Distributed store management application for Assosa University

Hundie Regassa
Ramatala Musa
Wasiyhun Sema

ABSTRACT

This project proposal deals with distributed store management application development specifically for Assosa university store. Our propose system maintain necessary information of the Assosa University store managing teams. Distributed store management Application mainly provides effective and fast data processing, registration, borrowing, retuning of materials among different sectors of store departments. This distributed Application of managing Material information in store department setting is expected to help various services keep an updated data on the status of their information. In designing and analyzing such a system, object oriented designing and analysis tool and technique has been employed. Generally, the main goal of distributed store management system is to shorten data-processing time, to reduce errors, to improve the accuracy of input and to provide data reliability of the information and to change the manual data handling system into automated system.

1.0. Introduction

Distributed applications are applications or software that runs on multiple computers within a network at the same time and can be stored on servers. Unlike traditional applications that run on a single system, distributed applications run on multiple systems simultaneously for a single task or job. Distributed applications can communicate with multiple servers or devices on the same network from any geographical location. The distributed nature of the applications refers to data being spread out over more than one computer in a network. (Tanenbaum)

Distributed applications are broken up into two separate programs: the client software and the server software. The client software or computer accesses the data from the server, while the server processes the data. In the today’s world ICT has very important in every organizational level so as to automate activities easily in the manner that check the information currently going on the organizations to be checked its accuracy and consistency. Today’s competitive environment is forcing companies to optimize the procurement processes and inventory levels while at the same time ensure accuracy of controls and implementation of standard procedures for the flow of materials. However, in the absence of appropriate systems and information infrastructure, companies are finding it difficult to achieve smooth and efficient materials planning and execution. In Departmental Store’s Management System, we keep track of objects or materials of the store. Properly managing property is essential to the success of every store keeper. Store Management system provides information to efficiently manage the flow of materials, effectively utilize people and equipment, coordinate internal activities and communicate with customers. In the current scenario of our country few departmental stores are automated and some are semi-automated and many are still having manual system for keeping the record of items. In manual system the store management system is quite time consuming and tedious. Semi-automated system is also not well organized. There are many departments in Assosa University which are not using the automated systems. The materials store of this University is one of them. Therefore, we are eager to develop store management system for this unit of the University.

1.1. Background of the organization

Assosa University is one of the newly established Higher Institution of Learning in Ethiopia. Ever since it was established in 2011/2004 E.C, the University has made a remarkable contribution to the country. The service it has rendered in the training of high level skilled manpower and professionals in
various key areas of development is exemplary. Until very recently, it has been the one of the higher institution learning (HIL) wherea material which is important for the customers are fully documented. Assosa university store department is also start its work at the time of the university is established. In the store department there is only four employees at the time of establishment, but now a day the number of employee is increased in to eight. The store department has two parts these are fixed asset store department and consumable material store department. In the fixed asset store department the materials which are not consumable are managed and also in the consumable store department the materials that are consumed by the people like pen, paper e.t.c are managed.

1.2. Statement of the problem
Most activities of the existing system are manual to keep the record of the transaction in the departmental store. We have found that employees first of all record all information in there ledger before entering in computer system. Meanwhile the high increment demand of materials causes the current system unsuitable to manage the store department. This makes difficult to handle the entire transaction, The problems that are faced in the manual system is that data redundancy in the paper document, There may be mistakes while recording large data and this may disrupt the transaction. Difficult to update information at the time of transaction process. Difficult to retrieve information about the materials, the customers, etc., less data security, Tiresome, time consuming and tedious checking system that means to check whether the materials are present or not, it is time consuming to audit the transaction (report) at the end of the year, Time wastage for the record during reception of new items, Manual identification of the code of each item during transaction, Difficult to manage and control daily activities.
So, in this project we are trying to make (develop) distributed store management Application which will help employees to keep record of materials in systematic way and help them produce report about the stock currently available in their store in automatic way to help then decision making about the store. Generally, the team member proposes the new distributed store management application for Assosa University in order to solve the above problems that are faced in the existing system of Assosa University store departments.

1.3. Objectives of the project

1.3.1. General Objectives
The main objective of this project is to develop distributed store management Application for Assosa University.

