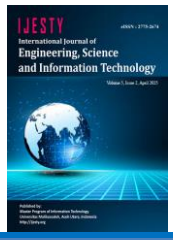
International Journal of Engineering, Science and Information Technology
Volume 5 No. 2 (2025) pp. 424-431
ISSN 2775-2674 (online)
Website: http://ijesty.org/index.php/ijesty
DOI: https://doi.org/10.52088/ijesty.v5i2.859
Research Paper, Short Communication, Review, Technical Paper



Implementation of the First Come First Served Method in a Website-Based Sports Facility Reservation Service System

Irsan Efendi Rangkuti*, Taufiq , Rizki Suwanda

Department of Informatics, Faculty of Engineering, Universitas Malikussaleh, Aceh, Indonesia

**Corresponding author Email: irsan.200170115@mhs.unimal.ac.id*

The manuscript was received on 18 August 2024, revised on 20 November 2024, and accepted on 20 March 2025, date of publication 12 April 2025

Abstract

The people of Kotanopan have a high interest in sports such as futsal and badminton, an interesting phenomenon that shows the popularity of these sports and opens up many business opportunities. Most sports facilities for rent still use a conventional system where prospective renters must come directly to the field or call the manager to make a reservation, making it prone to errors in the reservation process. From the management's side, they often encounter obstacles when processing tenant reservations, especially when sorting the schedules that the tenants have created. This research aims to build a sports facility reservation service system using the First Come, First Served (FCFS) method. This method is the most suitable scheduling system for the sports facility reservation system in Kotanopan. The results of the First Come First Served (FCFS) method experiment with a random trial of 5 users, each with execution times of 3, 3, 5, 5, and 9, yielded an average waiting time of 1 minute and an average reservation completion time of 6. With the test results showing that the system can meet the needs and has functions accessible to every system user, it is hoped that this system can facilitate users in making reservations online.

Keywords: *Sports Facilities, Reservation, PHP, First Come First Served, Web Application.*

1. Introduction

Sports facilities are objects or amenities comprising all exercise equipment and gear [1]. High interest in futsal and badminton among teenagers is an interesting phenomenon that shows the popularity of these sports and opens up many business opportunities. Futsal and badminton appeal to society due to the diversity of participants, including women. Even more interesting, this widespread interest automatically opens up many business opportunities for businesses in Indonesia that operate in the futsal sector.[2]. In a situation like this, the high public interest in sports is seen as a business opportunity that can be invested in for economic growth in recreation, sports, and technology. Many sports facility reservation systems still rely on conventional methods where prospective renters must come directly to the location to conduct the field rental transaction. Similarly, in the case of futsal facilities in Kotanopan, namely Thirty-One Futsal and Gemini Futsal, with the high volume of court bookings each day, the management of these sports facilities must be given significant attention. To address this issue, the researchers have designed an application to facilitate both renters and managers of sports facilities. With the existence of this application, it is expected to improve access for renters and address the issues that arise in the process of booking sports facilities.

The development of information technology in Indonesia is very significant, especially in the fields of tourism and sports, such as booking sports facilities. Information systems are a series of operations that allocate human and computer resources to transform inputs into outputs to achieve the company's goals. They are used to meet information needs for exchanges and activity planning.[3]. The "First Come, First Served" (FCFS) method in the field booking system is highly relevant for sports facilities and provides many benefits for managers and players. This is due to the high demand for sports facilities, especially during weekends or evenings. The FCFS method ensures that every team wanting to play has a fair opportunity to book the field. This system guarantees that the first player or team to

make a reservation will be given priority and get the schedule they want without worrying about favouritism or unique priorities. The First Come First Served (FCFS) method is a scheduling queue system that prioritizes the input process to be served until completion.[4]. Usually, the First Come First Served (FCFS) algorithm is used explicitly for queue systems because it is based on order, making it very suitable for systems requiring a queue system.[5].

2. Literature Review

2.1. Reservation System

Reservation is booking a place and other facilities before the customer arrives at a service. Reservations have advantages, such as guests knowing about the place they want, and they can make sure what they order when they book a place, so it is easy to get benefits [6]. The reservation system can be described as a collection of interconnected components to achieve a specific goal, such as helping people book certain places or facilities. Online reservation is booking a place using the internet through a website, Android application, or online travel agent [7]. This system generally combines various components and procedures, allowing users to book hotels, transportation, or entertainment services. The definition of a reservation system includes a well-organized process, from the provision of space to booking management, as well as front-end service responsibilities to ensure the availability and management of the booked facilities.

2.2. Web Application

Websites have experienced significant development due to the rapid growth of information technology. The internet world today has developed with a greater focus on content processing. In addition, the grouping of types of web is based on function, characteristics, or style, and the programming language used is more specific—two types of dynamic and statistical websites[8]. A web application is a program or software that runs on a server and can be accessed on various devices, such as computers, tablets, or smartphones, with just an internet connection. Web-based applications are developed using programming languages such as HTML, PHP, CSS, and JavaScript, requiring a web server and browser to function.[9]. A website can also be defined as a web page containing information that can be accessed via a computer connected to the internet, which allows anyone worldwide to obtain and manage information from various sources available on the internet[10].

