Adventist University of Central Africa

GOVERNMENT ENTERPRISE REPOSITORY SYSTEM

Case study :Rwanda Information Society Authority

A research project

Submitted in partial fulfillment of the

Requirement for the degree

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

Major in

INFORMATION MANAGEMENT

By

RWEGO MARIE VAILLANTE,22968

August, 2023

DECLARATION

I **Rwego marie vaillante** hereby declare that this thesis entitled "Government enterprise repository system" Case Study :RISA,in partial fulfillment of the requirement of the degree in Bachelor of information Technology, is an original report of my research project carried out under the supervision of Maniraho Laurent ,I declare that the work report in this research project has not been submitted in award to any other degree in this university or others. Almost all of the experimental work was created by me. The group's contributions have been appreciated and clearly identified.

Signature : …….

Date: ……/……/……...

PROJECT ABSTRACT

Research Project for the Bachelor Degree in Information Technology

Emphasis in Information Management

Adventist University of Central Africa

Title: GOVERNMENT ENTERPRISE REPOSITORY SYSTEM

Name of the researcher: Rwego marie vaillante

Name of the faculty advisor: Maniraho Laurent.

Date completed: August 2023

The main objective of this research was to develop a web-based application that might help Rwanda Information Society Authority digitize its business operations and automate various processes to improve the organization's speed and efficiency.

In order to complete the project's goals, an analysis of the current system was done, and problems that the company (Rwanda Information Society Authority) ran across were identified.

From there, appropriate solutions to the issue stated were given and a solution was implemented.

Additionally, methods like observations and interviews were used to collect information on how business procedures are typically carried out in RISA. To make sure that the system is meeting the public institution's needs, other tests were also carried out.This application was made using a mix of technologies, including JavaScript,React and Node JS for development.

In order to store and manipulate data, PostgreSQL was utilized as a database management system (DBMS). Vs Code was used as a text editor to write the code, and Visual Paradigm was used to create class diagrams, sequence diagrams, and relationship diagrams.

APPROVAL

I, **Maniraho Laurent** hereby certify that this project report has been done under my supervision and submitted with my approval.

Signature: ……

Date: ……/……/……

LIST OF ABBREVIATIONS

DBMS: Database Management System

ICT: information communication and technology

RISA : Rwanda information society Authority

GERS: Government Enterprise repository system

MIS: Management Information System

UML: Unified Modeling Language

UI/UX: User Interface/User Experience

SSR: Server Side Rendering

IT: Information Technology

ACKNOWLEDGEMENT

First of all, I want to thank God for providing everything I've ever needed for my studies, including my parents, lecturers, and friends.

I wanted to take this opportunity to thank the entire team at AUCA, especially the academic department of Information Technology, which has been a major supporter of my career and provided me with all the necessary course materials. I also want to use this opportunity to express my gratitude to Maniraho Laurent, my supervisor, for guiding me through this entire project and helping me.

Without my colleagues, AUCA would not have been the same, and I would like to take this opportunity to express my gratitude to everyone I encountered along the journey.

May the Almighty God bless you very much.

Rwego M.Vaillante

CHAPTER 1

GENERAL INTRODUCTION

Introduction

Rwanda's transition to a knowledge-based economy is being driven in large part by information and communication technology. Since the year 2000, Rwanda has persistently developed its ICT sector as a result of its decision to make ICT the main engine of its economy. Rwanda first laid the foundation for the ICT sector by creating institutional, legal, and regulatory frameworks. After that, Rwanda focuses on improving its ICT infrastructure by constructing a national data center that leverages cloud computing and centralizes information storage, management, and protection. The main objective of this system is to support RISA and suppliers in delivering ICT(information and communication technology)tools to public companies without relying on manual systems.the system aims to streamline and automate the process of management of ICT tools within the public sector .the system should provide a centralized system where information about available ICT tools ,suppliers(successful Bidders),contractors and other related data can be stored. This allows for easier access,sharing,and transparency of information across the government enterprise .

Background of the study

Rwanda information Society Authority is abbreviated as "RISA" is a government agency in Rwanda, responsible for the development and implementation of information communication and technology (ICT) policies, strategies, and frameworks. It plays a key role in driving the digital transformation of the country it is also a commercial public institution decided to contribute on the government's progress in ICT sector. It monitors and evaluates the progress and impact of ICT initiatives in Rwanda .

RISA is Established under the Ministry of ICT and Innovation; Rwanda Information Society Authority "RISA" is a public institution established in 2017, governed by presidential order N° 077/01 of 09/12/2022.

RISA has the mission of digitizing the Rwandan society through increased usage of Information and Communication Technologies and innovation technology as a cross-cutting enabler for the development of other sectors spearheading Rwanda's digital and social economic transformation.

Statement of the problem

The existing system has many problems, The public institutions in particular have different problems with requesting and suppliers with problems with delivery of tools in a good manner, I need to automate lthe working method for Risa, suppliers and institutions because they mostly rely on paper which is not secure, the following are the specific detailed features.

- It is difficult for RISA to Gather ICT needs from public institutions for future Tenders
- It is very difficult for RISA to approve All requests
- It is difficult for Risa to sort all needs in Item by item number for centralized tendering
- It is difficult for suppliers(private sectors) to know Information about ICT tenders.
- Difficult for Public institutions to know the suppliers Item
- Risa finds it difficult to see what contractors have provided
- Difficult for Risa to monitor payments proof for distributed Items

Choice and motivation of the study

According the above stated problems, the motivation to conduct this study is to help those institutions digitalize it's ways to carry out their operation and also help them leverage the use of technology.

The manual process of handling requests, supplier management, and bid publishing can be time-consuming, and inefficient. The study aims to identify ways to automate these processes through a repository system. By digitizing the procurement cycle and integrating suppliers, RISA, and successful bidders into a centralized platform, the study aims to improve efficiency, reduce paperwork, and eliminate manual errors.and this has become one of my motivations to carry out this project.

Objectives of the study

General objective

The overall objective of this project is to develop a web application that will enable RISA to digitize their work, especially in providing ICT tools, reporting, and information storage, and to provide a web portal through which public institutions can easily request services and Risa communicates successful bidders so that they all have information at the same time

Specific objectives

- To assess issues with the current system and create a better one.
- To build a database that would store data related to the system.
- To create a system with a good UI/UX.
- Creating reports on ICT tool requests and the outcomes of given tools
- To provide a portal for public companies to request services

Scope of the study

In this project the system is designed for all "**public institutions ,Risa,suppliers**", Users are permitted to view and have enough access accordingly and also It is going to facilitate RISA in terms of bid publishing , viewing successful contractor and also for public institutions to request Ict tools .

Methodology and Techniques used in the study

Methodology is the specific procedures or techniques used to identify, select, process, and analyze information about a topic. The methodology may include publication research, questionnaires, surveys and other research techniques and could include both present and historical information. The following are techniques and methods used in conducting this research.

Interview

A planned interaction in which one party asks questions and the other responds is known as an interview. A one-on-one chat between an interviewer and an interviewee is referred to as a "interview" in everyday speech. The interviewee answers the interviewer's questions by typically supplying information. Other audiences may use or receive that information right away or in the future. (Wikipedia,2022)

I had to conduct interviews with RISA in order to carry out my research study. In particular, I had to speak with the Administrators, Accountant, Secretary, and IT division Manager about business needs, users and public institution issues, and other support staff worries.

Observation

This is the act of observing how processes are carried out. It is an effective instrument for gaining understanding of the current system and for examining the accuracy of data gathered from other sources. This technique was used in getting more insight into the existing system, people tend to be more careful when they know they are being watched. This technique was used by observing when the Consult is required to gather information from RISA and other institutions. Therefore, building up a web application that will make it easier for them (RISA,suppliers)to gather information and know which quality of ICT tools will be delivered.

Expected results

This new system is expected to produce the following output:

- A digital centralized and secure database for storing information.
- No more wastage of time creating and generating quotations manually.
- Reports for different data from the system
- Online portal where public institutions can request different services
- System will provide proper recordings
- Online portal where suppliers will be able to view successful contractors

Organization of report

Chapter one, namely, General introduction will provide the basic information of this study like what made me choose this particular study and what motivated me, the overview of the problem we intend to solve, the methods and techniques used in collection of data, the objectives, the scope and the expected output of the study.

The focus of the second chapter, "Analysis of the Existing System," will mostly be on a detailed description of the current system, including its structure, problems, and suggested fixes.

The new system will mostly be discussed in the third chapter, Prerequisites Examination and Plan of the New System, in terms of topics of interest. A succinct description of the UML used and the plan it supports, including use-case diagrams, sequence diagrams, activity diagrams, data dictionary diagrams, and architectural diagrams.

The study's application will be the focus of the fourth chapter, Implementation of the new system. To illustrate how the new system was built and the technologies used to build and develop this software, we will describe and provide images of my codes used as forms of data entry and reports.