1.3.2. Specific objectives of the project
The specific objective will help as to achieve the general objective that is mentioned above and the individual tasks done in the project.
✓ To identify the problem, gather elicit or specify the requirement of the existing system.
✓ To analyze the requirements gathered (specify) from the existing system.
✓ To design a way to solve the problem or to address the requirement that is specified in the analysis phase.
✓ To implement the system design to real solution that can lead to the final solution of the problem.
✓ To test the implemented system for proper functionalities using different testing metrics
✓ To recommend further deployment of the system in to working environment.

1.4. Scope of the project

1.4.1. Scope in
Our project is limited to only the Assosa University Store Department and tends to perform database dependent recording, searching, deletion and update of stocks, customers and transaction process. Note only this it can process activities like integration with other department. In addition to this basic functionality the system can perform borrowing, retuning of materials among different sectors of store departments.
1.4.2. **Scope out**
The system can’t check the materials quality, employee management and materials order. **Generally**, we come up with this project to implement a new Distributed Store Management Application which can perform the entire specified task to the store with minimum time, effort and resource need in addition with great efficiency and accuracy and guarantee that the data will not lost or damaged easily.

1.5. **Significance of the project**
The project supports the whole system by specifying the management, accessibility, accuracy and efficiency of the system.

- Provides easy way of communication to employers
- Reduces the manual workload of the employee in the overall daily activities.
- The system offers more information to employees in a faster and more efficient way.
- Achieves an increase in the satisfaction of users from the new system.
- Giving access for the user and also set privilege accordingly for different department.
- Facilitates timely and prompt service relied
- The system allows controlling the overall activities done in the system easily.
- The system helps in managing the materials information (data) in well-organized way.
- Allow easily getting report related to the needed information

1.6. **Beneficiary of the project**
The following table below shows the beneficiaries and the analogous benefits acquire from the project.

<table>
<thead>
<tr>
<th>Beneficiaries</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Store keeper and the Staff and technicians</td>
<td>▪ Improve accuracy in handling or managing data</td>
</tr>
<tr>
<td></td>
<td>▪ Minimize time delay</td>
</tr>
<tr>
<td></td>
<td>▪ The business process will be supported by information technology and thereby enhance the operational works</td>
</tr>
<tr>
<td></td>
<td>▪ Enhanced opportunity for innovative customer service</td>
</tr>
<tr>
<td></td>
<td>▪ Encouraged accountability, Improved transparency</td>
</tr>
<tr>
<td></td>
<td>▪ It will save time and will increase the productivity of their employees with this system.</td>
</tr>
<tr>
<td>Customer</td>
<td>▪ They can get a quality service in short period of time</td>
</tr>
</tbody>
</table>

**Table 1.1 beneficiary of the project**

1.7. **Feasibility study**
The analyst must consider the following feasibility were highly considered step by step – Economic feasibility, operational, technically feasibility.

1.7.1. **Technical feasibility**
Determines the level of technology available in the software development we can simply observe that the project is feasible in terms of volume of data, frequency of updating and so on. Also the teams are going to use the latest software’s tools which are common in developing software nowadays because technology evolves quickly. In general the new software is feasible because it can be achieved within the given constraint.

1.7.2. **Economical feasibility**
Economic analysis’s most frequently used technique for evaluating the effectiveness of a proposed system. More commonly known as cost/benefit analysis, the procedure is to determine the benefits and savings that are expected from a proposed system and compare them with costs. If benefit outweighs costs, a decision is taken to design and implement the system otherwise; further justification or alternative in the proposed system will have to be made if it is to have a change of being approved. This is an ongoing effort that improves in accuracy at each phase of the system life cycle.
1.7.3. Operational feasibility
This test of feasibility checks if the system works with least difficulties when it is developed and installed. The technical staff has sufficient knowledge of the tools being used and the users need just to know how to access and run the programs. Hence it is concluded that the system is operationally feasible. In addition to this the system is platform independent since the system is developed by using Java programming languages. So Java is actually a platform independent which consisting of three components such as Java programming language, Java library of classes and interfaces and Java virtual Machine.

1.8. Methodology
The process used to collect information and data for the purpose of solving the problems. It’s not only focused on data collecting it also focuses on the approaches of development.

1.8.1. Data gathering methodology
In order to gather data or requirements basically we have used two types of data collecting methods quantitative and qualitative.

