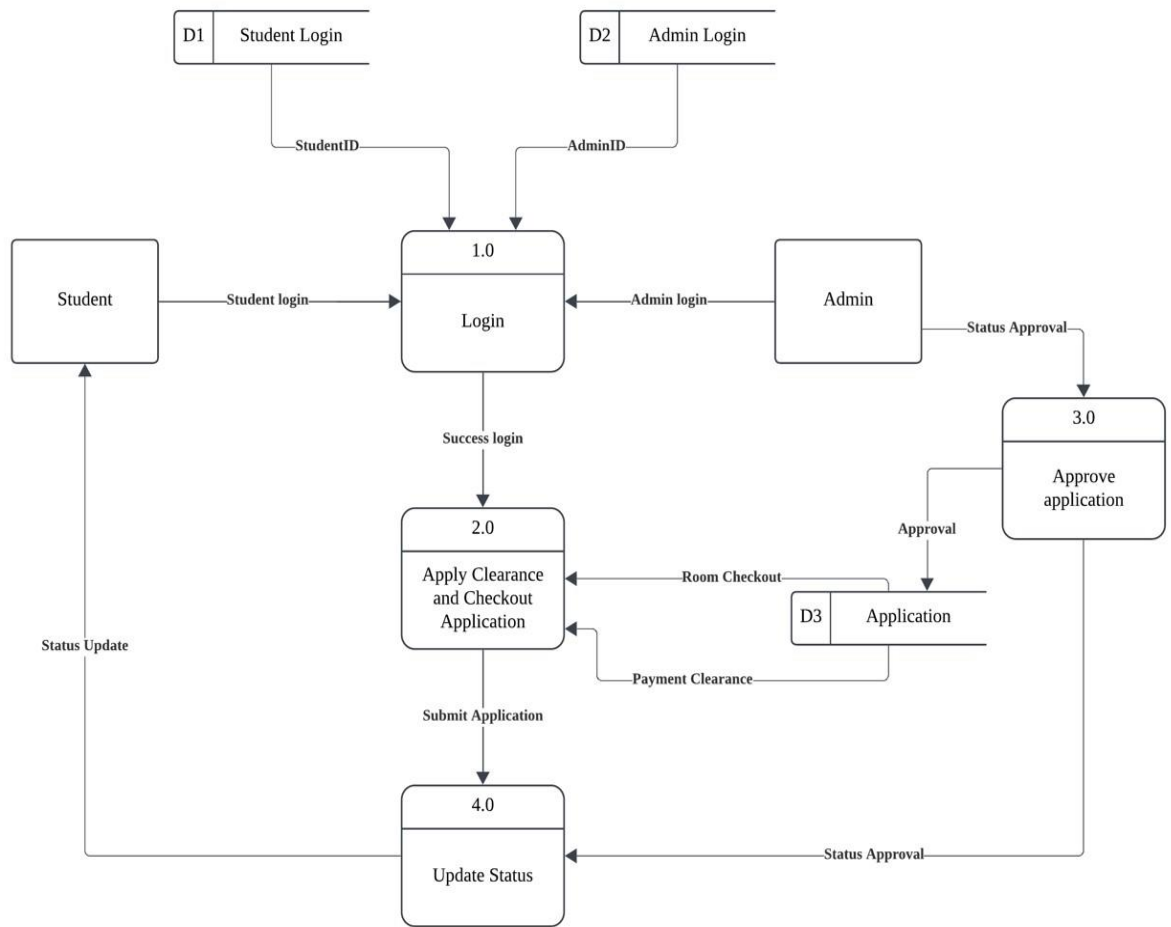


Figure 3.2 Data flow diagram level-0

3.3.3 Data flow diagram level-1

The DFD Level 1 diagram elaborates on the Application process by breaking it into three key subprocesses: Check for Outstanding Payments (2.1), Request Clearance (2.2), and Checkout Hostel Room (2.3). Each subprocess plays a vital role in ensuring the clearance and checkout process is completed systematically.

The first subprocess, Check for Outstanding Payments (2.1), begins after a student successfully logs into the system. It verifies if there are any unpaid fees or penalties. If

outstanding payments are identified, the system facilitates the payment clearance process, ensuring the student cannot proceed until all dues are settled.

The second subprocess, Request Clearance (2.2), focuses on enabling students to submit their clearance requests. This step ensures that students meet all necessary requirements, such as obtaining approvals from various departments and submitting required documents. The system processes these requests and keeps track of the clearance progress.

Finally, Checkout Hostel Room (2.3) involves the student completing their hostel related responsibilities, such as returning keys or settling any remaining room charges. Once this process is completed, the system updates the application status, ensuring all hostel-related tasks are resolved.

The DFD illustrates the sequential flow of these processes, starting from payment clearance to clearance requests and ending with hostel checkout. It ensures an organized and efficient approach to managing clearance and checkout, providing transparency and reducing errors in the process.

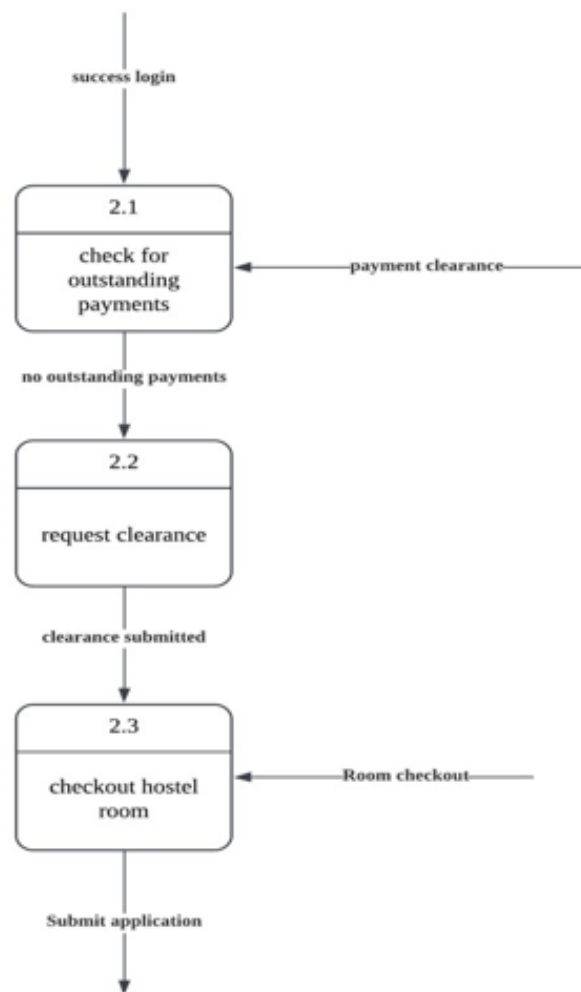


Figure 3.3 Data flow diagram level-1

3.3.4 Data Dictionary

A data dictionary is a centralized repository that contains definitions, descriptions, and details about the data elements within a system or database. It serves as a reference for understanding the structure, relationships, and meaning of the data used in a project.

A data dictionary serves as a critical foundation for any successful software development project. Its primary purpose lies in ensuring seamless data management and communication within the development team. By standardizing the definitions and usage of data fields across the entire system, the Data Dictionary minimizes the risk of misinterpretation and errors during data handling

i) Students Login Table (D1)

This table stores information about students who use the system to submit clearance requests and track their progress.

Table 3.3 Data dictionary for students

Field Name	Data Type	Size	Description	Constraints	Default Value
studentID	int	10	Unique identifier for a student	Must be unique, cannot be null	None
studentName	String	50	Full name of the student	Cannot be null	None
email	String	100	Email address of the student	Must be unique, valid email format	None
phoneNumber	String	15	Contact number of the student	Must be a valid number format	None

ii) Admin Login Table (D2)

This table stores information about administrative staff who review and approve clearance requests.

