*Department of Information Systems*

***Systems Design & Development***

**

**Systems Specification for** *[Project Name]*

***Team Members***

|  |  |
| --- | --- |
| ***BRRDEO001*** | ***Deony Barrington*** |
| ***MCHMOM001*** | ***Momelezi Mchunu*** |

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1. We know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.
2. This Systems Specification is our own work.
3. We have not allowed, and will not allow, anyone to copy our work with the intention of passing it off as their own work.

Full Name: \_\_Deony Barrington\_\_\_\_\_\_\_\_\_\_\_ Signed:\_\_\_\_\_D.Barrington\_\_ Date: \_\_13/\_10\_/2020

Full Name: \_\_\_Momelezi Mchunu\_\_\_\_\_\_\_\_\_\_\_ Signed:\_\_M.Mchunu\_\_\_\_ Date: \_\_18\_/\_11\_/2020

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# Introduction

## Context & Scope of System Specification

Poppel is a confectionary and soft drink manufacturing and importing company, established in 2003. Poppel’s current system is both labour intensive and inefficient, with a number of inherent problems. They also received a lot of customer complaints, including but not limited to incorrect invoices received, incorrect statements , incorrect balances and delays in orders being delivered. In order to solve these problems, Poppel decided to have a system designed and implemented to reduce the amount of errors made during the ordering process and thus increasing their overall sales by at least 5%. The system (solution) needs to allow creating a customer, customer order, reserve inventory items, cancel an item, generate a picking list and identify all expired products in the inventory. This is minimal functionality, and the more the system is capable of, the more of Poppel’s problems will be reduced. The system will therefore do the following:

* Create and maintain customer details
* Create and keep track of orders
* Keep track of and update inventory
* Generate picking list
* Generate report of expired products in inventory

Poppel Package Diagram

*Diagram

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*Figure 1: Package Diagram (Poppel)*

The system that is to be designed and implemented is part of the order processing package. The scope of the system is:

In Scope:

* Order Processing
  + Stock Availability Check
  + Order Capturing
  + Credit Check
  + Customer Details Check
* Marketing
* Financial
  + Creditors
  + Debtors
* Warehouse
  + Inventory
  + Picking Bay
  + Dispatch Bay
* Manufacturing
* Provincial Delivery
* Head Office
  + IT Department

Out of Scope:

* National Delivery
* Supplier
* Bank

## Overview Of Specification

The System’s Specification (this document) is an overview of the required functionality of a system, among other things. This document is follow up of the Business Case as well as the User Requirements Specification (URS).

In the Business Case, the current structure and functioning of the business, Poppel, had been outlined. This helped identify problematic areas, but also justified as to why this particular project had to be done and evaluated the benefits, costs and risks of alternative solutions. From the Business Case, the preferred solution had been identified by Poppel, and the project continued from there. After identifying the problem and the preferred solution, the project moved on to the URS, where the *user* requirements were outlined. This is a basis for identifying the functional requirements as well as the system design, which is laid out in this System Specification (this document).

Following this order allowed us to identify the problem, evaluate solutions and then obtain the user requirements, which made it a lot easier to identify the functionality of the system to be built as well as decide on the design, as mentioned above. This logical flow of events makes the overall development of the project much easier, and also allowed us to do each phase of the project in a concise and detailed manner, minimizing the possibility of missing functionality or user requirements when building the project. What’s left on the horizon is identifying the system specification and the design, which is done in this document. Finally, the last phase of the project will be to develop the system.--

## Design Assumptions & Constraints

Assumptions

* Required resources to install and maintain the system will be available
* System inventory records are always up to date
* Customers qualify for credit (i.e. they have a good credit record and is not black listed)
* The system assumes that each username, password and ID number will be unique
* Integration of the system with Poppel’s other current systems will be successful
* The order will be made telephonically via the marketing clerk
* Picking clerk, dispatch clerk and packing clerk all uses tablets to access the system

Constraints

* Time – not enough time to achieve all desired functionality
* Memory – the system uses a lot of secondary memory, therefore if the system is used with

thousands of entries, it will use a lot of memory

# User Interface & Dialogue Design

This section aims to outline the user interface (screens with which the user will interact) when the user is using the system. It contains a detailed description of the graphic representation of each interface, defines all data elements associated with each screen or graphical user interface. It also contains an overview of the criteria for the data elements.

