Bilan Grocery Management System

A Research Paper

Submitted for the partial fulfilment of the requirements for award of the Diploma

Information Communication Technology (ICT)

Under the Guidance of **Abdirizak Mohamed Abdillahi**

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**We Subeir, mohamed, and Mohamed hereby declare that this thesis is our original work and has not**

**been presented for the award of any diploma in any other college or university.**

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**BISMILLAH, first thanks to Allah(SW) who allowed us to achieve this stage of life and make**

**our long dream came true, again special thanks goes to our parents whom their encouragement**

**and advice for our studying.**

**Bilan Grocery Management System**

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**support, guidance and encouragement of our project.**

**This book would not have been possible without the help of many people whose comments and**

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**Bilan Grocery Management System**

**Chapter One**

**1.0 Introduction**

This system of BILAN GROCERY MANAGEMENT SYSTEM is designed mainly for the

purpose of management, workers, Cashier, Store and etc. Due to complexity, its difficult task to maintain their

details manually. So this system can help in making the work of the administrator easier and faster.

The purpose of this develop system is to reduce the manual work of the administrator by helping

in maintenance all the records computerized which is safe and secure.

This system does several things such as the admission for employee jobs recruitment, to store data,

back up the data etc. The main objectives of this system is to maintain the work details, staff

performance, Staff attendance, Staff records, generate receipts. This system specified all working

that taken by a furniture manager.

If manager want necessary information he checks the information about staff, work etc. it is

difficult to prepare the manual work to store the information about the all customers, staff and as

well as other workers. So this system helps to store those type of information using computerized

system. Every user of the system will have to log into the system using username and password so

that security.

***1.1Background***

A furniture management system is a software that is designed to make customers, and staff

activities in a company automated, organized and integrated. It is a one-stop solution that collates

all information about a customer on a single platform. This furniture management system is also designed for keeping their information secure and make

their management easier. The furniture management system provides on attractive environment

where you can manipulate data and information about the customers, staffs and etc. If I continue the background of  the book what I have learned Tisqaad is ict. When I came to Tisqaad ict I could only hear it orally but I did not know anything but now I understand a lot about it, because the time has come for me to take advantage of Tisqaad. But knowledge is not enough now compared to what I used to know about ict .

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***1.1.1 ORIGINAL BACKGOUND***

BILAN GROCERY is one of the most businesses that people need to their daily live because the Grocery sales all natural foods vegetables and fruits.

Bilan Grocery was established in 2008 over the last 14 years and a half decade our business

has emerged as one of leading by the market of the Grocery because more than 2000 costumers are depend in Bilan Grocery.

our products are manufactured exclusively from kenya ,Ethiopia,Somalia,and 70% is to produce by the land of Somaliland

ensure prompt delivery to our valued customers we maintain the stocks in every day of the year ,

Location of Bilan Grocery is only one location in Hero-Awr , who send their order though fax &

email from different houses and different small groceries and we supply them their goods, it is their trust, confident and

excellent service has forced our competitors to imitate us. We care for customers, ease feel free to

contact for any information regarding products, prices, delivery & for any other clarification.

***1.1.2 Vision***

Our vision is to make our customers to find all the needs that any customer wants to his self,

And by that part we also make that we will make the next months insha Allah to make free delivery,

And also our vision to make the best Grocery in the world and in the county.

***1.1.3 Mission***

Our goal is to set up a large vegetable garden next year to improve the quality of our neighbouring countries, such as bananas. We also aim to create more sectors to solve the needs of the market and deliver them to their homes.

***1.1.4 Structure of B.G.M.S***

The Manager is the president of Bilan Grocery Management System The president of the grocery is the manager of the place and the owner of the business owns the decision of everything and is followed ***by an accountant man .***

***Bilan Grocery Management System***

***1.2 Problem Statement***

When we interviewed Bilan Grocery we asked the problems. They told us that they have lot of problems.

In addition, these problems include:

1. Fluctuation of money during input and output transactions that brings a huge loss.

2. In addition, during the printing immediate reports Bilan is necessary need an app to solve

these problems and overcome it.

