



UNDERGRADUATE THESIS

PERISHABLE GOODS MANAGEMENT USING FEFO METHOD IN BREAD INVENTORY SYSTEM AT SLAY BAKEHOME STORE

PAULUS RANDI TRI WAHYUONO
NPM 19081010030

THESIS ADVISORS

Afina Lina Nurlaili, S.Kom., M.Kom.
Hazna At Thooriqoh, S.Tr.Kom., M.Kom

**MINISTRY OF HIGHER EDUCATION, SCIENCE, AND TECHNOLOGY
UNIVERSITAS PEMBANGUNAN NASIONAL VETERAN JAWA TIMUR
FACULTY OF COMPUTER SCIENCE
INFORMATICS STUDY PROGRAM
SURABAYA
2026**

APPROVAL SHEET

PERISHABLE GOODS MANAGEMENT USING THE FIRST EXPIRED FIRST OUT (FEFO) METHOD IN THE BREAD INVENTORY SYSTEM AT SLAY BAKEHOME STORE

By:

PAULUS RANDI TRI WAHYUONO
NPM. 19081010030

Has been defended before, and accepted by, the Board of Assessors of the Thesis Examination of the Informatics Study Program, Faculty of Computer Science, Universitas Pembangunan Nasional Veteran Jawa Timur, on June 12, 2026:

Approved,

Afina Lina Nurlaili, S.Kom., M.Kom.
NIP. 1993121 3202203 2010


.....

(Advisor I)

Hazna At Thooriqoh, S.Tr.Kom., M.Kom.
NIP. 19970320 202406 2 003


.....

(Advisor II)

Henni Endah Wahanani, S.T, M.Kom.
NIP. 19780922 202121 2 005


.....

(Assessor I)

Retno Mumpuni, S.Kom., M.Sc
NIP. 198707162025212045


.....

(Assessor II)

