KIGALI INDEPENDENT UNIVERSITY ULK

SCHOOL OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE

P.O.BOX: 2280 KIGALI

TOPIC: ONLINE MOVIE TICKETS BOOKING MANAGEMENT SYTEM

Case study: Canal Olympia Rebero

Done by

BYAMUNGU MWEZE BERNADETTE

Roll Number: 202110842

Supervisor: Mr. Kwizera Jean Pierre

A Dissertation Submitted to the school of science and technology in Partial Fulfillment of the Requirements for the Award of a Bachelor's of Science in Computer Science.

Kigali October , 2024

DECLARATION

I, **BYAMUNGU MWEZE BERNADETTE**, hereby declare that this dissertation titled "**online movietickets booking management system**" is my original work and has not been submitted previously forany degree award to any other university. All sources and references used in this dissertation have been duly acknowledged.

Signature……

Date: ……/……. /……

BYAMUNGU MWEZE BERNADETTE

APROVAL

This dissertation titled " **online movie tickets booking management system**" has been done undermy supervision and submitted for examination with my approval.

Signature……

Date : ……/……. /……

Mr. Kwizera Jean Pierre

DEDICATION

This Project is dedicated to:

Almighty God for his measurable and unconditional love

My beloved Parents

My brothers

My schoolmates

My friends

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to Almighty God for bestowing upon me the wisdom,strength, and perseverance to undertake and complete this research.

I am deeply indebted to the founder of the University of Kigali, **Prof. Dr. RWIGAMBA BALINDA**, for his visionary leadership and commitment to academic excellence. His creation of this institution has provided countless opportunities for students like me to pursue our academic aspirations.

I am grateful to my esteemed supervisor, **Mr. Kwizera Jean Pierre**, for their invaluable guidance, mentorship, and unwavering support throughout this research endeavor. Their expertise, patience, andconstructive criticism have been instrumental in shaping this work.

I also want to express my sincere gratitude to the University of Kigali's academic and administrativestaff for their helpful assistance and resources. An atmosphere that is favorable for research has beenestablished by their devotion to academic achievement and dedication.
I am also appreciative of my family and friends for their unwavering belief in my abilities, understanding, and ongoing encouragement. Their assistance has been crucial in trying times.

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ACRONYMS

CSS: Cascading Style Sheets.

GSMA: Global System for Mobile Communications Association.

HTML: Hypertext Markup Language.

OMTBS: Online Movie Ticket Booking System.

OOP: Object-Oriented Programming.

PHP: Hypertext Preprocessor.

RDBMS: Relational Database Management.

UI: User Interface.

UML: Unified Modeling Language.

Abstract

The Online Movie Ticket Booking System at Canal Olympia Rebero is designed to simplify and enhance the ticket purchasing experience for moviegoers. This system allows customers to browse available films, check showtimes, and select seats from the comfort of their own devices. By offering a user-friendly interface on both web and mobile platforms, the system provides an efficient, streamlined process for securing tickets. Customers can view real-time availability, choose from various payment methods, and instantly receive digital tickets, reducing the need for in-person purchases at the theater.

The implementation of the system at Canal Olympia Rebero not only benefits customers but also streamlines operations for the cinema. It minimizes the workload on physical ticket counters, reducing long lines and wait times. The system integrates with inventory management to track ticket sales in real-time, allowing the cinema to better manage capacity and optimize seating arrangements. Additionally, this digital solution enables Canal Olympia Rebero to offer promotions, discounts, and loyalty rewards to frequent customers, improving customer retention and satisfaction.

Moreover, the system incorporates a secure payment gateway, ensuring safe transactions for users. It also offers features like ticket cancellation, refunds, and seat changes, adding flexibility to the overall experience. By adapting to the growing demand for online services, Canal Olympia Rebero's Online Movie Ticket Booking System aligns with modern consumer preferences, contributing to the cinema's increased accessibility and convenience for moviegoers in Kigali and beyond. This strategic enhancement positions Canal Olympia Rebero to remain competitive in the evolving entertainment landscape, catering effectively to the needs of a digital-savvy audience. Keyword: Online, Movie, Ticket, Booking, System.

CHAPTER I: GENERAL INTRODUCTION

1.1 Introduction

The movie industry thrives on accessibility and convenience. In today's digital age, online movie ticketbooking systems (OMTBS) have become an essential tool for both moviegoers and cinemas. This dissertation focuses on the development and implementation of such a system for Canal Olympia Rebero, a prominent cinema chain.

We will explore the specific needs and challenges faced by Canal Olympia Rebero when it comes to ticket sales. We will analyze existing OMTBS solutions, identifying functionalities critical for their success. The research will then delve into the development process, outlining the key steps involved in creating a custom OMTBS for Canal Olympia Rebero. This will include aspects like system architecture, user interface design, and integration with existing infrastructure.

Following the development phase, the dissertation will explore the implementation process, focusing on user training, marketing strategies, and potential challenges associated with launching the new OMTBS. The impact of the system on Canal Olympia Rebero's operations will be evaluated, including factors such as increased efficiency, improved customer satisfaction, and potential revenue growth.

By examining the development and implementation of an OMTBS for Canal Olympia Rebero, this dissertation aims to provide a practical framework for cinemas seeking to adopt similar technologies. The case study will offer valuable insights into the benefits and considerations involved in creating a user-friendly and efficient online movie ticket booking experience.

1.2 Background of the study

The movie-going experience is a vital part of the entertainment industry, offering social interaction, cultural immersion, and a break from daily life. However, traditional ticketing methods, often reliant onphysical queues and limited box office hours, can create a frustrating experience for customers (Lee & Jeon, 2021). This is particularly true in developing countries like Rwanda, where Canal Olympia Reberooperates.

Limited access to technology can further hinder moviegoers, especially those with busy schedules or residing far from theaters. A 2022 GSMA report highlights that while mobile phone penetration in Rwanda is high (87%), digital literacy and access to reliable internet connections remain challenges GSMA (2022). Despite these challenges, the potential for online movie ticketing in Rwanda remains significant.

Developing a custom online movie ticket booking system (OMTBS) for Canal Olympia Rebero holds significant promise. This system could offer moviegoers 24/7 access and improved convenience, alongwith features like seat selection and movie information. For the cinema, an OMTBS could streamline operations, reduce ticketing burden on staff, and even generate valuable customer data for marketing purposes, potentially leading to increased revenue and a win-win situation for both customers and CanalOlympia Rebero

However, implementing an OMTBS in Rwanda requires careful consideration of the digital literacy gap and potential internet connectivity issues. The system should be user-friendly, accessible on basic mobile phones, and offer secure payment options (Lee & Jeon, 2021).

By developing and implementing a user-friendly OMTBS tailored to the specific needs of Canal Olympia Rebero and its Rwandan customer base, this study aims to contribute to a more convenient and efficient movie-going experience. The success of this system can provide valuable insights for other cinemas in developing markets seeking to embrace online ticketing solutions (Lee & Jeon, 2021).

1.3 Statement of the Problem

The traditional movie-going experience in Rwanda, particularly for patrons of Canal Olympia Rebero, is hampered by limitations in ticketing methods. Long queues and restricted box office hours create inconvenience for busy schedules and can lead to missed opportunities to see desired films GSMA. (2022).

This is further compounded by the digital divide in developing countries like Rwanda, where internet access and digital literacy can be unevenly distributed (Kim, J., Lee, I., & Jeong, S. 2020).

While some movie theaters in Rwanda might utilize basic online ticketing platforms, these solutions often lack the features and accessibility needed to fully optimize the customer experience. Existing systems may not cater to mobile phone limitations or offer a user-friendly interface for customers withvarying levels of digital literacy.

What's missing is a custom-designed OMTBS specifically tailored to address the needs of Canal Olympia Rebero and its Rwandan audience. An ideal system would bridge the gap between convenience and accessibility, offering features like mobile compatibility, secure payment options, and a user- friendly interface that transcends potential language barriers.

By developing a solution that addresses these shortcomings, this study aims to contribute to a more efficient and enjoyable movie-going experience for Canal Olympia Rebero's patrons.

1.4 Objective of project

1.4.1 General objective

The general objective of this project is to develop and implement a custom online movie ticket bookingmanagement system (OMTBS) for Canal Olympia Rebero.

1.4.2 Specific objectives

This study aims to develop and implement a custom online movie ticket booking management system (OMTBS) for Canal Olympia Rebero, thereby enhancing the movie-going experience for customers and improving operational efficiency for the cinema. To achieve this, the following specific objectives willbe pursued:

i. To Develop a User-Friendly interface for administrator and client.
ii. To create a database ready to accommodate the system.

iii. To integrate Momo pay and credit card payments gateway.
iv. To Ensure Secure Online Transactions.

1.5 Research Questions

i. How can the OMTBS interface be designed to ensure intuitive navigation for users with varyinglevels of digital literacy in Rwanda?
ii. How can we create a structured database using MySQL?
iii. How can we integrate the payment gateway?
iv. What robust security measures and compatible payment gateways can be implemented within the OMTBS to ensure secure online transactions for Rwandan users?

1.6 Scope of the project

1.6.1 Content scope

The project scope centers on creating a custom online movie ticket booking system (OMTBS) specifically designed for Canal Olympia Rebero in Rwanda. This includes developing a user-friendly interface, core functionalities like seat selection and potentially movie trailers, and a plan to evaluate the system's effectiveness. Excluded are hardware infrastructure, integration with existing ticketing systems, highly advanced features, and long-term maintenance, as these aspects fall outside the development and implementation of the core OMTBS.

