

1.1Introduction:

Information and communication technologies have become more phenomena attached to activities as a whole, and with the evolving technological and modern proliferation of companies and institutions. There have to be a certain environment to help in the organization, the existence of the ERP system as a service on demand is significant it is a technical system designed to coordinate all the resources, information, and activities necessary to complete the process procedures such as accounting and human resources and can exchange data between its various parts, and you can choose the parts that you need only to manage your company without having to spend large sums of money to no avail, as you can define the powers of each user of the system and thus provides you with a new level of security for your company.

Many companies recently realized the importance and core benefits of virtual technologies. Virtual technologies can improve the efficiency of using programs within the company.

Advantages of this technology clearly appear on applications of programs such as the service SaaS. ^[19]

1.2 Research Problem:

The problems of this thesis are as follows:

- Always in small or medium-sized companies the cost of an electronic information system cannot be provided
- There are the sheer volume of errors which are found in systems at companies at all levels
- Most companies lack management systems and modern planning in programming.
- The organizations always complain about the services and technical support of information technology companies,

- Most of the old companies do not know the meaning of software development.

Therefore we need methods to enable companies to develop their systems depending on demand, from this the idea of the ERP system as a service on demand is originated.

1.3 The importance of Research:

This Research help in the provision of services via the Internet, where it does not need any certain ordnance (physical or software) needs only a device with an internet connection, which is easily accessible from anywhere with the provision of maintenance and updates costs with the service and the possibility to participate in what the user needs of system services, user can take advantage of the latest applications without having to buy them, and this research also helps in saving time and effort to the programmers with high performance.

Always the full control of the application and not the customer where as in Cloud ERP system your data and your application can be placed on server that you control.

Both these models provide instant gratification, taking mere minutes to be up and running.

Ease of use, total cost of ownership, speed of implementation and the ability to configure the solutions to individual needs and integrate with existing systems.

1.4 Research Objectives:

(ERP) system as a service on demand sought to achieve the following objectives: -

1. The use of the advantages of ERP as a service on demand and take advantage of these services for subscription.
2. The user can activate the software modules that provide functions that only needed, making the system more accessible and less crowded.
3. The ability to add new functionality to the system or modify functions which are readily available through the activation of additional software modules or create new software modules.
4. Distribution of software, based on there is no need for the customer to purchase the program while he can use the functions and services needed for a fee paid by, scientifically it is like renting programmer tasks.
5. Parent company provides a system according to other non-free license allows anyone who buys to adjust the system.
6. You can follow your subscribe to the company through a separate application (desktop application) and by the private company profile page (the Web page).

1.5 Scope:

In this research, the focus is on the work of three units in ERP system they are: human resources management Unit, project management unit, and Accounting and Finance Management, this research doesn't address the rest of the units in the ERP system. Only the three mentioned units were because of their importance.

The focus will be on the software side and the side of the hardware (server), this research also uses SaaS ERP to a specific number of users of the system and the time period chosen by the customers therefore we set a price for the customer, we will not be touching the side of security in this research.

1.6 Research Structure:

Chapter one gives introduction about the project, defining the problem, objectives, importance and scope.

Chapter two contains two parts. Part one represents a general background about OpenERP SaaS systems and System Requirements, part two is the related studies.

Chapter three also contains two parts, first part explains the tools and techniques used in this project, and the second part is the UML design for the project functionality.

Chapter four contains the project implementation. Chapter five is the results and conclusion, recommendations.

2.1 Introduction:

This chapter is divided into two sections, the first section gives general description of OpenERP software as service, and the second section describes the related studies to research project.

2.1.1 Open Enterprise Resource planning.

Enterprise resource planning (ERP) is business process management software that allows an organization to use a system of integrated applications to manage the business and automate many back office functions related to technology, services and human resources. ERP software integrates all facets of an operation, including product planning, development, manufacturing, sales and marketing.

Open ERP is an impressive software system, being simple to use and yet providing great benefits in helping you manage your company. It's easy to install under both Windows and Linux compared with other enterprise-scale systems, and offers unmatched functionality.

ERP software is considered an enterprise application as it is designed to be used by larger businesses and often requires dedicated teams to customize and analyze the data and to handle upgrades and deployment. In contrast, Small business ERP applications are lightweight business management software solutions, customized for the business industry you work in. ^[5]

2.1.1.1 The architecture of OpenERP.

To access OpenERP you can:

- Use a web browser pointed at the OpenERP client-web server,
- Use an application client (the GTK client) installed on each computer.

The two methods of access give very similar facilities, and you can use both on the same server at the same time. It's best to use the web browser if the OpenERP server is some distance away (such as on another continent) because it's more tolerant of time delays between the two than the GTK client is. The web client is also easier to maintain, because it's generally already installed on users' computers. [5]

2.1.1.2 The main components of OpenERP. [5]

- **The PostgreSQL database server:**

Which contains all of the databases, each of which contains all data and most elements of the OpenERP system configuration.

- **The OpenERP application server:**

Which contains all of the enterprise logic and ensures that OpenERP runs optimally.

- **The web server:**

Separate application called the Open Object client-web, which enables you to connect to OpenERP from standard web browsers and is not needed when you connect using a GTK client.



Figure (2.1) OpenERP Architecture. [12]

2.1.1.3 ERP modules guide

OpenERP system, which are made up of a variety of software modules, can seem complex. In this research, you'll find introductions to ERP modules, including:

- (A) Human Resources.
- (B) Project management.
- (C) Accounting and Finance Management.

(A) Human Resource management. ^[12]

Manage the most important asset in your company: "People".



Figure (2.2) Human Resource management.

- **Human Resource management features.**

Key Features








 <p>Track time and attendances Record timesheets, check time spent on tasks, control your employees and project costs.</p>	 <p>Manage your employees Enter all essential data on your employees and oversee all important information in your company address book.</p>
 <p>Follow recruitment Keep track of the recruitment process to facilitate evaluation. Search and browse through your CV base.</p>	 <p>Centralizing your expenses Get rid of the paper work and follow expenses directly into OpenERP. Easy validation, reimbursement and re-invoicing.</p>
 <p>Reporting Giving you a comprehensive overview of your employees' timesheet and leaves in one single dashboard.</p>	 <p>Manage leave requests Employees enter their requests (paid holidays, sick leave, etc), for managers to approve and validate.</p>
 <p>Plan periodic evaluations Set-up evaluation plans for your employees and watch their evolution. Define steps with interviews and keep track of the progress.</p>	

Figure (2.3) Human Resource management features.

(B) Project management. ^[12]

A methodical approach to planning and guiding project processes from start to finish

- **Project management features.**

Key Features






 <p>Collaborate Efficiently Write tasks collaboratively using a shared pad, discuss with integrated chat, share tasks with customers.</p>	 <p>Instant reports and analysis Enjoy the smart user interface with graphical statistics, Gantt charts, calendars, etc..</p>
 <p>Schedule automatically The scheduler will help you plan tasks and phases according to your human resources availability.</p>	 <p>Manage issues Follow bugs and support requests, line-up the issues on projects while tracking your quality of service performance.</p>
 <p>Sync with Emails Save time and send/receive emails related to your project. Communicate with your team, customers and suppliers.</p>	

Figure (2.4) Project management features.

(C) Accounting and Finance Management. ^[12]

Reporting of the financial position and performance of a firm through financial statements issued to external users on a periodic basis.

- **Accounting and Finance Management features.**

Key Features











	Smart User Interface As an accountant, you need to be able to record a set of operations in just a few minutes.		Invoice Control Get clear visibility of invoices awaiting from your supplier, control and validate them without re-encoding.
	Easy Payment Management Reconcile invoices easily with payments through bank interfaces and check handling and printing.		Automate your Follow-Ups Set-up and automate follow-ups to get a periodical financial overview and get paid quickly.
	Integrated Analytic accounting Get your analytic accounting operations integrated with timesheets, projects, invoices, warehouse, etc.		Easy reconciliation OpenERP helps you to easily reconcile invoices and payments using the manual approach or the automated wizard.
	Multi-Currency Unlimited currencies supported with daily automatic updates of currency rates.		We support your country We support: US, FR, IN, UK, ES, CH + 20 other countries
	Multi-company Get your consolidated trial balance and consolidate statistics in real time.		Dashboard & KPIs Get customizable real time statistics with drill-up, drill-down, filter, drill-across data.

Figure (2.5) Accounting and Finance Management features.

2.1.2 Software as a Service:

Software as a Service describes any cloud service where consumers are able to access software applications over the internet. The applications are hosted in “the cloud” and can be used for a wide range of tasks for both individuals and organizations.

Enterprise users are able to use applications for a range of needs, including accounting and invoicing, tracking sales, planning, performance monitoring and communications.

SaaS is often referred to as software-on-demand and utilizing it is akin to renting software rather than buying it. With traditional software applications you would purchase the software upfront as a package and then install it onto your computer.

The software’s license may also limit the number of users and/or devices where the software can be deployed. Software as a Service users, however, subscribe to the software rather than purchase it, usually on a monthly basis. Applications are purchased and used online with files saved in the cloud rather than on individual computers.

SaaS customers have no hardware or software to buy, install, maintain, or update. Access to applications is easy: You just need an Internet connection. ^[18]

Why we use? ^[13]

- **High Adoption:** SaaS applications are available on almost all devices - anytime, anywhere. Since most people are familiar with how to use the Internet, the learning curve is lower and adoption rates are high.
- **Lower Initial Costs:** Since SaaS applications are subscription based, there is no license fee and hence lower initial costs. Also, as the SaaS provider manages the IT infrastructure, it lowers the IT costs for hardware, software and resources.

- **Seamless Integration:** With true multitenant architectures SaaS can scale indefinitely to meet customer demands, and many SaaS providers also offer customisation capabilities to meet specific needs.
- **Data backup and recovery:** Data is stored in multiple data centres to ensure that in the event of a disaster, the other data centres can continue delivering the service. SaaS solutions also eliminate the painstaking task of taking backups every week by triggering automatic backups without user intervention, thus ensuring the integrity of company data.



Figure (2.6) Software as services importance. ^[15]

2.1.3 SaaS ERP:

SaaS is a method of deploying ERP software in a hosted or on-demand environment. Unlike the traditional method of purchasing ERP software licenses, the software as a service software model allows for the ERP software package to be rented or licensed for a protracted period of time. The ERP software is hosted on the ERP developer's web server.

While there are many advantages to the software as a service software model, this type of ERP software is not ideal for every organization. The SaaS software model offers a lower cost entry point and provides additional benefits such as reduced time to implement, limited need for technical support and infrastructure, and a more predictable expenditure cycle.

On the converse, the software as a service software model includes disadvantages that must be reviewed as part of the ERP business case.

Not all ERP software vendors offer a SaaS software model and those that do may limit the ability to customize the software. This can limit the available options for ERP software and deter those organizations that prefer a highly customized ERP solution. ^[17]

❖ SaaS ERP Purpose :

The goal of software-as-a-service (SaaS) ERP hosting is to reduce: ^[5]

- Costs software.
- Hardware.
- Maintenance.

- **Software As Service ERP feature :**

Qualifying ERP SaaS Expectations



Figure (2.7) Software as Service ERP feature. ^[14]

2.2 Previous Studies:

2.2.1 Cloud ERP: a New Dilemma to Modern Organizations Authority Guo Chao Alex Peng and Chirag Gala (2014).^[11]

The Consultation of paper aimed to explore potential benefits and barriers associated with the adoption of cloud ERPs. A set of in-depth interviews were conducted with 16 ERP and cloud consultants. The findings, derived from a thematic analysis, identified that whilst the economic and technical benefits promised by cloud vendors are attractive, the success of cloud ERP adoption can be affected by critical challenges related to diverse organizational factors as well as with current legal and technical complexity in the cloud environment.

Results:

The results of this study have important practical and research implications. In practical terms, the research findings provide valuable insights to support CEOs and in-house IT managers in the process of strategic planning and decision making towards successful cloud ERP adoption. In particular, the identified cloud ERP benefits and barriers can serve as the foundation for managers to carry out Cost vs. Benefit comparison and analysis as a part of the feasibility study of their cloud ERP projects. On the other hand, the list of barriers presented in the paper highlights some of the most crucial issues that cloud ERP providers should strive to improve, if they want to make their products and services become more widely used in the industry and consequently facilitate the ERP transformation initiated by innovative cloud technologies.

2.2.2 ERP Software as Service (SaaS): Factors Affecting Adoption in South Africa Authority Motheo Lechesa, Lisa Seymour, Joachim Schuler (2014). [2]

The Consultation of paper affect the adoption of ERP SaaS in South Africa. Using interviews and qualitative data analysis, this study Developed a model that explains the factors that affect the adoption of ERP SaaS. Network limitations, customization, security and cost concerns were raised as dominant factors affecting the adoption of ERP SaaS. The research concludes by suggesting that over time the adoption of ERP SaaS should increase as the technology matures.

Results:

In general there is a lack of empirical research about Software as a Service (SaaS) in South Africa. This paper has made a first attempt. The research on the same subject focusing on certain industry or type of organization could also be useful. For instance, the research could focus on the factors affecting adoption of ERP SaaS in Small and Medium Enterprises in South Africa. The results of such research could be consistent and more concrete without generalizing amongst participants operating in different industries.

2.2.3 Determinants of SaaS ERP System Adoption Authority Ravi Seethamraju, the University of Sydney (2013). [6]

The Consultation of paper determinants for the adoption decision and analyses benefits and challenges. According to study, low total cost of ownership, low initial investment costs, potential willingness of the vendor to participate in co-creation of value for customers, continuous improvement of the product offerings and generic benefits of implementing an integrated ERP system are determinants of SaaS ERP adoption decisions by SMEs. Competitive pressures faced by the enterprise, external factors, concerns on the security and integrity of data have no influence on adoption decision, according to this study. Instead, SaaS ERP vendor's long term reputation, promised shorter deployment time, total cost of ownership, willingness to listen and continuously improve the product, vendor's ability and willingness to support customers throughout the product life cycle are the factors that would attract SMEs towards SaaS ERP systems.

Results:

SaaS ERP systems are considered the best option for SMEs to take advantage of the benefits of ERP systems without associated prohibitive costs of IT infrastructure, software, upgrades and maintenance. Empirical research on SaaS models in general and SaaS ERP systems in particular is limited. Filling this research gap, this study analyzed the factors influencing the decision to adopt SaaS ERP systems in SMEs and their impact on performance. Low total cost of ownership, willingness of the SaaS vendor to work with the customer, reputation of the SaaS vendor in the SME community are some of the key determinants of adoption decision.

Even though SaaS ERP system offers 'pay per use' model without any lock-in contracts, it is not easy to deal with the change management related issues in case of a switch from one vendor to another.

2.2.4 Enterprise 2.0 – is the market ready? Authority Dragoş Marian Mangiuc, the Bucharest Academy of Economic Studies, Romania (2011).^[3]

The purpose of paper is according to technology development and commonness of (cloud) market companies of all sizes evaluated their general audition using (SAAS). This research conducted a field study during the last past years among the Romanian and foreign companies to find a fair and rational answer to this question “Is the market ready for these technologies or did they come too soon?” The paper is a part of a larger research performed by the author in the field of Enterprise 2.0 technologies.

Result:

(SAAS) is not able to provide new and effective benefits for the model of systems distribution for the two ranks, rank one is special for the users and always about reduction of the cost and latest version reach of the applications of the systems they use, the second rank is special for the systems developers because it is able to get feedbacks from the users and answer their requests which will lead to reduction on development cost and increase in benefits rates accordingly.

From this we will have a logical result which is (SAAS) is not a good service of this kind from all perspectives and can noticeably reduce the cost of repairing network and devices.

2.2.5 Adoption of ERPs in a Medium-sized Enterprise – Authority Ravi Seethamraju, Jaya Seethamraju (2008).^[4]

By looking on the problems and restrictions over medium and small companies on their reliance on technology innovations. This research studied challenges and opportunities on their decisions of adopting (ERP) system this study noticed something more important than this which is the existence of financial resources shortage and the evaluation and testing of the appropriate systems, implementation of study projects facilitate vision and controlling of data generally.

Result:

It is expected that this study would have outputs on flexibility and ability to cope but we should activate and make use of (ERP) basic system with noticeable cost reduction by this the study will introduce excellent opportunities to medium and small companies so they can symbolize their processes , practice information management and compete internationally.

2.2.6 Summary of previous studies:

According to the studies above, we note that most of the countries in the world wants to impose and control ERP for each large, medium and small companies, but we have introduced service model upon request in order to minimize the challenges facing most small and medium-sized companies in order to reduce the cost of software and hardware maintenance, and is also known that on-demand service model reduces all of the effort, time and cost, so the ERP system as a service upon request of the best systems in the world and currently.

These studies and the results are excellent because it motivated us to work ERP system as a service upon request of the Sudanese companies, and seemed to enter the system in the last two years to Sudanese companies and became a deal with a smooth and very easy, and this system with Sudanese companies solve the problem of permanent and persistent faults.

It can also Sudanese companies to thrive in the near future ERP systems as a service on demand.

3.1 Introduction

This chapter is divided into four sections; the first section describes the system requirements.

The second section describes the system techniques, which used in system.

The third section describes the authority System, the fourth section describes the system analysis using UML technology.

3.2 Requirements System:

3.2.1 Functional Requirement:

- **Customer data recording:**

The registration of all customer data on the page and that client to take advantage of system services to enable.

- **The possibility of modifying the data:**

If the customer has an account on the page he directly go to his profile and follow all required procedures.

- **Query for the client's account:**

Help is provided by supporting customer's desktop by an application.

- **confirm the registration number of the company and the customer by E-mail:**

In order to help be sent his private data and security number quickly and with less effort.

- **Is attached to the customer's application by E-mail.**

The purpose is to help to upload the application and how to install it in detail and other procedures.

- **Registration of all customer data and users of your system in the client's page:**
 - For the benefit of the customer upon request to see his information only users of the system.
 - To benefit the page for the system manager.

3.2.2 Nonfunctional Requirements:

- **System availability:**
 - Ease of use of the system.
 - Speed access to system services.
 - The possibility of using the system at any time.
 - The possibility of using the system from any device with any specifications.

- **System reliability (Dependability):**

To provide a system that works well and reduce errors by the ratio, there is no error-free system, but the endeavor is to create a system in which what can have less error rate.

- **Effectiveness of the system (Efficiency):**

If the number of users is large effectiveness of the system is good.

- **Interoperability**

The system is characterized by fully harmonic between units in terms of design and development.

- **Scalability**

The system's ability to deal with increasing amounts of work.

3.3 Technologies to be used

3.3.1 SaaS:

Software as a service (SaaS) software is a method of deploying ERP software in a hosted or on-demand environment. Unlike the traditional method of purchasing ERP software licenses, the software as a service software model allows for the ERP software package to be rented or licensed for a protracted period of time. The ERP software is either hosted on the ERP developer's web server or via a third-party provider commonly referred to as an application service provider.

Why we used? ^[8]

- No additional hardware costs; the processing power required to run the applications is supplied by the cloud provider.
- No initial setup costs; applications are ready to use once the user subscribes.
- Pay for what you use; if a piece of software is only needed for a limited period then it is only paid for over that period and subscriptions can usually be halted at any time.
- Usage is scalable; if a user decides they need more storage or additional services, for example, then they can access these on demand without needing to install new software or hardware.
- Access to Software as a Service is compatible across all internet enabled devices.
- As long as there is an internet connection, applications are accessible from any location.

Future of Software as a Service:

SaaS is becoming an increasingly prevalent delivery model as underlying technologies that support Web services and service-oriented architecture (SOA) mature and new developmental approaches, such as AJAX, become popular. Meanwhile, broadband service has become increasingly available to support user access from more areas around the world.

3.3.2 Odoo:

The new version 8.0 of OpenERP/Odoo introduce a new ORM API.

It intends to add a more coherent and concise syntax and provide a bi-directional compatibility.

The new API keeps its previous root design as Model and Record but now adds new concepts like Environment and Record set.

Some aspects of the previous API will not change with this release, e.g. the domain syntax.



Figure (3.1) Odoo Definition. ^[16]

3.2.2 Python

Python programming language, from high-level languages, characterized simply written and read, easy to learn, use the object-oriented programming style (OOP), open source, and scalable. Python is the language of explanatory language, multi-purpose and are widely used in many fields, such as building independent software using the graphical interfaces known in the work of Web programs. ^[7]

Why we used?

- Is very flexible language.
- Increasing popularity in the scientific community.

3.3.3 PostgreSQL:

(Pronounced "post-gress-Q-L") is an open source relational database management system (DBMS) developed by a worldwide team of volunteers. PostgreSQL is not controlled by any corporation or other private entity and the source code is available free of charge.

3.3.4 XML:

Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format which is both human readable and machine-readable. It is defined by the W3C's XML 1.0 Specification and by several other related specifications all of which are free open standards.

3.3.5 HTML5:

HTML5 is a core technology markup language of the Internet used for structuring and presenting content for the World Wide Web. As of October 2014 this is the final and complete fifth revision of the HTML standard of the World Wide Web Consortium (W3C). The previous version, HTML 4, was standardized in 1997. ^[1]

3.3.6 XML-RPC:

Is among the simplest and most foolproof web service approaches that makes it easy for computers to call procedures on other computers.

Why we used?

- XML-RPC emerged in early 1998; it was published by User Land Software and initially implemented in their Frontier product.
- XML-RPC uses the HTTP protocol to pass information from a client computer to a server computer.
- XML-RPC and web services, however, the Web becomes a collection of procedural connections where computers exchange information along tightly bound paths.

3.3.7 Bootstrap:

Bootstrap is a powerful front-end framework for faster and easier web development. It includes HTML and CSS based design templates for common user interface components like Typography, Forms, Buttons, Tables and many other as well as optional JavaScript extensions.

Why we used?

Bootstrap also gives your ability to create responsive layout with much less efforts.

3.3.8 CSS:

Cascading Style Sheets, fondly referred to as CSS, is a simple design language intended to simplify the process of making web pages presentable.

3.3.9 Tornado :

Words of third-party networks simultaneously library can be a way for thousands of open connections making it ideal. ^[9]

Why we used?

- It makes the server is always open.
- Ease of dealing with the next request from the client.
- It makes a long-term contract for each user.

