WOLKITE UNIVERSITY

COLLEGE OF COMPUTING AND INFORMATICS

DEPARTMENT OF COMPUTER SCIENCE

TITLE: WEB-BASED PURCHASING INFORMATION MANAGEMENT SYSTEM FOR WOLKITE UNIVERSITY

No	Student Name	ID
1.	ABDULFETA SHUKRA	CIR/004/11
2.	DIRIBI HAILU	CIR/038/11
3.	FEDILA SHAMIL	CIR/438/12
4.	FIRAOL GUTEMA	CIR/046/11

Advisor Name: - Mr. Habtamu Alemayehu (MSc in CSE)

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Wolkite, Ethiopia

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Submitted to department of Computer Science in partial fulfillment of the requirement for the degree of Bachelor Science in Computer Science.

By:

1. Abdulfeta Shukra CIR/004/11
2. Diribi Hailu CIR/038/11
3. Fedila Shamil CIR/438/12
4. Firaol Gutema CIR/046/11

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Declaration

This is to declare that this project work which is done under the supervision of Mr. Habtamu Alemayehu. And having the title Web Based Purchasing Information Management system (PIMS) is the sole contribution of: *Abdulfeta Shukra, Diribi Hailu, Fedila Shamil* and *Firaol Gutema.* No part of the project work has been reproduced illegally (copy and paste) which can be considered as Plagiarism. All referenced parts have been used to argue the idea and have been cited properly. We will be responsible and liable for any consequence if violation of this declaration is proven.

Date: _____

Group Members:

Student Full Name	Signature
_____	_____
_____	_____
_____	_____
_____	_____

Approval Form

This is to confirm that the project report entitled “Purchasing Information Management System for Wolkite Univerisity” submitted to Wolkite University, College of Computing and Informatics Department of Computer Science by: Abdulfeta Shukra, Diribi Hailu, Fedila shamil, Firaol Gutema is approved for submission.

Advisor Name	Signature	Date
Department Head Name	Signature	Date
Examiner 1 Name	Signature	Date
Examiner 2 Name	Signature	Date
Examiner 3 Name	Signature	Date

Acknowledgment

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List of Abbreviations

Abbreviations	Description
BR	Business rule
CSS	Cascading Style Sheet
DBMS	Data Base Management System
HTML	Hyper Text Markup Language
MYSQL	My Structured Query Language
PHP	Personal Home Page
PIMS	Purchasing information management system
WKU	Wolkite University

Abstract

The purchasing system is a process used by an organization to buy products and services encompassing purchase from requisition and purchase order through product receipt and payment. In The existing system the receiving, collections of purchasing needs and records of materials are on paper. Purchasing is very record-intensive. The tasks involved are generally tedious, repetitive, and lend themselves to computerization even though the records may be complex and arranged in complicated ways. The general objective of the project is to develop web-based purchasing information management system for Wolkite University. Our project work made use of data collected from the Wolkite University, materials, and journals from various authors and system will develop to effectively achieve the aims of this project. It will be developed in PHP as back-end technology and HTML, CSS, and JAVASCRIPT as front-end technology and all of the data need for the application is stored in the form of tables in phpmyadmin. In conclusion, all the objectives and recommended for all Purchasing user in Wolkite University and this could serve as a model for other university.

CHAPTER ONE

1. Introduction

The purchasing system is a process used by an organization to buy products and services encompassing purchase from requisition and purchase order through product receipt and payment. Purchasing systems are a key component of effective inventory management in that they monitor existing stock and help organizations determine what to buy, how much to buy and when to buy it [1].

Purchasing is the function in a firm responsible for the professional management of a firm's interface with the supply market, to ensure its supply with the necessary goods and services provided by other organizations, i.e. suppliers. Industrial firms spend more than half of their turnover on supplies, which is why the purchasing function has become a central success factor for modern firms.

Purchasing can be distinguished into strategic sourcing (supply planning, supplier selection, and contracting) and operative procurement (material ordering, expediting, and paying). The activities of a purchasing department can be organized in a purchasing year cycle, which repeats on an annual basis. Next to ensuring a safe and timely supply, purchasing has the target to achieve good costs as well as to contribute to innovation and improve the strategic position of a firm.

1.1 Background of the Organization

Wolkite University is one of the nine newly established as third-generation universities by the federal government of Ethiopia in 2004 E.C. The university is located in the Southern Nation Nationalities Regional State, in the Gurage Zone. The main campus is located in Gubrie sub-city, which is 12 km from Wolkite town [2]. There are four ways of purchasing materials in the WKU purchasing system. Those are:-

Direct purchasing:-this type of purchasing is conducted for materials that are not visible when you planed that are important for teaching and learning processes like chalk, duster, laboratory chemical, and so on. They take costs up to 5,000 birrs.

Proforma: - this purchasing is conducted for materials that are larger than direct purchasing in size that does not need a tender and takes a cost of up to 200,000 birrs.

Restricted tender:-conducted when the suppliers are limited. Take a cost of up to 1.5 million birr. The tender is opened for sufficient times in order to get many competitors at the national and international level.

Level-II Tender:-this is conducted when we do not know the specifications of the material that we want to purchase and allow for different suppliers to announce their materials specification after this, we can select the specification that we want and we can select a supplier among themselves or another one. It is difficult and boring, and so in this project, the team will try to solve this problem by automating the system.

The mission of Wolkite University

- To produce graduates who are knowledgeable, attitudinal in nature, and practically innovative.
- To supply relevant and demanded technology and knowledge that address national and community level development problems to help make operations of the government and non-government organizations efficient, effective and competitive.
- To provide training and consulting services to the community and the government.

Vision of Wolkite University

- To be one of the leading Applied Sciences University in Ethiopia by 2022 E.C.

1.2 Statement of problem

In The existing system the receiving, collections of purchasing needs and records of materials are on paper. Purchasing is very record-intensive. The tasks involved are generally tedious, repetitive, and lend themselves to computerization even though the records may be complex and arranged in complicated ways. Generally in the existing system the following main problems exist.

- ✓ Less in sharing information and customer services because every work is done manually due to this the sharing of information is too low.
- ✓ Costly to produce reports it takes costs for paper and other writing materials to produce a report.
- ✓ Lack of security: means that all information is stored on paper for this reason the paper and all the purchasing information are lost.

- ✓ Duplication of data entry: - purchasing request is collected from each department many times.
- ✓ Data handling- is very tedious as the data is stored on paper and to search the required purchasing information.
- ✓ Generating a report is time-consuming and tedious as a report is generated by examining different documents on the recorded paper for this reason it is difficult and boring to generate a report for the concerned body.
- ✓ Categorizing the purchasing request is difficult.

1.3 Objectives of the project

1.3.1 General objectives

The general objective of the project is to develop web-based purchasing information management system for Wolkite University.

1.3.2 Specific objectives

Specific objectives are objectives that help to achieve the general objectives of the system. The specific objectives of the proposed system are:-

- ➢ Gather relevant data about the purchasing system in Wolkite University.
- ➢ Analyze and Identify problems in the existing purchasing system.
- ➢ Perform requirement definition and analysis for the new system.
- ➢ Design a system that considers the current condition.
- ➢ Design and develop a database for the system which stores all user's detailed documents.
- ➢ Test the performance of the system with real-time data prepared by the user and by the development team.
- ➢ Maintain and deploy the final product of the project.
- ➢ User manual preparation

1.4 Feasibility Analysis

We examined the feasibility of our study from different perspectives like, from its technical, operational, economical, and legal points of view.

- ➢ Determines the potential of the existing system.
- ➢ It is used to find out the problem of the existing system.

- To determine all goals of the new system.
- It finds all possible solutions to the problems of the existing system.

1.4.1 Operational feasibility

The proposed system allows replacing manual systems of WKU purchasing system to the web-based purchasing information management system and allows ease of searching of information. Hopefully, it is operationally feasible.

1.4.2 Technical feasibility

The system which we develop will be technically feasible. The system is technically feasible since the teams will develop it easily by using languages like HTML and simple programming languages like JavaScript. Also, the team use a relational database management system named as MySQL.

These languages are simple, open-source, and already known, so the team will develop the system easily. We will expect; that, the system can be operated in a simple way and all users can access easily by giving simple training for them. It doesn't require any technical expertise.

1.4.3 Political feasibility

The proposed system is politically feasible since it doesn't contradict government rule and regulations. In addition to this, the purchasing directorate and workers appreciate and accept the project ideas as well as they are ready to implement it. The project does not break the law that means all functionality supported in our system is legally allowed so the system is legally feasible.

1.4.4 Economic feasibility

The proposed system is not expensive. Since this project is going to be computerized system, there is reduction cost for material that use for manual operation such as cost of paper and pen, save time and make comfortable working environment for the users. Hence, our system is economically feasible.

Tangible benefits

Our new system gives tangible benefits that can be estimated in terms of money which means the benefit is real or actual rather than imaginary or visionary. For example, the system provides cost reduction /avoidance such as mobile card, paper, and reducing materials consumption.

Intangible benefits

The new system gives intangible benefits that cannot be estimated in money such as increasing work processing efficiency, Moral satisfaction for developers, error reduction, and increased flexibility, facilitating the activities, the purchasing workers and the user.

1.5 Scope and Limitation of the Project

1.5.1 Scope of the project

Scope defines the coverage areas of the project, activities, and operations done by the system. The project team needs to develop web-based purchasing information management system for wku. Currently, all wku purchasing activities are performed in a manual manner. The new system is developed only for Wolkite University. The new system keeps track of the main purchasing system activities such as to request, purchasing, reporting, addressing the output, and exchanging additional information.

- ❖ Our system does the following activities:-
- ✓ Collecting purchasing requests (needs) from each department, as well as colleges.
- ✓ Approving or rejecting purchasing requests based on the organization's business rules such as specifications of the material.
- ✓ Registering tender results and posting details of a winner.
- ✓ Post a notice to announce different departments, offices, and colleges to submit their purchasing needs.
- ✓ Generating timely reports to the concerned body.
- ✓ Registering the market detail of an item and modifying the market detail once in three months.

1.5.2 Limitation of the project

As there are some limitations like time, information, resource and other external factors.

- ✓ The system does not include payment.
- ✓ Our system provides purchase information to only for Wolkite university.

1.6 Significance of the project

After implementation, our system delivers different functions for wku staff workers that involve in the purchasing system. Currently, this system operates on a manual system. With the introduction of this web-based computerized system, the following benefits are achieved.

- ✓ Reduce resource wastage because purchasing requests are collected online and it does not need paper.
- ✓ It saves manpower as users sent their purchasing requests online.
- ✓ Save time to accomplish any task because all tasks are done online.
- ✓ Make tasks simple and efficient to generate timely reports.
- ✓ Creates satisfaction to the user as the workload is reduced.
- ✓ Generating reports within a short period of time to the concerned body.
- ✓ It facilitates faster decision-making for purchasing managers.
- ✓ Facilitates easy searching of purchasing information.

1.7 Beneficiary of the Project

There are two beneficiaries from the new system

1. Team members

The project initiates our team to get knowledge of how to develop the required system
And the team get a lot of experience of solving the problem while they are facing some difficulties.

2. Wolkite University

In the manual system, there is a loss of materials like paper, a costly pen, uses more manpower, and also it takes more time. But the system reduces the loss of costly materials and manpower. It has great importance for all offices that serve the purchase system because the system facilitates their job effectively and efficiently.

1.8 Methodology of the Project

1.8.1 Data Collection Tools/Techniques

- ❖ **Interview**

  The project team use direct interview techniques to get information about current flow of work by interviewing key workers such as purchasing directorate, purchasing team leader, approval committee as they told as the system uses manual way, to store

purchasing information by paper generally they have no computerized system to perform their task.

- **Direct observing**

  To gather relevant information the project team observes how the current system works. As we observe the approval committee out the tender and they agree with the supplier to buy the machines.

- **Document analysis**

  The project team tried to discover written documents about the purchasing areas relevant to the project. For example we get rules that the purchasing directorate gives from soft copy analysis.

1.8.2 System Analysis and Design

Here for the analysis of our project, we have selected the object-oriented system analysis and design method specifically UML (Unified Modeling Language) model. We have select this because of the following advantages: -

- ✓ To simplify the design and implementation of a complex program.
- ✓ It is known by the group members.
- ✓ To enable a high degree of reusability of designs and of software codes.
- ✓ Increase reusability.
- ✓ Ease of modification and extensibility of object-oriented models.
- ✓ Increased consistency among analysis, design and programming activities.
- ✓ Improved communication among users, analysis, design, and programming.

1.8.3 System Development Model

The model that is basically being followed is the iterative model. Since, to design this project we will required to review and redesign in each phase iteratively to meet user requirements.

We use Iterative Model because: -

- ✓ Repeating every step after every cycle of SDLC process.
- ✓ Software is first developed on a very small scale.
- ✓ On every next iteration, more features and modules are designed, coded, tested, and added to the software.
- ✓ Every cycle produces software, which is complete in it and has more features and capabilities than that of the previous one.

1.8.4 System Testing Methodology

We use the four types of testing, those are unit testing, integration testing, validation testing, and system testing.

Unit testing: We will use unit testing for our project, unit tests focus on each component individually, ensuring that it functions properly as a unit.

Makes heavy use of white-box testing techniques, exercising specific paths in a module control structure to ensure complete coverage and maximum error detection.

Integration testing: We will use integration testing for our project; in integration testing components must be assembled or integrated to form the complete software package. Integration testing addresses the issues associated with the dual problems of verification and program construction.

Validation testing: We will use validation testing for our project; validation testing provides final assurance that software meets all functional, behavioral, and performance requirements.

System testing: We will use system testing for our project, because system testing verifies that all elements mesh properly and that overall system function or performance is achieved.