The fifth chapter, titled "Conclusion and Recommandation" will conclude with conclusions, recommendations, and ideas for further research and development.

CHAPTER 2

ANALYSIS OF THE EXISTING SYSTEM

Introduction

In this chapter, we will take a look on the existing system, and the problems that are found and also their effects Technology, also how the new system in implementation will answer them. The analysis of the existing system consists of learning the existing system operations, the functional activities and non-functional activities of it. Often, the purpose of designing a new system is to replace the manual system with an automated one. Before the end of this chapter, proposed solution to solve the mentioned problems will be highlighted. We will also describe the process of monitoring and evaluating activities, to better understand the existing system.

Description of the current system environment

Historical background

Established in 2017, Rwanda information Society Authority provides home improvement services for commercial and residential properties across Rwanda and has served thousands clients to date.

Mission

RISA has the mission of digitizing the Rwandan society through increased usage of Information and Communication Technologies and innovation technology as a cross-cutting enabler for the development of other sectors spearheading Rwanda's digital and social economic transformation.

Vision

Secure Rwanda's cyberspace and information assets using public key infrastructure (PKI) technology.

Description of the existing system

As Explained in the analysis of the current system we can see that Rwanda information society Authority process operates under different processes:

- The public company must request ICT tools by filling out and submitting request form
- After the public company has requested the Tools RISA has to prepare a list of bidders
- Then the RISA publish the successful bidders as then they choose successful contractors who have quality products so that they can deliver Tools
- After knowing a successful contractor supplier view the purchase order from public companies and then deliver what they requested to them
- After the suppliers has made the delivery, they request for payment proof to the public companies
- Once the public institutions have paid for the Tools, he/she sends a document of the payment voucher to both Risa and Suppliers

Analysis of the current system

The current system pubic firms still utilize manual system to request ICT tools when RISA receives a request from a public company, they publish tender and then the awarded contractor check the available tools and communicate it to monacolin to see if the budget is available after they approve the tools that will be given to the companies in general, the entire institution lacks a digitized system for conducting requests and managing data in an efficient manner

Modeling of the current system

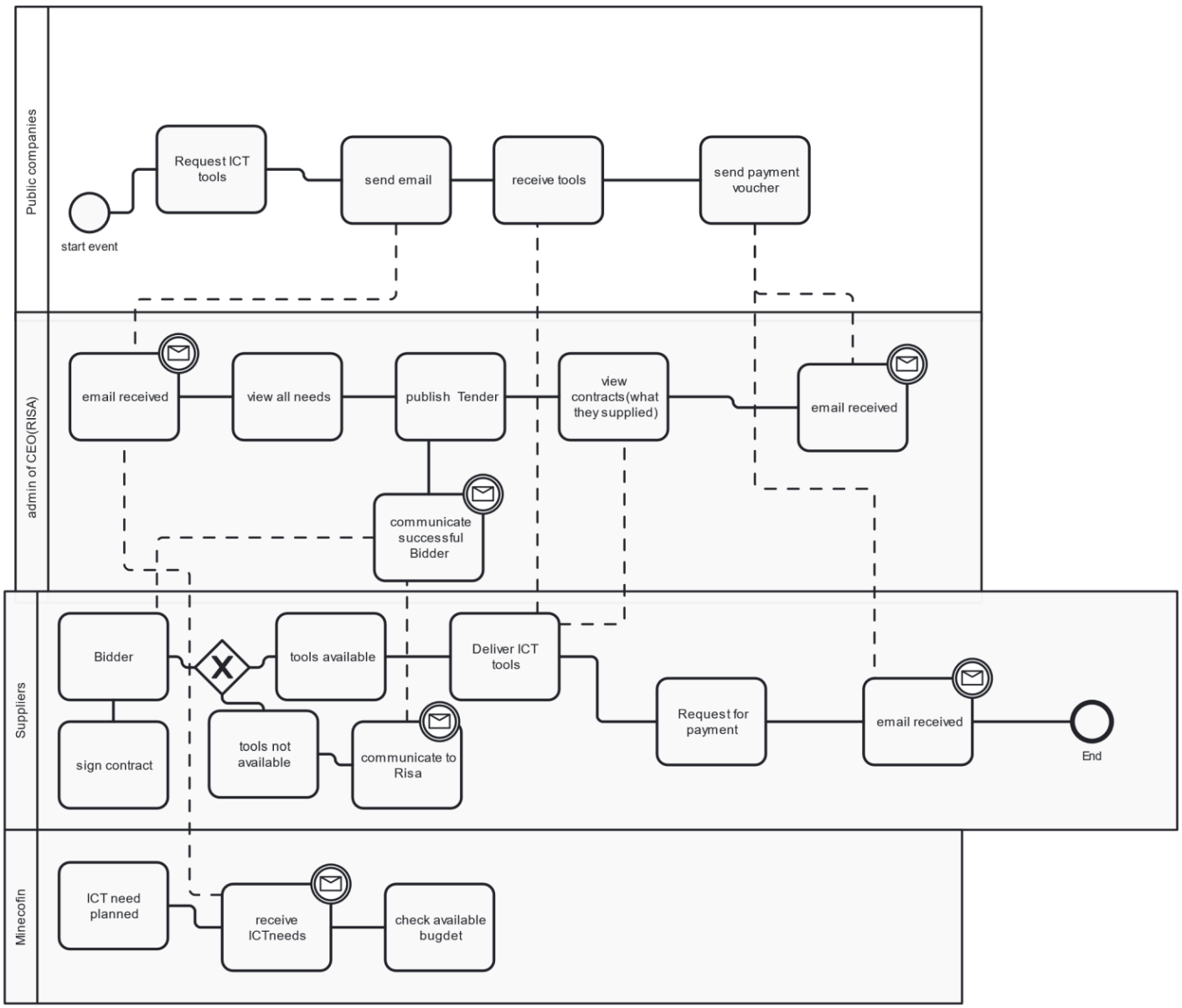


Figure 1: model of the current system

Problems of the existing system

The existing system has many problems as any other manual systems, but this one has its own specific problems as detailed below:

- It is difficult for the central institutions to process public companies requests at Short time.
- It is very difficult for RISA to approve requests
- It is difficult for suppliers to know the successful contractor.
- Risa finds it difficult to see what contractors have provided

Proposed solutions

According to the mentioned problems above, this new system will bring the following solutions:

- Creating a public institutions portal where they can request different ICT tools.
- The new system should receive All requests
- The new system will help the company in publishing Tender and successful contractor.
- The new system will be able to generate different reports.
- The new system will provide a dashboard for better data visualization

System requirements

Non-functional requirements, also known as quality requirements, specify the system's limitations and qualities while functional needs are those that are simpler to find at first.

Functional requirements

The Government Enterprise repository system must meet the following functional characteristics:

- REQ 1 The User shall be able to create an account.
- REQ 2: The User shall be able to Log in if the provided credentials are correct.
- REQ 3: The User shall be able to reset his/her password in case they forgot it.

- REQ 4: The system should provide request forms that capture all necessary information about the requested ICT tool, including the purpose of the tool, required specifications, and timeline.
- REQ 5: Approval procedures in the system should allow administrators to approve or reject requests based on established criteria.
- REQ 6: The system should have notification and communication features to inform requesters and approvers of the status of their requests and any changes or updates.
- REQ 7: The system administrator shall be able to manage users. This implies that a system administrator can be able to add, delete, update and view records.
- REQ 8: Risa and suppliers should be linked to view the payment voucher

Non-functional requirements

The following are some of non-functional requirements of this application:

- The system must have a good UI/UX.
- They must be run on window 10 or window 11 without change in its behavior
- The system must respond rapidly to user requests, manage several requests at once, and continue operating at peak efficiency even under heavy loads.
- The system must have a validation on each level on the UI level, API level and database level.
- The system must be responsive allowing user to use them on different screen sizes.
- The system should be able to perform a backup after every two weeks.

CHAPTER 3

REQUIREMENTS ANALYSIS AND DESIGN OF THE NEW SYSTEM

Introduction

This chapter will concentrate on the requirements analysis and the design of the new system after the previous chapter described the study of the existing system.

Typically, system development consists of two key parts:

System analysis is part of software development, which is the interdisciplinary area of research that deals with the analysis of collections of interacting entities, systems, and the interactions within those systems, frequently before those systems are automated as computer systems. As a result, system analysis is the act of looking into a system, locating issues, and using the information to suggest improvements. (Dennis Alan, 2012).

In the process of creating software, a system's architecture, parts, modules, interfaces, and data are defined in order to meet certain requirements. In order to establish what modifications will be required to include user needs that the present system was unable to satisfy.

System design It is a process of planning a new business system or replacing an existing system by defining its components or modules to satisfy the specific requirements. Before planning, you need to understand the old system thoroughly and determine how computers can best be used in order to operate efficiently.

System Design focuses on **how to accomplish the objective of the system**.

