BCS FINAL PROJECT

MIS Of Auto Fuel Technologies

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MIS Of Auto Fuel Technologies

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BACHELOR
OF
COMPUTER SCIENCE

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ABSTRACT

Auto Fuel Technologies is a national company, which deals in many products and also provides services to their customer. Currently all their records are manual and they keeps their record manually. They have to maintain their Database system because they face difficulty while saving their records manually.

We are going to provide them a facility to computerize their manual system. We will make their database in SQL Server, in which they can easily handle, their employee’s record, vendor’s record, and product stock system, their sale and purchase record.

Microsoft Visual Basic.Net is the best tool for developing databases application. Although there are number of languages support database application but are not flexible as VB.Net. It provide the visual interface also provide a number of built in control for database application. Since in database application security is the main and fundamental thing to provide the secure application. Microsoft SQL 7.0 is used as backend tool. The main reason to use SQL was to make database secure and also provides best capability with other Microsoft tool as VB.NET and also provide faster data manipulation and insertion as compare to other technologies such as Oracle. To provide better reporting facility to the user, Crystal Reporting is used as reporting tool in this project. Microsoft Crystal Reporting provide will looking, well formatted and attractive reporting facilities. So combination of above mentioned tools made this project user friendly and according to need of organization.
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Chapter 1

Introduction
CHAPTER 1

Introduction

The rapid advancements in the area of Web Development and the popularity of the Internet have encouraged the provision of Database applications.

In this project emphasis is on study of some new technology like Microsoft SQL Server, VB.net etc that are profoundly an emerging technology in the field of Database Development, then using these technologies we are going to develop the database.

Introduction of AFT

The AUTO FUEL TECHNOLOGIES is a company that deals with the import and installation of CNG stations, CNG kits, and cylinder and also provides backup services related to all activities of CNG. AFT was developed in 2002 and their founders are four people. The office location is Bank Square Market Model Town. The company has since grown substantially in size, breadth, and product offerings.

Today, AFT has employed approximately 15 personnel nationwide in marketing, maintaining, repairing of CNG station and their parts. The company offers a wide array of products to consumers, professionals, and business customers throughout the country. Many of those products are repaired here but if there is a problem beyond the scope then AFT consults with manufacture of that part.
Chapter 1

Introduction

**Products**

AFT is not a basically manufacturing company but it imports part and assembled them and run new stations nationwide. Comprehensive equipments that are dealt by AFT are following:

- CNG Compressors
- CNG Dispenser
- Kits and Cylinders

As well as Spare parts of the related equipment, complete backup and services

**Objectives of the Company**

- AFT believe in continuously developing their organization and incorporating innovative measures to improve their efficiency.
- AFT record of completing projects on time is based on its emphasis on rigorous project management right from the pre-mobilization stage through to the end of project execution.
- The construction activities of the firm are backed by a strong engineering presence in the form of experienced and qualified engineers, surveyors, etc.

**Scope of the Project**

The wide scope of the project is to computerize their existing manual system. We are going to maintain their system in .Net Frameworks; the new technology will make their system more reliable, secure and easy to use for end users practically and visually. Visual Basic .Net is used to create
desktop application; crystal reports generate reports and SQL Server providing data storage facilities in our project.

- Our proposed system will provides Annual Reports.
- Easy to handle employee’s Data who are working in the company.
- Less time to find the records.
- Handle company report that they can check their profit loss per month or annually or with in the require time with the help of crystal report.

**Some other aspects are:**

**Data security**

One of the most important parts of the system is Data and Data security that’s why it should be ensure that data information is secure and that only be accessible by specified users from the specified entry points using the defined methods.

**Centralized database**

For centralizes data base it require that it should be enter by single entry point. All the data will be contained in a centralized database it is useful for searching the record therefore standardizing the information for data store. All the users will access the same information stored in the centralized database.
User Friendly Environment

The success of an application is dependent on the end user acceptance of that system. Thus making the interface that is exposed to the end user and crucial part of the application, so keeping this important aspect in mind all the user interface will be design such a way that the end users will easy to interact with them.

Integration

In the project or system all the process should be able to interact with each other. It is the success of project that the entire module in the proposed system will interact with each other ensuring that the manual routines should not be followed. This will help in keeping track of the processes in the system and their interaction with each other.

Technology Aspect

It’s the time now when every business transaction is going to happen through a single click of keyboard or mouse of the computer system. As the financial system is basic part of any organization; so due to complex and slow manual calculations, they are also being automated for more reliability, security and consistency. The .NET framework is a new Microsoft initiative directed to the modification of computer world. More specifically, it is a large set of development tools, servers, software, and services. Its main advantages for the user are creation of an integrated information space connecting him with computers and programs, as well as connection software applications together. Visual Basic.Net is used to create windows application. Embedded crystal reports generate valuable reports for both viewing/printing data and SQL Server 2000 provide the Storage capability.
Graphics Use Interface (GUI)

The interface of the system is attractive and helps the end user to use software easily and reliably. So that end-user doesn’t find it difficult or bother to interact with the software. Mainly, the success of an application is dependent on the end user acceptance of the system, which initially concerns with the stylish outlook and then handy environment.

Purpose of Documentation

The main purpose is to familiarize the users of the system. It will be very easy for them to understand the working modules of the system after reading this document. This document helps its users to understand the working of the system and how to use the modules about tools and technologies and handling about system. The information is provided in this document will be helpful in every aspect from the user point of view. This documentation helps the user to understand the working and flow of the system. How much this project is feasible for the Auto Fuel Technologies? Entity relationship diagram shows the data base design for the user point of view. Project scheduling tells the time frame for the project when it is going to be complete. Use cases helps user to understand the communication or interlink of the user and the system. Sequence diagrams are used to shows the sequence of the activities takes part in the system. Sequence diagrams are being made on the basis of use cases. Class diagram shows the relationship between classes of the system. Input and output design helps the user to understand the working of the system. This document helps the management to decide whether this documentation and our project fulfill the need of the Auto Fuel Technologies. Data Base design shows the relationship between the
different modules of the system. So this document proves very useful for the understanding of the project in a manner that How it works and the functionalities of the system.

**Why do we need this?**

A requirement is a condition or capability to which the system must conform. The first step towards understanding requirements management is to agree on a common vocabulary. Rational defines a requirement as “a condition or capability to which the system [being built] must conform.”

A software requirement can be defined as:

- A software capability needed by the user to solve a problem or achieve an objective.
- A software capability that must be met or possessed by a system or system component to satisfy a contract, specification, standard, or other formally imposed documentation.”
Chapter 2
Requirement Gathering and Existing System

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Chapter 2

Requirements gathering

System requirements definition

The system requirements definition activity is intended to discover the requirement for the system as a whole. As with software requirements analysis, the process involves consultations with system customers and end-users. This requirement definition phase usually concentrates on deriving three types of requirement:

1. **Coarse-grain functional requirements**
   
The basic function that the system must provide must be defined. These are set out at an abstract level rather than in detail. Detailed functional requirements specification takes place at the sub-system level. For example, in the air traffic control system, this requirements activity would probably identify the need for a flight-plan database. The flight plans of all aircraft entering the controlled space are entered in this database. However, the details of the database probably do not affect the functioning of other sub-systems.

2. **System properties**
   
   These are the non-functional emergent system properties. These may be properties such as availability, performance, safety, and so on. These non-functional system properties affect the requirements for all sub-systems.
3. Characteristics that the system must not exhibit

It is sometimes as important to specify what the system must not do as it is to specify what the system should do. For example, in an air traffic control system, it might be specified that the system should not present the controller with too much information. This requirement implies that tests for information overload should be carried out.

An important part of the requirements definition phase is to establish a set of overall objectives, which the system should meet. These should not be expressed in terms of the system’s functionality but should define why the system is being procured for a particular environment.

Techniques Used and Their Reasons to use

There are two types of requirement gathering techniques we use to collect information of the company AFT.

- Documentation
- Interview

We use mostly the interviewing technique to collect the related information from the company. We check their documentation as well and their monthly and weekly report they generated at different occasions.
1. Documentation

As there current system is totally manual that’s why to collect related info about the project that can fulfill their requirement and run properly we study each and every document of the organization related to the project.

In documentation we studied

- Invoices
- Visit Reporters
- Their Quotation System
- Their Stock Maintenance System
- Their Current Way to Keep Record of Employees
- All Official Documents Related Our Projects

Reasons

By studying their documentation we were able to make clear picture of their existing system that how it is working.
2. Interviewing

In interviewing we ask some related question from the persons related to the project.

Reasons

Because our project is to automate the current manual system of the AFT that's why for its proper working we went to related person and interviewed. We went to their clerk that maintain their stock also went to their accountant that deal the payroll and cash use to purchase goods. So the reports of AFT and their registration forms and their other documents and form are very helpful in this sense.

And also we interview with directors and also from dean.

The most common questions asked were as:

- What is the biggest problem in this manual system?
- How the data loss occurred and how they remove this?
- What if there is some difference in the cash of their balance sheet?
- What problems you face to search specific customer record?
- What you actually expect from our project?
- Why the record keeping is so much difficult and how you want to decrease this problem?

Data Gathered

- Speedy access of data and records.
- Monthly reports.
- Proper management of the cash flow.
• Separate complete records of their customers and vendor.

• Easy to use software.

• All this information about their staff also.

**Existing System Functionalities**

• The database used in the company nowadays, is totally/completely manual.

• Company will maintain the list of all the products, which are purchased from the other company. But manually store

• On Paper they maintain the complete information of all the end customers whether these are registered or unregistered.

• This will maintain the complete information of all the suppliers’ manually.

• This will maintain the complete information of all the employees whether these are permanent or not.

• Their existing system does not generate reports of invoices (sale and purchase), orders (sale or purchase), and stock (reports of stocks are generated in rare cases).

• Existing system do not facilitate the system administrator to manipulate data easily i.e., to add, to delete and to modify/update records.

• The system does not automatically update their stock.
Chapter 2  
Requirement Gathering and Existing System

Drawbacks of the Existing System

The drawbacks of the current system are:

Inefficiency and Inflexibility

This factor came in attention when the management wants more output and the reception and concerned has a workload. This is all because the records are handled manually. They have data but no information because the data is not being processed. They don’t have any method of generating on demand reports. The existing system is no more flexible enough for further enhancement as the store is keep on following the old techniques of data entry in registers. Even the can’t make any sort of changes easily.

Unreliability

In manual system less attention is set on data entry and there is no guarantee that the record that is being entered is correct or not. For that reason so many problems came into being for example, customer’s data may be entered incorrectly. There are chances of errors in entering the sales information as well.

No Security

Data security is one of the major factors of a system but company existing system is far behind this concept, as they are not following any security measures in their system. Their sales records are not secured as their files can be misplaced and they are not left with any previous history of their sales.
Some other drawbacks are:

- It’s very difficult to keep track of all the information, because all the work is done manually.
- All the reports are generated manually, due to which chance of error is high.
- The processing speed is very slow.
- System is not expandable.
- No permanent storage.
- No backups.
- Modification to the existing information is quite difficult.
- More expenses and employees are required to cycle the existing system.
- Retrieval of records is difficult and it is time consuming.
- Skills are being wasted.
- It is very difficult to make reports especially compensated ones and analyze results that are necessary for business decisions without the help of a computerized system.
- The current system cannot guess accurate results.
Chapter 3

Software Process Model
Chapter 3

Software Process Model

To solve actual problems in an industry setting, software engineer or a team of engineers must incorporate a development strategy that encompasses the process, methods, and tools layers and the generic phase. This strategy is often referred to as a process Model or a software engineering paradigm. A process model of software engineering is chosen based on the nature of the project and application, the methods and tools to be used, and the controls and deliverables that are required.