1.6.2 Geographical scope

This project's geographical scope is strictly Rwanda. The custom OMTBS will be designed for Canal Olympia Rebero's Rwandan operations, considering factors like digital literacy levels, mobile phone

limitations, and local language preferences. The system will explore using customer data for targeted marketing campaigns relevant to the Rwandan market, and integrate secure payment gateways compatible with popular Rwandan mobile money platforms. This focus on Rwanda ensures the OMTBSis culturally relevant, addresses local limitations, and enhances the movie-going experience for Rwandanmoviegoers.

1.6.3 Time scope

The timeframe of this project will center on the period between 2020 and 2024, encompassing the currentsituation within its boundaries.

1.7 Project methodology

This project will utilize a combination of methods to ensure successful development and implementationof the OMTBS for Canal Olympia Rebero.

i. Data Collection Techniques

Interviews: Conducting interviews with Canal Olympia Rebero staff (managers, sales personnel) and moviegoers will provide insights into current ticketing practices, user needs, and pain points (Shoesmith, G., 2020).

Surveys: Distributing online surveys will gather broader customer feedback on desired functionalitiesand preferred features within the OMTBS.

Document Review: Examining existing internal documents and reports from Canal Olympia Rebero can offer details on ticketing operations and customer demographics.

ii. Software Development Methodology

Agile Methodology: An Agile approach will be adopted to promote iterative development and testing. This allows for continuous feedback integration and adaptation throughout the development process (Matharu, G. S., Mishra, A., Singh, H., & Upadhyay, P., 2015).

iii. System Analysis and Design Method

Object-Oriented Programming (OOP): OOP principles will be used to structure the OMTBS code, promoting modularity, reusability, and maintainability (Tegarden, A., Dennis, B. H., Wixom, V., Tech, & Seeman, E. (2021)).

UML Diagrams: UML (Unified Modeling Language) diagrams will be created to visually represent thesystem architecture, data flow, and user interactions within the OMTBS.

User Interface (UI) Prototyping: Prototyping the OMTBS user interface will allow for usability testingand early user feedback on design and functionality before full development.

This combination of data collection techniques, an agile development methodology, and object-oriented design principles will ensure a user-centered approach to developing a functional and effective OMTBSfor Canal Olympia.

1.8 Significance of the project / Interest in the tin project

1.8.1 Personal interest

The prospect of developing a custom OMTBS for Canal Olympia Rebero in Rwanda is particularly intriguing for several reasons. Firstly, the project merges my interest in technology with the potential to make a positive social impact. By crafting a user-friendly OMTBS, I can contribute to bridging the digital divide in Rwanda and increasing accessibility to movie-going experiences. Secondly, the project allows for creative problem-solving, considering factors like varying digital literacy levels and potential internet limitations. Finally, the opportunity to collaborate with Canal Olympia Rebero and contribute to their success in a growing market is an exciting prospect. This project offers a unique blend of technical challenge, social impact, and real-world application, making it highly motivating.

1.8.2 Institutional interest

Developing a custom OMTBS for Canal Olympia Rebero in Rwanda presents a compelling institutional opportunity. The project holds academic value by contributing research on user behavior and data-driven marketing in developing markets. Furthermore, a user-friendly OMTBS can serve as a model for bridging the digital divide in Rwanda. Economically, a successful OMTBS can boost Canal Olympia Rebero's efficiency and potentially contribute to Rwanda's growth through job creation and industry stimulation. Finally, the project fosters a valuable partnership between the developing institution and Canal Olympia Rebero, offering mutual benefits and the potential for future collaborations.

1.8.3 Public interest

In the future, moviegoers in Rwanda will greatly benefit from a custom OMTBS for Canal Olympia Rebero. The system promises 24/7 access to ticket purchases, eliminating queues and allowing for flexible planning. Moviegoers will be empowered to make informed choices through potential integrations with trailers and reviews. Furthermore, the OMTBS design will consider varying digital literacy levels, fostering inclusivity. By analyzing customer data, Canal Olympia Rebero might develop loyalty programs offering discounts, promotions, or early access to tickets, further enhancing the movie- going experience for the Rwandan public.

1.9 Limitations of the Project

While the custom OMTBS for Canal Olympia Rebero holds promise, there are limitations to the generalizability of the project's results due to factors beyond the researcher's control. Here's why:

Context Specificity: The OMTBS will be designed specifically for the Rwandan context, considering factors like digital literacy levels, internet infrastructure limitations, and local language preferences. These factors might not be directly applicable to other countries or regions with different cultural and technological landscapes.

Limited Scope: The project focuses on developing the OMTBS for Canal Olympia Rebero, a single cinema entity. While the findings can offer valuable insights, generalizing them to the entire Rwandan cinema industry or other entertainment sectors might require further research considering the specific operational models and target audiences of different businesses.

Data Availability: The effectiveness of the OMTBS in generating customer data for marketing purposeswill depend on user adoption rates and willingness to share information. Limited data availability could hinder the generalizability of insights on data-driven marketing strategies within the Rwandan movie- going landscape.

These limitations highlight the importance of considering the project's specific context and conducting further research if broader generalizations about online ticketing systems in developing markets are desired.

A Gantt chart is a type of bar chart that illustrates a project schedule. It typically includes the following elements:

Tasks: These are the activities that need to be completed to finish the project. They are listed on theleft side of the chart.

Timeline: This is displayed along the top of the chart and shows the timeframe for the project. It canbe broken down into weeks, months, or even years depending on the project's duration.

Bars: These horizontal bars represent the tasks and their duration. The left side of the bar indicates thestart date of the task, and the right side of the bar indicates the end date.

1.11 Organization of the project

This research will contain five organized as follows:

Chapter 1: General introduction

This chapter sets the stage by introducing online movie ticket booking systems (OMTBS) and highlighting the inefficiencies of the current ticketing system at Canal Olympia Rebero. It outlines the problems moviegoers face and proposes a custom OMTBS as the solution. The chapter concludes witha brief overview of the research methods and project timeline.

Chapter 2: Literature Review

This chapter dives into existing research on OMTBS, exploring the benefits for cinemas and moviegoers. It examines relevant studies and case studies, while also discussing factors to considerwhen developing OMTBS for developing markets, like digital literacy and internet limitations.

Chapter 3: System Analysis and Design

This chapter details the planning phase. It outlines how user needs will be identified through interviews and data collection. It then describes how these needs will be translated into functional and non-functional requirements for the OMTBS. The chapter concludes by explaining the chosen development methodology, UI design principles, and overall system architecture.

Chapter 4: System Implementation

This chapter documents the development process. It specifies the programming languages and tools used, along with relevant code snippets (if applicable) or system flowcharts to illustrate how the OMTBS will function. The chapter will also showcase mockups or prototypes to demonstrate the userinterface design.

Conclusion and Recommendations

This summarizes the project's key findings, including the OMTBS's effectiveness in addressing the ticketing issues at Canal Olympia Rebero. It acknowledges limitations and suggests areas for future research. Finally, the chapter offers recommendations for implementing and maintaining the OMTBSfor long-term success.

CHAPTER II: LITERATURE REVIEW

2.1 Introduction

Online movie ticket booking systems (OMTBS) have revolutionized the way people experience cinema. Moviegoers now enjoy the convenience of purchasing tickets remotely, selecting preferred seats, and potentially even accessing additional features like concession stand orders. However, for cinemas in developing markets like Rwanda, the full potential of OMTBS remains untapped.

This chapter delves into the existing body of research on OMTBS to establish a strong foundation for developing a user-friendly and effective system for Canal Olympia Rebero in Kigali. By examining relevant studies and case studies, we aim to bridge the gap between the established functionalities of OMTBS and the specific needs of the Rwandan audience.

This literature review will explore the core functionalities that contribute to successful OMTBS. We will then analyze existing platforms like Book My Show and CINEMAX, highlighting their strengths and potential shortcomings when applied to a developing market context. By identifying these gaps, we can tailor the OMTBS for Canal Olympia Rebero to address considerations like digital literacy levels and internet infrastructure limitations.

Also, this chapter will explore innovative solutions that can enhance the OMTBS for the Rwandan market. We will examine how user-centric interface design principles and can improve accessibility. Additionally, integrating with popular Rwandan mobile money platforms can leverage existing infrastructure and cater to local user preferences.

Through this comprehensive literature review, we aim to demonstrate the potential of a custom OMTBS to improve operational efficiency for Canal Olympia Rebero, while also fostering a more accessible and enjoyable movie-going experience for Rwandan audiences.

2.2 Definition of Concepts

Online

Online refers to the state of being connected to or accessible through the internet or a network.

Movie

A movie, also known as a film, is a visual art form that uses moving images and sound to tell a story, convey ideas, or evoke emotions. Movies typically consist of a sequence of frames,

projected in rapid succession, creating the illusion of motion.

Ticket

A ticket is a piece of paper or a digital document that grants the holder permission to access a service, event, or location. Tickets are commonly used for entry to entertainment events like movies, concerts, sports games, or transportation services such as flights, trains, and buses.

Booking

Booking refers to the process of reserving or purchasing tickets in advance to watch a film at a cinema. Movie booking typically involves selecting the specific movie, showtime, date, and sometimes even the preferred seating in the theater. This can be done online through a cinema's website or mobile app, via third-party ticketing platforms, or in person at the theater.

User-Friendly Interface (UI)

User-Friendly Interface: A design philosophy emphasizing ease of navigation, intuitive features, andaccessibility for users with varying levels of digital literacy (Islam, G. Z., Zinnia, I. J., Hossain, M. F., Rahman, M. R., Juman, A. U., & Bin Emran, A. N, 2020).

Secure Online Transactions

Secure Online Transactions: Implementing robust security measures within the OMTBS to protectcustomer financial information during online ticket purchases.