3.3.10Peewee:

Peewee is a simple and small ORM. It has few (but expressive) concepts, making it easy to learn and intuitive to use.

Why we use?

- Small, expressive ORM.
- Deals with the data base in terms of adding, deleting, and modifying.
- Written in python with support for versions 2.6+ and 3.2+.
- Built-in support for postgresql.
- Flask Web framework.

3.3.11 ERPpeek:

The library provides few objects to access the OpenObject model and the associated services provided by the Odoo XML-RPC API.

3.3.12NetBeans:

NetBeans is a Java-based integrated development environment (IDE). The term also refers to the IDE's underlying application platform framework

3.3.13 Java:

Java is a programming language expressly designed for use in the distributed environment of the Internet.

It was designed to have the "look and feel" of the C++ language, but it is simpler to use than C++ and enforces an object-oriented programming model.

3.3.14 Eclipse:

Eclipse is a Java-based open source platform that allows a software developer to create a customized development environment (IDE) from plug-in components built by Eclipse members.

3.3.15 Mozilla Firefox:

Mozilla Firefox (known simply as Firefox) is a free and open-source web browser, the Mozilla Corporation. Firefox is available for Windows, OS X and Linux operating systems.

3.3.16 UML:

Unified Modeling Language, or UML, provides an overview of the most important diagrams used in the visual modeling of computing programs.

The article is ideal for those who have little knowledge of UML concepts, including managers as well as novice practitioners.

❖ Behaviour diagram:

1. Use case diagram.
2. Activity diagram.
3. Sequence diagram.

3.4 Authority of System:

The nature of work in institutions require that some of the processes depend on a specific person that person has the powers of the authorized person to perform this work.

- Supports program (Open ERP) this type of procedures through the establishment of groups and control the show and hide or outsource some of the powers of these groups.

- In the program (Open ERP) in this research was clarified through:

1. We amend a group to the director of the company, which has registered only from within the site:

It is a specific powers to the director of the company.

2. After you enter the director of the company in the group in question is assigned a shelf life:

(Access Read, Access Write) only to users of its system.

- Manager can control the system in his account through the site.
- The possibility of modifying the company's account through a personal page for the system administrator at the site.
- Traceability of the company account through (Desktop App).
- The possibility of correspondence through the company's main page complaints and suggestions.
- allows the manager to give each user its own validity.

3.5 System Analysis:

3.5.1 USE CASE DIAGRAM:

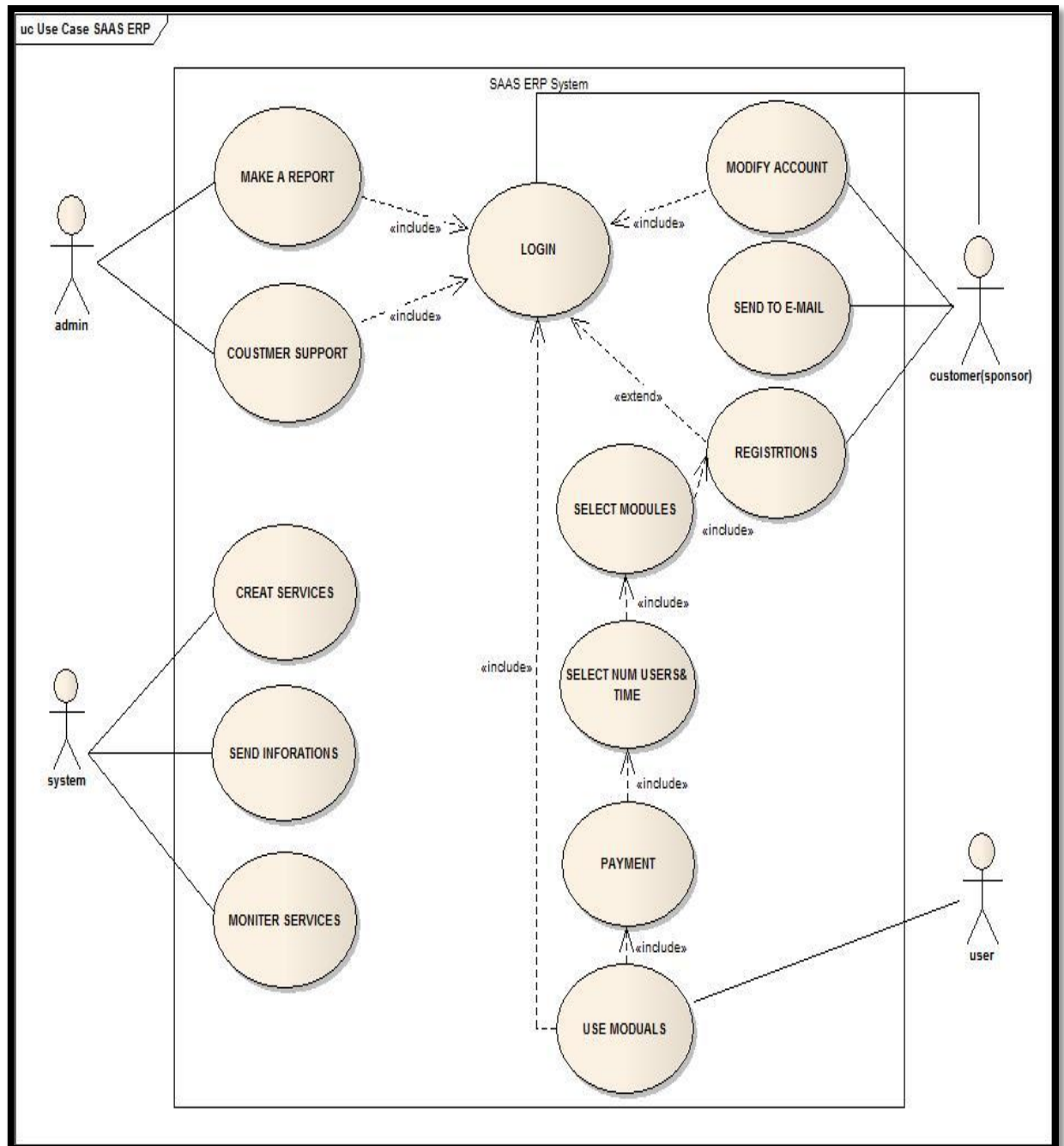


Figure (3.2) Use case Diagram for System.

3.5.2 SEQUENCE DIAGRAM:

3.5.2.1 Diagram of Create service for system side.

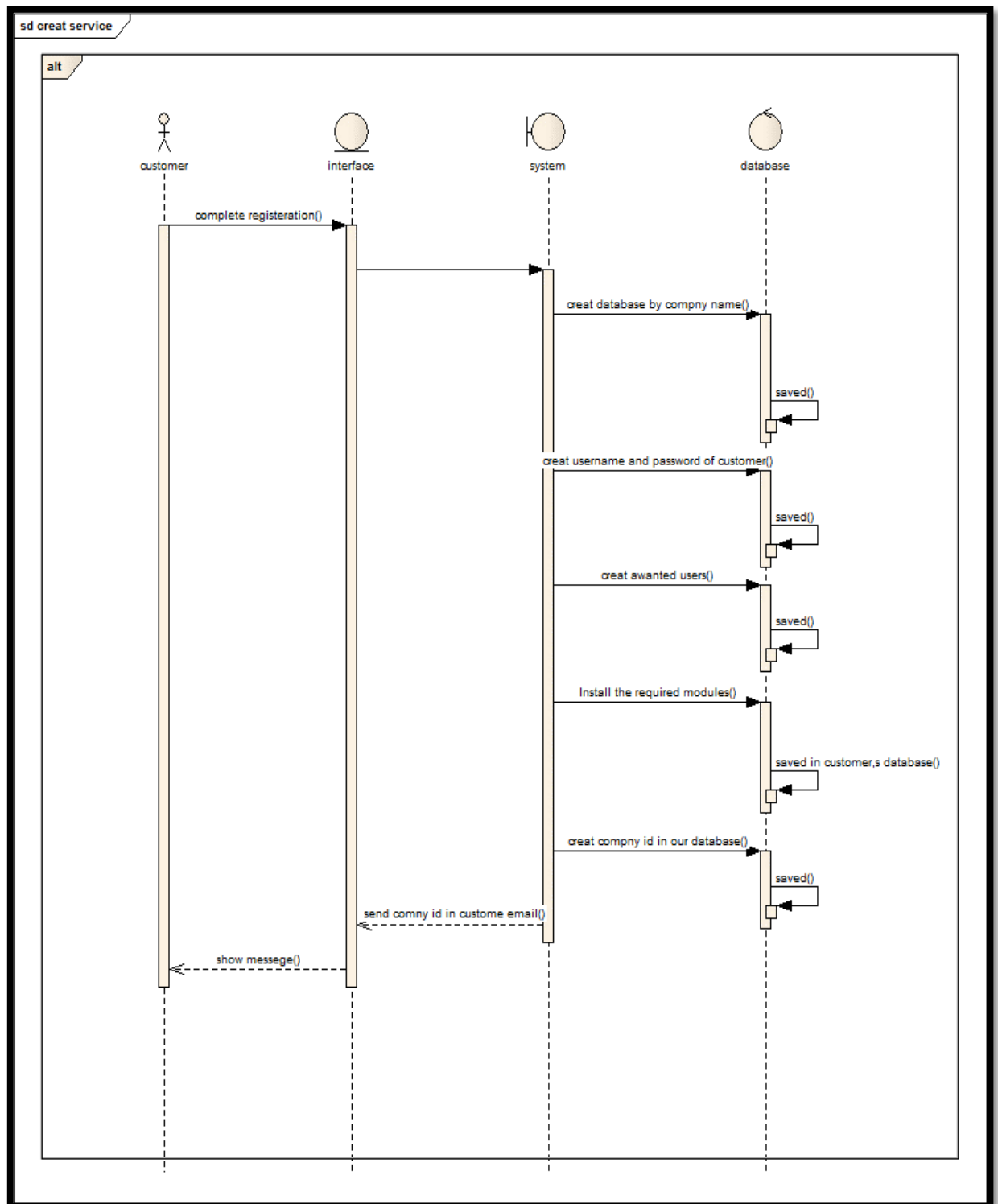


Figure (3.3) Sequence Diagram create services system Side.

3.5.2.2 Login Diagram Administrator Side.

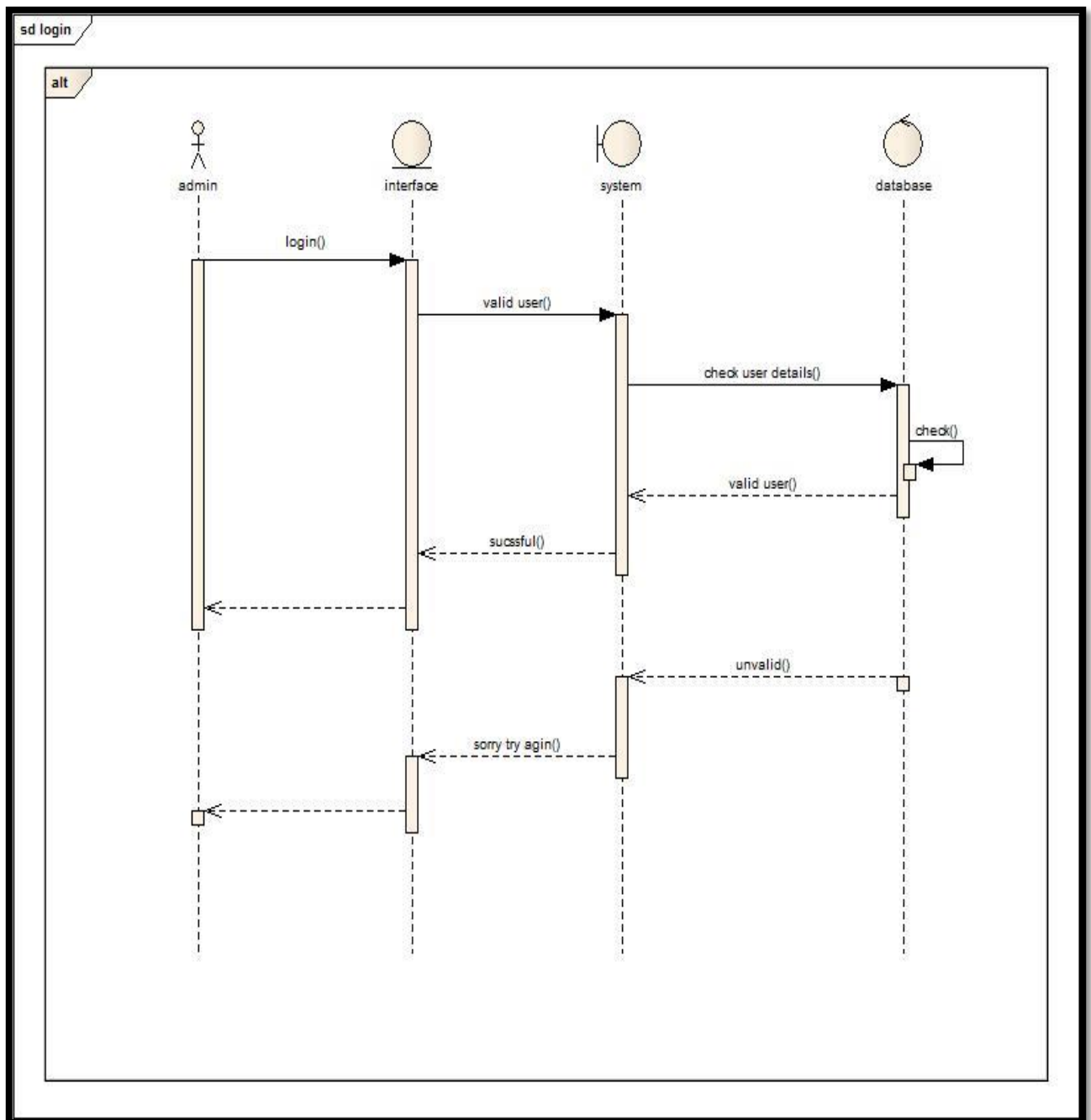


Figure (3.4) Sequence Diagram login for Administrator Side.

3.5.2.3 Login Diagram user Side.

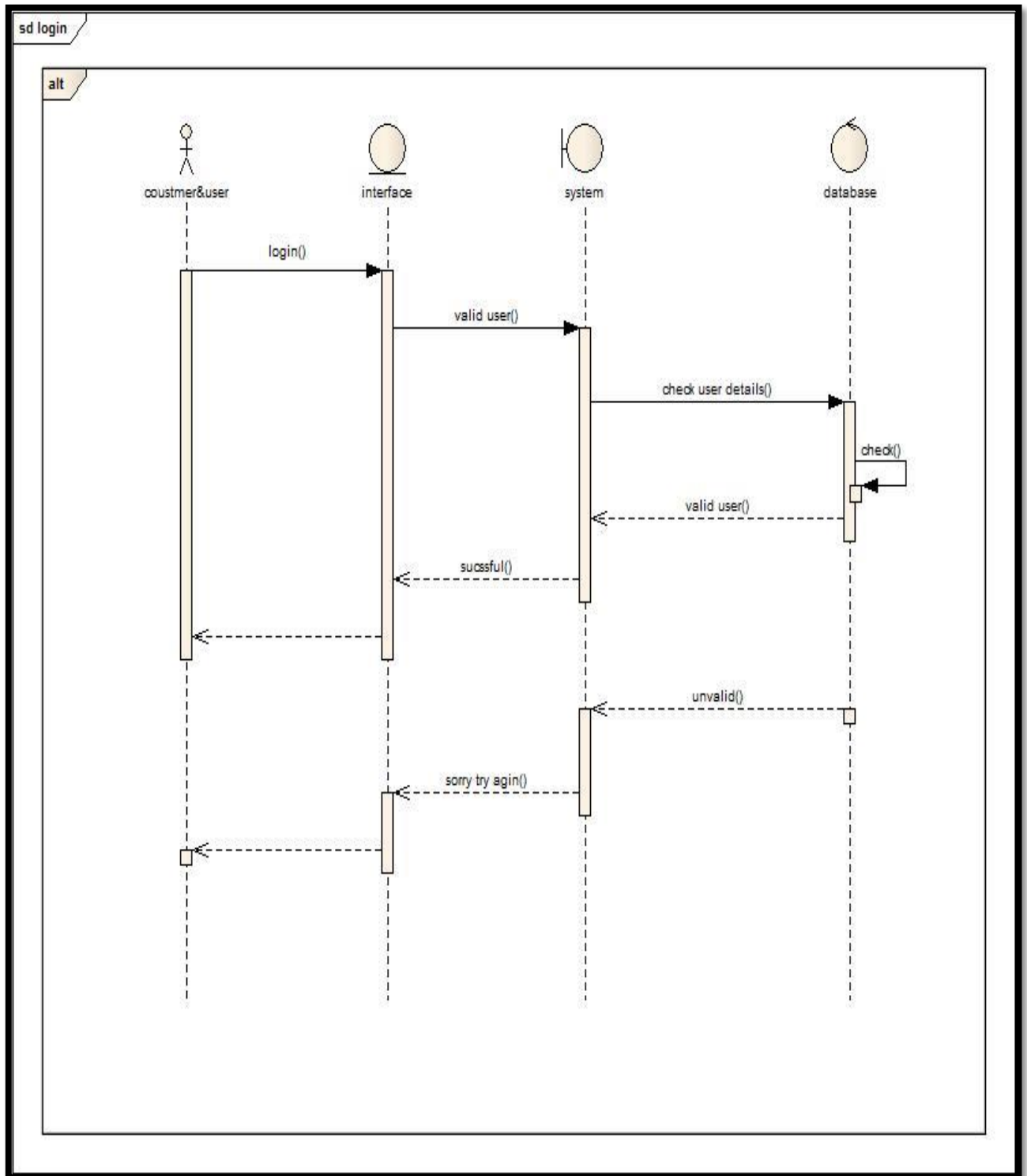


Figure (3.5) Sequence Diagram login for user Side.

3.5.2.4 Registration Diagram.

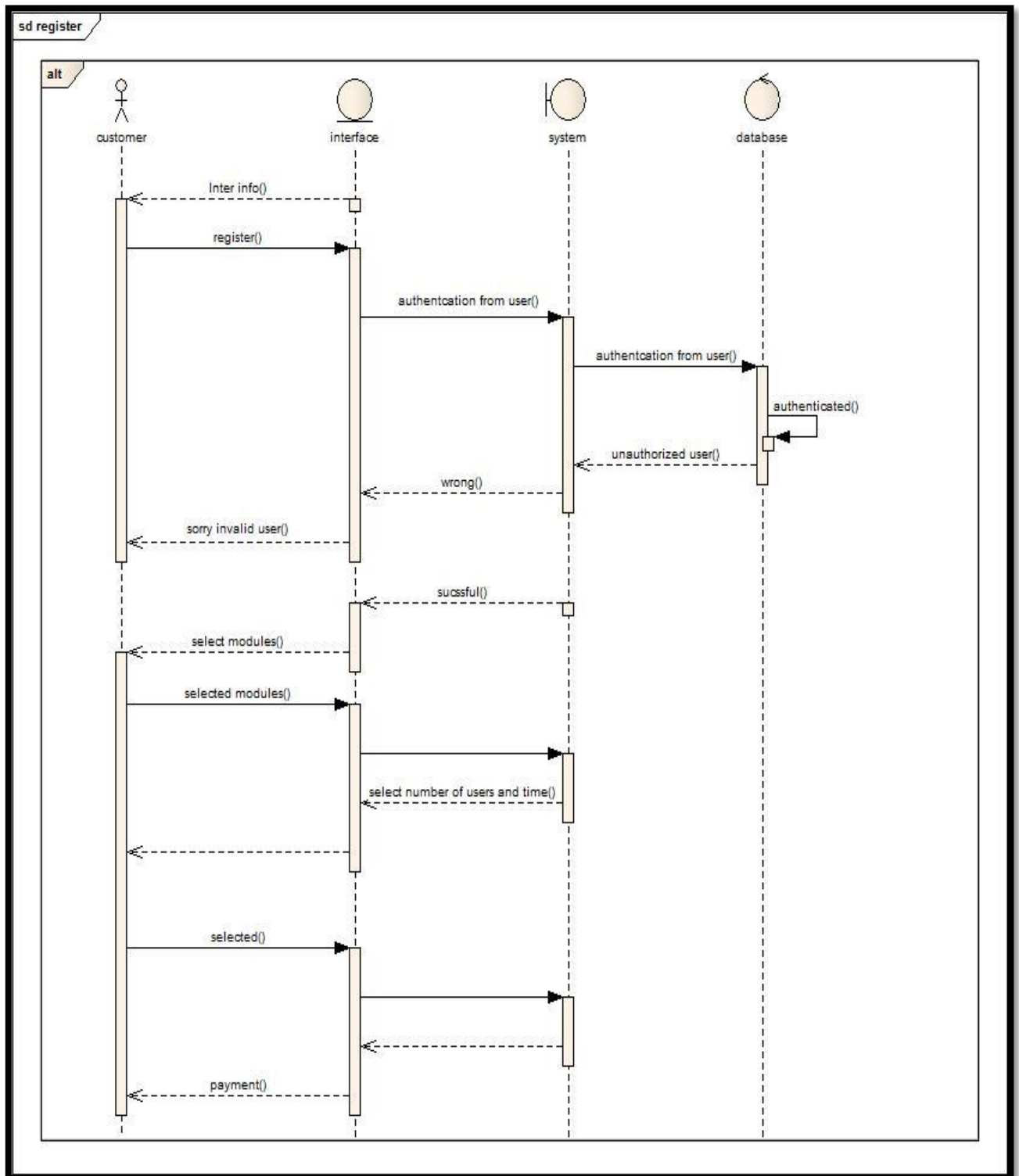


Figure (3.6) Sequence Diagram registrations for user Side.