Elements of a System

- **Components:** This offers a specific function or a collection of connected functions. They consist of modules.
- I**nterfaces:** This is the shared boundary that allows system components to communicate and interact with one another.
- **Data:** This is data and information flow management.

Analysis and Design Methodology

The analysis phase answers the questions of who will use the system, what the system will do, and where and when it will be used. Design methodology refers to the approach of to implementing the software development life cycle. There are numerous system development technologies and each of them is designed uniquely based on its functionality.

Unified Modelling Language (UML)

Unified modelling language is defined as a generic developmental modelling language used in analysis, design and the implementation of software systems.

The purpose of UML is to provide a simple and common method to visualize a software system's inherent architectural properties. Over time, UML has become the de-facto standard of building Object-Oriented Software. UML blueprints are used by business users, developers and anybody who need data modelling. UML is not a development method or a programming language.

The Unified Modeling Language (UML) integrates methods from object modeling, component modeling, business modeling, and data modeling (entity connection diagrams). It is applicable to every process, every stage of the software development life cycle, and every type of implementation technology (Louis Rivest, 2002).

The Unified Modeling Language (UML) provides a common method to see a system's architectural blueprints, which include components like:

- ✔ activities
- ✔ actors
- ✔ Business operations
- ✔ database schemas
- ✔ (Logical) Elements
- ✔ Statements in programming languages

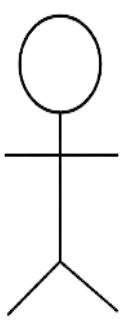
The key point about UML is to note that it's a language not a process or method. It defines a software system, details artifacts of the system to document and construct a system. Basically, it functions like a language that the blueprint is written on. It has three building blocks which contains elements for representing models, relationships that binds elements together and diagrams that groups collections of elements and relationships.

Design of the new system

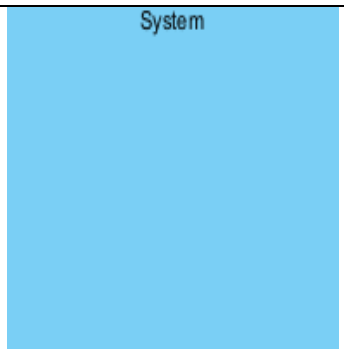
The design phase decides how the system will operate. The SDLC utilizes the requirements gathered and uses them as a blueprint for the new system. Systems design is the process of defining a system's architecture, parts, modules, interfaces, and data to satisfy established user requirements.

Use case diagram

Use case is a methodology used in a system to identify, analyze, clarify and organize system requirements. It is composed of a set of possible sequences between users and the system. The use case captures the dynamic aspect of a system. Use case diagrams are employed to clarify a system's operation from the viewpoint of external users. (Jeffrey L, 2007).

ACTORS	
▪ These are individuals or systems that interacts with the application. ▪ They are usually represented with a stick figure or a circle. ▪ Usually associated with other actors using a superclass association denoted by an arrow and placed outside the subject boundary.	

Use case ▪ It is a main figure that represents the system's functionality. ▪ It extends and includes another use case. ▪ It is placed inside the system boundary.	
Include/ Extend relationships ▪ Include relation represents an inclusion of the functionality of one-use case within another. ▪ An arrow is drawn from the base use case to the used use case. ▪ Exclude relation represents an extension of a use case to include behaviors that are optional. ▪ An arrow is drawn from the extension use case to the base use case.	 
Generalized relationship ▪ Represents from a specialized use case to a generalized one. ▪ An arrow is drawn from the specialized use case to the base use case.	
An association relationship ▪ Between actors and use cases there is a line. Knowing which actors are connected to which use cases in complex diagrams is crucial.	

Subject boundary ▪ It is labelled with the name of the subject on the top part and inside. ▪ A box for tying system scope to use cases. All use cases outside the norm would be regarded as being outside the system's scope.	

The use case of Government Enterprise repository system.

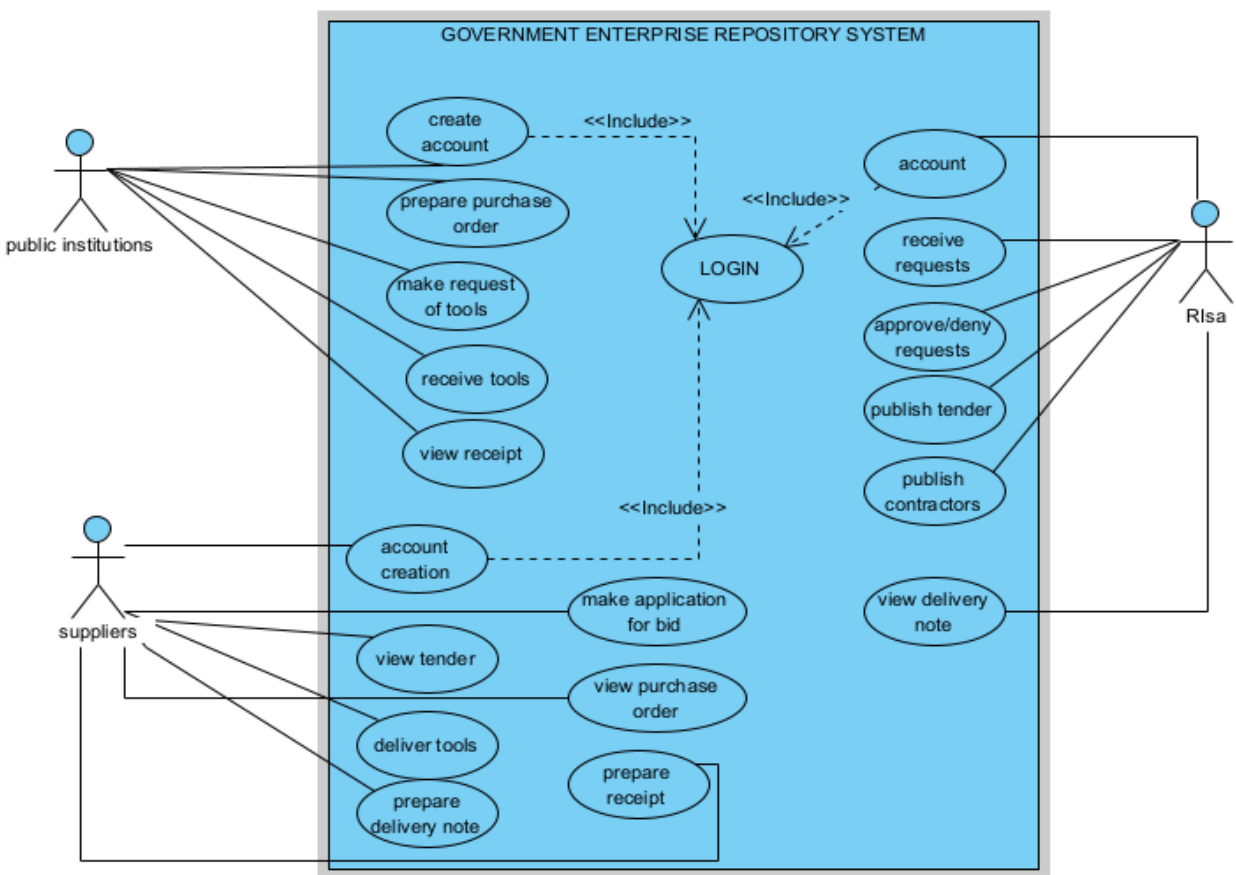


Figure 2: Use Case Diagram of the new System

Use-case description

Use case descriptions include information on what a use case does and what it needs to be properly executed. Each use case appears as follows:

- **Name:** a name of a use case
- **Description:** what a system intends to do
- **Actor:** the actor involved in the use case
- **Pre-condition:** the system state before the use case can begin
- **Post-condition:** the system state when the use case is over
- **Normal flow**: the actual steps of the use case
- **Alternative flow:** steps which may happen in case a normal flow fails.

1.Use Case description for Create Account

Name: Create User Account
Actor: Supplier /public institution/Risa
Description: The use case describes how the actor creates their account for helping them to log in into the system.
Pre-condition: None
Post condition: If the use case is successful the user account is created and he/she logs into the system, if not the system state does not change.
Normal Flow: i. The admin interacts with the system. ii. A form is issued to fill in credentials. iii. The system validates the credentials. iv. The system stores information in the database. v. New institution was created.

vi. New supplier was created.
Alternative flow: • a. if the information is not valid the system shows the error message. • b. The actor can decide to go back to the beginning of the main flow or cancel the login, at that point the use case ends.