3. Thieves come Bilan and steal goods.

4. Improper and all fashioned calculation of expenses.

5. Employees are less trained to the technologies.

6. Goods in the store are not listed and not registered***.***

***1.3 Proposed Solution***

When we interviewed Bilan , we asked the problems. They told us that they have lot of problems.

In addition, these problems include:

1. Fluctuation of money during input and output transactions that brings a huge loss.

2. In addition, during the printing immediate reports Bilan is necessary need an app to solve

these problems and overcome it.

3. Thieves come Bilan and steal goods.

4. Improper and all fashioned calculation of expenses.

5. Employees are less trained to the technologies.

6. Goods in the store are not listed and not registered.

When we looked the situation we figured out some solutions for these problems:

1. Immigrating from handwriting system to digital technological system.

2. To make simple app for calculating in and output transactions which also, prints immediate reports

3. To import and introduce CCTV cameras to overcome thieves and rubbers.

4. Using the latest app version of apps and calculating technologies.

5. To train all employees by using this management system.

6. To register every item in the store and make and identification

**Bilan Grocery Management System**

***1.4 The project goals and objectives***

**To provide a system which can manage all the records of customers and the delivery. This** system

will automate all the working of bussnies.This automated system will be able to store records

without paper and will be able to consume less time. Now admin can spend more time on

monitoring the bussnies instead of managing paper work.

Objective of Bilan Grocery management system project is to record various details of activities of the business ,It will simplify college work.

This system can maintain huge number of company

records including the staff, customers, imported goods, and goods to be exported etc. B.G.M.S

project is designed to remove all the deficiency of the current system.

Improve operations of college facilities by automating work orders and integrating adds, moves

and changes. Provide management with what if decision making analysis. Provides predictive in addition to proactive repair of facilities.

Some organizations evaluate project performance by considering the project objectives while

other organizations consider the project goals as well. As project goals are influenced by external

factors too, it seems more reasonable to evaluate the project team on project objectives only

However, we can also argue that measuring projects on objectives only may create the

paradox of running many successful projects.

***1.4.1 Project Goals***

1. Manage time effectively

2. It reduce the loss of data.

3. To keep a record of transactions carried out

4. To make data more secure.

5. Minimization redundancy of data.

**Bilan Grocery Management System**

***1.4.2 Project Objectives***

1. This system will automate all the working of college

2. This automated system will be able to store records without paper and will be able to

consume less time.

3. To manage all the records of staff and customers

**1.5 Theoretical background**

There are many technologies used during this project,

1. Visual Studio is a program that is used to develop an app.

2. SQL server is a software used to create, retrieve and store data.

3. Crystal reports are used inside the visual studio to retrieve data reports during printing.

4. Themes are used to decorate your software features.

Theories are developed by researchers to explain phenomena, draw connections and make predictions.

They are based on existing knowledge, observations, and ideas.

In your thesis or dissertation, the theoretical framework is where you define, discuss and evaluate theories

relevant to your research problem. You explain the key concepts, models and assumptions that guide your

project, and show that your work is grounded in established ideas.

A strong theoretical framework shows why you have chosen a particular approach to answering your

research question. It also provides a clear basis for interpreting and understanding the relevance of your

findings.

**The goal of a theoretical framework/background**

After refining your problem statement and research question(s), you have to explore what theories, ideas

and models other researchers have already developed. Often there will be many different possible

approaches to the topic, so you have to select the ideas that you find most useful.

By presenting this information, you ‘frame’ your research and justify your overall approach. The main

**Bilan Grocery Management System**

goals of a theoretical framework are to:

1. Define key concepts

2. Evaluate, select, and/or combine relevant theories

3. Explain your assumptions and expectations The theoretical framework shows that your research is not just coming ‘out of the blue,’ but that it has a

clear rationale based on existing theory. The definitions and models you select give your project direction,

and you will build on these choices at later stages.

This part of your dissertation lays the foundations that will support your analysis, helping you interpret

your results and make broader generalizations.