2.3. PHP

In addition to using the HTML programming language, websites can also be created using dynamic programming languages, one of which is PHP (Hypertext Preprocessor). PHP is an open-source server-side programming language that accepts scripts entered to be processed and processed on the server. PHP has the advantage of being open-source, which allows users to change and develop applications or systems according to their wishes[11]. PHP creates dynamic web pages such as Active Server Pages (ASP) or Java Server Pages (JSP). It is executed on the server and can be combined with HTML tags[12]. PHP is a multi-platform language. This means that it can run on various machines and information systems (Linux, Unix, Macintosh, Windows), the runtime can be done through the console, and other system commands can be executed.[13]. The PHP programming language was created by Rasmus Lerdorf in 1994. The first version of PHP was not available to the public but was used by Rasmus Lerdorf to track everyone who viewed his online resume on the homepage of his website. The first version, which most people used, was available in early 1995 and was known as a personal homepage tool.

2.4. MySQL

MySQL is software used to create databases that can be managed by many other users and collect much of their data. [14]. MySQL is a derivative of one of the central database concepts for data selection and entry that allows data operations to be carried out efficiently and automatically[15]. MySQL stores data in a database and manipulates the required data. PHP and MySQL work together on web application development. PHP is the programming language to integrate web applications with the MySQL database[16].

2.5. XAMPP

XAMPP stands for X Apache MySQL PHP Perl, where X represents the operating system (Windows, Linux, UNIX), and it is a software package consisting of a web server (APACHE), a database (MySQL - MariaDB), and application development (PHP and Perl). XAMPP is also known as a software stack developed by the Apache Friends group - apachefriends.org, web server users.[17]. XAMPP can replace the role of web hosting. The way to do it is to save the Websteke file to localhost. This file can be accessed through a browser. Xampp generally works offline, like web hosting, but many people cannot access our website.[18]. XAMPP has several essential components for managing a local server. Htdocs is the leading directory where various files to be executed are stored. This includes PHP, HTML, and other script files. In addition, phpMyAdmin is a web-based graphical interface used to manage basic MySQL data on your computer. Entering the following address into a browser: http://localhost/phpmyadmin will open the phpMyAdmin page for basic data administration purposes. In addition, the XAMPP Control Panel manages services, allowing users to start or stop various services running on it[19].

2.6. First Come First Served

The First Come First Served algorithm is a simple scheduling algorithm used by the CPU (Central Processing Unit) for processing. Using this queue system means that each process will be given a ready status, which will then be placed in the queue. The First Come First Served algorithm applies the principle where the execution process will be carried out based on the order of arrival or the users who arrive first.[20]. In this scheme, the server requests processes to be assigned to the server first. The First Come First, first-served scheduling is irrational and not prioritized. The FCFS scheduling rule is the most straightforward plan. That means the process continues until completion and is managed based on arrival time.

The implementation of the FCFS method is completed in minutes. Thus, the formulation in the calculation of the First Come First Served (FCFS) method is described as follows:

1. Searching for the Start Time value

……..……..……..…(1)

$ST_n = \max(FT_{n-1}, AT_n)$

2. Searching for the Finish Time value

$FT = ST + BT$……..……(2)

FT = Finish Time
ST = Start Time
BT = Burst Time (the duration of reservation execution)

3. Searching for the Waiting Time value

$WT = ST - AT$……(3)

WT = Waiting Time
ST = Start Time
AT = Arrival Time (user's arrival time)

……...……...…(4)

$\text{Average value of WT} = \frac{\text{Total WT value}}{\text{amount of data values}}$

4. Searching for the Turn Around Time value

$TAT = WT + BT$……..……(5)

TAT = Turn Around Time
FT = Finish Time
BT = Busrt Time
ATAT= Average of TAT

……...……..(6)

$\text{ATAT} = \frac{\text{Total TAT Value}}{\text{amount of data values}}$

3. Research Method

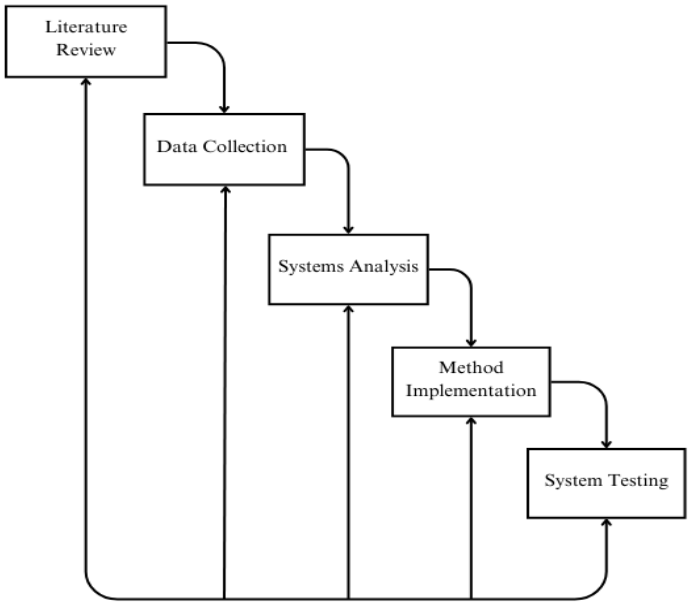


Fig 1. Research Flow

This method requires resolution at each stage before ensuring that every system component is thoroughly processed. These phases begin with studying the literature to understand relevant early theories and research findings and to gather the necessary data to build the appropriate system. Selain itu, fase analisis sistem dilakukan sebelum persyaratan untuk menerapkan cara desain dan pengembangan sistem dilakukan. Additionally, the system analysis phase is conducted before the requirements for implementing the system design and development methods are carried out. After installing the system, we hope this waterfall method will create a more orderly and predictable system. This reduces the likelihood of changes that could affect your workflow.

