

**JAVA DESKTOP ASSIGNMENT**

**BUILDING A SOFTWARE MANAGING GOODS RECEIPT AND GOODS DELIVERY OF A GROCERY STORE’S STORAGE**

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**Class:** SE1401

**Subject:** PRJ311 – Desktop Java Applications

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**ACKNOWLEDGEMENTS**

Thanks to the instructions of Mr. Luong Hoang Huong, our group has made a project “Building a software managing goods receipt and goods delivery of a grocery’s store storage”. To finish this project, our group wants to say thanks to Mr. Luong Hoang Huong for supporting and orientating us.

Although we have tried our best to do the project, it cannot be denied that we may lack of knowledge about coding and programming, and the lack of experience to do the project. That is the reason why this project may contain errors and problems. We hope that we can get feedbacks from teachers to improve the project, hence to get more experience for the later one.

We sincerely thanks!

**LIST OF TABLES**

Table 1: List of terminologies and acronyms

Table 2: Task sheet

Table 3: Unit testing check list

Table 4: Final check list

**LIST OF PICTURES**

Picture 1: The logo of Java Programming Language

Picture 2: The logo of Microsoft SQL Server

Picture 3: The use-case diagram

Picture 4: Login GUI of the software

**ABSTRACT**

Currently, information technology in our country is changing and developing rapidly, increasingly becoming a leading important field of our country, and weaving throughout our society.

Especially in business, the apply of information of technology has become more and more popular. In the past, all the works had to be done manually which requires lots of paperwork.

Due to the increase of customers’ need, Xuan Mai Grocery Store (specializes in wholesaling and retailing grocery and essential goods) in Binh Thuy District, Can Tho City, is in need to build a database to manage the receipt and issue of goods in the warehouse. This project will help that store to build a software (Using Java programming language for coding and Java Swing for designing GUI) in order to avoid wasting of time in managing all the paperwork and enhance the efficiency when managing and making statistics about the product.

**TABLE OF CONTENTS**

[**I.** **INTRODUCTION TO THE PROJECT** 8](#_Toc36250332)

[1. Problem definition 8](#_Toc36250333)

[2. The goal of the project 8](#_Toc36250334)

[3. Objects and the range of the project 9](#_Toc36250335)

[4. Contents for research 9](#_Toc36250336)

[5. The main contributions of the project 9](#_Toc36250337)

[6. The layout of the document 9](#_Toc36250338)

[**II.** **CONTENT OF THE PROJECT** 10](#_Toc36250339)

[1. Problem description 10](#_Toc36250340)

[a) Introduction 10](#_Toc36250341)

[b) Java Programming Language 10](#_Toc36250342)

[c) Microsoft SQL Server 11](#_Toc36250343)

[d) Context to choose the project 12](#_Toc36250344)

[e) Components in the database description 12](#_Toc36250345)

[f) Functional Requirement 14](#_Toc36250346)

[g) Management objectives 14](#_Toc36250347)

[h) Important output factors 14](#_Toc36250348)

[2. Project plan 15](#_Toc36250349)

[3. Designing the software based on requirement specification 16](#_Toc36250350)

[a) Software overview 16](#_Toc36250351)

[b) Use - case diagram 17](#_Toc36250352)

[c) Main functions of the software 18](#_Toc36250353)

[4. Task sheet 19](#_Toc36250354)

[**III.** **CONCLUSION TO THE PROJECT** 20](#_Toc36250356)

[1. Project review and monitoring report 20](#_Toc36250357)

[2. Unit testing check list 22](#_Toc36250358)

[3. Final check list 22](#_Toc36250359)

**TERMINOLOGIES AND ACRONYMS**

|  |  |
| --- | --- |
| **Terminologies / Acronyms** | **Definition** |
| IDE | Integrated Development Environment |
| SQL | Structured Query Language |
| WORA | Write once, run anywhere |
| JVM | Java Virtual Machine |

*Table 1: List of terminologies and acronyms*

1. **INTRODUCTION TO THE PROJECT**
2. Problem definition

* There are many fields that are applying information technology into management such as health care, education, banking and retail. The accuracy, quickness and diversity of management functions of management software products help reduce effort and improve work efficiency and gained a lot of achievement. In addition, applying IT in business field is getting more and more popular, especially with all people who are making business. They want to find a method in order to manage all the products easier instead of managing them by paperwork
* In the past, all these business’s transactions are done manually which requires lots of paperwork. This leads to the difficulty of maintenance and increases the possibility of the discrepancies in data. Even data retrieving also becomes hectic with this system. In order to avoid the waste of time and enhance the efficiency when working, a software that can be managed all the products in a store and can have many useful functions such as making statistics about product or managing the status and the availability of the product is really necessary.