Table 3.4 data dictionary for admin staff

Field Name	Data Type	Size	Description	Constraints	Default Value
adminID	int	10	Unique identifier for an admin	Must be unique, cannot be null	None
adminName	String	50	Full name of the admin	Cannot be null	None
department	String	50	Department assigned to the admin	Cannot be null	None

iii) Application Table (D3)

This table stores information about clearance requests submitted by students, including their status and associated documents.

Table 3.5 Data dictionary for application

Field Name	Data Type	Size	Description	Constraints	Default Value
requestID	int	10	Unique identifier for a clearance request	Must be unique, cannot be null	None
studentID	int	10	Foreign key linking to the Students table	Cannot be null	None
adminID	int	10	Foreign key linking to the Admin table	Can be null (if not yet assigned)	None
status	String	20	Clearance status (e.g., Pending, Approved)	Allowed values: "Pending", "Approved", "Rejected"	"Pending"
submissionDate	Date	N/A	Date when the clearance request was submitted	Cannot be null	Current Date
documents	List<String>	N/A	List of uploaded documents	File types: PDF, JPG, PNG	None

iv) Reports Table

This table stores reports generated by the system, such as clearance status reports.

Table 3.6 Data dictionary for reports

Field Name	Data Type	Size	Description	Constraints	Default Value
reportID	int	10	Unique identifier for a report	Must be unique	None
studentID	int	10	Foreign key linking to the Students Login table	Cannot be null	None
adminID	int	10	Foreign key linking to the Admin Login table	Cannot be null	None
content	String	500	Content of the generated report	Cannot be null	None
creationDate	Date	N/A	Date the report was created	Cannot be null	Current Date

3.3.5 Entity-Relationship Diagram

The Entity-Relationship Diagram (ERD) illustrates the interaction between various entities in the C2Track system. At the core of the system is the student entity, which represents users who initiate the process by submitting an application for clearance or hostel room checkout. This submission marks the starting point of the system workflow and establishes a direct relationship between the student and the application.

The Application entity serves as a record of the student's request. It includes all relevant details about the submitted application, such as the type of request, status, and associated documents. Once submitted, the application is forwarded to the admin for further processing. The admin plays a crucial role as they are responsible for reviewing and approving or rejecting applications based on the provided information.

The Review process is an essential step where the admin assesses the application. This review involves verifying whether the student has fulfilled all the necessary requirements, such as settling outstanding payments or completing other clearance obligations. After the review, the admin proceeds to the Update process, where the status of the application is changed to reflect its outcome. The updated status notifies the student about the result of their request, ensuring transparency and communication within the system.

Finally, the Report entity comes into play, summarizing the entire process. The report provides a comprehensive record of the application's progress and final status, making it accessible for both the student and the admin. This report serves as a crucial document for tracking and archiving purposes. Overall, the ERD captures the structured flow of data and relationships within the C2Track system, ensuring an efficient and organized clearance and checkout process.

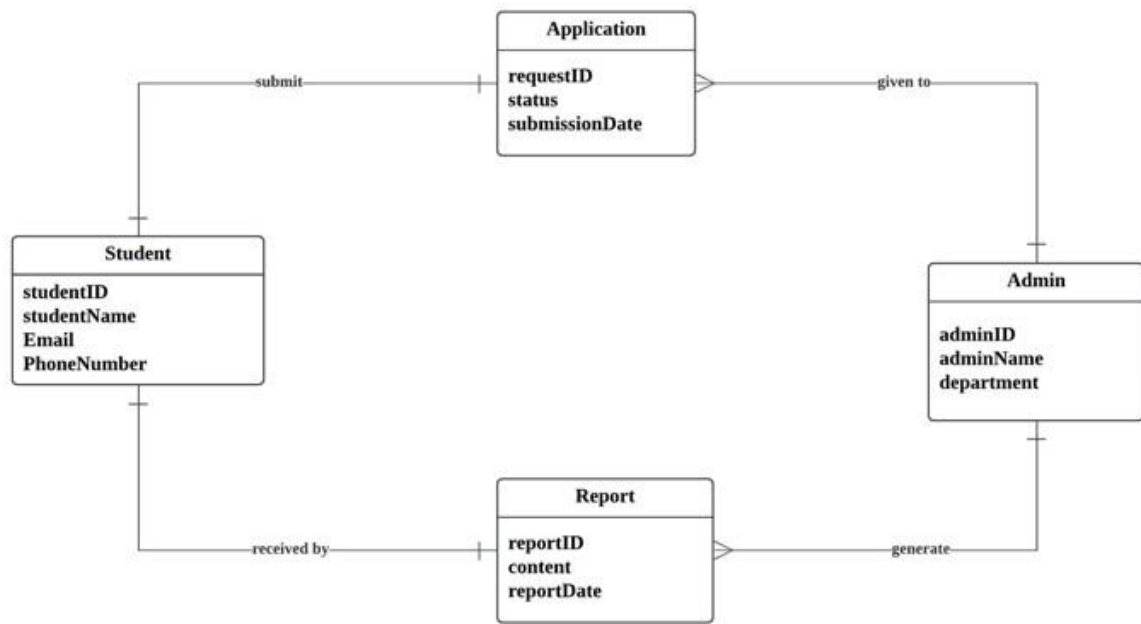


Figure 3.4 Entity-Relationship Diagram

3.3.6 Interface design

i) Login page design

The sketch design presents a straightforward user-friendly design for the login page. A user can immediately recognize the brand identity through the presentation of Organization Logo and Organization Name at the top area of the design. User recognition of accessed platforms should be immediate because it supports security and transparency requirements.

The main component is the Login Form that requests user credentials including a username and password. A Login Button under the form serving as a user-friendly element for account login. The form along with the button uses straightforward design which creates an intuitive process that reduces user efforts while preventing confusion.

The design contains a Contact Information component so users can obtain help or send inquiries when needed. The addition provides users with necessary assistance when they need help. The layout combines branding elements with functional requirements and user support features to deliver a smooth and secure login procedure.



Figure 3.5 Login sketch

ii) Clearance and checkout form

The sketch design features a layout for clearance and checkout pages with an intuitive design process in mind. The page displays Organization Logo and Organization Name as prominent elements at its top section. Brand identity reinforcement occurs through these elements to help users understand which organization they interact with because trust and recognition depend on it.

The Clearance and Checkout Form stands as the main design element. Users must submit required clearance and checkout details on this section of the application. Users should find the structure of this form easy to understand because it provides a seamless step-by-step process to avoid confusion during completion. Users can provide information efficiently by having clearly labelled fields which are properly organized on the page.

The system design incorporates both Back Buttons and Submit Buttons to assist users in their navigation between steps or pages for revising and editing information. The design feature provides users with flexibility and reduces their frustration levels. Users can complete their clearance and checkout submission through the crucial Submit Button element. The designers have made the button both noticeable and easy to reach so users can finish their process with minimum effort.

Organization Logo

Organization Name

Clearance and checkout form

Back Button

Submit Button

Figure 3.6 Clearance and checkout form

iii) Approval status page

The sketch design presents an organized format for a page that contains essential information about students and their approval status within an organization. The page begins with both Organization Logo and Organization Name showcased at the top. Such branding elements create both organizational identity recognition and instant audience awareness about which institution users currently interact with. The successful operation of clear communication requires this step for building trust between parties.

In the design centre Student Info displays data that is likely to contain student-related information. Student information along with academic documentation and important data would appear in this part of the design. The Approval Status section appears next to or beneath Student Info to display approval information about student-related requests and applications. Users can grasp the present situation easily through this status without requiring detailed investigation.