1.8.5 Development Tools and Technologies

- ✓ PHP is a server-side scripting technology that enables scripts (embedded in web pages) to be executed by a XAMP server.
- ✓ PHP is a program that runs inside XAMP server in all OS.
- ✓ Database Environment: MYSQL is a typical environment for constructing relational databases.

1.8.5.1 Front-end technologies

- **HTML**:to define the content of web pages
- **CSS**:to specify the layout of web pages
- **JavaScript**:to program the behavior of web pages
- **Bootstrap**:to develop responsive website

1.8.5.2 Back-end technologies

- **Apache Server: -** to compile the sever side scripting language
- **MYSQL DBMS: -** server to compile SQL queries and store data
- **PHP**: - for server-side scripting language

1.8.5.3 Documentation and Modeling Tools

We use the following software tools:

• **Microsoft office word 2010:-**To write the documentation

• **Microsoft PowerPoint 2010:-**For presentation at the end of the project

• **E-draw max:-**to draw different UML diagrams such as use cases, sequence diagrams, activity diagrams, class diagrams…….and so on.

1.8.5.4. Deployment Environment

- ✓ PHP programming language and Notepad++ and sublime text editors.

1.9 Document organization

This sub section of our project consists of five chapters and its descriptions shortly:

Chapter One: Introduction of the whole Project: This chapter focus on the reason for studying the problem selected should be listed. Project works already done in that area should be mentioned also it studies about the significance of our project. Additionally, the problem area and motivation to the need for our project work is mentioned.

Chapter Two: Description of the Existing Systems: It describes the exercising system how it works in detail wisely, to describe the users and their responsibilities in the existing system. Describe the exercising system major functions. In this chapter describe the existing system disadvantages and many more difficulties to work well. Also it studies about business rules of the existing System.

Chapter Three: Proposed System: This chapter studies about the overall description of our proposed system, functional requirements, and non-functional requirements of our project (Purchasing information management system).

Chapter Four: System Analysis: It studies about use case model, object model and dynamic models of the proposed system.

Chapter Five: System Design: It describes about design goals, current and proposed software architecture, Hardware/software mapping, Persistent data management and Access control and security.

CHAPTER TWO

2. DESCRIPTION OF EXISTING SYSTEM

2.1 Introductions of the Existing System

The current purchasing management system of Wolkite University is a manual (paper-based) system that needs intensive human labor, resource, consume time, less secure. This leads to a very inefficient and awkward way of storing records greatly slow down the flow of critical information as well as makes looking up information time-consuming.

Generally the existing system has their own hierarchy to request and purchase what they want. For instance, when departments want to buy items, they request to colleges and the colleges organize purchase needs and send to the purchase directorate, then they plan to buy what they requested; notice a bid to Suppliers.

2.2 Users of the existing system

The following are major users in the existing system.

- **Department head, College dean**
  - ✓ Request purchasing needs.
  - ✓ Check the purchased items.
  - ✓ Receive the item based on their request and materials specification.
  - ✓ Register the withdrawing form (model20).
- **Purchasing directorate**
  - ✓ Group purchasing requests based on item type.
  - ✓ Plan for purchasing activities.
  - ✓ Post purchasing related notices.
- **Approval committee**
  - ✓ Approve/reject the request that comes from college administrator.
  - ✓ Evaluate the winner.
  - ✓ Evaluate the plan.
- **Purchasing team**
  - ✓ Open the tender.
  - ✓ Register the winner.
  - ✓ Takes an agreement with the supplier.

- ✓ View market detail that comes from market study team.
- ✓ Post bid notice.
- ✓ Post bid result.

❖ **Market study team**

- ✓ Study (register) the market means that the price of the items.
- ✓ Announce market detail to purchasing team.
- ✓ Modify market detail.

❖ **Purchasing workers**

- ✓ Purchase the identified items.
- ✓ They involve in direct purchasing.
- ✓ Address the purchased materials inventory department.
- ✓ Report to purchasing team if the material is not found in the market.

❖ **Suppliers.**

- ✓ Fill the price and detail of the item that he/she supplies.
- ✓ Supply the materials if they are selected as a winner.
- ✓ Taking agreement with purchasing team.
- ✓ Apply for the tender or register to be among competitors.
- ✓ View the result of the tender that he/she was participate.

❖ **Property administration team**

- ✓ Registering the purchased items that they receive from the supplier.
- ✓ Store purchased items.
- ✓ Distribute the purchased items to colleges, cafeteria, clinic and librarys.

❖ **Quality assurer**

- ✓ Assure quality of the supplied item.
- ✓ View the items that the supplier supplies.

❖ **Finance officer**

- ✓ View model 19 that the supplier is received from inventory department.
- ✓ View tender result.

❖ **College administrator**

- ✓ View purchasing requests that comes from each departments.
- ✓ Send those requests to purchasing directorate.

❖ **Student Cafteria, Wolkite University Specialized Hospital, students Clinic,Librarys**

- ✓ Request purchasing needs.
- ✓ Check the purchased items.
- ✓ Receive the item based on their request and materials specification.
- ✓ Register the withdrawing form (model20).

2.3 Major Functions of the Existing System

The current purchasing system in wolkite university performs the following major function manually:-

- ✓ Register employee information.
- ✓ Generate report.
- ✓ Request purchasing needs.
- ✓ Study market detail.
- ✓ Post bid notice.
- ✓ Post bid result.
- ✓ Plan for purchasing activities.
- ✓ Making an agreement with Suppliers.

2.4 Forms and Other Documents of the Existing Systems

As we represent (Figure A.1) the manual system use this form to take over the process of purchasing materials.

2.5 Drawbacks of the Existing System

Registration related problem

- ✓ The employee's and supplier's registration is done manually. This, in turn, will result in poor techniques for handling the data. The Data can be lost or redundantly registered.

Information Problem

- ✓ Due to manual collecting of data, there are a redundant records and inconsistency problems.
- ✓ The inaccuracy of data and information may produce.
- ✓ Poor flow of information between different offices.
- ✓ Lack of a well-organized database system.

Data storage problem

- ✓ Data are not easily accessible due to its integration which is placed in different locations.
- ✓ Loss of data may occur.

Efficiency Problem

- ✓ The efficiency of the existing system is not optimal, because Storing, locating data of takes much more time.

Security and control problem

- ✓ The existing system can be accessed by an unauthorized person since it doesn't have any authentication and authorization system.

2.6 Business Rules of the Existing System

BR1: Departments, cafeteria, clinic, librarians, schools and colleges has to request purchase with the right specifications of materials.

BR2: Repeated the same material with different number in the same request form is impossible.

BR3: Request the material to purchase which is available in property administration team is forbidden.

BR4: The purchasing team can't analyze the request before the approval committee approve it.

BR5: The market study cannot do their activities unless they get organized request from the purchasing team.

BR6: Purchasing workers cannot purchase materials whose price is greater than the approved Performa.

BR7: Purchasing must be done after the validity of material is checked by the right expert.

BR8: department cannot receive unapproved purchases.

CHAPTER THREE

3. PROPOSED SYSTEM

Our proposed system is web-based purchasing information management system and solves the problems of the existing system. Because of this we have proposed to solve the problem of the existing purchasing system in Wolkite University by developing an automated purchase system. This means our proposed system will eliminate problems of the existing system by providing a centralized purchasing information management system.

The proposed system will give all information about the whole purchasing activities performed, and anyone who is authorized can access information without going to other offices which give information about it. Therefore, our proposed system hopefully eliminates the problems of the existing system.

3.1 Functional Requirements

Functional requirements are observable tasks or processes that must be performed by the system. Functional requirements describe the relations between the system and the user or the environment. Here the relation means the direct or indirect interactions between the user and the system.

The functional requirements of our proposed system include:-

- ✓ The system must record all purchase information.
- ✓ The system should retrieving the information of materials for the customer.
- ✓ The system should register employee
- ✓ The system shall record and group purchasing details of materials
- ✓ The system must manage username and password
- ✓ The system generate different reports
- ✓ The system shall a user give feedback
- ✓ The system market detailer register the market detail
- ✓ The system must request purchasing needs

- ✓ The system should approve or reject purchase request
- ✓ The system should register and post winner
- ✓ The system should modify market detail
- ✓ The system must view purchased item detail

3.2 Non-Functional Requirements

Nonfunctional requirements describe user-visible aspects of the system that are not directly related with the functional behavior of the system. In systems engineering and requirements engineering, a non-functional requirement is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors.

The non-functional requirement of our system is,

- ✓ **Control (security):** nobody can access the database without the authorized person, even if the authorized person must have a username and password to access the system.
- ✓ **Reliability:** the system provides correct information to the user, it retrieves the correct status of the student and staff members.
- ✓ **Usability:** the system is easy to use and to learn, because it has a full graphic user interface.
- ✓ **Efficiency:** the system has efficiency in terms of time and space and it has the capability of storing accurate data.
- ✓ **Performance:** the system performed all operations in a single of buttons and it retrieves the status of all purchase information.
- ✓ **Accuracy:** The level of accuracy in the proposed system is better due to the reduction of error. The system should give correct output for the users when they want to get services.
- ✓ **Error handling:** When the user makes some mistakes, the system responds that the error is occurred using easily understandable messages and allows the user to recover from the error.
- ✓ **Simplicity:** The system should be easy to use and simple to manipulate.

Generally, the Non-Functional requirements of the system can be viewed as follows:-

3.2.1 User Interface and Human Factors

The systems that we will develop support both infrequent users and expert user which means a moderate system to support both levels of skill. We will do such a thing by providing UI components, menus, and other interactive components in user-friendly manner.

As human factors, many different persons have different feelings and attitudes; so we will develop our systems user interface by selecting the best color which many will people supports and uses. This makes our system very interesting because users will use the system without frustration for a long period.

3.2.2 Hardware Consideration

Our system does not need any other hardware requirements rather than the existing standard desktop computer and laptops. The system will be portable that can be run on any type of computer and it supports any type of browser.

3.2.3 Security Issues

Our system use the access control security mechanism, password encryption, and the system provides authentication. The authentication includes username and password, and it gives access to the authorized person who has a username and password. When the administrator creates an account for the authorized user, the user gets a username and password through email. This protects the system from any unauthorized access.

Safety Procedures are available across the system and for all types of processes. Procedures that are easy to understand and easy to use significantly help manage the safety of your workplace. Therefore, we will control the safety of the system using backup mechanisms and updating basic newly released computer system software. The system must be secure because the frame-work we were used makes the system itself secure. Therefore, we will use access control mechanism in order to secure our proposed system.

3.2.4 Performance Consideration

The performance of our system is measured in terms of load time and response time. The system performance will be highly responsive because of query optimizing, normalizing tables,

and making client-side validation which is very important to check user's data validation before navigating to model or database and it support the concurrent user at a time.

3.2.5 Error Handling and Validation

Our system uses exception handling mechanisms to validate an error when it occurred and to develop robust software systematically. The system displays error messages if the user enters invalid input. This means that we will implement this system by validating at the front end and back ends; errors are handled from both sides easily.

3.2.6 Quality Issues

The quality issue is a defect, deficiency, or a significant variation in the products expected appearance or performance.

Create a quality issue quickly with only essential information such as Organization, Severity, and Source. Use the quality issue edit page to add more information such as workflow, proposed dispositions, and descriptions.

3.2.7 Backup and Recovery

Backup and recovery are the process of creating and storing copies of data that can be used to protect organizations against data loss.

The proposed system can be damaged or fail if there is a virus attack and continuous power disconnection from the source station and the data can be lost at that time. The system should be holding a backup of the data because database backup technology is available.

In general, the purpose of the backup and recovery strategy is to protect the database against data loss and reconstruct the database after data loss. Typically, backup administration tasks include the following:

- ✓ Planning and testing responses to different kinds of failure
- ✓ Configuring the database environment for backup and recovery
- ✓ Setting up the backup schedule
- ✓ Monitoring the backup and recovery environment
- ✓ Troubleshooting backup problems
- ✓ Recovering from data loss if the need arises

3.2.8 Physical Environment

As we know the system is web-based, so to use the system their existing local area network in the Wolkite University and use host IP addresses connect to the internet.

3.2.9 Resource Issues

Our purchasing information management system needs the resource to deploy the system. Resource like internet connection, database server, application server, and a client computer.

3.2.10 Documentation

The System has a well-defined document that helps to easily maintain the system and we will also prepare a short and precise help file on how to use the system for the system users. It will have a helping page to guide the user of the system and to show the process of how they will have to use it.

CHAPTER FOUR

4. SYSTEM ANALYSIS

4.1 System Model

System modeling helps the analyst to understand the functionality of the purchasing information management system. The model is composed of three individual models: -

The functional model: represented by use case and Scenario

The system object model: represented by classes and objects diagrams

The dynamic model: represented by, a sequence diagram, activity diagram and state chart diagram based on new system was proposed.

4.2 Use Case Model

An actor is an idealization of an external person or object process or thing that interacts with the system, subsystem, or class. The identified actors that will be participating in the system are:

- Purchasing Directorate
- Suppliers
- Finance office
- Property administrator
- Market detailer
- Directorate:- Student dean, College dean
- Units: - department, cafeteria, clinic, dormitory, library
- System administrator

4.2.1 Use Case Diagram

A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved. A use case diagram can identify the different types of users of a system and the different use cases and will often be accompanied by other types of diagrams as well. The use cases are represented by either circles or ellipses.

The identified Use Cases in the system are: -

- View purchased item
- Post Biding
- View purchasing request
- Modify market detail
- Register employee
- Register their detail
- Register model-20
- Register model-19
- Approve/reject Request
- Post notice
- Register market detail
- Manage account
- Take back-up
- Modify their detail
- View notice
- View model-19

Figure 4. 1 describes the overall use case diagram of PIMS which going to be developed. The PIMS that we will develop has eight actors and each actor has different use cases such as View request, register employee, manage account, View notice, and like.