Acknowledge by,

Dean of the Faculty of Computer Science

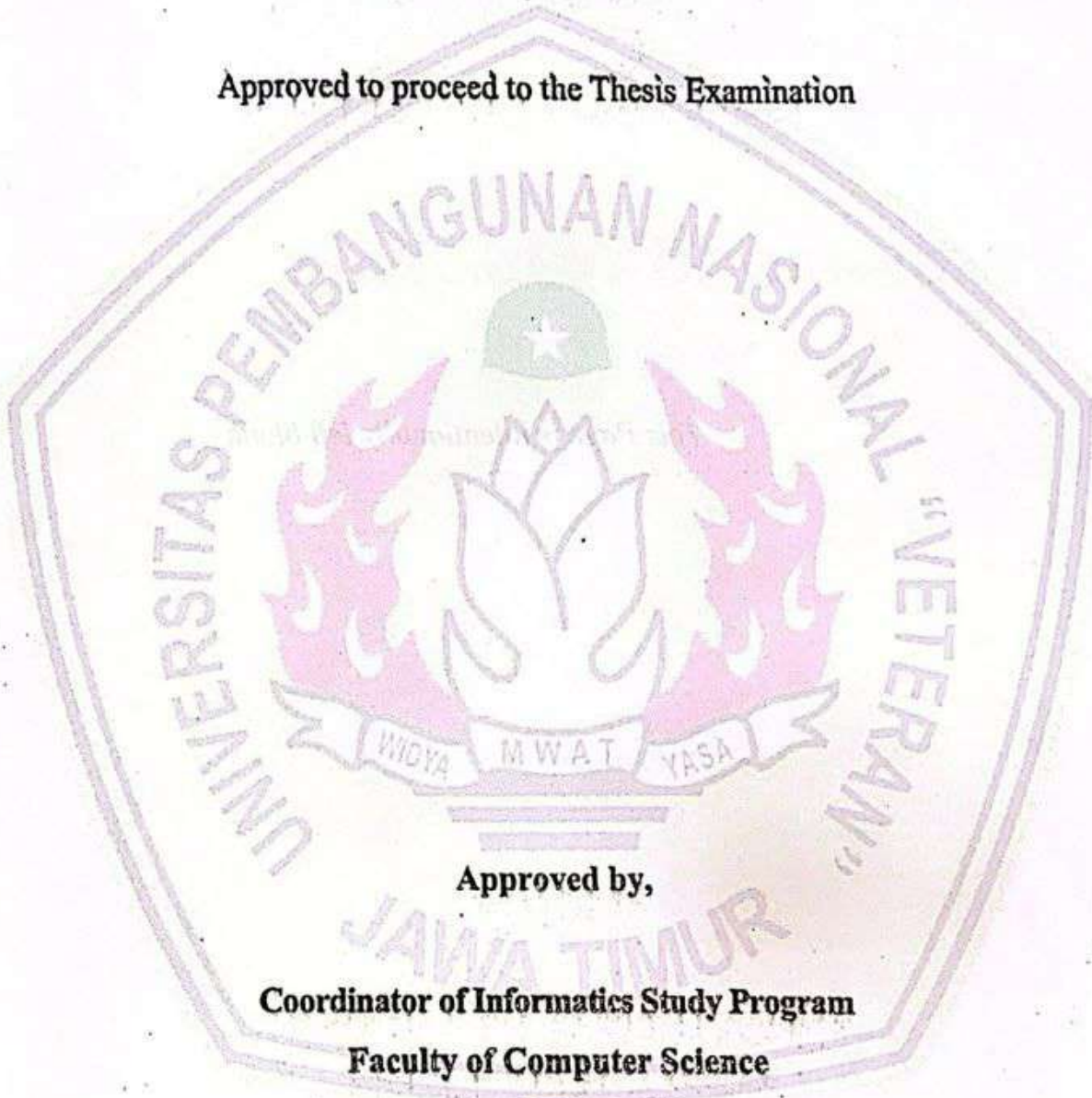

Prof. Dr. Ir. Novirina Hendrasarie, MT.
NIP. 19681126 199403 2 001

APPROVAL SHEET

**PERISHABLE GOODS MANAGEMENT USING FEFO METHOD IN
BREAD INVENTORY SYSTEM AT SLAY BAKEHOME STORE**

By :
PAULUS RANDI TRI WAHYUONO
NPM. 19081010030

Approved to proceed to the Thesis Examination



Approved by,

Coordinator of Informatics Study Program
Faculty of Computer Science

Dr. Intan Yuniar Purbasari, S.Kom. M.Sc

NIP. 198006022 025212 029

STATEMENT OF ORIGINALITY

I am the undersigned:

Student Name : Paulus Randi Tri Wahyuono
NPM : 19081010030
Degree Program : Bachelor (S1)
Study Program : Informatics
Faculty : Faculty of Computer Science

Hereby declares that this undergraduate thesis contains no part of any other scientific work that has been submitted to obtain an academic degree at any higher education institution. Furthermore, it does not contain any work or opinions previously written or published by others, except for those which are explicitly cited in this thesis and listed completely in references.

And I declare that this scientific document is free from elements of plagiarism. If in the future indications of plagiarism are found in this Thesis, I am willing to accept sanctions in accordance with the applicable laws and regulations.

Thus, I made this statement without any coercion from anyone and to be used as it should.



Surabaya, July 04 2026
Declarant,



METRA TEMPEL
97 18ACX075932520

PAULUS RANDI TRI WAHYUONO
NPM. 19081010030

ABSTRACT

Student Name / ID : Paulus Randi Tri Wahyuono / 19081010030
Thesis Title : Perishable Goods Management Using FEFO
Method in Bread Inventory System at Slay
Bakehome Store
Supervisors : 1. Afina Lina Nurlaili, S.Kom., M.Kom.
2. Hazna At Thooriqoh, S.Tr.Kom., M.Kom.

Slay Bakehome store faces challenges in managing perishable bread product inventory, where stock recording and sales processes are still conducted manually, potentially causing recording errors and increasing the risk of expired products. This research aims to design and develop a web-based sales information system by implementing the First Expired First Out (FEFO) method to optimize inventory management and minimize losses due to expired products. The research methodology includes observation and interviews for data collection, system design using UML, web-based system implementation, and testing using black-box testing. The system was developed by implementing the FEFO algorithm to ensure that products with earlier expiration dates are prioritized in the sales process. The research results demonstrate that the system is capable of managing production, inventory, and sales data in an integrated manner, providing real-time stock information, and generating fast and accurate reports. With the implementation of the FEFO method, this system has proven effective in minimizing the risk of expired products, reducing recording errors, and improving operational efficiency and the quality of managerial decision-making at Slay Bakehome.