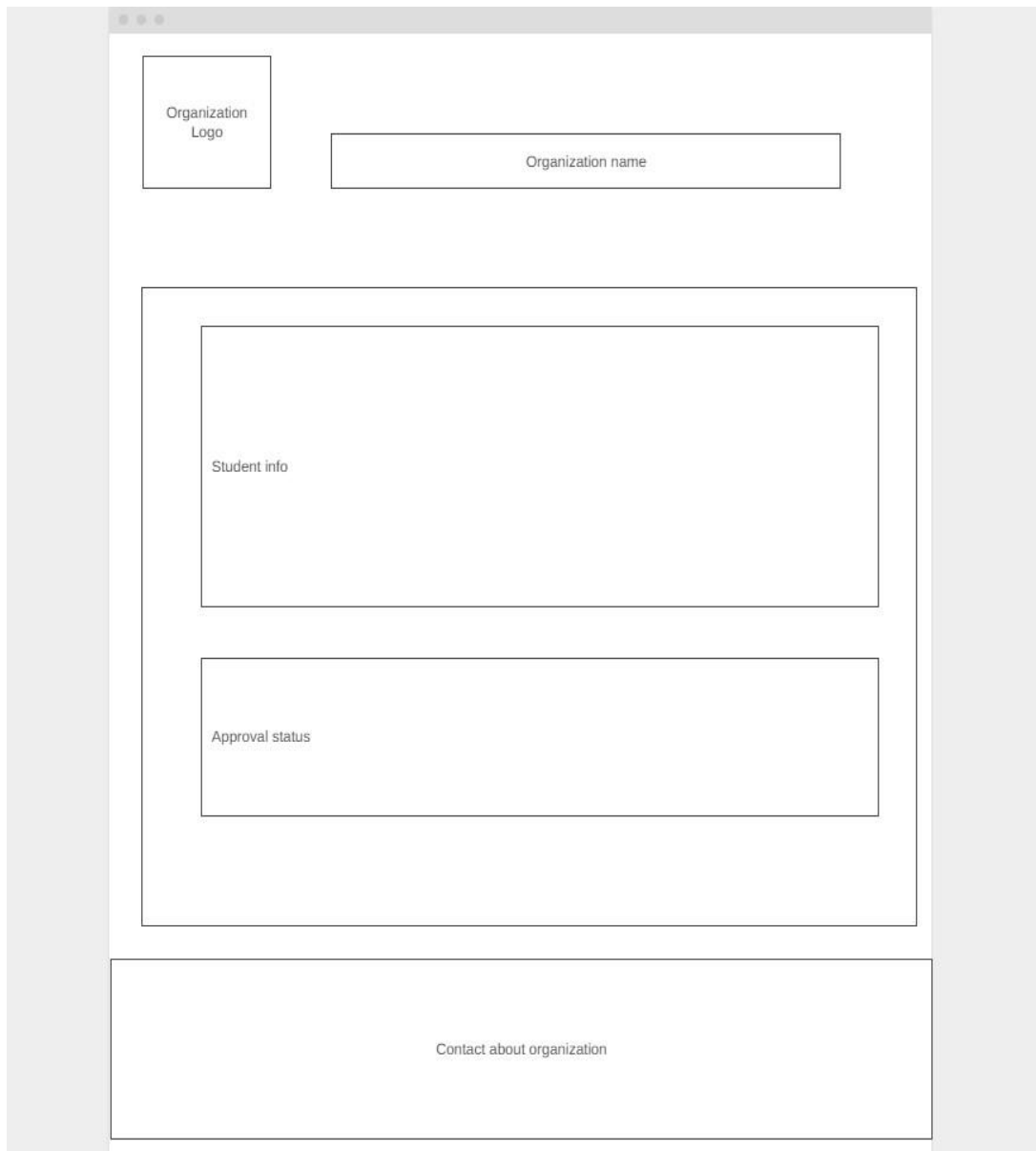


Figure 3.7 Approval status

3.4 Summary

The third chapter, which is Chapter 3 Requirements Analysis and Design, is concerned with the requirements analysis and design of the C2Track: Clearance and Checkout Tracking System on the UiTM Campus 1 Samarahan. The chapter reflects the waterfall approach, linear and sequential software development approach that guarantees clear stages and endpoints. This is aimed at developing a system that will eliminate the inefficiencies of the existing manual clearance system, which is tedious, subject to errors and does not offer real-time updates. The

chapter is split into two major sections, Requirement Analysis and System Design where the entire process of ensuring that the system highly satisfies the users and that it works efficiently is described.

The chapter begins with Requirement Analysis, which involves gathering detailed insights from stakeholders, including students and administrative staff, through structured interviews. These interviews reveal the challenges of the current system, such as the lack of centralized tracking, delayed communication, and the need for automated notifications. Based on this feedback, the system's functional requirements are outlined, including features like centralized request submission, status tracking, document validation, and an integrated communication system. These requirements aim to streamline the clearance process, reduce administrative workload, and provide students with a more transparent and efficient experience. Additionally, non-functional requirements, such as system performance, usability, and security, are defined to ensure the system is reliable and user-friendly.

The second part of the chapter focuses on System Design, which involves creating visual representations of the system's structure and data flow. A Context Diagram is used to illustrate the high-level interactions between the system and its primary users: students and administrative staff. This diagram shows how students can submit clearance requests, upload documents, and track their progress, while admins can review and approve requests. The Data Flow Diagram (DFD) Level-0 provides a more detailed view of the system's processes, including login, application submission, approval, and status reporting. The DFD Level-1 further breaks down the application process into subprocesses, such as checking for outstanding payments, requesting clearance, and completing hostel room checkouts.

To ensure clarity and consistency in data management, a Data Dictionary is created, defining the structure and constraints of the data used in the system. This includes tables for

students, admins, applications, and reports, each with specific fields and data types. The Entity-Relationship Diagram (ERD) visually represents the relationships between these entities, showing how students submit applications, admins review and update them, and reports are generated to track the process. Finally, the chapter includes Interface Design sketches for key system pages, such as the login page, clearance and checkout form, and approval status page. These designs emphasize user-friendliness, with clear branding, intuitive layouts, and easy navigation to ensure a seamless user experience.

CHAPTER 4: Implementation

4.1 Introduction

This chapter explains how the C2Track system was implemented, covering the tools and technologies used throughout the development process. It also elaborates on the system structure and module interfaces, including how each core function was built and tested. The purpose of this chapter is to demonstrate how the proposed system was realized in a practical environment using selected tools to achieve the objectives stated in earlier chapters.

4.2 Implementation Tool

This section explains the tools and software used to build the C2Track system. The development of this system required a few important applications that helped with coding, designing the interface, managing the database, and testing the system. Choosing the right tools was important to make sure the system works smoothly and can be updated or improved in the future.

4.2.1 Software Used for the Development

Several software tools were used throughout the development of the C2Track system:

- **XAMPP**

XAMPP is a free and open-source package that provides Apache, MySQL, PHP, and Perl. It was used to run the system locally on a computer. With XAMPP, the system could be tested without needing to upload it to an online server.

- **PHP**

PHP is the main programming language used to build the backend of the system. It handles form submissions, data processing, and communication with the database.

- **MySQL**

MySQL is used to store and manage all the data in the system, such as student information, form

submissions, and approval status. It works together with PHP to save and retrieve data from the database.

- **HTML, CSS, and JavaScript**

These are the basic technologies used to create the interface of the system. HTML is used for the structure of the pages, CSS is for styling the layout and colors, and JavaScript adds interactivity like form validation and dynamic page actions.