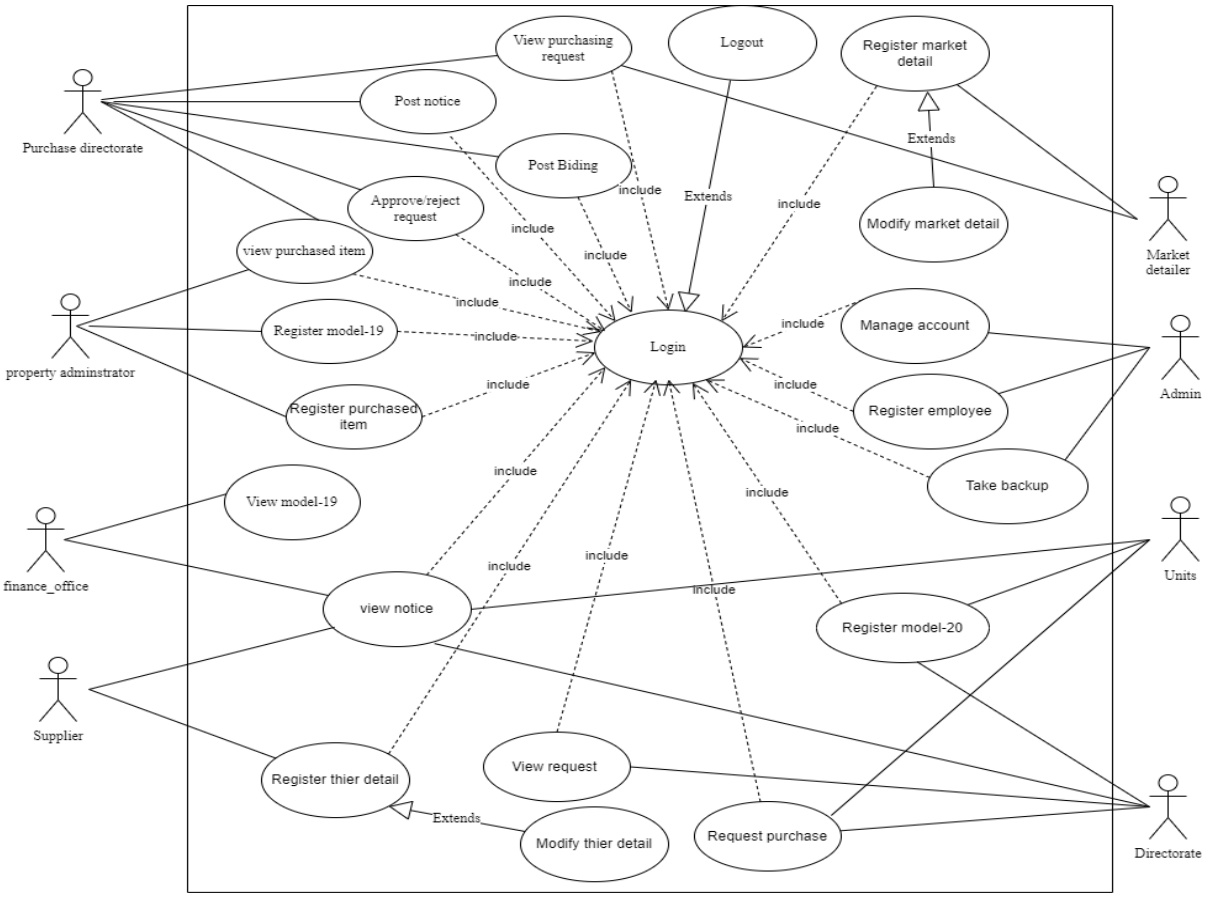

Figure 4.1 Use case diagram of PIMS

4.2.2 Use case description

A use case is an interaction between users and a system. It captures the goal of the users and

The responsibility of the system to its users. It is the functionality of the system or the service provided by the system [2].

Table 4.1describes how the actors interact with login use case, state about pre-conditions to act with login, actor action and system response, and it state what happened finally.

Table 4.1 Login Use case description

Use case Name	**Login**	
Actor	Purchasing Directorate, Suppliers, Property administrator, Market detailer, Units, System administrator,Finance_Officer, Directorate	
Description	Authenticate the user to use the system.	
Pre-conditions	Users must have a valid user name and password	
Basic course of action	Actor action	System response
	1. Users, who are authenticated, must go to the home of the web application. 2. The user clicks the login menu. 4. Users fill out the form (user name and password) and Login.	3. The system will displays login the page. 5. The system will check for the validity of the username and password from the database. 6. The system will display (enter) the homepage. 7. End-use case
Alternative course of action	A: The entered user name and password are not valid it returns to the basic flow of event 3. B: If the user forgets the password or user name, a reset password link appears and the user can reset the password.	
Post condition	The user successfully login into the system.	

Table 4.2 describes about interaction between manage account use case and the actors that interact with the use case (manage account), actor action and system response, pre-condition, and post-condition.

Table 4.2 Manage account Use case description

Use case name	**Manage account**	
Actor	System administrator	
Description	To control a user's	
Pre-conditions	The admin must be an authorized to perform the operation	
Basic course of action	**Actor action**	**System response**
	1. The admin press the Account button 3. The admin select one of the option 5. The admin insert the user name or ID and press search button. 7. The admin can manage the searched ID.	2. The system will display the users account option 4. Then the system will allows the Admin to search the account. 6. The system will display the information of the searched ID. 8. The system will display that the employee is successfully managed according to admin request 9. End-use case
Alternative course of action	A: Returns to basic flow of event 5. If the searched Id is not found the system display that the searched ID was not found in the system.	

	B: Returns to basic flow of event 6. Go to basic flow of event 4.
Post-condition	Then the user's information in the database will be updated.

Table 4.3 describes about the interaction between request purchase use cases and its actors as well as pre-condition, actor action, system response, alternative action, and finally post-condition.

Table 4.3 Request purchase Use case description

Use case:	**Request purchase**	
Actors:	Units, directorate	
Description	To ask or request purchasing needs to be purchased to satisfy their needs	
Pre-conditions:	A person must interact with the login page.	
Basic course of action:	User action	System action
	1. The actor press on Request purchase button. 3. The actor fill a form and press submit button.	2. The system will display request purchase form.
Alternative course of action	If the actor enters incorrect username and password the system displays an error message	
Post conditions:	If the material is present in inventory department within needed amount the system should give a message which says it is present in inventory department otherwise the system says the request is successfully it is send to purchasing directorate.	

Table 4.4 describes about the interaction between a post notice use case and its actor, user action, system response, alternative course of action, and post conditions.

Table 4.4 Post notice Use case description

Use case:	**Post notice**	
Actors:	Purchasing directorate	
Description	To post notice online to ask to submit their purchasing need at the end of each year for the next year purchasing activities	
Pre-conditions:	Purchasing directorate should interact within the login page	
Basic course of action:	User action	System action
	1. Purchasing directorate interact with post notice button. 3. Purchasing directorate write notice and post it.	2. The system display post notice page.
Alternative course of action	If the username and password is incorrect the system display incorrect username and password message.	
Post conditions:	The purchasing directorate successfully post the notice to the concerned body.	

Table 4.5 describes about interaction between approve/reject purchase request use case and the actors that interact with the use case, actor action and system response, pre-condition, and post-condition.

Table 4.5 Approve/reject purchase request Use case description

Use case:	**Approve/reject purchase request**
Actors:	Purchasing directorate
Description	To approve or reject different purchasing requests

Pre-conditions:	Purchasing directorate must interact with the login page	
Basic course of action:	User action	System action
	1. Purchasing directorate click on approve or reject purchase request button.	2. The system approve (accept) or reject the request.
Alternative course of action	If username and password is incorrect the system stays on the login page	
Post conditions:	1. Calculate total budget and decide whether it is enough to buy or not and if the budget is sufficient they approve the request otherwise they reject it. 2. Check whether the item is present in the inventory department or not with a needed amount and quality. If the item is present they reject the request unless they approve it.	

Table 4.6 describes about interaction between register market detail use case and the actors that interact with the use case, actor action and system response, pre-condition, and post-condition.

Table 4.6 Register market detail Use case description

Use case:	**Register market detail**	
Actors:	Market Detailers	
Description	To register and announce market detail of item that has to be purchased.	
Pre-conditions:	Market Detailers must interact to the login page	
Basic course of action:	User action	System action

	1. Market Detailers interact with Register market detail use case. 2. Market Detailers register, then submit it.	2. The system display Register market detail page.
Post conditions:	Announce the price of each item to the purchasing team.	

Table 4.7 describes about interaction between modify market detail use case and the actors that interact with the use case, actor action and system response, pre-condition, and post-condition.

Table 4.7 Modify market detail Use case description

Use case :	**Modify market detail**	
Description	To update the market detail in 3 months	
Actor	Market Detailer	
Pre-condition	The market Detailer must login with his/her self-account(username and password)	
Basic course of action	Actor action	system action
	1.market detailer interact to login page 3.market detailer enters username and password	2.the system displays the login page 4.if username and password is correct the system loads to user page 5.else back to step 2

Alternative course of action	If the user enters incorrect username and password the system should display please enter correct username and password
Post condition	Market study team announces or posts the market detail of each and every item

Table 4.8 describes about interaction between register winners use case and the actors that interact with the use case, actor action and system response, pre-condition, and post-condition.

Table 4.8 Register winners Use case description

Use case :	**register winners**	
Actor	Purchasing directorate	
Description	To register the winner among several suppliers	
Precondition	The purchasing team must login with his/her username and password to register the winner's detail.	
Basic course of action	**Actor action**	**system action**
	1. Purchasing directorate interact to login page 3.Purchasing directorate enters username and password 5. Purchasing directorate selects the supplier who presents the item with best price that means not much expensive price of the item	2.the system displays the login page 4. If username and password is correct the system displays the registration form.
Alternative course of action	If the user enters incorrect username and password the system should display please enter correct username and password	
Post condition	The Purchasing directorate registers the details of the winner	

Table 4.9 describes about interaction between register employee use case and the actors that interact with the use case, actor action and system response, pre-condition, and post-condition.

Table 4.9 Register employee Use case description

Use case name	**Register employee**	
Actor	System administrator	
Description	The administrator register employees with their records.	
Pre-conditions	They must be authorized to perform the operation	
Basic course of action	**Actor action**	**System response**
	1. The Actor click the Register button. 3. The Actor select the wanted option to register new employee. 5. The admin fill their information and press register button.	2.The system will displays the option 4. Then the system will display the wanted registration form according to the admin request 6. The system will display that the data was successfully recorded to the system.
Alternative course of action	A: If the information filled is not valid displays "Enter valid information ".	
Post condition	Registered successfully.	

Table 4.10 describes about interaction between register logout use case and the actors that interact with the use case, actor action and system response, pre-condition, and post-condition.

Table 4.10 Logout Use case description

Use case:	**Logout**
Actors:	Purchasing Directorate, Suppliers, Property administrator, Market detailer, Students dean, College dean, Units, System administrator
Description	To exit from the system
Pre-conditions:	*Actor should interact with login.*
Basic course of action:	1. Actors click on logout icon 2. The system makes the user out of the system
Post conditions:	The users become out of the system.

Table 4.11 describes about interaction between register purchased item use case and the actors that interact with the use case, actor action and system response, pre-condition, and post-condition.

Table 4.11 Register purchased item Use case description

Use case name	**Register purchased item**	
Actor	Property administrator	
Description	The Property administrator register purchased item that received from supplier.	
Pre-conditions	The Property administrator must be authorized to perform the operation.	
Basic course of action	**Actor action**	**System response**

	1. The actor click the Register button. 3. The actor fill their information and press register button.	2. The system will displays the registration form. 4. The system will display that the data was successfully recorded to the system. 5. End-use case.
Alternative course of action	A: If the information filled is not valid displays "Enter valid information ".	
Post condition	Registered successfully.	

Table 4.12 describes about interaction between view purchased item use case and the actors that interact with the use case, actor action and system response, pre-condition, and post-condition.

Table 4.12 View purchased item Use case description

Use case name	**View purchased item**	
Actor	Property administrator	
Description	The Property administrator view purchased item that stored in inventory.	
Pre-conditions	The Property administrator must be authorized to perform the operation.	
Basic course of action	**Actor action**	**System response**
	1. The actor click the view item button.	2. The system will displays the stored items.

Alternative course of action	A: If the information filled is not valid displays “Enter valid information “.	
Post condition	To check the items which stored on inventory department.	

Table 4.13 describes about interaction between take backup use case and the actors that interact with the use case, actor action and system response, pre-condition, and post-condition.

Table 4.13 Take backup Use case description

Use case:	**Take backup**	
Actor	System administrator	
Description	The system administrator take backup to recover data after its loss from data deletion or corruption, or to recover data from an earlier time.	
Pre-conditions	System administrator must be authorized to perform the operation.	
Basic course of action	**Actor action**	**System response**
	1. The actor click on back-up button to recover	2. The system will back-up a database to other place.
Alternative course of action	A: If the information filled is not valid displays “Enter valid information “.	
Post condition	To recover database	

4.3 Object Model

Object diagrams are also closely linked to class diagrams, just as an object could be viewed as an instance of a class. It could be viewed as instances of a class diagram. Each object is represented as a rectangle, which contains the name of the object and its class underlined and separated by a colon.

4.3.1 Class Diagram

Class diagrams are fundamental to the object modeling process and model the static structure of a system. Depending on the complexity of a system, you can use a single class diagram to model an entire system, or you can use several class diagrams to model the components of a system. Class diagrams are the blueprints of your system or subsystem. You can use class diagrams to model the objects that make up the system, to display the relationships between the objects, and to describe what those objects do and the services that they provide. You can use class diagrams to visualize, specify, and document structural features in your models.