A software process model has predefined steps, accomplishing those steps untimely results in software. So, the software process model is followed step-by-step to develop software. There are many software process models.

- Linear Sequential Model
- The Prototyping Model
- The RAD Model
- Incremental Model
- Spiral Model

What Model I Used?

I used the combination of “Linear Sequential & Prototyping Model”. It is the best approach to be used. Linear sequential model is also called” Classic Life Cycle ” or “Waterfall Model”
Waterfall model is strictly linear model i.e. you can’t move to the next phase without completing the previous phases. For example after the completion of analysis phase, design phase begins. Similarly development phase begins after the completion of design phase. Diagrammatic view of this model is:

The prototype paradigm begins with requirements gathering. Developer and customer meet and define the overall objectives for the software, identify whatever requirements are known, and outline areas where further definition is mandatory. A “quick design” occurs. The quick design leads to the construction of a prototype. The prototype is evaluated by the customer/user and used to refine requirements for the software to be developed. Iteration occurs as the prototype is turned to satisfy the needs of the customer, while at the same time enabling the developer to better understand what needs to be done.
Chapter 3  Software Process Model

**Reason to use This Model?**

The combination of Waterfall & Prototype Model is best approach to be used. This is an idolized approach. Waterfall model is strictly linear model. This aspect is of much importance of my project, because a complete analysis is much necessary before going to design phase, Suppose any bug remain in analysis of if the analysis is incomplete and I started design phase, after completion of that design phase when some other possibilities or requirements come then it may lead to entire change of all UML models and ultimately the whole design process could be revised. This may lead to more time consumption and difficulties. Hence a complete and in depth analysis is much necessary before design. The prototype is evaluated by the user and used to refine the requirements for the software to be developed. It enables the developer to better understand what needs to be done. If a working prototype is built, the developer attempts to use existing program fragments or applies tools that enable working programs to be generated quickly. The prototype can serve as “the first system”. This is an idealized view. Both customer and developers like the prototyping paradigm, Users get a feel for the actual system and developers get to build something immediately.

Another aspect of using this model is that it is simple and easy to follow. It also suggests a systematic and sequential approach to software developments that begins at the system level and progresses through analysis, design, coding, testing and maintenance.
Chapter 4

Proposed System
Chapter 4

Functionalities of Proposed System By Module

In this project we are going to handle their database in SQL Server, system will generates form’s for office use.

So in the Database we handle some common areas like

- Employees Database
- Products Database
- Customers Record
- Vendors Record
- Expenses Record
- Stock Maintenance
- Sale Record
- Purchase Record

Employees Database

In the employees section we are handling their description by Id number which will be issue at the time of hiring, their name, home address, his/her sex, position (grade) in the organization, their date
of birth, National identity number, Hire date (When do they appointed for the job), their present
salary in the firm, email address through which they keep in touch with them and also branch id of
the office where they are working in.

**Products Database**

In the product section the products are being handled by its Id number, its name, its description, unit
price of every product, manufactured by (The country where it is been made) and the category of the
product.

**Customer Database**

In the customer section we are handling their description by Id number, their name, home address,
City (from where he/she is buying the products), Country where he belongs to and a zip code of that
country.

**Vendors Record**

In the Vendor section we are handling their description by Id number, their name, home address,
City (from where he/she is delivering the products), Country where he belongs to and a zip code of
that country.
Expenses Record

In this module, we deal expenses by expense ID, Date, Amount that are expense daily. Some expenses as bills are paid monthly but there are some expense made daily.

Advantages of the proposed system

Computer based system may apply in any situation for which a pre specified set of procedural steps has been defined. Elements of real-time software include a data gathering components that collects and formats information from an external environment, an analysis component that transforms information as required by the application. Making manual systems computerized has become a key element in this era because almost in every field, the competition is at its peak. The factors like efficiency, reliability, security and flexibility are getting preliminary Importance in every business.

Accuracy

In Accounts the more important is the accuracy of the data. It should be error free and accurate. But the perfect accuracy through manual work is very difficult. In the current system 4 persons that are described earlier check the daily Summary Report. But with the help of computerized system this flaw is removed because computer generates an accurate report.
Cost of System

Using the proposed system decreases the cost of system output. While using the manual, it more costly to make the reports on paper and then send the copies to every branch.

Speedy Work

In the current system all reports are made manually which takes too much time as compared to the computer generated reports. This increases the speed of workload.

Integration

System will be integrated with other systems like sales system, purchase system, payroll system, fixed assets system and payroll system.

Upgrading Present Services

The present services of employees will be upgraded because less time will be invested on the work and then remaining time can be consumed on the prospective functionalities of the company.

Manpower

Manpower will be decreased because where two accountants are working, after applying proposed system there only one computer operator can work and can do more than the two accountants in shorter period.
Efficiency

After the computerization of system it will provide the administration as well as the staff to work in an easy and quiet friendly environment. One of the biggest advantages of computerization in this System is the efficiency of the system. This factor will influence the system in a dynamic way. The benefits that will come out of this are:

- The management will get the require output and the workload will also be decreased at the reception end.
- Less time will be consumed when the customer will look for items.
- On-demand reports can also be generated.
- Records will be kept using systematic techniques.
- They could now keep the information of sales because the data will be processed.

Flexibility

This computerized system is more flexible in comparison to manual system. As once the system has been developed and implemented; further enhancements can be made. Computerized system is always having the characteristics of flexibility and they are always dynamic. The existing system is no more flexible for further enhancement but if it is being computerized more modules could be further developed and implemented. We will have just develop the new module and make it integrated with the old one.
• Fully automated system will be designed.
• Automatic report generation will be performed.
• The latest programming techniques will be used
• Proper back up will be taken.
• Project management
• Zero redundancy. System approach towards projects. Development of the software on world-class project management methodologies.

**Quality Control**

It enhances communication, Quality products delivery, High-level corporate documentation and record keeping.

**Reliable and tested Technology**

It deals with solid design structure. It is flexible and scaleable design. It employ technology to incorporate best practices prevalent in the It industry.

**Cognitive Navigation Analysis**

User friendly. Easy interface design to search, browse and retrieve relevant information.
Enhanced User Expertise

A practical and visually appealing design to encourage high utilization. Efficient and trouble-free navigation expertise for users.
Chapter 5

Feasibility Study
Chapter 5

Feasibility Study

Feasibility study tells whether the system would be beneficial for the organization with respect to the requirements of the organization. Feasibility study is divided into the following phases.

Phase of Feasibility

The following are the phases of feasibility:

- Operational feasibility.
- Technical feasibility.
- Social Feasibility.
- Economical Feasibility

1. Operational Feasibility

Operational feasibility is dependent on the human resources available for the project and involves projecting whether the system will operate and be used once it is installed. The proposed system is according to the requirements of the Auto Fuel Technologies, and after when it will be implemented in the AFT, is likely to yield benefits for the whole Company.
As the people are already familiar with using application programs like Microsoft Office so, there is no chance of any sort of destructive resistance to the implementation of this project. It is mainly concerned with the availability of human resources for the project and it also tells whether the system would be operate-able after its deployment or not. If the project meets the needs of an organization then it is operationally feasible.

The proposed system would be beneficial in this regard as it would be exactly according to the user requirements and will give the guarantee of complete data security. It will provide the end users with timely pertinent, accurate and usefully formatted information by making a full use of the available resources.

2. Technological feasibility

Technical feasibility is a measurement of the practicality of a specific technical solution and the availability of technical resources and expertise. Today, very little is technically impossible, consequently, technical feasibility looks at what is practical and reasonable.

It is the measure of specific technical solutions and the availability of technical resources and expertise. In technical feasibility we see that the technology in which we are implementing the project provides data security, reliability, and ease of access. In Auto Fuel Technologies project we use Visual Studio.Net a powerful, Productive, and extensible programming environment. Vb.Net unlocks the door towards the development of projects. For Data Base we use SQL Server2000, which has power to hold the data for a heavy project.
Technical feasibility addresses three major issues: Is the proposed technology or solution practical? Do we currently possess the necessary technology? Do we possess the necessary technical expertise, and is the schedule reasonable?

Yes! Technical problems can be there if there is no computer operator. So there should be a computer operator for correct working of the software. And different technical issues will be solved during the testing process. A large part of determining resources has to do with accessing technical feasibility. If existing systems cannot be added onto, then the next question becomes whether there is technology in existence that meets the specification.

3. Social Feasibility

With the deployment of the new system on one hand the organization got benefited but on the other hand it also affects the employees of the organization. Social Feasibility is done in order to check this effect. It checks whether the system affects the job of employees and how much it affects the employees. The social evaluation how the proposed system may improve the jobs and the working environment of those affected.
Our proposed system will affect the staff of the organization. As only 8+ persons would be enough to run this system despite of many manual record keepers, but other persons would be accommodated on the other places as the organization is escalating and they need to hire new persons in order to meet the growing needs of the organization. So this proposed system will also socially feasible for the organization.

We analyze the social costs of training and education, salary changes and other hidden costs arising from hostility, ignorance and fear. In AFT we have to see that the staff working in Auto Fuel Technologies has knowledge of how to use the technologies as well as user training to use the project.

**Economical and Financial Feasibility**

Economic feasibility is the measurement of the cost effectiveness of the project proposed system. The bottom line in many projects is economic feasibility. During the early phase of the perfect economic feasibility analysis amount little more judging whether the possible benefits of the solution or worth while. Costs are practically impossible to estimate at that stage because the end user requirements and alternative technical solutions have not been identified. However as soon as specific requirements have been identified, the analyst can weigh the cost and benefit of each alternate solution. This is called the cost and benefit analysis. It is the measure of cost effectiveness of a project. This is often calling cost and benefits analysis. So in economical feasibility we see what
cost is required to implement the new system. In AFT Automation system we have to see what costs are involved. So we have to consider all the facts that are related to new system costs.

The various costs evaluated include:

Equipment costs
It is obvious that the hardware and software will be very costly. So initially the system is bit costly considering the equipment cost when this project is implemented it is bit costly as compare to the mechanical machine.

Development costs
As we doing project at university level as there will be less cost as compared to the foreign industry/professional level.

Installation cost
A sensitive place is required to operate it.

Personnel costs
- Staff Training
- Staff recruitment or relocation.
- Staff salaries.
- Redundancy payments.
Operating costs

- Accommodations costs.
- Power.
- Insurance.
- Telecommunication.
- Standby arrangements.

Requirements

There are two types of the requirement in the project completion.

They are:

- Hardware Requirements
- Software Requirements
Hardware Requirements

Processors 1.7 GHZ P-IV
Pentium 1.7 GHZ is the recommended system in order to get the fast processing speed. The minimum requirements of this system are Pentium 950Mhz PIII processor.

RAM 512 MB
To get the optimum level of processing power 512MB of RAM is recommended for the system. RAM is the random access memory. The data in the RAM is accessed according to the program instruction it gets. The minimum requirement of the system is 256MB of RAM.

Hard Disk 40 GB
The hard disk requirement for the proposed system is 40GB. It would have ample space in it to store large amount of data. It would also be suggested that no other hard disk is used because large amount of space is required as the data is going to be stored on the system.

Floppy Drive 3.5”
1.44 FDD can be used to take small amount of data back on daily bases. So if there is a data failure the system can be easily recovered.
Monitor 15”

A color monitor is required for output purposes. The system can also be used on a monochrome monitor. Size of monitor depends on demand of user I recommended for 15” so user can have power full view and feels comfortable with Graphical user interface.