How to create a theoretical framework

The first step is to identify the key terms from your problem statement and research questions. Concepts

often have multiple definitions, so the theoretical framework involves clearly defining what you mean by

each term.

1. Select key concepts

Sample problem statement and research questions

Company X is struggling with the problem that many online customers do not return to make subsequent

purchases. Management wants to increase customer loyalty and believes that improved customer

satisfaction will play a major role in achieving this goal. To investigate this problem, you have to identify

and plan to focus on the following problem statement, objective, and research questions:

Problem: Many customers do not return to make subsequent purchases.

Objective: To increase customer loyalty and thereby generate more revenue.

Research question: How can the satisfaction of company X’s online customers be improved in order to

increase customer loyalty?

The concepts of “customer loyalty” and “customer satisfaction” are clearly central to this study. The

**Bilan Grocery Management System**

theoretical framework should define these concepts and discuss theories about the relationship between

them.

2. Define and evaluate relevant concepts, theories, and models

By conducting a thorough literature review, you can determine how other researchers have defined and

drawn connections between these key concepts. As you write the theoretical framework, aim to compare

and critically evaluate the approaches that different authors have proposed.

After discussing different models and theories, you establish the definitions that best fit your research

and justify why this is the case. In more complex research projects, you might combine theories from different fields to build your own unique frameworks.

Make sure to mention the most important theories related to your key concepts. If there is a well-established theory or model that you do not want to apply to your own research, explain why it is not

suitable for your purposes.

3. Show what your research will contribute

Apart from discussing other people’s theories and ideas, the theoretical framework should aim to show

how your own project fits in.

1. Will you test a theory or contribute new evidence by collecting original (qualitative or

quantitative) data?

2. Will you use theory as a basis for interpreting and understanding your data?

3. Will you analyze critique or challenge established theory?

4. Will you combine theoretical approaches in a new or unique way?

If relevant, you can also use the theoretical framework to develop hypotheses for your research. A

hypothesis makes a testable prediction about the outcome of a specific study, while a theory is the

overarching explanation for why and how certain outcomes happen in general.

That means you can use the theory to determine what you expect to happen.

The structure of the theoretical framework

**Bilan Grocery Management System**

There are no fixed rules for structuring a theoretical framework. The important thing is to create a clear,

logical structure. One way to do this is to draw on your research questions/hypotheses and some of your key terms.

For example, you could create a section or paragraph that looks at each question, hypothesis, or key

concept. Within each section, you would then explore the theories and models that are relevant to that

particular item. As in all other parts of your thesis, make sure to properly cite your

A computerized machinery system for keeping tools of all dresses, drillers, screws, big-nails, rigs, safety

boots, and so many other tools. Checking out and returning are automated through barcode reader and

CCTV cameras. The machinery system also interfaces with an external relational database which stores

about the machinery company. Customers, employees, manager and machinery tool engineer. Customers

the same authority while the manager is the highest authority-admin of the system.

Data the information for computer processing, distinct pieces of information usually forms attending

special way

Categories data and programs. Programs are collection of instructions for manipulating data. Data can

exist variety of forms as a number, text, diagrams, as bits send by the electronic memory of the computer or as facts stored in person’s mind.

Database a set of data that has a regular structure and organized in such a way in which computer can

easily find the desire information.

Records data, details, documents, files, information and reports. In the structure of a database, the parts

consisting of several uniquely named components called the data fields. Several data records make up

data file, and several data files make up a database.

Share distributing, giving files or resources such as file, folder, or printer that had made sharable with

other users on the network.

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**Hardware requirements**

1. RAM 512MB

2. Hard Disk 300GB

3. Processor Pentium 4 and above

4. Android based Smartphone

Software requirements

1. OS Win 7 and above

2. Required software: my sql server c#

3. Front end: visual studio

4. Back end: c#, sql

1.6 Project Management

Project ALNFMS According to A Guide to the Project Management Body of Knowledge a project

is “a temporary endeavor undertaken to create a unique product, service or result”. Being that each project is unique it is important to also understand that an organization's project management

processes will likely need to be tailored in order to ensure project success. Project ALNFMS takes

into consideration that project management processes are not "one size fits all", meaning there will

be many times when processes need to be adjusted (added, removed, or revised) in order to ensure

project success.

