



Inventory Automation System

Submitted to:

Department of Computer Science and engineering
East West University

In partial fulfillment of the requirements for the degree of Bachelor of
Science in Computer Science and Engineering

Submitted By:

Md .Saddam Hossain

ID:2012-1-60-030

Supervised By:

Md.Sarwar Kamal

Senior Lecturer ,Department of Computer Science and Engineering

East West University

Fall 2016

Declaration

I hereby declare that the project worked entitled “**Inventory Automation System**” submitted to the east west university, is record of an original work done by me under the guidance of Md. Sarwar Kamal, Senior lecturer Department of Computer Science and Engineering, East West University, and this project is submitted in the partial fulfillment of the requirements for the award of the degree of of Bachelor of Science in Computer Science and Engineering. I also declare that, this project was done under CSE497 and has not been submitted elsewhere for requirement of any degree or for any reason except for publication.

Signature of the candidate

Md. Saddam Hossain

ID: - 2012-1-60-030

Department of Computer Science and Engineering

East West University

Letter of Acceptance

This project is submitted by Md. Saddam Hossain, ID: 2012-1-60-030 to the Department of Computer Science and Engineering, East West University, Dhaka Bangladesh is accepted as satisfactory for the partial fulfillment of the requirement for the degree of Bachelor of Science in Computer Science and Engineering .

Board of Examiners

Project Supervisor

Md. Sarwar Kamal

Senior lecturer

Department of Computer Science and Engineering

East West University

Aftabnagar,Dhaka-1212

Chairperson

Dr. Md. Mozammel Huq Azad Khan

Professor and Chairperson

Department of Computer Science and Engineering

East West University

Aftabnagar,Dhaka-1212

Acknowledgement

First of all thanks to almighty Allah for the uncountable blessings for the flourishing completion of my project. I would like to convey my vigorous gratitude and insightful indebtedness to my supervisor Md. Sarwar Kamal for his supervision, direction and demonstrative guidance and encouragement. His ardent concern on the topics and exclusive advices throughout the study was great help in completing the project.

Above all I am very obliged to my family members for their endless love, encouragement and supports.

ABSTRACT

Inventory automation tools are getting very popular nowadays. It saves enormous time and energy by keeping track of all the records and doing calculations for a business institution on day to day basis. A business automation system is also available from anywhere, form any device. Thus managing a business can be extremely simplified and easy by using the right tool. My system is developed keeping this in mind as a first priority, simplification and automation of any general purpose shop or business institution can be done using this tool. This is done for non-technical users, so user interface is made very straight forward and really easy to use. This tool is web based, so it's also accessible form any device, anytime. Thus the business owner can check out the recent update of his business even from distance. Also sell and customer information can be seen within seconds for future use.

Table of Contents

Declaration	i
Letter of Acceptance	ii
Acknowledgement.....	iii
Abstract	iv
Table of Contents	v
Contents.....	vi
List of Tables.....	vii
List of Figures	viii

Contents

Chapter 1 Introduction

1.1 Motivation.....	1
1.2 ERP (Enterprise Resource Planning) Software.....	2
1.3 Background Study.....	2
1.4 Objectives.....	2
1.5 Key Features of Proposed System.....	3
1.6 Outline.....	3

CHAPTER 02 : SYSTEM MODEL AND METHODOLOGY

2.1 System.....	5
2.2 System Analysis	5
2.2.1 Data Gathering	6
2.3 System Development.....	7
2.4 Beginning of a System Development.....	7
2.4.1 The systems development life cycle (SDLC).....	7
2.5 Feasibility study	12
2.6 Cost & Benefits Analysis	13
2.6.1 Requirements.....	14
2.7 Design.....	14
2.7.1 Steps of Design.....	15
2.8 System Model.....	15

2.8.1 The Incremental Model	16
2.8.2 Benefits of using incremental model.....	16
2.8.3 Selecting the Incremental Approach	17
2.9 Data analysis	17
2.9.1 Data Flow Diagram	18
2.10 Data flow diagram of Inventory Automation System	19
2.11 Class diagram of Inventory Automation System	20
2.12 Use Case flow diagram of Inventory Automation System.....	21
2.13 Database Design.....	21
2.13.1 Determining data to be stored	22
2.13.2 Determining Data Relationships	22
2.13.3 Logically Structuring Data	23
2.13.4 Database Design of Business Automation System	23
CHAPTER 03 : SYSTEM ANALYSIS AND DESIGN	
3.1 System Implementation.....	24
3.2 Implementation Phase Deliverables	24
3.3 Data Acquisition.....	25
3.3.1 Data Acquisition of the Project	25
3.3.2 Adding Products	26
3.3.3 Stored Product Information.....	26
3.3.4 Add Customer	27
3.3.5 Customer Information	27
3.3.6 Add Purchase.....	28
3.3.7 Purchase Information	28
3.3.8 Add Sales.....	29
3.3.9 Sales information.....	29
3.3.10 Cart Information	30
3.3.11 Add Company Information	30
3.3.12 User Role Deviation	30
CHAPTER 04 : RESULT & DISCUSSION	
4.1 Overview	31

4.2 Dashboard.....	31
4.3 Left Panel/ Sidebar	32
4.4 Showing Product List.....	33
4.5 Cart Items	34
4.6 Sales Menu	35
4.7 Create Invoice	36
4.8 Add The Customer information	36
4.9 Invoice.....	37
4.11 Settings.....	38
4.12 Prediction	39
4.13 Graph analysis.....	40
4.14 Advantage.....	41
4.15 Scope and Limitation	43
Chapter 5 Conclusion & Future Work	
5.1 Conclusion.....	45
5.2 Future Work	45
REFERENCES	46
APPENDIX.....	46
LIST OF TABLES	
Table 2.1: Key features of the phases of the SDLC	9
Table 2.2: Requirement of proposed system.....	14
Table 3.1: Product Information	28
Table 3.2: Customer Information	29
Table 3.3: Purchase Information	30
Table 3.4: Sales Information	30
Table 3.5: Cart Information.....	31
Table 3.6: Company Information	32
Table 3.7: User Role Information	32
List Of Figure	
Figure 2.1: SDLC	8
Figure 2.2: Prioritize Requests	11

Figure 2.3: Incremental model	18
Figure 2.4: Data flow Diagram of proposed system	20
Figure 2.5: Database design of proposed system	23
Figure 3.1: Major phases of a System	24
Figure 3.2: Add Product	27
Figure 3.4: Products information	27
Figure 3.5: Purchase Information.....	29
Figure 3.5: Sales list	29
Figure 3.3.9: sales Information	30
Figure 3.3.10: Add to cart	30
Figure 3.3.12: Company Information.....	31
Figure 4.1: Dashboard	32
Figure 4.2: Left Sidebar	34
Figure 4.5: Sales Menu.....	35
Figure 4.4: Product List.....	35
Figure 4.5: Cart Items.....	36
Figure 4.6: Create Invoice	36
Figure 4.7: Add Customer Information.....	37
Figure 4.9: Sample Invoice	37
Figure 4.0: Empty Cart.....	38
Figure 4.11: Prediction	39
Figure 4.11.1: Prediction specific	39
Figure 4.12: Graph overall	40
Figure 4.12.1:Graph specific.....	40
Figure 4.13: Settings	41

CHAPTER 01

INTRODUCTION

Automation software is being used by business to reduce the time and cost associated with completing particular processes. It is a way of reducing labor intensive activities. Manual triggers are being replaced by software which integrates disparate systems to enable an end to end business process. Costs are saved by the reduced need for time & people. My project will automate the process from anywhere it is used by thousands of business companies having multiple branches, whether it be invoice processing, account provisioning, information reporting or human resource management.

1.1 Motivation

Every business company or organization has to maintain the calculations of their daily sales, information of the employees, their salary and other stuffs, the available products info, the prices of individual products, amount of stocks, list of clients, amount of payable money to the clients etc. All these information has to be maintained in papers which is time consuming, impossible to access from anywhere and insecure. Again, if an organization has multiple brunches, then combining all different data from different brunches is also tough. Also, the reports of the sales, stock and other monetary stuffs for a specific time interval is also tough to find in a short time. In the other hand in a business company or organization need to buy product in every month. But it is impossible for a person to tell how many product will need in next month and how much product available in stock. For human being it is quite impossible to draw a product sell graph in every month to contains all information. These problems can be solved by making a computerized system or software.

My proposed system is a inventory automation system by which we can manage any business organization. It can be very useful to solve these problem. Because my proposed system can contains all the information of a business company as well as it can predict how much product will need in next month. It can also show the graph for a specific month or overall.

1.2 ERP (Enterprise Resource Planning) Software

ERP is a category of business management software-typically a suite of integrated applications-that an organization can use to collect, store, manage and interpret data from many business activities, including:

- Product planning.
- Purchase.
- Service delivery.
- Sales.
- Inventory management.
- Payment.
- Finance.

1.3 Background Study

Different types of automation software are available in market ,I have analyzed about some software such as accounting software, manage mental software, shop management software, ERP software ,I have analyzed the vital features of the software, gathered information . Analysis is a detailed study of the various operations performed by a system and their relationships within and outside of the system.

1.4 Objectives

1. Keeping records of all the sells information, customer information and purchase information.
2. Automate the manual calculations using the software system.
3. Making sure of accessibility of the system from any device, from anywhere.
4. Ensuring security of data and defining user roles on the system.
5. Making the cost and income management.
6. To design a very user friendly application that is easily understandable, usable & maintainable by non-technical people in any business system.
7. To develop a real world and usable application that solves a problem & automate the day to day processes of business companies.
8. Lower Cost.