- **Visual Studio Code (VS Code)**

VS Code is the code editor used during development. It helps organize the project files, write and edit code efficiently, and provides useful features like syntax highlighting and auto-complete.

- **Google Chrome**

This browser was used to test and view the system. It allowed checking the interface design, making sure pages display correctly, and using browser tools to debug errors.

4.3 C2Track Prototype

This section explains how the C2Track system works by showing its prototype and key modules. The system was designed with two main modules: one for students and one for admins. Each module has its own purpose and functions to make the clearance and checkout process easier.

4.3.1 System Hierarchy

The C2Track system has two main modules:

- **Student Module** – This module allows students to log in, submit their clearance and checkout forms, and view their status updates.
- **Admin Module** – This module allows admins to log in, view student submissions, approve or reject forms, and check the approval history.

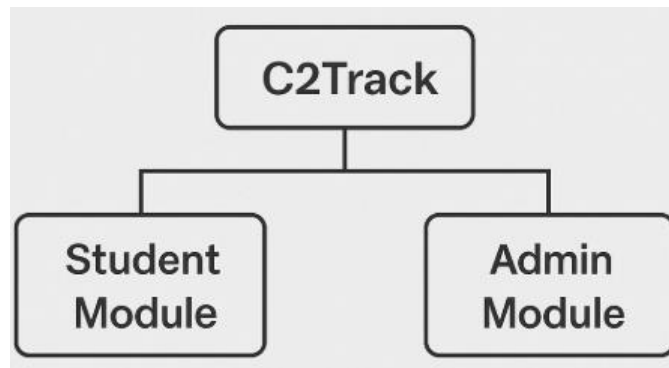


Figure 4.1 System Hierarchy

4.3.2 Student Module

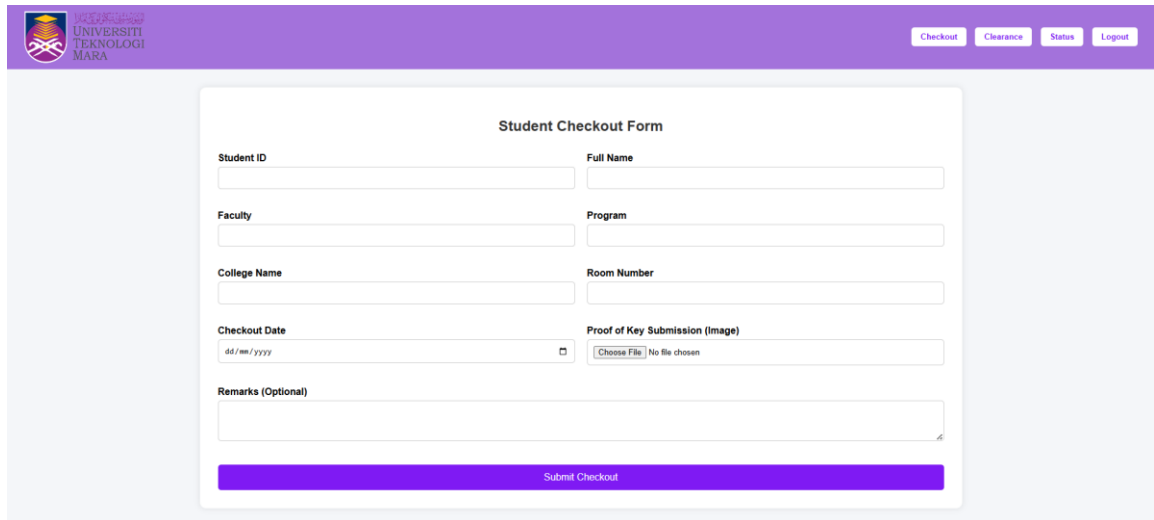
Login Interface

The login interface features a purple header with the Universiti Teknologi MARA logo and name. The main content area is light gray and contains a white 'Student Login' form. The form has fields for 'Student ID' and 'Password', a purple 'Login' button, and a link for 'Admin Login'. The footer is purple and contains contact information for Universiti Teknologi MARA (UiTM).

Figure 4.2 Login Interface

The login page lets students securely access the system using their student ID and password. PHP sessions are used to manage user sessions, while MySQL handles the login verification.

Checkout Submission Form



The screenshot shows a web application interface for a 'Student Checkout Form'. At the top, there is a purple header bar containing the Universiti Teknologi MARA logo on the left and four navigation buttons ('Checkout', 'Clearance', 'Status', 'Logout') on the right. The main content area is light gray and contains a white form titled 'Student Checkout Form'. The form has several input fields: 'Student ID', 'Full Name', 'Faculty', 'Program', 'College Name', 'Room Number', 'Checkout Date' (with a date picker icon), and 'Proof of Key Submission (Image)' (with a 'Choose File' button and 'No file chosen' text). There is also a 'Remarks (Optional)' text area. At the bottom of the form is a purple 'Submit Checkout' button.

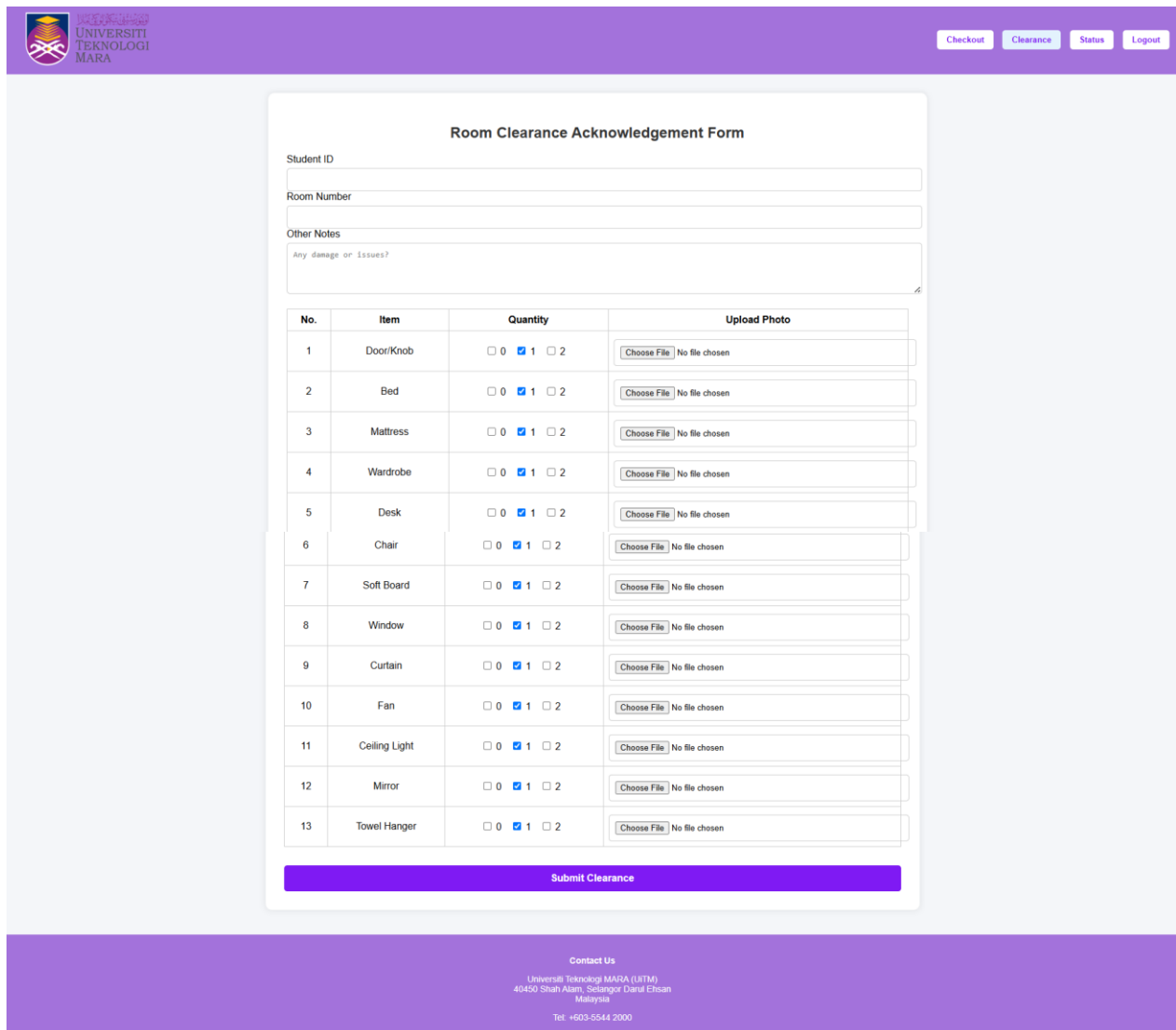
Figure 4.3 Checkout Submission Form

Students can fill out a form with details such as:

- Student name
- Student ID
- Block and room number
- Checkout date
- Any extra remarks

This form uses dropdowns and text input fields. The system checks all inputs before saving the data into the checkout table with a default status of "Pending".

Clearance Submission Form



Room Clearance Acknowledgement Form

Student ID

Room Number

Other Notes

Any damage or issues?

No.	Item	Quantity	Upload Photo
1	Door/Knob	☐ 0 ☒ 1 ☐ 2	Choose File No file chosen
2	Bed	☐ 0 ☒ 1 ☐ 2	Choose File No file chosen
3	Mattress	☐ 0 ☒ 1 ☐ 2	Choose File No file chosen
4	Wardrobe	☐ 0 ☒ 1 ☐ 2	Choose File No file chosen
5	Desk	☐ 0 ☒ 1 ☐ 2	Choose File No file chosen
6	Chair	☐ 0 ☒ 1 ☐ 2	Choose File No file chosen
7	Soft Board	☐ 0 ☒ 1 ☐ 2	Choose File No file chosen
8	Window	☐ 0 ☒ 1 ☐ 2	Choose File No file chosen
9	Curtain	☐ 0 ☒ 1 ☐ 2	Choose File No file chosen
10	Fan	☐ 0 ☒ 1 ☐ 2	Choose File No file chosen
11	Ceiling Light	☐ 0 ☒ 1 ☐ 2	Choose File No file chosen
12	Mirror	☐ 0 ☒ 1 ☐ 2	Choose File No file chosen
13	Towel Hanger	☐ 0 ☒ 1 ☐ 2	Choose File No file chosen

Contact Us
Universiti Teknologi MARA (UiTM)
40450 Shah Alam, Selangor Darul Ehsan
Malaysia
Tel: +603-5544 2000

Figure 4.4 Clearance Submission Form

In the clearance form, students are shown a list of room items such as Bed, Fan, Curtain, etc. Each item has quantity options (0 to 2) shown as checkboxes. Students also upload photos of each item.

The photo for each item is saved in its own folder and renamed using the student ID to keep it organized.

All item information is saved as a JSON structure in the clearanceapproval table.

Student Status Page

The screenshot displays the 'Your Checkout Status' and 'Your Clearance Status' sections. The top navigation bar includes links for Checkout, Clearance, Status, and Logout. The 'Your Checkout Status' table lists three entries, all with a status of 'Approved'. The 'Your Clearance Status' table lists two entries, one 'Approved' and one 'Rejected'.

Checkout Date	Room	Remarks	Status
2025-06-09	1	-	Approved
2025-06-09	1	-	Approved
2025-06-09	2111	-	Approved

Submitted	Room	Cleanliness	Comments	Status
2025-06-11	1	-	-	Approved
2025-05-27	311	Satisfactory	-	Rejected

Contact Us
Universiti Teknologi MARA (UiTM)
40450 Shah Alam, Selangor Darul Ehsan
Malaysia
Tel: +603-5544 2000

Figure 4.5 Status Page

This page shows students the current status of their checkout and clearance submissions. They can easily see whether their requests are still pending, approved, or rejected.

4.3.3 Admin Module

Admin Login

The screenshot shows the Admin Login page with a login form. The form includes fields for Admin ID (pre-filled with 'admin') and Password, a Login button, and a link to 'Back to Student Login'. The page features the Universiti Teknologi MARA logo and contact information at the bottom.

Welcome back, Admin

Admin ID
admin

Password

Login

[Back to Student Login](#)

Contact Us
Universiti Teknologi MARA (UiTM)
40450 Shah Alam, Selangor Darul Ehsan
Malaysia
Tel: +603-5544 2000

Figure 4.6 Admin Login

Admins must log in using their admin ID and password. Only after logging in, admin can they access the admin dashboard.

Approval Dashboard

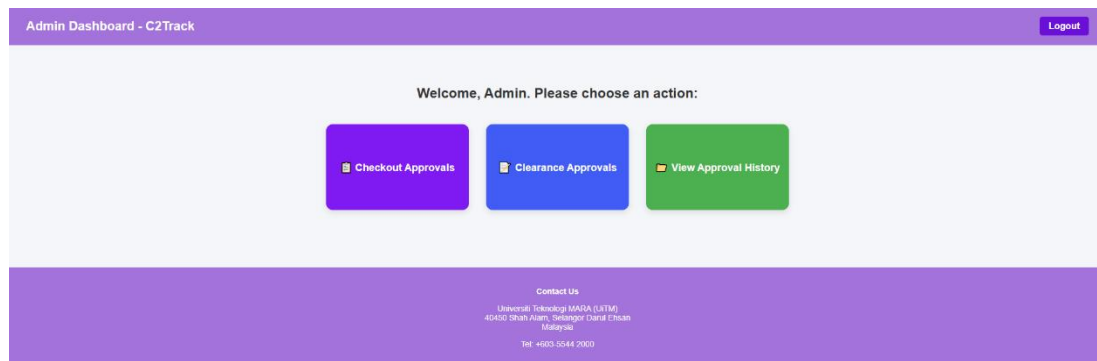


Figure 4.7 Approval Dashboard

The dashboard is split into two parts:

- Checkout Approvals – Displays a list of student checkout submissions. Admins can review the details and click either Approve or Reject.

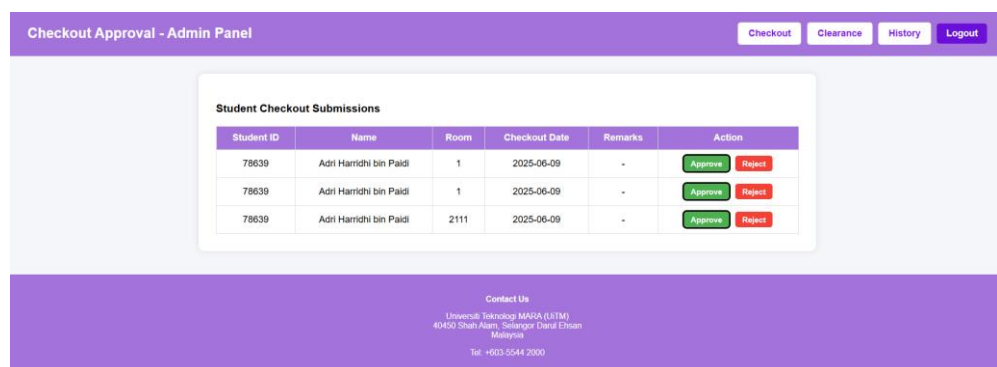


Figure 4.8 Checkout Approvals

- Clearance Approvals – Admins view item conditions and uploaded photos to decide whether to approve or reject the clearance form.