Keywords : Sales Information System, First Expired First Out (FEFO), Inventory Management, Product Stock, Web-Based

ACKNOWLEDGEMENT

All praise and gratitude to God Almighty for all His blessings, guidance, and grace upon the author, so that the thesis entitled **“Perishable Goods Management Using Fefo Method In Bread Inventory System At Slay Bakehome Store”** could be completed successfully.

The author would like to express gratitude to everyone who has helped and supported. The author has also received a great deal of assistance from various parties, whether in moral, spiritual, or material form. For that, the author would like to express gratitude to:

1. Mr. Prof. Dr. Ir. Akhmad Fauzi, M.MT., IPU., as Rector of Universitas Pembangunan Nasional “Veteran” Jawa Timur,
2. Mrs. Prof. Dr. Ir. Novirina Hendrasarie, MT as the Dean of the Faculty of Computer Science, Universitas Pembangunan Nasional “Veteran” Jawa Timur.
3. Mrs. Dr. Intan Yuniar Purbasari, S.Kom., M.Sc. as the Head of the Informatics Study Program, Faculty of Computer Science, Universitas Pembangunan Nasional “Veteran” Jawa Timur.
4. Mrs. Afina Lina Nurlaili, S.Kom., M.Kom. and Mrs. Hazna At Thooriqoh, S.Tr.Kom., M.Kom. as thesis supervisors who continuously provided guidance from the beginning of the preparation until this report was signed.
5. Mr. Andreas Nugroho Sihananto, S. Kom as the thesis coordinator who organized the entire thesis process so that it proceeded smoothly.
6. The lecturers of the Informatics Study Program who have provided a wealth of knowledge and experience during the course of study.
7. Beloved family, parents, and siblings who have provided endless prayers, support, and love in completing this thesis.
8. To Celine Anastasia Setiawan, who has continuously provided support, prayers, motivation, attention, and served as a place to share throughout the process of preparing this thesis until it could be completed successfully.
9. Fellow colleagues in the Undergraduate Informatics Study Program, Faculty of Computer Science, Universitas Pembangunan Nasional “Veteran” Jawa Timur who have always provided support and encouragement.

10. As well as all parties who have provided support, who cannot be mentioned one by one by the author.

The author acknowledges that there are many shortcomings in the preparation of this thesis. The process of completing this thesis has provided invaluable learning experiences, from understanding the practical needs of business operations to developing a system that addresses real-world challenges in perishable goods management. Through this journey, the author has gained deeper insights into system development methodologies, inventory management principles, and the importance of bridging the gap between academic knowledge and practical application. Therefore, constructive criticism and suggestions from all parties are highly expected for the improvement and enhancement of this thesis. Finally, with all the limitations that the author possesses, it is hoped that this report can be beneficial for all parties in general and for the author in particular, as well as serve as a reference for future research in the field of information systems and inventory management.

Surabaya, July 4 2026

Author,
Paulus Randi Tri Wahyuono

TABLE OF CONTENTS

TITLE PAGE SHEET	ii
APPROVAL SHEET	iii
STATEMENT OF ORIGINALITY	vii
ABSTRACT	ix
ACKNOWLEDGEMENT	xi
TABLE OF CONTENTS.....	xiii
LIST OF FIGURES	xvii
LIST OF TABLES	xix
LIST OF PROGRAM CODES	xxi
CHAPTER I INTRODUCTION.....	1
1.1 Background.....	1
1.2 Problem Formulation.....	3
1.3 Research Objectives	3
1.4 Research Benefits	3
CHAPTER II LITERATURE REVIEW	5
2.1 Previous Research	5
2.2 Information System Concepts	7
2.2.1 Definition of System.....	7
2.2.2 Definition of Information	7
2.2.3 Definition of Information System	8
2.2.4 Components of Information System.....	9
2.2.5 Objectives and Benefits of Information System.....	10
2.3 Sales Information System.....	10
2.3.1 Definition of Sales System	10
2.3.2 Sales Business Process in Bakery Stores.....	11
2.3.3 Common Problems in Manual Sales Systems	11
2.3.4 Role of Information Systems in Improving Sales Efficiency.....	12
2.4 Inventory Management.....	12
2.4.1 Definition of Inventory Management.....	12
2.4.2 Objectives of Inventory Management	13