1.5 Key Features of Proposed System

The project will have the following key features:

1. Sales Management.
2. Product Management.
3. Employee Management.
4. Invoice Creation.
5. Client List.
6. Multiple Branch Facilities.
7. Reporting and Analysis.
8. Role-based authentication & user privileges.
9. Security.

1.6 Outline

This report is organized in five chapter. The introductory information of the project work have already discussed in this chapter.

Chapter 1: Introduction

In this part I have introduced what my project is and how it can help a businessman to manage his/her daily accounts .I have also described what features and facilities our proposed system will have. I analyzed about other same types of software.

Chapter 02: System Analysis and Design

In this section the traditional and conventional ways of software development is described briefly .I also described which development process I followed during the development of this proposed system. The system architecture and model is also included textually and visually. Pictorial description of Database model and data flow diagram is also given in this section.

Chapter 03: Proposed System Development and Implementation.

I discussed about the specific steps which are taken to develop the proposed system. I discussed about the system architecture and defined different user interactions between the software system and system users.

Chapter 04: Result and Discussion.

In this section I have discussed and shown the final output of my developed system. I also described about the testing part, scope and limitation,

Chapter 05: Conclusion and Future work

In this section I have discussed about conclusion and future work of my project.

CHAPTER 02

System Analysis and Design

This phase starts when the management has decide to continue. It is to be noted that the purpose of system analysis is to understand the existing system. A related goal is to establish the system requirements. The best way to understand a system is to gather data about it. Data must be organized and analyzed.

2.1 System

A set of detailed methods, procedures and routines created to carry out a specific activity or solve a problem. a system is an orderly grouping of interdependent components linked together according to a plan to achieve a specific objective. The component may be simple or complex, basic or advanced. Component may refer to

- physical parts
- managerial steps (planning, organizing and controlling) or
- a system in a multilevel structure.

They may be single computer with a keyboard, memory, and printer or a series of intelligent terminals linked to a mainframe. In either case, each component is part of the total system and has to do its share of work for the system to achieve the intended goal. This orientation requires an orderly grouping of the components for the design of a successful system.

Example - A web application for online Bengali newspaper is a example of system.

2.2 System Analysis

Systems analysis is a process of collecting factual data, understand the processes involved, identifying problems and recommending feasible suggestions for improving the system functioning. This involves studying the business processes, gathering operational data, understand the information flow, finding out bottlenecks and evolving solutions for overcoming the weaknesses of the system so as to achieve the organizational goals. System Analysis also includes subdividing of complex process involving the entire system, identification of data store and manual processes. Analysis is a detailed study of the various operations performed by a system and their relationships within and outside of the system.

The major objectives of systems analysis are to find answers for each business process.

- What is being done?
- How is it being done?
- Who is doing it?
- When is he doing it? Why is it being done?
- How can it be improved?
- The system analyst must contain two parts:
- Data gathering
- Data analysis.

2.2.1 Data Gathering

There is no standard procedure for gathering data because each system is unique. Data gathering is expensive and requires a lot of work and time. But there are certain sources that are commonly used:

- Documentation.
- Interviews.
- Questionnaires.
- Observation.
- Sampling.

In the present economical environment every organization plans to expand and develop quick system for profitability and economic growth ,as soon as possible. This require a process which can quickly develop new systems, in lesser time with lesser cost. Organizations must learn how to build and implement systems to remain competitive. System that is built correctly can support agile organizations and can transform as the organization and its business transforms .System that effectively meets needs will help an organization become more productive and enhance decision making. System that does not meet employee needs may have a damaging effect on productivity and can even cause a business to fail. Employee involvement along with using the right implementation methodology when developing software is critical to the success of an organization. This will focus on the process of how to achieve the development goal.

2.3 System Development

System development refers to the process of

- Through better procedures and methods.
- Examining a business situation.
- With the intent of improving it.

System development is having two major component to it

- System Analysis – Analysis of current system for Problems & Demerits in it and Additional requirements in new system.
- System Design – Process of planning new system which will replace the old one

2.4 Beginning of a System Development

System development usually begins when a problem or opportunity is

Identified, it can be because of any of the followings:

- New design idea to smoothen the process in the organization.
- Evolving environmental changes such as Competition.
- Adding new business or product line to present business.
- Present system does not satisfy the users information needs.
- Present system no longer efficiently and effectively meets the Goals of
- Organization Excessive time spent in correcting errors
- Current Reports / Outputs not meting users decision making skills.

2.4.1 The systems development life cycle (SDLC)

The systems development life cycle (SDLC) is a disciplined and systematic approach that divides the software development process into various phases structure sequence of phases for implementing an information system. It is a conceptual model and overall process used in project management that describes the stages involved in an information system development project. The SDLC is the foundation for all systems development methodologies and there are literally hundreds of different activities associated with each phase in the SDLC. Typical activities include determining budgets, gathering system requirements, and writing detailed user documentation. The activities performed during each systems

development project will vary. The SDLC begins with a business need, followed by an assessment of the functions a system must have to satisfy the need, and ends when the benefits of the system no longer outweigh its maintenance costs. This is why it is referred to as a 'lifecycle'. The SDLC is comprised of six distinct phases such as Recognition of need, Feasibility study, Analysis, Design, Implementation, Post implementation and maintenance.

The systems development life cycle (SDLC)

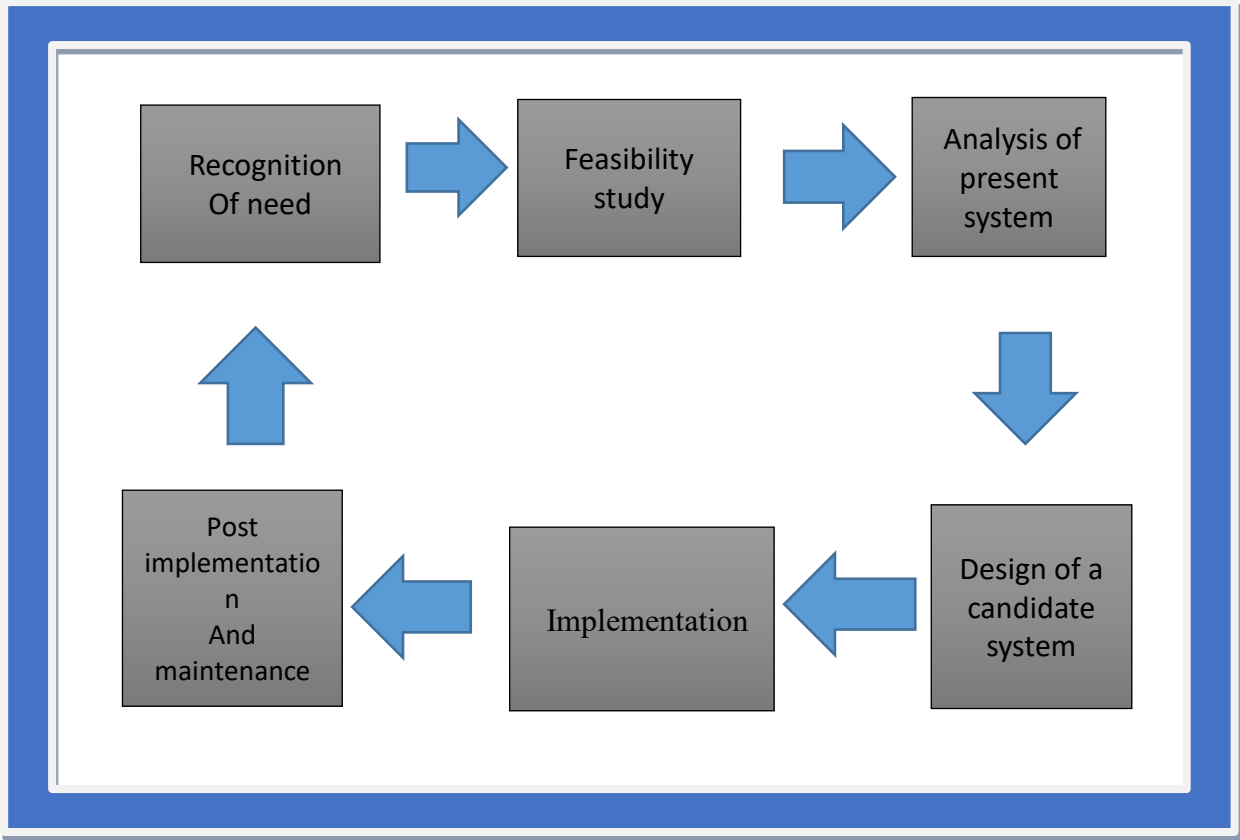


Figure 2.1: The systems development life cycle (SDLC)

Table 2.1: Key features of the phases of the SDLC.