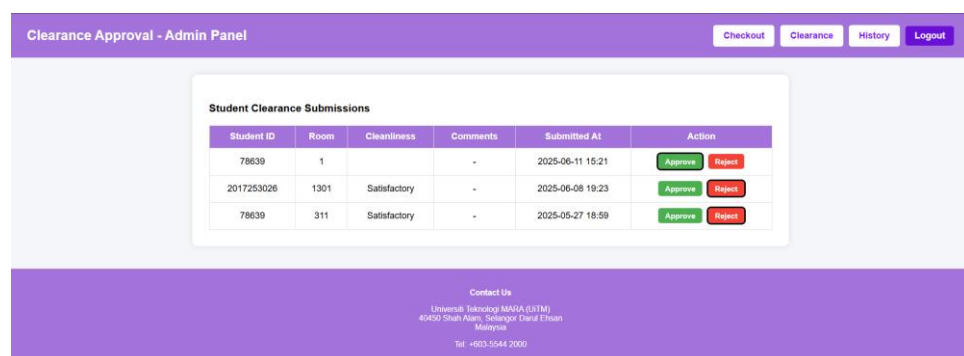
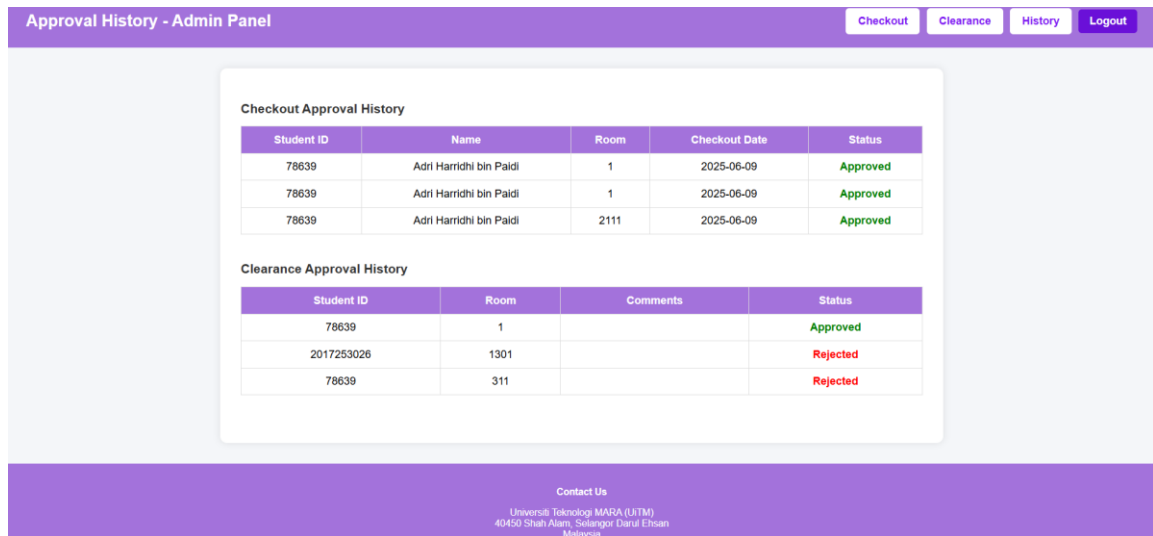


Figure 4.9 Clearance Approvals

Approval History



Approval History - Admin Panel					Checkout	Clearance	History	Logout
Checkout Approval History								
Student ID	Name	Room	Checkout Date	Status				
78639	Adri Harridhi bin Paidi	1	2025-06-09	Approved				
78639	Adri Harridhi bin Paidi	1	2025-06-09	Approved				
78639	Adri Harridhi bin Paidi	2111	2025-06-09	Approved				
Clearance Approval History								
Student ID	Room	Comments	Status					
78639	1		Approved					
2017253026	1301		Rejected					
78639	311		Rejected					
Contact Us Universiti Teknologi MARA (UiTM) 40450 Shah Alam, Selangor Darul Ehsan Malaysia								

Figure 4.10 Approval History

This page shows all past approvals and rejections for both checkout and clearance modules. It helps admins keep track of decisions and maintain records.

4.4 Discussion

The implementation of C2Track followed a modular approach, ensuring separation of concerns between student-facing and admin-facing functions. One of the challenges encountered was managing photo uploads for multiple items and naming them dynamically to prevent overwriting. This was solved using a combination of PHP logic and folder-based storage.

The UI was designed to be consistent across all pages with a shared header and footer, providing a smooth user experience. The use of checkboxes for quantity in the clearance form enhanced user speed and convenience. Additionally, the system was built to prevent form resubmission issues and to handle default selections effectively (e.g., setting quantity to 1 by default).

4.5 Summary

This chapter has detailed the implementation phase of the C2Track system, including the tools used and the structure of both student and admin modules. Each module was designed with usability and

functionality in mind, ensuring that the system meets the outlined objectives. The successful integration of dynamic photo uploads, modular approval flows, and a clear status tracking mechanism ensures that the C2Track system is both practical and reliable for real-world use.

CHAPTER 5: TESTING

5.1 Introduction

This chapter presents the testing phase conducted after the development and implementation of the C2Track system. The primary goal of this phase is to ensure that all system requirements and objectives have been successfully met and that the system operates smoothly without functional errors or performance issues. Testing plays a vital role in validating that the system is reliable, secure, and user-friendly before it is made available for use by students and administrators.

Through structured testing activities, this chapter aims to verify that the system accurately processes clearance and checkout submissions, handles admin approvals correctly, and maintains data integrity across all modules. Several testing methods were applied to detect bugs, ensure the responsiveness of the system, and confirm that user interactions align with expectations. All testing efforts in this chapter were conducted and validated by the system developer to ensure readiness for deployment.

5.2 Functionality Testing

This section presents the results of functionality testing conducted on the C2Track system. It focuses on validating that the system's core modules behave as intended and meet user requirements. Details of test cases and outcomes are provided in the following subsections.

5.2.1 Overview

Functionality testing was conducted to verify that the system performed its intended functions correctly. This includes checking whether features like form submission, admin approval, and status tracking worked as expected.

5.2.2 List of Functionality Testing Results

Table 6.1 Functionality Testing Results

Test Case ID	Module	Test Description	Expected Result	Actual Result	Status
TC_F01	Login	Login using valid student ID	Dashboard loads	Dashboard loads	Pass
TC_F02	Checkout Form	Submit form with all fields	Data saved & status = Pending	Data saved & status = Pending	Pass
TC_F03	Clearance Form	Submit clearance form with photos	Data and photos uploaded	Data and photos uploaded	Pass
TC_F04	Admin Dashboard	Approve a checkout record	Status changes to Approved	Status changes to Approved	Pass
TC_F05	Status Page	View status after form submission	Display pending status	Display pending status	Pass

5.3 Reliability Testing

This section highlights the reliability testing activities carried out on the C2Track system. The objective was to confirm that the system can operate stably across multiple sessions and user interactions. The test focused on system uptime, repeated form submissions, and behavior under typical usage conditions.

5.3.1 Overview

Reliability testing ensures the system performs consistently over time and under different conditions. This test verified how stable the system was during repeated use and under varying loads.

5.3.2 List of Reliability Testing Results

Table 6.2 Reliability Testing

Test Case ID	Scenario	Action	Expected Result	Actual Result	Status
TC_R01	Repeated login attempts	Login 10 times continuously	No crash, all successful	Successful	Pass
TC_R02	Continuous form submissions	Submit form 5 times in a row	All submissions saved	All saved	Pass
TC_R03	Admin reviewing multiple submissions	Approve 10 records in one session	No lag or crash	No issues	Pass

5.4 Efficiency Testing

This section explains the efficiency tests performed on the C2Track system to determine its responsiveness and resource usage. The aim was to evaluate how well the system handled operations such as loading pages, submitting forms, and accessing the database in a timely manner. This is important to ensure a smooth and fast user experience for both students and administrators.