1. The goal of the project

* The goal of the subject is to create a software that containing database and other necessary functions for product’s management. By using Java programming language (with NetBeans IDE) as the main coding language for this software and using Microsoft SQL Server software as the program for containing the database (using SQL Language).
* The program allows users to add information of goods, suppliers, information and staff sessions, inventory details and receipt-issue details. The project's product is the database named QLKHO. This is the database to manage the warehouse

1. Objects and the range of the project

* The objects for this document are anyone whose are interesting and having passion of using Java Programming Language by NetBeans IDE, using Microsoft SQL Server for management.
* The range of the project is the base knowledge about how to program desktop software using Java Programming Language by NetBeans IDE and how to manage database using Microsoft SQL Server. Moreover, the database about the products have been retrieved from the storage of Xuan Mai’s Grocery Store.

1. Contents for research

* The main contents for researching this project:
* Programming with Java
* Connecting database with Microsoft SQL Server

1. The main contributions of the project

* About the theory
* Knowledge of programming with Java
* Knowledge of manipulating data on Microsoft SQL Server
* Knowledge of uploading data from Microsoft SQL Server into the design of GUI (Using Java Swing)
* About the software
* The software has been installed and tested. It meets practical needs.

1. The layout of the document

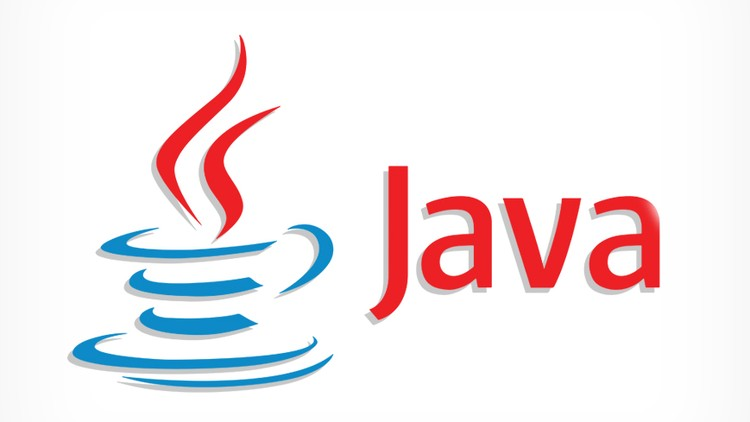
* The document consists of three main parts:
* Part 1: Introduction to the project: Giving problem definition, the goal of the project, Objects and the range of the project, Contents for research, and the main contributions of the project
* Part 2: Content of the project: Giving the problem description, Project plan, Designing the software based on requirement specification, Task sheet and Testing and evaluating the software
* Part 3: Conclusion to the project: Giving what it has been done, the limitation of the project and the later development of the project.
* Finally, the layout includes the references

1. **CONTENT OF THE PROJECT**
2. Problem description
3. Introduction

* The goal of this section is to provide general information to the reader about the system is based on the functional description of the product so that readers understand the function of each component in the product and to show the relationship between the components in the product

1. Java Programming Language

* Java is a general-purpose programming language that is class-based, object-oriented, and designed to have as few implementation dependencies as possible. It is intended to let application developers write once, run anywhere (WORA), meaning that compiled Java code can run on all platforms that support Java without the need for recompilation. Java applications are typically compiled to bytecode that can run on any Java virtual machine (JVM) regardless of the underlying computer architecture. The syntax of Java is similar to C and C++, but it has fewer low-level facilities than either of them. As of 2019, Java was one of the most popular programming languages in use according to GitHub, particularly for client-server web applications, with a reported 9 million developers.



*Picture 1: The logo of Java Programming Language*

1. Microsoft SQL Server

* Microsoft SQL Server is a relational database management system developed by Microsoft. As a database server, it is a software product with the primary function of storing and retrieving data as requested by other software applications—which may run either on the same computer or on another computer across a network (including the Internet).
* Microsoft markets at least a dozen different editions of Microsoft SQL Server, aimed at different audiences and for workloads ranging from small single-machine applications to large Internet-facing applications with many concurrent users.