## Windows Navigation Document

The following diagram shows the flow of the screens (UI) in the system, starting with the login screen:

Diagram

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*Figure 2: Screen Navigation Diagram*

* When signing in, the marketing clerk will be taken to the customers screen, from which he/she can decide whether to create an order, view the order history, view credit status of a customer or to view customer details

## Screen Standards And Detailed Screen Layout

This section shows each screen’s initial design and screen standards. *Please note that the design might be different to the final design.*

2.2.1 Login Screen

A picture containing indoor, photo, toy, food

Description automatically generated

*Figure 3.1: Login Screen*

***Screen Standards***

|  |  |
| --- | --- |
| Purpose | Correspond username to access rights, determining which part of the program the user can go to after login.  Disables any required functionality that user does not have access to. |
| Layout | Username textbox focused in order to guide user as to where to start and what to do |
| Font | Times New Roman |
| Font size | Varies between titles, buttons and labels. |
| Colour choice | Background – colourful; makes system fun to use  Components – white; contrasts with background, making visibility easier  Text – Text on components: black, contrasts with component background, ensuring visibility  Text – Title (Poppel): White; contrasts with background to enhance visibility |
| Data structures | Local variables to store username and password, to compare to usernames and passwords in database. |

*Figure 3.2: Table detailing screen standards*

2.2.2 Order Capture Form

*A picture containing timeline

Description automatically generated*

*Figure 3.3: Order Capture Screen for Poppel System*

|  |  |
| --- | --- |
| Purpose | Captures details used to create an order object. Information also get stored in a database that keeps track of all orders. |
| Layout | All the information on the right will be filled in automatically once the customer has been entered (except for delivery date). The list box on the left will display all the products added. Once the user clicks on add, the product details will be added to the products list box and the components with information will be cleared. |
| Font | Times New Roman |
| Font size | 18 |
| Colour choice | Background – colourful; makes system fun to use  Components – white; contrasts with background, making visibility easier  Text – Text on components: black, contrasts with component background, ensuring visibility |
| Data structures | Local variables to store input, database to which the data gets written to, collection to store all order items of an order. |

*Figure 3.4: Table detailing screen standards*

2.2.3 Customer Information Form

*A picture containing qr code

Description automatically generated*

*Figure 3.5: Expired Products Report Screen, Poppel System*

|  |  |
| --- | --- |
| Purpose | Provides a list of expired products in inventory |
| Layout | Company and form title at the top; list view box |
| Font | Times New Roman |
| Font size | Varies by components |
| Colour choice | Background – light blue; chosen as opposed to the colourful background to prevent the screen from being too busy, making it hard to focus on the information  List view – white; contrasts with background, making visibility easier  Text – black, contrasts with background, ensuring legibility |
| Data structures | Local variable to store date. Database to retrieve information. |

*Figure 3.6: Table detailing screen standards*

# Design Sequence Diagrams

## Placing An Order Via The Marketing Clerk

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*Figure 4: Design Sequence Diagram depicting order placement via Marketing Clerk, Poppel System*

# **Design Class Diagram**

*Diagram

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*Figure 5: Design Class Diagram, Poppel System*

# **Entity Relationship Diagram**

*Diagram

Description automatically generated*

*Figure 6: Entity Relationship Diagram, Poppel System*

# **Report Design**

Reports are structured documents that present information in objective and succinct manner. Reports reflects on certain aspects of a business, which is critical in business decision making, as well as seeing whether or not the business is profitable or not. Business owners, shareholders, investors and future investors. Reports can be extremely beneficial to a company, and it is therefore important to generate the right kind of reports.

Poppel is an importing and manufacturing company of confectionary and soft drinks. This means that the company needs to know whether or not it is making money, how many of its customers as paid their debt and maintaining good quality products, meaning it needs to be able to have control over products that are expired to prevent selling expired products to customers. This means that 3 reports will be generated:

1. Expired products report 2. Outstanding debts report 3. Sales report

## Expired products report

The purpose of generating an expired products report is so that expired products can be removed from inventory, preventing expired products being sold to customers, and thereby ensuring that customers are not lost and that there is no chance for a possible law suit. This report is therefore exceptionally important to the business.

### Detailed Output Requirements

|  |  |
| --- | --- |
| 1. *Output type & ID* | *ID: R001*  *Output type: Detailed Report* |
| 1. *Report Objectives* | *To generate a list of products that are expired so that they can be removed and not be sold to customers* |
| 1. *Audience* | *Warehouse General Workers* |
| 1. *Content* | * *Product code* * *Batch Number* * *Expiry date* * *Isle number* * *Shelf number* |
| 1. *Layout* | *List* |
| 1. *Selection* | *Select start date and end date (refers to expiry dates), click ‘Generate Report’* |
| 1. *Sequence* | *Descending order (oldest dates first)* |
| 1. *Comparison* | *Select products from inventory where date < (before) date specified* |
| 1. *Grouping* | *Products by batch number by expiry dates* |
| 1. *Media to be used* | *Electronic* |
| 1. *Frequency, Timing, Delivery* | *On demand* |
| 1. *Distribution* | *Warehouse General Worker* |
| 1. *Privacy, Security & Integrity requirements* | *In order to access, user has to log in to system. Anyone can access this report, but will be used by warehouse general worker* |

*Figure 7: Table detailing report details*

### Report Layout

A picture containing qr code

Description automatically generated

*Figure 8: Expired Products Report, Poppel System*

## Outstanding Debts Report

The purpose of generating a report detailing outstanding debts is so that the company can claim money that is owed to them by customers. Having too much debt owed to a company means that a company has a lot of debit, but not a lot of physical money which is essential for operation and making profit. Although the customers may owe a lot of money to the company, the company could still close down if they do not receive the payments.