Table 1 : Create Account

2.Use case description for Making orders/ online requests

Name: Making online requests
Actor: public institutions
Description: This allows public institutions to create , delete , view ,update and edit orders/online requests
Pre-condition: the public institution should first login in order interact with the system
Normal flow: Create an order/online request 1. The public institution requests the page where to create an order 2. The system displays requested page 3. The public institution fills the information in the order form and submit it 4. The system validate the information 5. The system persist the information in the database and displays success message 6.The system redirects the user to view order details page 4. The system validates and checks errors based on requirements 5.The system display success message and customer is redirected to order details page Delete the order 1. The public institution navigates to the page containing order details 2. The system displays requested page

3. The user/public institution clicks the delete icon on the order to delete 5. The user/public institution confirms the deletion 6. The order is deleted and a success message is displayed View orders 1. The user navigates to the page containing order details 2.The system displays the requested page
Alternative flow: Setting elections date 1. If the information is not valid, the system provides the message indicating the error. 2.If the system fails to store information displays the failure message Updating elections date 1. If the information is not valid, the system provides the message indicating the error 2. If the system fails to update information displays the failure message

Table 2 : Making requests

3.Use Case description for View list of applicants(suppliers)

Name: View List of suppliers
Actor: RISA
Description: This use case describes how the actors will view all information regarding all view case
Pre-condition: Actors must be logged in
Post condition: you should have a number of suppliers

Normal flow: 1. System allows the user to select certain supplier. 2. The Actor can view the list of suppliers and their categories. 3. RISA is able to delete and publish/unpublish Bidders.
Alternative flow: • If there are no suppliers the system will notify you.

Table 3 : view suppliers

4.Use case description for Managing online requests

Name: Manage online request
Actor: Risa
Description: This allows RISA to approve/reject , view online requests
Pre-condition: RISA should first login in order interact with the system
Post-condition: **Create a new online request** the request is registered in the system or the system fails to register the request **Update the request** the order is updated or the system fails to update the orders

Normal flow:

Create an online request

1. The public institutions requests the page where to create an order
2. The system displays requested page
3. public institutions fills the information in the order form and submit it
4. The system validate the information
5. The system persist the information in the database and displays success message
6. The system redirects the user to view order details page

Edit/Update existing elections date

1. public institutions navigates to the page containing order details
2. The system displays requested page
3. The customer clicks the edit icon on the order to update
4. The system redirects to the page containing order information form
3. The public institutions modifies the existing order information and saves

Delete the order

1. Public institutions navigates to the page containing order details
2. The system displays requested page
3. The public institutions clicks the delete icon on the order to delete
4. The system prompts a message for deletion
5. The public institutions confirms the deletion
6. The order is deleted and a success message is displayed

View orders

1. The customer navigates to the page containing order details
2. The system displays the requested page

Table 4 : Managing requests

Class Diagram

A class diagram is a diagram that represents a static view of an application. It is used for visualization, describing, documenting all aspects of the system and constructing executable code of the software application. This model shows the classes and relationships among classes that remains constant in the system.

Elements

Class Names
Attributes
Operations ()

A class

- It represents a person, place or thing that the system uses to attain and store information.
- It is written in bold and placed on the top compartment.
- Its middle compartment represents attributes.
- The bottom compartment represents operations carried out.

An attribute

- An attribute represents properties that describe the state of an object.

An operation

- Operations represents actions and functions that a class can perform.
- It is classified as a query, constructor or update operation.

Benefits of class diagrams

Class diagrams offer a number of benefits for any organization. Use class diagrams to:

- Showcase data models for information systems, regardless of how basic or advanced they are.
- Improve your understanding of the application's schematics in general.
- Any system-specific demands should be expressed graphically, and the information should be shared with the entire company.
- Create detailed charts that highlight any specific code that needs to be created and integrated into the described structure.
- Provide a description of system types that are used and afterwards passed across its components that is independent of implementation.

Purpose of Class Diagrams

The main purpose of class diagram are:

- It analyses and designs a static view of an application.
- It describes the major responsibilities of a system.
- It is a base for component and deployment diagrams.

SCHEMA OF CLASS DIAGRAM

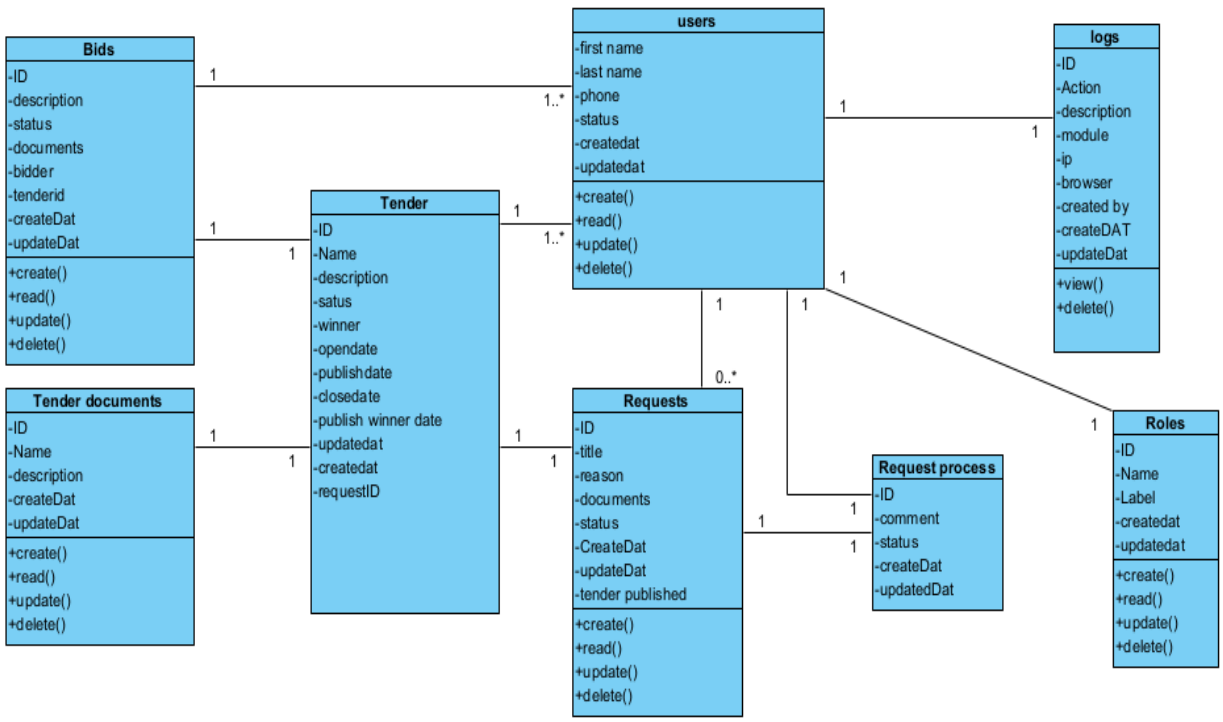


Figure 3: Class Diagram

Sequence Diagram

A sequence diagram or system sequence diagram (SSD) shows object interactions arranged in time sequence in the field of software engineering. It depicts the dynamic behavior of a system or a specific scenario by showing how objects interact with each other over time. Sequence diagrams are typically associated with use case realizations in the logical view of the system under development. Sequence diagrams are sometimes called event diagrams or event scenarios.

The notations and their definitions that are used in sequence diagram:

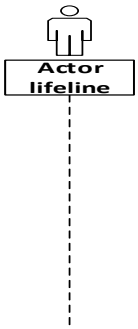
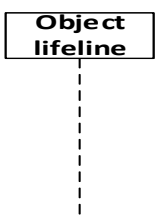
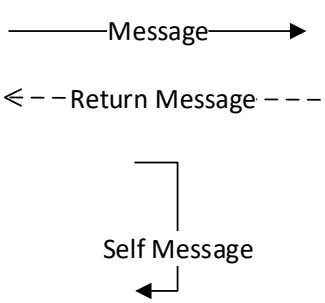
Term and definition	**Symbol**
An actor: It can be a person or system that derives benefit from and is external to the system. It participates in a sequence by sending and/or receiving messages. It is placed across the top of the diagram.	
An object lifeline: It participates in a sequence by sending and/or receiving messages. It is placed across the top of the diagram.	
An activation: It is a long narrow rectangle placed on top of a lifeline. It denotes when an object is sending or receiving messages	
A message: It conveys information from one object to another one. An operation call is labeled with the message being sent and a solid arrow, whereas a return is labeled with the value being returned and shown as a dashed arrow.	