3.5.2.5 Buy Diagram.

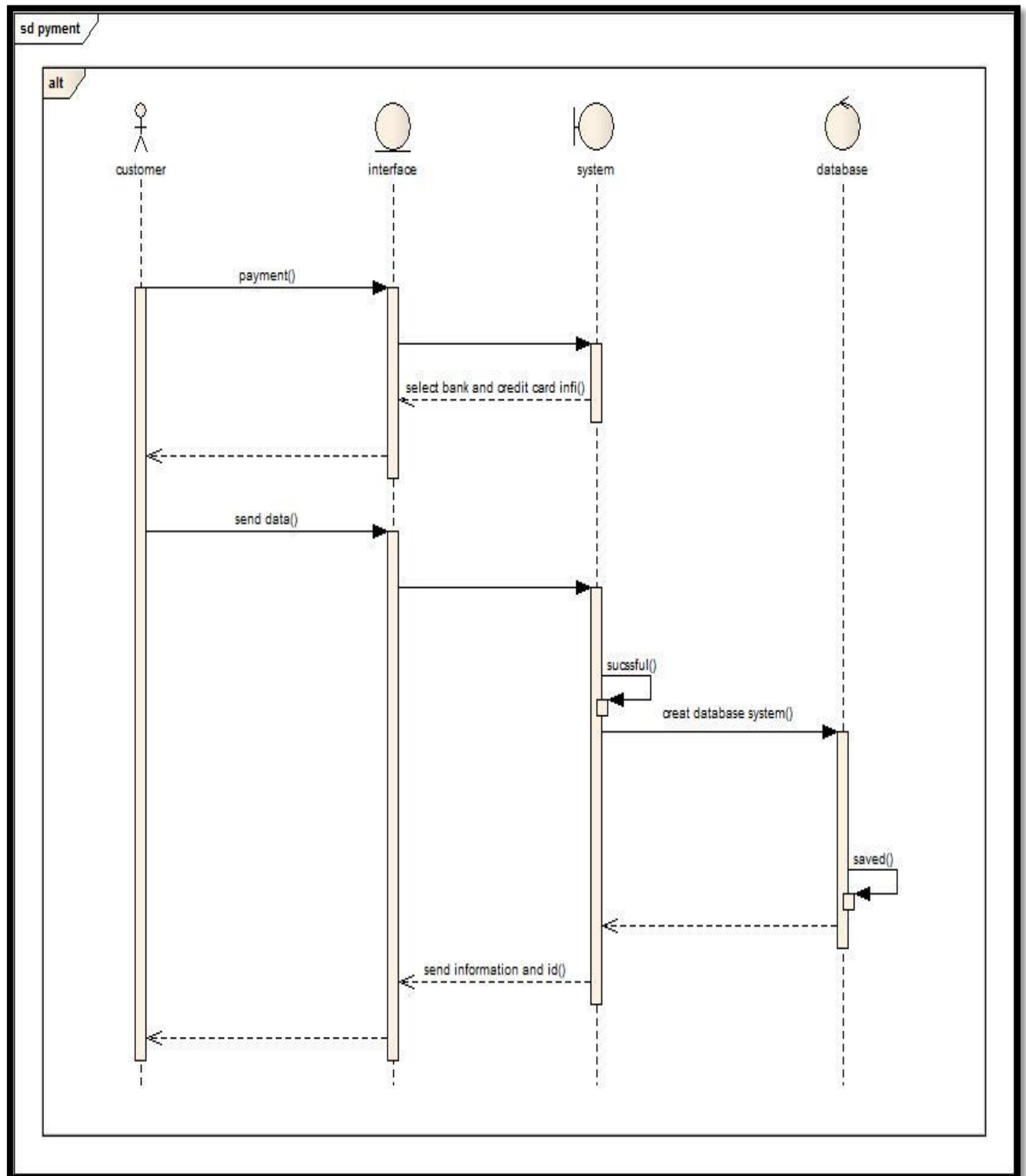


Figure (3.7) Sequence Diagram payment for user Side.

3.5.2.6 Modify Diagram.

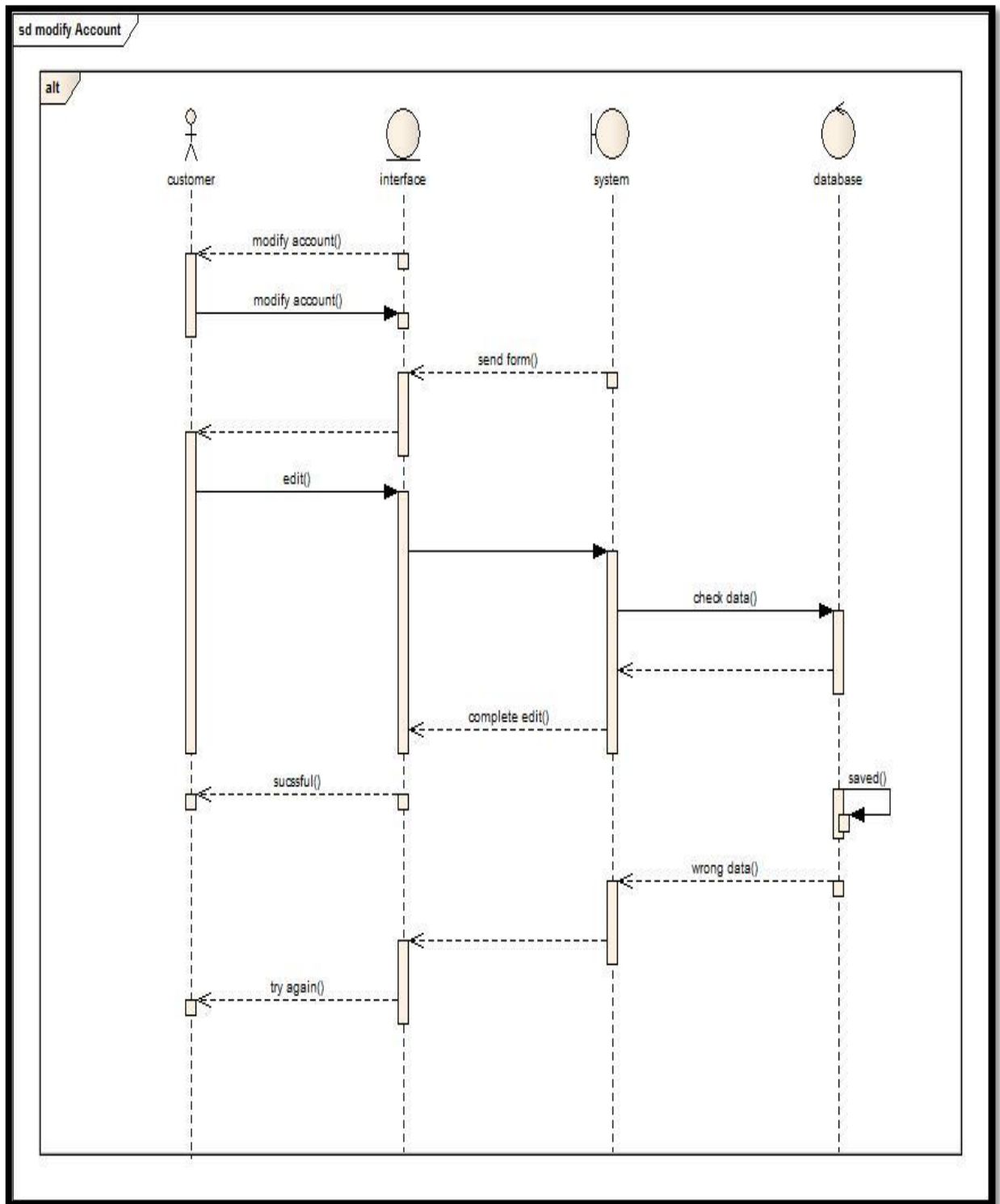


Figure (3.8) Sequence Diagram modify for user Side.

3.5.2.7 Payment External Diagram

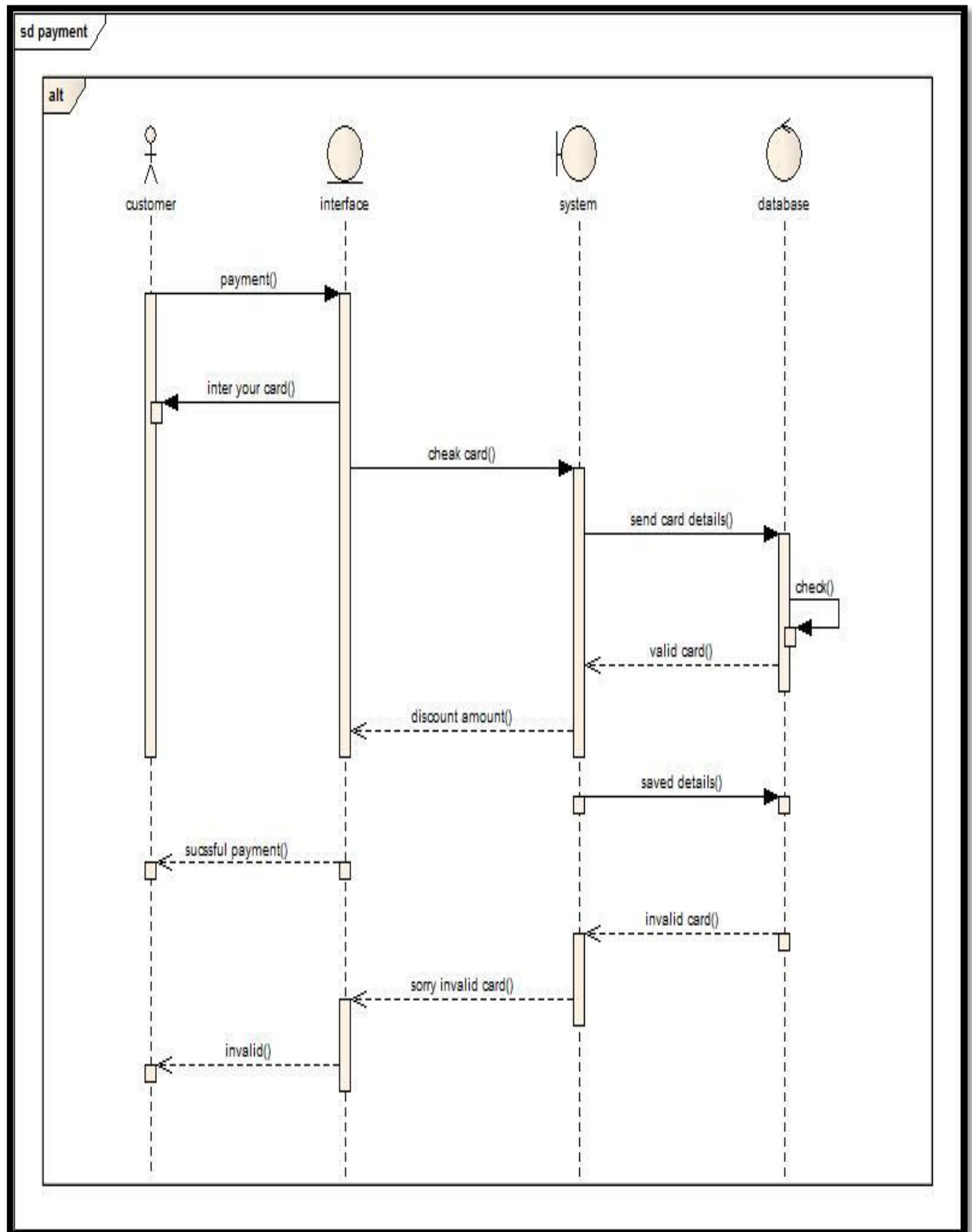


Figure (3.9) Sequence Diagram External payment for user Side.

3.5.2.8 Customer Support Diagram

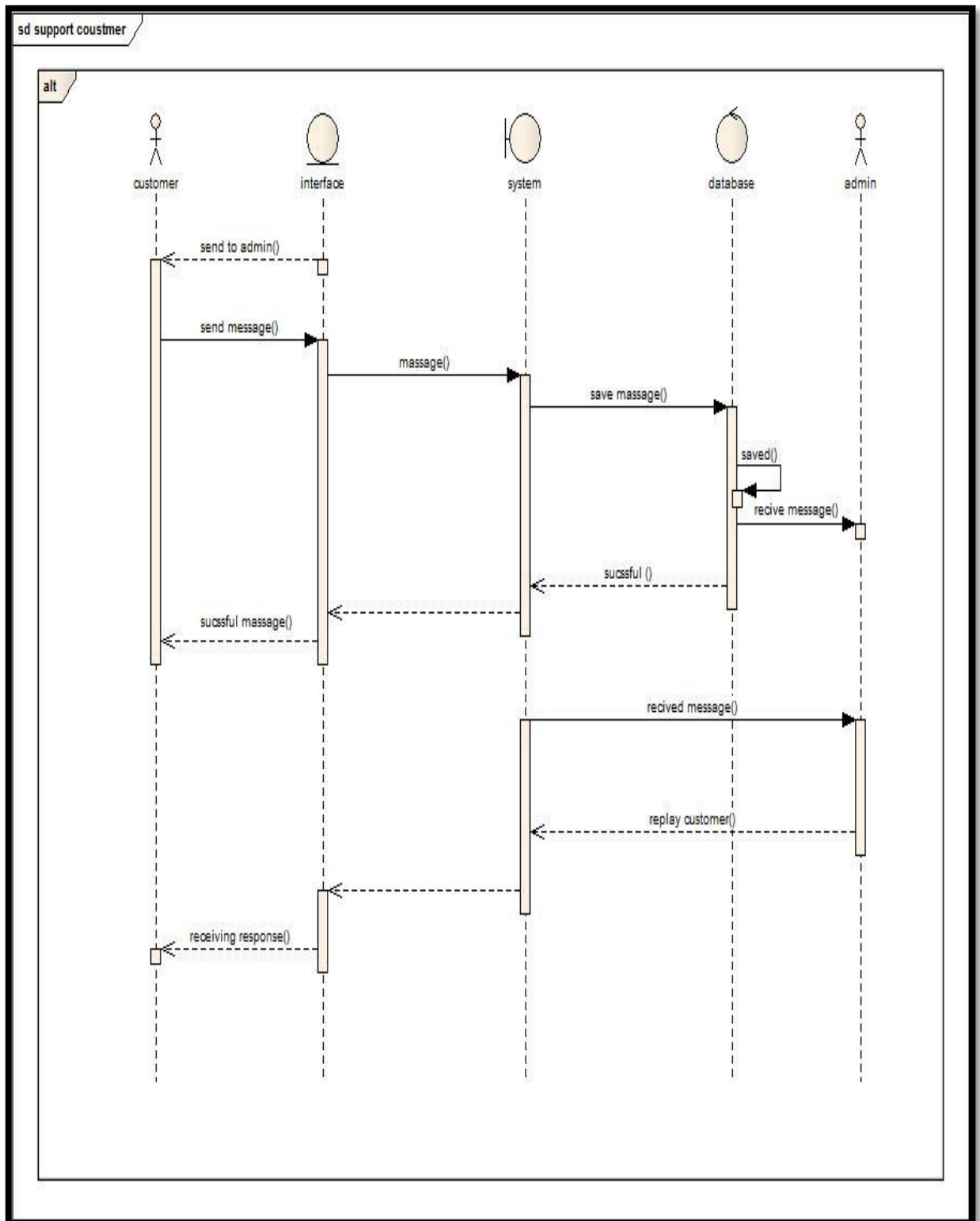


Figure (3.10) Sequence Diagram support for user Side.

3.5.3 ACTIVITY DIAGRAM:

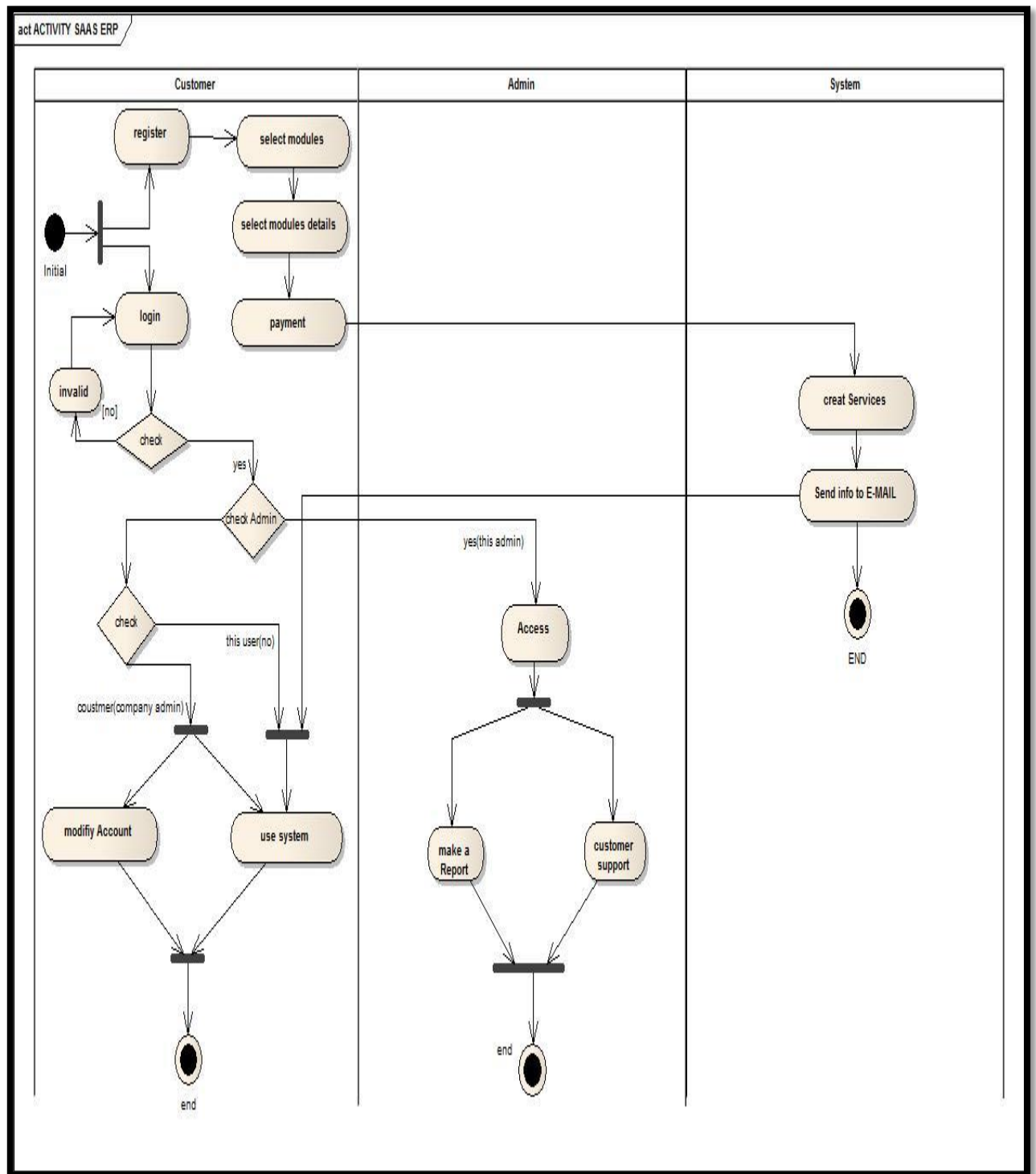


Figure (3.11) Activity Diagram for System.

4.1 Introduction:

This chapter shows how the system works and includes:

The design of the database system, and how the system works from the Web page, and explain how to use the desktop application.

4.2 Database System:

The design of the database described in the appendices.

4.3 How The System Works:

4.3.1 Process of server running:

The operation of the server is divided into two main sections:

1- Database Server:

The server receives requests for the creation customized order and send message to E-mail and modify the system upon request with the knowledge that the requests come from (Project Server).

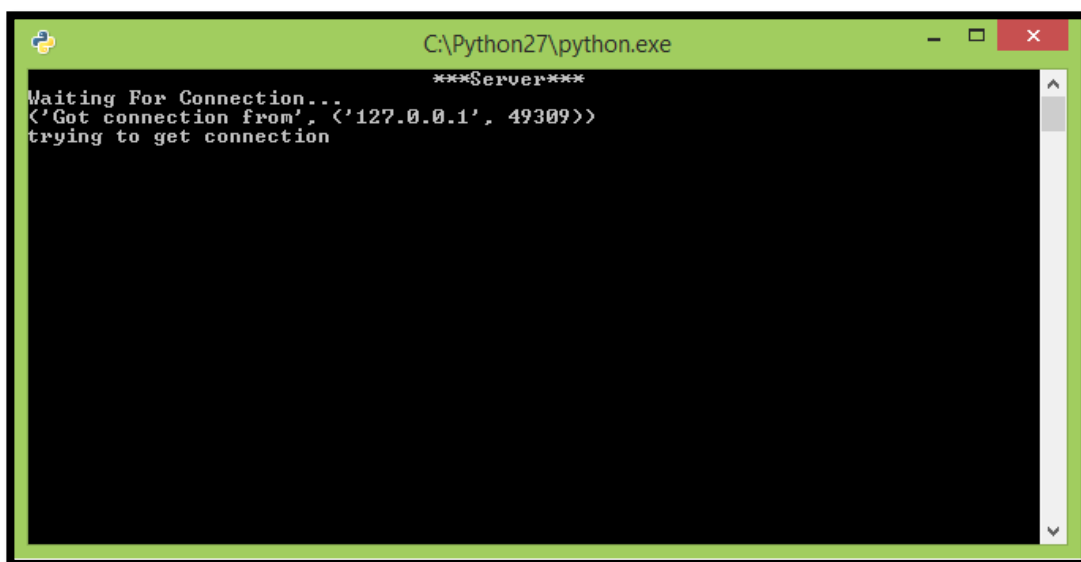


Figure (4.1) Running Database Server.

2- Project Server :

The server dealing with the contents of the website to access the pages of the system and communicate with system administrators and sign in to your customer system, It also sent requests for registration and requests for modifying the system to the (Database Server).



Figure (4.2) Running Project Server.