4. Result and Discussion

4.1. Implementation of the First Come First Served Method

The authors present the results and calculations of the FCFS method in the following table.

Table 1. First Come First Served method testing table

Member Name	Arrival Time	Burst Time	Start Time	Finish Time	Waiting Time	Turn Around
Member 1	21.59	3	21.59	22.02	0	3
Member 2	22.02	3	22.02	22.05	0	3
Member 3	22.05	5	22.05	22.10	0	5
Member 4	22.09	5	22.10	22.15	1	6
Member 5	22.11	9	22.15	10.24	4	14
Total					5	30
Average Result Value					1	6

The calculation of the First Come First Served (FCFS) method is described as follows:

1. Searching for the Start Time Value

$ST_n = \max(FT_{n-1}, AT_n)$

2. Searching for the Finish Time Value

$FT = ST + BT$

FT = Finish Time
ST = Start Time
BT = Burst Time

3. Searching for the Waiting Time Value

$WT = ST - AT$

WT = Waiting Time
ST = Start Time
AT = Arrival Time

Average Value $WT = \frac{\text{Total Nilai WT}}{\text{Amount Data Value}}$

$= 5/5$

= 1 minute

4. Searching for the Turn Around Time Value

TAT = WT + BT

TAT = Turn Around Time
FT = Finish Time
BT = Busrt Time
ATAT= Average TAT

$ATAT = \frac{\text{Total TAT Value}}{\text{Amount Data Value}}$

$= 30/5$

= 6 Minutes

The conclusion is that the average waiting time in the random reservation process was 1 minute, and the average reservation completion time was 6 minutes.

4.1. Member Registration

This registration page is intended for members. Registration is done by filling in personal data according to the provisions provided. After successful registration, members can have a username and password that can be used to log in and make reservations. The registration page can be seen in the image below.

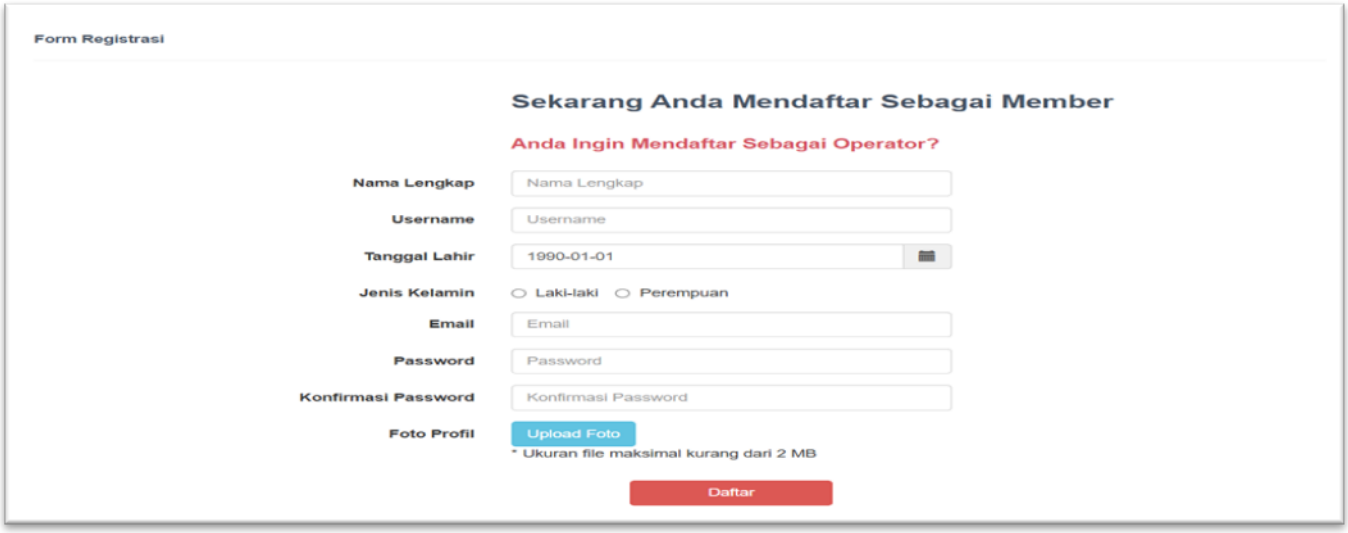


Fig 2. Registration Page (Indonesia)

4.2. Member Reservation

Members use the reservation or booking page to make reservations for previously selected sports facilities. On this page, members must fill in booking data from the date of play, Time of play, duration, and payment method. After filling in all the required data, members can proceed to the payment transaction stage.