Stage	Key question	Result
1. Recognition Of need	What is the problem or opportunity ?	Statement of scope and objectives , performance criteria
2. Feasibility study	What are the user demonstrable needs ? is the problem worth solving? how can the problem be redefined ?	Technical/behavioral feasibility,cost/benebfit analysis, System scope and objectives, Statement of new scope and objectives.
3. Analysis of present system	What must be done to solve the problem? What are the facts?	Logical model of system-data dictionary , data flow diagram
4. Design of a candidate system	How must the problem be solved? what is the system? Does the user approve the system? how well do individual programs test out? How ready are programs for acceptance test?	Design of alterative solutions, final cost/benefit analysis, hardware specifications, cost estimates, implementation specifications, implementation schedule, approval of systems by user, programs, test plans, security, audio, operating procedures, actual hardware use, formal system test.
5. implementation	What is the actual operation? Are user manuals ready? Are there delays loading files?	Training program ,user friendly documentation
6. Post implementation And maintenance	Is the key system running? Should the system be modified?	User requirements met, user standard met, satisfied user.

Recognition of Need

Whatever may be the reason of a request submitted by the User or Managers to the system analyst is assigned to make a preliminary investigation .The objective of this activity is to review all requests and identify those proposals that are most beneficial to the organization. But this should be noted that this is neither a designed study nor it includes collection of details to completely describe the business system. Preliminary system study is the first stage of system development life cycle. This is a brief investigation of the system under consideration and gives a clear picture of what actually the physical system is? In practice, the initial system study involves the preparation of a System proposal which lists the Problem Definition, Objectives of the Study, and Terms of reference for Study, Constraints, Expected benefits of the new system, etc. in the light of the user requirements. It consist of the groundwork necessary to determine whether the project should be pursued or not?

Purpose of the preliminary investigation

The preliminary investigation is the process of studying the systems request and preparing a recommendation. The purpose of the preliminary investigation is to determine if the systems request is worth pursuing into the analysis phase and to perform some initial project management planning tasks. Below Figure illustrates this step in the process. Preliminary investigation object can be achieved in following steps-

- a. Request Clarification
- b. Request Approvals

a . Request Clarification

➤ *Defining the Scope and Objective of Request:*

As mentioned in the objectives of System development objective earlier, an analyst has to define for which objective a request for development is submitted

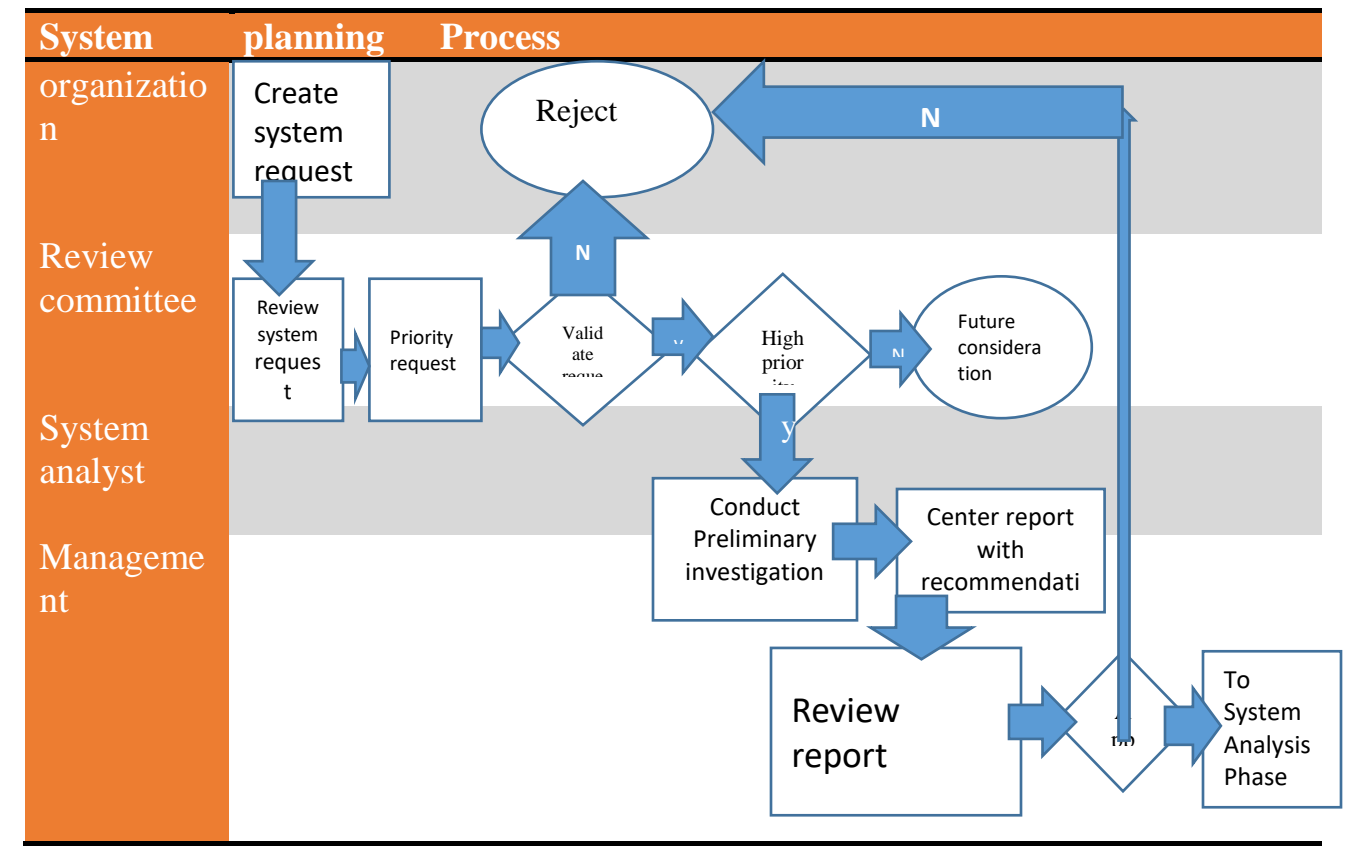


Figure 2.2: Prioritize Requests

Major steps of the preliminary investigation

Problem definition

First, in reviewing a systems request, the review team must ensure that they fully understand the problem or opportunity. In many cases, the system request does not identify the underlying problem. Sometimes what appears to be the problem turns out to be, on a closer look, only a symptom.

Scope of the problem

The preliminary investigation should also detail the scope of the project. The scope details the boundaries of the project. If the system request was to redesign the newspaper, the review team would need to decide if that included the database, the system interface, the computer infrastructure, the software and/or the underlying

business process. Although the scope will probably be adjusted in the analysis phase when the detailed fact finding is completed, it is important that the systems analyst and the business users are in agreement on an initial scope.

Objectives of the problem

The analysis will soon come to understand what the user needs, that I ,what the user thinks the system should be able to do. An analyst may want to expire these need as objectives.

After all of the above activities are completed, a recommendation needs to be made.

2.5 Feasibility study

Feasibility study is the test of a system proposal according to it's workability, impact on organization, ability to meet user needs, and effective use of resources. It is used to find best candidate system.

Feasibility Considerations

Three key considerations are involved in the feasibility analysis:

- a. Economic feasibility,
- b. Technical feasibility and
- c. Behavioral feasibility

(a)Economic feasibility

Economic analysis is the most frequently used method for evaluating the effectiveness of a candidate system. It is also known as cost/benefit analysis, the procedure is to determine the benefits and savings that are expected from a candidate system and compare them with costs. If benefits outweigh costs, then the decision is made to design and implement the system.

(b)Technical feasibility

It considers the technical requirements of the proposed project. The technical requirements are then compared to the technical capability of the organization. The systems project is considered technically feasible if the internal technical capability is sufficient to support the project requirements. It include the following:

- Is the project feasible within the limits of current technology?
- Does the technology exist at all?
- Manpower- programmers, testers & debuggers
- Software and hardware

- Are the current technical resources sufficient for the new system?
- Can the technology be easily applied to current problems?
- Does the technology have the capacity to handle the solution?

(c)Behavioral /operational feasibility

Operational feasibility is dependent on human resources available for the project and involves projecting whether the system will be used if it is developed and implemented.

Steps in feasibility analysis

1. Form a project team and appoint a project leader
2. Prepare system flowcharts(DFD)
3. Evaluate potential candidate systems
4. Describe and identify characteristics of candidate system
5. Determine and evaluate performance and cost effectiveness of each candidate system
6. Weight system performance and cost data
7. Select the best candidate system
8. Prepare feasibility report

2.6 Cost & Benefits Analysis

The cost & benefits of this system is shown below:

Without development cost there are some others cost for this system development.

Domain Cost of proposed system

This is a online based system. So, at first we need unique domain for this project so that user can access the system by using internet.

Domain Cost = 10\$ – 15\$ /year

Hosting Cost of proposed system

Our project files, databases files and other files have to store in online. That's why we need a hosting.

Hosting Cost = 40\$ - 50\$ /year (1GB).

SSL Certificate Cost of proposed system

For the security purpose SSL Certificate is very necessary for our project. SSL stands for Secure Sockets Layer. SSL is an acronym for Secure Sockets Layer, an encryption technology. SSL creates an encrypted connection between your web server and your visitors' web browser allowing for private information to be transmitted without the problems of eavesdropping, data tampering, or message forgery. SSL Certificates are small data files that digitally bind a cryptographic key to an organization's details. When installed on a web server, it activates the padlock and the https protocol (over port 443) and allows secure connections from a web server to a browser. SSL Certificate Cost = 65\$ - 70\$ /year.