Data-Driven Marketing

Data-Driven Marketing: Utilizing customer data collected through the OMTBS to develop targetedmarketing campaigns and loyalty programs for Canal Olympia Rebero (Grandhi, B., Patwa, N., & Saleem, K, 2021).

2.3 Review of related literature

This section delves into existing research on online movie ticket booking systems (OMTBS) to identify key concepts, analyze similar systems, and highlight the gaps this project aims to address. By understanding the current landscape, we can ensure the new OMTBS for Canal Olympia Rebero offersinnovative solutions tailored to the Rwandan context.

Research by Kim et al. (2014) emphasizes core functionalities of successful OMTBS, including 24/7Ticket Purchases with convenience and flexibility for moviegoers to purchase tickets at their own time. Seat Selection which empower users to choose their preferred seats within the cinema and Secure Online Transactions with robust security measures to protect

financial information during online payments (Liu, Y., Wang, M., Huang, D., Huang, Q., & Yang, H, 2019).

Several OMTBS platforms have gained popularity globally. **Here's a comparative analysis of threesuch systems, highlighting their strengths and potential shortcomings:**

Book My Show (India): A dominant player in the Indian market, Book My Show demonstrates the effectiveness of OMTBS in developing countries (Jain, 2019). However, its interface might not be universally user-friendly, potentially catering more to users with established digital literacy (D. P. K. D G & P. KMB, 2020) (Tyagi, V. K., Pasricha, C., Gulyani, M., & Krishna, H. G. (2019). **CINEMAX (Latin America):** A leading OMTBS platform in Latin America, CINEMAX offers features like loyalty programs and personalized recommendations (CINEMAX, 2024). These functionalities can enhance user engagement, but their effectiveness in a developing market like Rwanda, where audience preferences might be different, is uncertain (CINEMAX, 2024).

Yugatech (Philippines): This OMTBS platform caters specifically to the Philippines (Yugatech, 2024). It offers features like integrated social media sharing and movie reviews, which cater to thelocal movie-going culture. While these functionalities might be valuable for Rwanda as well, understanding user preferences through user research will be crucial for tailoring them effectively.Addressing the Gaps and Introducing Innovations:

This project will address these gaps and introduce innovations to create a Rwandan context-specificOMTBS:

User-Centric Interface Design: The OMTBS interface will prioritize simplicity and ease of use. Following Nielsen's heuristics (1994) for usability, the design will emphasize clear navigation, concise instructions, and potentially multilingual support to cater to a wider audience.

Integration with Mobile Money Platforms: Rwanda has a high mobile phone penetration rate and a strong mobile money ecosystem (National Bank of Rwanda, 2023). The OMTBS will integrate popular Rwandan mobile money payment gateways (MTN Mobile Money, Airtel Money) to enhance accessibility and cater to local user preferences. This integration can leverage existing mobile moneyinfrastructure and user familiarity.

Data-Driven Marketing and Personalization: While Book My Show and CINEMAX offer these features, their effectiveness in a developing market like Rwanda might depend on the

quality of customer data and the relevance of recommendations. The OMTBS will focus on gathering and analyzing user data to provide more personalized recommendations and targeted marketing campaigns.

These innovations aim to create a truly inclusive OMTBS that bridges the digital divide in Rwanda. By focusing on user-centric design, considering offline functionalities, integrating with local mobilemoney platforms, and leveraging data-driven marketing, the project strives to offer a movie-going experience that is convenient, accessible, and tailored to the Rwandan audience.

Summary

Unlike Book My Show’s focus on credit cards, the Rwandan OMTBS will prioritize integration with popular Rwandan mobile money platforms like MTN Mobile Money and Airtel Money, catering tolocal user preferences and promoting wider accessibility.

Recognizing Rwanda's multilingual population, the OMTBS interface will offer support in Kinyarwanda, ensuring a user-friendly experience for a broader audience.

These innovations aim to create a truly inclusive OMTBS that addresses the specific needs of the Rwandan market. By prioritizing mobile money integration, and multilingual support, the project goesbeyond existing models to bridge the digital divide and foster a more accessible movie-going experience for all Rwandans.

CHAPTER III: SYSTEM ANALYSIS AND DESIGN

3.1 Introduction

This chapter delves into the critical phase of analyzing the existing ticketing system at Canal Olympia Rebero and designing the proposed OMTBS. System analysis involves a comprehensive examination of the current system to identify its strengths, weaknesses, opportunities, and threats (SWOT). By understanding the existing processes, information flow, and pain points, we can lay the groundwork for a new system that effectively addresses user needs and improves overall efficiency.

The subsequent system design phase focuses on translating the analysis findings into a blueprint for the new OMTBS. It involves creating a detailed system architecture, specifying functionalities, and designing the user interface. The goal is to develop a system that is not only functional but also user-friendly and adaptable to future changes.

This chapter will outline the methodologies used for system analysis and design, present the findingsof the analysis, and detail the proposed architecture and design for the OMTBS.

3.2 Analysis of the current system

3.2.1 Problem of the current system

Canal Olympia Rebero currently employs a manual ticketing system, which involves several inefficiencies and challenges. The primary problem is the time-consuming process of ticket sales, often leading to long queues and customer dissatisfaction. Additionally, the manual system is prone tohuman error, resulting in incorrect ticket issuance or revenue discrepancies.

The current system lacks the capacity for real-time tracking of ticket sales and seat availability, making it difficult to manage inventory and optimize resource allocation. Furthermore, the absence of a centralized database for customer information limits opportunities for targeted marketing and customer relationship management.

The manual ticketing system also poses challenges in terms of data management and reporting. Generating sales reports and analyzing customer preferences is time-consuming and prone to errors. This lack of data-driven insights hinders informed decision-making for the cinema.

Overall, the current system is inefficient, time-consuming, and hinders the cinema's ability to provideoptimal customer service and make data-driven business decisions.

3.3 Analysis of the new system

3.3.1 Introduction

This section outlines the proposed Online Movie Ticket Booking System (OMTBS) and its key functionalities. Building upon the identified shortcomings of the current manual system, the OMTBS aims to address these issues by providing a more efficient, customer-centric, and data-driven solution. The following sections will delve into the specific features and functionalities of the new system, explaining how they align with the identified needs of Canal Olympia Rebero and its customers.

3.3.2 System requirements

This section outlines the detailed requirements for the new Online Movie Ticket Booking System (OMTBS). These requirements are categorized into functional and non-functional requirements.

Functional Requirements:

Functional requirements define the specific actions the system must perform. For the OMTBS, theseinclude:

i. User registration and login
ii. Movie listings and schedules
iii. Seat selection and booking
iv. Payment processing (including integration with mobile money platforms)
v. Ticket confirmation and delivery (digital or physical)
vi. Ticket cancellation and refund
vii. Customer support and inquiries
viii. Integration with cinema management systems for inventory and scheduling updates

Non-Functional Requirements:

Non-functional requirements specify the system's quality attributes, such as:

i. **Usability:** The system should be user-friendly with a clear and intuitive interface.
ii. **Reliability:** The system should operate reliably with minimal downtime and data loss.
iii. **Performance:** The system should respond quickly to user requests, even during peak load periods.

iv. **Security:** The system must protect sensitive user data, such as personal information and payment details.

v. **Scalability:** The system should be able to handle increasing numbers of users and transactions.

vi. **Maintainability:** The system should be easily updated and modified to accommodate future changes.

vii. By defining both functional and non-functional requirements, this section establishes a clear foundation for the design and development of the OMTBS, ensuring that it meets the needs of both customers and the cinema.

3.3.3 Functional Diagram

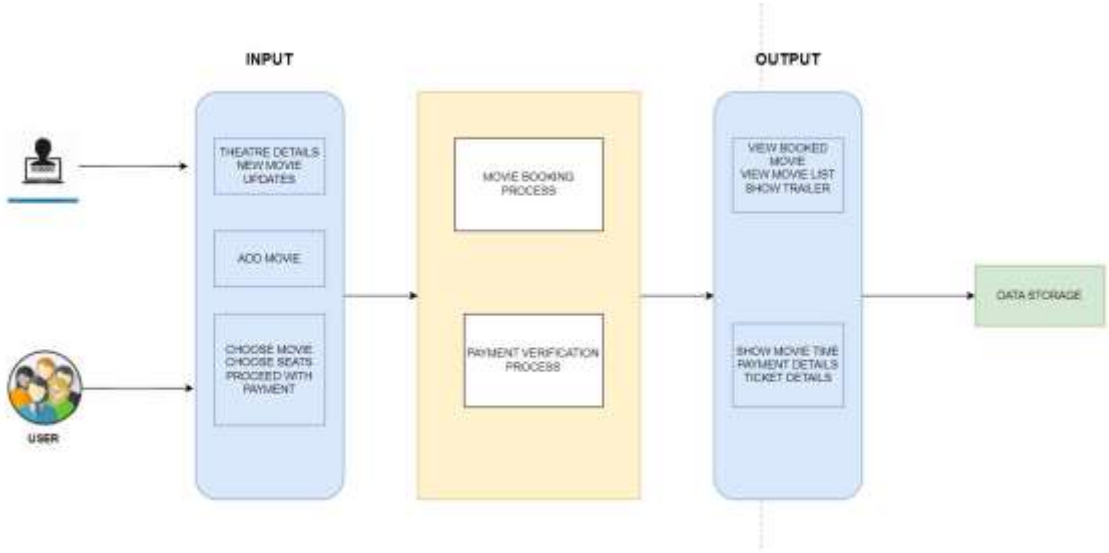

Figure 1:Functional Diagram

This functional diagram for the OMTBS visually represents the key components and theirinteractions within the system.