4.3.2 Registration process:

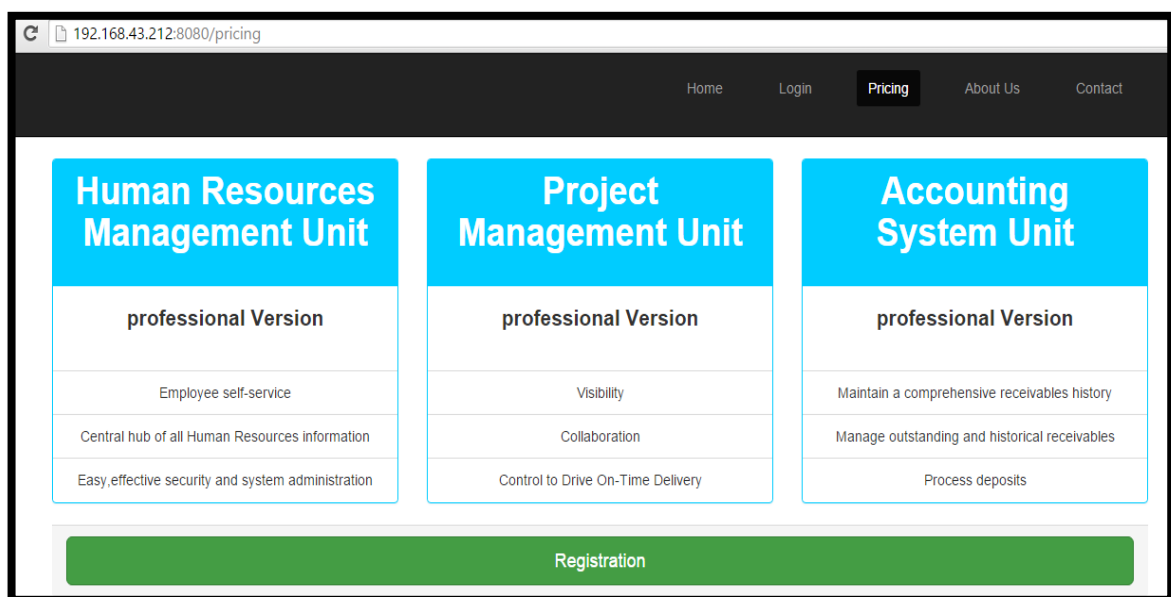
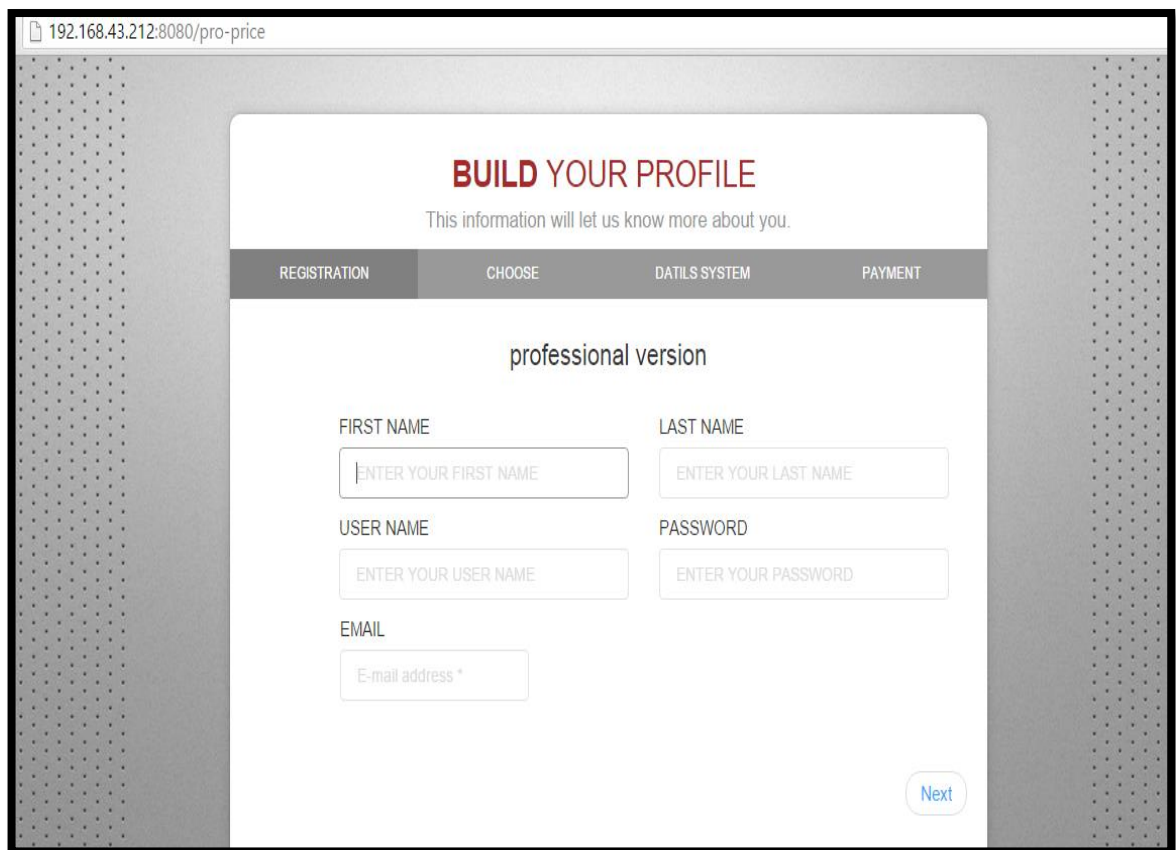


Figure (4.3) pricing screen.

The customer enter his own information to complete the registration:

1- Enter the Main information of customer:

- a) First name.
- b) Last name.
- c) User name.
- d) Password.
- e) E-mail.



The screenshot shows a web browser window with the address bar displaying '192.168.43.212:8080/pro-price'. The main content area features a registration form titled 'BUILD YOUR PROFILE' in red. Below the title, a subtitle reads 'This information will let us know more about you.' A navigation bar contains four tabs: 'REGISTRATION' (selected), 'CHOOSE', 'DATILS SYSTEM', and 'PAYMENT'. The form is labeled 'professional version' and includes five input fields: 'FIRST NAME' (placeholder: ENTER YOUR FIRST NAME), 'LAST NAME' (placeholder: ENTER YOUR LAST NAME), 'USER NAME' (placeholder: ENTER YOUR USER NAME), 'PASSWORD' (placeholder: ENTER YOUR PASSWORD), and 'EMAIL' (placeholder: E-mail address *). A 'Next' button is located at the bottom right of the form.

Figure (4.4) Screen shows the main information of customer.

BUILD YOUR PROFILE

This information will let us know more about you.

REGISTRATION CHOOSE DATILS SYSTEM PAYMENT

professional version

FIRST NAME LAST NAME

Motaz Mohammed

USER NAME PASSWORD

uno

EMAIL

mo3tz0905@gmail.com

Next

Figure (4.5) Screen shows the process of filling the main information in website, then press the (next) button to move to the next page if all field is correct otherwise if field incorrect Figure (B.1) is appear. .

2- Choosing System modules :

- A. Human Resource Management Unit.
- B. Project Management Unit.
- C. Accounting Unit.

192.168.43.212:8080/pro-price#

BUILD YOUR PROFILE

This information will let us know more about you.

REGISTRATION CHOOSE DETAILS SYSTEM PAYMENT

What are the systems that you need?

HUMAN RESOURCES MANAGEMENT UNIT

PROJECT MANAGEMENT UNIT

ACCOUNTING UNIT

Previous Next

Figure (4.6) Screen shows process of selecting the systems that needed by the customer in his own company.

192.168.43.212:8080/pro-price#

BUILD YOUR PROFILE

This information will let us know more about you.

REGISTRATION CHOOSE DETAILS SYSTEM PAYMENT

What are the systems that you need?

☐ HUMAN RESOURCES MANAGEMENT UNIT

☐ PROJECT MANAGEMENT UNIT

☐ ACCOUNTING UNIT

Previous Next

Figure (4.7) Screen shows process of selecting the systems of consumer on-site, then press (next) button to move to the next page if field is selected otherwise if field empty Figure (B.2) is appear.

3- Enter the details information of System:

- a) Number of Users.
- b) The period of time for subscription.
- c) Company name.

192.168.43.212:8080/pro-price#

BUILD YOUR PROFILE

This information will let us know more about you.

REGISTRATION CHOOSE DETAILS SYSTEM PAYMENT

CONFIRM LIST OPTION.

NUMBER OF USER

ENTER number user

The length of time to use the system

1 Month

Company Name

Enter Your Company Name

Previous Next

Figure (4.8) Screen shows information of the system chosen by the customer at the site.

192.168.43.212:8080/pro-price#

BUILD YOUR PROFILE

This information will let us know more about you.

REGISTRATION CHOOSE DATILS SYSTEM PAYMENT

CONFIRM LIST OPTION.

NUMBER OF USER

The length of time to use the system

Company Name

Previous Next

Figure (4.9) Screen shows the process of filling the details information of Customer in website, then press the (next) button to move to the next page if all field is correct otherwise if field incorrect Figure (B.3-B.4) is appear.

4- Insert the credit card information for purchase:

- a) Choosing customer bank.
- b) Enter account number.

The screenshot shows a web browser window with the address bar displaying '192.168.43.212:8080/pro-price#'. The main content area features a form titled 'BUILD YOUR PROFILE' with the subtitle 'This information will let us know more about you.' The form has a progress bar with four steps: 'REGISTRATION', 'CHOOSE', 'DETAILS SYSTEM', and 'PAYMENT'. The 'PAYMENT' step is currently active. Below the progress bar, there is a 'Payment Details' section. This section includes a header with the text 'Payment Details' and four credit card logos: VISA, MasterCard, DISCOVER, and AMERICAN EXPRESS. Below the logos, there are two input fields: 'Bank Name' with a dropdown menu showing 'Khartoum Bank' and 'Account Number' with a text input field containing '12131415'. At the bottom of the form, there are two buttons: 'Previous' and 'FINISH'.

Figure (4.10) Screen shows the process of filling the purchase information of Customer in website, then press the (finish) button finish the registration

5- Registration success process at the site.

In this process the site shows a message that Registration has been successfully completed and is confirmed in customer e-mail when System is ready.

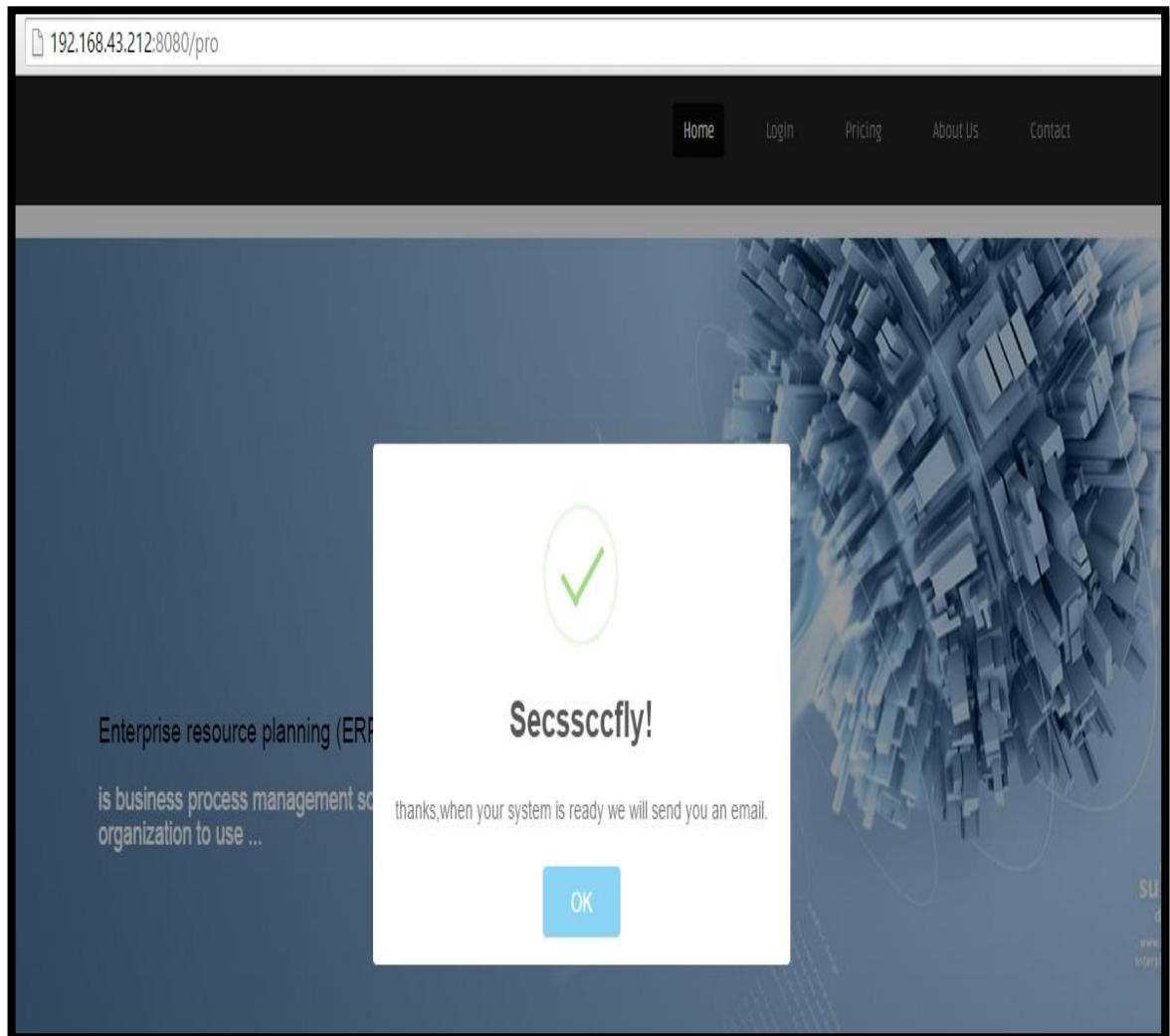


Figure (4.11) Screen shows that all information is correct, and Registration has been successfully completed and is confirmed in customer e-mail when System is ready.

4.3.3 Creating the Database System:

A screenshot of a Windows command prompt window titled "C:\Python27\python.exe". The window has a black background with white text. The text shows the execution of a script that sets up a database system. It starts with "Waiting For Connection...", then reports a connection from '192.168.137.50'. The script then proceeds to create a database, connect to it, change admin credentials, and install various modules. The list of modules includes mail, project, analytic, auth_signup, base_setup, board, decimal_precision, email_template, fetchmail, portal, portal_project, procurement, product, resource, and share. The script concludes with "Done with database las".

```
***Server***
Waiting For Connection...
('Got connection from', ('192.168.137.50', 54488))
trying to get connection
thread started
accepted a connection
trying to get connection
the database does not exist and creating it
database created Successful
connect to database las
connected to database las
change admin username and password for database las
finshed changes for database las
login as admin for database las
in as admin for database las
create user as admin for database las
created user as admin for database las
create useres for database las
created useres for database las
Install project for database las
1 module(s) selected
15 module(s) to process:
  to install    mail
  to install    project
  to install    analytic
  to install    auth_signup
  to install    base_setup
  to install    board
  to install    decimal_precision
  to install    email_template
  to install    fetchmail
  to install    portal
  to install    portal_project
  to install    procurement
  to install    product
  to install    resource
  to install    share
project instaled for database las
Login as a user for database las
deactivate the adminstaration account  for database las
Done with database las
```

Figure (4.12) create the database for system chosen

4.3.4 Account confirm process by E-mail:

The customer enter his E-mail and make sure that confirm message of system arrive and message contains:

- a) Company ID.
- b) Username.
- c) Number of users.
- d) Expire Date.
- e) System Link.
- f) Attachment file.

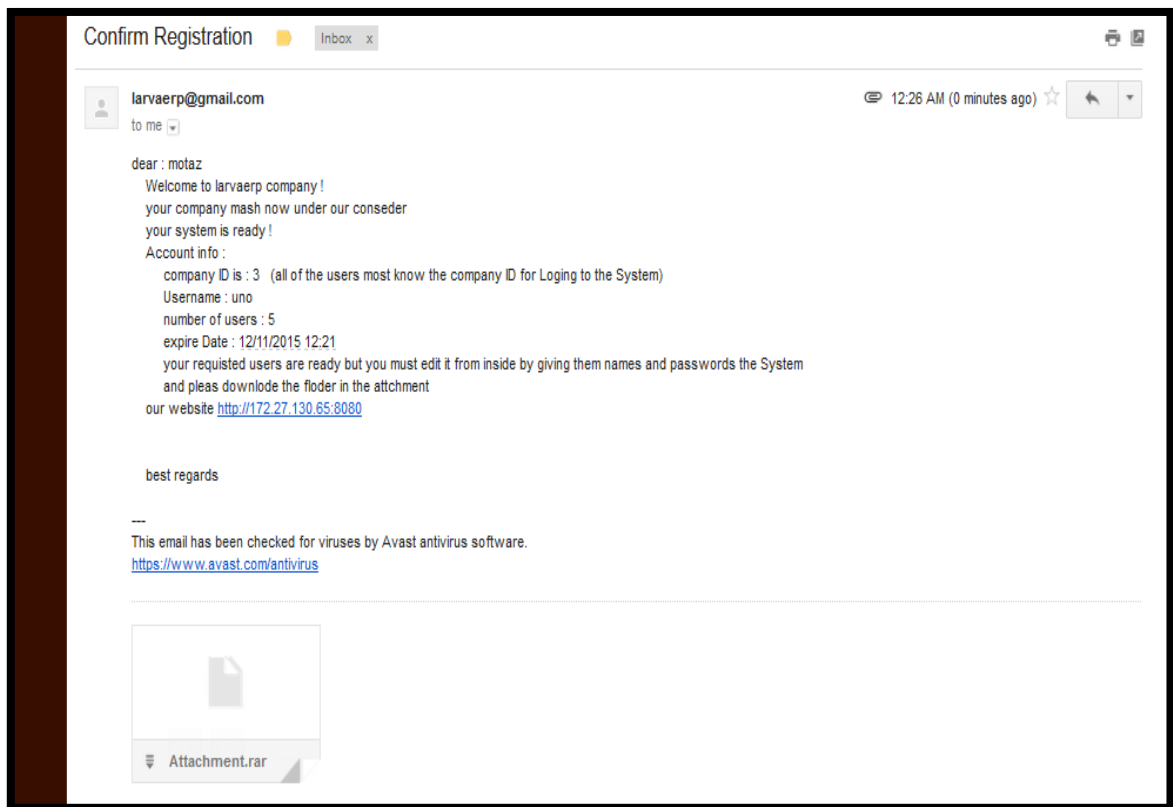


Figure (4.13) Screen shows the massage that sent to customer contain System information, also its E-mail has (attachment) which contains (Usage information booklet), and (Desktop app).

4.3.5 Login process.

Access to log in page and enter the data sent in the customer E-mail:

- a) Company ID.
- b) Username.
- c) Password.

The image shows a login screen with a blue background. At the top, the word "Login" is displayed in a large, white, sans-serif font. Below the title, there are three white input fields stacked vertically. The first field is labeled "Company ID" in a light gray font and has a small dropdown arrow icon on its right side. The second field is labeled "Username" in a light gray font. The third field is labeled "Password" in a light gray font. Below these fields, there is a blue, rounded rectangular button with the text "Sign In" in white. In the bottom right corner of the screen, there is a small, light gray rectangular button with the text "Cancel" in a darker gray font.

Figure (4.14) Screen shows login process to system.

➤ **Users of the system is divided into three main sections:**

1- Administer.

It responds to messages received from the participants and visitors and controls (Access Right) and (Groups) processes.

The image shows a login interface with a blue background. At the top, the word "Login" is displayed in a large, dark font. Below it, there are three input fields: the first contains the number "0", the second contains the text "admin", and the third contains five black dots, indicating a password field. To the left of the password field is a blue rounded rectangle button with the text "Sign In" in white. At the bottom right of the interface is a light gray rounded rectangle button with the text "Cancel" in dark gray.

Figure (4.15) Screen shows (Admin) process filling login information to access System from website, then press on (sign in) button to move to the next page if all field is correct otherwise if field incorrect Figure (B.5) Is appear.

This screenshot shows a 'Customer Support' interface. At the top right, there is a dark header with the text 'Coustmer Support'. Below this, a message card is displayed. The card has a light gray header with 'Name: motaz'. The main body of the card contains the message 'Message: please help me ! my system'. Below the message is a text input field with the placeholder text 'Write the Reply Here'. Underneath the input field are two buttons: a blue 'Reply' button and a red 'Delete' button. At the bottom of the card, the email address 'email: mo3tz0905@gmail.com' is shown.

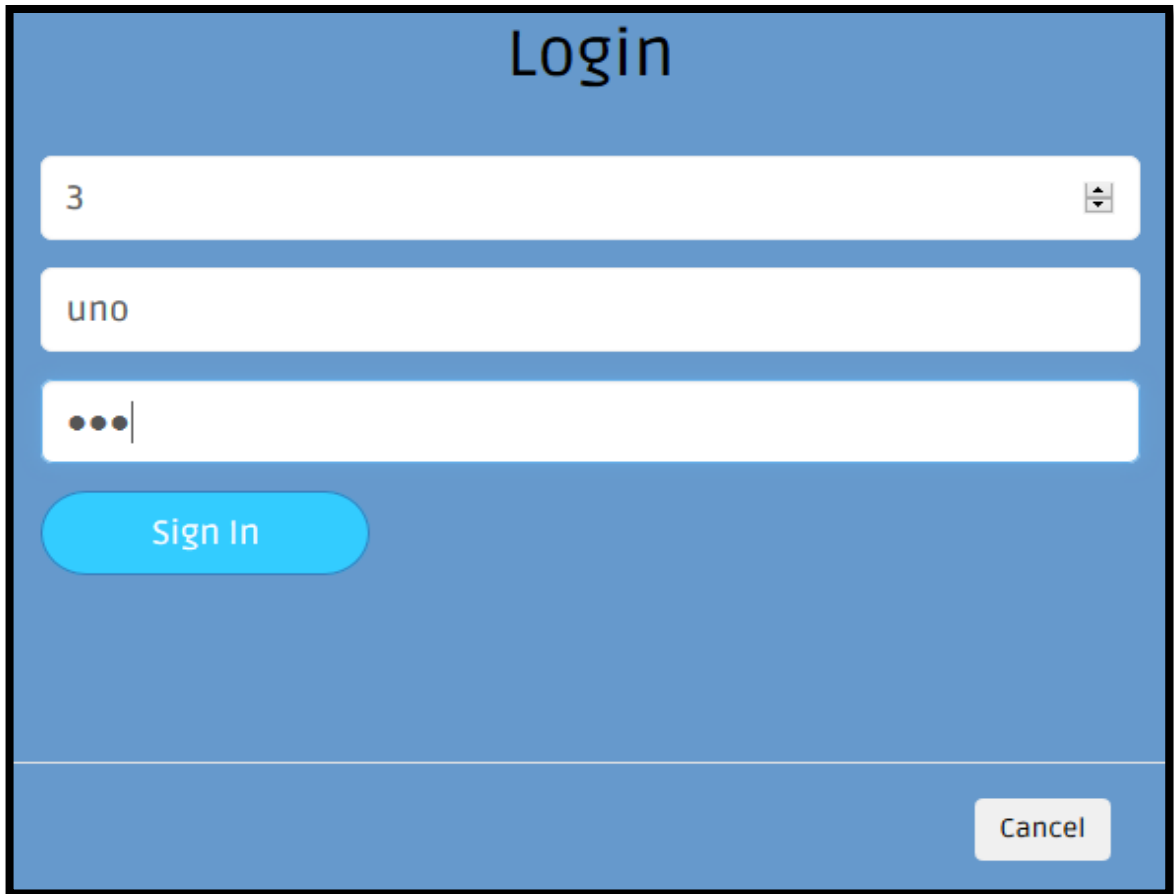
Figure (4.16) Screen shows all the messages customer and visitors that sent complaints or proposals at the company's website which on a (Admin) page, with the possibility of a response from the same place (Reply) or (Delete).