Table 2:Sequence description table

Database Diagram

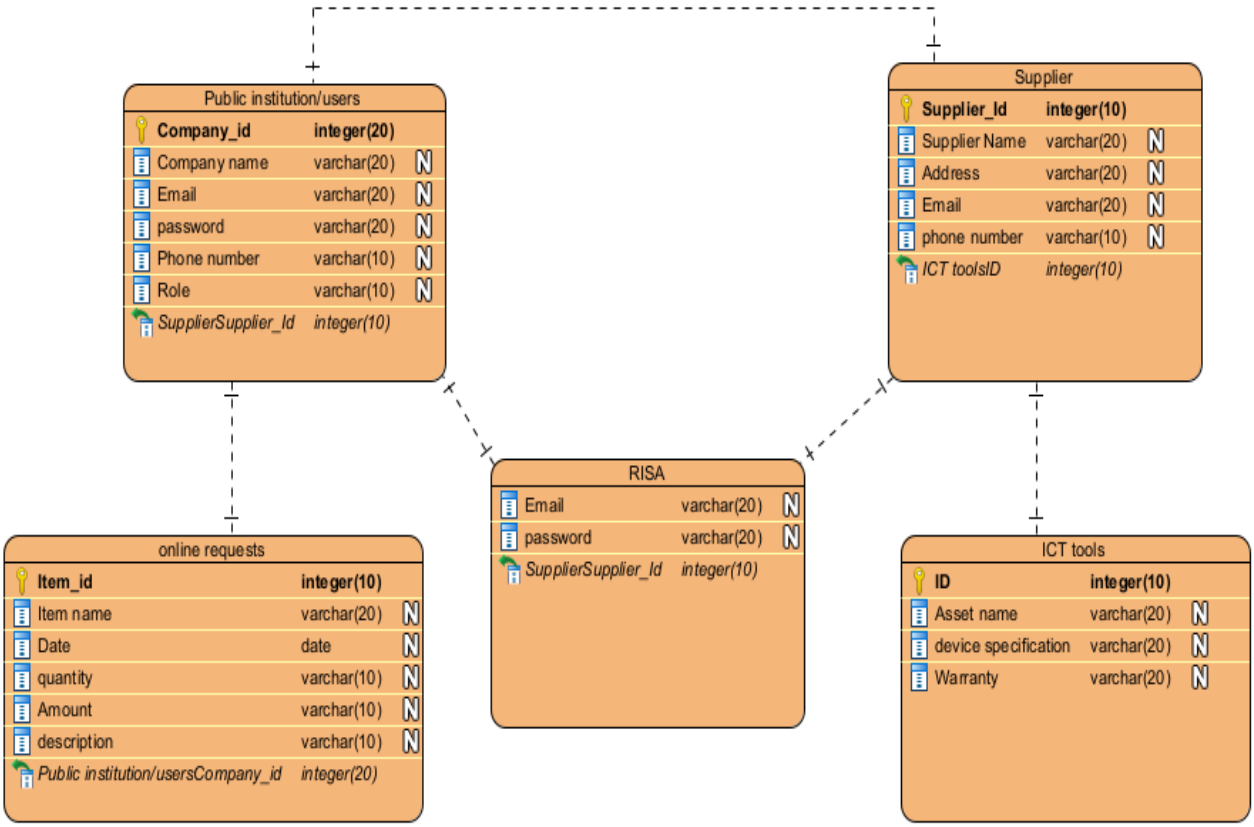


Figure 4 : Database diagram

Sequence Diagrams

Login request

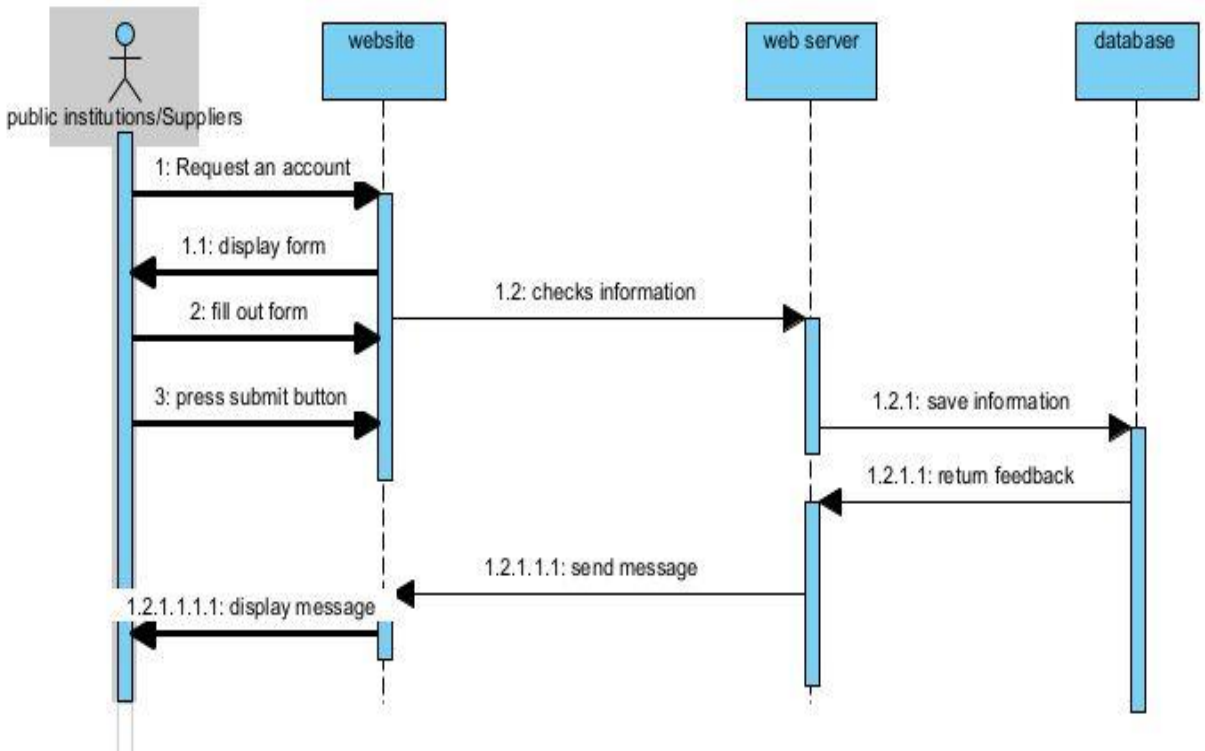


Figure 5 :sequence diagram to create account

Sequence diagram for Ordering ICT tools

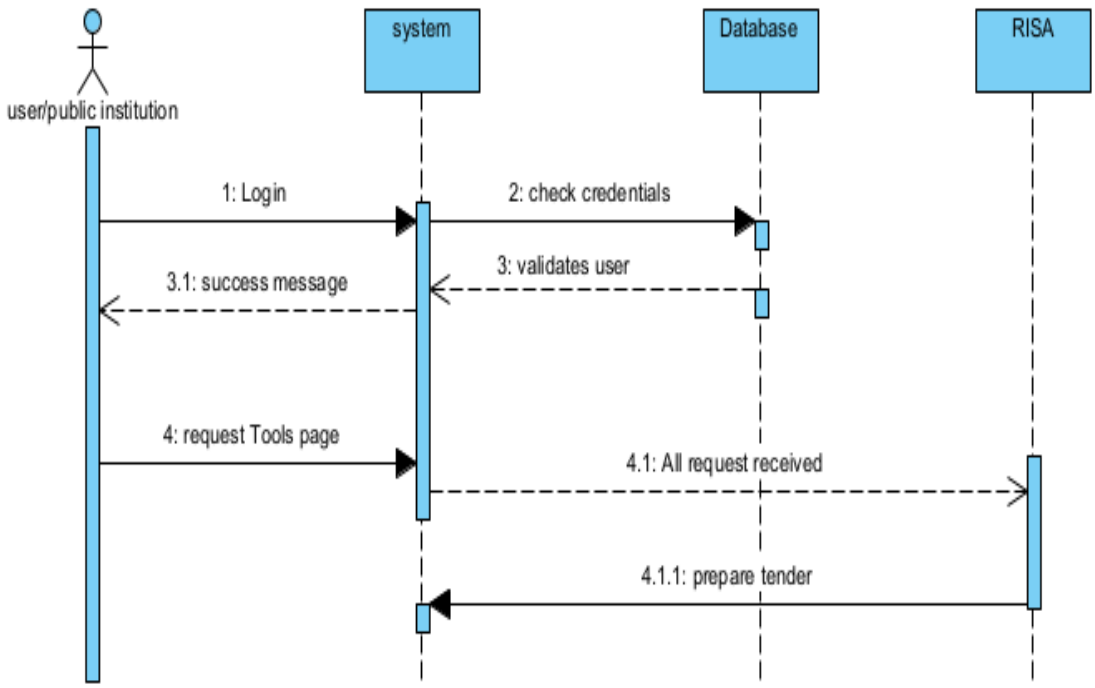


Figure 6 :sequence diagram for ordering ICT tools

Sequence diagram for delivering tools

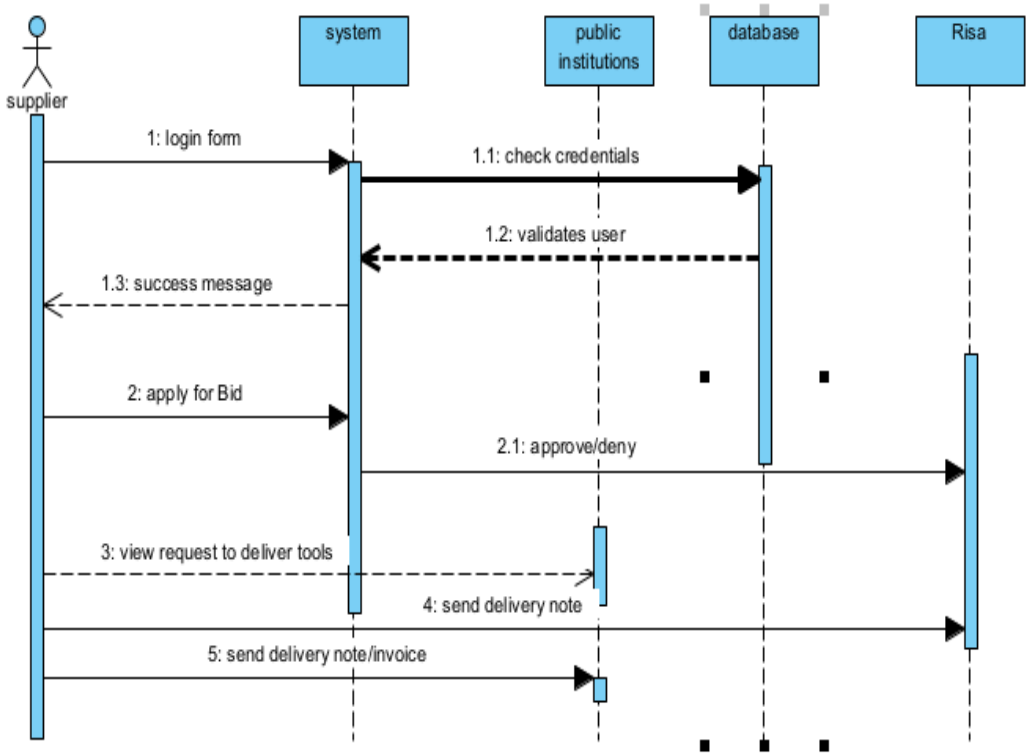


Figure 7 :sequence diagram for delivering ICT tools

System Architecture Design

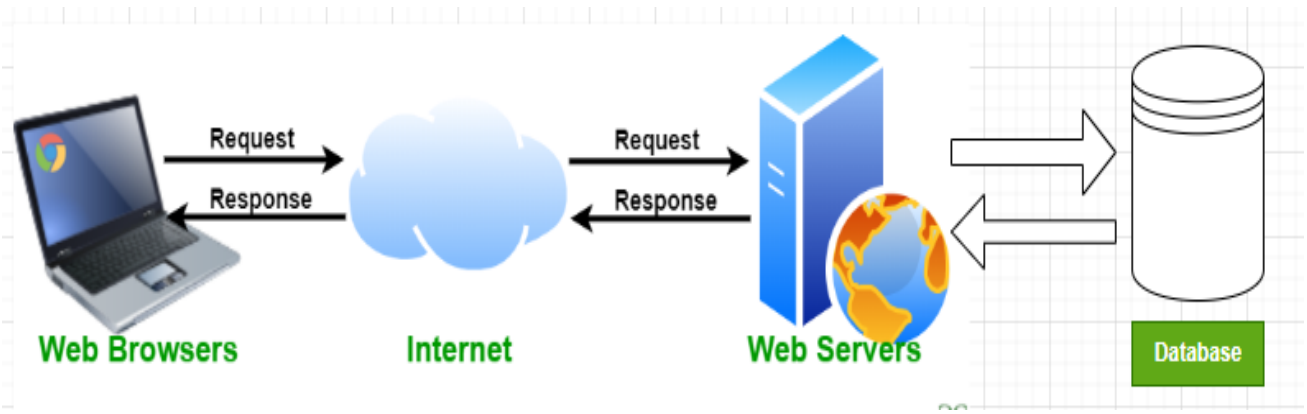


Figure 8 : archicteture diagram

CHAPTER 4

IMPLEMENTATION AND TESTING OF THE NEW SYSTEM

Introduction

This chapter will include the explanation of the technology used to build the system, and the presentation of the new system by showing the screen shoots of system user interface.

Technologies Used

- NODE js

Languages to be used are:

- React js
- HTML
- CSS (Bootstrap)

Database:

- Postgres

React js: is an open-source JavaScript framework and library developed by Facebook. It's used for building interactive user interfaces and web applications quickly and efficiently with significantly less code than you would with vanilla JavaScript

Nodejs: Node.js (Node) is an open source, cross-platform runtime environment for executing JavaScript code. Node is used extensively for server-side programming, making it possible for developers to use JavaScript for client-side and server-side code without needing to learn an additional language. Node is sometimes referred to as a programming language or software development framework, but neither is true; it is strictly a JavaScript runtime.

PostgreSQL: is a powerful, open source object-relational database system that uses and extends the SQL language combined with many features that safely store and scale the most complicated data workloads.

