



Design of Parking Information System in Langsa City General Hospital, Aceh

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Abstract

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This study designed and built a parking information system at the Langsa City General Hospital with the aim of facilitating the management of incoming and outgoing vehicle data at the Langsa City General Hospital parking lot in Aceh. With the rapid advancement of technology, previous data management was still done manually, so it was not effective and efficient, and officers found it very difficult to know the data of incoming and outgoing vehicles. Researchers designed a computer-based information system to facilitate the management of the parking system. Methods of data collection using descriptive qualitative methods, namely observation, interviews, and literature study, and software development methods using the waterfall as well as the PHP programming language and the MYSQL database. The information system created aims to make it easier for officers to manage vehicle entry and exit data at the Langsa City Regional General Hospital in Aceh.

Keywords: Information System, Parking Information System, Waterfall

Abstrak

Penelitian ini merancang dan membangun sistem informasi parkir di rumah sakit umum daerah kota langsa bertujuan untuk mempermudah pengelolaan pendataan kendaraan yang masuk dan yang keluar pada parkir rumah sakit umum daerah kota langsa, aceh. Dengan kemajuan teknologi yang begitu pesat, pengelolaan data sebelumnya masih dilakukan secara manual sehingga tidak efektif dan efisien, dimana petugas sangat sulit mengetahui data kendaraan yang masuk dan yang keluar. Peneliti merancang sistem informasi tersebut berbasis komputer untuk memudahkan dalam pengelolaan sistem parkir. Metode pengumpulan data menggunakan metode kualitatif deskriptif, yaitu observasi, wawancara dan studi Pustaka dan metode pengembangan perangkat lunak menggunakan waterfall serta bahasa pemrograman PHP dan menggunakan database MYSQL. Sistem informasi yang dibuat bertujuan untuk memudahkan petugas dalam mengelola data masuk dan keluar kendaraan pada Rumah Sakit Umum Daerah Kota Langsa, Aceh.

Kata-kata kunci: Sistem Informasi, Sistem Informasi Parkir, Waterfall



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1. Introduction

Along with the development of technology, parking data management is no longer based on manual recording but uses a parking information system. The rapid growth in the number of motorcycles and the imbalance between the development of motorized vehicles and the number of available parking lots often make it difficult for drivers to entrust the safety of their vehicles, which makes them worry about losing them. In addition, the driver needs to keep an eye on how safe the car is at all times. Because the parking mechanism is manual, officers cannot know or inform the public of the parking space capacity.

The current vehicle parking system, especially at Langsa City General Hospital, is still manual. When the vehicle entered Langsa City Regional General Hospital, the parking attendant was still writing down the license plate number on a piece of paper. Adopting a parking information system is expected to make it easier for both drivers and parking attendants. Using a parking information system is expected to make it easier for hospital visitors to save time, which is faster than using the manual method. Then, it can also be under reasonable control at the Langsa City Regional General Hospital so that the utilization and improvement of parking control are correctly on target. In addition, officers at the Langsa City General Hospital have become more transparent and provide better services. A clean and transparent system of order and public services is a challenge that government agencies must address in carrying out their functions.

The results of the study show that the design of a Parking Information System at the Langsa City General Hospital allows parking managers to provide security and comfort for motorists who park their vehicles in the parking area. This design replaces the manual parking system, where the driver must use the card number given by the parking attendant. Several earlier research were nearly identical to what I studied, including the Design of a Parking Information System at the Pacitan Regency Communications and Informatics Department of Transportation, written by Eko Wahyudianto (2013) [1], Web-based Gis Parking Leasing Information System Design, written by Ahmad Hidayat and Faisal (2019) [2], Web-Based Parking Management Information System for Kertosono Nganjuk Hospital, written by Yuliana Ainur Ristanti and Landung Sudarmana (2016) [3].

2. Method

Data collection method used:

2.1 Internship

Internships are one form of systematic and synchronistically implementation between educational programs on campus with a mastery program of skills acquired through work activities directly in the work world to achieve a certain level of expertise. Apart from this, internships are one of the academic activities that are mandatory for all students in a specific study [4].

2.2 Literature Study

A Literature study is an activity to collect data that is relevant to the issue or problem being studied. Books, scientific articles, theses, dissertations, encyclopedias, the internet, and other sources are all good places to find this information.