ALNFMS in project management can happen at any time and for any process being applied to a

project. Organizations often have a project methodology in place and may realize that this

methodology needs to allow for adjustments to best manage a variety of projects. As a project .

manager you cannot blindly follow a methodology, you need to know how to assess a project to

determine what processes will need to be adjusted in order to achieve a successful outcome for

your project. Here we are going to look at a very high level method for process ALNFMS. This

Four step method includes: evaluating existing processes, assessing the project, documenting the

ALNFMS process, and re-evaluating.

**1.6.1 TOTAL COST**

In this section, we provided cost previewing table and made an item, quantity, price and total

columns in which each item is given an appropriate price in the market.

**NO NAMES Price**

**1 Desktop Computer. $300**

**2 Table and chair. $40**

**3 Printer. $300**

**4 External Hard Disk. $40**

**Total. $680**

**1.6.2 Time Management**

A Gantt chart, commonly used in project management, is one of the most popular and useful ways

of showing activities (tasks or events) displayed against time. On the left of the chart is a list of

the activities and along the top is a suitable time scale. Each activity is represented by a bar; the position and length of the bar reflects the start date, duration and end date of the activity. Gantt

charts provide a standard format for displaying show project schedule information by listing

project activities and their corresponding matching start and finish dates in a calendar format. A

Gantt chart is a very useful project management tool that provides you with an overview of your schedule (it is not network diagram).

## 2.2 Requirements

### 2.2.1 Fuctional Requirements

In [software engineering](https://en.wikipedia.org/wiki/Software_engineering) and [systems engineering](https://en.wikipedia.org/wiki/Systems_engineering), a **functional requirement** defines a function of a [system](https://en.wikipedia.org/wiki/System) or its component, where a function is described as a specification of behavior between inputs and outputs.[[1]](https://en.wikipedia.org/wiki/Functional_requirement#cite_note-FultonAirborne17-1)

Functional requirements may involve calculations, technical details, data manipulation and processing, and other specific functionality that define what a system is supposed to accomplish.[[2]](https://en.wikipedia.org/wiki/Functional_requirement#cite_note-2) Behavioral requirements describe all the cases where the system uses the functional requirements, these are captured in [use cases](https://en.wikipedia.org/wiki/Use_case). Functional requirements are supported by [non-functional requirements](https://en.wikipedia.org/wiki/Non-functional_requirement) (also known as "quality requirements"), which impose constraints on the design or implementation (such as performance requirements, security, or reliability). Generally, functional requirements are expressed in the form "system must do <requirement>," while non-functional requirements take the form "system shall be <requirement>."[[3]](https://en.wikipedia.org/wiki/Functional_requirement#cite_note-LoucopoulosRequire05-3) The plan for implementing functional requirements is detailed in the system design, whereas *non-functional* requirements are detailed in the [system architecture](https://en.wikipedia.org/wiki/System_architecture).[[4]](https://en.wikipedia.org/wiki/Functional_requirement#cite_note-AdamsNon15-4)[[5]](https://en.wikipedia.org/wiki/Functional_requirement#cite_note-JönssonImpact06-5)

As defined in [requirements engineering](https://en.wikipedia.org/wiki/Requirements_engineering), functional requirements specify particular results of a system. This should be contrasted with non-functional requirements, which specify overall characteristics such as cost and [reliability](https://en.wikipedia.org/wiki/Reliability_engineering). Functional requirements drive the application architecture of a system, while non-functional requirements drive the technical architecture of a system.[[4]](https://en.wikipedia.org/wiki/Functional_requirement#cite_note-AdamsNon15-4)