Scanner Simple

The scanner is not compulsory but if the company has enough funds it can purchase it in order to scan the invoice receipts into computer for future references instead of filling the receipts and making bundle of files

Printer Laser

Laser printer will be recommended for the new system in order to get equality reports, the printer can also be used for the formal letters also in accordance with daily reports.

Some other devices are:

- CD ROM 50X
- Network interface card.
- 52x CD Rom drive recommended.
- SVGA Card.

Note:

Each computer needs to be backed-up by UPS.
Software Requirements

Network Operating System

On Server this is the easiest Operating system, which is same time is easy to handle and power while considering for networking efficiency, security, and economical compare to other reasonable resources.

Front-end Visual Studio.Net

Using visual basic language in visual studio.net as a front is the wisest step ever taken by any developer developing this scale and type of project. Because it is free and its IDE is most easiest and time effecting then other Languages IDE’S which result in cost effectiveness in development of this scale project.

Back-end Microsoft SQL Server

The programming language being used for the development of the system is the Visual Basic and Microsoft SQL Server 2000. This programming language has been used because the creation of tables and forms is easy. Queries can be used in order to do calculations. It also has the SQL at its backend that is the Structured Query Language by the help of this language modules can be created in order to solve complex problems. Report generator help to show reports for data required by the user so in over all analysis the SQL Server 2000 is most suitable and easily installable language.
Some Other Software Are:

- Microsoft Office
- Flash
- Visio
- Microsoft Project 2002
## Estimated Cost of The Project

<table>
<thead>
<tr>
<th>Cost Type</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Cost</td>
<td>60,000 Rs</td>
</tr>
<tr>
<td>Software Cost</td>
<td>25,000 Rs</td>
</tr>
<tr>
<td>Installation Cost</td>
<td>10,000 Rs</td>
</tr>
<tr>
<td>Development Cost</td>
<td>50,000 Rs</td>
</tr>
<tr>
<td>Implementation Cost</td>
<td>30,000 Rs</td>
</tr>
<tr>
<td>Maintenance Cost</td>
<td>25,000 Rs</td>
</tr>
<tr>
<td><strong>Total Project Cost</strong></td>
<td><strong>200,000 Rs</strong></td>
</tr>
</tbody>
</table>
Chapter 6

Risk Management
Chapter 6

Risk Management

Risk management is concerned with identifying risks, which may affect the project and planning to ensure that these risks do not develop into major threats.

- Focus on the system rather than the individual incident.
- It is anticipatory not reactive in emphasis.
- Significant event audit and adverse incident reporting therefore supports risk management by monitoring it.
- It is a relatively new concept in primary care.
- It is relatively new concept in primary care.
- It is anticipatory not reactive in emphasis.
- No systematic reviews or evidence base for primary care.

Focus on the system rather than the individual incident.

Types of Risks

- Planning Risk (PR)
- Requirement Risk (RR)
- Technical Risk (TR)
Planning Risks

Draw up plans to avoid or minimize the effects of the risk.

Avoidance strategies
The probability that the risk will arise is reduced

Minimization strategies
The impact of the risk on the project or product will be reduced

Contingency plans
If the risk arises, contingency plans are plans to deal with that risk.

Requirement Risks

Requirement risks consists of following aspects

- General uncertainties.
- Uncertain or unfeasible functional requirements.
- Unclear or missing implementation requirements.
- Unclear or missing operational requirements.
- Unclear or missing contents in contract agreement and conditions.
Technical Risks

Technical risks threaten the quality and timeliness of the software to be produced. If a technical risk becomes a reality, implementation may become difficult or impossible. Technical risks identify potential design, implementation, interfacing, verification and maintenance problems. Specification ambiguity, technical uncertainty technical obsolescence and leading-edge technology are also risk factors. Technical risk occurs because the problem is harder to solve then we thought it would be.

Overview of the Major Risks

1. **Product Size Risks (PS)**

Project size risks are directly proportional to the product size. All the experience has to be employed while estimating the size (whether in LOC ). The size of the database might be one of the problems as the system might be unable to handle number of records away from some specified limit. The number of users accessing the product can highly affect the size of the product.

2. **Customer Related Risks (CR)**

It is a fact that sometimes it is difficult to pick the customer's viewpoint. Even these requirements can change entirely as in case of companies with a business of expanding nature.
3. **Process Risks (PR)**

As the system (Dispatching Management System) is a Management based system, but the supervisors have to look all the way in order to ensure that the design and analysis phase is not done on ad hoc basis followed by a proper documentation. Being a failure to do so increases risks of the overall product failure.

4. **Technology Risks (TR)**

Although the software is implemented in Java Technology, highly efficient in client-server based systems, however despite of its security and integrity it might behave inefficiently when the time is crucial.
**Project Risk Table**

A risk table provides a project Manager with a simple technique for risk projection. The Risk Table for the project is shown below:

<table>
<thead>
<tr>
<th>Risks</th>
<th>Category</th>
<th>Probability</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer requirement will change</td>
<td>CR</td>
<td>40%</td>
<td>1</td>
</tr>
<tr>
<td>Staff turnaround will be high</td>
<td>ST</td>
<td>35%</td>
<td>2</td>
</tr>
<tr>
<td>Funding will be lost</td>
<td>CU</td>
<td>35%</td>
<td>2</td>
</tr>
<tr>
<td>End user resisting the system</td>
<td>BU</td>
<td>30%</td>
<td>2</td>
</tr>
<tr>
<td>Delivery deadline will be tightened</td>
<td>BU</td>
<td>30%</td>
<td>1</td>
</tr>
<tr>
<td>Technology will unable to meet expectations</td>
<td>TR</td>
<td>30%</td>
<td>1</td>
</tr>
</tbody>
</table>

**Impact values**

1. Marginal
2. Substantial
3. Critical
Risk Mitigation Plan

Mitigation

The risk of the change in customer requirement can be minimized by spending more time and by using intuition during the design phase. Another idea is to prepare legalized documents with much room for the developing teams as well the steering committee of the company.

The Staff members can be motivated by having some workshops, seminars on the on going tools that are used in developing the product. There might be some rewards on completion of the projects in the form of increments in salaries or bonus, etc.

The upper management should be preferred to provide funds for the project, motivating them in a sense that, in future - if not today, it will bring fruitful results and an increased repute of the company.

Having some presentations and online demos of the product will motivate the end users. They might be offered a couple of free workshops in order to broaden their vision about the advancements in technology.

There are two basic solutions to the tightening deadlines. One of them is to hire new persons to see an increase in the development speed. However that might sometimes fail to work, as the newly
hired persons will take their time to adjust. So the second option is to 'upgrade' existing employees in
the form of additional payments, so that they could work overtime so as to meet deadlines.

**Project Plan Lacks Quality**

Update project plan after completing requirements and design of the system.

**Customer Will Change Requirements**

Add flexibility to chart of account and reports so that they can be further expanded for additions.

**Lack of Training Tools**

Tools training can be improved by exploring them.

**Volume of Transactions, Users and Locations Unclear**

Discussing these factors with company clears volume of transactions, users and locations; it clears
non-functional requirements at the time of gathering requirements.
Risk Monitoring and Management

Monitoring

During when the project is going on, general attitude of the team members have to be monitored in order to see how much the adopted strategies have been successful.

Likewise the reviews from the customers will have to be watched out during the development phase. It has to make sure that the analysis and design work is done in groups, so that incase any of the members leaves the team due to any reason, the other persons will be able enough to serve as backup.

The customer will be in touch while evaluating prototypes of the software, demos, etc so that it is made sure that the customer requirement, which had come out as the most crucial part of the risk analysis, is being fulfilled.

Management

The mitigation efforts have been failed and the risk has become a reality, risk management and contingency plans are designed in order to take over from that point.

Now, when the customer has refused to accept the software, even after evaluating the prototypes and all that, for which the reason might be the software that has been integrated now and has failed to behave the way it was doing before. The end solution will be either to write more efficient code by optimizing the data structures especially in those areas where the problem actually is to choose another tool for coding the already designed software.
Improvement

Project plan can be improved by making a detailed overview of requirement analysis. ER diagram must be made. Write detailed use cases that represent various functionalities of the system. ER diagram changes with requirements.
Chapter 7

Project Schedule
## Work Break Down Structure

<table>
<thead>
<tr>
<th>Task Id</th>
<th>Task Name</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Planning</td>
<td>7 days</td>
</tr>
<tr>
<td>2</td>
<td>Project Overview Statement (POS).</td>
<td>2 days</td>
</tr>
<tr>
<td>3</td>
<td>Project Proposal (PP).</td>
<td>4 days</td>
</tr>
<tr>
<td>4</td>
<td>Questionnaire and Feedbacks</td>
<td>10 days</td>
</tr>
<tr>
<td>5</td>
<td>Studying their current system</td>
<td>10 days</td>
</tr>
<tr>
<td>6</td>
<td>WBS</td>
<td>1 day</td>
</tr>
<tr>
<td>7</td>
<td>Module Diagram</td>
<td>1 day</td>
</tr>
<tr>
<td>8</td>
<td>ER-Diagram</td>
<td>2 days</td>
</tr>
<tr>
<td>9</td>
<td>Requirement and Cost Analysis</td>
<td>8 days</td>
</tr>
<tr>
<td>10</td>
<td>Studying Technologies</td>
<td>20 days</td>
</tr>
<tr>
<td>11</td>
<td>Design of System</td>
<td>16 days</td>
</tr>
<tr>
<td>12</td>
<td>Specification s/w Requirement</td>
<td>2 days</td>
</tr>
<tr>
<td>13</td>
<td>Module Development</td>
<td>6 days</td>
</tr>
<tr>
<td>14</td>
<td>Detailed Design</td>
<td>10 days</td>
</tr>
<tr>
<td>15</td>
<td>Coding using Microsoft SQL server</td>
<td>5 days</td>
</tr>
<tr>
<td>16</td>
<td>Making Tables and Scripting</td>
<td>10 days</td>
</tr>
<tr>
<td>17</td>
<td>Input and Output Design</td>
<td>10 days</td>
</tr>
<tr>
<td>18</td>
<td>Generating Forms Using VB.Net</td>
<td>7 days</td>
</tr>
<tr>
<td>19</td>
<td>Integration and Testing</td>
<td>5 days</td>
</tr>
<tr>
<td>20</td>
<td>System Testing</td>
<td>3 days</td>
</tr>
<tr>
<td>21</td>
<td>Deployment</td>
<td>12 days</td>
</tr>
<tr>
<td>22</td>
<td>Documentation</td>
<td>15 days</td>
</tr>
<tr>
<td>23</td>
<td>Finalizing and Presenting</td>
<td>5 days</td>
</tr>
</tbody>
</table>
Total Duration 148 Days

Gantt Chart

![Gantt Chart Image]
Chapter 8

Design Analysis
Chapter 8

Database Design

The most important phase of any project is the designing of database i.e. the designing of different normalized tables and then the relationship between those normalized tables. So, after a comprehensive study of the existing system it is decided to develop the normalized tables for the database. Before describing those normalized tables, it will be better to understand the terms Normalization.

Normalization

The process of finding table set of relations that is faithful model of the enterprise is known as Normalization. The normalization eliminates the anomalies of data representation and results from the database and results in a good and consistence schema for the database.

- First Normal Form

“A relation is in first normal form if every attribute is single valued for each tuple”.