5.4.1 Overview

Efficiency testing measured how quickly the system responded to user actions. This includes page load time, form submission speed, and database access.

5.4.2 List of Efficiency Testing Results

Table 6.3 Efficiency Testing

Test Case ID	Component Tested	Action	Expected Time	Actual Time	Status
TC_E01	Login Page	Load login interface	< 2 seconds	1.2 seconds	Pass
TC_E02	Form Submission	Submit checkout form	< 3 seconds	2.5 seconds	Pass
TC_E03	Status Page	Load status data	< 2 seconds	1.6 seconds	Pass

5.5 Usability Testing

This section describes the usability testing conducted on the C2Track system to assess how user-friendly and accessible the system was for actual users. The main focus was on evaluating how easily users could navigate the interface, understand the form fields, and complete tasks without confusion. Feedback was gathered from real users to improve the design and overall experience.

5.5.1 Overview

Usability testing evaluated how easy and intuitive it was for users to interact with the system. It involved real users trying out the interface and giving feedback on layout, labels, navigation, and form usage.

5.5.2 List of Usability Testing Results

Table 6.4 Usability Testing

Test Case ID	Interface	User Feedback	Improvement Suggestion	Status
TC_U01	Login Page	Easy to understand and use	No change needed	Pass
TC_U02	Clearance Form	Clear labels, photos easy to upload	Set default quantity to 1	Pass
TC_U03	Status Page	Good tracking display	None	Pass

5.6 Maintainability Testing

This part discusses the maintainability aspects of the C2Track system. The goal was to evaluate whether the system's structure and codebase are organized in a way that makes future improvements and debugging manageable. The system was reviewed for its use of clean coding practices, comments, and file organization, as well as how easily a developer could implement changes without affecting other components.

5.6.1 Overview

Maintainability testing checks how easily the system can be modified, updated, or debugged. This was tested by reviewing how readable and modular the code is, and how easy it was to add or change features.

5.6.2 List of Maintainability Testing Results

Table 6.5 Usability Testing

Area Tested	Description	Evaluation	Status
Code Structure	PHP functions and MySQL queries	Organized into logical sections	Pass
Error Handling	Handling of file and form errors	Custom error messages implemented	Pass
Modularity	Pages separated by function (e.g., checkout, status)	Easy to maintain and extend	Pass

5.7 Portability Testing

Portability testing was done to ensure that the system works properly across different devices and browsers. This is important because users may access the system using laptops, smartphones, or tablets, and each of these devices may run different browsers such as Chrome, Firefox, or Edge. The layout, functionality, and responsiveness of the system were carefully observed on each platform to confirm consistent performance.

5.7.1 Overview

Portability testing assessed whether the C2Track system could operate reliably in various environments. The goal was to verify if all pages and features displayed and functioned correctly on different browsers and screen sizes. This included checking form layouts, navigation, button responses, and the loading of uploaded images. By testing the system on multiple devices and browsers, this test

helped ensure that the system is accessible and usable by a wide range of users regardless of their chosen platform.

5.7.2 List of Portability Testing Results

Table 6.6 Portability Testing

Test Case ID	Platform/Browser	Action	Result	Status
TC_P01	Chrome (Desktop)	Access and test all pages	No issues	Pass
TC_P02	Firefox (Desktop)	Access and test all pages	No issues	Pass
TC_P03	Microsoft Edge	Access and test all pages	No issues	Pass
TC_P04	Chrome (Mobile)	Access on smartphone	Pages load fine	Pass

5.8 Summary

In summary, all testing conducted on the C2Track system has demonstrated that it meets the quality expectations across different software characteristics. The system performed well in terms of functionality, reliability, efficiency, usability, maintainability, and portability. This confirms that the C2Track system is ready for deployment and can support students and admin staff effectively.

CHAPTER 6: CONCLUSION AND FUTURE WORKS

6.1 Introduction

This chapter concludes the development of the *C2Track: Clearance and Checkout Tracking System for UiTM Campus 1 Samarahan*. The system was developed to assist UiTM students and administrators in managing the clearance and checkout processes more efficiently. This chapter summarizes the achievements of the project objectives, outlines current limitations, and suggests future improvements. In conclusion, the development of C2Track has achieved its goal of offering a practical and centralized platform to manage clearance and checkout processes at UiTM Campus 1 Samarahan. With successful implementation of core features such as student submissions, admin approvals, and data storage, the system provides a foundation for further innovation. With recommended improvements in future work, C2Track has the potential to be scaled and integrated into broader campus-wide management systems.

6.2 Objective Achievements

The project was built with the aim of addressing manual inefficiencies in the current clearance and checkout procedures. The objectives and how they were achieved are listed below:

- To develop a clearance and checkout system that stores and organizes student submissions.

Implemented a user-friendly form interface for students to submit checkout and clearance data, including photo uploads.

- To allow tracking and approval by admin users.

Created an admin dashboard to view, approve, or reject student submissions with real-time status updates.

- To reduce paperwork and manual validation.

Automated the process of recording conditions of items via photo evidence and centralized storage in the database.

6.3 Project Limitations

Although the system meets its primary objectives, several limitations were identified during implementation:

- The system operates on a local server and is not accessible online.
- There is no role-based access control (e.g., multiple admin departments).
- Notification mechanisms (e.g., email/SMS) for students are not integrated.
- Reports cannot be exported in PDF or Excel formats.
- Mobile optimization is limited to basic browser responsiveness.

6.4 Future Works

The following are recommended for future enhancement of the system:

1. Web Hosting & Online Deployment

Deploy the system online to allow access from anywhere, especially for off-campus students.

2. Role-Based Access Control

Implement multi-level login access for different departments such as finance, library, and hostel management.

3. Notification Integration

Use email or SMS APIs to notify students when their submissions are approved or rejected.

4. Exportable Reports

Add functionality to generate printable reports in PDF or Excel for administrative record-keeping.

5. Mobile Application Version

Build a mobile version of the system to further simplify access and usability for students.