In some cases a requirements analyst generates use cases after gathering and validating a set of functional requirements. The hierarchy of functional requirements collection and change, broadly speaking, is: user/[stakeholder](https://en.wikipedia.org/wiki/Project_stakeholder) request → analyze → use case → incorporate. Stakeholders make a request; systems engineers attempt to discuss, observe, and understand the aspects of the requirement; use cases, entity relationship diagrams, and other models are built to validate the requirement; and, if documented and approved, the requirement is implemented/incorporated.[[6]](https://en.wikipedia.org/wiki/Functional_requirement#cite_note-MITRESys14-6) Each use case illustrates behavioral scenarios through one or more functional requirements. Often, though, an analyst will begin by eliciting a set of use cases, from which the analyst can derive the functional requirements that must be implemented to allow a user to perform each use case.

## 2.2.2 Non fuctional Requirements

In systems engineering and requirements engineering, a **non-functional requirement** is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors. This should be contrasted with functional requirements that define specific behavior or functions.

In general, functional requirements define what a system is supposed to *do* whereas non-functional requirements define how a system is supposed to *be*. Non-functional requirements are often called **qualities** of a system. Other terms for non-functional requirements are "constraints", "quality attributes", "quality goals" and "quality of service requirements". Qualities, that is, non-functional requirements, can be divided into two main categories:

1. Execution qualities, such as security and usability, which are observable at run time.
2. Evolution qualities, such as testability, maintainability, extensibility and scalability, which are embodied in the static structure of the software system.

## 2.3 System DFDs

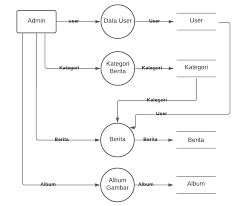
A **data-flow diagram** is a way of representing a flow of data through a [process](https://en.wikipedia.org/wiki/Process) or a system (usually an [information system](https://en.wikipedia.org/wiki/Information_system)). The DFD also provides information about the outputs and inputs of each entity and the process itself. A data-flow diagram has no control flow — there are no decision rules and no loops. Specific operations based on the data can be represented by a [flowchart](https://en.wikipedia.org/wiki/Flowchart).[[1]](https://en.wikipedia.org/wiki/Data-flow_diagram#cite_note-:0-1)

There are several notations for displaying data-flow diagrams. The notation presented above was described in 1979 by [Tom DeMarco](https://en.wikipedia.org/wiki/Tom_DeMarco) as part of [structured analysis](https://en.wikipedia.org/wiki/Structured_analysis).

For each data flow, at least one of the endpoints (source and / or destination) must exist in a process. The refined representation of a process can be done in another data-flow diagram, which subdivides this process into sub-processes.

The data-flow diagram is a tool that is part of [structured analysis](https://en.wikipedia.org/wiki/Structured_analysis) and [data modeling](https://en.wikipedia.org/wiki/Data_modeling). When using [UML](https://en.wikipedia.org/wiki/Unified_Modeling_Language), the [activity diagram](https://en.wikipedia.org/wiki/Activity_diagram) typically takes over the role of the data-flow diagram. A special form of data-flow plan is a site-oriented data-flow plan.

Data-flow diagrams can be regarded as inverted [Petri nets](https://en.wikipedia.org/wiki/Petri_nets), because places in such networks correspond to the semantics of data memories. Analogously, the semantics of transitions from Petri nets and data flows and functions from data-flow diagrams should be considered equivalent.



## 2.3.1 Contex Diagram

The [Context Diagram](https://www.modernanalyst.com/Resources/Articles/tabid/115/ID/1355/Introduction-to-Context-Diagrams.aspx) shows the system under consideration as a single high-level process and then shows the relationship that the system has with other external entities (systems, organizational groups, external data stores, etc.).

Another name for a Context Diagram is a [Context-Level Data-Flow Diagram](https://www.modernanalyst.com/Resources/Articles/tabid/115/ID/2012/Putting-Systems-Analysis-Into-Context-using-the-Context-Diagram.aspx) or a Level-0 Data Flow Diagram.  Since a Context Diagram is a specialized version of [Data-Flow Diagram](https://www.modernanalyst.com/Resources/Articles/tabid/115/ID/2015/Data-Flow-Diagram-with-Examples-Tips.aspx), understanding a bit about Data-Flow Diagrams can be helpful.