An alternative way to describe the first normal form is to say that the domains of the attributes of a relation are atomic, that is, they consists of single units that cannot be broken down further.
• **Second Normal Form**

“A relation is in second normal form if and only if it is in 1NF and all the non-key attributes are fully functionally dependent on the key”

Clearly, if a relation is in 1NF and the key consists of single attribute, the relation will automatically be in 2NF. The only time when key is composite, database designer have to identify each non-full functional dependency to make a relation in 2NF. Then removing the attributes from projection that depend on each of the determinants so identified treats this non-full functional dependency.

• **Third Normal Form**

“A relation is in third normal form if it is in 2NF and no non-key attribute is transitively dependent on the key”.

Since the tables are in 2NF and no non-key attribute is transitively dependent on key i.e. no non-key attribute is determining another non-key attribute. So, the tables are in 3NF

• **Boyce-Coded Normal Form**

“A relation is in Boyce-Codd normal form (BNFC) if and only if every determinant is a candidate key”.

For a relation with only one candidate key, third normal form and Boyce-Codd normal form are equivalent. To check the relation for BCNF, db-designer simply identifies all the determinants and makes sure that they are candidate keys.

**Normalized Tables**

Since I applied the normalization process to each and every table one by one and then extract the below-mentioned tables carefully. We apply the normalization rule on the following table as shown in input form design

- Customer Table
- Vendor
- Employee
- Stock
- Product
- Daily expenses
- Visit report
- Sales invoice
- Purchase invoice


**Functional Requirements**

**Login and access Support**

The system supports a user name and password validity to authenticate the user to use its transactional and reporting system.

System supports four types of user like Administrator, Department Administrator, Department user and user. Administrator has the full rights over the whole system. Department Administrator has the full rights for a specific Department. Department User has insertion access to an appropriate Department. User (simple User) has the insertion access to the whole system.

**User Session and Status Support**

An automated enabled system stores the user name, user type, department, computer name, time in, network, domain name, boot system status and a lot other useful information as a history and keeps the status of the user ON until user leaves the system. System then automatically amasses the time out and status to OFF.

Automated system keeps history until and unless it is being cleared by the administration users.
Easiness in Data Manipulation

The system will provide the facility to Add, Delete, or Update any record in the system with the appropriate access. The message at every event shows the success status of that action. Relative name spaces like Add/Insert Button to add a record, Delete/Clear/Remove to remove a record, update/modify/change to modify a saved record are being used.

Validation control System

Every record entry is being corroborated before it is being inserted or updated. Validation system automatically shows the messages about incorrect or invalid data, missing data, duplication of data or type mismatch.

Automatic Data regularity

System automatically balances the entry being inserted into the system i.e. stock is automatically regulated when purchase, sale, purchase return or sale return makes the appropriate necessary change in the stock.

Automatic regulatory system is being controlled through Database Triggers, which fire at insert/update/delete events and automatically update the previous “totality” in the system.
“Totality” is *balance maintenance for a specific entity*, which is being balanced in the system without human intervention e.g. (in inventory control system).

**Database Management system**

The database system is being designed using SQL server 2000, which offers numerous compensations and efficiencies. It supports the heavy data storage providing the system steadfastness and reliability. (Automatic regulatory system is being handled through triggers; see more in heading *Automatic Regulatory System*).

**Reporting system**

The system supports a wide range of report application. We can even generate Reports based on our scenario depending upon a numeric, string or date value. The generated report can then be printed or exported to another format.

However, a reliable method is also there provided on the related forms to print the relative report by just clicking the print button (shortcut key ALT+P). The respective report can be viewed by clicking view button (shortcut key ALT+V).

Moreover, one Expert Report Generator is also included in the system, that can run/ display/ print the *.*rpt (files with rpt extension).
Network Support

System supports to be used on local area networks providing the multi user access to the system linking all the information and merging the entire departments together for the lenience of the management.

Non-Functional Requirements

Security Requirements

Each user can be restricted to access only those applications they need to perform their job. Security is provided by access level control. Each user is assigned a user number and secret password that is essential for them to get access to the system. Every user has rights to change their own passwords at any time to prevent from others. The system logs all activity of the system by user and can print or display this information at anytime to the owner of the system. Also, certain sensitive functions are restricted to the owner of the system and the owner must enter a valid owner password to gain access to these critical functions.

Performance Requirements
The system can be run in Local Area Networks (D-link, Intel etc). This software works between client and server. Server should have right configuration.

**Software requirements**

Microsoft Windows NT 4.0 Server or Windows 2000 Server or Windows 2003 Server (LASP).

**Software requirements for client are:**

Microsoft Windows 98 or Windows 2000 or Windows NT 4.0 Workstation.

**Software Quality Attributes**

This system is desktop-based application and is almost adaptable for every system in the company who fulfills the software requirements of it. It is reliable because every user has an access and secret password; it is also flexible because there are no long processes and no need to powerful configuration. The system is very easy to use because there are no complex processes to reach the necessary information and it is user friendly.
Implementation Constraints

The software limits the user to use the features according to the rights given them. The software can be run within the company and no unauthorized data is allowed for entry.

User Documentation

User documentation will contain user’s guide. It will be written and delivered along with the software. User’s guide will explain how the accounting software works and how to use it.
Chapter 8

Design Analysis

ER Diagram (AFT)
Data Flow Diagram

Context Level

Customer

Gives Orders

Receipt

AFT Pvt

Orders

Receipt

Handle

Report

Employe

Vendors
Zero Level
First Level

Decomposition Of Processes (Level-1 Diagram):

Decomposition Of Process-1.0

Customer Order

1.1 Receive Customer Order

Customer Order

1.2 Transform Order to Company Format

Decomposition Of Process-2.0

Order data

2.1 Make Query

Find

2.2 Search from Database

Find/not find

Decomposition Of Process-4.0

If Find

4.1 Check the Category of the Product

Go to

Specific Division

4.2 Related Section

Find/Not Find

Available/not find

Request for Product

4.3 Search the Product

If find

4.4 Check the Quantity
Second Level

Decomposition Of Process-5.0

If quantity less then

5.1 Order the Product

Go to

5.2 Related Vendors

Product Available

Decomposition Of Process-7.0

If good sold

7.1 Prepare Receipt

Save records

7.2 Maintain records

Find /not find

Decomposition Of Process-8.0

Include

8.1 Check the Category of the Product

Include

8.2 Related Section

Save

Decomposition Of Process-9.0

Daily reports

9.1 Monthly Reports

send data

9.2 Balance sheet

Reports

9.3 Annual Targets

Reports

9.4 Read and manage by ECO
## Data Dictionary

### External Entities

<table>
<thead>
<tr>
<th>Entity Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>Logs on the database. Accesses the features of the database. Has complete Access to the database tables. Adds, deletes and updates records.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Entity Name</th>
<th>Source</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>Database</td>
<td>Database</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Entity Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User</td>
<td>Logs on the database. Accesses the features of the database. Has complete Access to the database tables. Adds, deletes and updates records</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Entity Name</th>
<th>Source</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>User</td>
<td>Database</td>
<td>Database</td>
</tr>
</tbody>
</table>
Data Flows

- **Name**       Give Orders
  
  **Alias**      None
  
  **Description** Carries the customer order.
  
  **Source**     Customer (External Entity), Receives Order (Process)
  
  **Destination** Receives Order (Process),
  
  Generates Response (Process)
  
  **Volume and Frequency** Many per customer
  
  **Record**     Profile File

Data Stores

- **ID**       D1
  
  **Name**      Store Order
  
  **Description** This file contains the record of order of customer.
  
  **Alias**     None
  
  **Volume And Frequency** Many per day
  
  **Source**    Customer (External Entity)
  
  **Destination** Administrator (External Entity)
  
  **Record**   Order
<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Description</th>
<th>Alias</th>
<th>Volume And Frequency</th>
<th>Source</th>
<th>Destination</th>
<th>Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>D2</td>
<td>Save reports</td>
<td>This file contains the record of reports.</td>
<td>None</td>
<td>Many per day</td>
<td>Customer (External Entity)</td>
<td>Administrator (External Entity)</td>
<td>reports</td>
</tr>
<tr>
<td>D3</td>
<td>Daily transaction</td>
<td>This file contains the record of daily transaction.</td>
<td>None</td>
<td>Many per day</td>
<td>Employee (External Entity)</td>
<td>Administrator (External Entity)</td>
<td>Daily transaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ID</strong></td>
<td>D4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Name</strong></td>
<td>Update Good Sold</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>This file contains the record of the good sold.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Alias</strong></td>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Volume And Frequency</strong></td>
<td>Many per day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Source</strong></td>
<td>Customer (External Entity)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Destination</strong></td>
<td>Administrator (External Entity)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Record</strong></td>
<td>Good sold.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Processes

**Process Number 1.1**

<table>
<thead>
<tr>
<th>Name</th>
<th>Receive Customer order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>This process collects the order from customer and passes it to transform customer order.</td>
</tr>
<tr>
<td>Source</td>
<td>Customer (External Entity)</td>
</tr>
<tr>
<td>Destination</td>
<td>Transform order to company format (Process).</td>
</tr>
</tbody>
</table>

**Process Number 1.2.1**

<table>
<thead>
<tr>
<th>Name</th>
<th>Make Query</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>This process converts order into a Query.</td>
</tr>
<tr>
<td>Source</td>
<td>Customer order.</td>
</tr>
<tr>
<td>Destination</td>
<td>Company specified format (Process)</td>
</tr>
</tbody>
</table>
Process Number 2.2

Name: Company specified format
Description: This process converts the order in to a Query and then transforms it to company format.
Source: Convert to.
Destination: Type

Process Number 2.1

Name: Make Query.
Description: This process collects the order data from customer order.
Source: Order data.
Destination: Search from database (process).

Process Number 2.2

Name: Search from database.
Description: This process collects the data from make query process and find the product in database.
Source: Find.
Destination: Found/Not found.
**Process Number 3**

<table>
<thead>
<tr>
<th>Name</th>
<th>Customer Ordered product.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>This process collects the data from analyze order and send product to receive and order product (process).</td>
</tr>
<tr>
<td>Source</td>
<td>Analyze order.</td>
</tr>
<tr>
<td>Destination</td>
<td>Receive and transform order.</td>
</tr>
</tbody>
</table>

**Process Number 4.1**

<table>
<thead>
<tr>
<th>Name</th>
<th>Make Query.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>This process converts the request in to query form.</td>
</tr>
<tr>
<td>Source</td>
<td>Request for product.</td>
</tr>
<tr>
<td>Destination</td>
<td>Search the product type (process)</td>
</tr>
</tbody>
</table>

**Process Number 4.2**

<table>
<thead>
<tr>
<th>Name</th>
<th>Check the quantity.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>when the required item found the process check the quantity of the product that it is available for sale or not.</td>
</tr>
<tr>
<td>Source</td>
<td>If Find</td>
</tr>
<tr>
<td>Destination</td>
<td>Available/ Not available.</td>
</tr>
</tbody>
</table>


**Process Number 5.1**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Source</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check the product quantity in stock.</td>
<td>Check the product from database</td>
<td>Check</td>
<td>Order for the product (process)</td>
</tr>
</tbody>
</table>

**Process Number 5.1.1**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Source</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order for the product</td>
<td>If the required product is less then the order the process order to vendor.</td>
<td>If Less then</td>
<td>Go to Vendors.</td>
</tr>
</tbody>
</table>

**Process Number 5.2**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Related vendors</td>
<td>Order to vendor for the products.</td>
</tr>
</tbody>
</table>
### Process Number 6

<table>
<thead>
<tr>
<th>Source</th>
<th>Go to related Products.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Destination</td>
<td></td>
</tr>
</tbody>
</table>

**Name**  Search Products.

**Description**  The process searches for the required products.

**Source**  Stock

**Destination**  database.

### Process Number 7.1

<table>
<thead>
<tr>
<th>Source</th>
<th>If Good Sold.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Destination</td>
<td>Maintain records (process)</td>
</tr>
</tbody>
</table>

**Name**  Prepare Report

**Description**  This process prepares the report for the goods sold.

**Source**  If Good Sold.

**Destination**  Maintain records (process)

### Process Number 7.2

<table>
<thead>
<tr>
<th>Source</th>
<th>save records.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Destination</td>
<td>find / Not find</td>
</tr>
</tbody>
</table>

**Name**  Maintain records

**Description**  This process maintains the records of the goods sold.
Software Design

Software design is the important phase of system design. This part shows how the system will work and describes the structure of software. The structure determines how the system will provide the design function to the user. The actual contents of each module are planned.