- Class diagrams show classes, attributes, and operations or methods.
- A class is shown as a rectangle
- Attributes may include the type of data and any initial value.
- Methods are usually public.

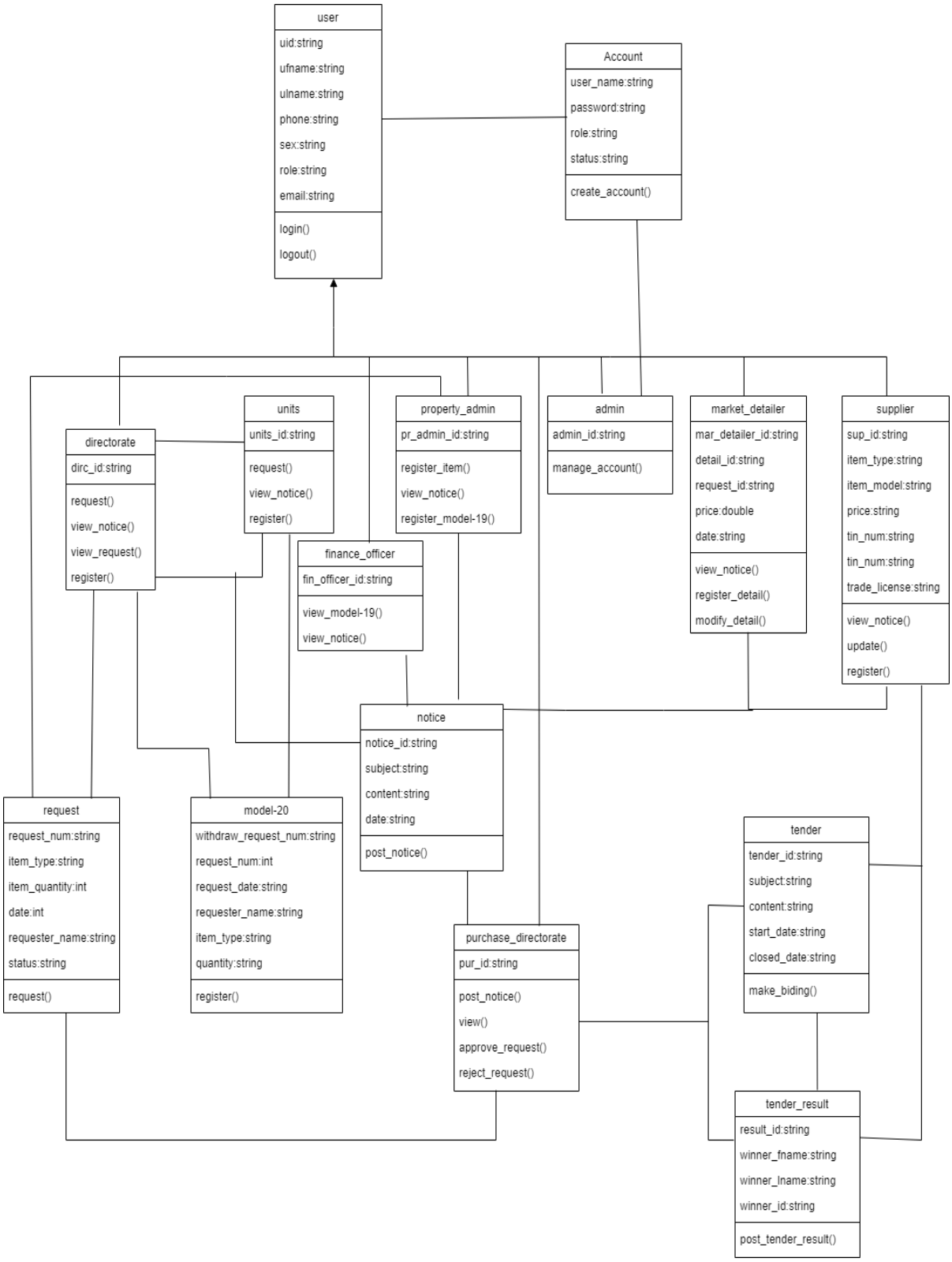

Figure 4.2 class diagram of PIMS

4.3.2 Data Dictionary

Table 4.14 Account data dictionary

Attributes	Data type	Data size	Key constraint	Constraint
User name	String	20	Primary key	Not Null
password	String	20		Not Null
Role	String	20		Not Null
status	String	20		Not Null

Table 4.15 user data dictionary

Attributes	Data type	Data size	Key constraint	Constraint
U_id	String	20	Primary key	Not Null
U_fname	String	20		Not Null
U_lname	String	20		Not Null
U_phone	String	20		Not Null
U_role	String	20		Not Null

Table 4.16 Market detailer data *dictionary*

Attributes	Data type	Data size	Key constraint	Constraint
Market_detail_id	String	20	Primary key	Not Null
Request_id	String	20		Not Null
price	String	20		Not Null
date	String	20		Not Null

Table 4.17 Notice data dictionary

Attributes	Data type	Data size	Key constraint	Constraint
notice_id	String	20	Primary key	Not Null
subject	String	50		Not Null
content	String	200		Not Null
Start date	String	20		Not Null
End date	String	20		Not Null

Table 4.18 Supplier data dictionary

Attributes	Data type	Data size	Key constraint	Constraint
supplier_id	String	20	Primary key	Not Null
fname	String	20		Not Null
lname	String	20		Not Null
sex	String	20		Not Null
phone	String	20		Not Null
email	String	20		Not Null
Item type	String	20		Not Null
Item model	String	20		Not Null
Quantity	int	20		Not Null
Price	int	20		Not Null
Tin number	int	20		Not Null

Trade license	String	20		Not Null
Status	String	20		Not Null

Table 4.19 Tender data dictionary

Attributes	Data type	Data size	Key constraint	Constraint
tender_id	String	20	Primary key	Not Null
subject	String	20		Not Null
content	String	20		Not Null
Post_date	String	20		Not Null
Closed_date	String	20		Not Null

Table 4.20 Tender result

Attributes	Data type	Data size	Key constraint	Constraint
tender_id	String	20	Primary key	Not Null
Winner_fname	String	20		Not Null
Winner_lname	String	20		Not Null
Post_date	String	20		Not Null
Winner_id	String	20		Not Null

Table 4.21 directorate data dictionary

Attributes	Data type	Data size	Key constraint	Constraint
Dirc_id	String	20	Primary key	Not Null

fname	String	20		Not Null
lname	String	20		Not Null
phone	String	20		Not Null
email	String	20		Not Null

Table 4.22 Request data dictionary

Attributes	**Data type**	**Data size**	**Key constraint**	**Constraint**
Request_num	String	20	Primary key	Not Null
Item_type	String	20		Not Null
Item_quantity	String	20		Not Null
Specification	String	100		Not Null
date	int	20		Not Null
Requester name	String	20		Not Null
Status	String	20		Not Null

4.4 Dynamic Model

4.4.1 Sequence Diagram

A sequence diagram is a form of interaction diagram which shows objects a lifeline running down the page time and their interactions over their represented or message arrows. For example, Arrows shows from the source lifeline to the target lifeline. The Sequence shows objects communicating with each other and what messages trigger those communications [2]. As we try to show in Figure 4.3 the sequence of interaction diagram of creating account use case. The sequence of the action in this use case describes that if the system actors open the system the home page display and the actor selects the Account link from the login page then the account controller display the account form. The system actor fills the account form. After

the user clicks the account button the account controller validates the data from the database. If the data is filled correctly the system respond to a successful registration message.

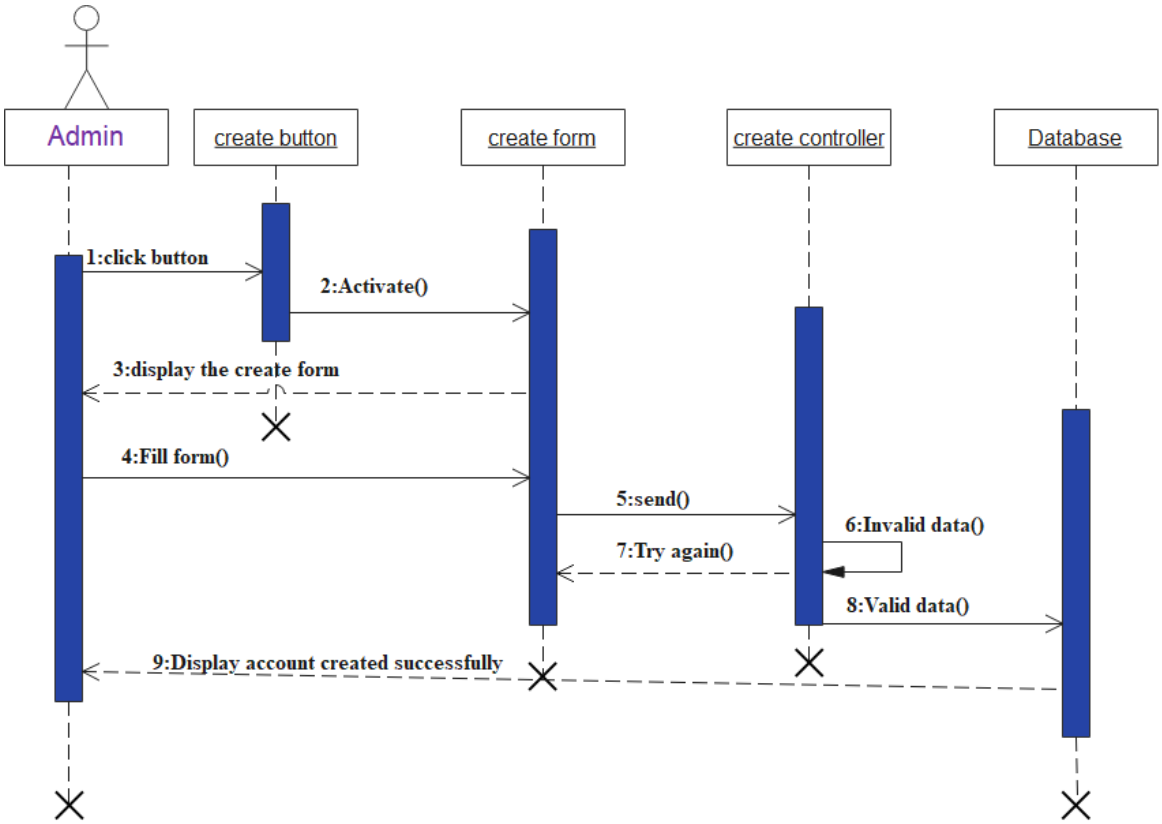

Figure 4.3 Create an account sequence diagram

Figure 4.4 describe the sequence diagram of search use case in our system. First the actor inter in to home page and click search button then the actor search information want to see by using Id number.

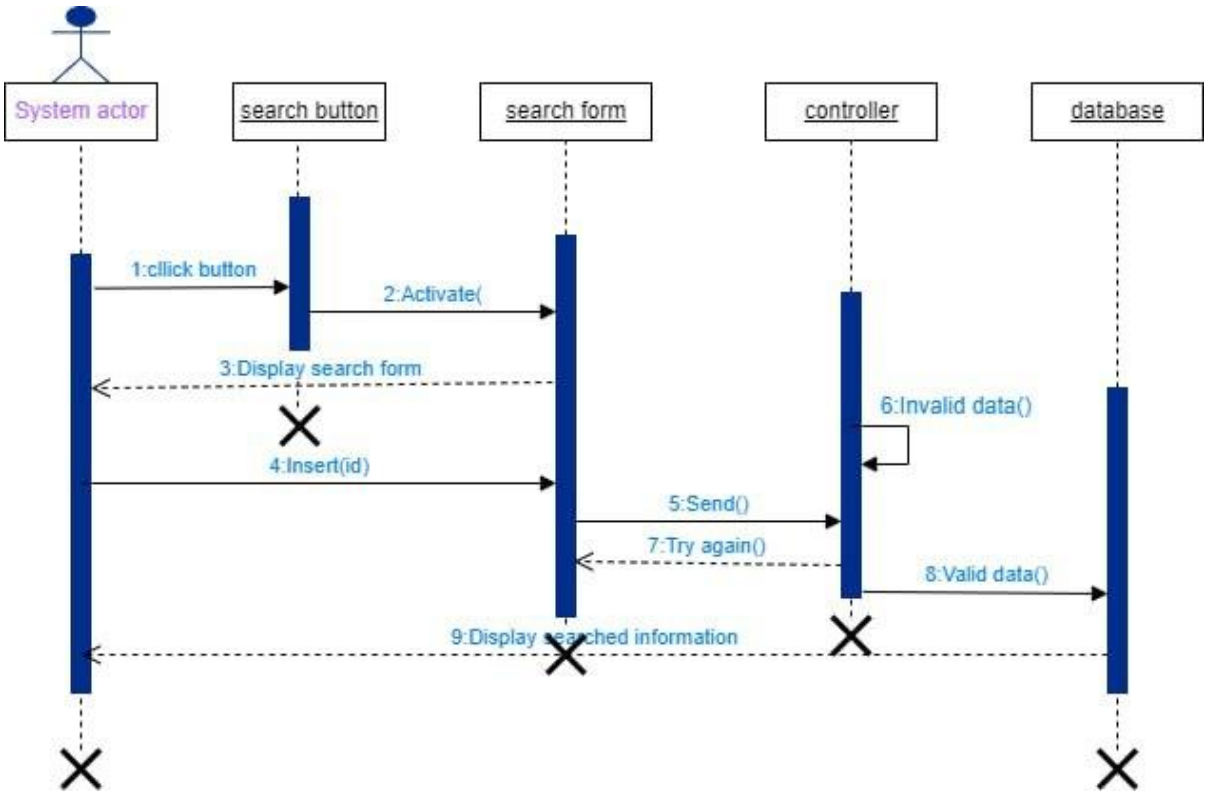

Figure 4.4 Search sequence diagram

Figure 4.5 describe about how the system admin register the officer into the system. The system admin will add detail of new officer and register controller add information into database.