2.3 Interview

The interview was used as a data collection method when researchers wanted to have an initial understanding of the problems that needed to be investigated and when researchers wanted to get more information from the responders [5].

The design method applied to this research is the waterfall method. The waterfall method is a model of system development for systematic and sequential information systems. According to Bassil (2012), it's called a waterfall because, step by step, and it must be passed, waiting for the completion of the previous stage and run sequentially [6]. The waterfall method by Youssef Bassil can be seen in **Figure 1**.

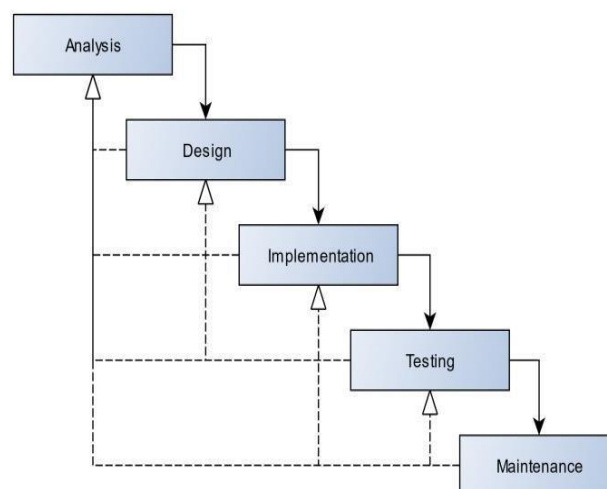


Figure 1. Waterfall method by Youssef Bassil (2012)

The steps of the waterfall method:

2.1 Analysis

This stage describes a system that will then be designed according to what is needed by the design of the system, like the necessity of hardware analysis, software, and also the importance of the process, input or output, and data interests of analysts and a data collection process [7]. Information was then processed and analyzed so that data or information complete about the user needed to be specified for the software to be developed.

2.2 Design

In this stage, the specification of needs from the previous stage will be studied, and the system design will be prepared. System design helps in determining hardware and requirement systems, defining system architecture as a whole, and selecting software flow for detailed algorithms [8]. The design is done with the aim of giving a complete picture of what to do.

2.3 Implementation

This is the stage where the entire design is converted into program code. The generated program code is still in the form of modules that will be integrated into a complete system.

2.4 Testing

This stage is performed after the program code is completed. Self-testing focuses on the internal logic of software and external functions and searches for possible errors and checks to match expected results. In this case, the author uses the black box testing method as a reference to determine whether the created application is suitable and accessible of [9].

2.5 Maintenance

The last stage in the Waterfall method, is when the user and maintenance operate the finished software is carried out. In this maintenance stage, the process of repairing errors or bugs that were not detected in the previous stages was carried out [10].

3. Results and Discussion

3.1 Analysis of the current system

In the old system, the system was done manually, so it was not effective and efficient in terms of data management. Below is a flowchart that describes the procedure for the parking entry and exit system that is currently running at the Langsa City Regional General Hospital, Aceh, which can be seen in **Figure 2**.