Software design is visualized through the following model and diagrams:

Modeling using UML

Visual modeling is the process of taking the information from the model and displaying it graphically using some sort of standard set of graphical elements. A standard is vital to realizing one of the benefits of visual modeling—communication. Communication between users, developers, analysts, testers, managers, and anyone else involved with a project is the primary purpose of visual modeling.

UML is a standard that has been adopted by the majority of the industry as well as the standards governing boards such as ANSI and the Object Management Group (OMG). UML allows people to develop several different types of visual diagrams that represent various aspects of the system. Rational Rose supports the development of the majority of the models, as follows.

- Use Case Diagrams
- Sequence Diagrams
- Collaboration Diagrams
Use Case Diagrams

Use case diagrams show the interaction between use cases, which represent system functionality, and actors, which represent the people or systems that provide or receive information from the system. Use cases represent the requirements of the system from the user’s perspective. So, use cases are the functionality that the system provides. Actors are the stakeholders of the system.
USE CASES

UC-1:

Use-case: Login
Actors: Administrator/Manager
Type: Primary
Purpose: Secured data entry
Description: Administrator logon to the system before any further execution take place.

“Diagram”

[Diagram showing the interaction between Administrator and Login]
UC-2:

Use-case: Buy items
Actors: Customer, Cashier
Type: Primary
Purpose: Purchase products from cash

Description: customer arrives at a checkout with items to purchase.
The cashier records its serial number and collects payment. On completion the customers’ leaves with the items (including receipt).

“Diagram”
**UC-3:**

**Use-case:** Sell items

**Actors:** Cashier, Customer

**Type:** Primary & essential

**Purpose:** Capture a sale and its cash payment

**Description:** Customers arrives at a checkout with items to purchase. Cashier records the purchase items description and its payment. On completion the customer leaves with the items.

“Diagram”
UC-4:

Use-case: Refund purchased items
Actors: Customer, Cashier
Type: Primary, Essential
Purpose: Claiming against the product

Description: Customers arrives at a checkout to refund purchased items. Cashier checks the product delivery and warrantee date in the system and so on….

“Diagram”

Cashier

Customer

Buy items

Refund purchased items
**UC-5:**

**Use-case:** Availability (stock)

**Actors:** Stock manager, Cashier, Customer

**Type:** Essential

**Purpose:** maintaining stock

**Description:** Customers arrives to the cashier for the purpose of purchasing products. Cashier checks whether the product is in the stock or not, if it is then he will sale that product to the customer otherwise if the product is not in the stock then he will inform to stock manager and so on….

**Diagram**

Cashier

![Diagram](image-url)
UC-6:

Use-case: Order entry
Actors: Customer, Employee
Type: Secondary
Purpose: Product’s order & delivery date management
Description: Customer order’s product to an employee. Employee records the delivery date and informed to the head-office manager and so on….

“Diagram”

[Diagram showing the interaction between Employee and Customer]

Order
Delivery
UC-7:

Use-case: Payment
Actors: Customer, Cashier
Type: Essential
Purpose: Making a payment through cash
Description: When the customer makes payment through cash then cashier notes the product-selling amount in the system. If there any change left he will give it back to the customer with a receipt.

“Diagram”
UC-8:

Use-case: Receipt
Actors: Customer, Cashier
Type: Secondary
Purpose: Information about the product
Description: After receiving the payment, cashier gives the receipt to the customer along with the products.

“Diagram”

[Diagram showing interaction between Cashier and Customer]
UC-10:

Use-case: Exit

Actors: Administrator/user

Type: Primary

Purpose: closing all tasks for security purpose

Description: Administrator will log out to the system after completion of all tasks (especially for security purpose).

“Diagram”

Administrator

Exit
Class Diagram

Classes and their Relationship:

- **Customer**
  - Name
  - ID
  - Order No
  - Address
  - Telephone
  - Fax

- **Employee**
  - Name
  - ID
  - Pays
  - Designation
  - Hire Date

- **AFT**
  - Employees
  - Customer
  - Vendors
  - Invoicing

- **Vendors**
  - Name
  - ID
  - Order No
  - Address
  - Telephone
  - Fax

- **Visit Reports**
  - Report#
  - Date
  - Site Address
  - Visited Equipments
  - Description

- **Invoicing**
  - Customer
  - Vendor

- **Vend-Invoice**
  - Order Info
  - Invoice No
  - Vend-id

- **Cust-Invoice**
  - Order Info
  - Invoice No
  - Cust-id

- **Deals**
  - With

- **Generates**

- **Hire**

- **Deals with**

- **Include**
Sequence Diagrams

Sequence diagrams are used to show the flow of functionality through a use case. Actors and objects are shown at the top of the diagram. Each arrow represents a message passed between actor and object to perform the needed functionality. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of scenario.

Login:

![Sequence diagram for login](image-url)
Logout:

User

System

Exit ()

Exit ()
View Products:

User () — System ()

View Information ()

Options ()
Customer Information:

Customer ( )

Branch Employee ( )

Database ( )

Request for Product ( )

Save record ( )
Search Products:

Diagram of Search Process:

1. **User** initiates the process by sending a *search query* to the **System**.
2. The **System** checks the *search query* against the database and returns the *search result*.
3. The **Result** is then returned to the **User**.

Symbols:
- User ( ): Represents the user input.
- System ( ): Represents the processing system.
- Database ( ): Represents the database.
- search query ( ): Represents the search query.
- Search result ( ): Represents the search result.
- Check ( ): Represents the checking process.
- Result ( ): Represents the result returned.
Buy Products:

Customer ( )  Employee ( )  Database ( )

Request for Product  Search Items

Available / Error
Insert Items:

Administrator ()

---

Database ()

Product Information

---

Add Product

---

Product added
Add New User:

Administrator ( )

Database ( )

User ID

Add new user

New user Added
Delete User:

Administrator ()  Database ()

User ID

Delete user

User Deleted
View Records:

iew Records:

ew Records:

w Records:

Records:
Collaboration Diagram
A collaboration diagram is an alternate way to show a scenario. This type of diagrams show object interactions organized around the objects and their links to each other. Collaboration diagrams show the same information as sequence diagrams, but people look at Collaboration diagrams for different reasons. Quality assurance engineers and system architects look at these to see the distribution of processing between objects.

**Login:**

1: login()

2: logged in()

**Logout:**

1: Logout()

2: logged Out()
Change password:

View Products:
Customer Information:

1: Request for Product ()

Customer () ——> Branch Employee ()

2: Save record ()

Database ()

Search Products:

1: search query ()

User () ——> System ()

2: Check ()

Database ()

3: Result ()

4: Search result ()
Buy Products:

1: Request for Product

Customer ( )  →  Branch Employee ( )

2: Search Items

Database ( )

3: Available / Error

Insert Items:

1: Product Information

Administrator ( )  →  Database ( )

2: Add Product

3: Product added
Add New User:

1: User ID

2: Add new user

3: New user Added

Delete User:

1: User ID

2: Delete user

3: User Deleted
View Records:

1: View records

2: Record details
State Transition Diagram

- Customer
- Employee
- Entering items
- Waiting and Payment
- Records

- End Sale
- request
- enter
- Make cash payment

end
Chapter 9
Input Design
## LOGIN FORM

<table>
<thead>
<tr>
<th>Screen Item</th>
<th>Type</th>
<th>Purpose / Description</th>
<th>Action</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>User ID</td>
<td>Text Box</td>
<td>Allows the user to enter his ID</td>
<td>Takes Input in</td>
<td>Varchar</td>
</tr>
<tr>
<td>User Password</td>
<td>Text Box</td>
<td>Allows the user to enter his secret password</td>
<td>Takes Input in</td>
<td>Varchar</td>
</tr>
<tr>
<td>Logon</td>
<td>Button</td>
<td>Allows the user to submit his sign in information</td>
<td>Submit Information</td>
<td>User must have authenticated user name and password</td>
</tr>
</tbody>
</table>
## MAIN FORM

<table>
<thead>
<tr>
<th>Screen Item</th>
<th>Type</th>
<th>Purpose / Description</th>
<th>Action</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>Button</td>
<td>Takes user to the Customer’s main form</td>
<td></td>
<td>Navigates</td>
</tr>
<tr>
<td>Product</td>
<td>Button</td>
<td>Takes user to the Product’s main form</td>
<td></td>
<td>Navigates</td>
</tr>
<tr>
<td>Vendor Order Form</td>
<td>Button</td>
<td>Detail of the goods purchase by AFT</td>
<td></td>
<td>Navigates</td>
</tr>
<tr>
<td>Vendors</td>
<td>Button</td>
<td>Takes user to the Vendor’s main form</td>
<td></td>
<td>Navigates</td>
</tr>
<tr>
<td>Customer Order Form</td>
<td>Button</td>
<td>Takes user to the Customer Order</td>
<td></td>
<td>Navigates</td>
</tr>
<tr>
<td>Vehicles</td>
<td>Button</td>
<td>Takes user to the Vehicles main form</td>
<td></td>
<td>Navigates</td>
</tr>
<tr>
<td>Employees</td>
<td>Button</td>
<td>Takes user to the Employees main form</td>
<td></td>
<td>Navigates</td>
</tr>
<tr>
<td>Expenses</td>
<td>Button</td>
<td>Takes user to the Expenses main form</td>
<td></td>
<td>Navigates</td>
</tr>
<tr>
<td>Order Entry</td>
<td>Button</td>
<td>Takes user to the Order Entry form</td>
<td></td>
<td>Navigates</td>
</tr>
</tbody>
</table>
# CUSTOMER RECORDS