This screenshot shows a company report interface. The top section has a light gray header with 'Company Name: mash' and 'Company ID: 3'. Below this, the report details are listed: 'Inestalled module : Project Management', 'number Of Useres: 5', 'Expire Date: 2015-11-12 12:21:11.705000', and 'email: mo3tz0905@gmail.com'. At the bottom of the report is a text input field with the placeholder text 'write the message here'. Below the input field is a blue 'Send' button.

Figure (4.17) Screen shows all the reports of all companies registered on the site, With the possibility of sending messages to Customer of the system

2- Company Admin.

The system administrator has the access of modification users.



A login form titled "Login" with a blue background. It contains three input fields: the first field contains the number "3" and has a small icon on the right; the second field contains the text "uno"; the third field contains three dots and a vertical line, indicating a password field. Below the input fields is a blue rounded button labeled "Sign In". At the bottom right of the form is a white button labeled "Cancel".

Figure (4.18) Screen shows (Company Admin) process of filling login information to access to his profile in site, then press on (sign in) button to move to the profile page if all field is correct otherwise if field incorrect Figure (B.5) is appear.

System Info

Company ID :	3
Company Name :	mash
Email :	mo3tz0905@gmail.com
Module :	management
Number Of Useres :	5
End Date :	2015/11/12

To SystemEdit Profile

Cancel

Figure (4.19) Screen shows (Admin profile) which contain all company information.

➤ **Divided Profile page into:**

1- Edit Profile:

Access to the official site and access to the personal account page (Company-Admin) and access to modify the system information:

- a) Number of User.
- b) E-mail.
- c) Date.
- d) Modules.

After entering this data, the system requirement to input your customer account number until the modification process successfully.

Edit Your Account

Enter Edit Number Users

ENTER number of user

Enter Edit Your Email

ENTER Your New Email

Edit time to use the system

- DATE -

Choose Modules:

☐ Human Resources Management Unit.

☒ Project Management Unit.

☐ Accounting Unit.

Bank Name

Khartom Bank

Enter Account number

ENTER Account number

Worrying: Unchecking Module Mean Deleteing it !!

UPDATE

Logout&Cancel

Figure (4.20) Screen shows edit process to main information of company

2- To System:

This process is entering its system and deal with the users of the system, and has the independent properties.

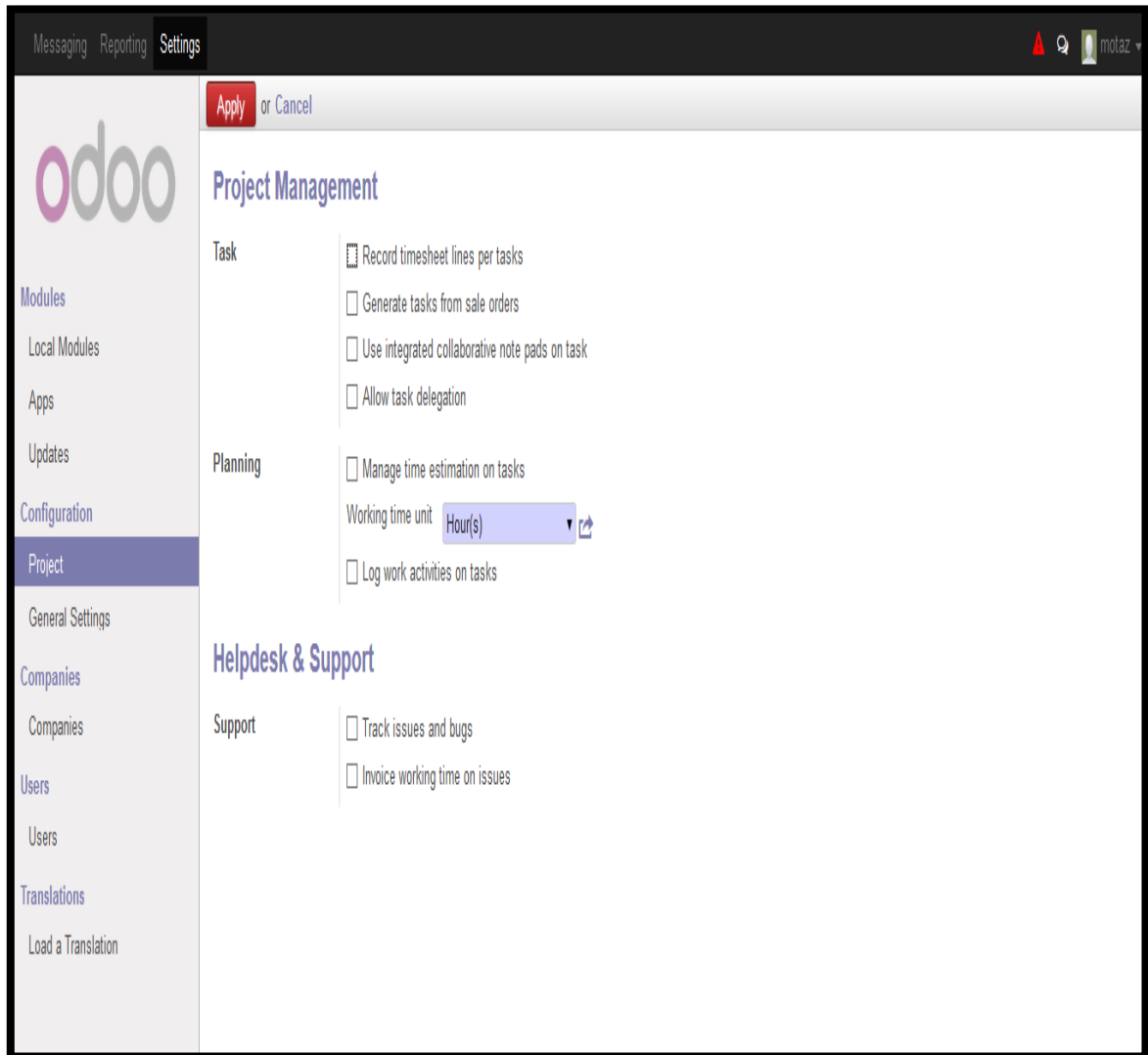


Figure (4.21) the process of entering the system by (Admin) and deal with it.

3- Company User.

Using the company's system.

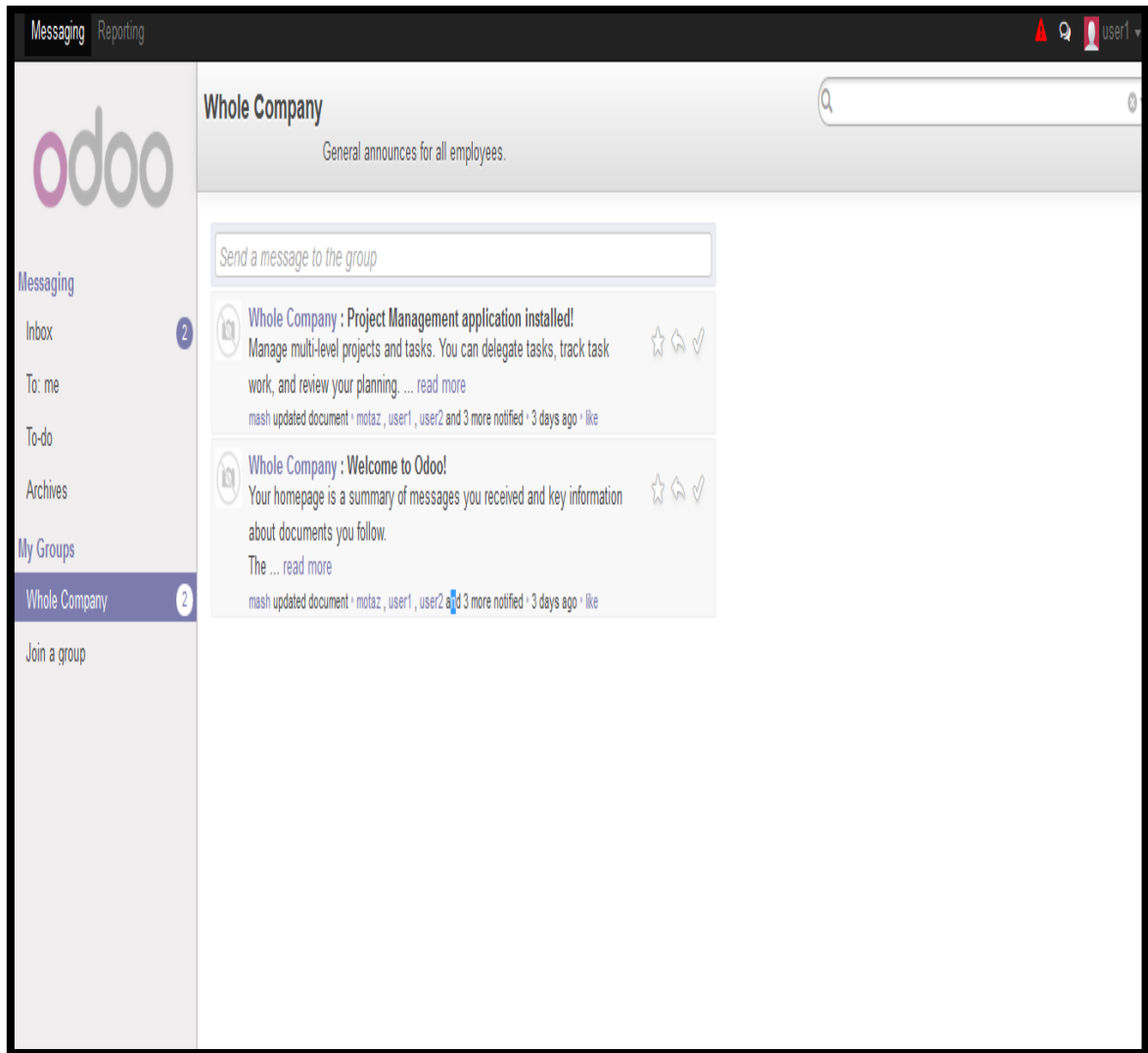


Figure (4.22) Screen shows the process of entering the system by (Users) and deal with it.

4.3.6 Process of activating the user:

Access the system and deal with the system and activate the users of the system by (Company admin) account.

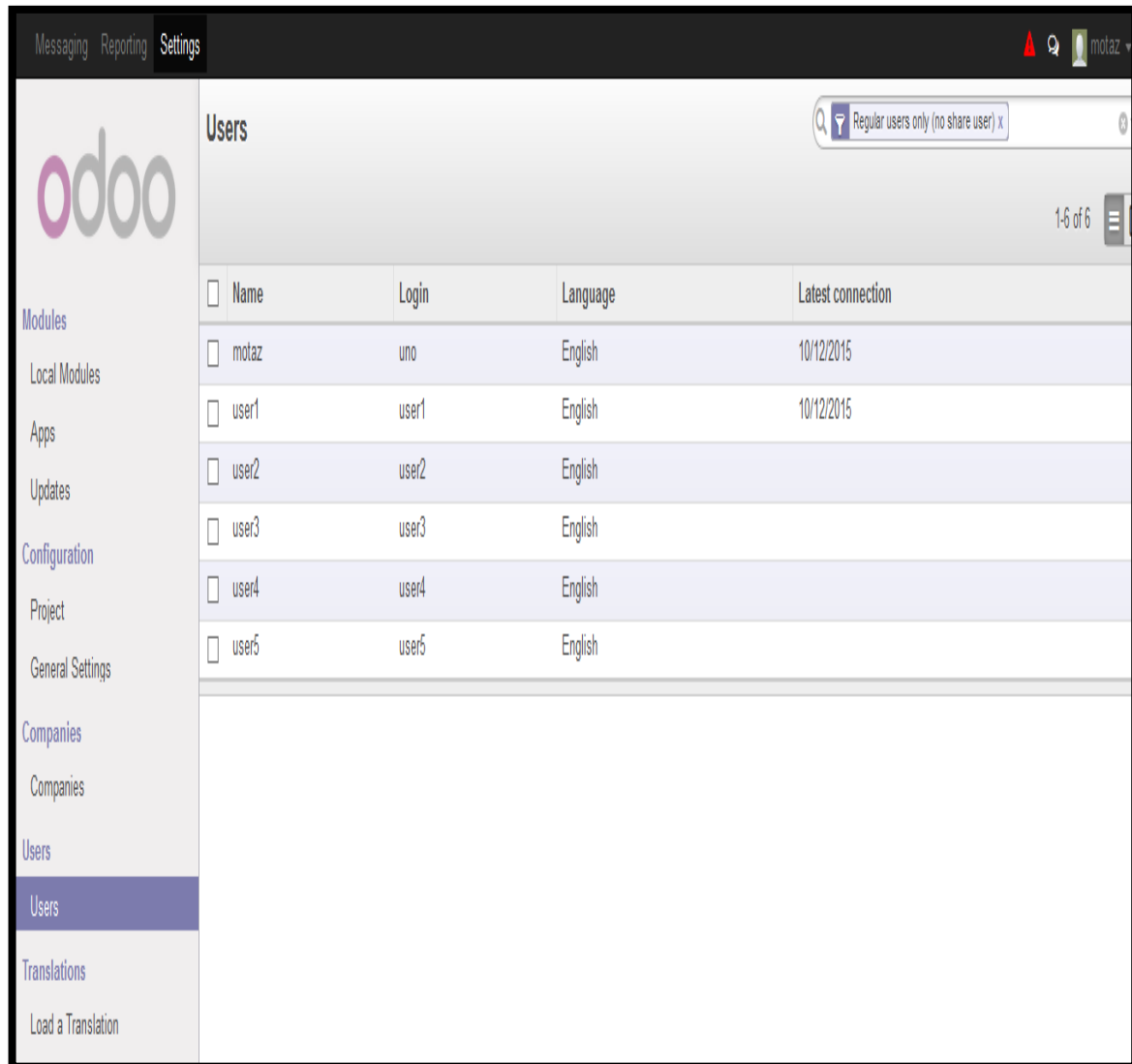
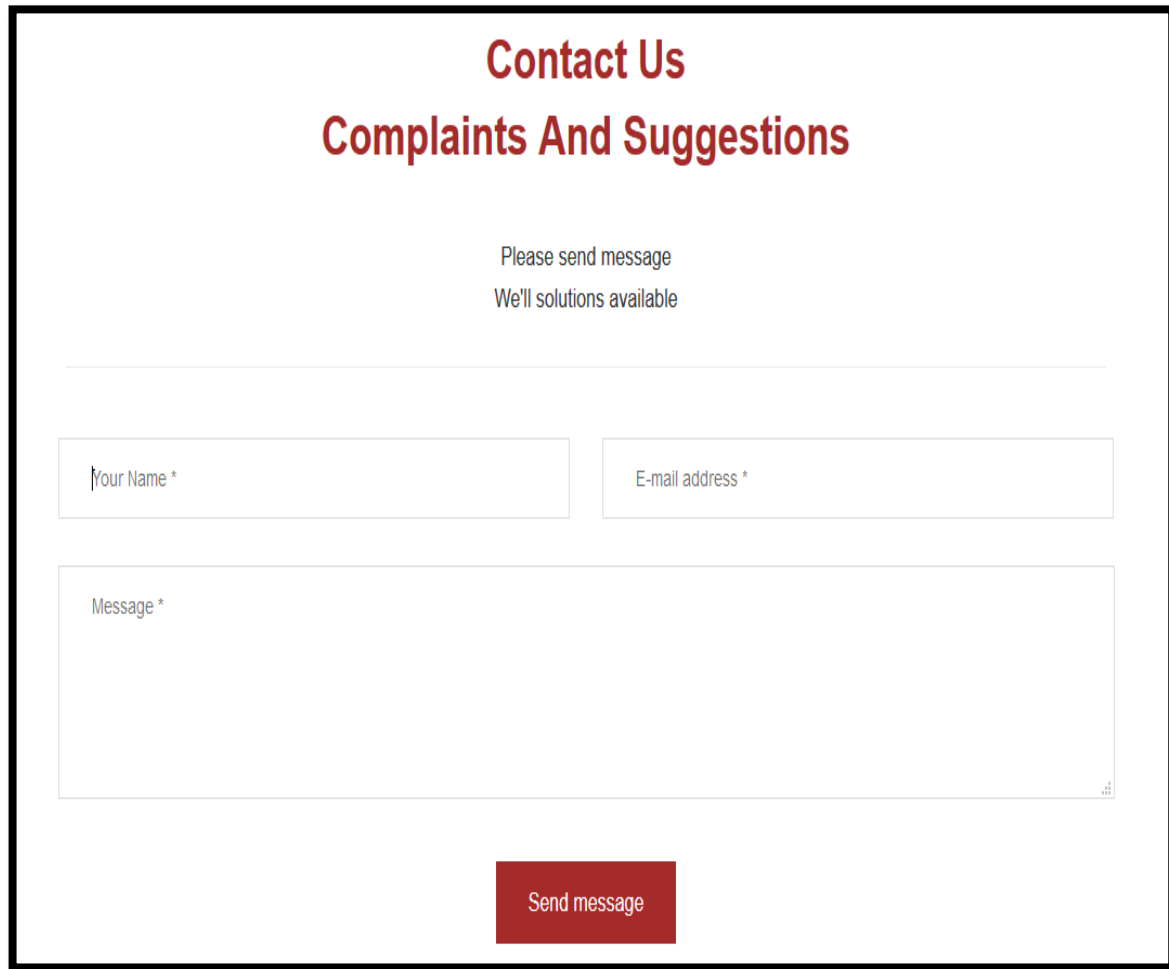


Figure (4.23) Screen shows process of entering to (users), and the possibility of activating the users in figures (C.6-C.7-C.9) screen and modify user data (C.8).

4.3.7 Process Complaints and suggestions:

Customer or visiting can communicate with the company's own the website by E-mail messages.



The image shows a web form titled "Contact Us" and "Complaints And Suggestions" in a large, bold, dark red font. Below the title, there is a light gray box containing the text "Please send message" and "We'll solutions available". Below this, there are three input fields: "Your Name *" (a text box), "E-mail address *" (a text box), and "Message *" (a large text area). At the bottom of the form, there is a red button labeled "Send message".

Figure (4.24) Screen shows process of sending complaints and suggestions by customer or visitor to (website Admin).

4.3.8 Process monitor Account:

The process by which the customer able to control his personal account by (Desktop app).

A. Installing application from Attachment file came with confirm E-mail.

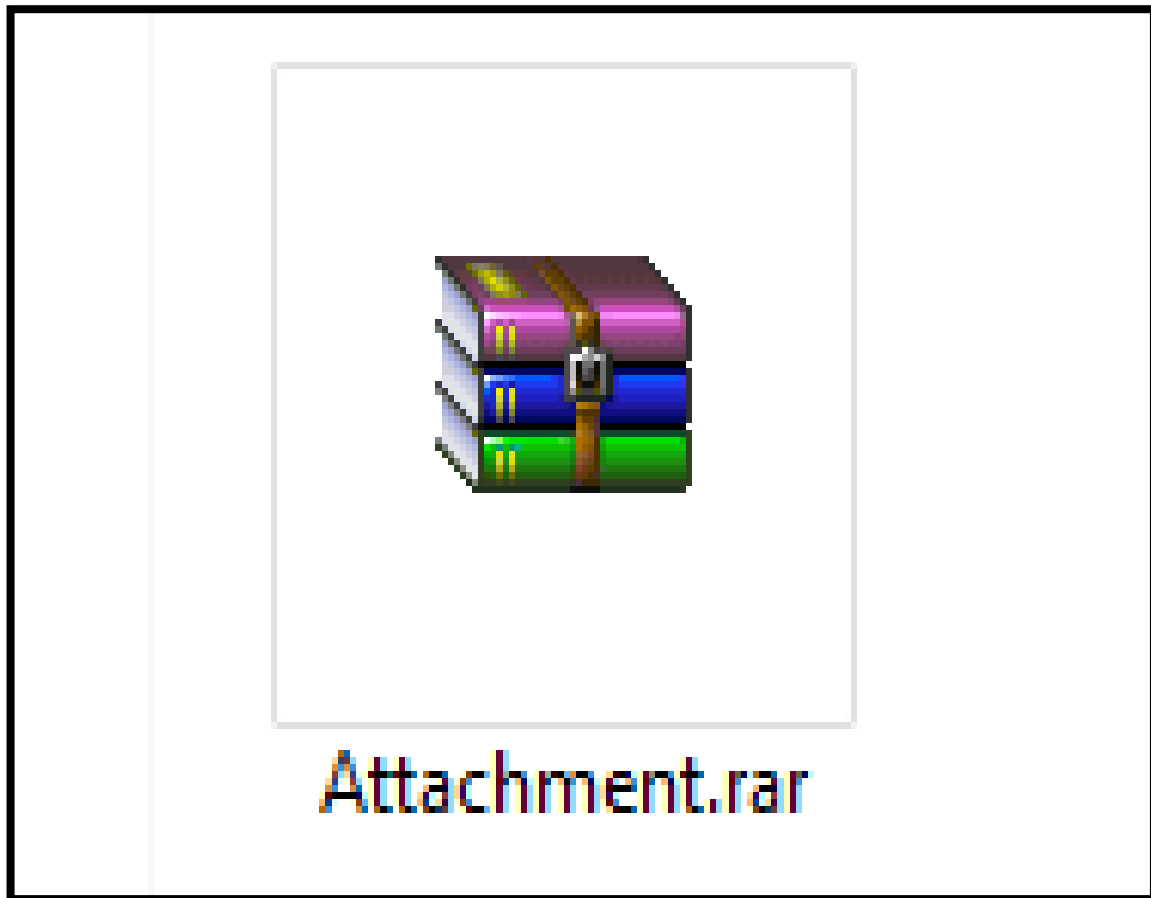


Figure (4.25) Screen shows download the file from e-mail in the desktop, and can know the installation steps in the screen figures (C.1-C.2-C.3-C.4-C.5).