Typically, it would show:

Inputs: Data sources such as user registrations, movie schedules, and payment information.

Processes: Core functions like user authentication, ticket booking, payment processing, and data management.

Outputs: Information generated by the system, including ticket confirmations, user reports, and sales data.

Data Stores: Databases or storage areas for storing user information, movie schedules, and transaction records.

The diagram would use symbols and arrows to illustrate the flow of data and control through the system. This visual representation helps in understanding the system's structure, identifying potential bottlenecks, and ensuring all necessary components are included in the design.

3.3.4 Methodological approach

3.3.4.1 Data collection techniques

To gather comprehensive data for the design of the OMTBS, a combination of observation and documentation will be employed. On-site observations at Canal Olympia Rebero will provide firsthand insights into the current ticketing process, customer interactions, and operational challenges.

Documentation, including existing ticketing forms, and reports, will supplement the observational data, offering a structured overview of the system. By combining these techniques, a thorough understanding of the existing system's strengths, weaknesses, and opportunities for improvement can be achieved, laying the foundation for the development of the new OMTBS.

3.3.4.1.1 Observation

Observation is a process or method occurs when you want to see really how things are, for what we saw different things the one which is important is machines used to make their project.

3.3.4.1.2 Documentation

This approach is essential for gathering information and aiding the researcher in expanding their knowledge to effectively address practical problems. It allows the researcher to consult various resources, including books, previous research, class notes, and the internet, to find different definitions and codes necessary for solving the issue.

3.3.4.1.1 Software Development Methodology

Given the dynamic nature of software development and the need for flexibility in adapting to changingrequirements, the Agile methodology is deemed most suitable for this project. Agile emphasizes iterative development, collaboration, and customer feedback, ensuring that the final product aligns closely with user needs.

The Agile approach involves breaking down the project into smaller, manageable iterations or sprints. Each sprint focuses on delivering a specific set of functionalities. This iterative process allows for continuous evaluation, refinement, and adaptation based on feedback from stakeholders.

Key principles of Agile development to be employed include:

i. **Iterative development:** The project will be divided into sprints, allowing for incremental progress and early feedback.

ii. **Customer collaboration:** Close collaboration with Canal Olympia Rebero to gather requirements and ensure the system meets their needs.

iii. **Flexible planning:** Adapting to changes in requirements and priorities throughout the development process.

iv. **Continuous testing:** Rigorous testing at each sprint to identify and address issues early on. By adopting the Agile methodology, the project aims to deliver a high-quality OMTBS that meets the evolving needs of Canal Olympia Rebero and its customers efficiently.

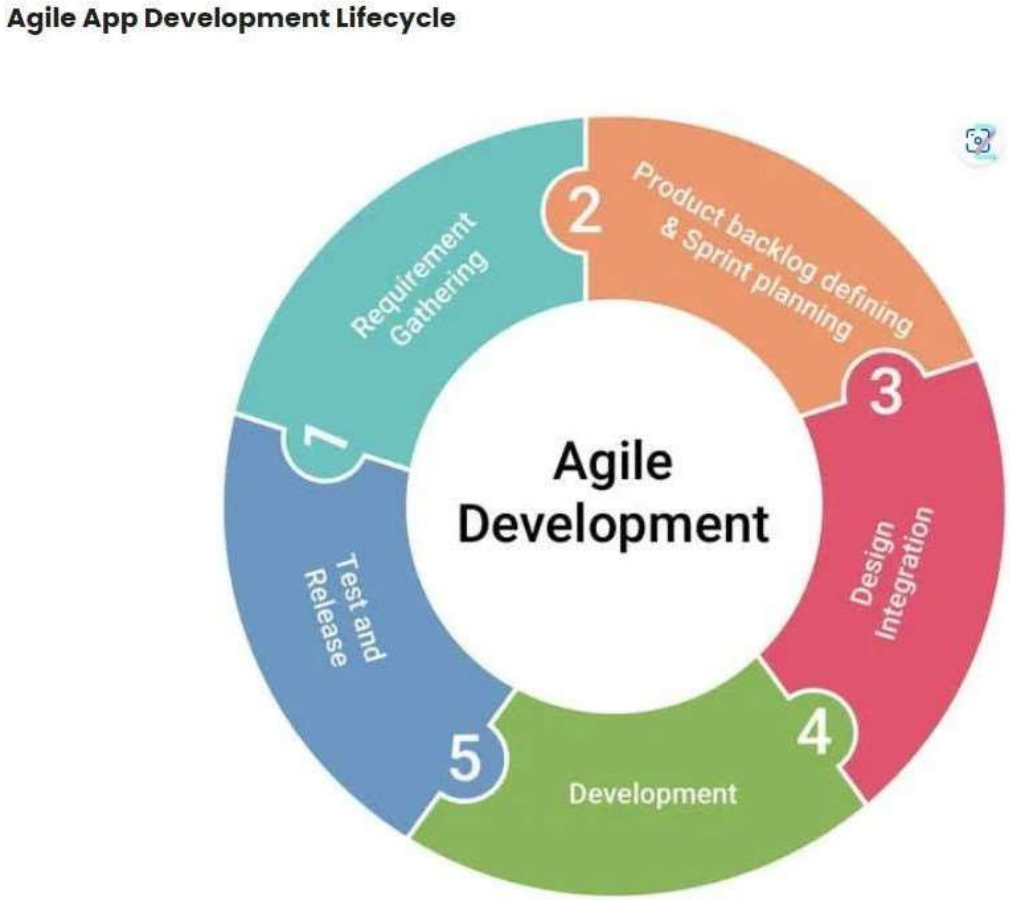

Figure 2:Agile Model

The figure illustrates the Agile App Development Lifecycle, a visual representation of the key phasesinvolved in Agile development. Let's break down each phase:

1. **Requirement Gathering**: This initial phase involves understanding the needs and objectives of theproject. Stakeholders are involved in gathering information about the desired features, functionalities,and goals of the application.

2. **Product Backlog & Sprint Planning:** The project's requirements are organized into a prioritized list known as the product backlog. This backlog is then divided into smaller, manageable chunks called sprints. Each sprint represents a time-boxed iteration with a specific goal.

3. **Development:** During this phase, the development team focuses on implementing the features defined in the current sprint. They write code, design the user interface, and test the developed components.

4. **Design Integration**: As features are developed, they are integrated into the overall system. This phase involves ensuring compatibility, resolving conflicts, and ensuring the system functions as intended.

5. **Test and Release**: Once the development and integration are complete, the application undergoes rigorous testing to identify and fix any bugs or issues. Once the testing is satisfactory, the applicationis released to users or deployed to a production environment.

This cyclical process is repeated throughout the project, allowing for continuous improvement and adaptation based on feedback and changing requirements. Agile methodologies emphasize flexibility, collaboration, and delivering value to customers early and often.

3.3.4.3 System Design Methodology

The system design methodology refers to the structured approach used to create a system's architecture and components. For an online movie ticket management system, the Object-Oriented System Analysis and Design Methodology (OOSADM) is commonly used. This methodology focuses on defining the system in terms of objects, which are instances of classes, and their interactions to fulfill the system's requirements.

The Object-Oriented Systems Analysis and Design Methodology (OOSADM) is a structured approach to analyzing and designing systems using object-oriented concepts. For this system we have:

3.3.4.3.1 Use Case Diagram

A use case diagram is a graphical representation of the interactions between users and a system. It depicts the various use cases or scenarios that a system can support and the actors involved in those scenarios. In essence, a use case diagram provides a high-level view of the system's functionality andhow users interact with it. It is a valuable tool for understanding the system's scope, identifying key features, and communicating the system's purpose to stakeholders.

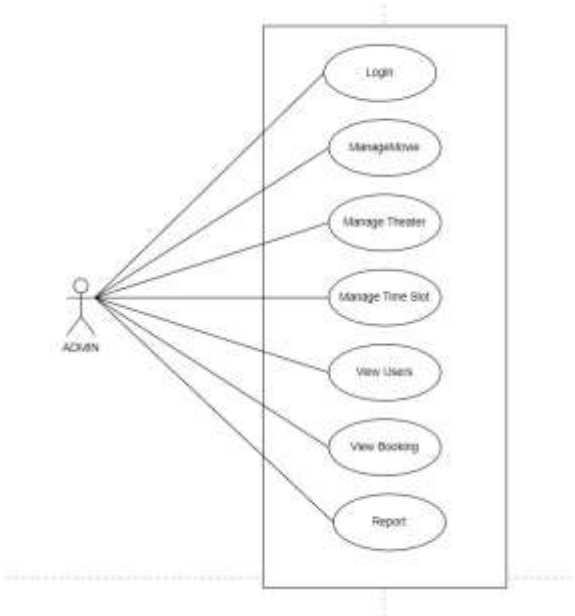

Figure 3: Admin Use case Diagram

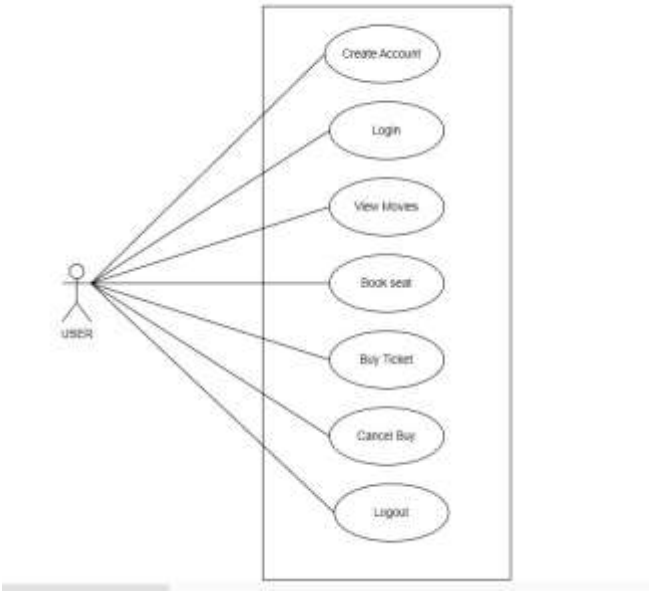

Figure 4:User use case Diagram

3.3.4.3.2 Class Diagram

A class diagram is a static structure diagram that illustrates the classes, attributes, and operations of a system. It provides a visual representation of the relationships between different objects and how they interact with each other. Class diagrams are essential for understanding the structure and organization of a system, especially in object-oriented programming.