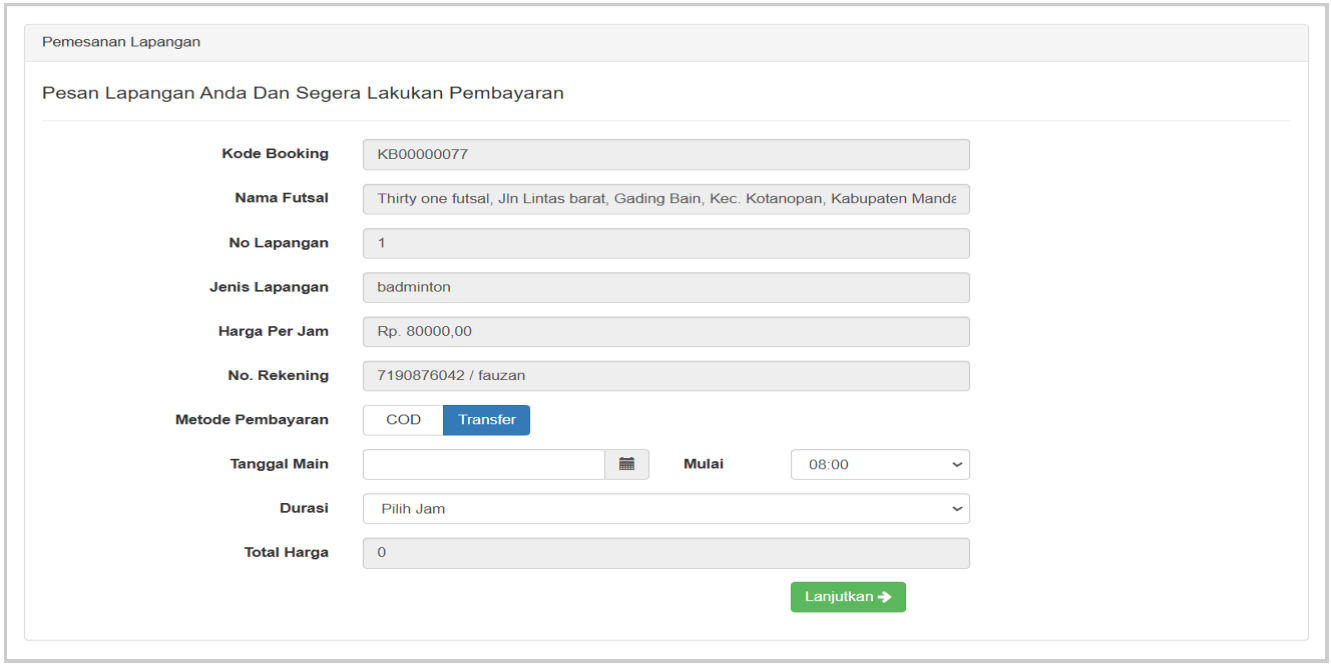


Fig 3. Member Reservation Page (Indonesia)

4.3. Payment Transaction

Members use the payment transaction page to make payment transactions. Payment uploads can be a photo of proof of transfer from the member's account to the manager's account.

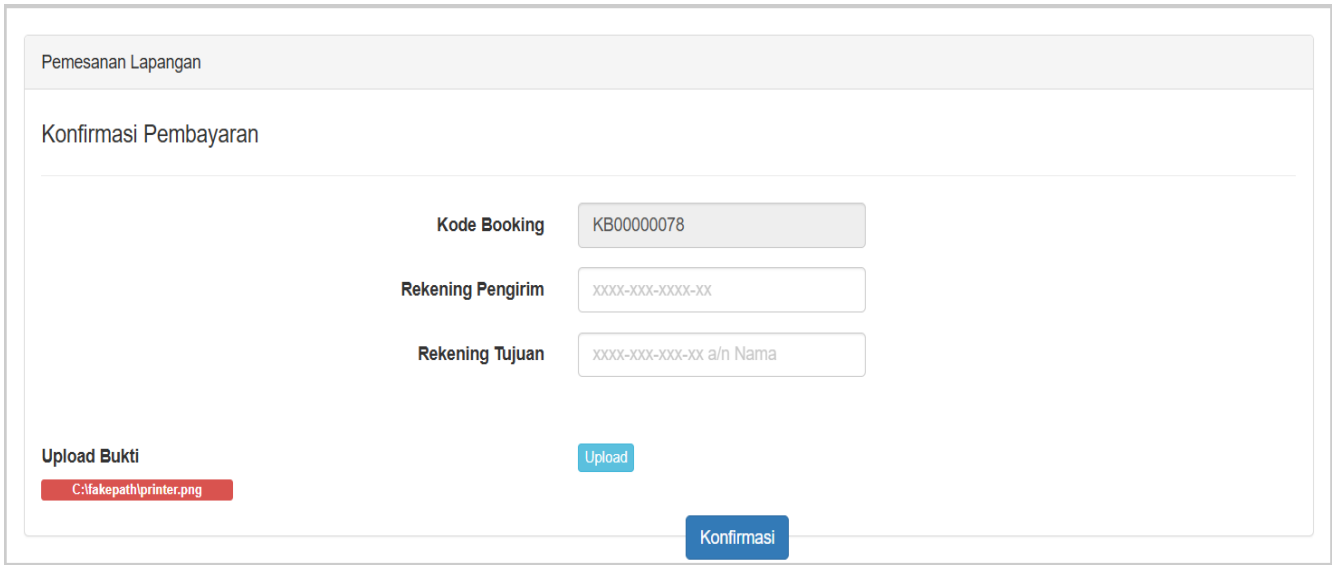


Fig 4. Payment Transaction Page (Indonesia)

4.4. Order History

The order history page displays the order history that members have made. On this page, visitors can also see data from orders starting from the primary date, start time, end time, place name, and total payment to order status.