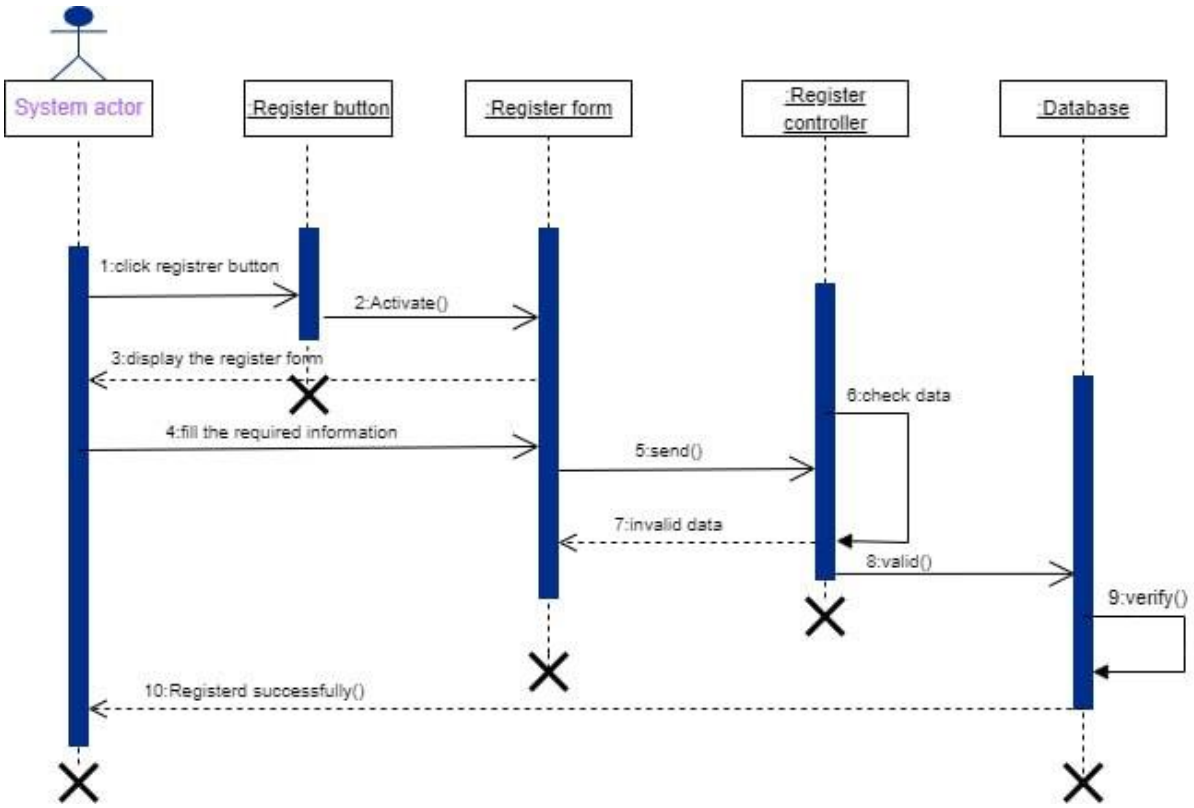

Figure 4.5 Register sequence diagram

4.4.2 Activity Diagram

It is used to understand the flow of works that an object or component performs and visualize the interaction between different use cases. The activity diagram depicts the logic for how someone to do the system. In the activity diagram the field circle indicates the starting point of the activity and the field circle with a border represents the end point of activity [3].

Figure 4.6 describes the login activity of our system, if the user wants to login in to the system they must enter valid user name and password then successfully login.

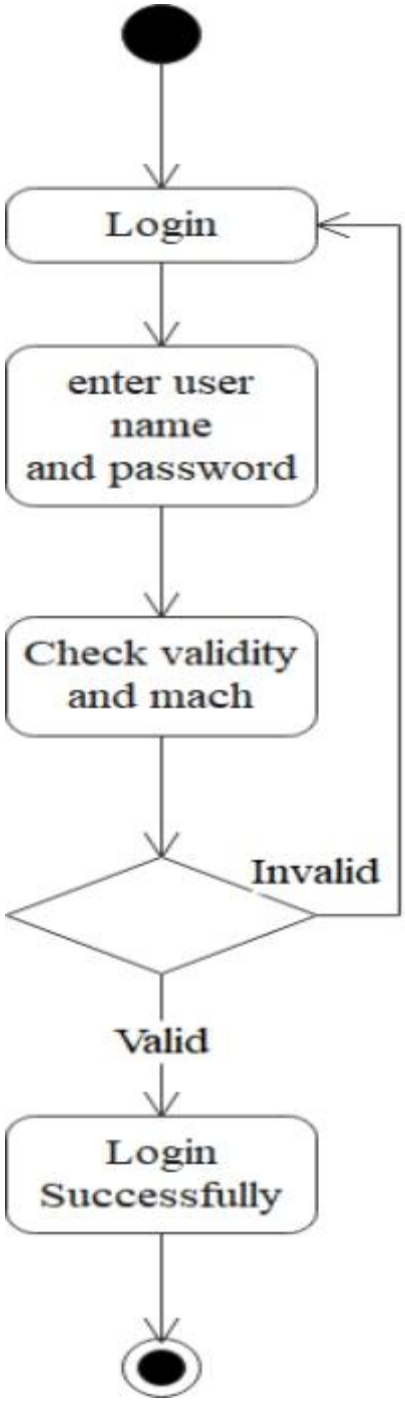

Figure 4.6 Login activity Diagram

Figure 4.7 describes the Search activity of our system, if the officer wants to search employee information he/she enters Emp_ID, then if an ID is found employee information should be displayed else error message.

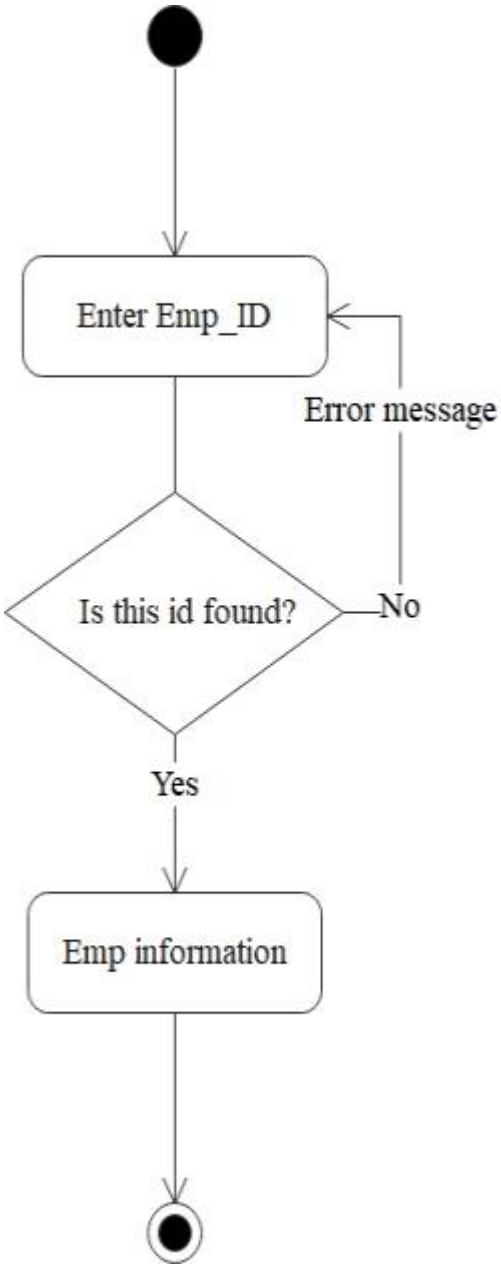

Figure 4.7 Search activity Diagram

CHAPTER FIVE

5. SYSTEM DESIGN

The system design describes what must be done to the selected services to support the interactions. It includes: The way the service will be used to provide the repository of data, how programs will be developed to give users access to the data, the interface that is needed to support interactions in the system, how services will be integrated.

The purpose of PIMS is to facilitate the purchasing system and give efficient service at the right time.

5.1 Design Goals

Describes the important system qualities and defines the values against which options are evaluated (i.e. it describes the qualities of the system that developers should optimize). The objectives of design are to model the system with high quality. Implementing a high-quality system depends on the nature of design created by the designer. If one wants to changes the system after it has been put in-to operation depends on the quality of the system design. So if the system is designed effectively, it will be easy to make changes to it.

The design goals of our system are:

User interface: **-** PIMS should be easy to use and guides users how easily they use the system. The GUI design of Wolkite University web-based purchasing information management system shall be user friend. The functionalities of Wolkite University web-based purchasing management system also arranged in a module based on the similarities of their function that used for users to use the system easily.

Hardware Consideration: - the system we will develop compatible with any standard computer server by making a responsive interface.

Security: **-** Unauthorized access to the system of web-based purchasing management systems should be restricted. Hence, security will be implemented to prevent an unauthorized persons from accessing the Wolkite web-based purchasing management system. There are groups with different privilege levels are defined in the purchasing management system. Users and also the administrator belongs to a specific group will be given a password and user name to access the

system at the privilege of his/her group. We will use the secret key password encryption mechanism.

Performance: - the performance of the system is depending on the time required to perform a given task and memory required for that task so the following factors increase system performance. Avoiding redundancy of codes increases the time of operation and memory space of the system.

PIMS should respond fast with high throughput, i.e. it should perform the task quickly because we use efficient algorithm to develop it.

Error Handling and Validation

The system is expected to handle errors encountered during run time. Errors could rise from users and the system. Errors that occurred from the wrong doing of users will be handled by appropriate exception handling mechanisms. Generally, if an error occurs, the system will identify the error and notify the user so that he/she can take the appropriate corrections rather than terminating the system.

Quality Issues: Since the system is used for the purchasing process it is related with the resource control of the university such as paper and time so it should be accurate, robust and reliable.

Requirement for reliability and it includes:-

- ✓ **User requirements-**the system should be work as the requirements of the users.
- ✓ **System portability**-the ability to work on a different personal computer and mobile phone.

Backup and Recovery: The process of backing up refer to making copies of data so that these additional copies may be used to restore the original after a data loss event. These additional copies are typically called "backups." Backups are useful primarily for two purposes. The first is to restore a state following a disaster (called disaster recovery). The second is to restore small numbers of files after they have been accidentally deleted or corrupted. Data loss is also very common. So that our system uses incremental back-up and Recovery in order to restore the data base after lost it.

Physical Environment

Our System's server must be put in a place that has high security room. And the client must put in the local area it must connect with the server.

Documentation: The System has well-defined document which helps to easily maintain the system and we will also prepare a short and precise help file on how to use the system for the system users. It will have a helping page to guide the user of the system and to show the process how they will have to use it.

5.2 Current System Architecture

In this recent period Wolkite University uses manual system for purchasing information management system. Because of this, the university doesn't use any software architecture.

5.3 Proposed System Architecture

The proposed system is expected to replace the existing manual system by an automated system in many aspects. It is mainly based on the system analysis document. The architecture used for WKU web-based purchasing information management system is a 3 tier client/server architecture where a client can use Internet browsers to access provided by the system using the Internet. Three-tier architectures consist of three components distributed in 3 layers: client, application server and database.

- ✓ The client layer contains UI (User Interface) part. This layer takes input and gives Output to the user.
- ✓ The middle tier (web/application server) is between the database layer and the Presentation layer. A web server is a program that runs on a network server (computer) to respond to HTTP requests. The most commonly used web servers are Internet Information Server (IIS) and Apache. HTTP is used to transfer data across the Internet. It is the standard protocol for moving data across the internet.
- ✓ The database layer will be more secure and the client will not have direct access to the database.

Figure 5. 1 Proposed System Architecture

5.3.1 Subsystem Decomposition and Description (component diagram)

A subsystem decomposition, the activity of identifying subsystems, their services, and their relationships with each other. Subsystem decompositions will help reduce the complexity of the system. Subsystem decomposition for Wolkite University web-based purchasing information management system is needed to make the system clear and understandable by dividing the whole system into subsystems and components. In the subsystem decomposition, we try to show the relationship between each component. Subsystem decomposition of Wolkite University web-based purchasing information management system refers to the process by which a complex system is broken down into parts that are easier to understand, program, and maintain. The major subsystems identified as following:-

Registration management subsystem

- Register purchased item
- Register user
- Register model-20
- Register model-19
- Register market detail

Account management subsystem

- Create account
- Update account

- Activate account
- De-activate account

View management subsystem

- View purchasing request
- View notice
- View model-19
- View purchased item

Request management subsystem

- Send request
- Approve request
- Reject request

Notice management subsystem

- Post notice
- Post biding

Database Connection Subsystem: this subsystem used for established connection between class and database management system.