Presentation of the new System

Login page

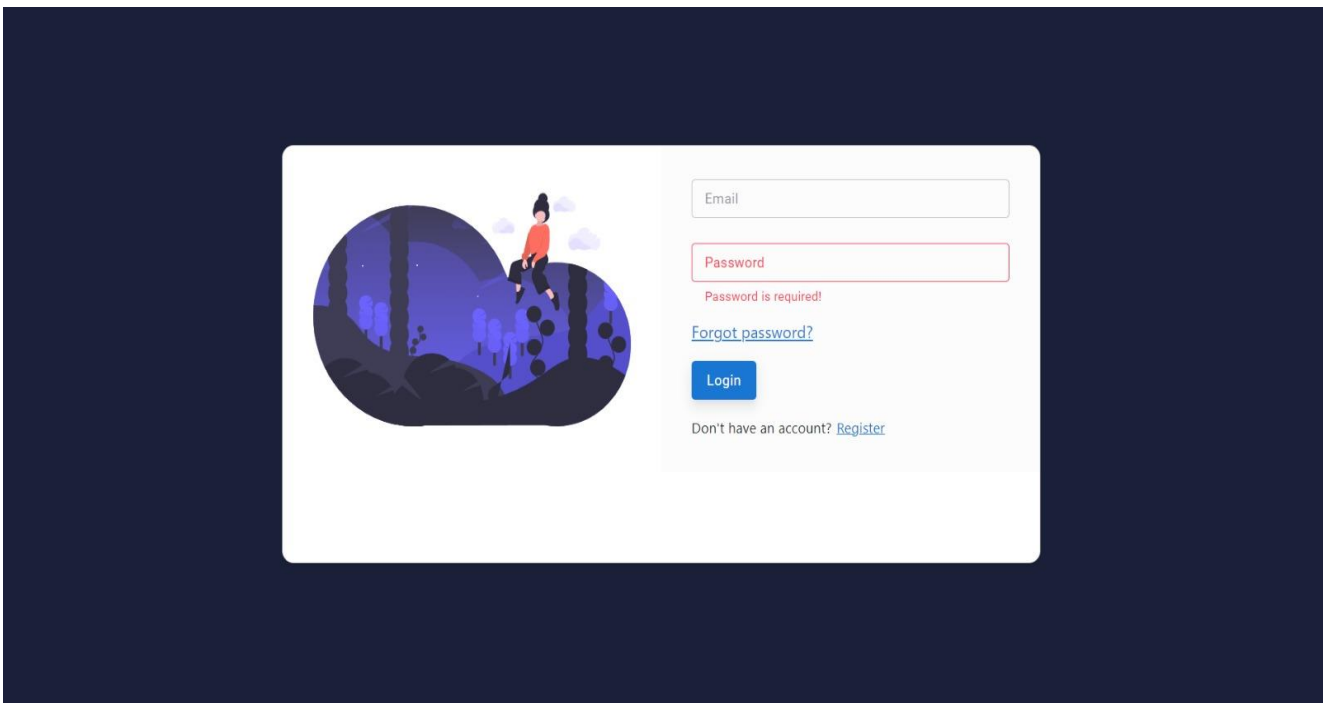


Figure 9 : Login page

Register user

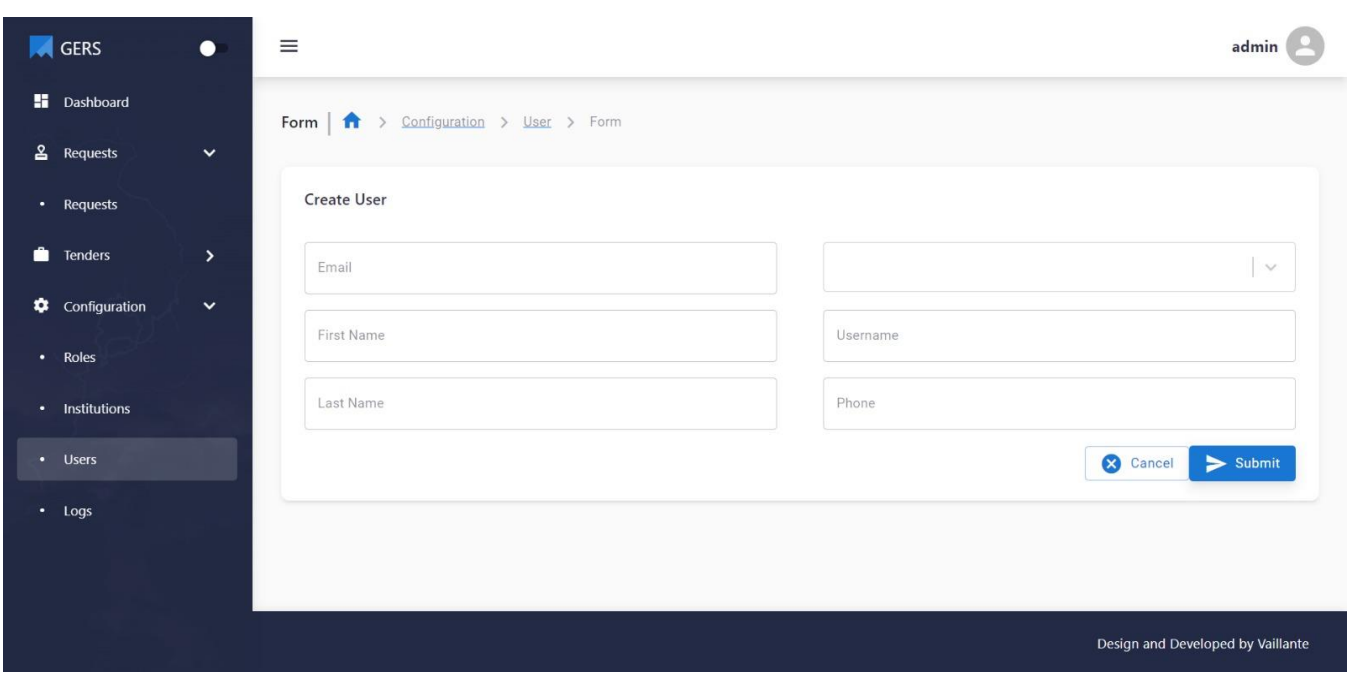


Figure 10 :Register user

Users List

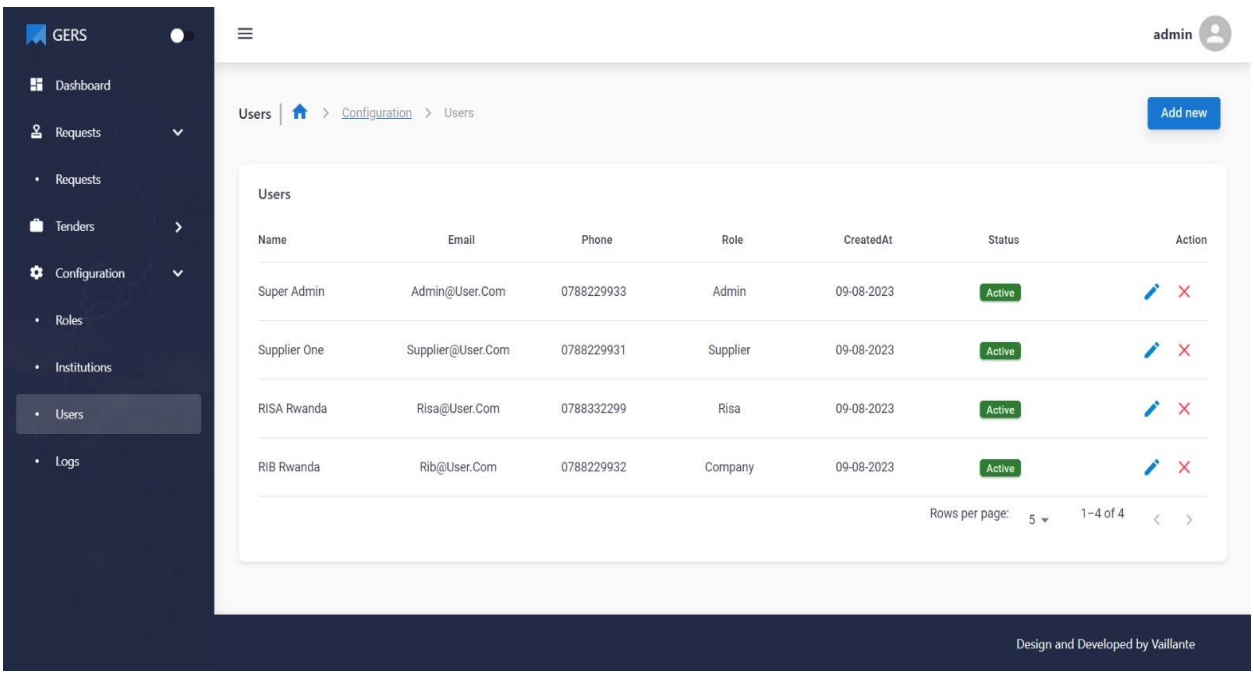


Figure 11 :Users list

Supplier form

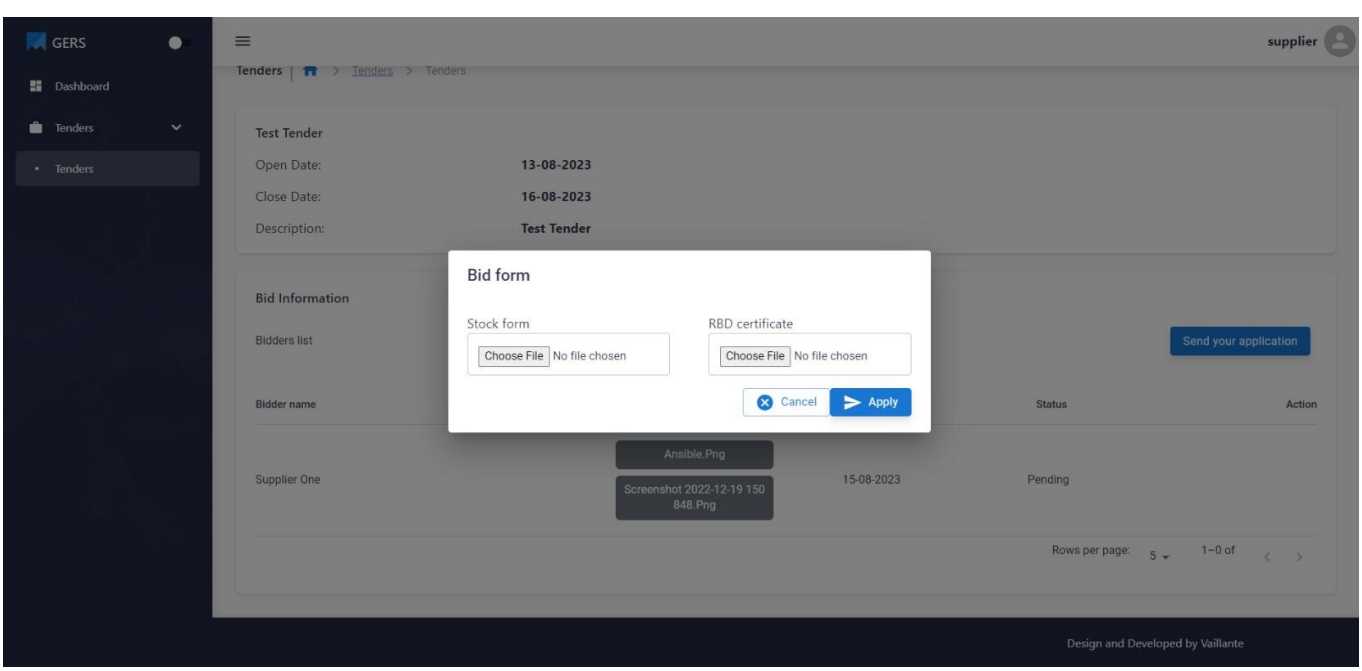


Figure 12 :supplier form

Request form

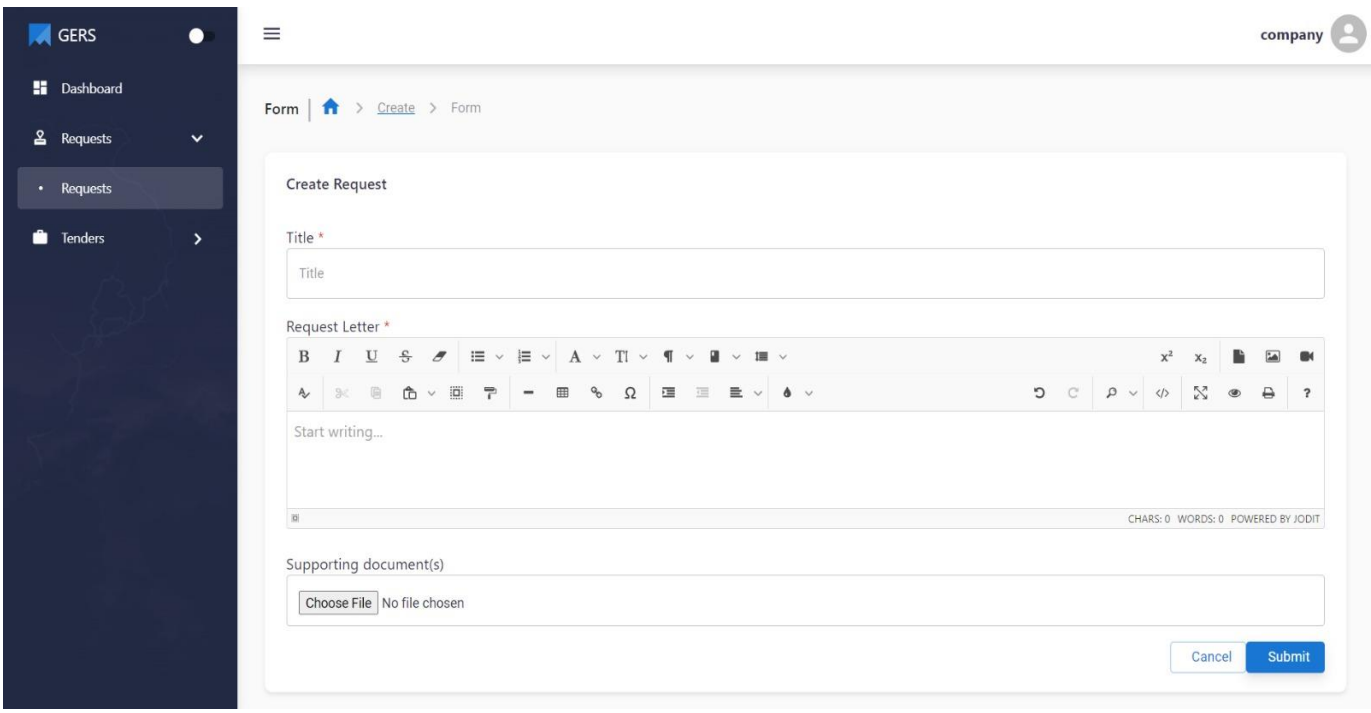


Figure 13 : Request form

Bid list

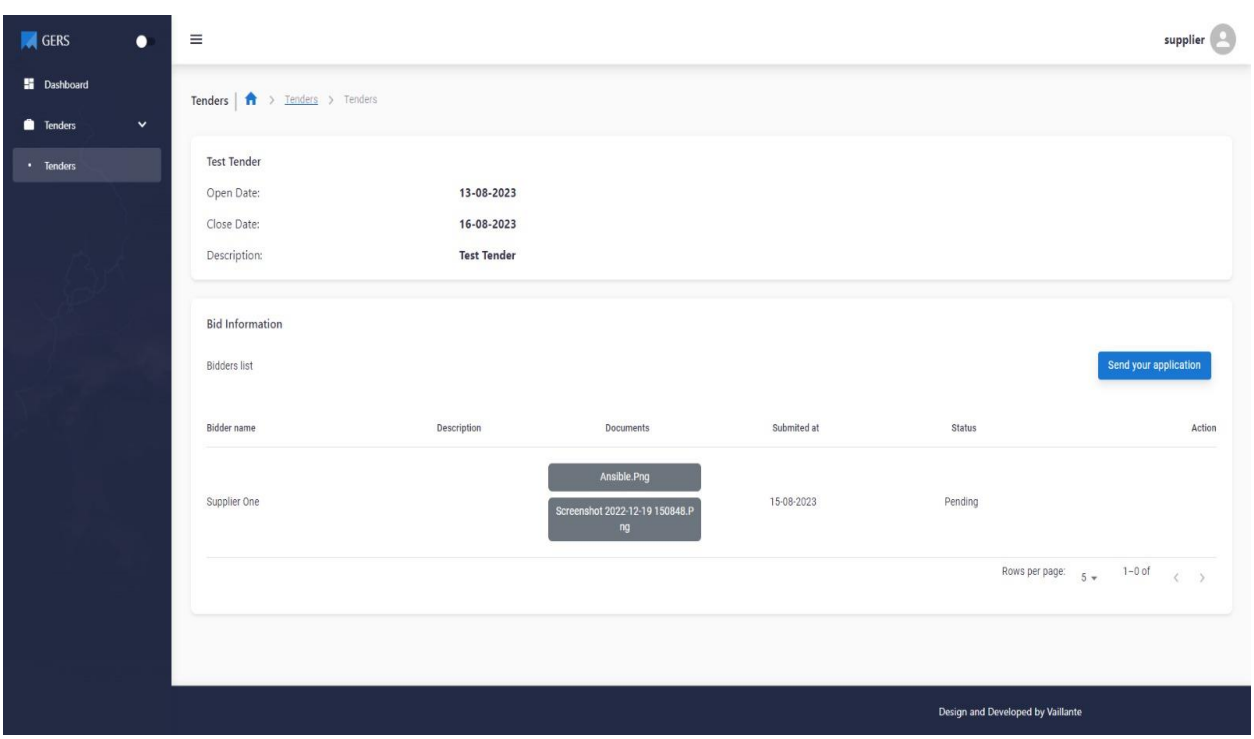


Figure 14 :Bid list

Software Testing

Software Testing play important role in software development, it is a process to evaluate the functionality of a software application with an intent to find whether the developed software met the specified requirements or not and to identify the defects to ensure that the product is defect free in order to produce the quality product

Considered Key element in testing the system

- Check if the system meets the specified requirement
- Check if the system works as expected
- Compare the actual result of the system with the expected result
- Check if the system is error free and bug free

There different types of software testing but in this project, I choose to use:

- Unit Testing
- Integration Testing
- System Testing

Unit testing:**:** is a process to ensure the proper functioning of particular software or a portion of a program. It is a method by which individual units of source code, sets of one or more computer program modules together with associated control data, usage procedures, and operating procedures, are tested to determine if they are fit for use**.**. During this testing, we look for programming errors that may have occurred while a certain capability was being implemented. During unit testing, a programmer examines each unit of code to see if it is functioning as intended and to look for errors or bugs.

On Backend:

- Checked if every service function is working as expected
- Checked if data consuming and data retrieval functions are transferring data successfully with error and bug free.

On frontend:

• Verified that each route requesting data from the backend is reaching the destination;

• Verified that each JSX request is reaching the destination and that the response to the request is what was expected

•Verify that the functions for displaying data from the backend are functioning.

Integration Testing: is the phase in software testing in which individual software modules are combined and tested as a group. This test is useful to check the assembly of the different part of the software. It is also a progression of tests, in which the software and hardware components are collected and tested until the entire system is tested. The application modules have been successively tested until completion to ensure that the whole constituted by the assembled software components answers to the required functional and technical specifications.