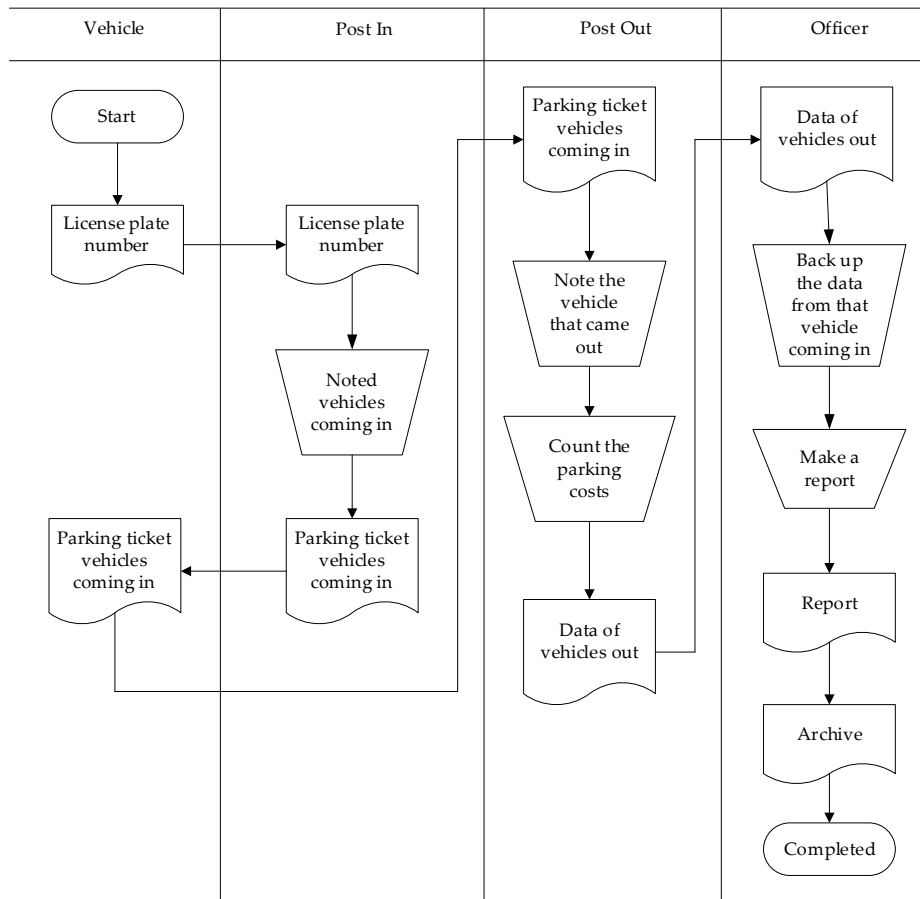


Figure 2. Current Flowchart

There are various issues with the process mentioned above, including it being challenging to know the number of vehicles that have entered and those that have left, it being difficult to know the place or available capacity, and it being slow to report. This research can improve efficiency and the user experience, especially for patients, their families, and medical staff. Here are some possible consequences: An effective parking system can reduce driver stress and save time and effort spent looking for a parking space by monitoring activities in the parking lot. Parking information systems can improve the security of the parking area in long-term planning and decision-making, and research can help improve data management techniques to manage data on parking facility usage.

3.2 System Design

This information system uses a flowchart, context diagrams, and a DFD (*data flow diagram*).

a. The Proposed Flowchart

The procedure proposed for the process of the system going in and out of the parking lot can be seen in **Figure 3**.

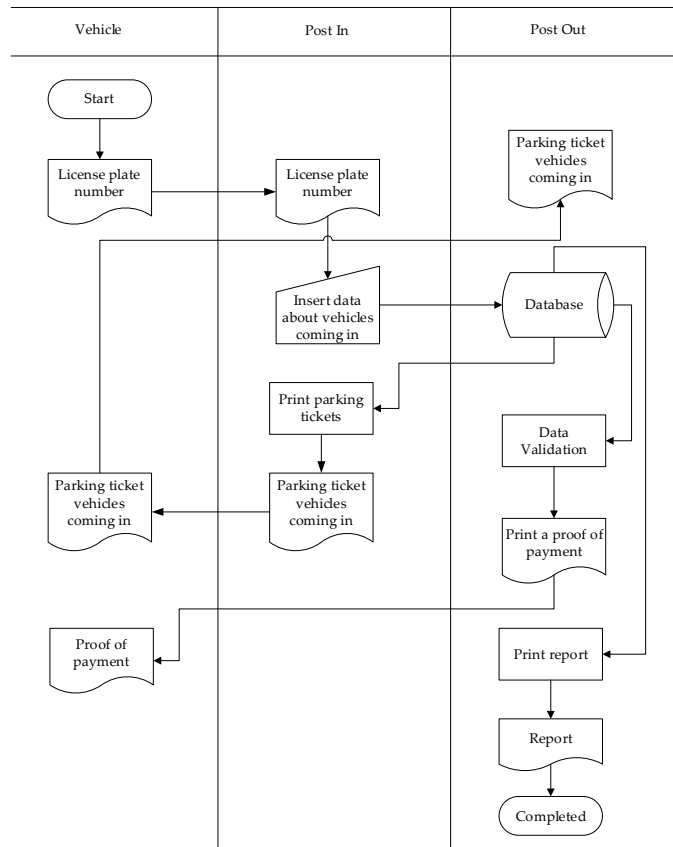


Figure 3. Proposed Flowchart

b. Context Diagram

The context diagram describes the system in one circle and the relationship with the outer entity. The circle represents the whole process in the system [11]. The context diagram that describes a large part of the data stream of the parking information system can be seen in Figure 4.