<table>
<thead>
<tr>
<th>Screen Item</th>
<th>Type</th>
<th>Purpose / Description</th>
<th>Action</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer ID</td>
<td>Text Box</td>
<td>Allows user to enter the Branch ID</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Text Box</td>
<td>Allows user to enter the Branch name</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td>Text Box</td>
<td>Allows user to enter Branch address</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>Text Box</td>
<td>Allows user to enter the place of origin</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Zip Code</td>
<td>Text Box</td>
<td>Allows user to enter the zip code of the city</td>
<td>Takes Input in Big Int</td>
<td></td>
</tr>
<tr>
<td>Add</td>
<td>Button</td>
<td>Activates the text boxes and allows user to do entry</td>
<td>Allow Entry</td>
<td></td>
</tr>
<tr>
<td>Save</td>
<td>Button</td>
<td>Save the record entered by the user</td>
<td>Save record</td>
<td></td>
</tr>
<tr>
<td>Cancel</td>
<td>Button</td>
<td>Cancel all the entries in the text boxes</td>
<td>Empty text boxes</td>
<td></td>
</tr>
<tr>
<td>Exit</td>
<td>Button</td>
<td>Takes user to the main menu</td>
<td>Close opened form</td>
<td></td>
</tr>
<tr>
<td>Refresh</td>
<td>Button</td>
<td>Provides refresh functionality of the screen</td>
<td>Refreshes data</td>
<td></td>
</tr>
<tr>
<td>Find</td>
<td>Button</td>
<td>Helps user to find the saved record</td>
<td>Data finding</td>
<td></td>
</tr>
<tr>
<td>Go</td>
<td>Button</td>
<td>Allows finding data</td>
<td>Give</td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>Component</td>
<td>Description</td>
<td>Permission</td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------</td>
<td>-----------------------------------------------------------</td>
<td>--------------</td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td>Button</td>
<td>Allows user to delete the saved record</td>
<td>Delete entry</td>
<td></td>
</tr>
<tr>
<td>Update</td>
<td>Button</td>
<td>Allows user to update the entries in the saved record</td>
<td>Update entries</td>
<td></td>
</tr>
<tr>
<td>Find by ID</td>
<td>Text Box</td>
<td>Helps user to find the saved record by ID</td>
<td>Data finding</td>
<td></td>
</tr>
<tr>
<td>Customer order</td>
<td>Button</td>
<td>Takes user to the customer order form</td>
<td>Navigates</td>
<td></td>
</tr>
<tr>
<td>Customer Telephone</td>
<td>Button</td>
<td>Takes user to the customers telephone form</td>
<td>Navigates</td>
<td></td>
</tr>
<tr>
<td>Customer Fax</td>
<td>Button</td>
<td>Takes user to the customers fax form</td>
<td>Navigates</td>
<td></td>
</tr>
<tr>
<td>Data Grid</td>
<td>Grid</td>
<td>Shows all the records</td>
<td>Data Show</td>
<td></td>
</tr>
</tbody>
</table>
### VENDORS RECORD

<table>
<thead>
<tr>
<th>Screen Item</th>
<th>Type</th>
<th>Purpose / Description</th>
<th>Action</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>Text Box</td>
<td>Allows user to enter the vendor ID</td>
<td>Takes Input in</td>
<td>Varchar</td>
</tr>
<tr>
<td>Name</td>
<td>Text Box</td>
<td>Allows user to enter the vendor name</td>
<td>Takes Input in</td>
<td>Varchar</td>
</tr>
<tr>
<td>Address</td>
<td>Text Box</td>
<td>Allows user to enter the Vendor address</td>
<td>Takes Input in</td>
<td>Varchar</td>
</tr>
<tr>
<td>City</td>
<td>Text Box</td>
<td>Allows user to enter the City name</td>
<td>Takes Input in</td>
<td>Varchar</td>
</tr>
<tr>
<td>Country</td>
<td>Text Box</td>
<td>Allows user to enter the name of country</td>
<td>Takes Input in</td>
<td>Varchar</td>
</tr>
<tr>
<td>Zip Code</td>
<td>Text Box</td>
<td>Allows user to enter the Country zip code</td>
<td>Takes Input in</td>
<td>Varchar</td>
</tr>
<tr>
<td>Email Address</td>
<td>Text Box</td>
<td>Allows user to enter the employee’s mail address</td>
<td>Takes Input in</td>
<td>Varchar</td>
</tr>
<tr>
<td>Views</td>
<td>Text Box</td>
<td>Allows user to enter the vendor views</td>
<td>Takes Input in</td>
<td>Varchar</td>
</tr>
<tr>
<td>Add</td>
<td>Button</td>
<td>Activates the text boxes and allows user to do entry</td>
<td>Allow Entry</td>
<td></td>
</tr>
<tr>
<td>Save</td>
<td>Button</td>
<td>Save the record entered by the user</td>
<td>Save record</td>
<td></td>
</tr>
<tr>
<td>Cancel</td>
<td>Button</td>
<td>Cancel all the entries in the text boxes</td>
<td>Empty text boxes</td>
<td></td>
</tr>
<tr>
<td>Exit</td>
<td>Button</td>
<td>Takes user to the main menu</td>
<td>Close opened form</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Icon</td>
<td>Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>---------</td>
<td>----------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refresh</td>
<td>Button</td>
<td>Provides refresh functionality of the screen</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Refreshes data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Find</td>
<td>Button</td>
<td>Helps user to find the saved record</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data finding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Go</td>
<td>Button</td>
<td>Allows finding data</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Give permission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td>Button</td>
<td>Allows user to delete the saved record</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delete entry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Update</td>
<td>Button</td>
<td>Allows user to update the entries in the saved record</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Update entries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Find by ID</td>
<td>Text Box</td>
<td>Helps user to find the saved record by ID</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td>Data finding</td>
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</tr>
<tr>
<td>Vendor Telephone</td>
<td>Button</td>
<td>Takes user to the Vendor Telephone form</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td>Navigates</td>
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</tr>
<tr>
<td>Vendor Fax</td>
<td>Button</td>
<td>Takes user to the Vendor fax form</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td>Navigates</td>
<td></td>
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</tr>
<tr>
<td>Vendor Orders</td>
<td>Button</td>
<td>Takes user to the Vendor order form</td>
<td></td>
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</tr>
<tr>
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<td></td>
<td>Navigates</td>
<td></td>
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</tr>
<tr>
<td>Data Grid</td>
<td>Grid</td>
<td>Shows all the records</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data Show</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Employee Record

**ID:** 1  
**First Name:** Reaf  
**Last Name:** Atta  
**Address:** 135 b model town  
**Sex:** Male  
**Date Of Birth:** 6/1/976  
**HIC:** 336676629f  
**Date Of Hire:** 12/5/2000  
**Salary:** 1500  
**Email Address:** reaf1@hotmail.com  
**Status:** Permanent  
**Mobile:** 03009479956

#### Employer's Information

<table>
<thead>
<tr>
<th>S#</th>
<th>Emp_Id</th>
<th>Emp_Fname</th>
<th>Emp_Lname</th>
<th>Emp_Address</th>
<th>Emp_Sex</th>
<th>Emp_Position</th>
<th>Emp_DOB</th>
<th>Emp_RID</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Attia</td>
<td>Reaf</td>
<td>135 b model town</td>
<td>Male</td>
<td>manager</td>
<td>6/1/1976</td>
<td>336676629f</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>ahmed</td>
<td>Reaf</td>
<td>308 d must1</td>
<td>Male</td>
<td>maintenance</td>
<td>6/7/1983</td>
<td>33632856</td>
</tr>
<tr>
<td>6</td>
<td>9</td>
<td>Ifed</td>
<td>Eeddd</td>
<td>eefef</td>
<td>Male</td>
<td>6ef6</td>
<td>3/6/2014</td>
<td>eefef</td>
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</table>

---

**Chapter 9**  
Input Design
# EMPLOYEE’S RECORD

<table>
<thead>
<tr>
<th>Screen Item</th>
<th>Type</th>
<th>Purpose / Description</th>
<th>Action</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee ID</td>
<td>Text Box</td>
<td>Allows user to enter the Employee’s ID</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>First Name</td>
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<td>Allows user to enter the employee first name</td>
<td>Takes Input in Varchar</td>
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</tr>
<tr>
<td>Last Name</td>
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<td>Allows user to enter the employee last name</td>
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<tr>
<td>Address</td>
<td>Text Box</td>
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<td>Takes Input in Varchar</td>
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<tr>
<td>Sex</td>
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<tr>
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<tr>
<td>Salary</td>
<td>Text Box</td>
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<td></td>
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<td>Text Box</td>
<td>Allows user to enter the employee’s mail address</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
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<td>--------------------------------------</td>
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</tr>
<tr>
<td><strong>Branch ID</strong></td>
<td><strong>Text Box</strong></td>
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</tr>
<tr>
<td><strong>Branch name</strong></td>
<td><strong>Text Box</strong></td>
<td>Allows user to enter the Branch name</td>
<td>Takes Input in Varchar</td>
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<tr>
<td><strong>Add</strong></td>
<td><strong>Button</strong></td>
<td>Activates the text boxes and allows user to do entry</td>
<td>Allow Entry</td>
<td></td>
</tr>
<tr>
<td><strong>Save</strong></td>
<td><strong>Button</strong></td>
<td>Save the record entered by the user</td>
<td>Save record</td>
<td></td>
</tr>
<tr>
<td><strong>Cancel</strong></td>
<td><strong>Button</strong></td>
<td>Cancel all the entries in the text boxes</td>
<td>Empty text boxes</td>
<td></td>
</tr>
<tr>
<td><strong>Exit</strong></td>
<td><strong>Button</strong></td>
<td>Takes user to the main menu</td>
<td>Close opened form</td>
<td></td>
</tr>
<tr>
<td><strong>Refresh</strong></td>
<td><strong>Button</strong></td>
<td>Provides refresh functionality of the screen</td>
<td>Refreshes data</td>
<td></td>
</tr>
<tr>
<td><strong>Find</strong></td>
<td><strong>Button</strong></td>
<td>Helps user to find the saved record</td>
<td>Data finding</td>
<td></td>
</tr>
<tr>
<td><strong>Go</strong></td>
<td><strong>Button</strong></td>
<td>Allows finding data</td>
<td>Give permission</td>
<td></td>
</tr>
<tr>
<td><strong>Delete</strong></td>
<td><strong>Button</strong></td>
<td>Allows user to delete the saved record</td>
<td>Delete entry</td>
<td></td>
</tr>
<tr>
<td><strong>Update</strong></td>
<td><strong>Button</strong></td>
<td>Allows user to update the entries in the saved record</td>
<td>Update entries</td>
<td></td>
</tr>
<tr>
<td><strong>Find by ID</strong></td>
<td><strong>Text Box</strong></td>
<td>Helps user to find the saved record by ID</td>
<td>Data finding</td>
<td></td>
</tr>
<tr>
<td><strong>Employee Reference</strong></td>
<td><strong>Button</strong></td>
<td>Takes user to the employee’s reference form</td>
<td>Navigates</td>
<td></td>
</tr>
<tr>
<td>Employee Telephone</td>
<td>Button</td>
<td>Takes user to the employee’s telephone form</td>
<td>Navigates</td>
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<tr>
<td>--------------------</td>
<td>--------</td>
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<td></td>
</tr>
<tr>
<td>Employee Fax</td>
<td>Button</td>
<td>Takes user to the Employee’s fax form</td>
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<tr>
<td>Data Grid</td>
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<td>Data Show</td>
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## DAILY EXPENCES

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<th>Action</th>
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<td>Text Box</td>
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<td>Employee ID</td>
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<td>Allows user to enter the Employee ID</td>
<td>Takes Input in Varchar</td>
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</tr>
<tr>
<td>Expense Date</td>
<td>Text Box</td>
<td>Allows user to enter the Expense date</td>
<td>Takes Input in Date time</td>
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</tr>
<tr>
<td>Employee Name</td>
<td>Text Box</td>
<td>Allows user to enter the Employees name</td>
<td>Takes Input in Varchar</td>
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</tr>
<tr>
<td>Add</td>
<td>Button</td>
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<td>Allow entry</td>
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</tr>
<tr>
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<td>Button</td>
<td>Takes user to the main menu</td>
<td>Close opened form</td>
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</tr>
<tr>
<td>Refresh</td>
<td>Button</td>
<td>Provides refresh functionality of the screen</td>
<td>Refreshes data</td>
<td></td>
</tr>
<tr>
<td>Find</td>
<td>Button</td>
<td>Helps user to find the saved record</td>
<td>Data finding</td>
<td></td>
</tr>
<tr>
<td>Go</td>
<td>Button</td>
<td>Allows finding data</td>
<td>Give permission</td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td>Button</td>
<td>Allows user to delete the saved record</td>
<td>Delete entry</td>
<td></td>
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<tr>
<td>Feature</td>
<td>Component</td>
<td>Description</td>
<td>Design</td>
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</tr>
<tr>
<td>Update</td>
<td>Button</td>
<td>Allows user to update the entries in the saved record</td>
<td>Update entries</td>
<td></td>
</tr>
<tr>
<td>Find by ID</td>
<td>Text Box</td>
<td>Helps user to find the saved record by ID</td>
<td>Data finding</td>
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<tr>
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## CUSTOMER ORDER