A [Data-Flow Diagram (DFD)](https://www.modernanalyst.com/Resources/Articles/tabid/115/ID/2009/An-Introduction-to-Data-Flow-Diagrams.aspx) is a graphical visualization of the movement of data through an information system. DFDs are one of the three essential components of the structured-systems analysis and design method (SSADM). A DFD is process centric and depicts 4 main components.

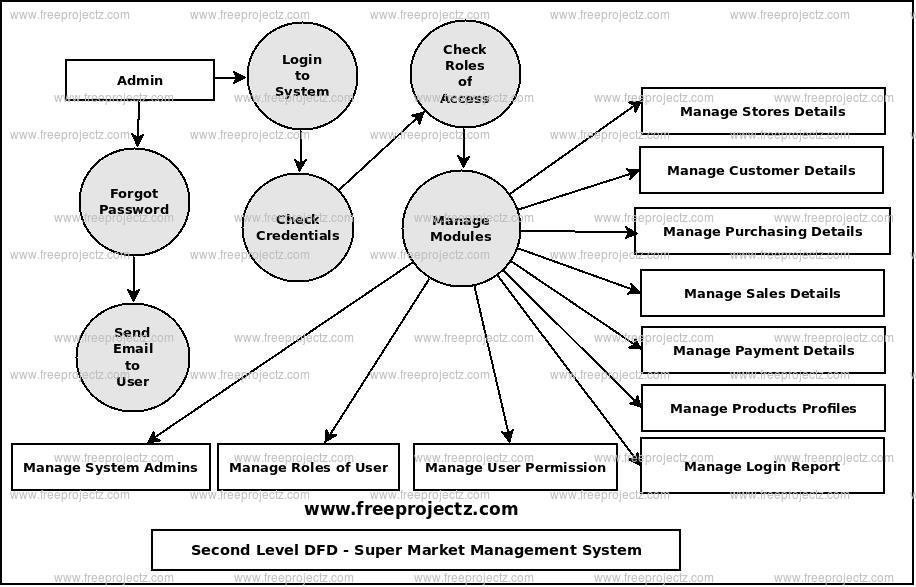
* Processes (circle)
* External Entities (rectangle)
* Data Stores (two horizontal, parallel lines or sometimes and ellipse)
* Data Flows (curved or straight line with arrowhead indicating flow direction)

Each DFD may show a number of processes with data flowing into and out of each process.  If there is a need to show more detail within a particular process, the process is decomposed into a number of smaller processes in a lower level DFD. In this way, the Content Diagram or Context-Level DFD is labeled a “Level-0 DFD” while the next level of decomposition is labeled a “Level-1 DFD”, the next is labeled a “Level-2 DFD”, and so on.

## 2.3.2 Level Zero Diagram

A zero level DFD describes **Overview of the processes input and output**. The input–process–output (IPO) model, or input-process-output pattern, is a widely used approach in systems analysis and software engineering for describing the structure of an information processing program or other process.

DFD Level 0 is also called a Context Diagram. It's **a basic overview of the whole system or process being analyzed or modeled**. It's designed to be an at-a-glance view, showing the system as a single high-level process, with its relationship to external entities.



## 2.3.3 Lowel Level

**low-level**, as technical terms, are used to classify, describe and point to specific [goals](https://en.wikipedia.org/wiki/Objective_(goal)) of a systematic operation; and are applied in a wide range of contexts, such as, for instance, in domains as widely varied as [computer science](https://en.wikipedia.org/wiki/Computer_science) and [business administration](https://en.wikipedia.org/wiki/Business_administration).

**High-level** describe those operations that are more [abstract](https://en.wikipedia.org/wiki/Abstraction) in nature; wherein the overall goals and systemic features are typically more concerned with the wider, macro system as a whole.