### Detailed Output Requirements

|  |  |
| --- | --- |
| 1. *Output type & ID* | *ID: R002*  *Output type: Detailed Report* |
| 1. *Report Objectives* | *Generate a list of debtors in order to claim money owed* |
| 1. *Audience* | *Marketing clerk b*usiness owners and shareholders |
| 1. *Content* | * *Customer Number* * *Amount Outstanding* |
| 1. *Layout* | *List* |
| 1. *Selection* | *Select date (last payment date), click ‘Generate Debtors List’* |
| 1. *Sequence* | *Descending (oldest) order by last payment date* |
| 1. *Comparison* | *Select customer number, amount outstanding, last payment date from customers where date < (before) date specified* |
| 1. *Grouping* | *Group by last payment dates* |
| 1. *Media to be used* | *Electronic* |
| 1. *Frequency, Timing, Delivery* | *On demand* |
| 1. *Distribution* | *Marketing clerk* |
| 1. *Privacy, Security & Integrity requirements* | *In order to access, user has to log in to system. Only the marketing clerk has access to generate a debtors list.* |

*Figure 9: Table detailing report details*

### Report Layout 1

*Table

Description automatically generated*

*Figure 10: Report layout*

## Sales Report

The sales report is an important report to make business decisions. Sales reports shows the sales of products across the year, i.e. by month. If a product is not selling too well, the company might consider stopping the manufacturing of that particular product and instead use those resources on a product that sells really well

### Detailed Output Requirements

|  |  |
| --- | --- |
| 1. *Output type & ID* | *ID: R002*  *Output type: Summary Report* |
| 1. *Report Objectives* | *Show sales over specified number of months to see sales trend* |
| 1. *Audience* | *Marketing clerk, b*usiness owners, shareholders, investors and future investors |
| 1. *Content* | * *Month* * *Product* * *Sales (in currency)* |
| 1. *Layout* | *Bar graph* |
| 1. *Selection* | *Select start date and end date, click ‘Generate Sales Report’* |
| 1. *Sequence* | *Start date to end date* |
| 1. *Comparison* | *Select all from orders where date > (after) start date and date > (before) end date* |
| 1. *Grouping* | *Group by product and date* |
| 1. *Media to be used* | *Electronic* |
| 1. *Frequency, Timing, Delivery* | *On demand* |
| 1. *Distribution* | *Marketing clerk* |
| 1. *Privacy, Security & Integrity requirements* | *In order to access, user has to log in to system. Only the marketing clerk has access to generate a debtors list.* |

*Figure 11: Table detailing report details*

### Report Layout

*Chart

Description automatically generated.*

*Figure 12: Report layout*

# **Input-Output Standards & Controls**

This section of the system specification outline the input and output controls as well as the standards.

In attempt to reduce user input errors, certain measures are put in place, such as using components that does not require user input.

## Formalised Outputs:

***Login Screen:***

* Username incorrect message (Message box) – if user entered incorrect/non-existent username

Graphical user interface, application

Description automatically generated

*Figure 13.1: Error message displayed, Poppel System*

* Password incorrect message (Message box) – if password entered does not correspond with the username

Graphical user interface, application

Description automatically generated

*Figure 13.2: Error message displayed, Poppel System*

* Success message (Message box) – When credentials correctly entered.

Graphical user interface, text, application

Description automatically generated

*Figure 13.3: Success message displayed, Poppel System*

***Capture order screen:***

* Order successfully created message (Message box) – when order has been processed and stored in database

Graphical user interface, application

Description automatically generated

*Figure 13.4: Success message displayed, Poppel System*

* Customer not found error message (Message box) – If customer number is incorrectly entered

Graphical user interface, application, website

Description automatically generated

*Figure 13.5: Error message displayed, Poppel System*

* Credit limit exceeded (Message box) – Error message that pops up if order total is more than customer credit limit

Graphical user interface, text, application

Description automatically generated

*Figure 13.6: Error message displayed, Poppel System*

***Create customer screen:***

* Successfully added customer message (Message box) – Success message when customer is created successfully and added to database

***Graphical user interface, application, Teams

Description automatically generated***

*Figure 13.7: Success message displayed, Poppel System*

## Built-In Validation to Ensure Requirements are Met

* Person’s ID numbers are 13 digits long
* Ages, quantities are of type int
* Prices, totals , salary of type decimal
* Dates of type date/time

## Input Integrity Controls

# *Capture order screen:*

* Combo box to select product code. Prevents user from entering incorrect product codes
* Credit available determined by system
* Date time picker used to select order confirmed date as well as the delivery date. This ensures that dates are in the correct format.