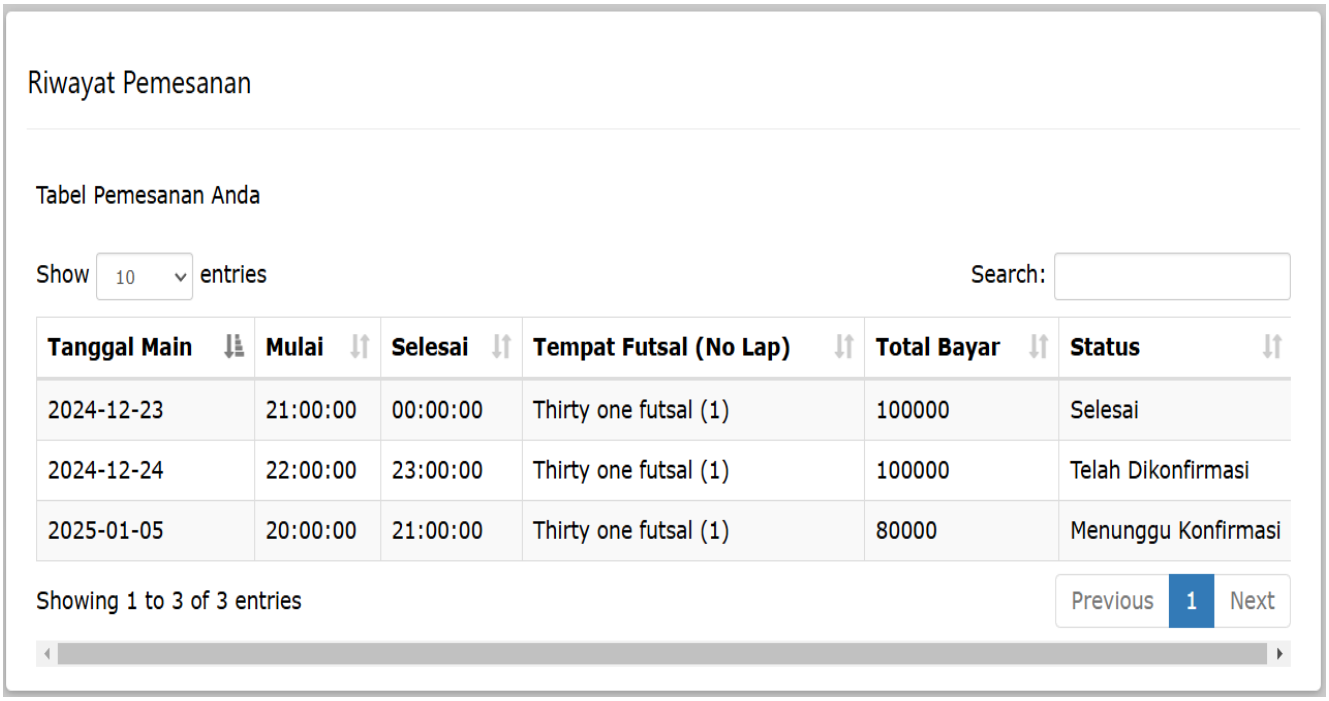
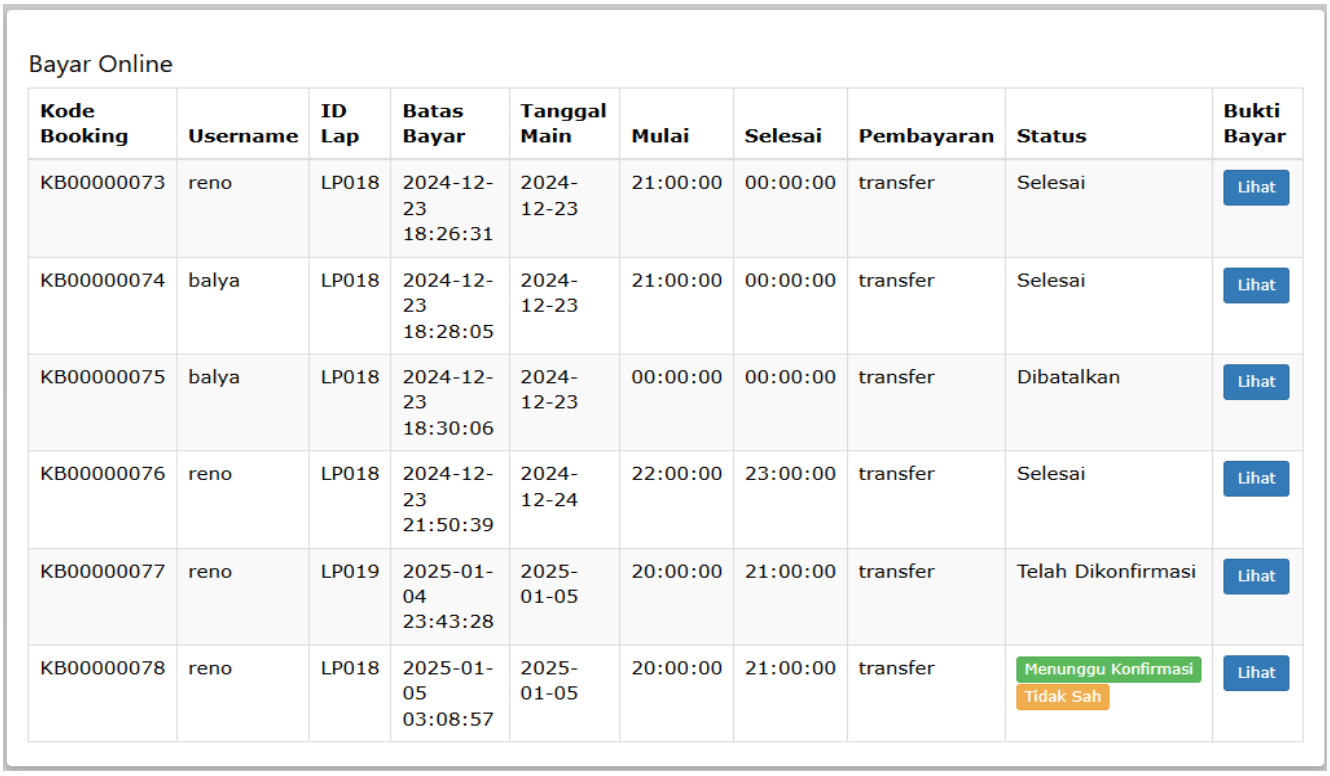