B. Enter (Company ID, Username, Password)

After you install the program and open it must be enter data of Company Admin.

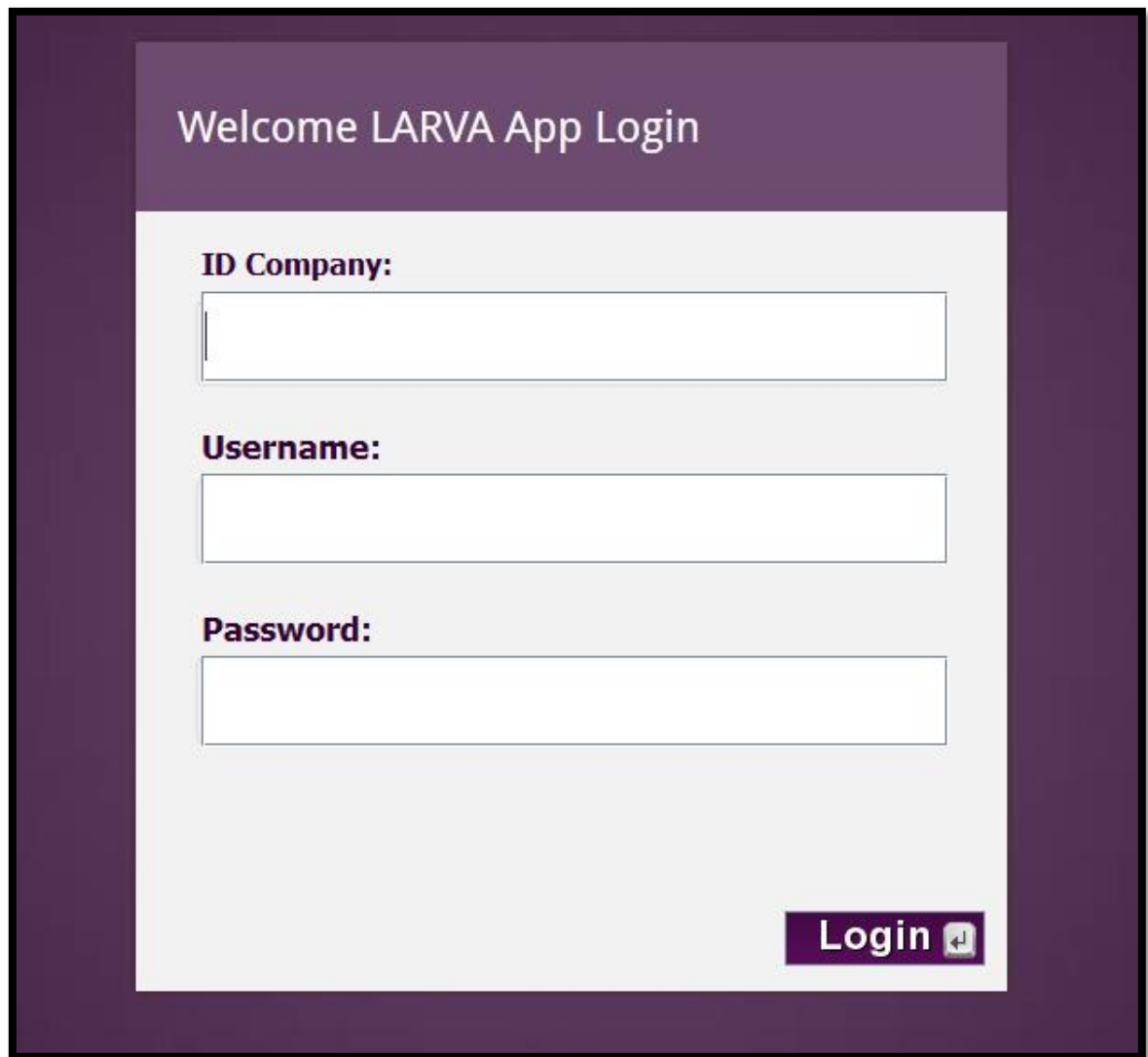
The image shows a login window for the LARVA App. The window has a dark purple border. Inside, there's a light gray header bar with the text "Welcome LARVA App Login" in white. Below this, there are three input fields stacked vertically, each with a label to its left: "ID Company:", "Username:", and "Password:". Each label is in a bold, dark purple font. The input fields are white with thin gray borders. At the bottom right of the light gray area, there is a dark purple button with the word "Login" in white, followed by a small icon of a computer monitor with a cursor arrow pointing at it.

Figure (4.26) Screen shows the main interface of Desktop application.

Welcome LARVA App Login

ID Company:

2

Username:

uno

Password:

•••

Login →

Figure (4.27) Screen shows process of filling customer information (Company-Admin) in desktop application, then press on (login) button to move to the profile page.

C. Showing all system-specific data with access to my System.

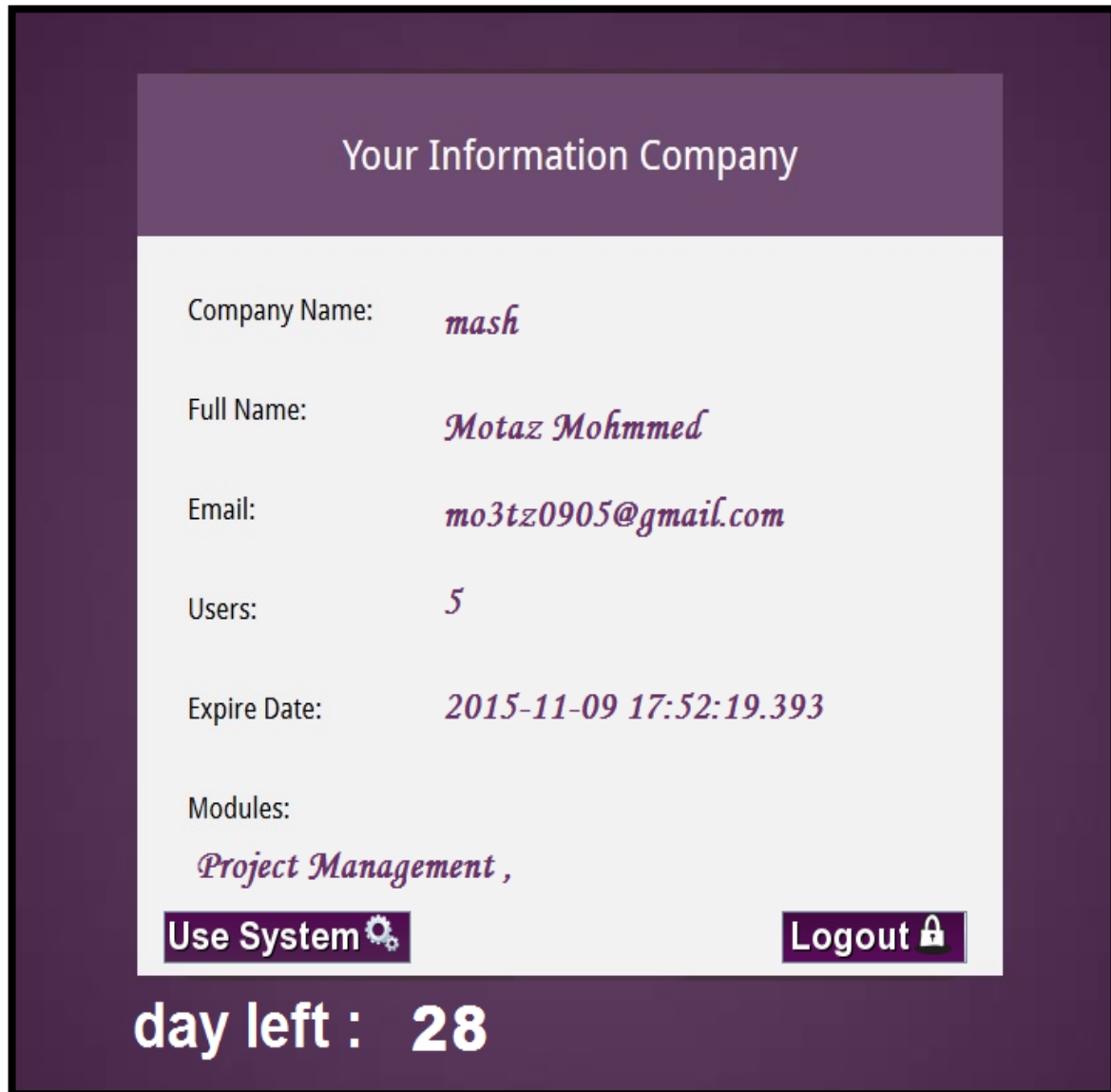


Figure (4.28) Screen shows all Customer information (Company Admin) in Desktop app

D. The official website of the system if (to System) button is pressed.

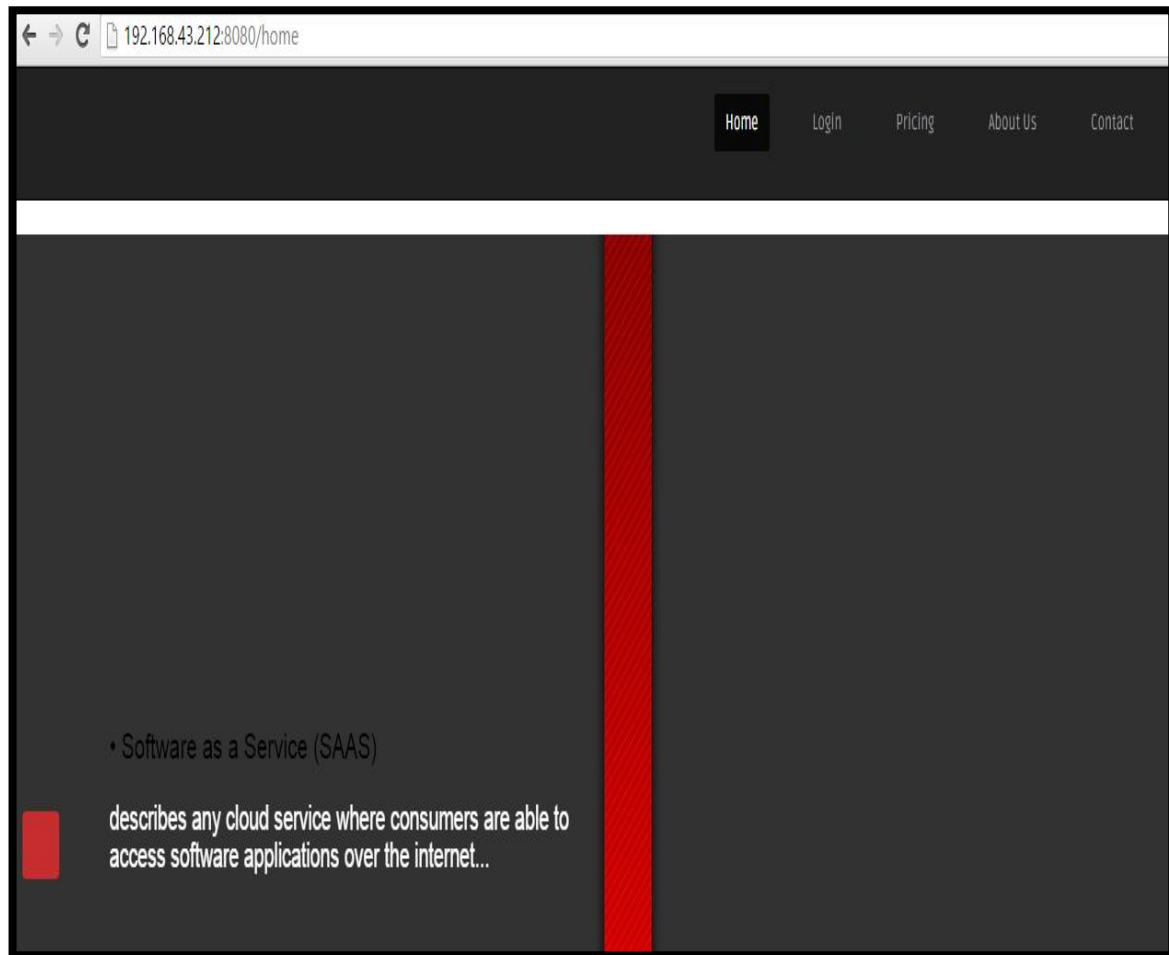


Figure (4.29) Screen shows official website of the system.

5.1 Introduction:

This chapter is section discusses the final results of the System, and the second section discusses the conclusion and recommendations.

5.2 Results:

The final results include:

- ❖ Conversion of rent to buy the product and the product is low cost of the program and the hardware and maintenance.
- ❖ Dealing with system is online so we didn't need devices with high options
- ❖ SaaS applications are available on almost all devices - anytime, anywhere.
- ❖ Apply the concept (SAAS) application in practical system (OpenERP).
- ❖ The ability to share data easily between different departments in the organization.
- ❖ SAAS is lowers the IT costs for hardware, software and resources.
- ❖ Provide features are regularity of work and invest a lot of time and efforts because most regimes in the old companies abound where mistakes.
- ❖ SaaS providers also offer customization capabilities to meet specific needs.
- ❖ It was reached that there is no better way whatsoever from the use of this type of system to make harmonious corporate information systems and provide a lot of disbursements to organize and speed up the processes within the organization.
- ❖ SAAS ensure the integrity of company data.

5.3 Conclusion:

Pen age began to be broken ... and its edges torn
Wind take what is left in our hands from the moment that brought us together in
unique brotherhood ... we met ... we separate ... we went back ...
Then here we go ... knocking the doors of departure to meet the cross road ... and the
end point.
We put the final touches a trip that lasted for five chapters between thinking and
prudence in..... (Software as services ERP system).
The trip was very hard to elevate the mind and the ascension varying ideas.....
This effort is the effort of our eyeballs we don't claim perfection, but we did our best
so if we reach the goal our objective will be met and if not then we have the honor of
trying and learning.
And finally ...
We hope to obtain acceptance and deliver satisfaction
Oh God, pray and solute our beloved Prophet Muhammad and his family and peace.

5.4 Recommendations:

There is no perfect work but what we did is a launch for a big project we recommend the following:

- 1- Adoption of the project by a big company to be developed at future.
- 2- When applying the system as a service upon request we recommend that the implementing team should have implementer and business consultant because this is a cause of success.
- 3- Link the proposed system with all governmental companies for the possibility of future expander to e-government.
- 4- Actual application for the SAAS ERP.
- 5- More care must be to information systems and specially organization management because it works in facilitating lot of work and reduction of effort.
- 6- We recommend finalizing other ERP department cause they are linked and relay on each other
- 7- Focusing on the security aspect on SAAS ERP.

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(12:13 PM 10/10/2015).

Appendices

1- Appendix A:

Database system:

(1)Table Name: Company

companyName text	companyId integer	id [PK] serial	
ahmedco	١	١	١
mash	٢	٢	٢
Daal	٣	٣	٢
petronas	٤	٤	٣
Zain	٥	٥	٥
MTN	٦	٦	٦
sudani	٧	٧	٧
one second	٨	٨	٨
morjan	٩	٩	٩
sariy	١٠	١٠	١٠
alrashid	١١	١١	١١
almohajer	١٢	١٢	١٢
africa	١٣	١٣	١٢
alseed	١٤	١٤	١٣
shikan	١٥	١٥	١٥
			*

Figure (A.1) Company

(2) Table Name: Person part 1:

email text	password text	userName text	lName text	fName text	id [PK] serial	
hotmail.com	١٢٣	ahm	abbas	ahmed	١	١
5@gmail.com	١٢٣	uno	Mohmmmed	Motaz	٢	٢
hotmail.com	١٢٣	moh	ali	mohmed	٣	٣
5@gmail.com	١٢٣	moe	mohmmmed	ahmed	٤	٤
hotmail.com	١٢٣	sara	ali	sara	٥	٥
hotmail.com	١٢٣	mazen	ali	mazen	٦	٦
hotmail.com	١٢٣	mona	ahmed	mona	٧	٧
hotmail.com	ahmed	ahmed	satti	ahmed	٨	٨
hotmail.com	saad123ali	ali	ali	saad	٩	٩
hotmail.com	moh147asd	moha	mohmmmed	mohaend	١٠	١٠
hotmail.com	hayo123os	hayo	osama	hoyam	١١	١١
hotmail.com	١٢٣٤٥	khd	Omer	Khalid	١٢	١٢
5@gmail.com	١٢٣١٧٨	Omr	Ali	Omer	١٣	١٣
hotmail.com	hba12345	hba	Othman	Hiba	١٤	١٤
5@gmail.com	sam12347	salm	mohmmmed	salem	١٥	١٥
						*

Figure (A.2) Person part 1

(3) Table Name: Person part 2:

companyName	endDate	RegDate	expireDate	numOfUser	accounting	management	hr
text	ut time zone	ut time zone	text	integer	boolean	boolean	boolean
ahmedco	٢٠١١-١١-٠٩	٢٠١٥-١١-٠٩	Month ٣	١	FALSE	FALSE	TRUE
mash	٢٠١٥-١١-٠٩	٢٠١٥-١١-٠٩	Month ١	٥	FALSE	TRUE	FALSE
Daal	٢٠١١-١١-٠٩	٢٠١٥-١١-٠٩	Month ٣	٣	TRUE	FALSE	FALSE
petronas	٢٠١١-٠٤-٠٩	٢٠١٥-١١-٠٩	Month ١	١٢	FALSE	TRUE	TRUE
Zain	٢٠١٥-١١-٠٩	٢٠١٥-١١-٠٩	Month ١	١	TRUE	FALSE	TRUE
MTN	٢٠١٥-١١-٠٩	٢٠١٥-١١-٠٩	Month ١	١١	TRUE	TRUE	FALSE
sudani	٢٠١١-١١-٠٩	٢٠١٥-١١-٠٩	YEAR ١	٧	TRUE	TRUE	TRUE
one second	٢٠١١-١١-٠٩	٢٠١٥-١١-٠٩	Month ٣	٨	FALSE	FALSE	TRUE
morjan	٢٠١١-٠٤-٠٩	٢٠١٥-١١-٠٩	Month ١	٩	TRUE	FALSE	FALSE
sariy	٢٠١٥-١١-٠٩	٢٠١٥-١١-٠٩	Month ١	٤	FALSE	FALSE	TRUE
alrashid	٢٠١١-١١-٠٩	٢٠١٥-١١-٠٩	YEAR ١	٥	TRUE	FALSE	FALSE
almohajer	٢٠١٥-١١-٠٩	٢٠١٥-١١-٠٩	Month ١	١٢	FALSE	TRUE	FALSE
africa	٢٠١١-١١-٠٩	٢٠١٥-١١-٠٩	Month ٣	١٢	FALSE	FALSE	TRUE
alseed	٢٠١١-٠٤-٠٩	٢٠١٥-١١-٠٩	Month ١	٤	TRUE	FALSE	FALSE
shikan	٢٠١١-٠٤-٠٩	٢٠١٥-١١-٠٩	Month ١	٤	TRUE	FALSE	TRUE

Figure (A.3) Person part 2

(4) Table Name: Contact:

	id [PK] serial	name character vai	message text	email character varying(255)
1	1	motaz	please help	mo3tz0905@gmail.com
2	2	mohammed	Hi	gammer.1990@hotmail.com
3	3	Ali	good mornin	aliko12@gmail.com
4	4	sara	hello	saro131@hotmail.com
5	5	ahmed	good job	hamado89@gmail.com
*				

Figure (A.4) Contact

2- Appendix B:

System validation

1- Validations of Registration.