Quantitative data collection method: its relay on random sampling and structured data collection. The team uses two types of quantitative data collection methods. Those are:-

- Observation: The team collects some necessary information by observing the employees how they work each time in their day to day activities.
- Interview: In interview, the team asks standard set of questions and nothing more, the team use face to face interview to ask the project manager and store administrator of ASU store departments to get the highest response.

Qualitative data collection method: Qualitative data plays an important role in impact evaluation by providing information use full to understand the process behind observed results.

- Document analysis: The team uses some document analysis to gather information how store(material) is managed and it can be performed by:-
  - Determining what type of document should be analyzed.
  - Evaluating whether the information in the document is important for the team.
  - Determining who authored the document and who may have contributed information.

1.8.2. Development methodology
Object Oriented Methodology (OOM) is a systematic development approach encouraging and facilitating re-use of software components. The OOM can achieve higher productivity, lower maintenance costs and better quality (Simon Bennett).

The team prefers to use object oriented system analysis and design over the structured one is because of the following reasons.

- Simplicity: software objects model real world objects, so the complexity is reduced and the program structure is very clear.
- Modularity: each object forms a separate entity whose internal workings are decoupled from other parts of the system.
- Modifiability: it is easy to make minor changes in the data representation or the procedures in an object oriented program. Changes inside a class do not affect any other part of a program, since the only public interface that the external world has to a class is through the use of methods.
- Extensibility: adding new features or responding to changing operating environments can be solved by introducing a few new objects and modifying some existing ones.
- Maintainability: objects can be maintained separately, making locating and fixing problems easier.
- Re-usability: objects can be reused in different programs. (Tegarden)

1.8.3. Development approach
A software development approach helps the team to structure, plan and control the process of developing software. There are several software methodologies that can be used in developing software. Some of them that we will be use are:-
Agile methodology is an iterative, team-based approach to development. This approach emphasizes the rapid delivery of an application in complete functional components. Rather than creating tasks and schedules, all time is “time-boxed” into phases called “sprints.” Each sprint has a defined duration (usually in weeks) with a running list of deliverables, planned at the start of the sprint (Szalvay).

- The customer has frequent and early opportunities to see the work being delivered, and to make decisions and changes throughout the development project.
- The customer gains a strong sense of ownership by working extensively and directly with the project team throughout the project.
- If time to market for a specific application is a greater concern than releasing a full feature set at initial launch, Agile can more quickly produce a basic version of working software which can be built upon in successive iterations.
- Development is often more user-focused, likely a result of more and frequent direction from the customer.

### 1.8.4. Development tools

In this project will use several kinds of development tools these are:-

#### 1.8.4.1. Hardware requirements

<table>
<thead>
<tr>
<th>Computer(client)</th>
<th>Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum requirement hard ware:</td>
<td>4 GB of RAM.</td>
</tr>
<tr>
<td>3.06 GHZ processor and more</td>
<td>Processor 2.1 GHz</td>
</tr>
<tr>
<td>40 and above GB Hard disk</td>
<td>50 GB internal Hard Disk</td>
</tr>
<tr>
<td>256 MB of RAM and above</td>
<td>Network Interface Card (or Modem)</td>
</tr>
<tr>
<td>1.44MB floppy drive</td>
<td></td>
</tr>
</tbody>
</table>

Table 1.2 hardware requirements

- **Switch**: device used to connect a PC to the network.
- **Network Interface Card (NIC)**: It connects the computer to the cabling, which in turn links all of the computers on the network together. Other Hard disk, Monitor, Flash disk, (http://www.projectgeeks.com)

#### 1.8.4.2. Software requirements

<table>
<thead>
<tr>
<th>Software name</th>
<th>Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system</td>
<td>windows operating</td>
</tr>
<tr>
<td>Database back up</td>
<td>MySQL</td>
</tr>
<tr>
<td>Enterprise Application(platform)</td>
<td>J2EE</td>
</tr>
<tr>
<td>Programming Language</td>
<td>Java</td>
</tr>
<tr>
<td>Server for data base</td>
<td>WampServer 2.4 (Server) or xampp server</td>
</tr>
<tr>
<td>Word office</td>
<td>Microsoft office word 2007</td>
</tr>
</tbody>
</table>

Table 1.3 Software Requirements

### 1.8.5. Testing methodology

Basically there are many ways of testing methodology; that we have been use to test our system are the following once

- **Unit testing**: is done at the lowest level. It tests the basic unit of software, which is the smallest testable piece of software, and is often called “unit”, “module”, or “component” interchangeably.