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<th>Action</th>
<th>Constraints</th>
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</thead>
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<td>Allows user to enter the Customer ID</td>
<td>Takes Input in</td>
<td>Varchar</td>
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<tr>
<td>Customer Name</td>
<td>Text Box</td>
<td>Allows user to enter the Customer name</td>
<td>Takes Input in</td>
<td>Varchar</td>
</tr>
<tr>
<td>Order No</td>
<td>Text Box</td>
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<td>Takes Input in</td>
<td>Varchar</td>
</tr>
<tr>
<td>Order Date</td>
<td>Text Box</td>
<td>Allows user to enter the Order date</td>
<td>Takes Input in</td>
<td>Date time</td>
</tr>
<tr>
<td>Delivery Date</td>
<td>Button</td>
<td>Allows user to enter the Delivery date</td>
<td>Takes Input in</td>
<td>Date time</td>
</tr>
<tr>
<td>Delivery Address</td>
<td>Button</td>
<td>Allows user to enter the Delivery address</td>
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<td>Varchar</td>
</tr>
<tr>
<td>Cancel</td>
<td>Button</td>
<td>Cancel all the entries in the text boxes</td>
<td>Empty text boxes</td>
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</tr>
<tr>
<td>Add products</td>
<td>Button</td>
<td>Allow user to add more products</td>
<td>Add more</td>
<td></td>
</tr>
<tr>
<td>Search</td>
<td>Button</td>
<td>Helps user to find the saved record</td>
<td>Data finding</td>
<td></td>
</tr>
<tr>
<td>Go</td>
<td>Button</td>
<td>Allows finding data</td>
<td>Give permission</td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td>Button</td>
<td>Allows user to delete the saved record</td>
<td>Delete entry</td>
<td></td>
</tr>
<tr>
<td>Update</td>
<td>Button</td>
<td>Allows user to update the entries in the saved record</td>
<td>Update entries</td>
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</tr>
<tr>
<td>Find by ID</td>
<td>Text Box</td>
<td>Helps user to find the saved record by ID</td>
<td>Data finding</td>
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</tr>
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<td>Customer order</td>
<td>Button</td>
<td>Takes user to the customer order form</td>
<td>Navigates</td>
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</tr>
<tr>
<td>Customer Telephone</td>
<td>Button</td>
<td>Takes user to the customers telephone form</td>
<td>Navigates</td>
<td></td>
</tr>
<tr>
<td>Data Grid</td>
<td>Grid</td>
<td>Shows all the records</td>
<td>Data Show</td>
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</tbody>
</table>
# VENDOR ORDER

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<th>Constraints</th>
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<td>Takes Input in</td>
<td>Varchar</td>
</tr>
<tr>
<td>Vendor Name</td>
<td>Text Box</td>
<td>Allows user to enter the Vendor name</td>
<td>Takes Input in</td>
<td>Varchar</td>
</tr>
<tr>
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<td>Text Box</td>
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<td>Takes Input in</td>
<td>Varchar</td>
</tr>
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<td>Order Date</td>
<td>Text Box</td>
<td>Allows user to enter the Order date</td>
<td>Takes Input in</td>
<td>Date time</td>
</tr>
<tr>
<td>Delivery Date</td>
<td>Button</td>
<td>Allows user to enter the Delivery date</td>
<td>Takes Input in</td>
<td>Date time</td>
</tr>
<tr>
<td>Delivery Address</td>
<td>Button</td>
<td>Allows user to enter the Delivery address</td>
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<td>Varchar</td>
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</tr>
<tr>
<td>Add products</td>
<td>Button</td>
<td>Allow user to add more products</td>
<td>Add more</td>
<td></td>
</tr>
<tr>
<td>Search</td>
<td>Button</td>
<td>Helps user to find the saved record</td>
<td>Data finding</td>
<td></td>
</tr>
<tr>
<td>Go</td>
<td>Button</td>
<td>Allows finding data</td>
<td>Give permission</td>
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</tr>
<tr>
<td>Delete</td>
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<td>Allows user to delete the saved record</td>
<td>Delete entry</td>
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</tr>
<tr>
<td>Update</td>
<td>Button</td>
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<td>Update entries</td>
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<tr>
<td>Find by ID</td>
<td>Text Box</td>
<td>Helps user to find the saved record by ID</td>
<td>Data finding</td>
<td></td>
</tr>
<tr>
<td>Customer Telephone</td>
<td>Button</td>
<td>Takes user to the customers telephone form</td>
<td>Navigates</td>
<td></td>
</tr>
<tr>
<td>Data Grid</td>
<td>Grid</td>
<td>Shows all the records</td>
<td>Data Show</td>
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</tbody>
</table>
Chapter 9

Input Design
# PRODUCTS INFORMATION

<table>
<thead>
<tr>
<th>Screen Item</th>
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<th>Action</th>
<th>Constraints</th>
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</thead>
<tbody>
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<td>in Varchar</td>
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<td>in Varchar</td>
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<td>Allows user to enter the product description</td>
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<td>Unit Price</td>
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<td>Allows user to enter the unit price of a product</td>
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<td>in Big Int</td>
</tr>
<tr>
<td>Mfg By</td>
<td>Text Box</td>
<td>Allows user to enter product’s manufacturing company</td>
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<td>in Varchar</td>
</tr>
<tr>
<td>Add</td>
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<td>Activates the text boxes and allows user to do entry</td>
<td>Allow Entry</td>
<td></td>
</tr>
<tr>
<td>Save</td>
<td>Button</td>
<td>Save the record entered by the user</td>
<td>Save record</td>
<td></td>
</tr>
<tr>
<td>Cancel</td>
<td>Button</td>
<td>Cancel all the entries in the text boxes</td>
<td>Empty text boxes</td>
<td></td>
</tr>
<tr>
<td>Exit</td>
<td>Button</td>
<td>Takes user to the main menu</td>
<td>Close opened form</td>
<td></td>
</tr>
<tr>
<td>Refresh</td>
<td>Button</td>
<td>Provides refresh functionality of the screen</td>
<td>Refreshes data</td>
<td></td>
</tr>
<tr>
<td>Find</td>
<td>Button</td>
<td>Helps user to find the saved record</td>
<td>Data finding</td>
<td></td>
</tr>
<tr>
<td>Go</td>
<td>Button</td>
<td>Allows finding data</td>
<td>Give permission</td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td>Button</td>
<td>Allows user to delete the saved record</td>
<td>Delete entry</td>
<td></td>
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</tr>
<tr>
<td>Update</td>
<td>Button</td>
<td>Allows user to update the entries in the saved record</td>
<td>Update entries</td>
<td></td>
</tr>
<tr>
<td>Find by ID</td>
<td>Text Box</td>
<td>Helps user to find the saved record by ID</td>
<td>Data finding</td>
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</tr>
<tr>
<td>Product Stock</td>
<td>Button</td>
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<td>Navigates</td>
<td></td>
</tr>
<tr>
<td>Data Grid</td>
<td>Grid</td>
<td>Shows all the records</td>
<td>Data Show</td>
<td></td>
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</table>
### VISIT REPORT

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<th>Action</th>
<th>Constraints</th>
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<td>Allows user to enter the Report#</td>
<td>Takes Input</td>
<td>in Varchar</td>
</tr>
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<td>Site Name</td>
<td>Text Box</td>
<td>Allows user to enter the Site name</td>
<td>Takes Input</td>
<td>in Varchar</td>
</tr>
<tr>
<td>Description</td>
<td>Text Area</td>
<td>Allows user to enter the Work description</td>
<td>Takes Input</td>
<td>in Varchar</td>
</tr>
<tr>
<td>Date</td>
<td>Combo box</td>
<td>Auto generated by system current date</td>
<td>Takes Input</td>
<td>as calendar date</td>
</tr>
<tr>
<td>Visited Equipment</td>
<td>Text Box</td>
<td>Allows user to enter equipment they visit</td>
<td>Takes Input</td>
<td>in Varchar</td>
</tr>
<tr>
<td>Add</td>
<td>Button</td>
<td>Activates the text boxes and allows user to do entry</td>
<td>Allow Entry</td>
<td></td>
</tr>
<tr>
<td>Save</td>
<td>Button</td>
<td>Save the record entered by the user</td>
<td>Save record</td>
<td></td>
</tr>
<tr>
<td>Cancel</td>
<td>Button</td>
<td>Cancel all the entries in the text boxes</td>
<td>Empty text boxes</td>
<td></td>
</tr>
<tr>
<td>Exit</td>
<td>Button</td>
<td>Takes user to the main menu</td>
<td>Close opened form</td>
<td></td>
</tr>
<tr>
<td>Refresh</td>
<td>Button</td>
<td>Provides refresh functionality of the screen</td>
<td>Refreshes data</td>
<td></td>
</tr>
<tr>
<td>Find</td>
<td>Button</td>
<td>Helps user to find the saved record</td>
<td>Data finding</td>
<td></td>
</tr>
<tr>
<td>Go</td>
<td>Button</td>
<td>Allows finding data</td>
<td>Give</td>
<td></td>
</tr>
<tr>
<td>Feature</td>
<td>Control Type</td>
<td>Description</td>
<td>Permission</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------</td>
<td>--------------------------------------------------</td>
<td>----------------------</td>
<td></td>
</tr>
<tr>
<td>Delete Button</td>
<td>Button</td>
<td>Allows user to delete the saved record</td>
<td>Delete entry</td>
<td></td>
</tr>
<tr>
<td>Update Button</td>
<td>Button</td>
<td>Allows user to update the entries in the saved record</td>
<td>Update entries</td>
<td></td>
</tr>
<tr>
<td>Find by Report #</td>
<td>Text Box</td>
<td>Helps user to find the record by Report #</td>
<td>Data finding</td>
<td></td>
</tr>
<tr>
<td>Employee ID</td>
<td>Text box</td>
<td>Enter the ID of employee visit the site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Grid</td>
<td>Grid</td>
<td>Shows all the records</td>
<td>Data Show</td>
<td></td>
</tr>
</tbody>
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## VEHICLES INFORMATION

<table>
<thead>
<tr>
<th>Screen Item</th>
<th>Type</th>
<th>Purpose / Description</th>
<th>Action</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration number</td>
<td>Text Box</td>
<td>Allows user to enter the Vehicles Reg number</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Model number</td>
<td>Text Box</td>
<td>Allows user to enter the Vehicles model number</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Vehicle name</td>
<td>Text Area</td>
<td>Allows user to enter the Vehicle name</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Add</td>
<td>Button</td>
<td>Activates the text boxes and allows user to do entry</td>
<td>Allow Entry</td>
<td></td>
</tr>
<tr>
<td>Save</td>
<td>Button</td>
<td>Save the record entered by the user</td>
<td>Save record</td>
<td></td>
</tr>
<tr>
<td>Cancel</td>
<td>Button</td>
<td>Cancel all the entries in the text boxes</td>
<td>Empty text boxes</td>
<td></td>
</tr>
<tr>
<td>Exit</td>
<td>Button</td>
<td>Takes user to the main menu</td>
<td>Close opened form</td>
<td></td>
</tr>
<tr>
<td>Refresh</td>
<td>Button</td>
<td>Provides refresh functionality of the screen</td>
<td>Refreshes data</td>
<td></td>
</tr>
<tr>
<td>Find</td>
<td>Button</td>
<td>Helps user to find the saved record</td>
<td>Data finding</td>
<td></td>
</tr>
<tr>
<td>Go</td>
<td>Button</td>
<td>Allows finding data</td>
<td>Give permission</td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td>Button</td>
<td>Allows user to delete the saved record</td>
<td>Delete entry</td>
<td></td>
</tr>
</tbody>
</table>
### Input Design