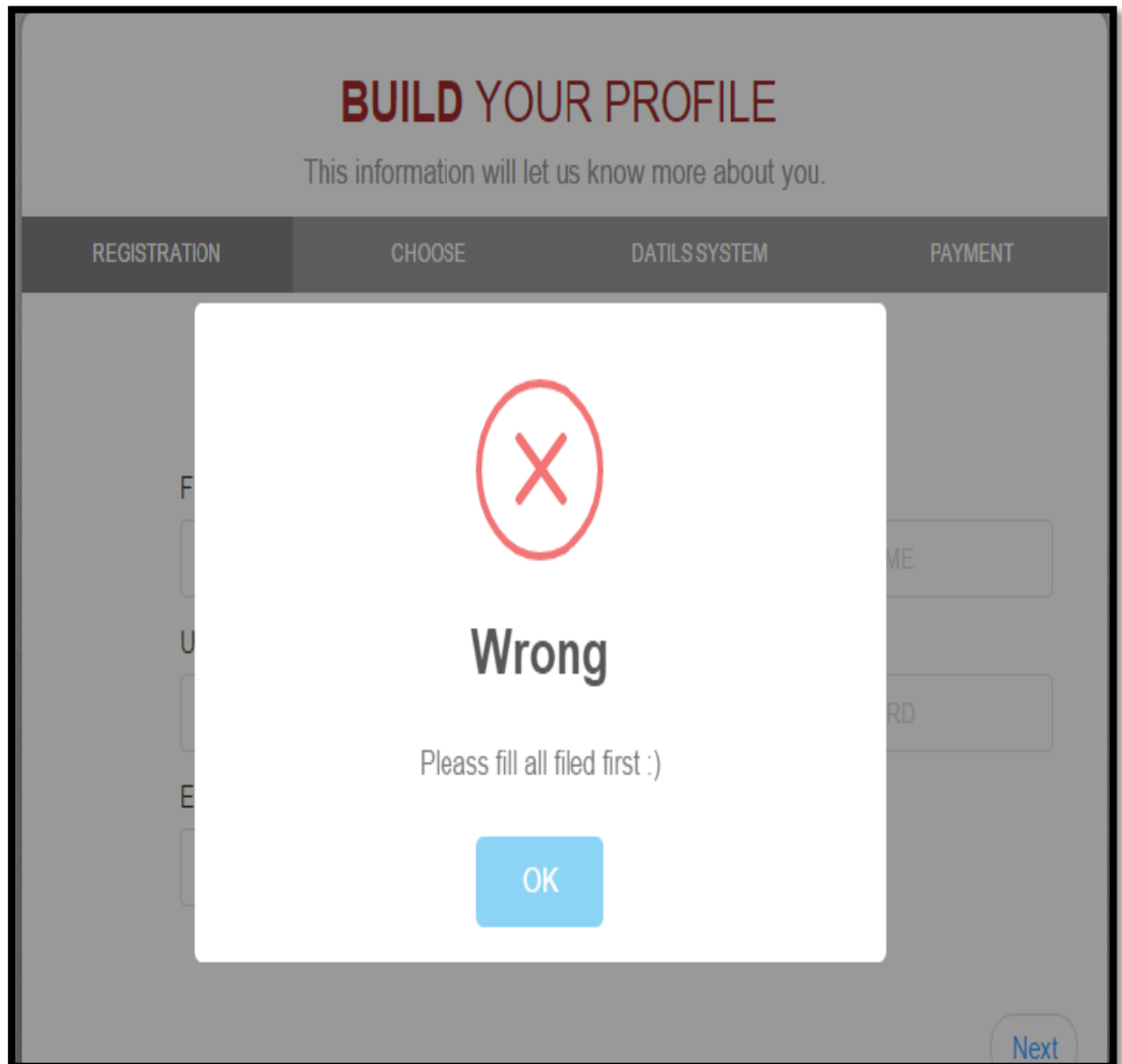


Figure (B.1) Validations of Registration.

2- Validations of choose modules.

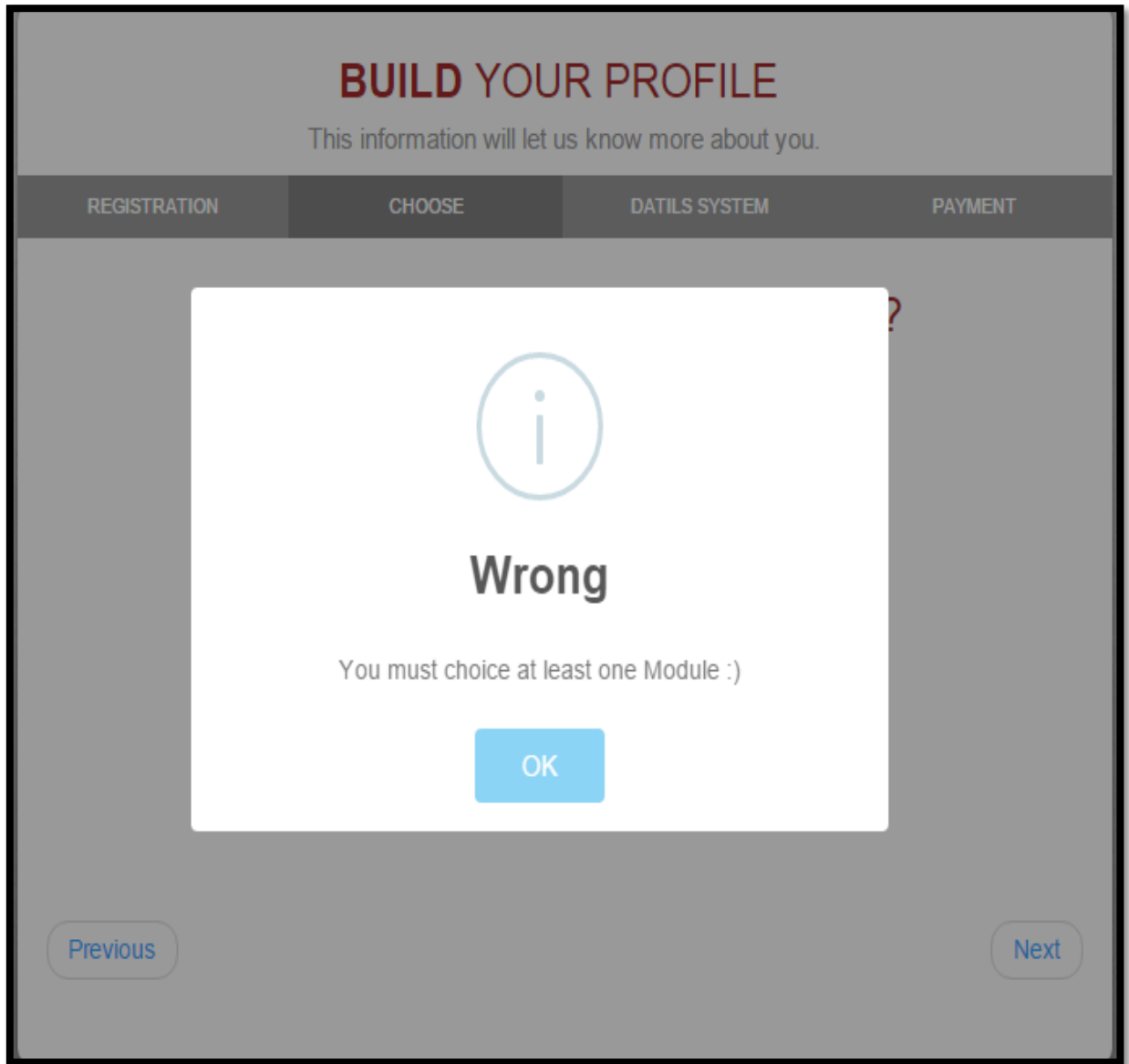


Figure (B.2) Validations of choose modules.

3- Validations of details modules.

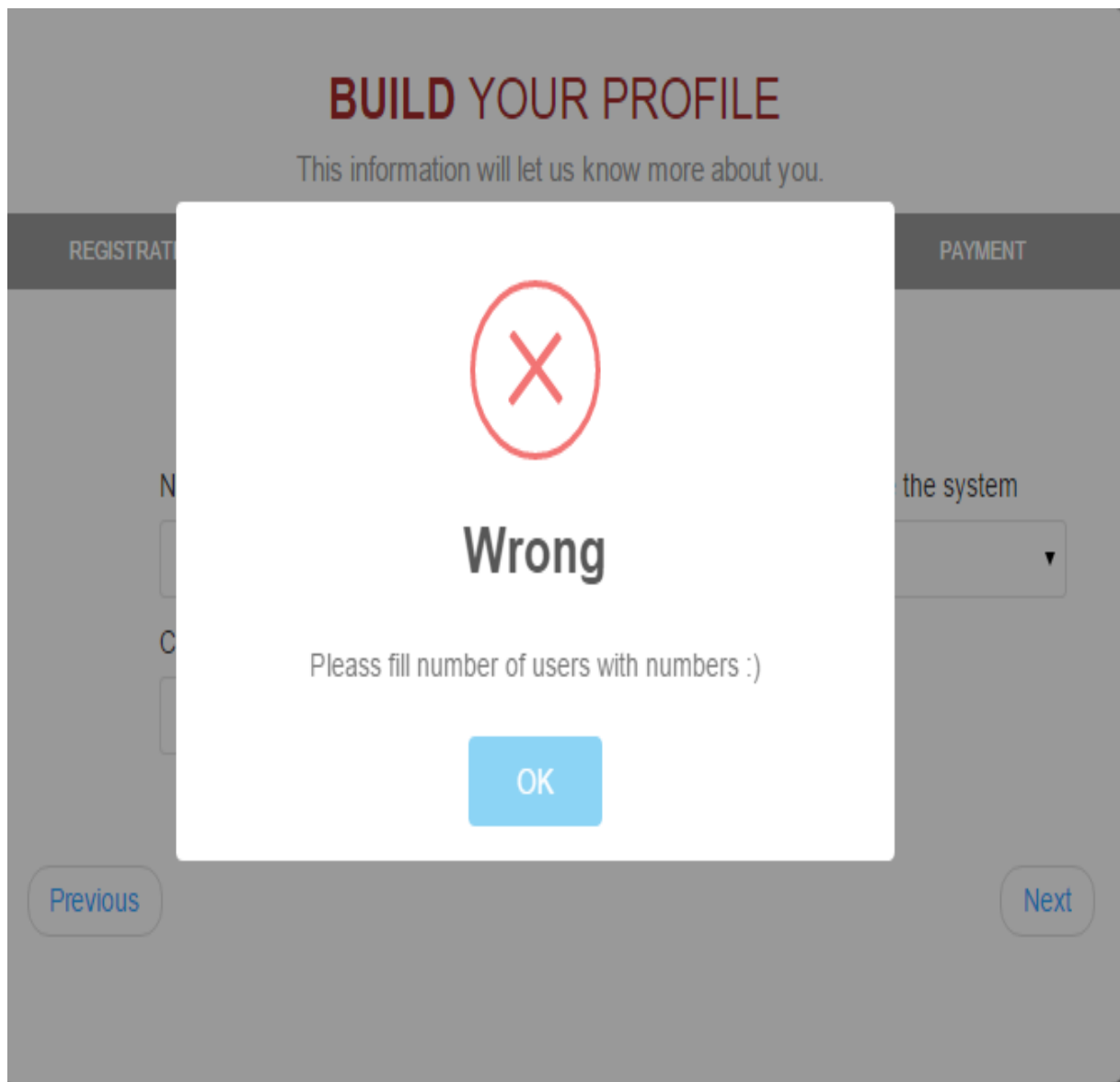


Figure (B.3) Validations of details modules.

4- Validations of company name.

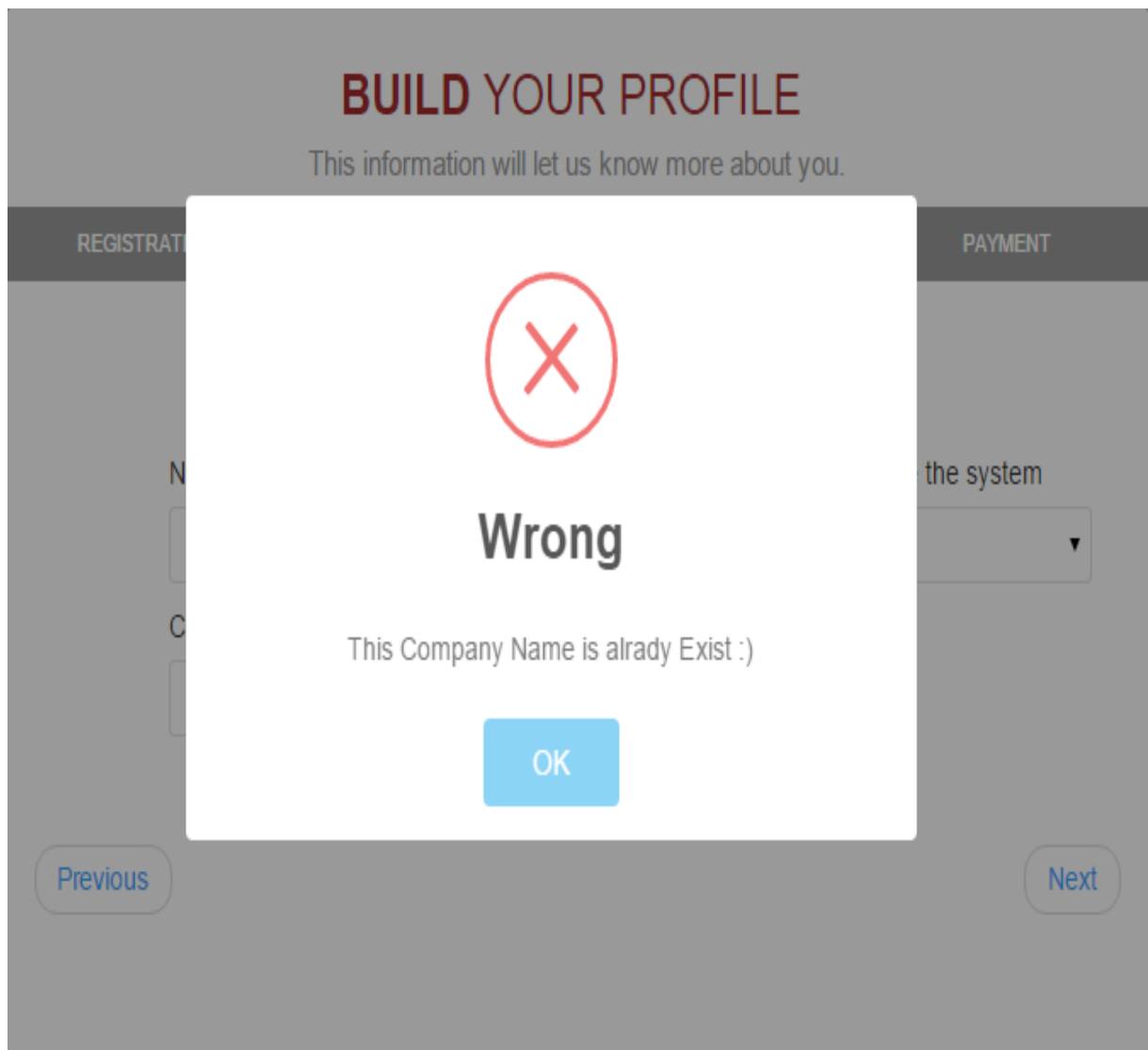
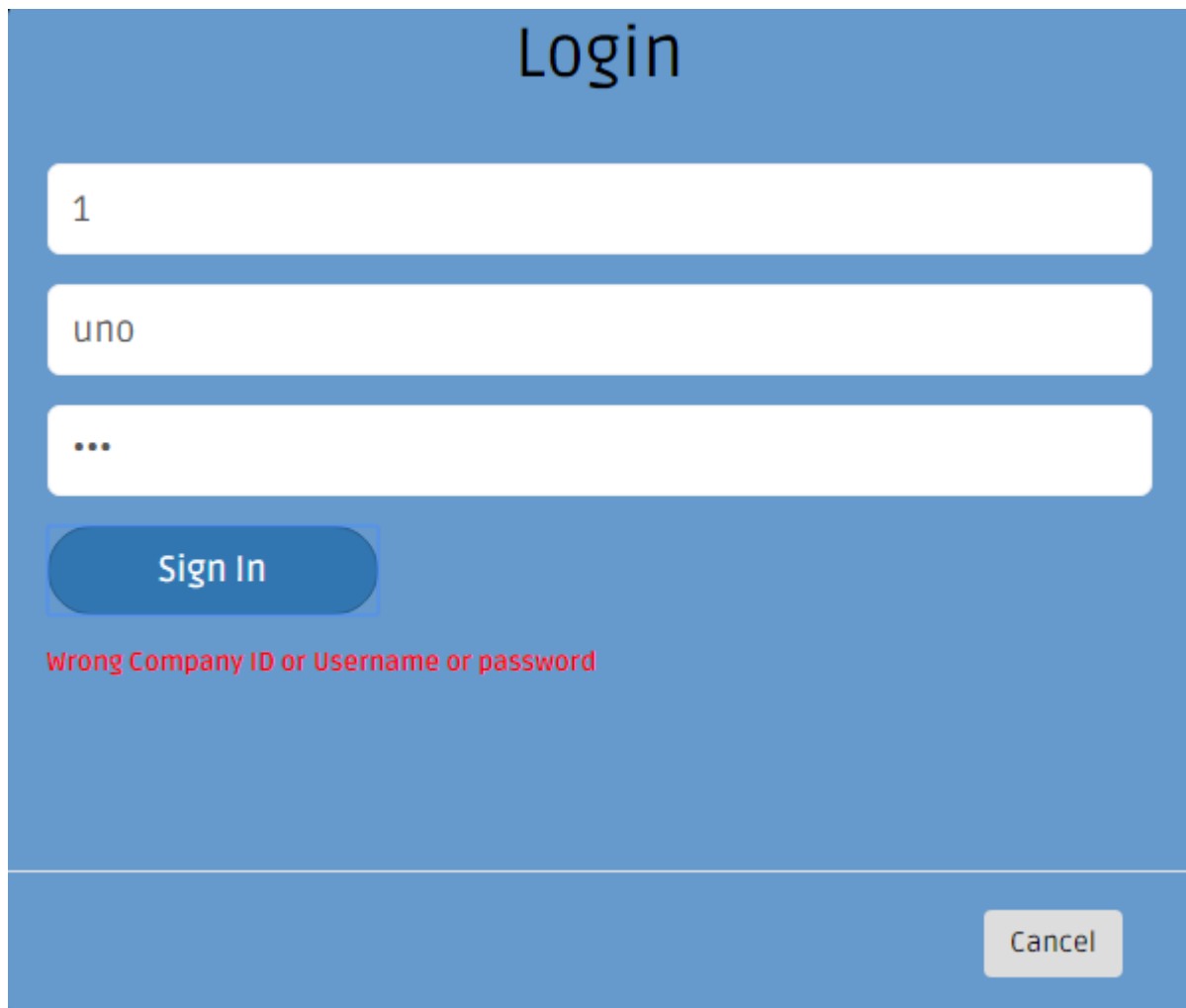


Figure (B.4) Validations of company name.

5- Validations of company name.



The image shows a login interface with a blue background. At the top, the word "Login" is centered in a large, black, sans-serif font. Below it are three white input fields. The first field contains the number "1". The second field contains the text "uno". The third field contains three dots "...". Below the input fields is a blue button with rounded corners and the text "Sign In" in white. Below the button, the text "Wrong Company ID or Username or password" is displayed in a red, sans-serif font. At the bottom right of the form, there is a light gray button with rounded corners and the text "Cancel" in a dark gray, sans-serif font.

Figure (B.5)validation login

3- Appendix C:

1- Install desktop Application.

Steps to install the program:

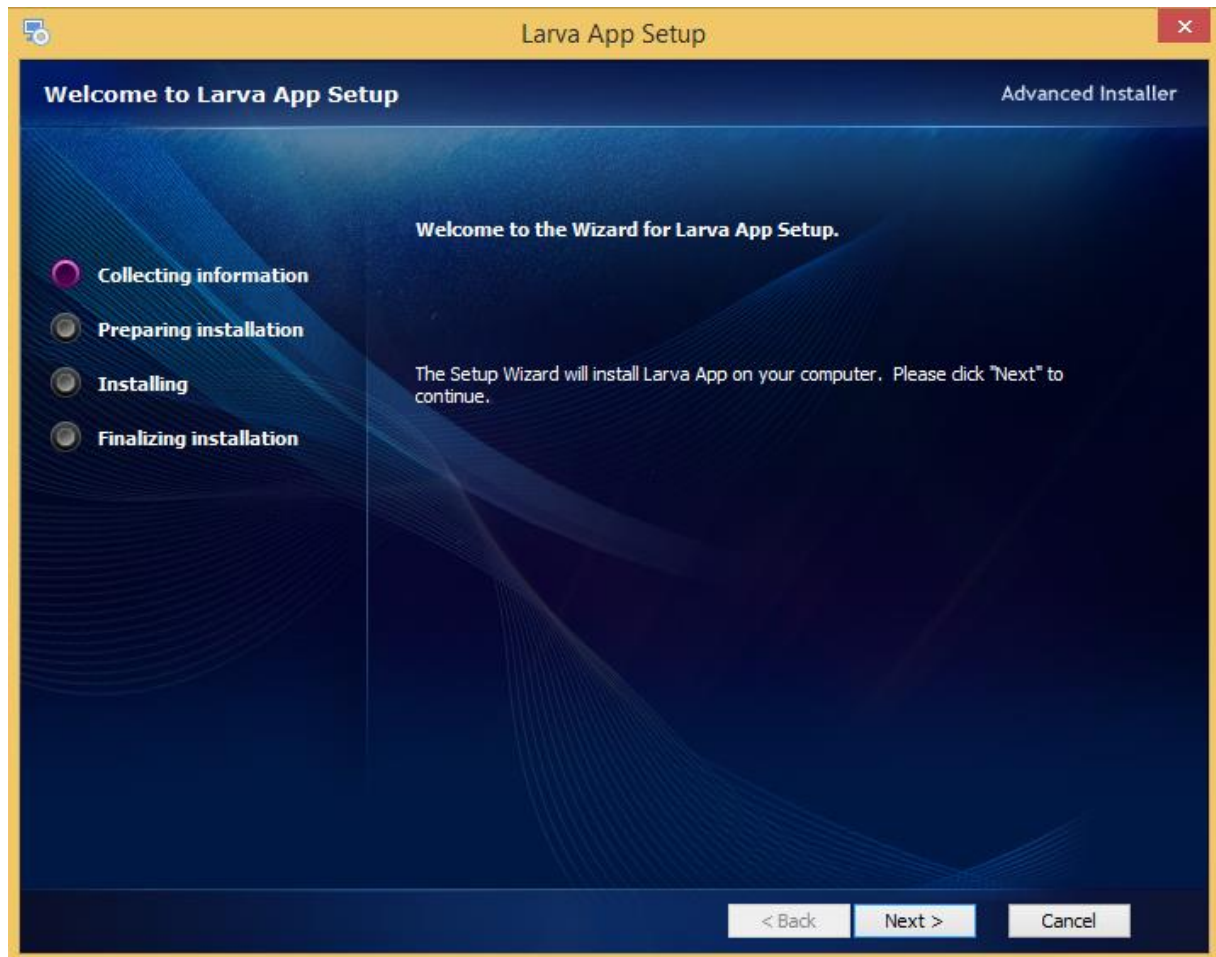


Figure (C.1) install App step 1

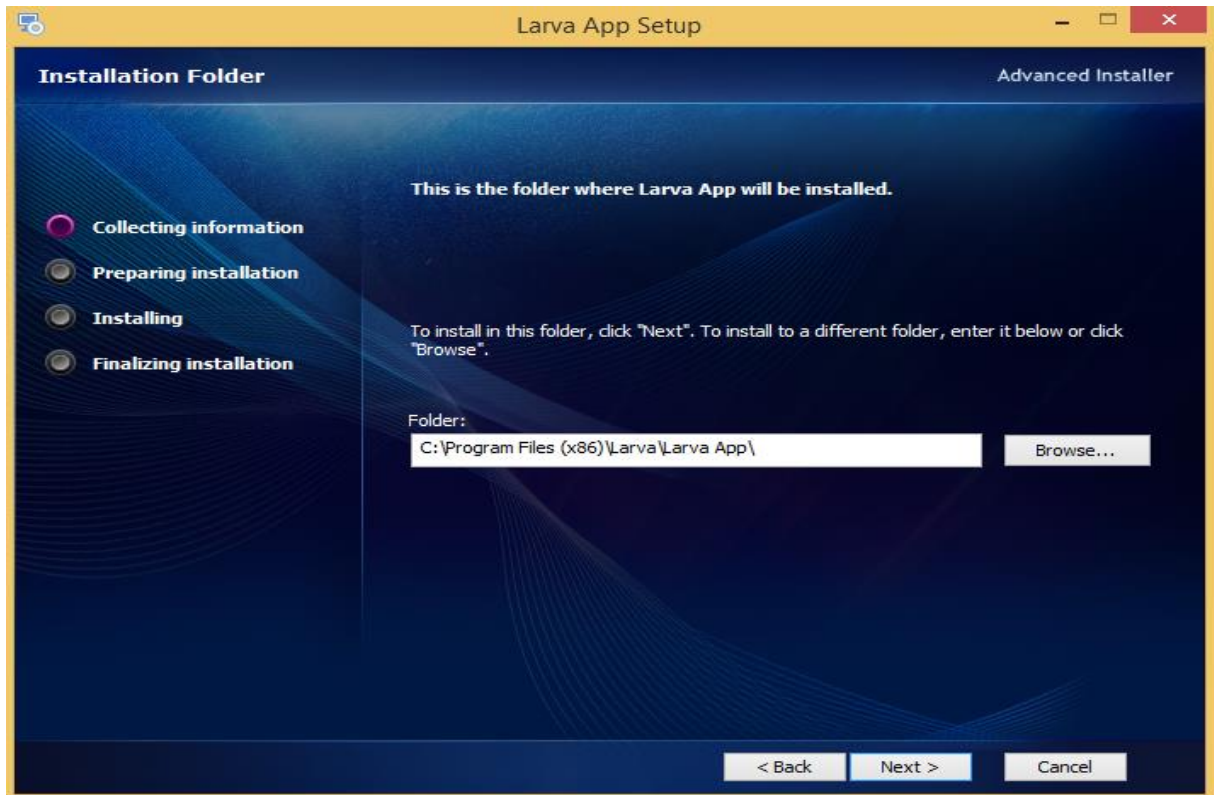


Figure (C.2) location for install App step 2

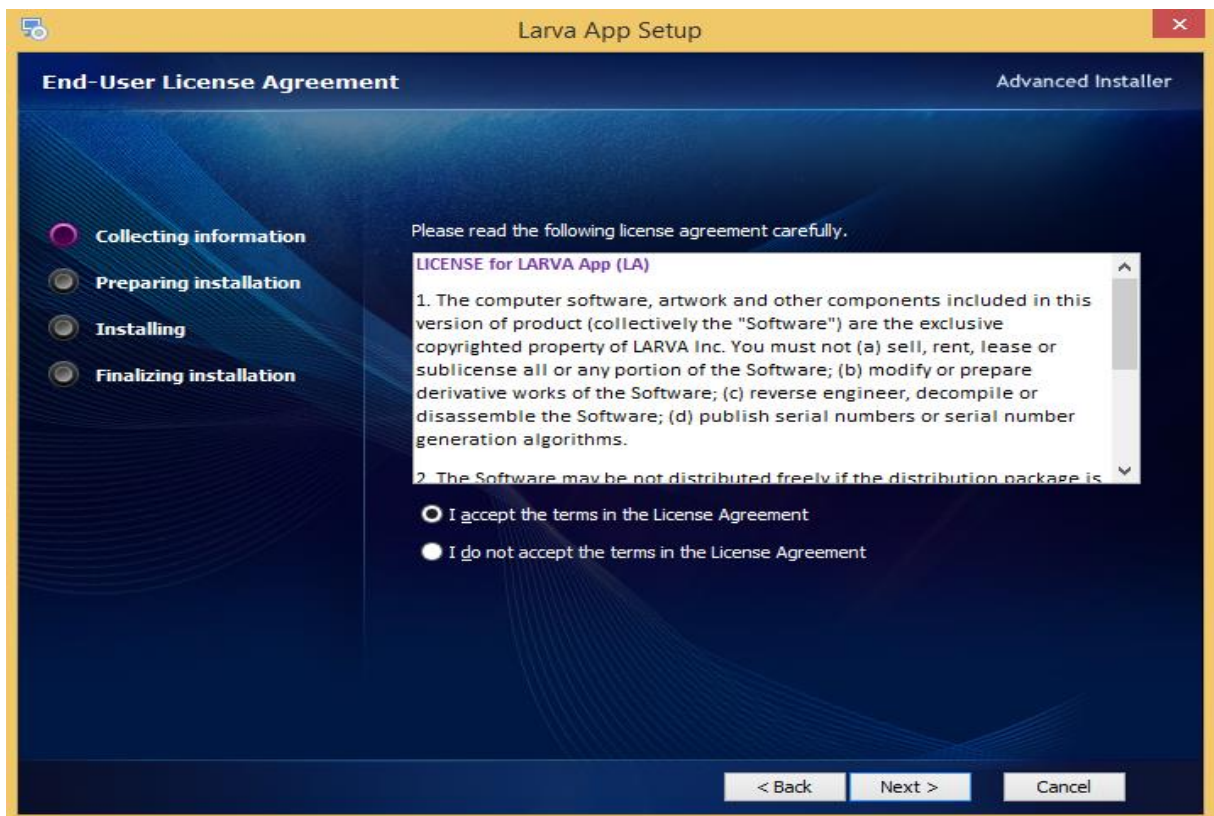


Figure (C.3) accept for install App step 3

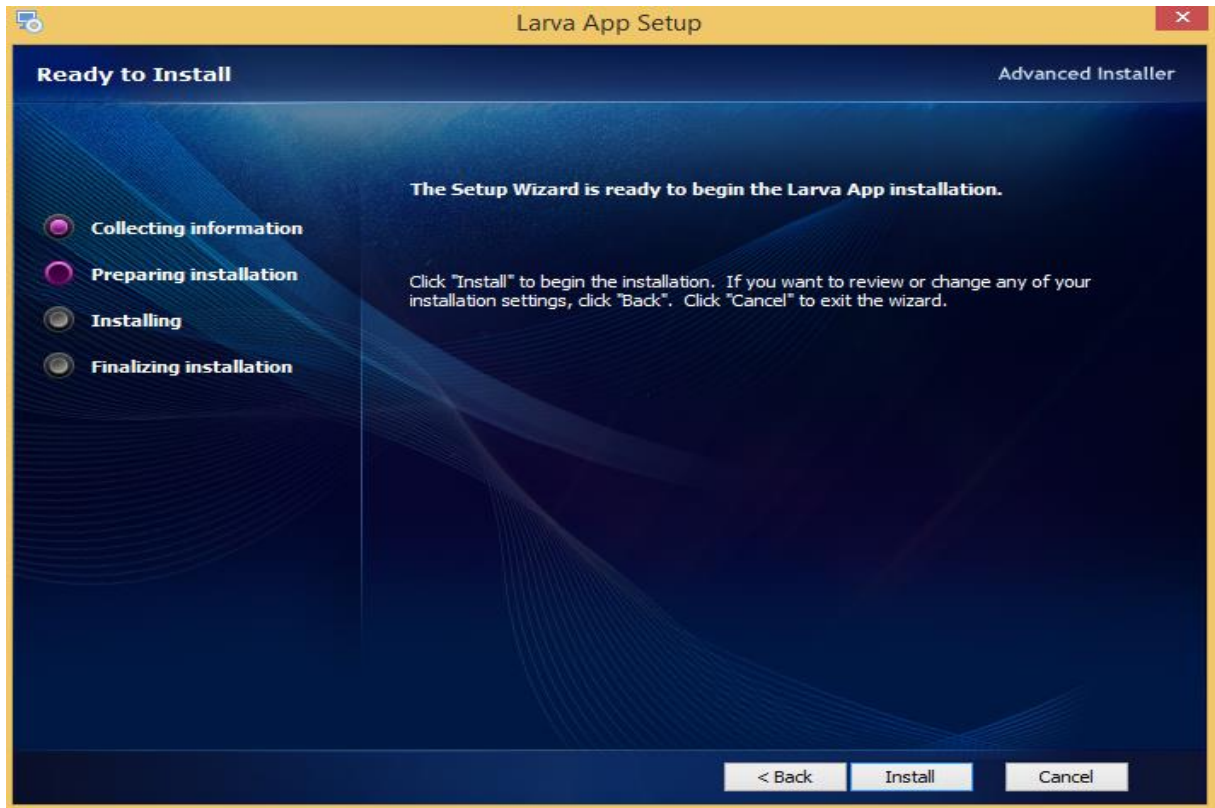


Figure (C.4) install step 4

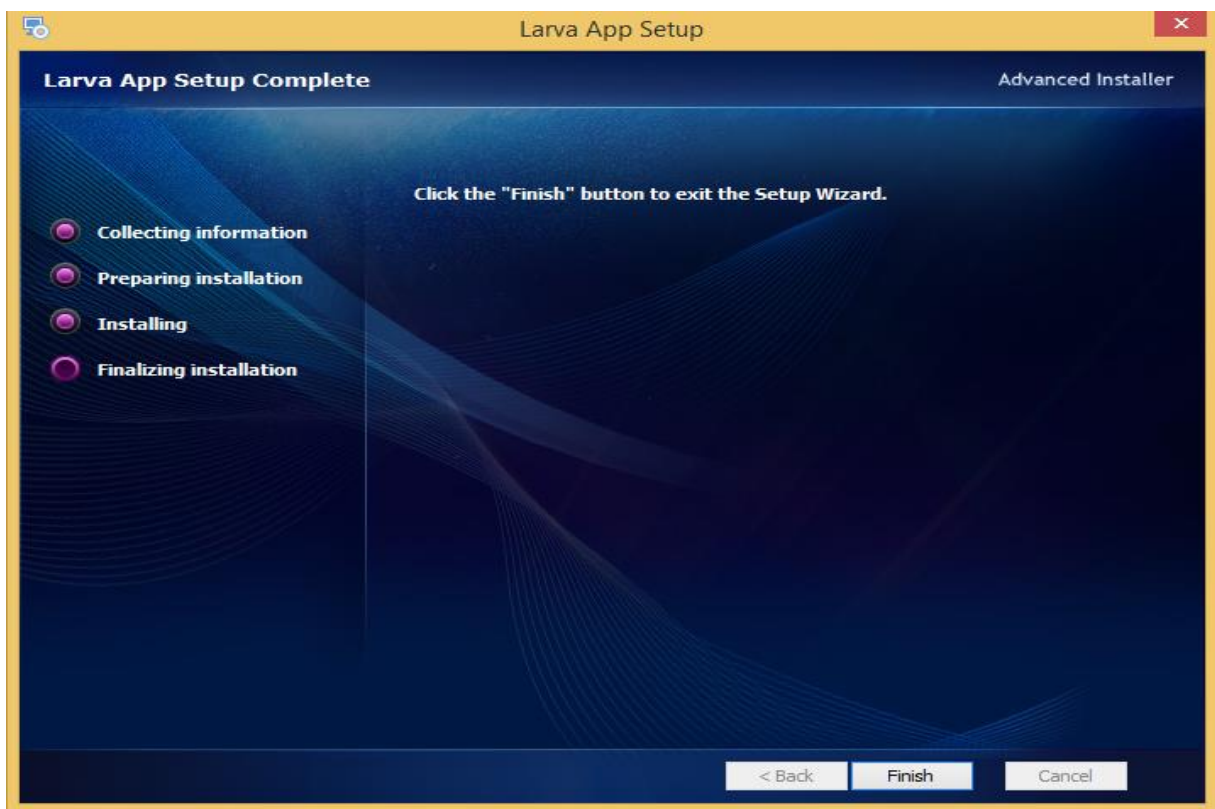


Figure (C.5) finishing install App step 5

2- Users activation of the system

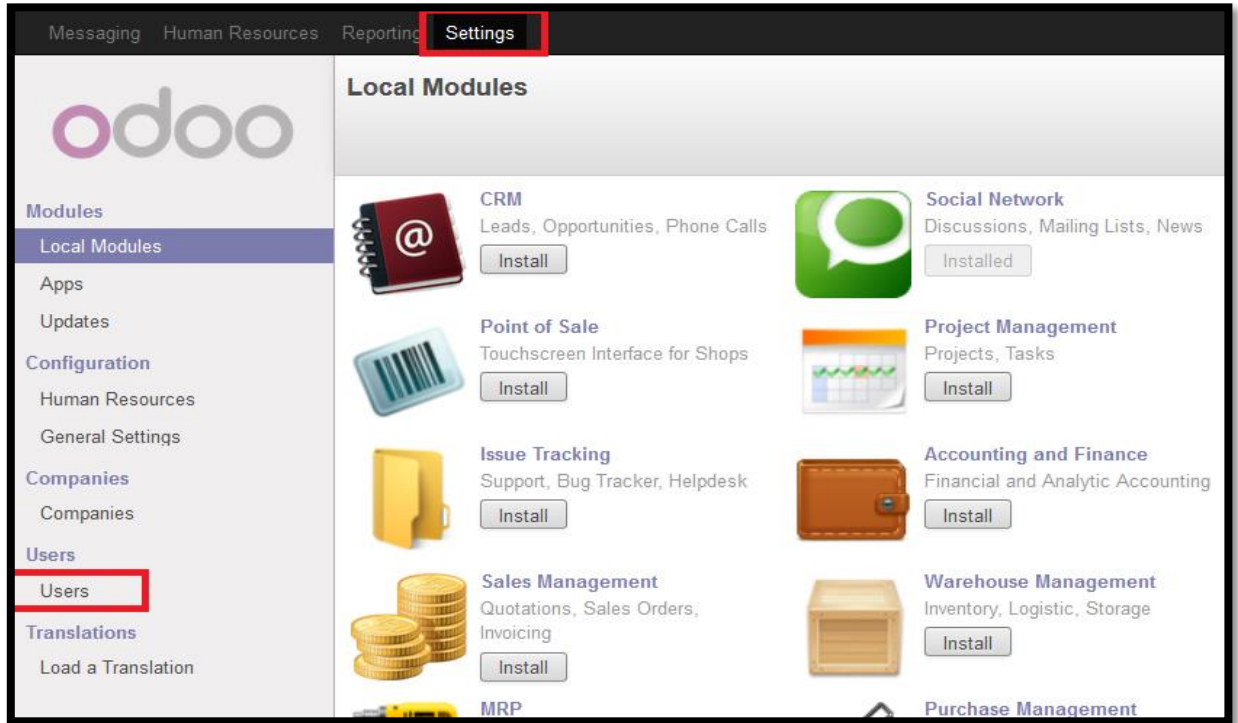


Figure (C.6) Users activation step 1

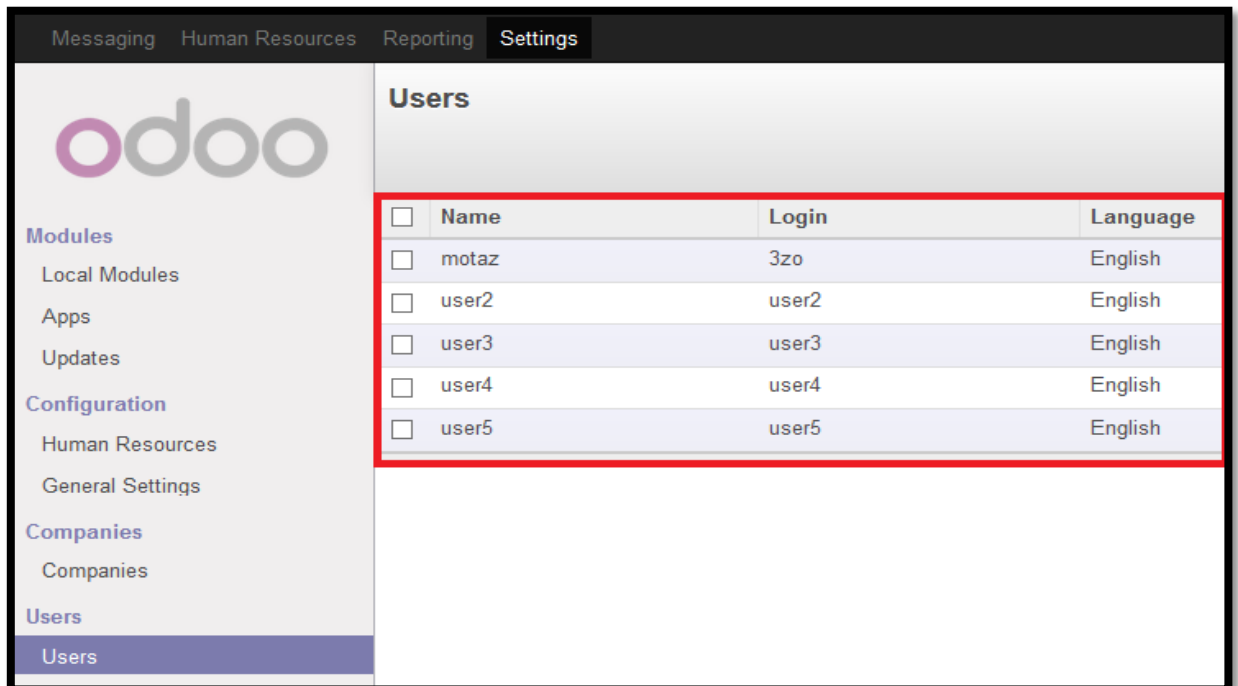


Figure (C.7) Users activation step 2

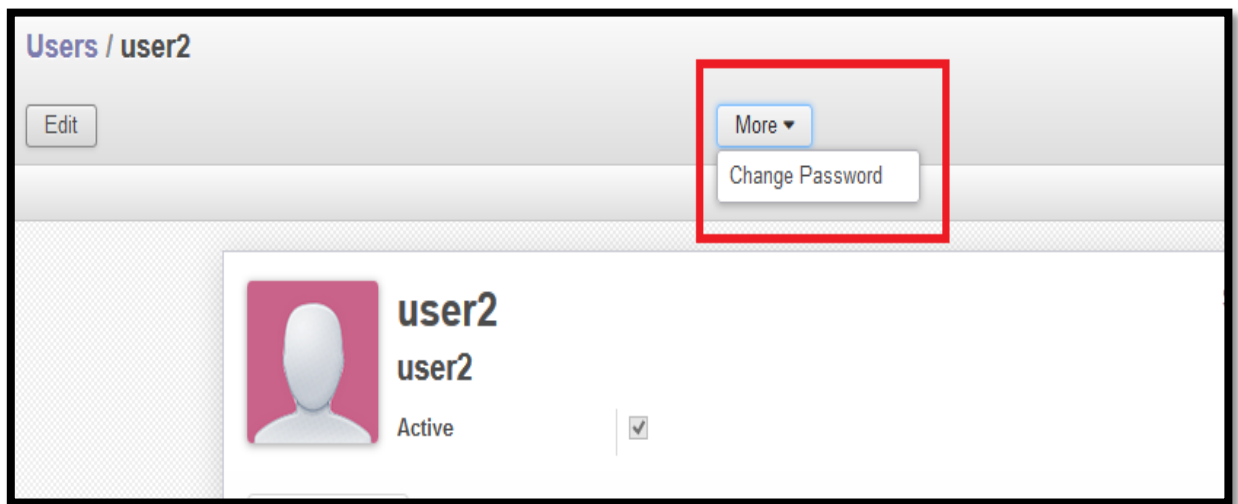


Figure (C.8) Users activation step 3

A screenshot of a 'Change Password' dialog box. The dialog has a title bar with 'Change Password' and a close button (X). Inside, there are two main sections: 'User Login' and 'New Password'. The 'User Login' section contains the text 'user2'. The 'New Password' section contains a text input field with a blue background and a red border. Below these sections, there are several empty text input fields. At the bottom left, there is a red button labeled 'Change Password' and a blue link labeled 'or Cancel'.

Figure (C.9) final step for Users activation.

4- Appendix D:

1- Explain forms UML


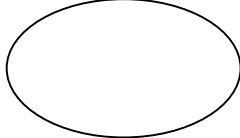
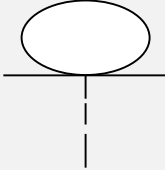
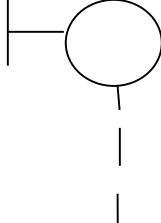
Explain Figure	Name Figure	Figure
An actor is anything outside the system that interacts with the system to complete a task.	Actor	
Each use case on the diagram represents a single task that the system needs to carry out.	Use Cases	
A system components	object	
It is usual to display use cases as being inside the system and actors as being outside the system.	boundary	

Figure (D.1) Explain form UML

2- UML Relationships.



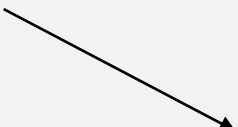
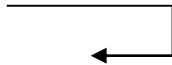
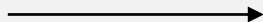
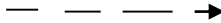
Explain Figure	Name Figure	Figure
The association is the link that is drawn between actor and a use case. It indicates which actors interact with the system to complete the various tasks.	Associate	
Use the includes link to show that one use case includes the task described by another use case.	Include	
Use the Extends link to show that one use case extends the functionality of another use case at specific Extension Points.	Extend	
A self-message can represent a recursive call of an operation or one method calling another method belong to the same object.	Self-message	
The sender sends the message	Message	
Results of procedure calls.	Return-message	

Figure (D.2) UML Relationships