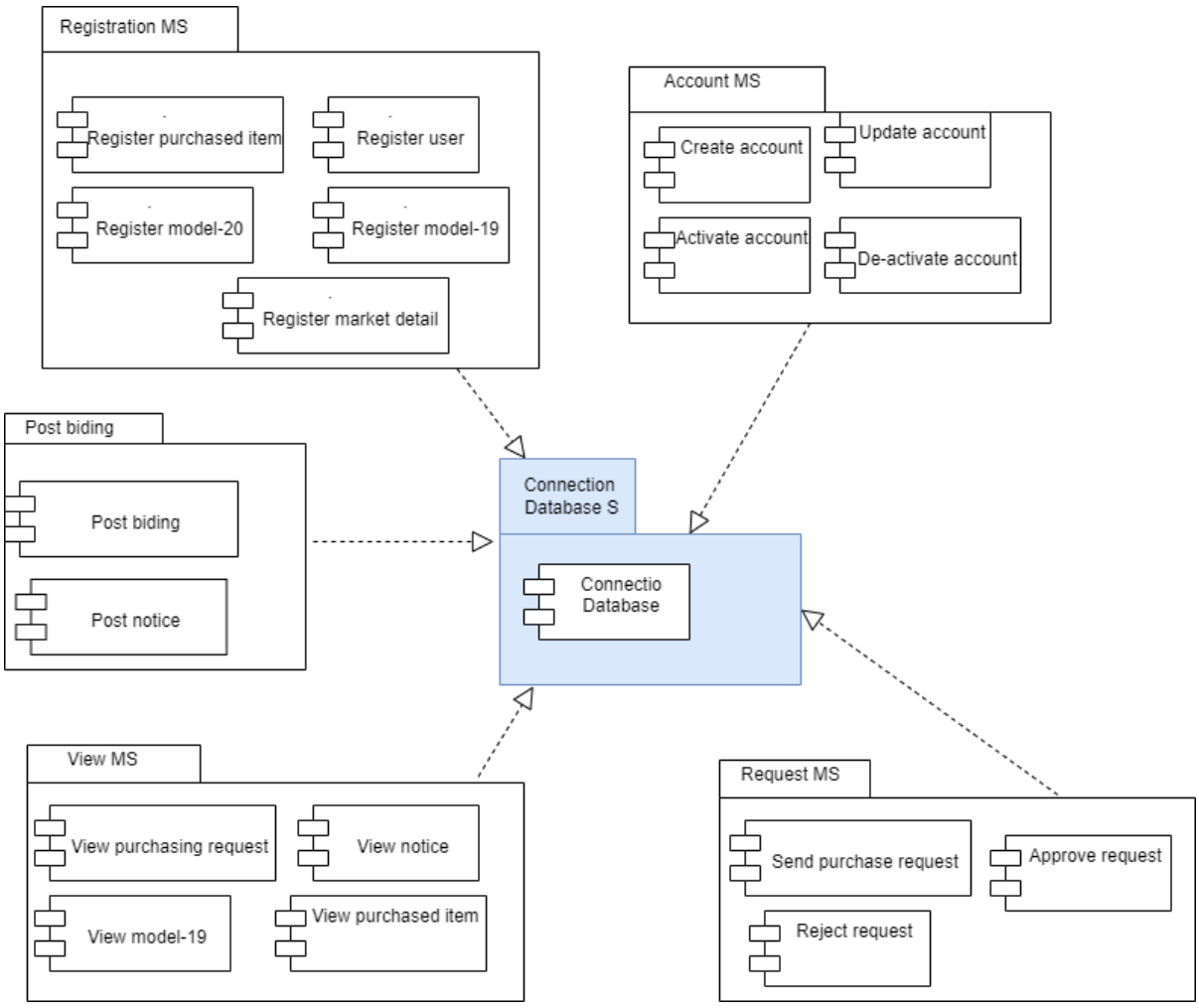

Figure 5. 2 component diagram

5.3.2 Hardware/Software Mapping

UML deployment diagram of a web-based purchasing information management system is an implementation diagram that shows the structure of a run-time system. From it, we can learn about the physical relationships among software and hardware components and the distribution of components to processing nodes. Use a deployment diagram to show the structure of the run-time system and communicate how the hardware and software elements that make up an application to be configured and deployed. The deployment diagram shows how the software components, processes, and objects are deployed into the physical architecture of the system. It shows the configuration of the hardware units and how the software components are distributed across the units.

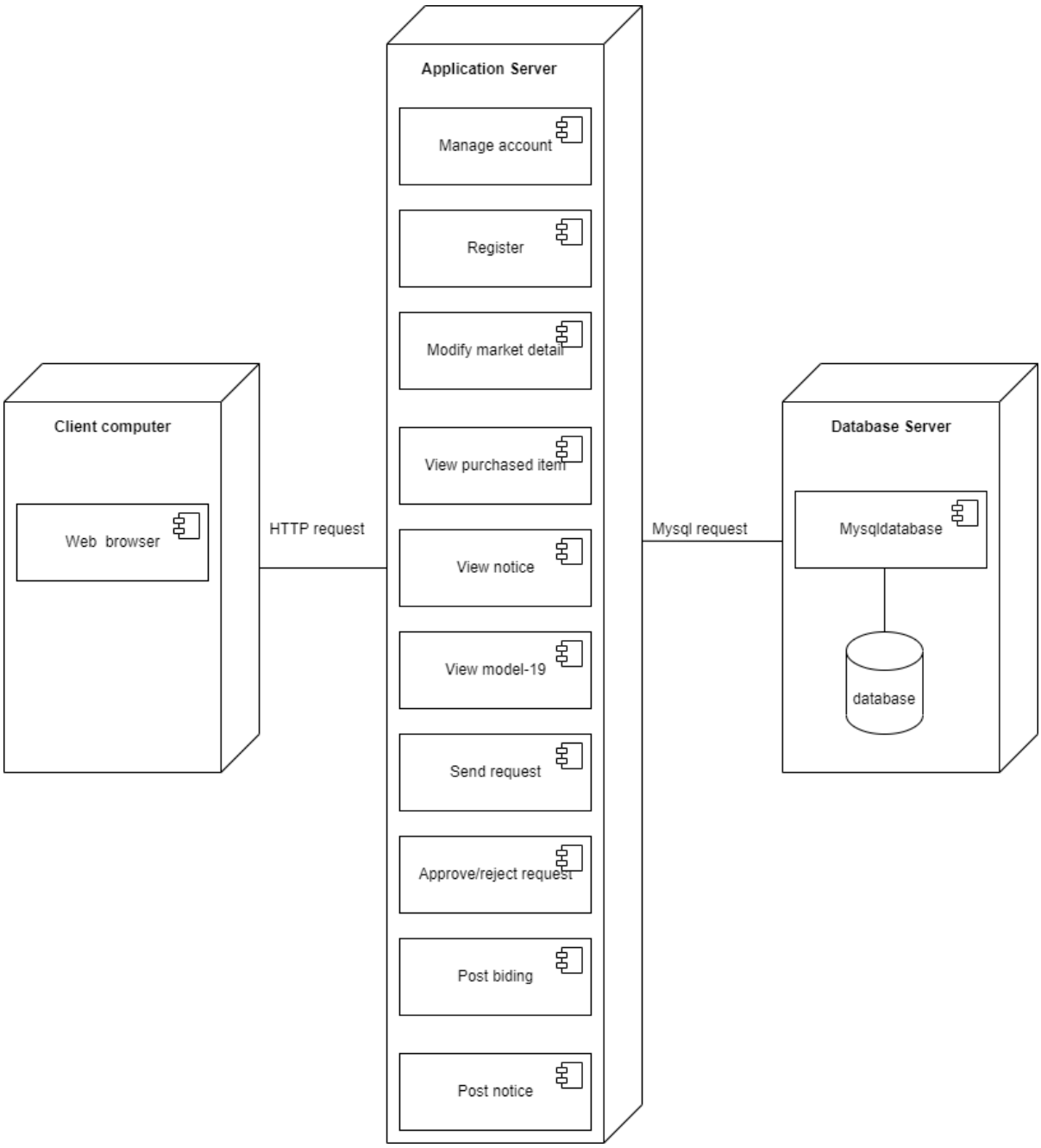

Figure 5. 3Deployment diagram

5.3.3 Detailed Class Diagram

The detail class diagram is the main building block of object-oriented modeling. It is used for general conceptual modeling of the structure of the application, and for detailed modeling translating the models into programming code. Class diagrams can also be used for data modeling.

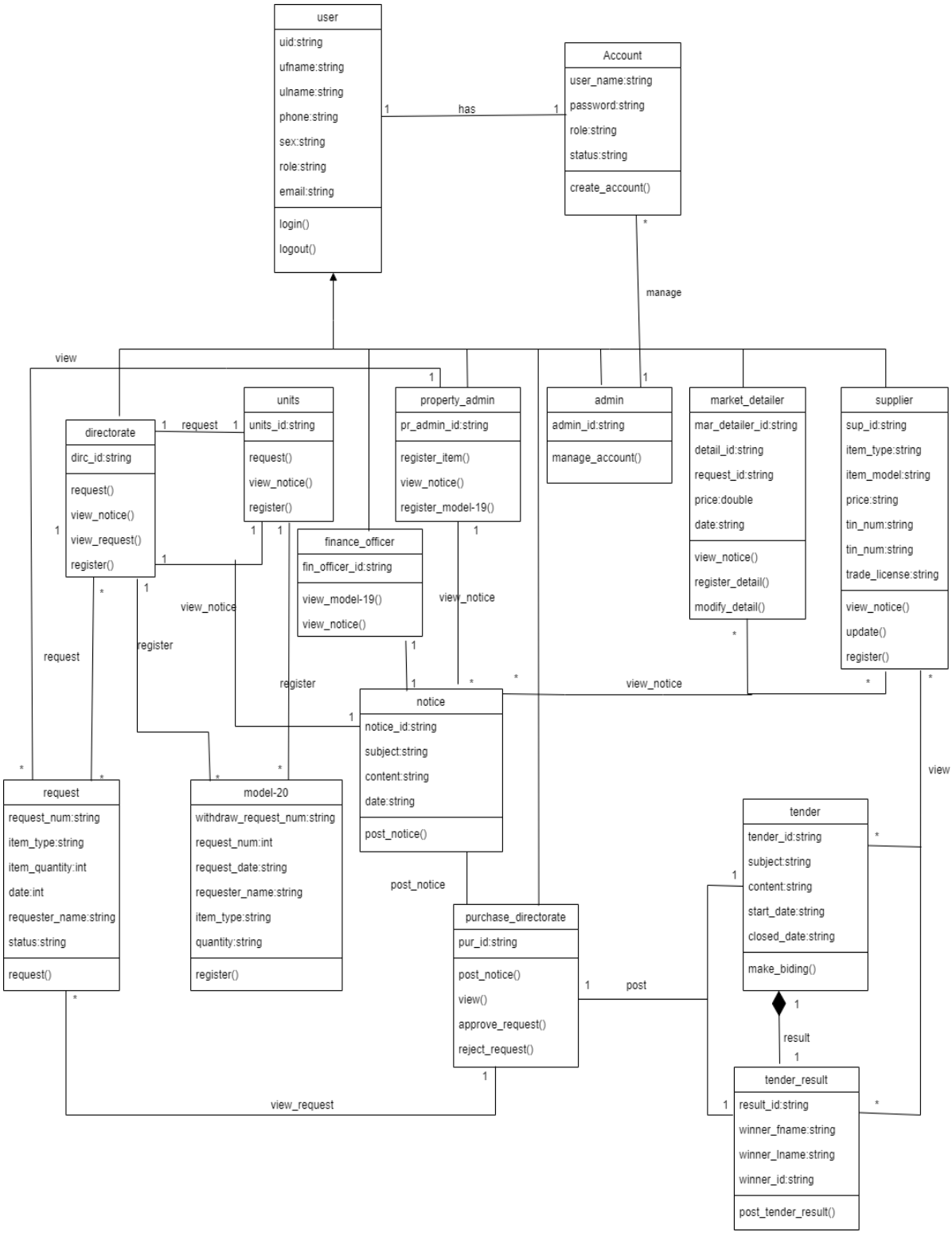

Figure 5. 4 Detailed Class Diagram

5.3.4 Persistent Data Management

Persistent modeling deals with how the persistent data that is the files with a database are stored and managed. The overall information of the purchasing information management system is the persistent data. So it must be stored on a secure database system. The persistence classes are used to store the most important and permanent information of the system. The new proposed systems have several systems and the persistent data of these systems will be stored in the MySQL database. The following tables indicate the persistence of data management that are used in our PIMS.