# *CREATE CUSTOMER screen:*

* Combo box used for gender identification. Reduces the possibility of garbage in garbage out by reducing user input.

# *Expired products report*

* Date selected from date time picker to ensure format of date corresponds with the rest of the data in the database.

# **Implementation Plan**

|  |  |  |
| --- | --- | --- |
| Item | Due Date | To do |
| System Specification Introduction | 13/09 | Momelezi |
| User Interface and Dialogue Design | 17/09 | Deony |
| Entity Relationship Diagram | 20/09 | Momelezi |
| Design Class Diagram | 23/09 | Deony |
| I.O Standards and Controls | 29/09 | Momelezi |
| Implementation planning | 12/09 | Deony |
| Test Plan | 05/10 | Deony |
| Products table, controller classes etc | 14/10 | Momelezi |
| Database manager and database controller class | 21/10 | Deony |
| Employee and credit status classes and controllers | 28/10 | Momelezi |
| Inventory, orders | 03/11 | Deony |
| Remaining class | 10/11 | Deony, Momelezi |
| Finalize system specification | 11/11 | Deony |
| Presentation | 13/11 | Deony, Momelezi |

*Figure 14: Table detailing implementation plan*

# **Test Plan**

## Test Environment

* Visual Studio & Microsoft Access, Lenovo laptop (2 different laptops)

## Test Items & Test Approaches

* ***Username & password accepted correctly***

Approach: In order to test whether or not the username and password are being accepted correctly, known correct and incorrect values will be used and the output will be compared to the expected output. Expected output: Incorrect username or password results in error message. “Incorrect” also includes no username or password. Correct and corresponding username and password results in success message and user proceeded to main screen.

* ***Check if all adding functions adds data to database (create order, create customer, etc. )***

Approach: This process is done manually. When an order or customer is created, the values are kept track of. Thereafter, the database will be checked manually whether or not it was captured successfully. It is considered successful when each of the details entered corresponds to a row in the table with the exact same details for the exact same corresponding fields.

* ***Check if totals are correctly calculated***

Approach: This process is also done manually. When an order is created, the total is calculated manually on a physical calculator. The grand total in the order capture screen will be compared to the calculated amount. The database will also physically be checked. This applies to any other *calculations*.

* ***Credit status shown in order capture form corresponds to customer number (i.e. correct credit availability shown.***

Approach: Check credit status of customer number in database manually. See if value in form and value in database corresponds.

* ***Expired products report shows correct items***

Approach: Go through list of products listed with their expiry dates. Check that each date is before the date that is entered.

* ***Picking list generates correct products***

Approach: Go through list of products listed with the order number. Check that each product listed is an order item wit order number property corresponding to order number entered. Process is done manually.

* ***Invoice form displays information correctly***

Approach: Compare details on list to details in orders table. Ensure that each value corresponds.

## Problem Tracking (Test Cases)

|  |  |
| --- | --- |
| Problem | Reason |
| 1.Username erroneously not found | Error in SQL; Space before ‘ |
| 2.Delivery address incorrect | Customer number incorrectly obtained from textbox |
| 3.Subtotal calculation error | Totals obtained from textboxes incorrectly parsed |
| 4.Specified cast is not valid | Column name typed incorrectly in SQL |
| 5. Data type mismatch in inserting order | Parsed incorrectly |

*Figure 15: Table detailing problem tracking*

## Test Schedule

Testing was done as classes were created. No specific schedule used. In a situation where another class was needed for a class to operate, testing would be done once the latter has been created.

# **References**

1. Year published:  
   2020  
   Page title:  
   How to Make a Sales Report in Excel: The Pros and Cons  
   Website name:  
   ForceManager  
   Publisher:  
   The publisher of the document  
   URL:  
   <https://www.forcemanager.com/blog/how-to-make-a-sales-report/>  
   Access date: 18 November 2020
2. Year published:  
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   The title of the web page or article  
   Website name:  
   [Accountingweb.co.uk](http://Accountingweb.co.uk)  
   Publisher:  
   The publisher of the document  
   URL:  
   <https://www.accountingweb.co.uk/sites/default/files/styles/large/public/debtor_invoice_data.png?itok=vg7lU1jy>  
   Access date: 18 November 2020