*Picture 2: The logo of Microsoft SQL Server*

1. Context to choose the project

* Currently in Can Tho, there are many grocery stores, cafes and supermarkets that have used management software, so management software is a potential and attractive topic for students and the IT
* Due to the increasing in customers’ need and increasing in number of goods, so that Xuan Mai grocery store is needing to build a database to manage goods, instead of using traditionally method which was managing those by paperwork.

1. Components in the database description

* The goods in stock are provided by many different suppliers and each supplier can provide multiple goods. Supplier information includes: Supplier ID, Supplier Name, Supplier Address, Supplier Email and Supplier Phone Number.
* Each good will have information including: Goods ID, Unit, Name of goods, Date of manufacture, Expiry date and the minimum quantity required in the warehouse of that goods.
* In a day, there will be different shifts for each employee and multiple employees may work in the same shift in a day. Information on the shift including: Shift order number, Salary of shift, Start time of shift and End time of shift. Employees can check the schedule to know their working time in a day.
* There will be different goods receipt batches in a day and each batch will have a process manager. Every goods receipt batches, the following details will be stored: Goods receipt ID, Receipt amount, Goods receipt’s price, receipt’s time and notes of that goods receipt.
* Similar to goods receipt, there will be different goods issue batches in a day and each batch will have a process manager. Every goods issue batches, the following details will be stored: Goods issue ID, Issue amount, Goods issue’s price, issue’s time and notes of that goods issue.
* In every goods issue, the goods will be delivered to a certain destination and there may be multiple locations for one goods issue. Information of the receiving location including: Location ID, Name of receiving place, Receiving address and Contact phone number at the receiving location.
* At the receiving location, the goods will be delivered to the customers. Customer information is including: customer ID, customer name and customer phone number.
* At the end of each day, an employee will take responsibility for stocktaking, and at the same time check the status of existing goods in stock. The information of an inventory is saved as follows: Stock inventory’s ID, Goods existing quantity, Stock’s status and Good inventory’s time.

1. Functional Requirement

* Print out details of all receipt - issue information
* Calculate the total amount of receipts- expenses in receipt-issue in a day
* Calculate the total salary of the employee in a day.
* Check goods that need to be receipt on the next day (if the remaining good’s stock in the inventory at the time of inventory is less than the minimum amount of that goods)
* Check the amount of issue of any goods
* Find employee information
* Print out goods receipt-goods issue details at a fixed time (day, month or year)
* Check the status of goods based on end of day inventory

1. Management objectives

* Managing receipt-issue of goods, goods’ consumption and distribution of each type of goods in a certain period of time (1 day, 1 month to 1 quarter)
* Manage the work of the storekeeper, from that paying the appropriate salary for them.

1. Important output factors

* The list of items currently in store and in stock
* List of storekeeper staff currently working
* The total amount of money receipts - expenses in daily receipt-issue based on the number of products, items already receipt-issue in that day.
* Total salary of the employee in 1 day.
* List of items to receipt in the next day
* Check the income statement in the business based on the total amount of revenue and expenditure in that month for the receipt and issue of goods and the monthly salary of employees

1. Project plan

After choosing the topic for the assignment, our group figured out the list of tasks that each member should have done during the project – doing period.

* Selecting topic for assignment
* Dividing tasks for each member
* Preparing document
* Making introduction
* Making problem description
* Making customer requirement specification
* Drawing use – case diagram
* Thinking and using suitable algorithms
* Making unit testing check list
* Checking the whole document
* Coding
* Displaying menu for staffs / admin
* Creating methods for adding / updating / deleting products for admin
* Creating methods for adding / updating / deleting suppliers for admin
* Creating methods for managing goods receipt for staffs
* Creating methods for managing goods delivery for staffs
* Creating methods for checking products at the end of the day
* Creating test cases for each method
* Preparing presentation
* Checking document and code sample
* Presenting

1. Designing the software based on requirement specification
2. Software overview

* Software functions:
* Ensuring accuracy, consistency, ease of use, and maintenance requirements.
* Functions that respond quickly to user requests.
* Context:
* Meet the research requirement and the needs of users.
* Design:
* Friendly interface easy to use layout of logical buttons.
* Icons are suggestive, and the messages are easy to understand.
* The program is easy to understand and support the upgrade phase

