



**DEVELOPING MOBILE PARKING APPS TO REDUCE
CONGESTION IN THE MALL**

UNDERGRADUATE THESIS

**Submitted as one of the requirements to obtain
Sarjana Komputer**

**By:
ERWIN HERMAWAN
001202000024**

**FACULTY OF COMPUTING
INFORMATICS STUDY PROGRAM**

CIKARANG

JUNE, 2023

PANEL OF EXAMINER APPROVAL

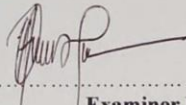
The Panel of Examiners declare that the undergraduate thesis entitled **Developing Mobile Parking Apps to Reduce Congestion in the Mall** that was submitted by STUDENT majoring in **Informatics** from the Faculty of Computer Science was assessed and approved to have passed the Oral Examination on 12 05 2023.

Panel of Examiner



.....
A. Chowfir

Chair of Panel Examiner



.....

Examiner I

STATEMENT OF ORIGINALITY

In my capacity as an active student at President University and as the author of the final project stated below:

Name : Erwin Hermawan

Student ID number : 001202000024

Study Program : Informatics

Faculty : Computer Science

I hereby declare that my final project entitled “**Developing Mobile Parking Apps to Reduce Congestion in the Mall**” is to the best of my knowledge and belief, an original piece of work based on sound academic principles. If there is any plagiarism detected in this final project, I am willing to be personally responsible for the consequences of these acts of plagiarism and will accept the sanctions against these acts in accordance with the rules and policies of President University.

I also declare that this work, either in whole or in part, has not been submitted to another university to obtain a degree.

Cikarang, 2023



Erwin Hernawan

SCIENTIFIC PUBLICATION APPROVAL FOR ACADEMIC INTEREST

As an academic community member of the President's University, I, the undersigned:

Name : Erwin Hermawan

Student ID number : 001202000024

Study program : Informatics

for the purpose of development of science and technology, certify, and approve to give President University a non-exclusive royalty-free right upon my final report with the title:

“Developing Mobile Parking Apps to Reduce Congestion in the Mall”

With this non-exclusive royalty-free right, President University is entitled to converse, to convert, to manage in a database, to maintain, and to publish my final report. There are to be done with the obligation from President University to mention my name as the copyright owner of my final report.

This statement I made in truth.

Cikarang, 2023



ERWIN HERMAWAN

ADVISOR APPROVAL FOR JOURNAL/INSTITUTION'S REPOSITORY

As an academic community member of the President's University, I, the undersigned:

Name : Cutifa Safitri
ID number : 20190900815
Study program : Informatics
Faculty : Computing

declare that following thesis:

Title of thesis : **Developing Mobile Parking Apps to Reduce Congestion in the Mall**
Thesis author : ERWIN HERMAWAN
Student ID number : 001202000024

will be published in **journal / institution's repository / proceeding / unpublished.**

Cikarang, 2023



Cutifa Safitri

PLAGIARISM CHECK RESULT

Erwin Hermawan All Ch ver 2

ORIGINALITY REPORT

13% SIMILARITY INDEX	9% INTERNET SOURCES	3% PUBLICATIONS	10% STUDENT PAPERS
--------------------------------	-------------------------------	---------------------------	------------------------------

PRIMARY SOURCES

1	www.coursehero.com Internet Source	2%
2	ijmemr.org Internet Source	1%
3	Submitted to University of Wisconsin Extension Student Paper	1%
4	Submitted to Kuala Lumpur Infrastructure University College Student Paper	1%
5	Submitted to Harrisburg University of Science and Technology Student Paper	1%
6	Submitted to Middlesex University Student Paper	1%
7	Submitted to Colorado State University, Global Campus Student Paper	<1%
8	godaddy-couponcodes.net Internet Source	<1%

Stats

Average Perplexity Score: 3315.566

A document's perplexity is a measurement of the randomness of the text

Burstiness Score: 14109.843

A document's burstiness is a measurement of the variation in perplexity

Your sentence with the highest perplexity, "*Cutifa Safitri*", has a perplexity of:
88870