2.6.1 Requirements

Table 2.2 Requirement of proposed system

Specifications	Description
Platform :	Web Server (Apache)
Languages :	HTML, CSS, JavaScript, PHP
Frameworks :	Bootstrap, jQuery.
Database :	MySQL
Project Type :	Web Application

As My system is online based, any device able to connect to internet & browse pages can be used to access this system. To access & use the system properly, a computing device like a computer, tablet or smart phone is needed. There are no specific configuration or platform for this proposed system. Any computer, tablet or smartphones which is able to connect to the internet is able to use this system.

2.7 Design

The design phase decides how the system will operate, in terms of the hardware, software, and network infrastructure; the user interface, forms, and reports that will be used; and the specific programs, databases, and files that will be needed. Although most of the strategic decisions about the system were made in the development of

the system concept during the analysis phase, the steps in the design phase determine exactly how the system will operate.

2.7.1 Steps of Design

The design phase has four steps. These are described below -

1. The design strategy must be developed. This clarifies whether the system will be developed by the company's own programmers, whether it will be outsourced to another firm (usually a consulting firm), or whether the company will buy an existing software package.
2. This leads to the development of the basic architecture design for the system that describes the hardware, software, and network infrastructure that will be used. In most cases, the system will add or change the infrastructure that already exists in the organization. The interface design specifies how the users will move through the system (e.g., navigation methods such as menus and on-screen buttons) and the forms and reports that the system will use.
3. The database and file specifications are developed. These define exactly what data will be stored and where they will be stored.
4. The analyst team develops the program design, which defines the programs that need to be written and exactly what each program will do

2.8 System Model

A System model is the conceptual model as a result of system modeling that describes and represents a system. A system comprises multiple views such as planning, requirement (analysis), design, implementation, deployment, structure, behavior, input data, and output views. A system model is required to describe and represent all these multiple views.

All System model describes and represents the multiple views possibly using two different approaches, the first one is the non-architectural approach and the second one is the architectural approach. Here we have used the Incremental Model. A brief description of Incremental Model is discussed below and we have discussed that how the software is related to this model.

2.8.1 The Incremental Model

In incremental model the whole requirement is divided into various builds. Multiple development cycles take place here, making the life cycle a “multi-waterfall” cycle. Cycles are divided up into smaller, more easily managed modules. Each module passes through the requirements, design, implementation and testing phases. A working version of software is produced during the first module, so you have working software early on during the software life cycle. Each subsequent release of the module adds functionalities to the previous release. The process continues till the complete system is achieved.

In the diagram below when we work incrementally we are adding piece by piece but expect that each piece is fully finished. In adding the pieces until it's complete.

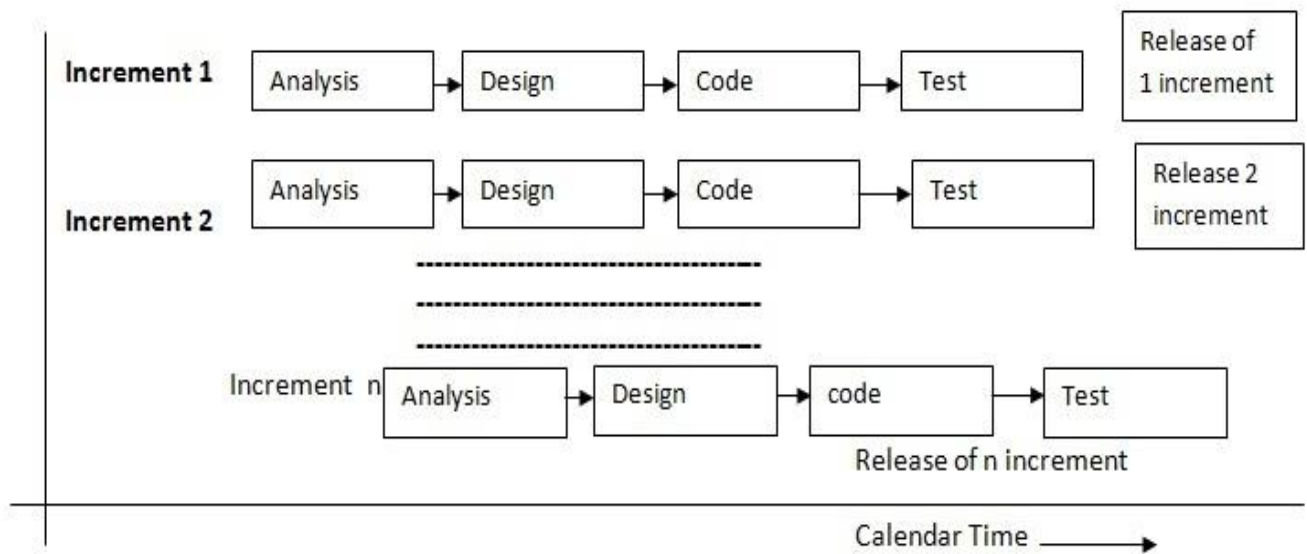


Figure 2.3: Incremental model

2.8.2 Benefits of using incremental model

1. Generates working software quickly and early during the software life cycle
2. More flexible – less costly to change scope and requirements.
3. Easier to test and debug during a smaller iteration.

4. Customer can respond to each built.
5. Lowers initial delivery cost.
6. Easier to manage risk because risky pieces are identified and handled during iteration.

2.8.3 Selecting the Incremental Approach

It is necessary to determine whether the system to be built is suitable for incremental or not. This is decided depending on application area, complexity and projects characteristics. We choose it for the following reasons:

1. Requirements of the complete system are clearly defined and understood.
2. Incremental model improves the quality of software day by day
3. Major requirements must be defined; however, some details can evolve with time.
4. There is a need to get a product to the market early.
5. A new technology is being used.
6. Resources with needed skill set are not available.
7. There are some high risk features and goals.

2.9 Data analysis

Data analysis is the basic function of the analysis phase. To analyze gathered data we have used DFD (Data Flow Diagram) tools. By using DFD we show how the current system works and to determine the system requirements.

2.9.1 Data Flow Diagram

A data flow diagram is a short road map for that graphically represents how the data moves through the existing system. We have used data flow diagram in design process. The data flow diagram provides facilitating communication between us and user. DFD shows what kinds of information will be input to and output from the system, where the data will come from and go

to, and where the data will be stored. It does not show information about the timing of processes, or information about whether processes will operate in sequence or in parallel.