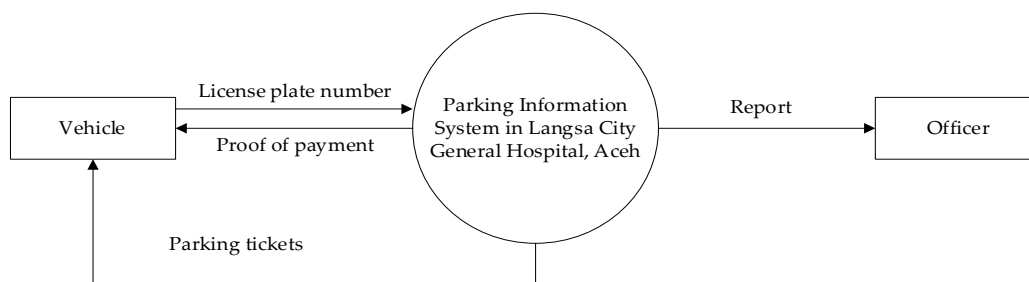


Figure 4. Context Diagram

c. DFD (Data Flow Diagram)

Data flow diagram (DFD) is an image representation that explains the flow of information and the changes that occur from a data input to the output of a data [12]. Details of the DFD procedure can be seen in Figure 5.

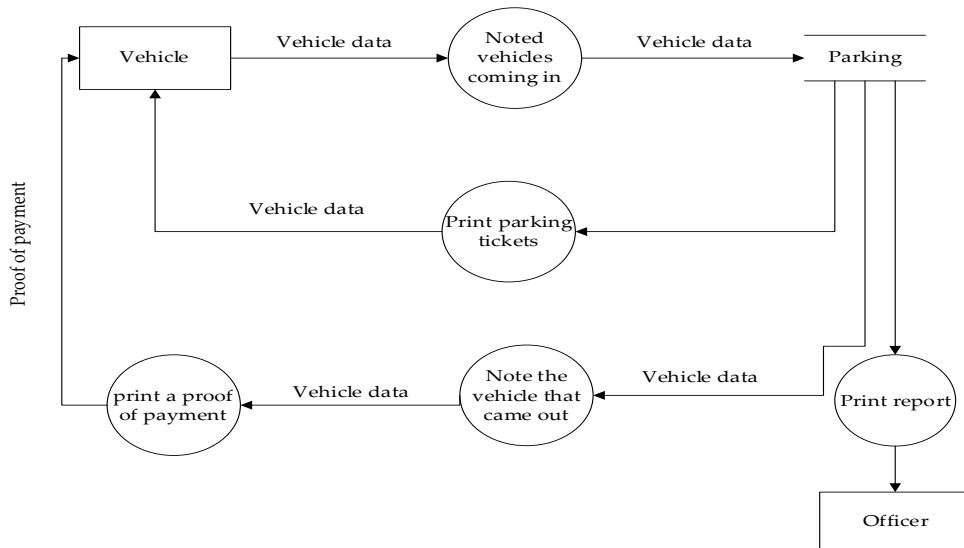


Figure 5. DFD

d. Database Design

An entity relationship diagram, or ERD, is a structural diagram used to design a database. An ERD describes the data it stores in a system and its limits [13]. ERD components are entities, Relationships, and Attributes. ERD processes that can be seen in Figure 6.