- **Integration Testing**: is performed when two or more tested units are combined into a larger structure. The test is often done on both the interfaces between the components and the larger structure being constructed, if its quality property cannot be assessed from its components.

- **System Testing**: tends to affirm the end-to-end quality of the entire system. System test is often based on the functional/requirement specification of the system. Non-functional quality attributes, such as reliability, security, and maintainability, are also checked ((Jovanović).
1.9. **Project plane (schedule)**
Planning is an essential tool for developing the given system on time, so our team has plane to do each and every activity with a given period of time.

1.10. **Cost estimation for the project**

<table>
<thead>
<tr>
<th>Material (device)</th>
<th>Amount</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash disk</td>
<td>1</td>
<td>150 ETB</td>
</tr>
<tr>
<td>Desk top computer</td>
<td>1</td>
<td>From the University</td>
</tr>
<tr>
<td>Printing</td>
<td>Maximum of 110 pages</td>
<td>110 ETB</td>
</tr>
<tr>
<td>Paper</td>
<td>1 pack</td>
<td>120 ETB</td>
</tr>
<tr>
<td><strong>Total price</strong></td>
<td></td>
<td><strong>330 ETB</strong></td>
</tr>
</tbody>
</table>

Table 1.5 Cost estimation for the project

1.11. **Responsibility of team members**

<table>
<thead>
<tr>
<th>Team members</th>
<th>Tasks</th>
<th>Contact Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hundie Regassa</td>
<td>Requirement gathering</td>
<td></td>
</tr>
<tr>
<td>Ramatala Musa</td>
<td>System analysis</td>
<td>(+251)0915629483 <a href="mailto:wasit1014@gmail.com">wasit1014@gmail.com</a></td>
</tr>
<tr>
<td>Wasyihun sema</td>
<td>System design and implementation</td>
<td></td>
</tr>
</tbody>
</table>

Table 1.6 Responsibility of team members

Chapter Two

2. **Requirement Analysis and Description**

2.1. **Introduction**
It is possible to develop a better system by understanding the existing system of the store management system of Assosa University store departments. Even if it uses a manual system; it is performing the following activities. Registering new items of the stock, distributed items for user supply items from the stock maintain and update records, prepare report and others.

2.2. **Existing System description**
The existing Store management system currently is working using manual system, and this leads to less security issues. This is the result of lack of any computer based systems which store all the information’s of materials in the structured database. The system also distributed items for user. In the following process: Firstly the user requests their needs to the store clerk and the store manager approves the request. And the store clerk also seen the items in the stock then checks the item whether it found in the store or not. If the requested item is exist the stock clerk give information to distributors then user fill the form and take the item that he/she need. But if the requested item is existed, store clerk permitted to the purchaser to buy the requested item and the manager announce to the user the item you need is coming in the telephone or notice board.

2.2.1 **Players of the Existing system**
The main players of the existing system are the following
i. Store clerk(keeper)
ii. Store manager
iii. Distributor
2.2.2. Activity of the Existing system

The activity or the work flow of the existing system is performed starting from the top head to the lower or store clerk person. First the store clerk receives the materials details from the store head and he/she assigns a code and recodes the information. Then the store clerk must get permission to receive and give the materials to the staff members by the head of the store office and the store clerk checks the incoming and outgoing materials by the related professionals. Then the store clerk documents the information and reports those materials detail based on their type to the officer.

The activities of the existing system are of the following

- Registering new Items of the store and new users
- Material distribution for each users
- Identify the materials that has given for the user or not gives
- Borrow or loan materials to user
- Generate reports periodically

2.2.3. Business rule of the existing system

Business rules are statements about the organization’s way of doing business. They reflect business policies. Organizations have policies in order to satisfy the business objective, satisfy customers, and make good use of resources, and conform to laws or general business conversions. Business rule become requirements that is they may be implemented in software as a means of requirements of this software system.