2.10 Data flow diagram of Inventory Automation System

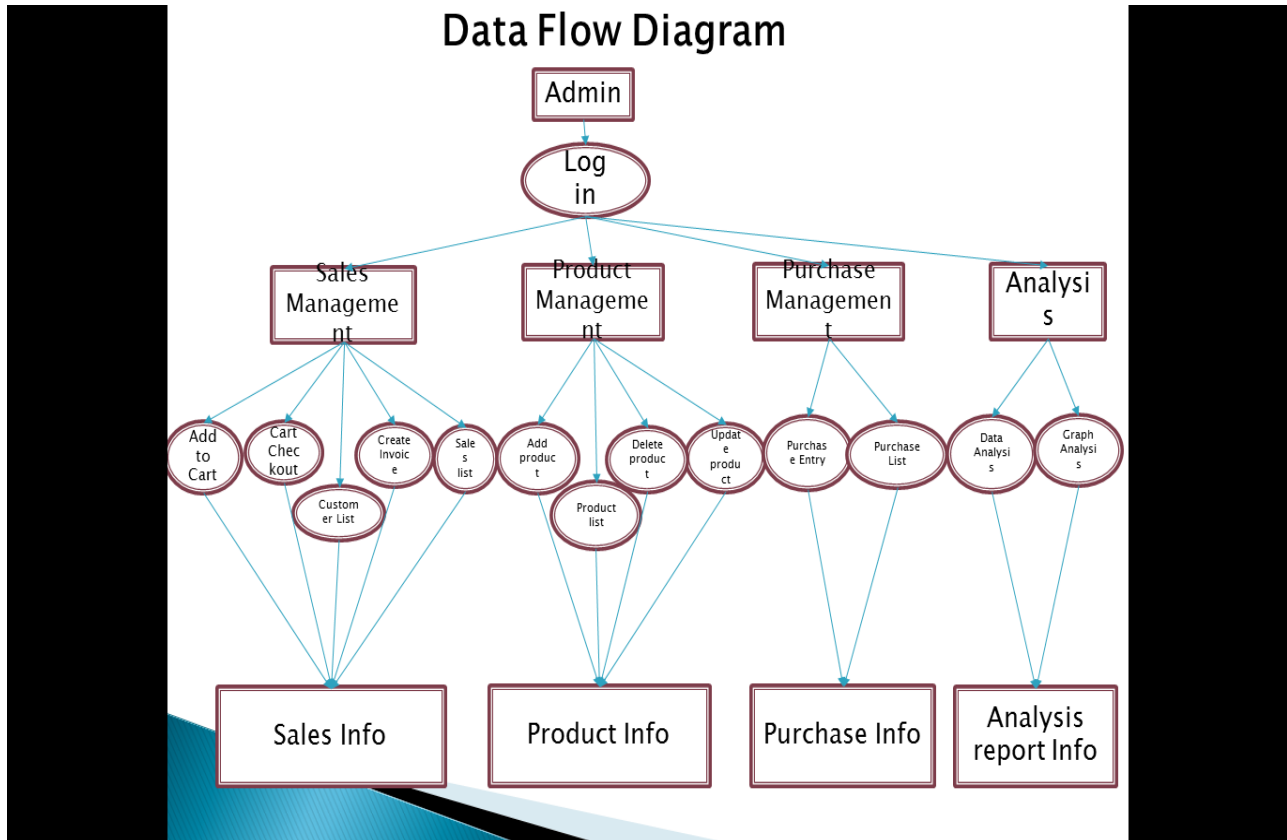


Figure 2.4: Data flow Diagram of proposed system

2.11 Class diagram Inventory Automation System

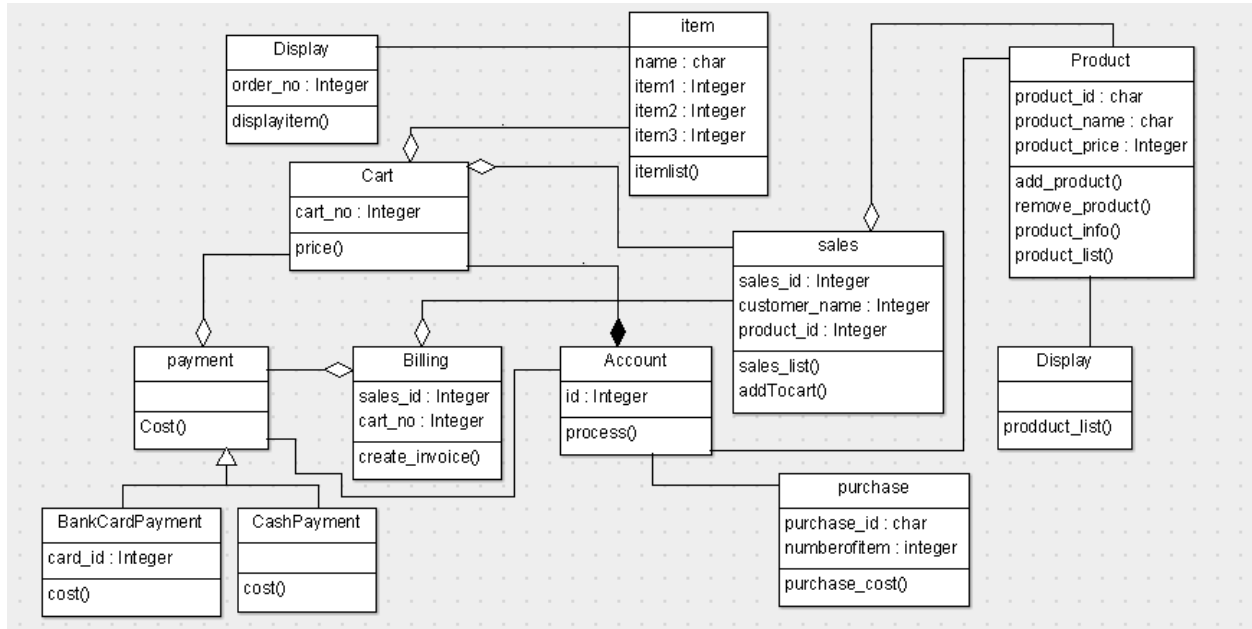


Fig: Class Diagram

2.12 Use Case Diagram of Inventory automation system



Fig: Use Case Diagram

2.13 Database Design

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).

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:

- Determine the data to be stored in the database.
- Determine the relationships between the different data elements.
- Superimpose a logical structure upon the data on the basis of these relationship.

2.13.1 Determining data to be stored

In a majority of cases, a person who is doing the design of a database is a person with expertise in the area of database design, rather than expertise in the domain from which the data to be stored is drawn e.g. financial information, biological information etc. Therefore, the data to be stored in the database must be determined in cooperation with a person who does have expertise in that domain, and who is aware of what data must be stored within the system.

This process is one which is generally considered part of requirements analysis, and requires skill on the part of the database designer to elicit the needed information from those with the domain knowledge. This is because those with the necessary domain knowledge frequently cannot express clearly what their system requirements for the database are as they are unaccustomed to thinking in terms of

the discrete data elements which must be stored. Data to be stored can be determined by Requirement Specification.

2.13.2 Determining Data Relationships

Once a database designer is aware of the data which is to be stored within the database, they must then determine where dependency is within the data. Sometimes when data is changed you can be changing other data that is not visible. For example, in a list of names and addresses, assuming a situation where multiple people can have the same address, but one person cannot have more than one address, the address is dependent upon the name. When provided a name and the list the address can be uniquely determined; however, the inverse does not hold - when given an address and the list, a name cannot be uniquely determined because multiple people can reside at an address. Because an address is determined by a name, an address is considered dependent on a name.

2.13.3 Logically Structuring Data

Once the relationships and dependencies amongst the various pieces of information have been determined, it is possible to arrange the data into a logical structure which can then be mapped into the storage objects supported by the database management system. In the case of relational databases the storage objects are tables which store data in rows and columns. In an Object database the storage objects correspond directly to the objects used by the Object-oriented programming language used to write the applications that will manage and access the data. The relationships may be defined as attributes of the object classes involved or as methods that operate on the object classes.

The way this mapping is generally performed is such that each set of related data which depends upon a single object, whether real or abstract, is placed in a table. Relationships between these dependent objects is then stored as links between the various objects.

Each table may represent an implementation of either a logical object or a relationship joining one or more instances of one or more logical objects. Relationships between tables may then be stored as links connecting child tables with parents. Since complex logical relationships are themselves tables they will probably have links to more than one parent.

2.13.4 Database Design of Business Automation System

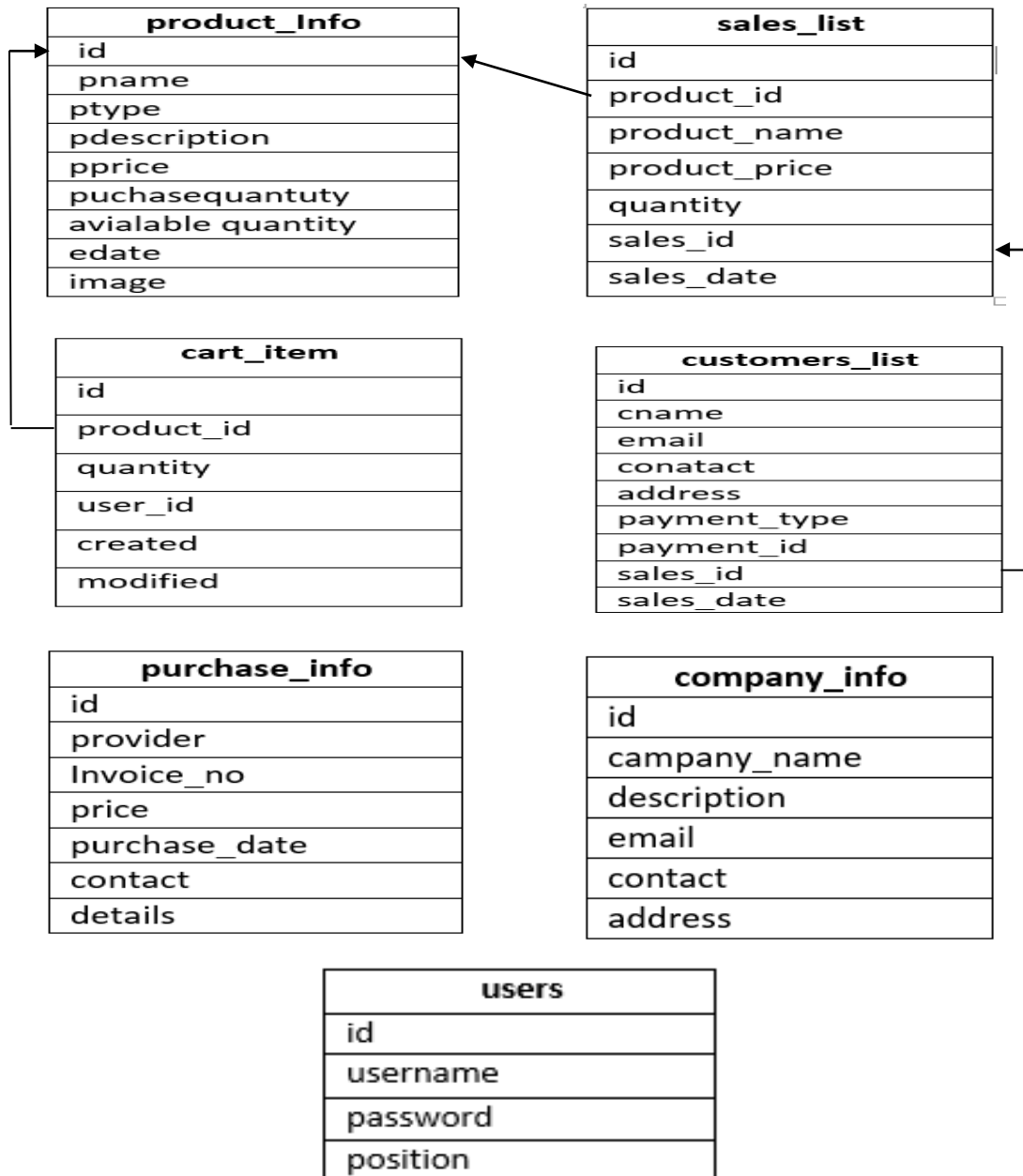


Figure 2.5 Database design of proposed system

Chapter 3

Proposed System Development and Implementation:

The development phase is an operational phase of my system .This is the phase where I start to code the system. I follow the requirements specification from the design stage and start to create the new system. The Development Phase features a key step in the project system construction. The major phases of a system is shown in Figure 3.1. The previous phases lay the foundation for system development; the following phases ensure that the product functions as required. To complete the Development Phase successfully, two elements are required: a) A complete set of design specifications and b) Proper processes, standards, and tools.