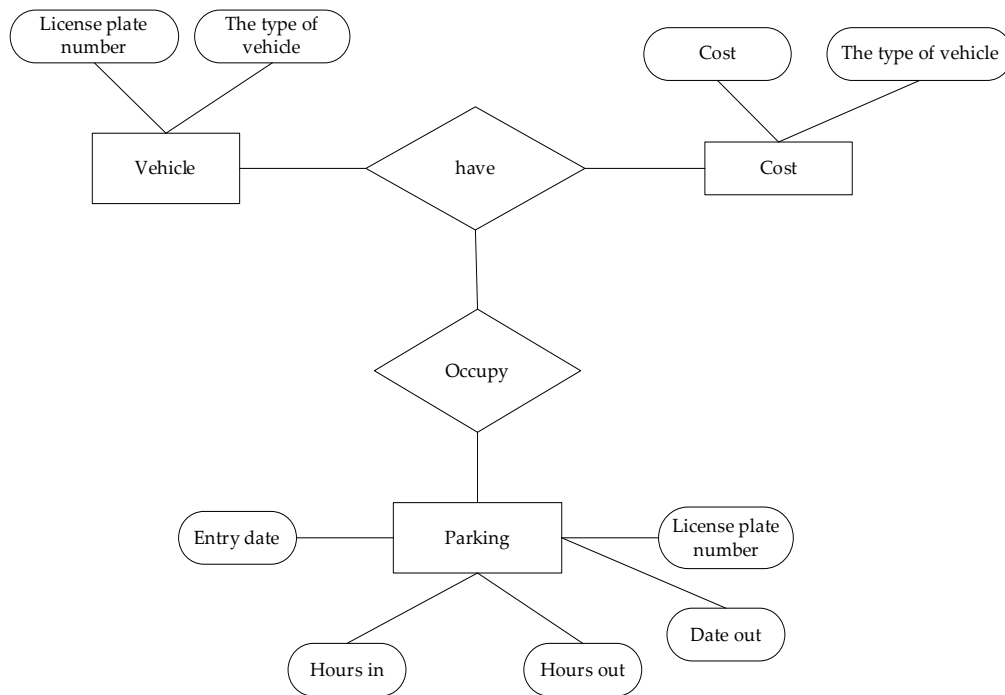


Figure 6. ERD

Database relations are relationships between tables or entities to perform functions in the system [14]. The database relation can be seen in Figure 7.

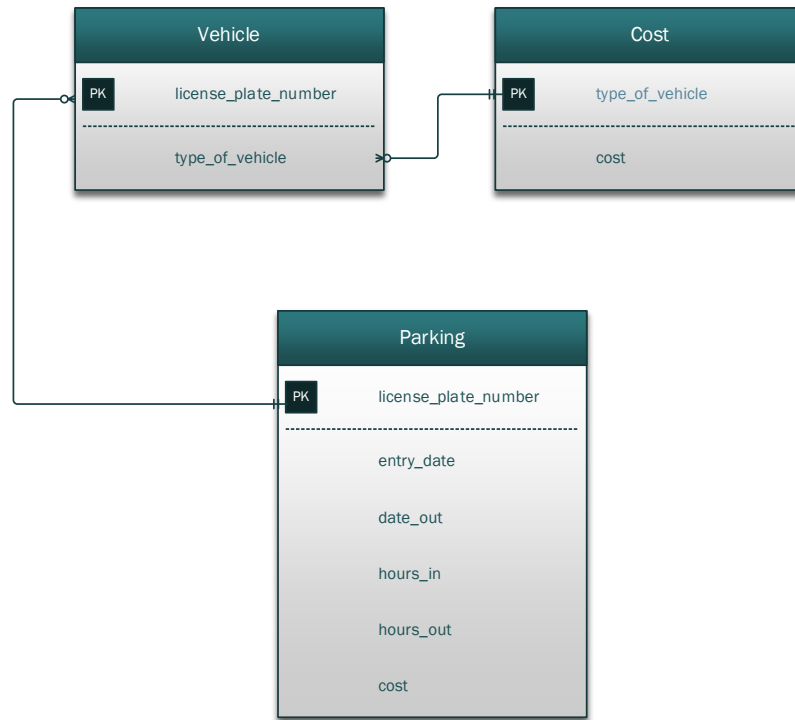


Figure 7. Relational Database

Database design is intended to define the content or structure of tables. The design was based on a database already performed on stage [15]. An entity in the database used in the design is table vehicle, table of cost, and table of parking. The vehicle table is used to store vehicle license plate number data and the type of vehicle. The structure of the vehicle table can be seen in **Table 1**.