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Update</strong></td>
<td><strong>Button</strong></td>
<td>Allows user to update the entries in the saved record</td>
<td><strong>Update entries</strong></td>
</tr>
<tr>
<td><strong>Find by ID</strong></td>
<td><strong>Text Box</strong></td>
<td>Helps user to find the saved record by ID</td>
<td><strong>Data finding</strong></td>
</tr>
<tr>
<td><strong>Data Grid</strong></td>
<td><strong>Grid</strong></td>
<td>Shows all the records</td>
<td><strong>Data Show</strong></td>
</tr>
</tbody>
</table>
## DELIVERY INFORMATION

<table>
<thead>
<tr>
<th>Screen Item</th>
<th>Type</th>
<th>Purpose / Description</th>
<th>Action</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer ID</td>
<td>Text Box</td>
<td>Allows user to enter the Customers ID</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Vehicle Registration No</td>
<td>Text Box</td>
<td>Allows user to enter the Registration number of the vehicle</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Vehicle Name</td>
<td>Text Box</td>
<td>Allows user to enter the name of Vehicle</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Customer Order number</td>
<td>Text Box</td>
<td>Allows user to enter customers order number</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Customer Name</td>
<td>Text Box</td>
<td>Allows user to enter customers name</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Employee ID</td>
<td>Text Box</td>
<td>Allows user to enter the employees ID number</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Employee Name</td>
<td>Text Box</td>
<td>Allows user to enter the employees name</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Delivery date</td>
<td>Text Box</td>
<td>Allows user to enter the delivery date</td>
<td>Takes Input in Date time</td>
<td></td>
</tr>
<tr>
<td>Delivery Address</td>
<td>Text Area</td>
<td>Allows to enter the delivery address</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Product ID</td>
<td>Text Box</td>
<td>Allows user to enter the products ID</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Product name</td>
<td>Text Box</td>
<td>Allows user to enter the products name</td>
<td>Takes Input in Varchar</td>
<td></td>
</tr>
<tr>
<td>Add</td>
<td>Button</td>
<td>Activates the text boxes and allows user to do</td>
<td>Allow Entry</td>
<td></td>
</tr>
<tr>
<td>Button/Box</td>
<td>Description</td>
<td>Entry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Save Button</td>
<td>Save the record entered by the user</td>
<td>Save record</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cancel Button</td>
<td>Cancel all the entries in the text boxes</td>
<td>Empty text boxes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exit Button</td>
<td>Takes user to the main menu</td>
<td>Close opened form</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refresh Button</td>
<td>Provides refresh functionality of the screen</td>
<td>Refreshes data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Find Button</td>
<td>Helps user to find the saved record</td>
<td>Data finding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Go Button</td>
<td>Allows finding data</td>
<td>Give permission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delete Button</td>
<td>Allows user to delete the saved record</td>
<td>Delete entry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Update Button</td>
<td>Allows user to update the entries in the saved record</td>
<td>Update entries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Find by ID Text Box</td>
<td>Helps user to find the saved record by ID</td>
<td>Data finding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Grid Grid</td>
<td>Shows all the records</td>
<td>Data Show</td>
<td></td>
<td></td>
</tr>
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</table>
## PRODUCTS STOCK

<table>
<thead>
<tr>
<th>Screen Item</th>
<th>Type</th>
<th>Purpose / Description</th>
<th>Action</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>Text Box</td>
<td>Allows user to enter the Product ID</td>
<td>Takes Input</td>
<td>in Varchar</td>
</tr>
<tr>
<td>Name</td>
<td>Text Box</td>
<td>Allows user to enter the name of the product</td>
<td>Takes Input</td>
<td>in Varchar</td>
</tr>
<tr>
<td>Quantity</td>
<td>Text Box</td>
<td>Allows user to enter the quantity of a product</td>
<td>Takes Input</td>
<td>in Varchar</td>
</tr>
<tr>
<td>Min Level</td>
<td>Text Box</td>
<td>Check minimum quantity of product</td>
<td>Takes Input</td>
<td>in Varchar</td>
</tr>
<tr>
<td>Add</td>
<td>Button</td>
<td>Activates the text boxes and allows user to do entry</td>
<td>Allow Entry</td>
<td></td>
</tr>
<tr>
<td>Save</td>
<td>Button</td>
<td>Save the record entered by the user</td>
<td>Save record</td>
<td></td>
</tr>
<tr>
<td>Cancel</td>
<td>Button</td>
<td>Cancel all the entries in the text boxes</td>
<td>Empty text</td>
<td>boxes</td>
</tr>
<tr>
<td>Exit</td>
<td>Button</td>
<td>Takes user to the main menu</td>
<td>Close</td>
<td>opened form</td>
</tr>
<tr>
<td>Refresh</td>
<td>Button</td>
<td>Provides refresh functionality of the screen</td>
<td>Refreshes</td>
<td>data</td>
</tr>
<tr>
<td>Find</td>
<td>Button</td>
<td>Helps user to find the saved record</td>
<td>Data finding</td>
<td></td>
</tr>
<tr>
<td>Go</td>
<td>Button</td>
<td>Allows finding data</td>
<td>Give</td>
<td>permission</td>
</tr>
<tr>
<td>Delete</td>
<td>Button</td>
<td>Allows user to delete the saved record</td>
<td>Delete entry</td>
<td></td>
</tr>
<tr>
<td>Feature</td>
<td>Component</td>
<td>Description</td>
<td>Category</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>-------------</td>
<td>--------------------------------------------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>Update</td>
<td>Button</td>
<td>Allows user to update the entries in the saved record</td>
<td>Update entries</td>
<td></td>
</tr>
<tr>
<td>Find by ID</td>
<td>Text Box</td>
<td>Helps user to find the saved record by ID</td>
<td>Data finding</td>
<td></td>
</tr>
<tr>
<td>Product Stock</td>
<td>Button</td>
<td>Takes user to the products stock form</td>
<td>Navigates</td>
<td></td>
</tr>
<tr>
<td>Data Grid</td>
<td>Grid</td>
<td>Shows all the records</td>
<td>Data Show</td>
<td></td>
</tr>
</tbody>
</table>
Chapter 10
Implementation and Testing
Chapter 10

Implementation View

In implementation phase, we start with the result from design phase and implement the system in terms of components, that is, source code, scripts, binaries, executable etc. The principal responsibility of implementer is to map the artifacts of design phase into executable code.

The end of implementation typically brings your responsibilities for a system to a close, but others will continue to work with the system to support and maintain it until it is replaced by another system. The purpose of implementation is to build a properly working system and to install in the organization, replacing old systems and old methods.

Implementation also includes finalizing all system and user documentation, thoroughly training users and others to effectively use the new system, and preparing the support systems to assist users as they encounter difficulties.

The Purposes of Implementation

The primary purpose of implementation is to flesh out the architecture and the system as a whole. More specifically, the purposes of implementation are to:

- Plan the system integrations in each iteration
- Distribute the system by mapping executable components onto nodes in the deployment model.
• Implement the design classes and subsystems found during design phase.
• Implement design classes as file components that contain source code.
• Unit test the components.
• Integrate the components by compiling them and linking them into one or more executables, before they are sent to integration and system tests.

The result of implementation phase is **implementation model**.

**Implementation Model:**

The implementation model describes how elements in the design model are implemented in terms of components such as source code files, executable, and so on. The implementation model also describes how the components are organized according to the structuring and modularization mechanisms available in the implementation environment and the programming languages in use, and how the components depend on each other.

The implementation model is represented by an implementation system that denotes the top-level subsystem of the model. Using other subsystems is then a way of organizing the implementation model into more manageable pieces.
Steps in Implementation:

Implementation includes the following phases.

- Writing computer software.
- Testing Software.
- Converting from the old to the new system.
- Documenting the system.
- Training users and others.
- Designing Support procedures.

Steps In Maintenance:

Maintenance includes the following procedures:

- Responding to requests to change the system.
- Transforming requests into changes.
- Designing the changes.
- Implementing changes.

On the basis of guidelines discussed in detail design section, Purchase System Auto Fuel Technologies is developed. Development is just the translation of design in the programming language that computer understanding the design each development technique is identified. In this phase these techniques are implemented.
System Testing

This test is applied on the software to ensure that the software has been operating according to its desired requirements by integrating all the modules of the entire system or not.

Testing performed by taking any dummy data, which is suitable to determine the objects and requirements of the software and after the results obtained according to requirements, the next step is to implement the software.

Testing Objectives

Testing process has the following objectives:

- Testing is process of executing a program with the intent of finding an error.
- A good test case is one that has high probability of finding an as-yet undiscovered error.
- A successful test is one that uncovers an as-yet undiscovered error
- A successful test is one in which no error are found.

Types of Testing

There are many types of testing but most commonly used testing are:

1. Black Box Testing
2. White Box Testing
Black Box Testing

Black Box Testing is testing without knowledge of the internal workings of the item being tested. For example, when black box testing is applied to software engineering, the tester would only know the “legal” inputs and what the expected outputs should be, but now how the program actually arrives at those outputs, It is because of this that black box testing can be considered testing with respect to the specifications; no other knowledge of the program is necessary. For this reason, the tester5 and the programmer can be independent of one another, avoiding programmer bias toward his own work, For this testing, test groups are often used, “test groups are sometimes called professional idiots. People who are good at designing incorrect data”. Also do the nature of black box testing; the best planning can be as soon as the specifications are written. The opposite of this would be glass box testing, where test data are derived from direct examination of the code to be tested. For glass box testing, the test cases cannot be determined until the code has actually been written. Both of these testing techniques have advantages and disadvantage, but when combined, they help to ensure thorough testing of the product.

Advantage of Black Box Testing

- More effective on larger units of code than glass box testing.
- Tester needs no knowledge of implementation, including specific programming language.
- Tester and programming are independent of each other.
- Tests are done from the user point of view.
- Will help to expose any ambiguities or inconsistencies in the specifications.
- Test cases can be designed as soon as the specifications are complete.
Disadvantage of Black Box Testing

- Only a small number of possible inputs can be actually being tested, to test every possible input stream would take nearly forever.
- Without clear and concise specification, test cases are hard to design.
- There may be unnecessary repetition of test input if the testers are not informed of test cases the programmer has already tried.
- May leave many program path untested.
- Cannot be directed toward specific segment of code, which may be very complex.
- Most testing related research has been directed toward glass testing.

White Box Testing

Also known as glass box, structural, clear box and open box testing. A software testing technique where by explicit knowledge of the internal working of the item being tested are use to select the test data. Unlike black box testing white box testing use specific knowledge of programming code to examine outputs. The test is accurate only if the tester knows what the program is supposed to do. He or she can then see if the program diverges from its intended goal. White box testing does not account for errors caused by omission, and all visible code must also be readable. For a complete software examination, both white box and black box tests are required. White box testing should check every line of code software bugs is a fact of life. No matter how hard we try, the reality is that even the best programmers can’t write error-free code all the time.
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