ABSTRACT

In urban areas, the presence of a large number of vehicles is a common problem, driven by the preference of middle and upper-middle-class individuals to reside in cities due to job opportunities and improved infrastructure. As a result, the demand for convenient shopping options has led people to choose malls over traditional markets. With the increasing number of women acquiring driving skills, cars have become the preferred mode of transportation to malls. However, certain challenges arise, such as the inconvenience of parking far away from the mall entrance, particularly for women wearing attire unsuitable for walking long distances. Additionally, the burden of carrying heavy bags can further discourage extensive shopping. To address these issues, some malls have introduced ladies parking, strategically located near the mall entrance to facilitate easier access for women. However, the lack of awareness and understanding regarding these ladies parking features in mobile parking apps contributes to the perpetuation of discriminatory perceptions. Furthermore, societal attitudes and prevailing mindsets hinder the widespread adoption and utilization of ladies parking features, impeding efforts to ensure equal access and convenience for women in mall environments. To address these challenges, this research aims to develop a mobile application that informs users about the availability of ladies parking in different malls, thereby enhancing convenience and facilitating informed decision-making for women drivers.

Keywords: ladies parking, online parking, mall, QR Code, MD5 Algorithm.

ACKNOWLEDGEMENT

- (1) Allah Swt. who has given the favor of faith, the favor of health;
- (2) Cutifa Safitri, Ph.D. as the supervising lecturer who has provided the time, energy, and thoughts to direct me in the preparation of this thesis;
- (3) All lecturers in the scope of informatics, who have provided guidance and knowledge to the writer; and
- (4) All of my friends, who always support my thesis process.

TABLE OF CONTENTS

ABSTRACT	i
ACKNOWLEDGEMENT.....	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	viii
LIST OF FIGURES	ix
1 CHAPTER I INTRODUCTION.....	1
1.1 Background	1
1.2 Problem Statement.....	2
1.3 Objectives.....	2
1.4 Scope and Limitations.....	3
1.4.1 Scope.....	3
1.4.2 Limitations.....	3
1.5 Project Methodology.....	3
1.6 Final Project Outline	4
2 CHAPTER II LITERATURE REVIEW	6
2.1 Online Parking.....	6
2.2 MD5 Algorithm	7
2.3 QR Code.....	13
2.4 Ladies Parking	16
2.5 Related Work.....	17
2.5.1 CariParkir	17
2.5.2 Conventional Parking.....	17
2.6 Remarks.....	17
3 CHAPTER III SYSTEM ANALYSIS	19

3.1	System Overview	19
3.2	Function Analysis	19
3.3	Use Case Diagram	20
3.4	Use Case Narrative	21
3.5	Swim Lane Diagram	34
3.5.1	Swim Lane Diagram for Main Menu Page.....	34
3.5.2	Swim Lane Diagram for admin login page	35
3.5.3	Swim Lane Diagram for admin page	35
3.5.4	Swim Lane Diagram for admin parking data page	36
3.5.5	Swim Lane Diagram for landing page	36
3.5.6	Swim Lane Diagram for second fragment page	37
3.5.7	Swim Lane Diagram for third fragment page.....	37
3.5.8	Swim Lane Diagram for list mall page	38
3.5.9	Swim Lane Diagram for parking activity page.....	38
3.5.10	Swim Lane Diagram for ladies list page	39
3.5.11	Swim Lane Diagram for ticket page	39
3.5.12	Swim Lane Diagram for qr generator page	40
3.5.13	Swim Lane Diagram for qr scanner page.....	40
3.5.14	Swim Lane Diagram for register page	41
3.5.15	Swim Lane Diagram for login page	41
3.6	Hardware and Software Requirement	42
3.6.1	Hardware Requirement	42
3.6.2	Software Requirement.....	42
4	CHAPTER IV SYSTEM DESIGN.....	43
4.1	User Interface Design	43
4.2	Main Menu	43
4.3	Register Menu	45