2.4.3 Inventory Management Methods.....	13
2.4.4 Expired Product Risks in Bakery Products	14
2.5 FEFO Algorithm (FIRST EXPIRED FIRST OUT)	15
2.5.1 Definition of Algorithm.....	15
2.5.2 Basic Concept of FEFO	15
2.5.3 Working Principle of FEFO in Bread Inventory	16
2.5.4 Advantages and Disadvantages of FEFO Method.....	16
2.5.5 FEFO Implementation for Short Shelf-Life Products	17
2.6 Waterfall	18
2.7 Website and Supporting Technologies	19
2.7.1 Definition of Website	19
2.7.2 Website as Information System Medium	19
2.7.3 Programming Languages and Database	20
2.7.4 Advantages of Web-Based Systems	21
CHAPTER III METHODOLOGY.....	23
3.1 Research Stages	23
3.1.1 Data Collection.....	23
3.1.2 System Design	25
3.1.3 System Development.....	25
3.1.4 System Testing	26
3.2 First Expired First Out (FEFO) Algorithm.....	26
3.3 Waterfall	34
3.3.1 System Requirements Analysis	35
3.3.2 System Design	36
3.3.3 System Flowchart	38
3.3.4 Use Case Diagram	40
3.3.5 Activity Diagram	42
3.3.6 Class Diagram	46
3.3.7 Sequence Diagram.....	48
CHAPTER IV RESULTS AND DISCUSSION	53
4.1 Programming Tools	53
4.2 Code Implementation	53

4.3	Information System Workflow	55
4.3.1	Login Page	55
4.3.2	Dashboard Page.....	56
4.3.3	Product Management Page.....	57
4.3.4	Stock Management Page	57
4.3.5	Sales Transaction Page.....	58
4.3.6	Transaction History Page	59
4.3.7	Sales Report Page.....	59
4.3.8	Low-Demand Bread Page	60
4.4	System Testing Scenarios	61
4.5	System Testing Results.....	63
4.5.1	Admin Functional Testing Results	63
4.5.2	FEFO Method Testing Results.....	64
4.6	Discussion.....	67
CHAPTER V	CONCLUSION	69
5.1	Conclusion.....	69
5.2	Recommendations	69
REFERENCES		71
APPENDICES		73

LIST OF FIGURES

Figure 3.1	Research Stages	23
Figure 3.2	Flowchart of the Algorithm First Expired First Out (FEFO).....	27
Figure 3.3	System Flowchart	38
Figure 3.4	Use Case Diagram Admin and Cashier	41
Figure 3.5	Activity Diagram Login.....	43
Figure 3.6	Activity Diagram Managing Product Data	44
Figure 3.7	Activity Diagram Adding New Product	45
Figure 3.8	Activity Diagram Editing Product	46
Figure 3.9	Class Diagram.....	47
Figure 3.10	Sequence Diagram Login.....	48
Figure 3.11	Sequence Diagram Managing Product Data	49
Figure 3.12	Sequence Diagram Adding New Product	50
Figure 3.13	Sequence Diagram Editing Product.....	52
Figure 4.1	Login Page	55
Figure 4.2	Dashboard Page	56
Figure 4.3	Product Management Page	57
Figure 4.4	Stock Management Page.....	57
Figure 4.5	Sales Transaction Page	58
Figure 4.6	Transaction History Page.....	59
Figure 4.7	Sales Report Page	59
Figure 4.8	Low-Demand Bread Page.....	61
Figure 4.9	Stock Data Before Transaction	65
Figure 4.10	Sales Transaction Process	66
Figure 4.11	Stock Data After Transaction	66

LIST OF TABLES

Table 3.1 Interview Questions with the Store Owner	23
Table 4.1 System Testing Scenarios	62
Table 4.2 Admin Functional Testing Results.....	63
Table 4.3 FEFO Method Testing Results.....	64

LIST OF PROGRAM CODES

Program Code 4. 1 Stock Data Retrieval	54
Program Code 4. 2 Stock Quantity Update	54