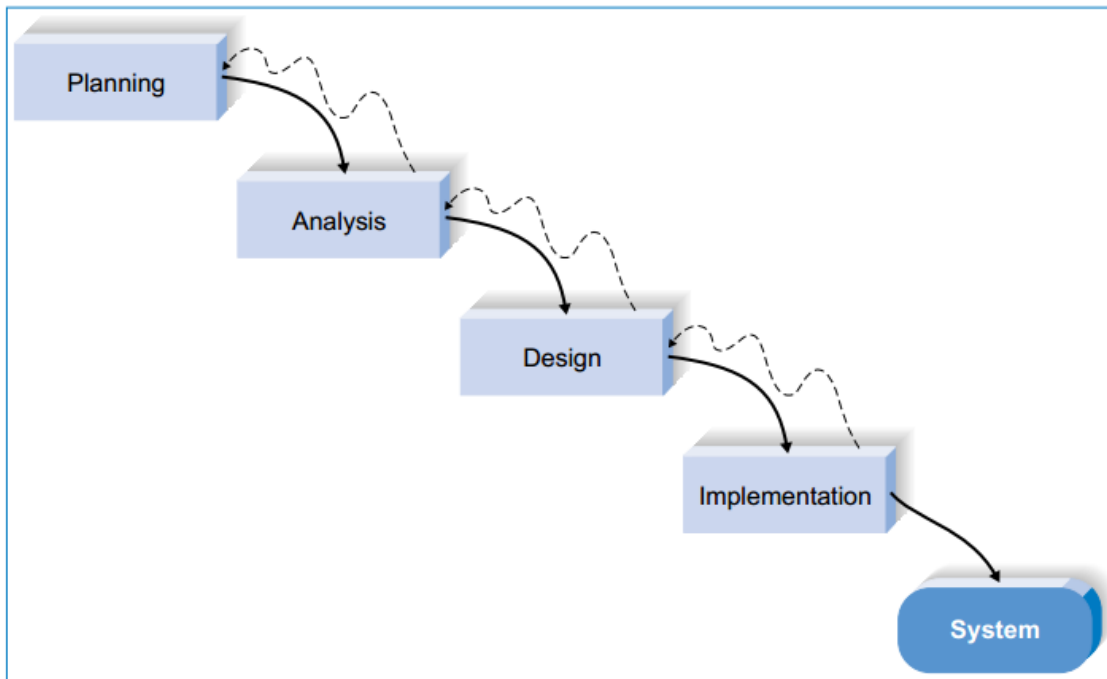


Figure 3.1 Major phases of a System

3.1 System Implementation

In order to achieve deliverable of acceptance and meeting of objectives, the new system being built must be tested. Aligned with this, the end users must be fully trained so the company will

benefit from the new system. The construction phase does two things: builds and tests a functional system that fulfills business or organizational design requirements, and implements the interface between the new system and the existing production system. The project team must construct the database, application programs, user and system interfaces, and networks. Some of these elements may already exist in your project or be subject to enhancement There are five activities that must be performed during the implementation phase:

1. Construct software components
2. Verify and test
3. Convert Data
4. Training end users and document the system
5. Install the system

3.2 Implementation Phase Deliverables

■ Coding

- Code Programs & Database Structures
- Program Documentation
- Structure charts, Structured English, Decision tables/trees, Data flow diagrams.

■ Testing

- Test Scenarios & Test Data.
- Results of Program & System Testing.

■ Installation

- Installation & Conversion Plans.
- Software and hardware installation, Data conversion plan, Site & facility remodeling plan.
- User Guides & Training Plan.

3.3 Data Acquisition

Data acquisition is the process of sampling signals that measure real world physical conditions and converting the resulting samples into digital numeric values that can be manipulated by a

computer. Data acquisition systems, abbreviated by the acronyms *DAS* or *DAQ*, typically convert analog waveforms into digital values for processing. The components of data acquisition systems include:

- Sensors, to convert physical parameters to electrical signals.
- Signal conditioning circuitry, to convert sensor signals into a form that can be converted to digital values.
- Analog-to-digital converters, to convert conditioned sensor signals to digital values.

3.3.1 Data Acquisition of the Project:

A business automation system consist of different data Acquisition part. Some major parts are described below-

3.3.2 Adding Products

Add New Product:

Product Name:

Price/Product:

Product Type:

Product Quantity:

Product Description:

Entry Date:

Product Image:

Figure 3.2 Add Product

3.3.3 Stored Product Information

Table 3.1 Product Info.

List of All Products:

Serial	Product Name	Product Type	Product Description	Product Price	Purchase Quantity	Available Quantity	Details
1	Maximus IX UFO	Electronics	Maximus IX UFO	9999	30	3	View Details
2	Asus ZenFone 2 ZE500CL	Electronics	Asus ZenFone 2 ZE500CL	17000	25	2	View Details
3	Goldberg Discovery ZL1	Electronics	Goldberg Discovery ZL1	5899	40	2	View Details
4	Alcatel Hero	Electronics	Alcatel Hero	17999	30	30	View Details
5	Samsung Galaxy Ace S5830	Electronics	Samsung Galaxy Ace S5830	14880	26	7	View Details
6	Sony Xperia miro	Electronics	Sony Xperia miro	13000	25	24	View Details

Fig: List of all product information

3.3.4 Add Customer

Cart Items:

Product Name	Price (USD)	Quantity	Sub Total
Samsung Galaxy Ace S5830	\$14,880.00	1	\$14,880.00
Total			\$14,880.00

Billing Information:

Customer Name: **Invoice Type:**

Email: **Customer Address:**

Contact No: **Sales Date:**

Figure 3.3.4 Add Customer

3.3.5 Customer Information

Table 3.2 Customer Information

List of Customers:						
Serial	Customer Name	Email	Contact	Address	Sales ID	Details
1	Apon	apon@gmail.com	01761086935	badda,dhaka	582cd90335ac1	View Details
2	dibbo	dibboraj4@gmail.com	01782136592	Dhaka,Bangladesh	582cd9b8232e9	View Details
3	Md.Saddam Hossain	saddamhossain0030@gmail.com	01723994590	Dhaka,Bangladesh	5835d48400c58	View Details
4	aurthohin	apon@gmail.com	0172345649373	banasree	5835d54fe851c	View Details
5	Md.Syful Islam	syfulislam030@gmail.com	01761086935	Village Bakar Kanda, Post:Chander Nagor District S	5835d610a0c05	View Details
6	jahangir	jahangir@gmail.com	01923465786	uttara,dhaka	5835d8ccefdfc	View Details
7	dhrubo	dhrubo@gmail.com	01765432780	nilkhet,dhaka	5835dc145657c	View Details
8	ananta	ananta@gmail.com	01823456734	khikhet	5835de1133523	View Details
9	khairul	khairul1@gmail.com	01823456789	gazipur,dhaka	5835dee88d5e1	View Details

3.3.6 Add Purchase

Add New Purchase Entry	
Provider Name: <input type="text" value="Example: ABC Company LTD."/>	Purchase Date: <input type="text" value="30-11-2016"/>
Invoice No: <input type="text" value="Example: 123456789"/>	Contact No: <input type="text" value="Example: 01758088528"/>
Total Price: <input type="text" value="Enter Total Price..."/>	Details: <input type="text" value="Enter Purchase Description..."/>
<input type="button" value="Add Purchase"/> <input type="button" value="Clear"/>	

Figure 3.3 Purchase Information

3.3.7 Purchase Information

Table 3.3 Purchase Information Table

List of purchases:

Serial	Provider Name	Invoice No	Total Price	Purchase Date	Contact No	Details
1	Samsung	123456	150000	0000-00-00	01761086935	Samsung Galaxy
2	iphone	1234536	300000	0000-00-00	01782136592	iphone 7s
3	Symphony	1234536878	200000	0000-00-00	01782136592	Symphony

Fig: Purchase Information

3.3.8 Sales List

List of Sales:

Serial	Sales ID	Total Price	Sales Date	Details
1	5835d48400c58	23990	2016-08-03	View Details
2	5835d54fe851c	7390	2016-10-23	View Details
3	5835d610a0c05	11500	2016-10-23	View Details
4	5835d8ccefdcf	22980	2016-10-13	View Details
5	5835dc145657c	9090	2016-10-16	View Details
6	5835de1133523	6990	2016-10-03	View Details
7	5835dee88d5e1	1589	2016-10-05	View Details
8	5835e032f0e5a	84278	2016-10-10	View Details
9	5835e19d81c57	8490	2016-10-15	View Details

Fig: Sales List

3.3.9 Sales information

Sales Information:

General Information	
Customer Name: Md.Saddam Hossain	Sales ID: 5835d48400c58
Contact No: 01723994590	Sales Date: 2016-08-03

Serial	Product Name	Quantity	Product Price
1	Symphony H175	1	10490
2	Huawei Ascend G730	1	13500
		Total :	23990

Fig: Sales Information

3.3.10 Add to Cart

List of Cart Items:

Product Name	Price (USD)	Quantity	Sub Total	Action
Samsung Galaxy Ace S5830	\$14,880.00	<input type="text" value="1"/> Update	\$14,880.00	✖ Remove from cart
Sony Xperia miro	\$13,000.00	<input type="text" value="1"/> Update	\$13,000.00	✖ Remove from cart
Symphony H175	\$10,490.00	<input type="text" value="1"/> Update	\$10,490.00	✖ Remove from cart
Samsung Galaxy S6	\$42,500.00	<input type="text" value="1"/> Update	\$42,500.00	✖ Remove from cart
Alcatel Hero	\$17,999.00	<input type="text" value="1"/> Update	\$17,999.00	✖ Remove from cart
Total			\$98,869.00	🛒 Checkout

Fig: Cart Items

3.3.11 Cart Information

Table 3.5 Cart Information Table

id	product_id	quantity	user_id	created	modified
2	18	1	1	2016-08-16 12:40:51	2016-08-16 16:40:51
3	21	1	1	2016-08-16 12:41:47	2016-08-16 16:41:47
4	20	1	1	2016-08-16 12:41:48	2016-08-16 16:41:48

3.3.12 Add Company Information

Business Information:

Company/Institute Name:

Email:

Company Description: A

Contact No:

Company Address:

Chapter 4

Result and Discussion

4.1 Overview

In this chapter we discussed about the summary of the functional parts of our system. We discussed about how to use this system & how to sell products in step by step procedure using this system. We also briefly discussed about the scope & limitation of our system. Then we discussed about the further development planning that we have to improve this system & take it to the next level.

4.2 Dashboard

Finally, we have successfully developed all the requirements of the project “A Inventory Automation System” This is the dashboard of this software.

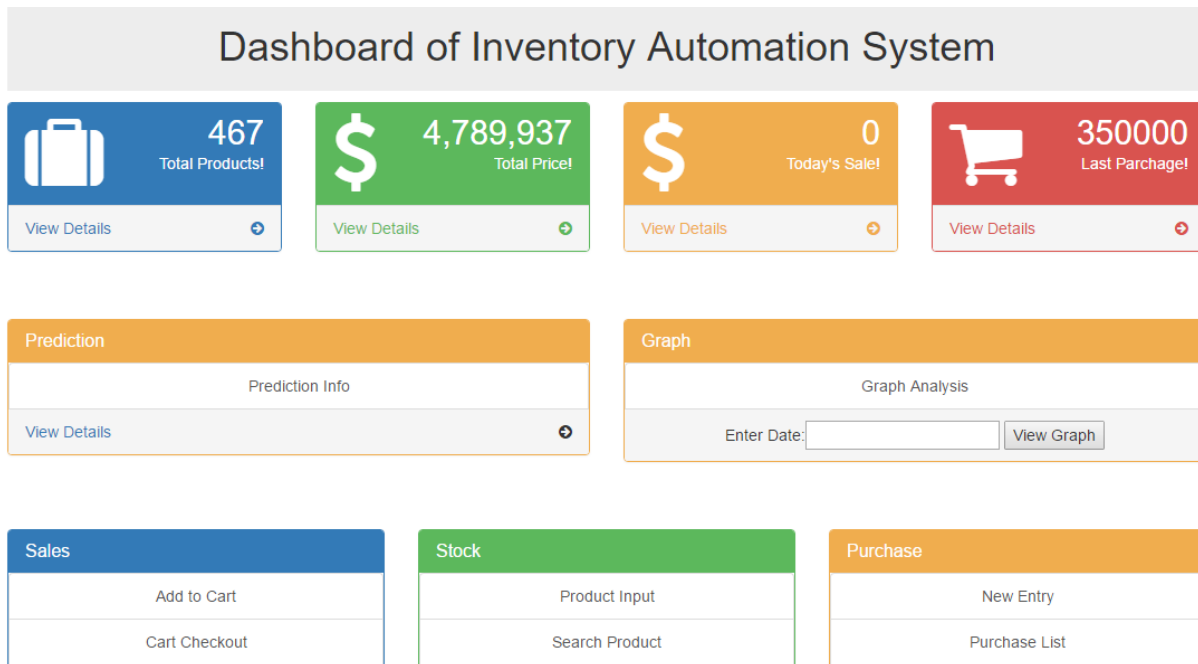


Figure 4.1 Dashboard

From this page seller can see the overall condition of his business. From dashboard seller can see the information of

1. Total products – How many products are available in his shop.
2. Total price – The grand total price of all products in his shop.
3. Today's sale – This section gives the information of Today's all sales.
4. Last Purchase - This section gives the information of the last purchase.
5. Prediction-from this section we can see how many product will need for my business.
6. Graph Analysis-it show the graph.

4.3 Left Panel/ Sidebar

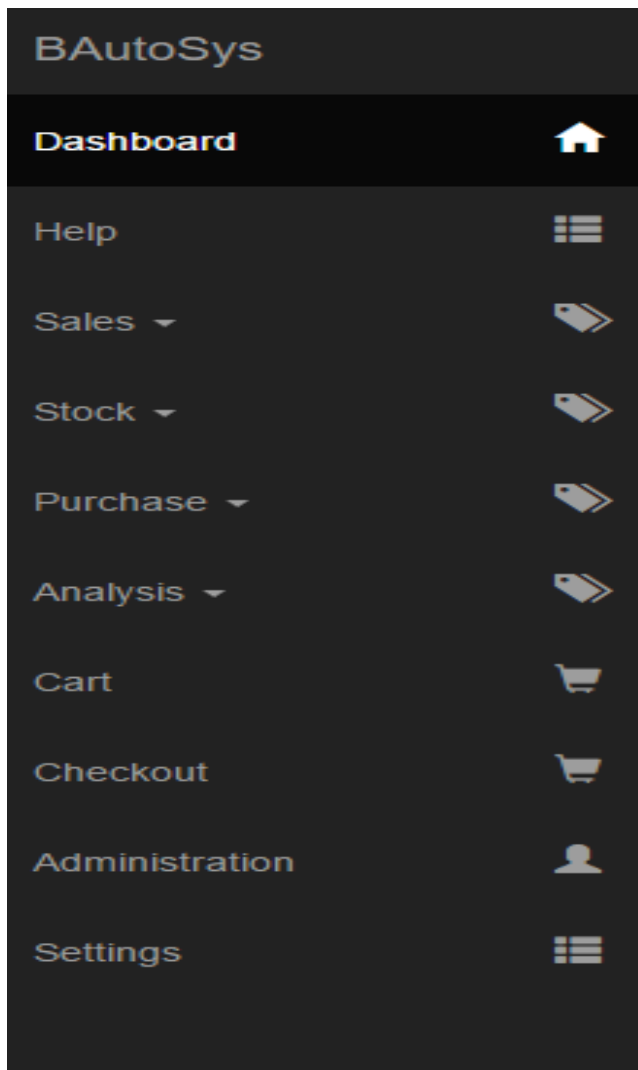


Figure 4.3 Left Sidebar

This is the left panel. By this panel seller can easily pick up any information from any page. The left panel contains

1. Dashboard – This section describes the overall information of any business.
2. Help – This section describes how to use this software.
3. Sales
 - i. Create Invoice
 - ii. Sales List
 - iii. Customer List
4. Stock
 - i. Product Input
 - ii. Search Product
 - iii. Product List
5. Purchase
 - i. New Entry
 - ii. Purchase List
 - iii. Purchase Info
6. Analysis
 - i. Prediction
 - ii. Graph Analysis
7. Cart – This section shows the selected items for sale.
8. Checkout - This section shows the cart items & billing information
9. Administration – The section is only for the owner of the company.
10. Settings - This section gives the facility of Dynamic changes of company information.

If the seller wants to sell any product then he has to go to the product list page. Then he has to choose the products that customer wants. The Product list of our system is shown below.

4.4 Sales Menu

Sales
Add to Cart
Cart Checkout
Create Invoice
Sales List
Customer List









Figure 4.5 Sales Menu

Sales menu describes about

- i. Add to Cart
- ii. Cart Checkout
- iii. Create Invoice
- iv. Sales List
- v. Customer List

4.5 Showing Product List

List of All Products

 <p>Walton Primo VX (1) ₹ 11500</p> <input type="text" value="1"/> Add to cart	 <p>Symphony H175 (5) ₹ 10490</p> <input type="text" value="1"/> Add to cart	 <p>Samsung Galaxy S6 (4) ₹ 42500</p> <input type="text" value="1"/> Add to cart	 <p>Samsung Galaxy J7 Prime (5) ₹ 23500</p> <input type="text" value="1"/> Add to cart
 <p>Huawei GR3 (1)</p>	 <p>Huawei G7 Plus (4)</p>	 <p>Huawei Ascend G730 (7)</p>	 <p>Huawei Y625 (4)</p>

11:30 PM

After adding the products into the cart , a cart list will be created. The list of cart items is shown below:

4.6 Cart Items

List of Cart Items:

Product Name	Price (USD)	Quantity	Sub Total	Action
GP Modem	\$2,200.00	<input type="text" value="1"/> Update	\$2,200.00	✕ Remove from cart
Cooler 450D	\$600.00	<input type="text" value="1"/> Update	\$600.00	✕ Remove from cart
Mouse MS-Usb	\$550.00	<input type="text" value="1"/> Update	\$550.00	✕ Remove from cart
Total			\$3,350.00	🛒 Checkout

Figure 4.4 Cart Items

The seller can update the product quantity or remove any product from cart items finally from cart item list.