Table 1. Table of Vehicles

Name	Data Type	Long	Description
license_plate_number	Varchar	10	License plate number
type_of_vehicle	Varchar	10	Type of vehicle

The cost table is used to store cost code, cost, and vehicle type data. The structure of the cost table can be seen in **Table 2**.

Table 2. Table of Cost

Name	Data Type	Long	Description
cost_code	Varchar	5	Cost code
cost	Integer	8	Parking Cost
type_of_vehicle	Varchar	10	Type of vehicle

Parking tables are used to store data on entry date, license plate number, entry time, exit time, exit date, and parking cost. The structure of the table parking entry can be seen in **Table 3**.

Table 3. Table of Parking

Name	Data Type	Long	Description
entry_date	Date	10	Vehicle entry date
license_plate_number	Varchar	10	License plate number
hours_in	Time	10	The time the vehicle enters
hours_out	Time	10	Vehicle time exit
date_out	Date	10	Vehicle exit date
cost_count	Integer	10	Parking cost

The System implementation is done using the PHP programming language, and the database used is MySQL. In the design of this program, the implementation is fully provided on hardware PCs with the Windows operating system [16]. The login view is the first thing that appears when opening the application, where officers who have access permission must enter a username and password before they can use this application. The login view can be seen in **Figure 8**.

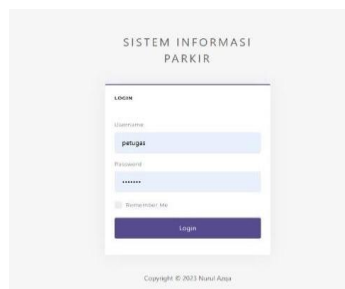


Figure 8: The Login Form

In this parking information system, the entry post display is used by officers or users to enter information and manage vehicles entering the parking area. This entry post display includes the following essential components and information: officer identification, vehicle type, vehicle entry time, and vehicle license plate number, as can be seen in **Figure 9**.

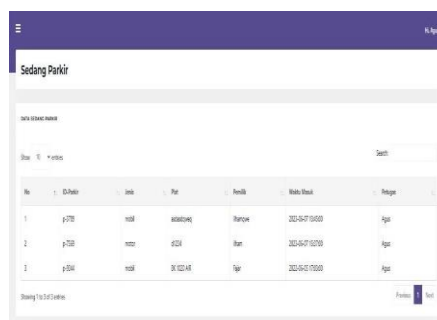


Figure 9. Post in Form

This is the view of the parking ticket printed by the system when the driver enters the parking area, which can be seen in [Figure 10](#).



Figure 10. Parking Ticket

This exit post view has the role of collecting data on vehicles that will exit and providing the necessary information to users. The following are some of the components in the exit post display, such as the time the vehicle exits, the vehicle plate number, and the parking status, as can be seen in [Figure 11](#).

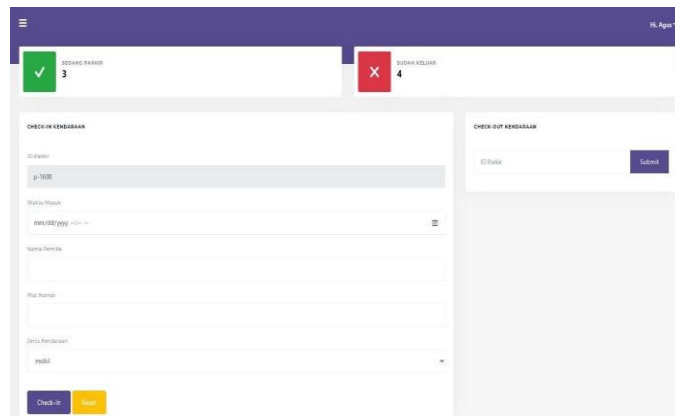


Figure 11. Post Out Form

This research can help hospital parking management, improve customer service, increase efficiency, and improve operations. In addition, this research can produce techniques to manage incoming and outgoing vehicle data and solutions to improve security.

4. Conclusion

The resulting design can be used as a solution to provide adequate parking facilities for the Langsa City General Hospital. The resulting design, in addition to being able to improve vehicle safety in the parking lot, can also provide faster service for drivers who park their vehicles

in the parking area of the Langsa City General Hospital. Based on the design of the system built using the waterfall method, it has met the needs of both officers and drivers.

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