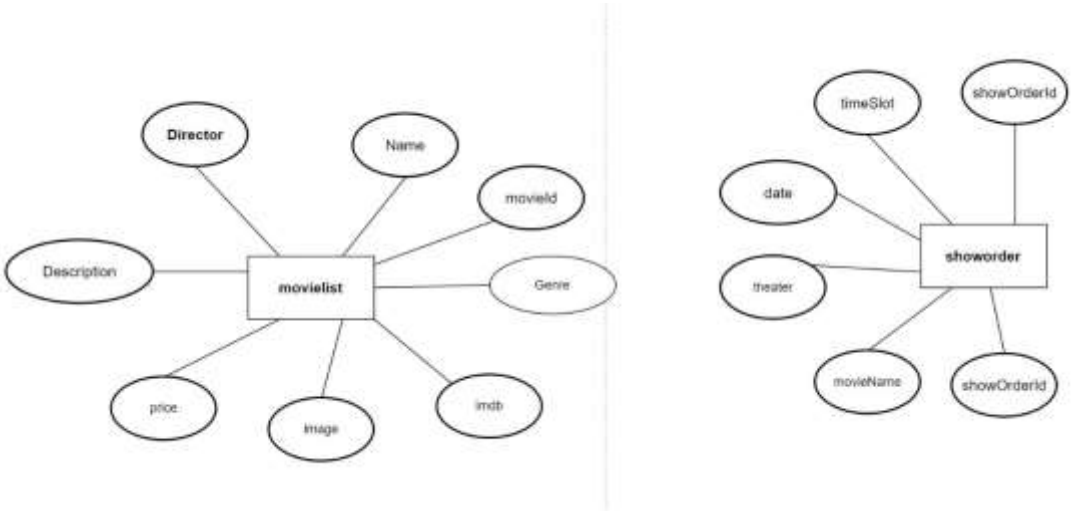

Figure 5: Class Diagram 1

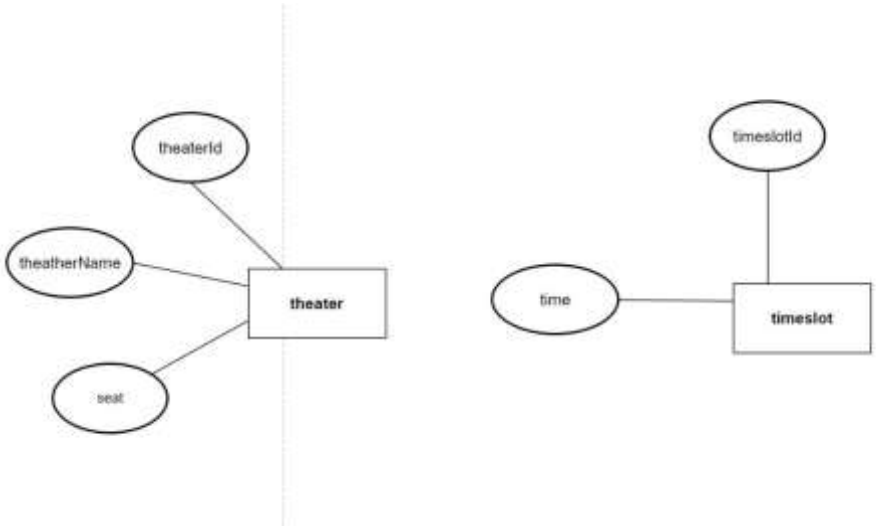

Figure 6:Class Diagram 2

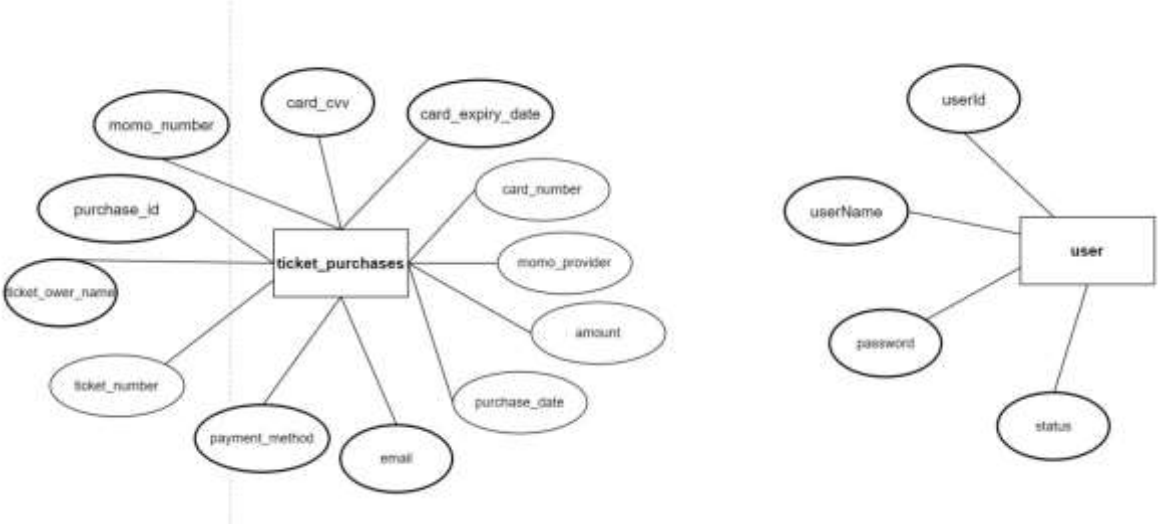

Figure 7:Class Diagram 3

3.3.4.3.3 Sequence diagram

A Sequence Diagram is a type of interaction diagram that shows how objects interact in a particular scenario of a use case. It emphasizes the time ordering of messages, illustrating the sequence of interactions between objects to accomplish a specific task.

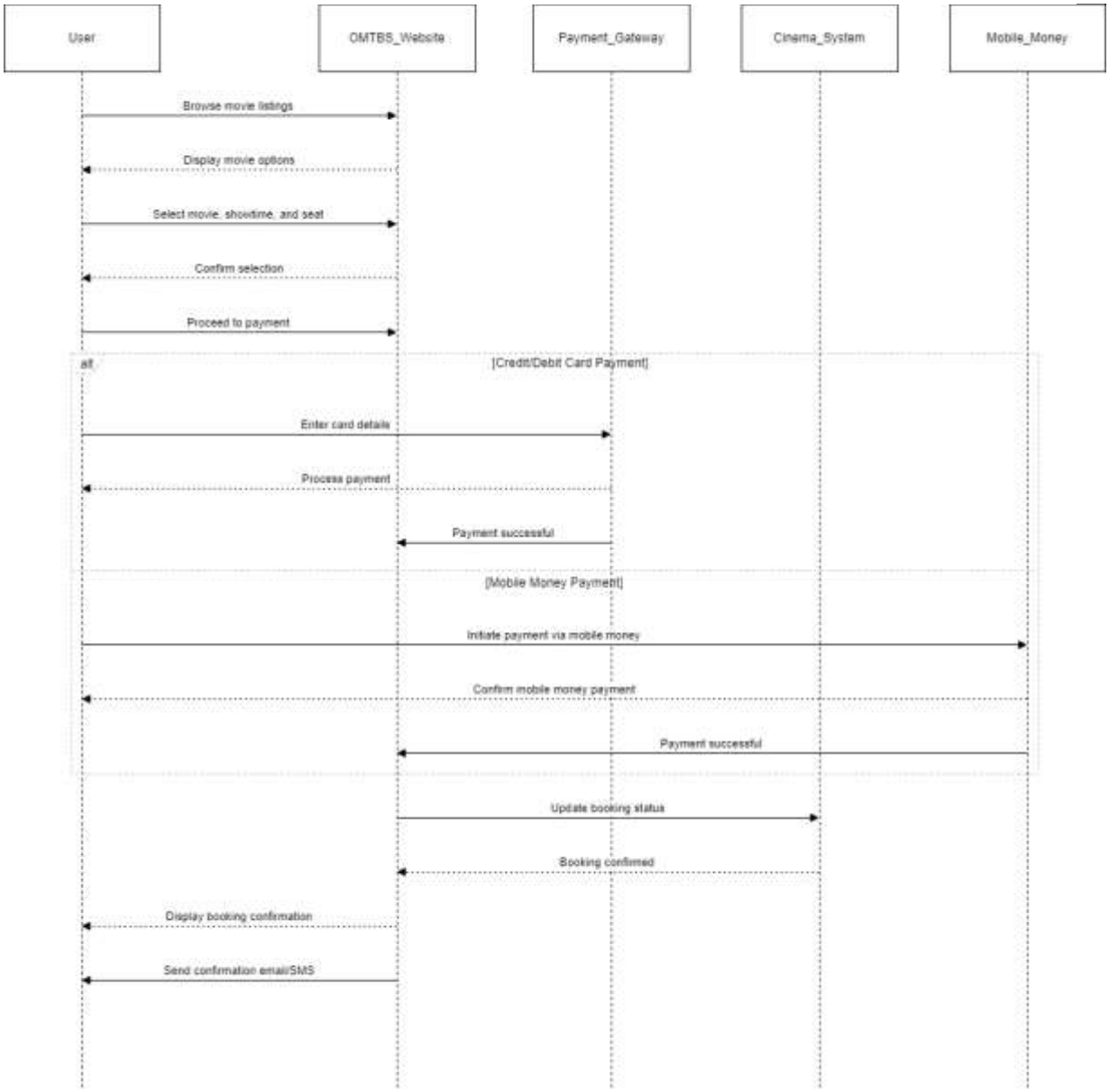

Figure 8:Sequence Diagram

3.3.4.3.1.4 Activity diagram

Activity Diagram is used to model the workflow of a system by depicting the sequence of activities and the flow of control between them. It is particularly useful for visualizing the dynamic aspects of the system and understanding the overall process flow.