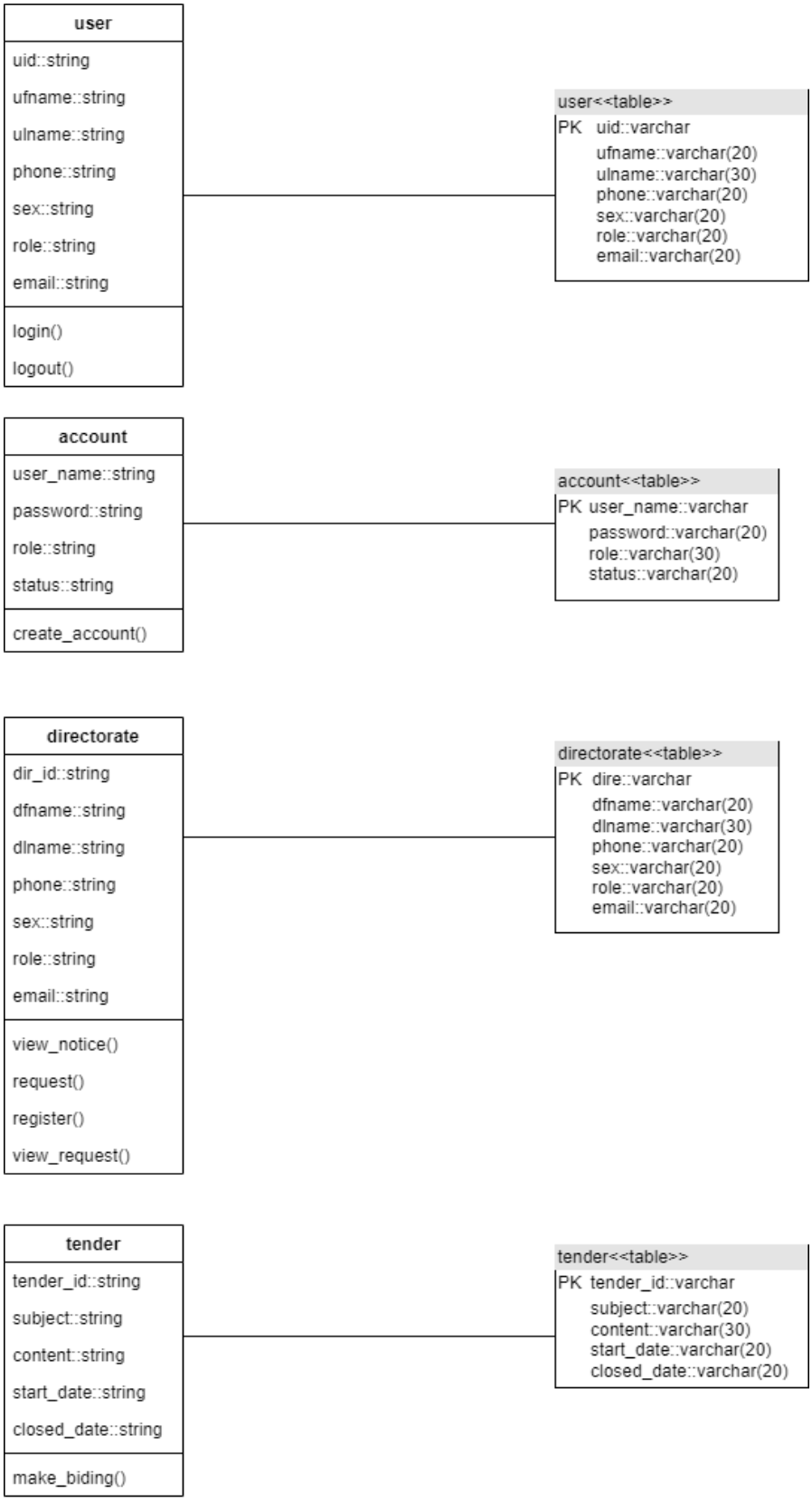

Figure 5. 5 Persistent Data Management

5.3.5 Access Control and Security

In our system, different actors have access to different information and data. Access control and security specify which users are granted access and certain privileges to systems, resources or information. This access control is verified by a username and password. The system authenticated the user. In a multi-user system, different actors have access to different functions and data. The PIMS has the following: -

Table 5. 1 Access Control and Security

Actor	**Operation**							
	Manage account	Register	Request	Modify	Approval	post	Take back Up	view
System Admin	✓	✓		✓			✓	
Purchasing directorate					✓	✓		✓
Supplier		✓		✓				✓
Property admin		✓						✓
Market detailer		✓						✓
Student dean		✓	✓					✓
College dean		✓	✓					✓
Units		✓	✓					✓
Finance								✓

5.4 Packages

Here we are trying to show our system's package diagram that describes the decomposition of subsystems into packages and the file organization of the code. This includes an overview of each package, its dependencies with other packages, and its expected usage. In the previous section we were trying to define the sub-system of our system, in this part we are going to describe the dependency of each subsystems to another sub system that is found in the same package.

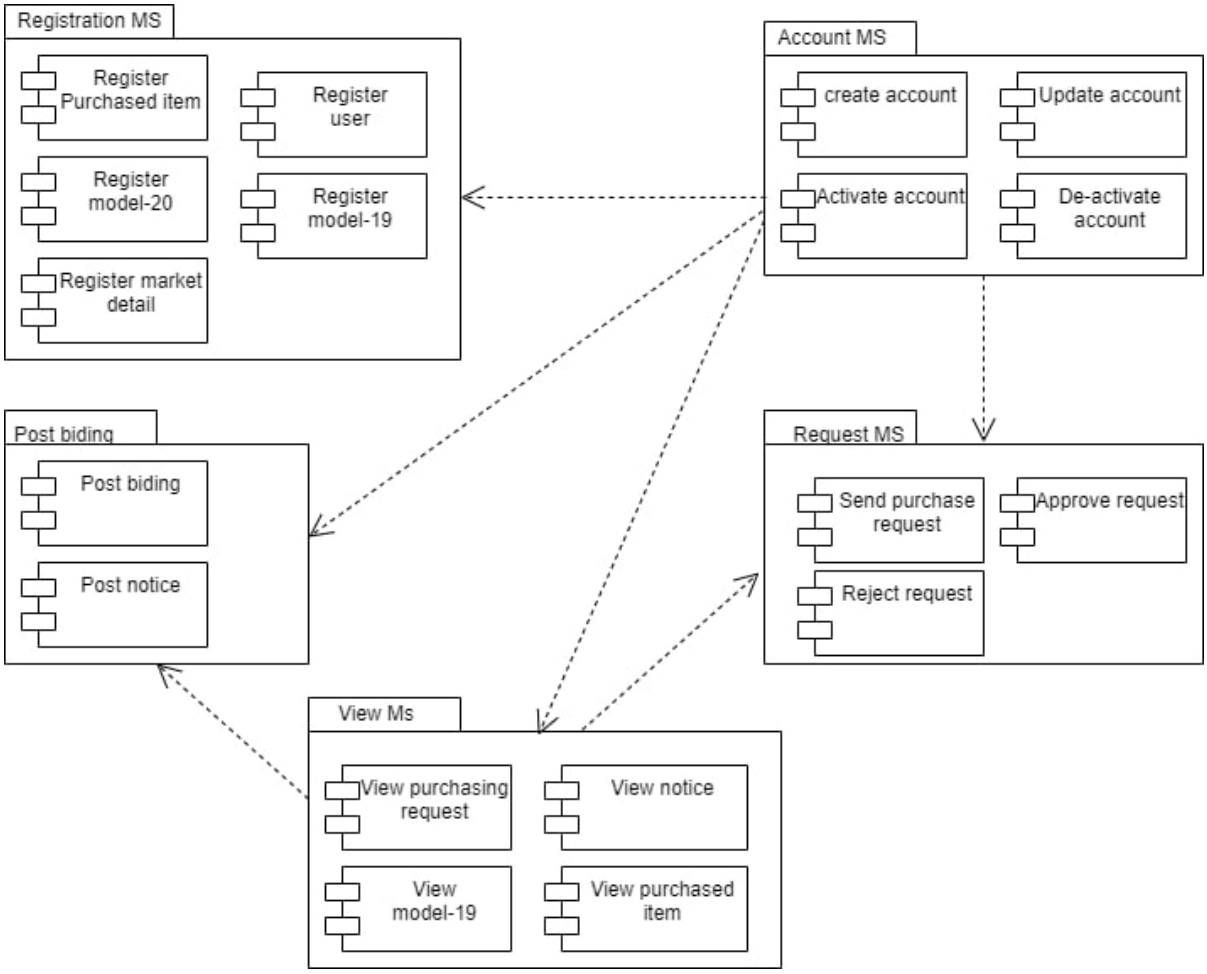

Figure 5. 6 Package diagram

5.5 Algorithm Design

An algorithm is a procedure or formula for solving a problem, based on conducting a sequence of specified actions. It is a step-by-step process carried out to solve the given problem.

Algorithm use when supplier register their detail

```
Begin
If supplier click Register detail
        Display register form
        Then supplier fill register form
        If(valid)
                Send information to data base
                eIf information exist on database
                        Display your detail already exist
                Else
                        Display message successful submition
        Else
        Display error message
        End if
        End if
End if
End
```

Algorithm use when department request purchasing

```
Begin
If department_head  click Request Purchasing
      Display request form
      Then admin fill request form
      If(valid)
              Send information to data base and
              Display message successful requested
     Else
     Display error message
     End if
     End if
End if
End
```

5.6 User Interface Design

Our goal in user interface design is to make the user's interaction as simple and efficient as possible, in terms of accomplishing user goals. Graphical user interface design is utilized to support its usability by allowing users to interact with the new system through graphical icons and visual indicators.

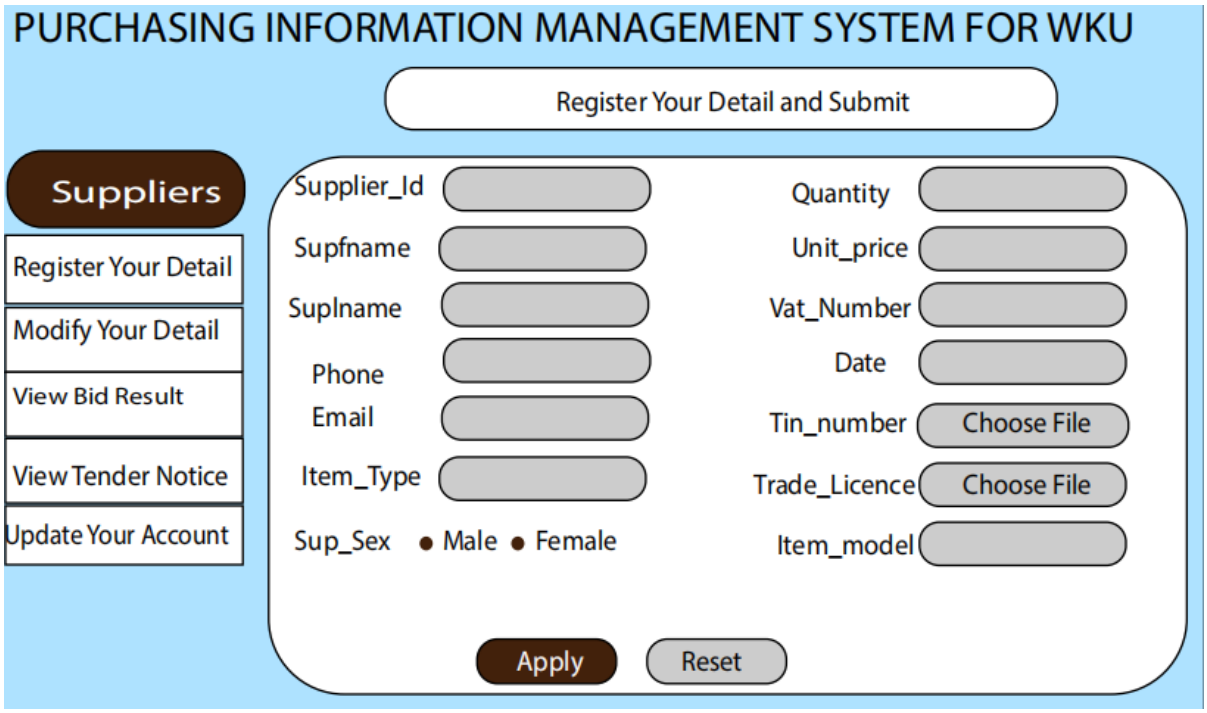

Figure 5. 7 register supplier detail user interface

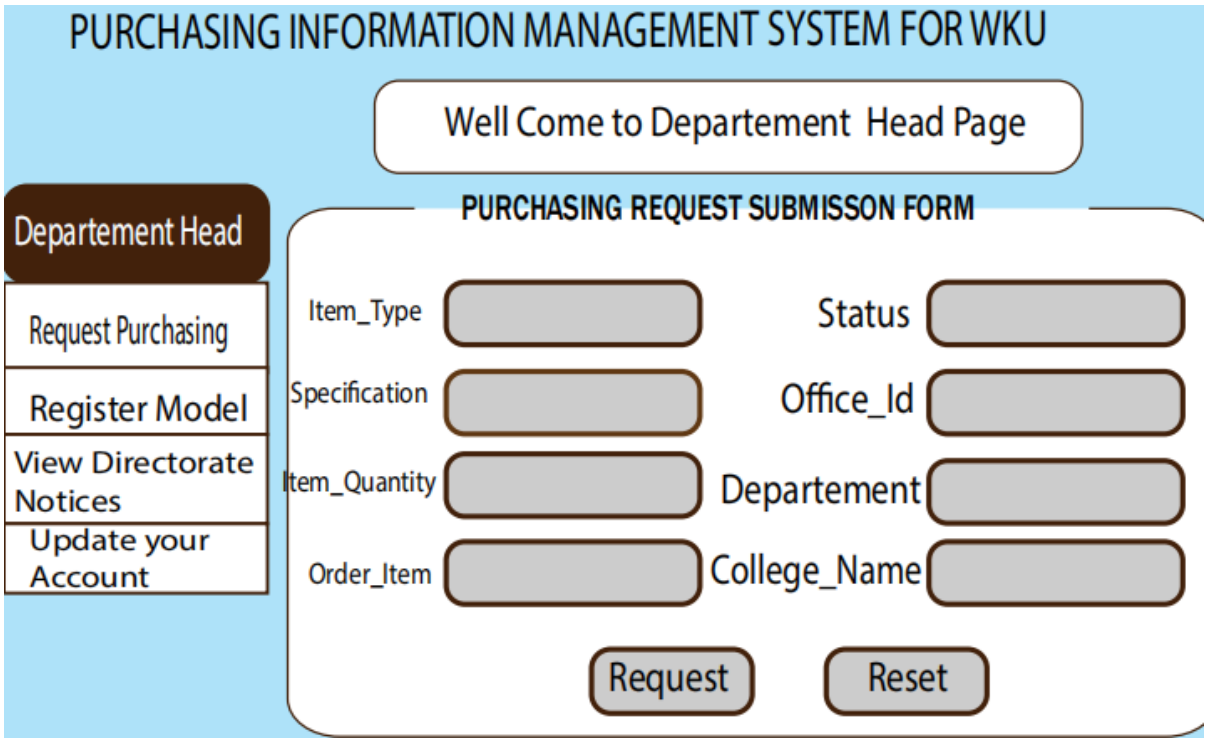

Figure 5. 8 request purchase user interface

CHAPTER SIX

6. IMPLEMENTATION AND TESTING

6.1 Introduction

Implementation refers to the coding of the all documents gathered starting from requirement analysis to Design phase. To implement this system the user must have a server and client computer on which the system will be hosted. From the testing sides, since the system is web based and accepts appropriate inputs from the users as well as each and every code are tested specifically and universally, for the testing purpose we have used both black box and white box testing procedure. Black box testing is a testing technique that ignores the internal working of the system and focus on the output generated against any input and execution of the system. White box is a testing technique that takes into account the internal mechanism of the system.