The existing system has many business rules or principles some of them are:

- **BR1**: new items are recorded by the stock clerks in the manual ways.
- **BR2**: after recording and assigning code by the store clerk the items lead to the Distributors then he/she record, check and place them.
- **BR3**: any person or organizations of the Ethiopian electric utility are allowed to take an authenticated material.
- **BR4**: when the users/organization want to borrow and purchase any material he/she must register his id, full name, email, status, kinds of items and other user details properly.
- **BR5**: in order to get the item he /she must get permission from the Stock manager/inventory managers and the store officer has to put their signature.
- **BR6**: the user or organizations has to put his/her signature while taking the item.
- **BR7**: when the user or the organization to take the borrow items if should not damage the item the Distributors accepts items.
- **BR8**: if the user or organizations has loss or damage the item he/she has to replace that item or pay the cost with additional percent.
- **BR9**: finally Distributors take the items to stock clerk and the stock clerk update the items.
- **BR10**: then generate report the get and distribute material in required time.

2.3. Proposed system

The proposed system is intended for Distributed store management Application purposes. Thus, it can perform different processes included in the store departments. It will be able to monitor the delivery of a certain items; the newly added items will be added to the current stocks.

The proposed system of distributed store management application that attempts to replace the manual system has the following nature.

- The system can record any new item issue requested item with appropriate specification category
- The system generate a unique ID for each new fixed asset which will added to the database
- The system can enable to search items that are available in the store house and use
- It shortens the step by step process in delivering or returning items
- It generates up to date report at any time for decision makers for budget allocation and controlling.
2.3.1. Business rule of the proposed system
BR1: the system should provide authentication to the users by verifying the user name and password before the use the system
BR2: The user of the system is only the registered user or authorized user
BR3: The system doesn’t register again with the same user name or ID
BR4: The system doesn’t accept numbers in case of name and vice versa
BR5: in the system password is not less than 6 characters and collection of symbol, numbers and letters.
BR6: If the user fills the form with improper password and user name the system display error messages and then the user fill correctly.
BR7: The system must be work 24 hours and 7 days per week as the user initiates the server.
BR8: the system doesn’t open the request form or page until user fill all request filled.
BR9: The system validates all data before save to database or it has controller system to all activity.

2.4. Requirements of the system
2.4.1. Functional Requirements
The functional requirement describes the behaviour of the system that supports user goals, tasks or activities of the system. It capture the intended behaviour of the system. This behaviour may be expressed as service, task or functions the system is required to perform. Some of the functional requirements of the system is the following.

- Logion
- Logout
- Add new users
- Add new material information to the data base
- Update material information
- Request Item
- Search item
- Delete Item
- Generate report when needed.
- View user request
- View report
- Register users
- Delete users
- Manage users
- Categorize materials. The materials are categorized based on their service years which means worn out materials are stored on separate data base tables with the materials that are not worn out.

2.4.2. Non Functional Requirements
Non-functional requirements are additional qualities of the system. Qualities are properties or characteristics of the system that its stakeholders care about and hence will affect their degree of satisfaction with the system. Some of the non-functional requirements of the systems are:-

Availability: -The system should operate 24 hours with in 7 day per week. A system is always operational and available for use as much as possible reduces down time as the person or the user initiates the server. The system provides services for all system users without any time limitation.

Error handling
When the user make an error:-

- The system must have capacity for error handling.
- The system should display error message if the user input invalid character
Portability: - This distributed store management application can run on various platforms which means it is platform independent application.

Maintainability: - this distributed store management application is implemented in modular way which helps to identify the errors and handle easily. In the system there is user management, registration and report module; so if there is a problem in one of these modules it can be easily maintained.

Robustness: - the system is robust while
  ✓ Validating data entry
  ✓ Error reporting
  ✓ Displaying correct output result or output.

Security Requirements: All system data must be backed up every 24 hours and the backup copies stored in a secure location which is not in the same building as the system, all external communications between the system’s data server and clients must be encrypted. Since everything in the office is financial, the system of DBMS should be highly secured. Every user of the system should have their own privilege which in turn maximize the.

Data retention: - The system should be able to store the useful data, and data that will use later on.

Accuracy: - the new system should try to reduce errors that are in the existing system. The accurate system will improve and ease all the processes from searching to updating material information’s to generating reports and many other services. Consequently this will lead to improved customer satisfaction.

Reliability: Distributed application should be more reliable than single system. Such as Redundancy improves it, need to maintain, consistency, need to be secure, Fault tolerance: need to mask failures, recover from errors.

Reference

Szalvay, V. An Introduction to Agile Software Development.pdf.