Fig 5. Order History Page (Indonesia)

4.5. Payment Verification

The payment check page is intended for managers or operators. This page functions to approve proof of payment and schedule it. The appearance of this page can be seen in the image below.



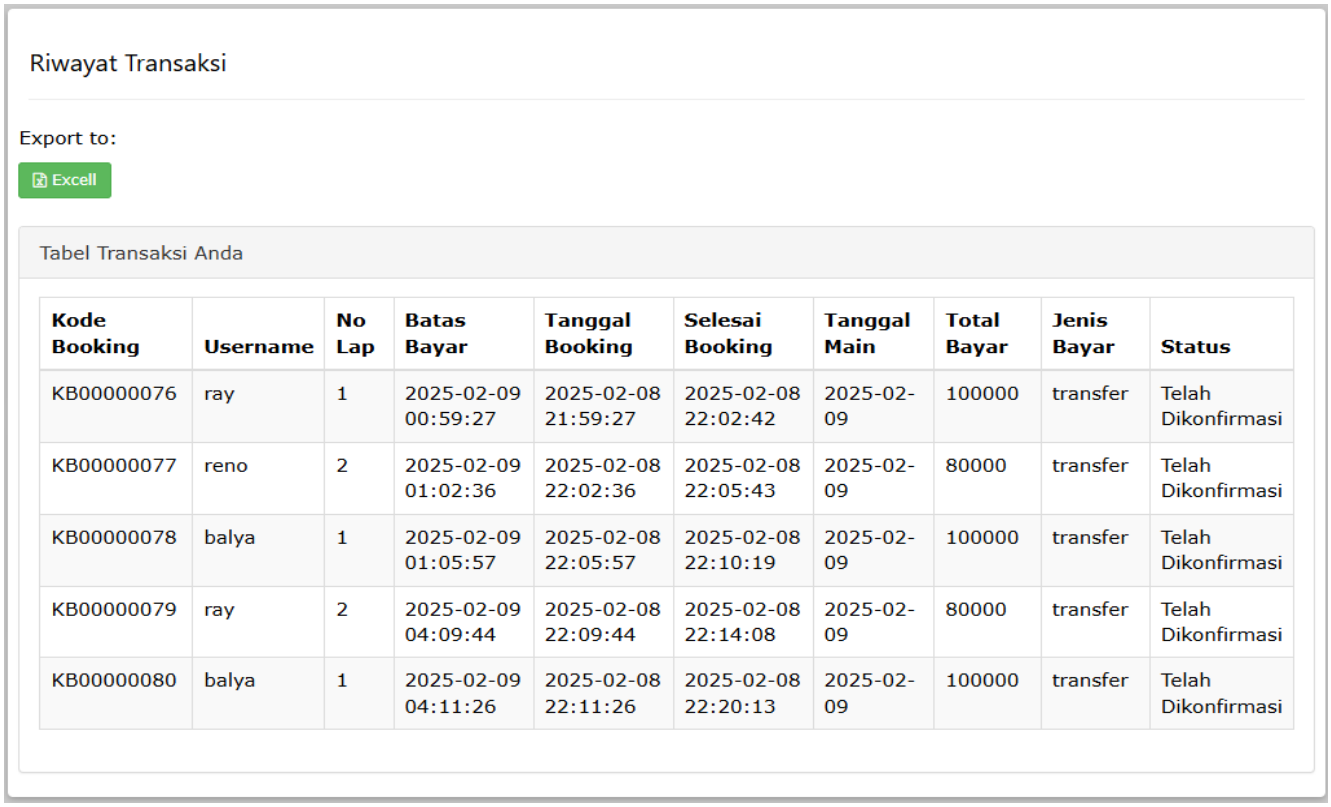
Bayar Online

Kode Booking	Username	ID Lap	Batas Bayar	Tanggal Main	Mulai	Selesai	Pembayaran	Status	Bukti Bayar
KB00000073	reno	LP018	2024-12-23 18:26:31	2024-12-23	21:00:00	00:00:00	transfer	Selesai	Lihat
KB00000074	balya	LP018	2024-12-23 18:28:05	2024-12-23	21:00:00	00:00:00	transfer	Selesai	Lihat
KB00000075	balya	LP018	2024-12-23 18:30:06	2024-12-23	00:00:00	00:00:00	transfer	Dibatalkan	Lihat
KB00000076	reno	LP018	2024-12-23 21:50:39	2024-12-24	22:00:00	23:00:00	transfer	Selesai	Lihat
KB00000077	reno	LP019	2025-01-04 23:43:28	2025-01-05	20:00:00	21:00:00	transfer	Telah Dikonfirmasi	Lihat
KB00000078	reno	LP018	2025-01-05 03:08:57	2025-01-05	20:00:00	21:00:00	transfer	Menunggu Konfirmasi Tidak Sah	Lihat

Fig 6. Payment Verification Page

4.6. Transaction History

The Transaction History page displays the history of reservation transactions ordered by members for operator review. This transaction report can be printed in Excel format by pressing the green Excel button above the operator transaction table. This transaction page is the reference for researchers when determining the First Come, First Served (FCFS) method test.



Riwayat Transaksi

Export to:

Excell

Tabel Transaksi Anda

Kode Booking	Username	No Lap	Batas Bayar	Tanggal Booking	Selesai Booking	Tanggal Main	Total Bayar	Jenis Bayar	Status
KB00000076	ray	1	2025-02-09 00:59:27	2025-02-08 21:59:27	2025-02-08 22:02:42	2025-02-09	100000	transfer	Telah Dikonfirmasi
KB00000077	reno	2	2025-02-09 01:02:36	2025-02-08 22:02:36	2025-02-08 22:05:43	2025-02-09	80000	transfer	Telah Dikonfirmasi
KB00000078	balya	1	2025-02-09 01:05:57	2025-02-08 22:05:57	2025-02-08 22:10:19	2025-02-09	100000	transfer	Telah Dikonfirmasi