**Low-level** describes more specific individual components of a systematic operation, focusing on the details of rudimentary micro functions rather than macro, complex processes. Low-level classification is typically more concerned with individual components within the system and how they operate.

Features which emerge only at a high level of description are known as [epiphenomena](https://en.wikipedia.org/wiki/Epiphenomenon).

Chapter Three 3.0

Introduction Project Design is an early phase of the project where a project's key features, structure, criteria for success, and major deliverables are all planned out. The point is to develop one or more designs which can be used to achieve the desired project goals. All review processes require a standard to review against; and if our primary goal is to catch bugs and ensure our code is doing the tasks intended. The main difference between software analysis and design is that the output of a software analysis consists of smaller problems to solve. Additionally, the analysis should not be designed very differently across different team members or groups. In contrast, the design focuses on capabilities, and thus multiple designs for the same problem can and will exist. Depending on the environment, the design often varies, whether it is created from reliable frameworks or implemented with suitable design patterns. Design examples include operation systems, webpages, mobile devices or even the new cloud computing paradigm.

3.1 Data dictionary

A data dictionary, or metadata repository, as defined in the IBM Dictionary of Computing, is a "centralized repository of information about data such as meaning, relationships to other data, origin, usage, and format” Oracle defines it as a collection of tables with metadata. The term can have one of several closely related meanings pertaining to databases and database management systems (DBMS):

1: A document describing a database or collection of databases

2: An integral component of a DBMS that is required to determine its structure

3: A piece of middleware that extends or supplants the native data dictionary of a DBMS A data dictionary is a collection of descriptions of the data objects or items in a data model for the benefit of programmers and others who need to refer to them. A first step in analyzing a system of objects with which users interact is to identify each object and its relationship to other objects. This process called data modeling results in a picture of object relationships. After each data object or item is given a descriptive name, its relationship is described (or it becomes part of some structure that implicitly describes relationship), the type of data (such as text or image or binary value) is described, possible predefined values are listed, and a brief textual description is provided. This collection can be organized for reference into a book called a data dictionary. When developing programs that use the data model, a data dictionary can be consulted to understand where a data item fits in the structure, what values it may contain, and basically what the data item means in real-world terms. For example, a bank or group of banks could model the Data objects involved in consumer banking. They could then provide a data dictionary for a bank's programmers.

3.1.1 Data item dictionary

A data dictionary is a file or a set of files that contains a database's metadata. The data dictionary contains records about other objects in the database, such as data ownership, data relationships to other objects, and other data. The data dictionary is a crucial component of any relational database. Ironically, because of its importance, it is invisible to most database users. Typically, only database administrators interact with the data dictionary. This contains all data definitions for cross-referencing and for managing and controlling access to the information repository / database. It provides a very thorough interface description (comparable to Interface Control Documents) that is independent of the model itself. Changes made to a model may be applied to the data dictionary to determine if the changes have affected the model’s interface to other systems. Data dictionaries do not contain any actual data from the database, only book keeping information for managing it. Without a data dictionary, however, a database management system cannot access data from the database. Below are the illustrations

3.1.2 Data structure dictionary

Admin

Customers

BILAN GROCERY

MANAGEMENT SYSTEM

SS

SYSY

3.1.3 Data store dictionary

Data-flow diagram (DFD) is a way of representing a flow of a data of a process or a system (usually an information system). The DFD also provides information about the outputs and inputs of each entity and the process itself. A dataflow diagram has no control flow, there are no decision rules and no loops. Specific operations based on the data can be represented by a flowchart. There are several notations for displaying data-flow diagrams. The notation presented above was described in 1979 by Tom DE Marco as part of Structured Analysis. For each data flow, at least one of the endpoints (source and / or destination) must exist in a process. The refined representation of a process can be done in another data-flow diagram, which subdivides this process into sub-processes. The data-flow diagram is part of the structured analysis modelling tools. When using UML, the activity diagram typically takes over the role of the data-flow diagram. A special form of data-flow plan is a site-oriented data-flow plan. Dataflow diagrams can be regarded as inverted Petri nets, because places in such networks correspond to the semantics of data memories. Analogously, the semantics of transitions from Petri nets and data flows and functions from data-flow diagrams should be considered equivalent.