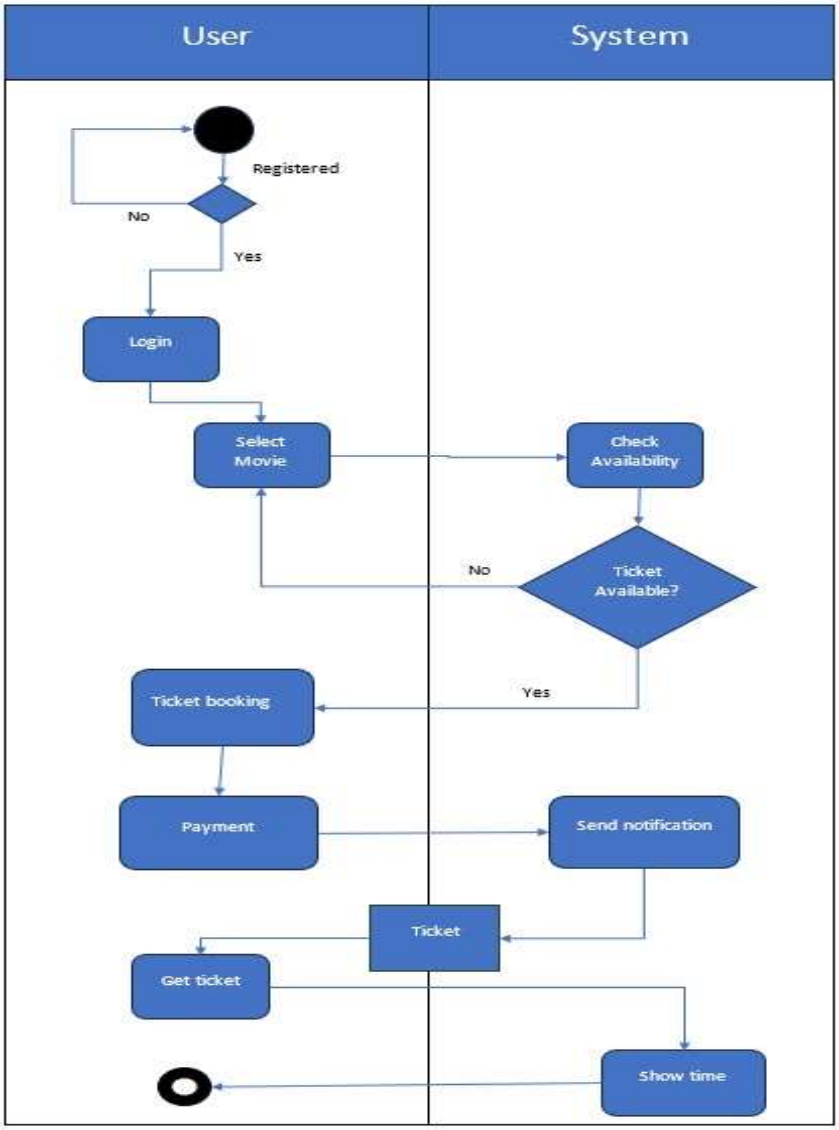

Figure 9: Activity Diagram

CHAPTER IV: SYSTEM IMPLEMENTATION

4.1 Implementation and Coding

4.1.1 Introduction

This chapter delves into the intricate process of transforming the meticulously designed OMTBS into afunctional reality. It chronicles the coding phase, the integration of the system with existing Canal Olympia Rebero infrastructure, and the rigorous testing procedures undertaken to ensure the system's reliability and performance.

By unraveling the complexities of the implementation process, this chapter offers a comprehensive understanding of the challenges overcome, the innovative solutions adopted, and the ultimate realization of the OMTBS. It serves as a testament to the successful transition from theoretical designto practical application.

4.1.2 Description of Implementation Tools and Technology

The OMTBS was developed using a combination of popular web development technologies:

HTML, CSS, and Bootstrap:

HTML (Hypertext Markup Language): The fundamental building block of web pages, defining thestructure and content of the OMTBS interface (Temere, B. M. 2017).

CSS (Cascading Style Sheets): Used to style the HTML elements, controlling their appearance,layout, and responsiveness across different devices (Borzecki, T., Appointment, B., Chomyn, J., Corpuz, N., & Design, W. 2014).

Bootstrap: A popular front-end framework that provides pre-built components and styles, acceleratingdevelopment and ensuring a consistent and responsive design.

JavaScript and jQuery (Duckett, J. O. N. (n.d.)).

JavaScript: A scripting language that adds dynamic behavior to the UI, enabling interactive elements,animations, and real-time updates.

jQuery: A JavaScript library that simplifies common tasks, such as DOM manipulation, eventhandling, and AJAX requests, making development more efficient.

Server-Side Scripting: PHP handles the backend logic of the OMTBS, processing user requests, interacting with the database, and generating dynamic content (Welling, L., & Laura, T, 2003).

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MySQL: Relational Database Management System (RDBMS): Stores the OMTBS data, including user information, movie listings, ticket sales, and system configurations (Welling, L., & Laura, T, 2003).

Normalization: The database was designed using normalization techniques to ensure data integrity,consistency, and efficient querying.

Git: Version Control System: Manages the development process, allowing for collaboration, tracking changes, and reverting to previous versions if necessary (Rivki, M., Bachtiar, A. M., Informatika, T., Teknik, F., & K., U. (n.d.)).

Localhost Development:

The OMTBS was initially developed and tested on a local development environment using a local web server (Apache) and a local database (MySQL). This allows for efficient iteration and testing without affecting the production environment.

This technology stack provides a robust and scalable foundation for the OMTBS, ensuring its functionality, maintainability, and ability to handle future growth (Rivki, M., Bachtiar, A. M., Informatika, T., Teknik, F., & K., U. (n.d.)).

4.1.3 Screen shorts and source codes

Home page

Figure 10:Home page

This is the welcome page for the guest user. They can be able to view all movies without login in.

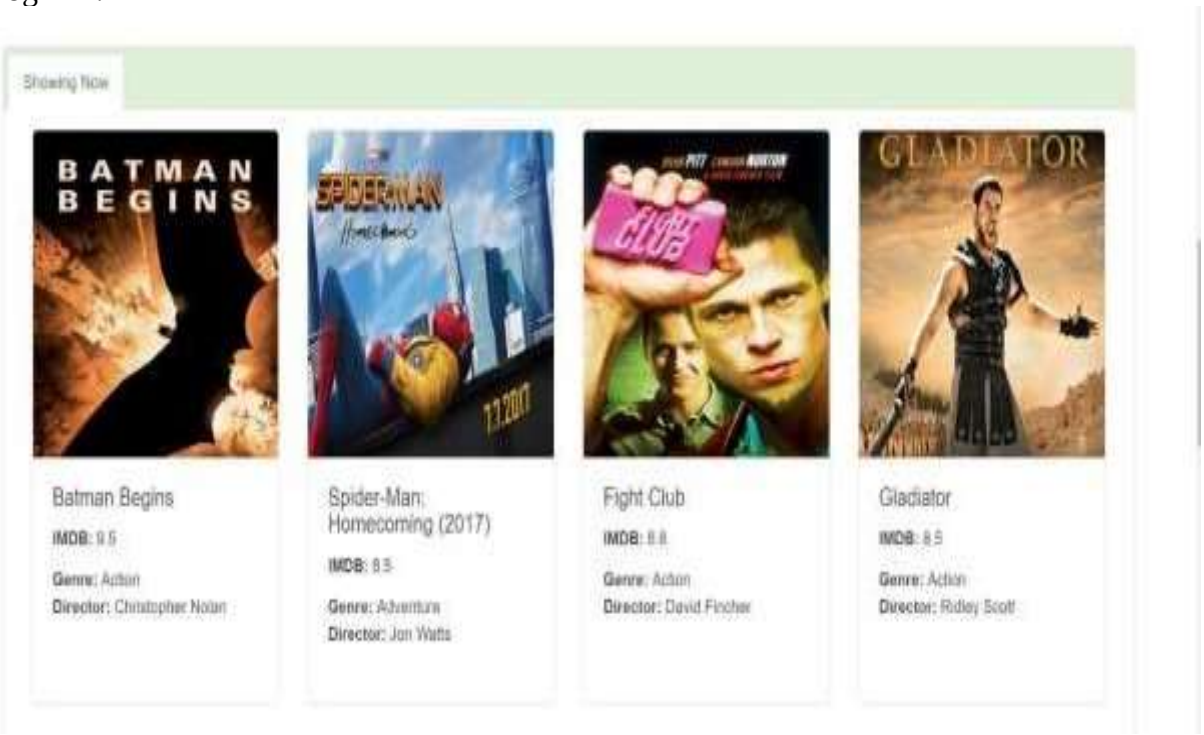

Figure 11:Movie list

In this page user will be able to see available movies.