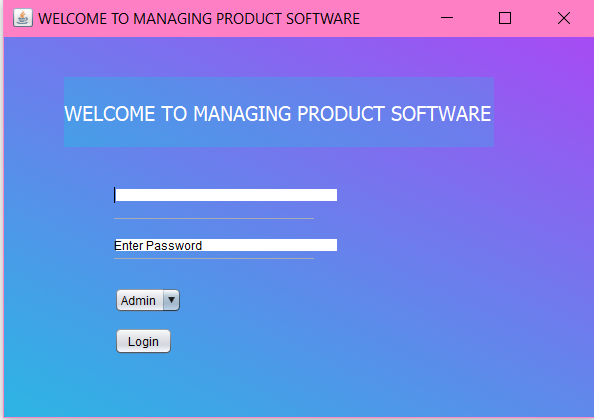
1. Use - case diagram

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*Picture 3: The use-case diagram*

1. Main functions of the software
   * Displaying menu for staffs / admin: When executing the program, the menu will appear and ask for login. Based on user’s choice and fill in the login form (account, password), the method will login into the software as admin or staffs. If wrong information was input in the form, alert user
   * Creating methods for adding / updating / deleting products for admin: In the admin’s menu, admin has the permission to add, update, and delete product based on the information in the database stored. When executing, return the result for the admin about the status of the method that user has chosen to modify the products in the database.
   * Creating methods for adding / updating / deleting suppliers for admin: In the admin’s menu, admin has the permission to add, update, and delete suppliers based on the information in the database stored. When executing, return the result for the admin about the status of the method that user has chosen to modify the suppliers in the database.
   * Creating methods for managing goods receipt for staffs: In the staff’s menu, staff has the permission to manage the goods receipt. When executing, return the result for the staff about the status of the goods receipt process.
   * Creating methods for managing goods delivery for staffs: In the staff’s menu, staff has the permission to manage the goods delivery. When executing, return the result for the staff about the status of the goods delivery process.
   * Creating methods for checking products and exporting to Excel at the end of the day: In the admin menu, admin has the permission to check the availability of the product, and can export the table from JTable into Excel file



*Picture 4: Login GUI of the software*

1. Task sheet

The following table would specifically describe the plan for this project as well as tasks division for each member in the group.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SN** | **Task** | **Person in charge** | **Start date** | **End date** | **Note** |
| 1 | Selecting topic for assignment | All members | 19/02/2020 | 19/02/2020 |  |
| 2 | Dividing tasks | Nghĩa | 26/02/2020 | 26/02/2020 |  |
| 3 | Making project’s introduction + problem definition (document) | Vinh | 26/02/2020 | 27/03/2020 |  |
| 4 | Making project’s customer requirement specification (document) | Vinh | 26/02/2020 | 27/03/2020 |  |
| 5 | Drawing use – case diagram (document) | Thuận + Nghĩa | 26/02/2020 | 27/03/2020 |  |
| 6 | Thinking and using suitable algorithms (code) | All members | 26/02/2020 | 27/03/2020 |  |
| 7 | Displaying menu for staffs / admin (code) | Vinh | 26/02/2020 | 27/03/2020 |  |
| 8 | Creating methods for adding / updating / deleting products for admin (code) | Nghĩa | 26/02/2020 | 27/03/2020 |  |
| 9 | Creating methods for adding / updating / deleting suppliers for admin (code) | Vinh | 26/02/2020 | 27/03/2020 |  |
| 10 | Creating methods for managing goods receipt for staffs (code) | Thuận | 26/02/2020 | 27/03/2020 |  |
| 11 | Creating methods for managing goods delivery for staffs (code) | Thuận | 26/02/2020 | 27/03/2020 |  |
| 12 | Creating methods for checking products and exporting to Excel | Thuận + Nghĩa | 26/02/2020 | 27/03/2020 |  |
| 13 | Creating test cases for each method (code + document) | Thuận + Nghĩa | 26/02/2020 | 27/03/2020 |  |
| 14 | Preparing document | All members | 26/02/2020 | 27/03/2020 |  |
| 15 | Checking document and code sample (presentation) | All members | 26/02/2020 | 27/03/2020 |  |
| 16 | Preparing presentation | All members | 26/02/2020 | 27/03/2020 |  |
| 17 | Presenting | All members | N/A | N/A |  |