KB00000079	ray	2	2025-02-09 04:09:44	2025-02-08 22:09:44	2025-02-08 22:14:08	2025-02-09	80000	transfer	Telah Dikonfirmasi
KB00000080	balya	1	2025-02-09 04:11:26	2025-02-08 22:11:26	2025-02-08 22:20:13	2025-02-09	100000	transfer	Telah Dikonfirmasi

Fig 7. Transaction History Page (Indonesia)

5. Conclusion

Based on the results of the implementation of the First Come First Served method on a website-based sports facility reservation service system, it can be concluded that the system that has been created can meet user needs and has functions that can be accessed properly. Testing shows that this system can overcome problems in managing reservation data, making data processing more straightforward more structured, and increasing time efficiency by optimizing the ordering of schedules based on customer reservation dates. The results of the experiment with five random users, each with an execution time of 3, 3, 5, 5, and 9 minutes, showed that the average waiting time was 1 minute. In contrast, the average reservation completion time was 6 minutes. Thus, the First Come, First Served method applied to this system has proven to be efficient, and this system can help with more organized management, increase productivity, and provide convenience and comfort for customers.

References

[1] B. Indrayana and E. Yuliawan, "Survei Kelayakan Sarana Dan Prasarana Pada 31 Cabang Olahraga Anggota Koni Kota Jambi Peserta Pekan Olahraga Provinsi Jambi Ke-23," *J. Prestasi*, vol. 4, no. 2, p. 43, 2020, doi: 10.24114/jp.v4i2.20374.

[2] R. W. Aji and U. Darusalam, "Penerapan Metode First Come First Served Pada Sistem Informasi Layanan Reservasi Futsal Berbasis Website," *J. Media Inform. Budidarma*, vol. 6, no. 1, p. 580, 2022, doi: 10.30865/mib.v6i1.3519.

[3] R. Ramadhan, F. Fauziah, and E. T. Esti Handayani, "Penerapan Algoritma First Come First Served dalam Menentukan Penyewaan Lapangan Futsal Berbasis Web," *J. JTIK (Jurnal Teknol. Inf. dan Komunikasi)*, vol. 6, no. 1, pp. 102–110, 2022, doi: 10.35870/jtik.v6i1.373.