To do the sell the seller has to click the checkout button from the left sidebar or the sales menu which is shown below.

4.7 Create Invoice

Cart Items:

Product Name	Price (USD)	Quantity	Sub Total
GP Modem	\$2,200.00	1	\$2,200.00
Cooler 450D	\$600.00	1	\$600.00
Mouse MS-Usb	\$550.00	1	\$550.00
Total			\$3,350.00

Billing Information:

Customer Name: <input type="text" value="Enter Customer Name..."/>	Invoice Type: <input type="text" value="Cash"/>
Email: <input type="text" value="Enter Email..."/>	Customer Address: <input type="text" value="Enter Customer Address..."/>
Contact No: <input type="text" value="Enter Contact No..."/>	Sales Date: <input type="text" value="2016-08-16 13:31:14"/>

Figure 4.6 Create Invoice

4.8 Add Customer information:

Cart Items:

Product Name	Price (USD)	Quantity	Sub Total
Sony Xperia miro	\$13,000.00	1	\$13,000.00
Samsung Galaxy Ace S5830	\$14,880.00	1	\$14,880.00
Total			\$27,880.00

Billing Information:

Customer Name: Md.Saddam Hossain	Invoice Type: Cash
Email: saddamhossain0030@gmail.com	Customer Address: badda,dhaka
Contact No: 01761086935	Sales Date: 2016-11-30 18:45:15

Figure 4.7 Add Customer Information

Finally, by clicking the “Confirm Sale” button the actual sale information will be added to database & the invoice of the sale will be generated dynamically, ready to be printed like this copy:

4.9 Invoice

Creative Minds Ltd
A place where creativity overflows..

Email : hello@creativeminds.com
Contact : 01761086935
Dhaka, Bangladesh

Cart Items:

Product Name	Price (USD)	Quantity	Sub Total
Sony Xperia miro	\$13,000.00	1	\$13,000.00
Samsung Galaxy Ace S5830	\$14,880.00	1	\$14,880.00
Total			\$27,880.00

Billing Information:

Customer Name: Md.Saddam Hossain	Invoice Type: Cash
Email: saddamhossain0030@gmail.com	Customer Address: badda,dhaka
Contact No: 01761086935	Sales Date: 2016-11-30 18:45:15

signature

date

Thank you for your business with us.

Figure 4.9 Sample Invoice

4.10 If The Cart is Empty

The billing information can not be added & invoice can not be created if the cart is empty.



Figure 4.9 Empty Cart

4.11 Prediction Information:

Serial	Product Name	Available Quantity	Avarage Need in a Month	Total Need
1	HeadPhoneplus;	4	9	5
2	HeadPhone;	8	19	11
3	USB Flash Drives;	70	0	No need to buy
4	UV 128 REDYELLOW ;	15	29	14
5	UV 150 BLAck ;	80	0	No need to buy
6	ADATA UV 131 Pen Drive ;	8	21	13

Fig: Show Overall prediction

4.11.1 Specific Category Prediction Information:

Serial	Product Name	Available Quantity	Avarage Need in a Month	Total Need
1	Hospital Management Software;	5	0	No need to buy
2	Diagnostic Software;	1	2	1
3	Webroot Antivirus Software;	9	1	No need to buy
4	Cloud Based Antivirus Software;	22	3	No need to buy
5	Kaspersky Internet Security;	29	1	No need to buy
6	McAfee Internet Security;	27	5	No need to buy
7	Eset Smart Security Antivirus;	16	23	7

Fig: Show specific category prediction

4.12 Graph Analysis:

Total sell graph:

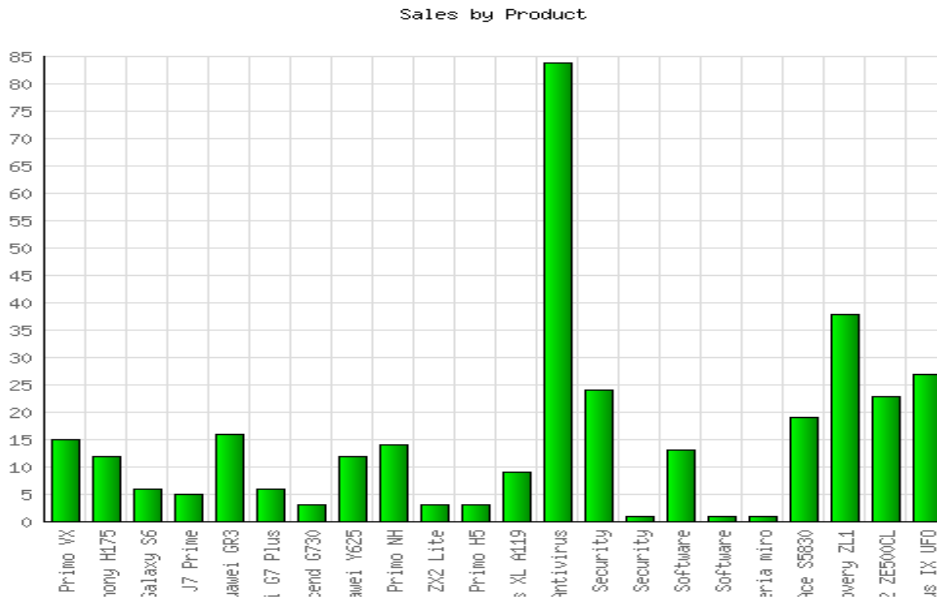


Fig: total sell in last 90 days

4.12.1 Total sell in a month:

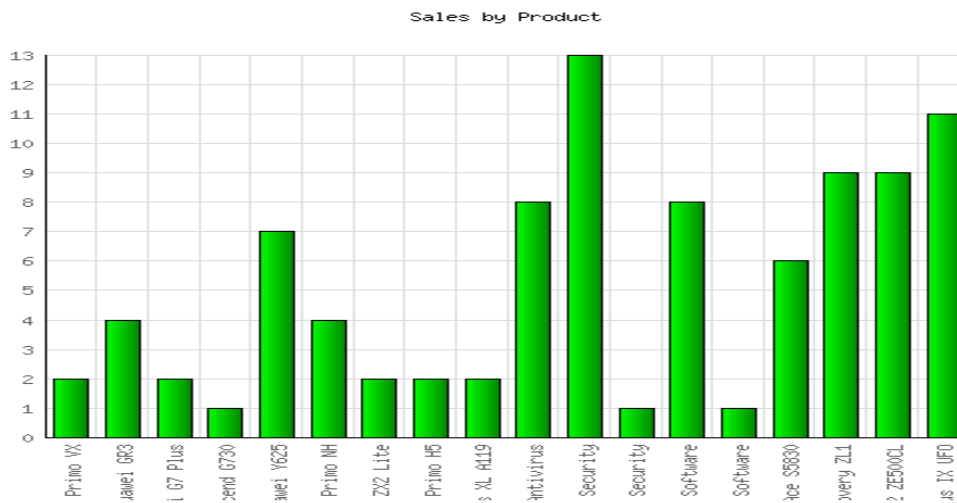


Fig: sell in a specific month

4.13 Settings

The software is developed to be used in any kind of small or medium business institutions having different idea. Tiny information. This information added and updated here to be used in invoice.

Business Information:

Company/Institute Name:	<input type="text" value="Creative Minds Ltd"/>	Email:	<input type="text" value="hello@creativeminds.com"/>
Company Description:	<input type="text" value="place where creativity overflows.."/>	Contact No:	<input type="text" value="01761086935"/>
		Company Address:	<input type="text" value="Dhaka,Bangladesh"/>

4.13 Scope and Limitations

The system will have the following limitations & boundaries:

1. To access & use the system properly, a computing device like a computer, tablet or smart phone is needed.
2. There is no individual domain & hosting for individual company or business organization.
3. Operators of this system must be properly trained & guided.

Though this system has many functionalities it will takes more time to develop

Chapter 5

Conclusion & Future Work

5.1 Conclusion

I tried to develop an efficient and advance automation system for any kind of small and medium business institution. My system can successfully keep track of the calculations and data manipulation for the business institution. It has a very simplified and easy to use user interface. It is a web application and designed to support mobile devices, it has different layout for devices having different screen sizes. It is secure and built on top of the latest technologies. It's efficiently developed, using relational tables and conventional coding standard. It has a nice and ordered architecture, it's easily understandable and extendable. It can save enormous amount of time and energy of the necessary calculations. Also, manual calculations are error prone which can be a great problem, but this system ensures error free calculations. Reports can be generated in seconds and invoice is created and saved dynamically. Besides the existing features and functionalities, it will be more advanced as I have lots of features planned for further development.

5.2 Future Work:

My system has all the functionalities to manage a business organization. But I have some plan to make it more efficient, reliable. Some important features that I want to add in further development of My project, these are pointed below:

1. Add a barcode scanner.
2. Master card payment
3. Developing a native android application of the system.
4. Human resource management.
5. Multiple branch management.
6. Payroll Management.
7. Data analytics.
8. Intelligent report generation.
9. Advanced product filtering.
10. Advanced sales and customer management.

REFERENCES

[1] Elias M. Award “System Analysis and Design” McGraw-Hill Edition, 2nd ed.

[2] E. Balagurusamy, “Head First PHP”, 4th ed.

[3] www.W3school.com

[4] www.stackoverflow.com

[5] www.tutorialpoint.com

[6] [http:// php.about.com](http://php.about.com)