4.4	Login Menu	46
4.5	Admin Login Menu	47
4.6	Admin Menu.....	48
4.7	Parking Data Menu	49
4.8	QR Generator Menu.....	50
4.9	Home Menu	52
4.10	Profile Menu	53
4.11	Ladies Parking Menu.....	54
4.12	Mall List Menu.....	55
4.13	Park Car Menu	56
4.14	Ladies Mall List Menu	58
4.15	Ticket Menu	59
4.16	Payment menu.....	60
4.17	Class Diagram.....	61
5	CHAPTER V SYSTEM IMPLEMENTATION.....	62
5.1	User Interface	62
5.1.1	Main Menu.....	62
5.1.2	Admin Login.....	64
5.1.3	Admin Page.....	66
5.1.4	Admin Parking Data.....	68
5.1.5	Landing Page	70
5.1.6	Profile	72
5.1.7	Ladies Parking.....	74
5.1.8	List Mall	76
5.1.9	Park Car	78
5.1.10	Ladies List Mall.....	80
5.1.11	Ticket.....	82

5.1.12	QR Code Generator.....	84
5.1.13	QR Code Scanner.....	86
5.1.14	QR Code Confirmation	88
5.1.15	Register.....	90
5.1.16	Login	91
5.2	Coding Explanation	92
5.2.1	MainActivity.java	92
5.2.2	Admin.java	93
5.2.3	adminpage.java	94
5.2.4	Parkingdata.java, CarsAdapter.java, CarsAdapterInterface	95
5.2.5	Landingpage.java	100
5.2.6	FirstFragment.java	101
5.2.7	SecondFragment.java	103
5.2.8	ThirdFragment.java.....	106
5.2.9	Listmall.java	108
5.2.10	ParkCarActivity.java & ParkCarModel.java	109
5.2.11	Ladieslist.java	113
5.2.12	TicketAdapter & TicketAdapterInterface.java	114
5.2.13	Qr.java, CaptureAct.java	116
5.2.14	qrscanner.java	118
5.2.15	Successful.java.....	119
5.2.16	Register.java	122
5.2.17	Loginpage.java.....	125
5.2.18	activity_main.xml	127
5.2.19	activity_admin.xml.....	130
5.2.20	activity_adminpage.xml	131
5.2.21	activity_parkingdata.xml	132

5.2.22	activity_landingpage.xml	134
5.2.23	fragment_first.xml.....	135
5.2.24	fragment_second.xml	136
5.2.25	fragment_third.xml.....	138
5.2.26	bottom_nav_menu.xml.....	140
5.2.27	activity_listmall.xml.....	141
5.2.28	activity_parkcar.xml.....	144
5.2.29	activity_ladieslist.xml	146
5.2.30	activity_successful.xml	149
5.2.31	activity_qrscanner.xml	151
5.2.32	activity_qr.xml.....	152
5.2.33	activity_register.xml.....	153
5.2.34	activity_loginpage.xml	155
5.2.35	searchmenu.xml	156
6	CHAPTER VI SYSTEM TESTING.....	157
6.1	Testing Environment.....	157
6.1.1	Application Testing Scenario	157
6.2	Testing Summary.....	160
7	CHAPTER VII CONCLUSION AND FUTURE WORKS	161
7.1	Conclusion.....	161
7.2	Future Works.....	161
	REFERENCES	162