[4] Wulandari, Muhamad Resya Novario, and Muhamad Fahreza, "Sistem Informasi Penyewaan Lapangan Futsal Menggunakan Metode First Come First Served Pada NF Mini Soccer," *KRESNA J. Ris. dan Pengabdi. Masy.*, vol. 1, no. 1, pp. 44–51, 2021, doi: 10.36080/jk.v1i1.11.

[5] U. Abdulrohim, D. V. Versanika, and C. Dirgantara, "Implementasi Metode First Come First Served Pada Platform Reservasi Lapangan Badminton Berbasis Mobile," vol. 11, no. 1, pp. 39–42, 2022.

[6] N. Noviastuti and D. A. Cahyadi, "Peran Reservasi Dalam Meningkatkan Pelayanan Terhadap Tamu Di Hotel Novotel Lampung," *J. Nusant. (Jurnal Ilm. Pariwisata dan Perhotelan)*, vol. 3, no. 1, pp. 31–37, 2020.

[7] A. Prasetyo, "Sistem Reservasi Dengan Metode Algoritma First Come First Served (Studi Kasus Wisata Sikepel Kabupaten Purworejo)," *J. Bus. Theory Pract.*, vol. 10, no. 2, p. 6, 2021.

[8] Rina Noviana, "Pembuatan Aplikasi Penjualan Berbasis Web Monja Store Menggunakan Php Dan Mysql," *J. Tek. dan Sci.*, vol. 1, no. 2, pp. 112–124, 2022, doi: 10.56127/jts.v1i2.128.

[9] F. D. Laksana and R. Suwanda, "Design of a Web-Based Self-Reporting Information System for Teacher Professional Education," *J. Minfo Polgan*, vol. 13, pp. 1085–1091, 2024.

[10] R. Syabania and N. Rosmawani, "Perancangan Aplikasi Customer Relationship Management (Crm) Pada Penjualan Barang Pre-Order Berbasis Website," *Rekayasa Inf.*, vol. 10, no. 1, pp. 44–49, 2021.

[11] R. Y. Endra, Y. Aprilinda, Y. Y. Dharmawan, and W. Ramadhan, "Analisis Perbandingan Bahasa Pemrograman PHP Laravel dengan PHP Native pada Pengembangan Website," *Expert J. Manaj. Sist. Inf. dan Teknol.*, vol. 11, no. 1, p. 48, 2021, doi: 10.36448/expert.v11i1.2012.

[12] R. Hermiati, A. Asnawati, and I. Kanedi, "Pembuatan E-Commerce Pada Raja Komputer Menggunakan Bahasa Pemrograman Php Dan Database Mysql," *J. Media Infotama*, vol. 17, no. 1, pp. 54–66, 2021, doi: 10.37676/jmi.v17i1.1317.

[13] Sitanggang Rianto, Urian Dachi Teddy, and Manurung H G Immanuel, "Rancang Bangun Sistem Penjualan Tanaman Hiasberbasis Web Menggunakan Php Dan Mysql," *Tekesnos*, vol. 4, no. 1, pp. 84–90, 2022.

[14] M. S. Novelan, Z. Syahputra, and P. H. Putra, "InfoTekJar : Jurnal Nasional Informatika dan Sistem Kendali Lampu Menggunakan NodeMCU dan Mysql Berbasis IOT (Internet Of Things)," *J. Nas. Inform. dan Teknol. Jar.*, vol. 5, no. 1, 2020.

[15] Suhartini, M. Sadali, and K. Y. Putra, "Sistem Informasi Berbasis Web Sma Al- Mukhtariyah Mamben Lauk Berbasis Php Dan Mysql," *J. Inform. dan Teknol.*, vol. 3, no. 1, pp. 79–83, 2020.

[16] S. M. Arif, "Pembuatan Website Informasi & Pendaftaran Webinar Umum Menggunakan PHP & MySQL," *J. Inf. Syst. Applied, Manag. Account.*, vol. 7, no. 3, pp. 789–796, 2023, doi: 10.52362/jisamar.v7i3.1168.

[17] M. Arafat, "Rancang Bangun Sistem Informasi Pemesanan Online Percetakan Sriwijaya Multi Grafika Berbasis Website," *Intech*, vol. 3, no. 2, pp. 6–11, 2022, doi: 10.54895/intech.v3i2.1691.

[18] M. O. Fitri, "Awebserver Sebagai Alternatif Pengganti Xampp Pada Platform Android," *Teknosains Media Inf. Sains Dan Teknol.*, vol. 15, no. 2, p. 245, 2021, doi: 10.24252/teknosains.v15i2.20028.

[19] Y. Anggraini, D. Pasha, D. Damayanti, and A. Setiawan, "Sistem Informasi Penjualan Sepeda Berbasis Web Menggunakan Framework Codeigniter," *J. Teknol. dan Sist. Inf.*, vol. 1, no. 2, pp. 64–70, 2020, doi: 10.33365/jtsi.v1i2.236.

[20] Y. Muharam, "Implementasi Algoritma First Come First Served Pada Aplikasi Pemesanan Lapangan Futsal Berbasis Website Pada Bisoc Futsal Batununggal Bandung," *Comput. | J. Inf.*, vol. 8, pp. 41–45, 2021.