6. Security Enhancements

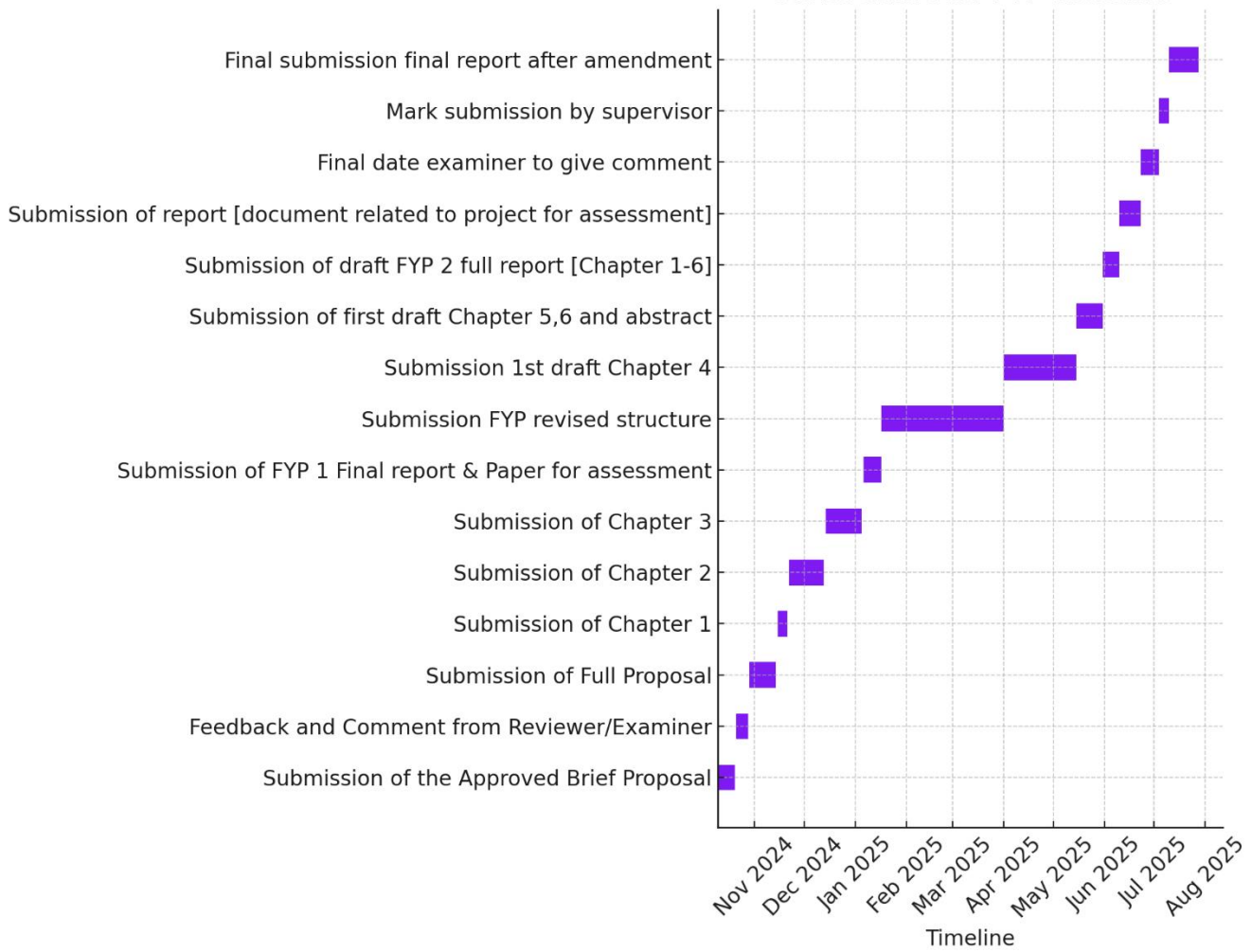
Introduce stronger validation, CAPTCHA, and file handling restrictions to improve data security.

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Appendix A

Gantt Chart for FYP Timeline



Appendix B



Infrastructure University
Kuala Lumpur

ROF- 07/11
Rev No.:03/18
Page No:1 of 2

UNIVERSITY CLEARANCE FORM

Notes:

1. Please have this form signed by the designated Heads of departments and submit to Registrar's Office.
2. Your Certificates and Full transcripts will not be released without this Clearance Form.

STUDENT INFORMATION

Name : _____

I/D No. : _____ NRIC No. /Passport No. : _____

Intake : _____ Programme : _____ Semester/Year of Graduation : _____

E-mail : _____ Mobile No. : _____

Student's signature

Date

CLEARANCE DEPARTMENT	PARTICULARS	AUTHORIZATION (Signature, Stamp & Date)
LIBRARY	☐ Cleared ☐ Not Cleared Remarks:	
STUDENT AFFAIRS-ALUMNI (to fill up tracers study)	☐ Cleared ☐ Not Cleared Remarks:	
INTERNATIONAL STUDENTS CENTRE	☐ Cleared ☐ Not Cleared Remarks:	
BURSARY DEPARTMENT (Payment Counters) <u>GRADUATION FEE</u> 1) Attending Convocation = RM350.00 2) Not Attending Convocation= RM150.00	Checklist: ☐ Has made full settlement of Academic Fees ☐ Has paid Graduation Fee (Not Attending) ☐ Has paid Graduation Fee (Attending) <u>DEPOSIT CLAIM FORM;</u> ☐ i) Has submitted Deposit Claim Form to Bursary Dept- Graduated/Completed. ☐ ii) Not submitted-Progression Student ☐ Not Cleared ☐ Cleared Remarks: _____ _____ _____	
	_____ _____ _____	_____ _____ _____

Checked By/Date

REGISTRAR'S OFFICE	GRADUATION STATUS: ☐ Graduated ☐ Pending Approval ☐ Not Complete Returning of Robe: ☐ Yes ☐ No ☐ Not Applicable Other reasons to withhold certificate ☐ Yes ☐ No Remarks : 	RO EXECUTIVE
	FINAL CLEARANCE : ☐ Approved to release Certificate ☐ Approved to release Full Transcript/Partial Transcript ☐ Not Approved	

NOTE:

DEPOSIT OF ROBE RENTAL

1. **ATTENDING CONVOCATION**
Deposit of Robe Rental (Has collected early certificate) = RM600.00
2. **NOT ATTENDING CONVOCATION**
Deposit of Robe Rental (Has collected early certificate) = RM800.00*
*Processing fee of RM200 will be deducted once the application is approved.
3. Any lost or damage to the robe will give effect to the deposit.

Appendix C

	UNIVERSITI ISLAM MALAYSIA ISLAMIC UNIVERSITY MALAY: الجامعة الإسلامية ماليزيا ACADEMIC MANAGEMENT & QUALITY ASSURANCE BLOK I, BANGUNAN MBN EMBASSY TECHZONE, JALAN TEKNOKAT 2, 63000 CYBERJAYA, SELANGOR DARUL EHSAN TEL : 03-8324 6666 FAKS : 03-8324 6600	
UNIVERSITY CLEARANCE FORM		
STUDENT INSTRUCTION: - Please have this form signed by the designated departments and submit to Academic Office. - Your Certificates and Full Transcripts will not be released without this Clearance Form.		
<u>STUDENT INFORMATION</u>		
Name :	_____	
ID No. :	_____	NRIC No. / Passport No. : _____
Intake :	_____	Mobile No. : _____ Semester/Year of Graduation : _____
Email :	_____	Programme : _____
Student's signature		Date
CLEARANCE DEPARTMENT	PARTICULARS	AUTHORIZATION (Signature, Stamp, Date)
LIBRARY	Cleared ☐ Not Cleared ☐ Remarks : _____ _____ _____	
STUDENT AFFAIRS-ALUMNI (to fill up tracers study)	Cleared ☐ Not Cleared ☐ Remarks : _____ _____ _____	
INTERNATIONAL STUDENT OFFICE (*if foreign student)	Cleared ☐ Not Cleared ☐ Remarks : _____ _____ _____	
FINANCE	Cleared ☐ Not Cleared ☐ Remarks : _____ _____ _____	

Appendix D



STUDENT AFFAIRS DIVISION

CHECK-OUT FORM RESIDENTIAL COLLEGE

RESIDENTIAL COLLEGE : _____

PART A : STUDENTS INFORMATION

FULL NAME					
MATRIC NO. (OLD)		MATRIC NO. (NEW)			
FACULTY		YEAR / SEMESTER			
GENDER		PHONE NO.			
CHECK-OUT DATE		CHECK-OUT TIME		ROOM NO.	

PART B : OTHERS INFORMATION

NO.	MAIN ITEMS	DETAILS	PLEASE TICK AT THE RELEVANT BOX
1	Key Return Method	Return to staff at Residential College Office Counter.	
		Return to Fellow on Duty.	
2	Student Goods/Equipment in Room	Goods/Equipment must be removed and the room must be cleaned thoroughly.	
		Goods/Equipment are left behind in the room.	

PART C : ADDITIONAL INFORMATION

--

Verified by :

Name : _____
Date : _____

Master of Residential College