3.1.4 Data flow dictionary

In computers, the path of data from source document to data entry to processing to final reports. Data changes format and sequence (within a file) as it moves from program to program.

3.1.5 Function description dictionary

Customers

Administration

Processor

Administration

Data

Source

Employee

Register

Customer

main form

BILAN GROCERY

MANAGEMENT SYTEM

3.2 Data Design

Database design is the organization of data according to a database model. The designer determines what data must be stored and how the data elements interrelate. With this information, they can begin to fit the data to the database model. Database management system manages the data accordingly. Database design involves classifying data and identifying interrelationships. This theoretical representation of the data is called an ontology. The ontology is the theory behind the database's design

3.2.1 Entities and Attributes

An entity relationship diagram is a means of visualizing how the information a system produces is related. There are five main components of an ERD: Entities which are represented by rectangles. An entity is an object or concept about which you want to store information. An entity relationship diagram is a means of visualizing how the information a system produces is related. There are five main components of an ERD: Entities which are represented by rectangles. An entity is an object or concept about which you want to store information.

3.2.2 Database design

3.2.2.1 Create an initial ERD Database design

is the process of producing a detailed data model of database. This data model contains all the needed logical and physical design choices and physical storage parameters needed to generate a design in a data definition language, which can then be used to create a database. A fully attributed data model contains detailed attributes for each entity. The term database design can be used to describe many different parts of the design of an overall database system. Principally, and most correctly, it can be thought of as the logical design of the base data structures used to store the data. In the relational model these are the tables and views. In an object database the entities and relationships map directly to object classes and named relationships. However, the term database design could also be used to apply to the overall process of designing, not just the base data structures, but also the forms and queries used as part of the overall database application within the database management system (DBMS). ϖ The process of doing database design generally consists of a number of steps which will be carried out by the database designer. Usually, the designer must: ϖ Determine the data to be stored in the database. ϖ Determine the relationships between the different data elements. Superimpose a logical structure upon the data on the basis of these relationships

3.2.2.2 Assign all data elements to entities

Entities: An entity is something that exists as itself, as a subject or as an object, or potentially, concretely or abstractly, physically or not. Which are represented by rectangles. An entity is an object or concept about which you want to store information.

Entity

A weak entity: is an entity that must defined by a foreign key relationship with another entity as it cannot be uniquely identified by its own attributes alone.

Entity

Action: Which do diamond shapes represent, show how two entities share information in the database.

Relation ship

3.2.2.3 Create 3NF designs for all tables, taking care to identify all primary and Foreign Key

Primary Key

A primary key, also called a primary keyword, is a key in a relational database that is unique for each record. It is a unique identifier, such as a driver license number, telephone number (including area code), or vehicle identification number (VIN). A relational database must always have one and only one primary key.

Foreign keys

is a process in which data attributes within a data model are organized to increase the cohesion of entity types in other words, the goal of data normalization is to reduce and even eliminate data redundancy, In simpler words, the foreign key is defined in a second table, but it refers to the primary key or a unique key in the first table.

Database Normalization

Database Normalization: is a process in which data attributes within a data model are organized to increase the cohesion of entity types in other words, the goal of data normalization is to reduce and even eliminate data redundancy, an important consideration difficult to stores objects in a relational database that maintains the same information in several places?

First Normal Form

As per First Normal Form, no two Rows of data must contain each set of columns must have a unique value, such that multiple columns cannot be used to fetch the same row. Each table should be organized into rows, and each row should have a primary key that distinguishes it as unique. The Primary key is usually a single column, but sometimes more than one column can be combined to create a single primary key. For example, consider a table which is not in First normal form, any row must not have a column in which More than one Value is saved. Like separated with commas. Rather than that, we must separate such data into multiple rows.

Second Normal Form (2NF) A table is in Second Normal Form if it is in 1NF and all its non-key column depend on the full Key.