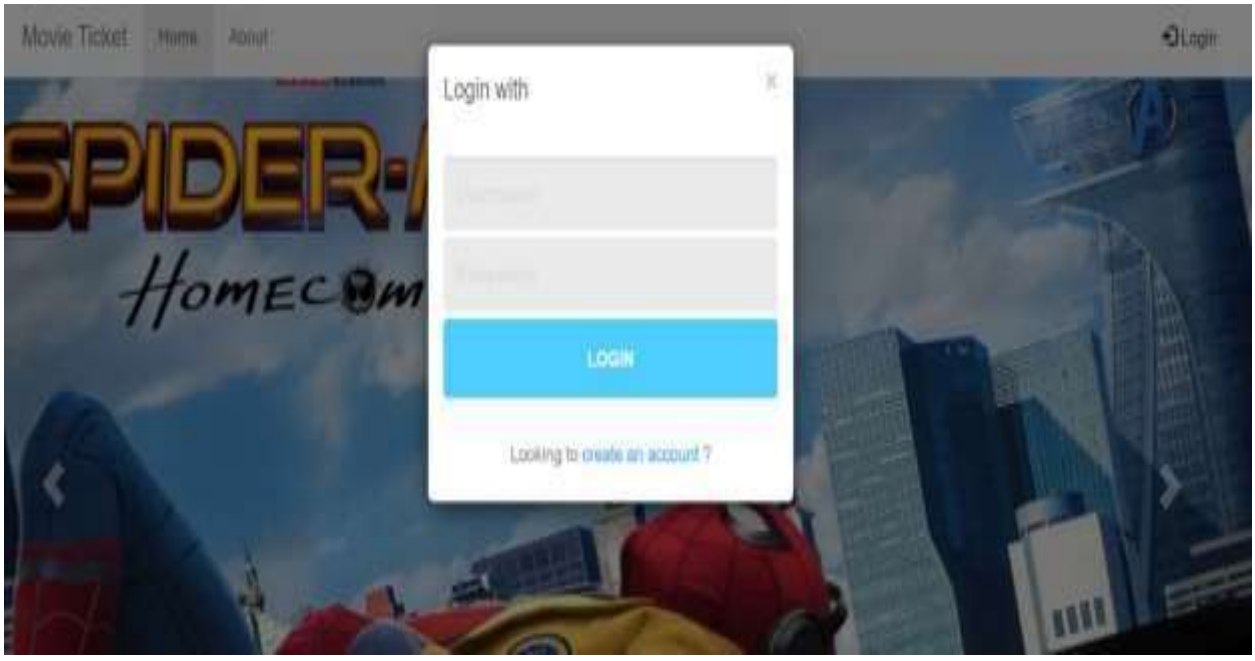

Figure 12:Login form

ADMIN DASHBOARD

Figure 13:Admin Dashboard

This dashboard allows the administrator to manage all necessary information about the theater, movie,users and slots.

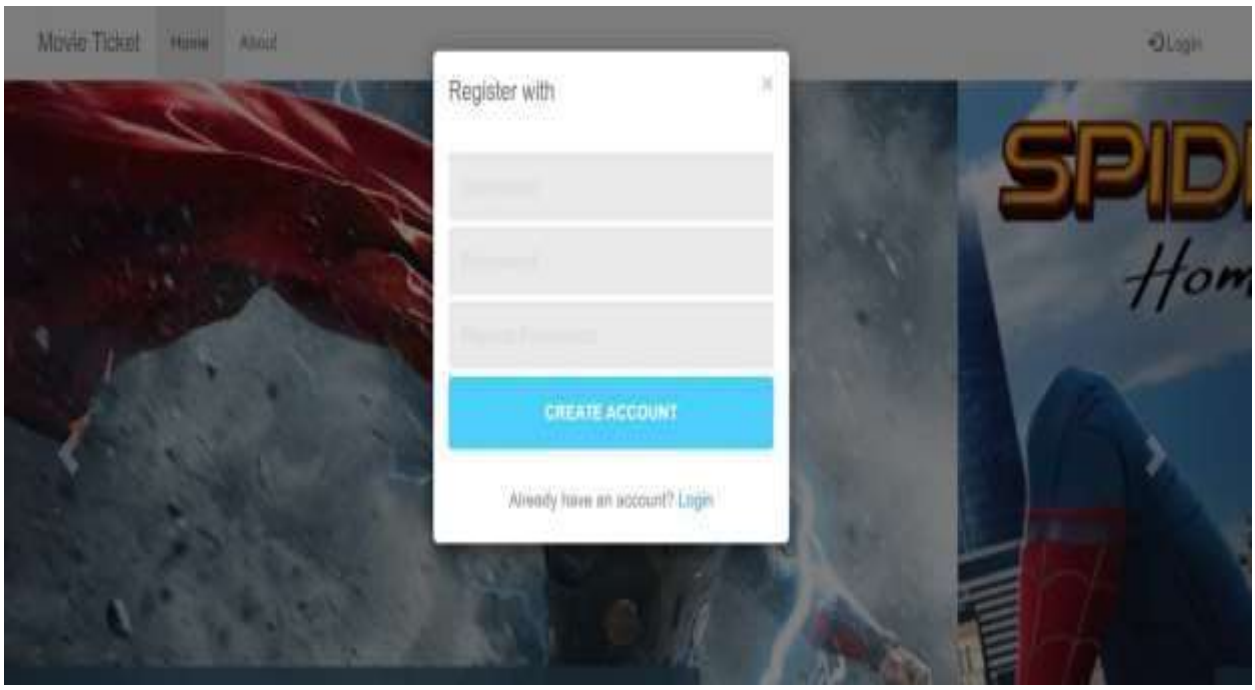

Figure 14:Registration page

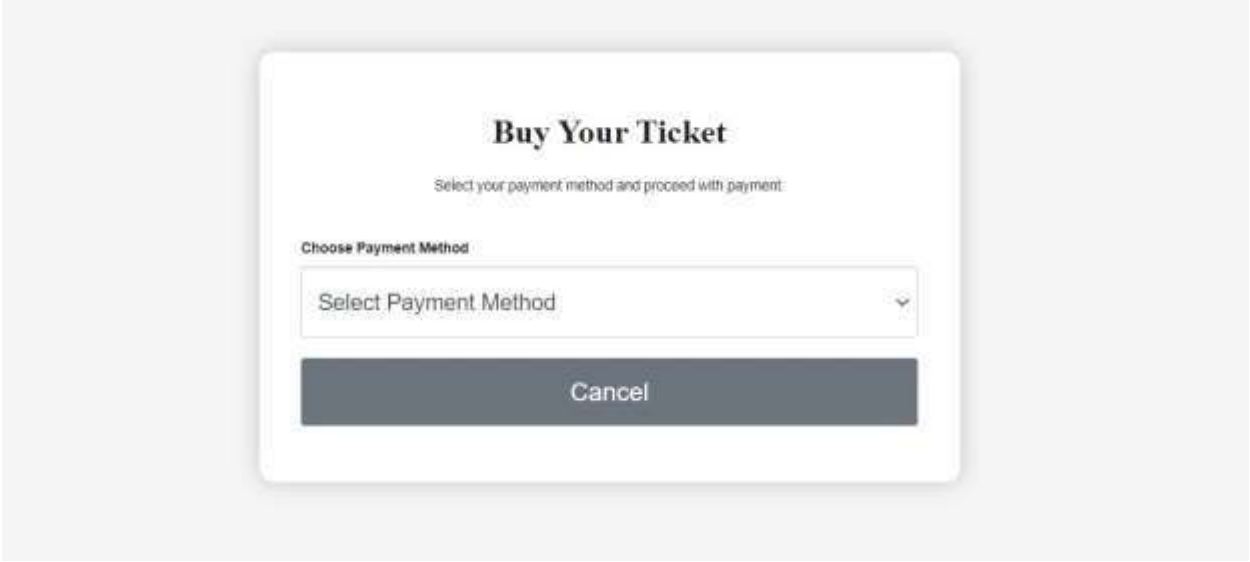

Figure 15: Buy Ticket

4.2 Testing

4.2.1 Introduction

Thorough testing is a critical phase in ensuring the OMTBS functions as intended and meets the definedrequirements. This section outlines the testing strategies employed, including unit testing, integration testing, and user acceptance testing. The goal is to identify and address any defects or inconsistencies before the system is deployed to production.

4.2.2 Unit testing outputs

Unit testing involves testing individual components or modules of the OMTBS in isolation. This helps identify and address defects at the earliest possible stage.
The following unit tests were conducted:

Table 1:Unit Testing

Test Case	Expected Result	Actual Result	Status
User Login with Valid Credentials	Login successful, user redirected to dashboard.	Login successful, user redirected to dashboard.	Passed
User Login with Empty Username	Error message displayed: "Username cannot be empty".	Error message displayed correctly: "Username cannot be empty".	Passed
User Login with Incorrect Password	Error message displayed: "Invalid username or password".	Error message displayed correctly: "Invalid username or password".	Passed

4.2.3 Validation Testing outputs

Validation testing ensures that the OMTBS meets the specified functional and non-functional requirements. This involves verifying that the system behaves as expected and adheres to the defined specifications.