*Table 2: Task sheet*

1. **CONCLUSION TO THE PROJECT**
2. Project review and monitoring report

* General review
* Our group has basically completed the project with the support of all group’s members and the instruction of teacher.
* All members try their best in order to complete given tasks, although there are many difficulties when doing the project.
* There are still many issues in both coding and making document that our group has not finished fixing yet.
* Advantages
* All members support each other to finish the task
* Each member has their own strengths to do the suitable tasks.
* Disadvantages
* Due to some members are not good at code or not good at preparing document, the given tasks are somehow inequal to members.
* Our group started at the end of the deadline, so all the tasks cannot be fully completed and checked before presenting.
* Project report
* Document
* All of members have participated in making document.
* All the given tasks from the project has been approximately approached.
* Diagrams have been drawn basically but not fully functional completed.
* The document has been checked carefully before submitting and presenting.
* Code
* The code is mainly done by one member, others supported.
* The code’s structure is not well-organized.
* The code is not well-optimized
* The code is not well-designed

1. Unit testing check list

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SN** | **Check task** | **Expected Result** | **Status** | **Note** |
| 1 | Display the initial menu, staff’s menu and admin’s menu | True | Passed |  |
| 2 | Input correct password for admin and staffs | True | Passed |  |
| 3 | Modify products | True | Passed |  |
| 4 | Modify suppliers | True | Passed |  |
| 5 | Display goods receipts information | True | Passed |  |
| 6 | Display goods delivery information | True | Passed |  |
| 7 | Display the check of products in the database | True | Passed |  |
| 8 | Input wrong username or wrong password when login | False | Passed | Alert user |
| 9 | Input wrong format of price | False | Passed | Alert user |
| 10 | Input wrong format of phone number | False | Passed | Alert user |
| 11 | Input wrong format of email | False | Passed | Alert user |
| 12 | Input wrong format of quantity | False | Passed | Alert user |
| 13 | Miss fields when inputting product | False | Passed | Alert user |
| 14 | Input NULL at non-NULL fields | False | Passed | Alert user |

*Table 3: Unit testing check list*

1. Final check list

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SN** | **Task** | **Person in charge** | **Status** | **Evaluation** | **Note** |
| 1 | Selecting topic for assignment | All members | Finished | 100% |  |
| 2 | Dividing tasks | Nghĩa | Finished | 80% |  |
| 3 | Making project’s introduction + problem definition (document) | Vinh | Finished | 80% |  |
| 4 | Making project’s customer requirement specification (document) | Vinh | Finished | 80% |  |
| 5 | Drawing use – case diagram (document) | Thuận + Nghĩa | Finished | 70% |  |
| 6 | Thinking and using suitable algorithms (code) | All members | Finished | 80% |  |
| 7 | Displaying menu for staffs / admin (code) | Vinh | Finished | 90% |  |
| 8 | Creating methods for adding / updating / deleting products for admin (code) | Nghĩa | Finished | 70% |  |
| 9 | Creating methods for adding / updating / deleting suppliers for admin (code) | Vinh | Finished | 70% |  |
| 10 | Creating methods for managing goods receipt for staffs (code) | Thuận | Finished | 70% |  |
| 11 | Creating methods for managing goods delivery for staffs (code) | Thuận | Finished | 70% |  |
| 12 | Creating methods for checking products and exporting to Excel (code) | Thuận + Nghĩa | Finished | 80% |  |
| 13 | Creating test cases for each method (code + document) | Thuận + Nghĩa | Finished | 70% |  |
| 14 | Preparing document | All members | Finished | 70% |  |
| 15 | Checking document and code sample (presentation) | All members | Finished | 70% |  |
| 16 | Preparing presentation | All members | Finished | 70% |  |
| 17 | Presenting | All members | N/A |  |  |

*Table 4: Final check list*

**REFERENCES**

1. Wikipedia: Java (programming language)

<https://en.wikipedia.org/wiki/Java_(programming_language)>

1. Wikipedia: Microsoft SQL Server

<https://en.wikipedia.org/wiki/Microsoft_SQL_Server>