6.2 Implementation of the Database

In order to develop our system, we use mysql database the reason to choose this data bases are:-

It is open source, reliable, compatible with all major hosting providers, cost-effective, and easy to manage.

6.3 Implementation of the Class Diagram

There is class diagram in our project it includes attributes for user username its data type varchar, Last name its data type varchar, Password its data type varchar, Role its data type varchar, type its data type varchar, Id its data type varchar and contains the visibility public for user name implemented by using PHP language.

6.4 Testing Tools and Environment

For the project implementation the Following Software and hardware are used.

- **Hardware**
  - Computers: for client side and server-side Dell 780 OptiPlex with
  - laptop: we use it in dorm to do since it is portable, we use it every where

- Printer: To printing the documents
- Server**:** To create connection to the client computer (to host the system)

❖ **Software**

- Language: PHP, React, Express
- Editors:Sublime.
- Mysql Server
- Google chrome, fire fox, Microsoft Explorer (Browser).
- Window 10 operating system
- MS word 2016
- E draw max, lucid chart
- Front-end HTML,CSS
- Back-end PHP

6.5. Implementation of User Interface

User interface design is a process that tries to determine what a user might want from a system, and then provides the means to make that happen.

6.6 Testing

Software Testing is a method to check whether the actual software product matches expected requirements and to ensure that software product is bugs free. It involves execution of software/system components using manual or automated tools to evaluate one or more properties of interest. The purpose of software testing is to identify errors, gaps or missing requirements in contrast to actual requirements.

- Input output functions.
- Access privileged
- Database interaction.
- Create user account
- Graphical user interface

6.6.1 Test Case

In software engineering, a **test case** is a specification of the inputs, execution conditions, testing procedure, and expected results that define a single test to be executed to achieve a particular software testing objective, such as to exercise a particular program path or to verify compliance with a specific requirement.

6.6.2 Unit Testing

Unit testing is a type of testing in which individual units or functions of software testing. Its primary purpose is to test each unit or function. A unit is the smallest testable part of an application. It mainly has one or a few inputs and produces a single output. Some of the unit tests are Login

6.6.3 System Testing

System testing, also referred to as system-level tests or system-integration testing, is the process in which a quality assurance (QA) team evaluates how the various components of an application interact together in the full, integrated system or application.

6.6.4 Integration Testing

Integration testing (sometimes called **integration and testing**, abbreviated **I&T**) is the phase in software testing in which individual software modules are combined and tested as a group. Integration testing is conducted to evaluate the compliance of a system or component with specified functional requirements.

6.7 Configuration of the Application Server

- ✓ Properly start and shutdown the application server.
- ✓ Organize folders and files on the server properly.
- ✓ In our project we create purchasing folder, copy and paste in to project.
- ✓ Configure the server to work on from remote machine
- ✓ Configure the server to work on different port number.

6.8 Configuration of Application Security

Since our system involves storing of some personal data, we put some security mechanisms like unauthorized person cannot login into the system because the system requires a user name and password. Web application security is the process

of securing confidential data stored online from unauthorized access and modification. We have implemented all input validations properly in order to secure our system. Since the system developed to the users who may senior to computer or may professional to computer so all inputs must be implemented easily and sample to use.

When the user enters invalid inputs or empty, the system notifies to the user to inter valid inputs. In order to secure our system, we have been performed the following activities: -

- ✓ All inputs were validated properly
- ✓ User accounts was assigned with necessary access privileges
- ✓ Sessions was implemented.

CHAPTER SEVEN

7. CONCLUSION AND RECOMMENDATION

7.1 Conclusion

We have developed online Purchasing Information Management System for addressing some problems of users such us wastage of time and resource, loss of data, redundancy of data, difficulty to search a specific data and so on. To develop this system we use Object-oriented system analysis and design (OOSAD) is a software engineering approach that models a system as a group of interacting objects. And we use Unified Modeling Language (UML) for representing these models. Object-oriented analysis (OOA) applies object-modeling techniques to analyze the functional requirements for a system. Object-oriented design (OOD) elaborates the analysis models to produce implementation specifications. We use PHP language for back end and HTML markup language for front end and MySQL server as server during implementation of the system.

7.2. Recommendation

According to the scope of our project the teams develop this automated system. Because of the time constraints we may have some limitations which should be taken in considerations, but in the future the team believes to that the system can be fully operational by making some functionality that are not included in the proposed systems. During the development of this project the group members faced many challenges. However, by the cooperation of all group members work together and advisors there is now able to reach the final results in such away.

Finally the team would recommend that future work should be done on the system in order to make the system performs better for universities who would like to use our system.

References

[1] J. Ahmed, "puschasing system," [Online]. Available: https://www.google.com/search?q=what+is+purchasing+system&oq=what+is+purchasind+sys&aqs=chrome.1.69i57j0i13j0i22i30l8.19228j1j4&sourceid=chrome&ie=UTF-8. [Accessed 23 sep 2014].

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Appendix

A.1 forms used in an existing system

አ.ው.ሁ 30.1	አጠቃላይ የገንዘብ መጠን ብር 30,740,000(ሰላሳ ሚሊዮን ሰባት መቶ አርባ ሺ) ብርብቻ ነው።
አ.ው.ሁ 31.1	በድንበኝ ላይ የሚያስከትሉ ማናቸውም ሁኔታዎች በውሉ ዋጋ እና በማስረከቢያው ጊዜ ላይ ለውጥ አያስከትሉም።
አ.ው.ሁ 31.2	አቅራቢው በውል መሰረት ግዴታውን ሙሉ በሙሉ ወይም በከፊል አለመወጣን ሲረጋገጥ አቅራቢው ለውል ማስከበርያ ያስያዘው የውል ማስከበርያ ሙሉ በሙሉ በመስሪያቤቱ ሊወረስ ይችላል ።

አንቀጽ 4

የውል ሰጪ ግዴታዎች

1. ውል ሰጪ የቀረበለትን በመስፈርቱ መሰረት የቀረበ መሆናቸውን በባለሙያ አረጋግጦ የመረከብ ኃላፊነት አለበት።
2. መውል ሰጪ በውል መሰረት ገቢ ያደረገውን የእቃዎች ብዛት ተሰልቶ በአንድ ጊዜ በአንድ ሳምንት ውስጥ ይከፈላል።
3. ውል ሰጪ በመስፈርቱ መሰረት የቀረበውን አቅርቦት የሚያሟላ ባለሙያ የመመደብ ኃላፊነት አለበት ።

አንቀጽ 5

የውል ተቀባይ ግዴታዎች

ውል ተቀባይለዕቃዎቹ ከ20/01/2014ዓ.ም ጀምሮ እስከ 20/04/2014ዓ.ም ቀን ውስጥለውል ሰጪ የማቅረብ ግዴታ አለበት።

1. የዕቃዎቹ አቅርቦት የሚፈጸመው በወልቂጤ ዩኒቨርሲቲ ቅጥር ግቢ ድረስ ሲሆን የንዳድ ወጪ የመሸፈን ኃላፊነት የውል ተቀባይ ይሆናል።
2. ውል ተቀባይ የውል ማስከበሪያ ከሚያቀርበው የዕቀዎቹ አቅርቦት አጠቃላይዋጋ 10% 3,074,000(ሦስት ሚልዮን ሰባ አራት ሺህ ብር) ገቢ ተደርጓል።
3. ለውል ተቀባይ በዕቃዎችላይ የውል ሰጪ የሰጠውን አስተያየት ተቀብሎ የማረም ግዴታ አለበት።

አንቀጽ 6

ስለሥራ አፈፃፀም ዋስትና እና የዕቃዎች ዋጋ

1. ለሥራ አፈጻፀም ዋስትና ውል ተቀባይ በባንክ የተረጋገጠ ሲፒኦ ያቀርባል።
2. ውል ተቀባይ ለጨረታ ባስገባው ቴክኒካልና ፋይናንሽያል ፕሮፖዛል መሠረት በአባሪው ውስጥ የተዘረዘሩትን እና ዝርዝሩ የሚ በጨረታ ቁጥር Wku/24/2013ዓ.ም አዋርድ ውስጥ የተጠቀሱትንለማቅረብ፡ውል ሰጪ የዕቃዎቹ አቅርቦት ጠቅላላ ዋጋ ብር30,740,000(ሰላሳ ሚሊዮን ሰባት መቶ አርባ ሺ) ለውል ተቀባይ ለመክፈል ተስማምቷል።

አንቀጽ 7

ከአቅም በላይ የሆኑ ምክንያቶች

1. በፍትሐብሔር ሕግ ቁጥር ከ1792-1794 ከአቅም በላይ የሆኑ ሁኔታዎች ቢያጋጥሙ በዚህ ውል የተጠቀሱት አስገዳጅ ሁኔታዎች ተፈፃሚነት አይኖራቸውም።
2. ይህ ከአቅም በላይ የሆነ ሁኔታ ሲያጋጥም ውል ተቀባይ (የውል ሰጪ) በ 3 ቀን ውስጥ ለውል ሰጪ (ለውል ተቀባይ) በጽሁፍ ማሳወቅ አለበት። ሆኖም ግን በተቻለ መጠን ውሉን ለመፈጸም የተቻለውን ሁሉ ማድረግ አለበት።
3. ይህ ከአቅም በላይ የሆነ ሁኔታ እስከ 15 ቀን ድረስ የሚዘልቅ ከሆነ ውል ተቀባይ ወይም ውል ሰጪ ውሉታውን የማቋረጥ መብት አላቸው።
4. በዚህ ውል ያልተካተተ ከአቅም በላይ ችግር ለምሳሌ የውጭ ምንዛሬ እጥረት ቢኖርና ይህም ትክክለ ስለመሆኑ የሚገልጽ ለብሔራዊ ባንክ ጥያቄ የተረጋገጠ ማስረጃ ከቀረበ የውል ቀን በሁለቱም ወገን ስምምነት ሊራዘም ይችላል።

አንቀጽ 8

A.2 Sample Source Code

Sample source code for supplier user interface

```
<?php
session_start();
if(isset($_SESSION['susername'])&& isset($_SESSION['spassword']))
{
?>
<html>
<body>
<head>
<style>
.dropbtn1 {
    background-color: #424766;
    color: white;
    width:270px;
    height60px;
    margin-top:5px;
    border-radius:15px;
    border-color: 15px #0ea524;
    font-family: times new roman;
    font-size: 25px;
    transition: all 0.5s;
    cursor: pointer;
    border-radius: 4px;
   cursor: pointer;
}
</style>
<title>home page</title>
```

```
 <link type="text/css" href="BS/bootstrap/css/bootstrap.min.css" rel="stylesheet">

      <link type="text/css" href="BS/bootstrap/css/bootstrap-responsive.min.css"
rel="stylesheet">

      <link type="text/css" href="BS/css/theme.css" rel="stylesheet">

      <link type="text/css" href="BS/images/icons/css/font-awesome.css" rel="stylesheet">

      <link type="text/css"
href='http://fonts.googleapis.com/css?family=Open+Sans:400italic,600italic,400,600'

         rel='stylesheet'>

</head>


<body>

 <div class="navbar navbar-fixed-top">

         <div style="background-color: lightblue;" class="navbar-inner">


            <center>


            

               <?php include("header.php");

?>

         </center>

           </div></div>

         <!-- /navbar-inner -->

<div class="wrapper">

         <div class="container">

           <div class="row">

              <div class="span3"style=>

                 <div class="sidebar">

                   <button class="dropbtn1">Tender Suppliers</button>

                    <ul class="widget widget-menu unstyled">
```

```
<li> <a href="download_document.php"><i class="menu-icon icon-list"></i>View and downlaod Agreement</a></li>

<li> <a href="registersupplierdetail.php"><i class="menu-icon icon-list"></i> Fill Your Detail</a></li>

<li><a href="modifydetail.php"><i class="menu-icon icon-list"></i>Modify Your Detail</a></li>

<li><a href="viewbidresult.php"><i class="menu-icon icon-list"></i> View Bid Result </a></li>

<li><a href="viewtendernotice.php"><i class="menu-icon icon-list"></i>View Tender Notice</a></li>

<li><a href="supplieraccount.php"><i class="menu-icon icon-list"></i>Update Your Account</a></li>

</ul>

 <ul class="widget widget-menu unstyled">

                        <li><a href="logout9.php"><i class="menu-icon icon-signout"></i>Logout </a></li>

                    </ul>

                  </div> </div>

                 <div class="span9">

                  <center>

                     <div class="card" style="width: 80%;">

            <img class="card-img-top" src="images/profile2.png" alt="Card image cap">

                        <div class="card-body">

                       <h1 class="card-title"><center>Welcome To Suppliers Page</center></h1>

                        </div> </div>

                  </center>

                </div> </div>

           </div> </div>

<div class="footer">

    <div class="container">
```

```
<?php include("footer.php");?>
</div></div>
</body>
</html>
<?php
}
else{
echo "<script type='text/javascript'>alert('Access Denied!!!')</script>";
 header( "Refresh:1; url=login.php", true, 303);
}
?>
```