LIST OF TABLES

Table 2.1 Remarks	17
Table 3.1 Table of Function Description	19
Table 3.2 Use Case Narrative for “Access Main Menu Page” Use Case	21
Table 3.3 Use Case Narrative for “Register Account to the System” Use Case	22
Table 3.4 Use Case Narrative for “Login Account to the System” Use Case ..	23
Table 3.5 Use Case Narrative for “Logout From the System” Use Case	24
Table 3.6 Use Case Narrative for “Logout From the System” Use Case	25
Table 3.7 Use Case Narrative for “Using the Find the Mall” Use Case	26
Table 3.8 Use Case Narrative for “Input the Car Registration to the System” Use Case	27
Table 3.9 Use Case Narrative for “Using Parking Ticket Menu” Use Case ..	29
Table 3.10 Use Case Narrative for “Using Parking Ticket Menu” Use Case ..	30
Table 3.11 Use Case Narrative for “Using the Payment” Use Case	31
Table 3.12 Use Case Narrative for “Admin QR Code Generator Menu” Use Case	32
Table 4.1 Label Description from Figure 4.1	43
Table 4.2 Label Description from Figure 4.1	45
Table 4.3 Label Description from Figure 4.2	46
Table 4.4 Label Description from Figure 4.3	47
Table 4.5 Label Description from Figure 4.4	48
Table 4.6 Label Description from Figure 4.5	49
Table 4.7 Label Description from Figure 4.6	51
Table 4.8 Label Description from Figure 4.7	52
Table 4.9 Label Description from Figure 4.8	54
Table 4.10 Label Description from Figure 4.9	55
Table 4.11 Label Description from Figure 4.10	56
Table 4.12 Label Description from Figure 4.11	57
Table 4.13 Label Description from Figure 4.12	58
Table 4.14 Label Description from Figure 4.1.14	59
Table 4.15 Label Description from Figure 4.1.15	61

LIST OF FIGURES

Figure 2.1: Working principle of an iterated hash function	9
Figure 2.2: One step of the compression function in MD5	10
Figure 2.3 QR Code Example	14
Figure 2.4 How QR Code Handle the Distortion	16
Figure 3.1 Use Case Diagram	20
Figure 3.2 Swim Lane Diagram of Main Menu Page	34
Figure 3.3 Swim Lane Diagram of Admin Login Page	35
Figure 3.4 Swim Lane Diagram of Admin Page	35
Figure 3.5 Swim Lane Diagram of Admin Parking Data Page	36
Figure 3.6 Swim Lane Diagram of Landing Page	36
Figure 3.6 Swim Lane Diagram of Second Fragment Page	37
Figure 3.7 Swim Lane Diagram of Third Fragment Page	37
Figure 3.8 Swim Lane Diagram of List Mall Page	38
Figure 3.9 Swim Lane Diagram of Parking Activity Page	38
Figure 3.10 Swim Lane Diagram of Ladies List Page	39
Figure 3.11 Swim Lane Diagram of Ticket Page	39
Figure 3.12 Swim Lane Diagram of QR Generator Page	40
Figure 3.13 Swim Lane Diagram of QR Scanner Page	40
Figure 3.14 Swim Lane Diagram of Register Page	41
Figure 3.15 Swim Lane Diagram of Login Page	41
Figure 4.1 Main Menu Interface Design	43
Figure 4.2 Register Menu Interface Design	45
Figure 4.3 Login Menu Interface Design	46
Figure 4.4 Admin Login Interface Design	47
Figure 4.5 Admin Menu Interface Design	48
Figure 4.6 Parking Data Menu Interface Design	49
Figure 4.7 QR Generator Menu Interface Design.....	50
Figure 4.8 Home Menu Interface Design	52
Figure 4.9 Profile Menu Interface Design	53

Figure 4.10 Ladies Parking Interface Design	54
Figure 4.11 Mall List Menu Interface Design	55
Figure 4.12 Park Car Menu Interface Design	56
Figure 4.13 Ladies List Menu Interface Design	58
Figure 4.14 Ticket Menu Interface Design	59
Figure 4.15 Payment Menu Interface Design	60
Figure 4.16 Class Diagram of The Application	61
Figure 5.1 Main Menu	63
Figure 5.2 Admin Login	64
Figure 5.3 Admin Page	67
Figure 5.4 Admin Parking Data	69
Figure 5.5 Landing Page	71
Figure 5.6 Profile	73
Figure 5.7 Ladies Parking	75
Figure 5.8 List Mall	77
Figure 5.9 Park Car	79
Figure 5.10 Ladies List Mall	81
Figure 5.11 Ticket	83
Figure 5.12 QR Code Generator	85
Figure 5.13 QR Code Scanner	87
Figure 5.14 QR Code Confirmation	90
Figure 5.15 Register	90
Figure 5.16 Login	91