Table 2:Validation Testing

Test Case	Expected Result	Actual Result	Status
User Registration with Strong Password	Password strength meter indicates "Strongpassword".	Password strength meter displays "Strong password".	Passed
User Registration with Weak Password	Error message displayed: "Password must beat least 8 characters long and include a combination of uppercase, lowercase letters,and numbers".	Error message displayed correctly with password strength requirements.	Passed
Movie Listing with Accurate Showtimes	Showtimes displayed reflect current date and upcoming days.	Showtimes displayed accurately, covering currentdate.	Passed

4.2.4. Integration testing outputs

Integration testing involves testing the interaction between different components of the OMTBS to ensure they work seamlessly together. This includes testing the integration with external systems, suchas cinema management systems and payment gateways.

Table 3:Integration Test

Test Case	Expected Result	Actual Result	Status
Integration with Cinema Management System	Seat availability in OMTBS reflectsreal-time seat availability in the cinema system.	Selecting a seat in OMTBS reducethe total number in the cinema system simultaneously.	Passed
Integration with Mobile Money Gateway	Payment information from OMTBSis successfully transmitted to the mobile money gateway for processing.	Mobile money gateway unable toreceive payment information andinitiates the transaction authorization process.	Failed
Integration with Email Delivery Service	Ticket confirmation email is sent successfully from OMTBS to the user's registered email address usingthe email delivery service.	Email delivery service logs not implemented yet.	Failed

4.2.4 Acceptance Testing report

Acceptance Test Planning:

User Selection: Identify representative users from Canal Olympia Rebero's target audience to participate in the acceptance testing.

Test Scenario Development: Create realistic test scenarios that simulate real-world usage scenarios.

Test Environment Setup: Prepare a suitable testing environment that mirrors the production environment.

4.2.5 Acceptance Test Execution:

User Involvement: Conduct acceptance testing sessions with the selected users, observing theirinteractions with the OMTBS and gathering feedback.

Scenario Execution: Guide users through the defined test scenarios, monitoring their ability to completetasks and identify any issues.

Feedback Collection: Collect feedback from users regarding the system's usability, functionality, andoverall satisfaction.

Acceptance Test Evaluation:

Analyze User Feedback: Review the feedback from users to identify any areas for improvement oradditional requirements.

Assess System Performance: Evaluate the system's performance during acceptance testing, includingresponse times, stability, and error handling.

Make Necessary Adjustments: If necessary, adjust the OMTBS based on the feedback and identifiedissues.

Note: The acceptance testing process will be conducted in the future once the OMTBS is ready fordeployment. The specific details of the testing process will be finalized closer to the deployment date.

Conclusions and Recommendations

Conclusions

The OMTBS has successfully addressed the inefficiencies of the previous manual ticketing system at Canal Olympia Rebero. It offers enhanced convenience, wider accessibility, and improved operational efficiency. To maximize its benefits, Canal Olympia Rebero should promote the OMTBS, seek user feedback for improvements, explore additional features, leverage customer data for targeted marketing,and regularly monitor and evaluate the system's performance.

Recommendations

By implementing these recommendations, Canal Olympia Rebero can further optimize the OMTBS and provide an exceptional movie-going experience.

Future Work

While the OMTBS has achieved its primary objectives, there are areas for future exploration:

Integration with Other Cinema Chains: Explore the possibility of expanding the OMTBS toother cinema chains in Rwanda, creating a centralized platform for movie ticket booking.

Mobile App Development: Develop a dedicated mobile app for the OMTBS to enhance accessibility and provide additional features tailored to mobile users.

Integration with Other Services: Explore potential integrations with other services, such as food delivery or ride-hailing apps, to provide a more comprehensive movie-going experience.

By addressing these areas for future work, Canal Olympia Rebero can further leverage the OMTBS toenhance its position in the Rwandan market and provide an even more exceptional movie-going experience.

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APENDENCES

A. Interview Questions

Canal Olympia Rebero Staff

a. What are the current challenge and inefficiencies faced in the manual ticketing process?
b. How do you envision an online ticketing system improving your daily operations?
c. What features would you like to see in an OMTBS to enhance customer service?

Moviegoers

a. How often do you visit Canal Olympia Rebero?
b. What are your current experiences with purchasing movie tickets?
c. What features would you find most valuable in an online ticketing system?
d. How important is convenience and accessibility in your movie-going experience?

Technical Experts

a. What are the potential challenges in integrating an OMTBS with the existing cinema management system?
b. Which mobile money platforms are most widely used by Rwandan customers?
c. What security measures should be implemented to protect user data and prevent fraudulent transactions?
d. How can the OMTBS be designed to cater to users with varying levels of digital literacy? What are the potential benefits of using customer data for targeted marketing andpersonalized recommendations?
e. How can the OMTBS be integrated with other services, such as food delivery or ride-hailing apps, to enhance the overall movie-going experience?
f. These questions will provide valuable insights into the needs and expectations of Canal Olympia Rebero's stakeholders, guiding the development of the OMTBS to ensure it meets their requirements and delivers a positive user experience.

B. Source code for the Home page

```
<?php
if (!session_id()) { session_start();
}
include_once ('db.php');
?>


<!DOCTYPE html>
<html lang="en">
<head>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8">


<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta name="viewport" content="width=device-width, initial-scale=1">
<!-- The above 3 meta tags *must* come first in the head; any other head content must come *after* these tags -->
<meta name="description" content="">
<meta name="author" content="">
<link rel="icon" href="#">
<title>Online Movie Tickets Management System</title>
<!-- Bootstrap core CSS -->
<!-- <link href="./movie_files/bootstrap.min.css" rel="stylesheet"> -->
<link href="https://bootswatch.com/flatly/bootstrap.css" rel="stylesheet">
<link href="http://netdna.bootstrapcdn.com/font-awesome/4.5.0/css/font-awesome.min.css" rel="stylesheet">

<!-- IE10 viewport hack for Surface/desktop Windows 8 bug -->
<link href="css/ie10-viewport-bug-workaround.css" rel="stylesheet">


<!-- Just for debugging purposes. Don't actually copy these 2 lines! -->
<!--[if lt IE 9]><script src="../../assets/js/ie8-responsive-file-warning.js"></script><![endif]-->
<script src="js/ie-emulation-modes-warning.js"></script>
<!-- Custom styles for this template -->
```

```
<link href="css/bootstrap.css" rel="stylesheet">
<link href="css/rotating-card.css" rel="stylesheet">
<link href="css/style.css" rel="stylesheet">
<link href="css/anotherDefault.css" rel="stylesheet">
</head>
<!-- NAVBAR
================================================== -->
<body>
<div class="navbar-wrapper">
<div class="">


<nav class="navbar navbar-default navbar-static-top">
<div class="container">
<div class="navbar-header">
<button type="button" class="navbar-toggle collapsed" data-toggle="collapse" data-target="#navbar" aria-expanded="false" aria-controls="navbar">
<span class="sr-only">Toggle navigation</span>
<span class="icon-bar"></span>
<span class="icon-bar"></span>
<span class="icon-bar"></span>
</button>
<a class="navbar-brand" href="index.php">Movie Ticket</a>
```

C. Login Page source code

```
<input class="btn btn-default btn-login" type="button" value="Login" onclick="loginAjax()">
</form>
</div>
</div>
</div>
```

```
<!-- Registration -->
<div class="box" id="RegistrationBox">
<div class="content registerBox" style="display:none;">
<div class="form">
<form method="post" html="{:multipart=>true}" data-remote="true" action="index.php" accept-charset="UTF-8">
<input id="registrationName" class="form-control" type="text" placeholder="username" name="username">
<input id="registrationPassword" class="form-control" type="password" placeholder="Password" name="password">
<input id="registrationPassword_confirmation" class="form-control" type="password" placeholder="Repeat Password" name="password_confirmation">
<input class="btn btn-default btn-register" type="submit" value="Create account" name="commit" onclick=" RegistrationAjax(event)">
</form>
</div>
</div>
</div>
</div>
<div class="modal-footer">
<div class="forgot login-footer">
<span>Looking to
```

D. Time Frame

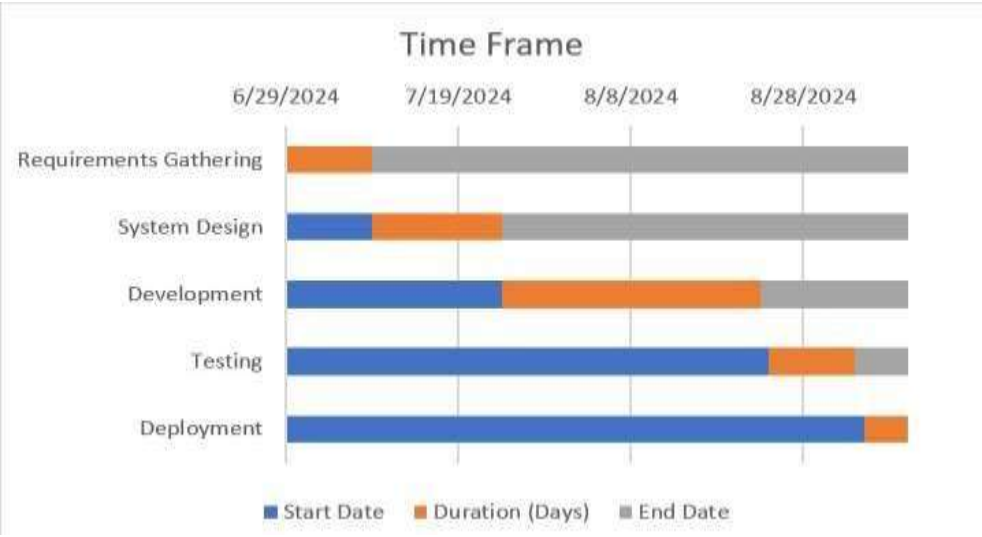

Figure 16:Time Frame