System testing: This is a test of complete and fully integrated software product; the focus of the system testing is to evaluate the compliance of the entire system with respect to the specified requirements. System testing helps in approving and checking the business, functional, technical, and any non-functional requirements of the application concerning the architecture as a whole. System testing in relation to property publishing supporting system will check if the system meets the specified requirements, check user experience and user interaction with the user, check the reaction and speed of the system in response to user actions it tests if it is suitable for delivery to the end-users.

Software and hardware compatibility requirements

Client-side requirements:

- Operating System**:** Windows 7, 8, 10 and Linux
- Browser most of modern browsers including (chrome, Microsoft edge, opera, Mozilla Firefox)

Server-side Requirement:

- Node js
- Database: MySQL SERVER
- RAM: 1GB minimum,
- 2GB or more free hard disk space.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

Conclusion

The main objectives of This project of Government enterprise repository system will facilitate the day-to-day operations of any business of Rwandan ICT such as RISA, public institutions. the system will be able to provide you with an intuitive and accurate way to manage all ict tools delivered , This will provide them the ability to use the system to provide services in a way that prevents time from being wasted. additionally boost public institution acquisition.

We hope that the implementation of this tool and its integration will result many benefits to Government enterprise repository system

The process of designing and creating a web application allowing RISA to systematically digitize their company activities has been demonstrated in this study. Risa had to rely on its pre-existing system, which involved writing on paper, before this research. Future development will take into account the following to make sure that any potential deployment of this system is progressive and that it has in the near future attained its full potential:

- To get user feedback that will enable the application's quality be further improved, the usability of the web application is evaluated.

. The primary goals of The Government Enterprise Repository System initiative would make it easier for public institutions like RISA and other Rwandan ICT businesses to conduct their daily operations. They will be able to utilize the system to supply services in a method that doesn't waste time because it will be able to give you an accurate and straightforward way to handle all delivered ICT tools. It will also help suppliers who are interested in providing ICT tools respond to Tender additionally increase the acquisition of public institutions.

We anticipate that the integration of this instrument and its execution will provide the Government Enterprise Repository System considerable advantages.

This study has illustrated the steps involved in designing and developing a web application that would enable RISA to systematically digitize its business operations. Risa had to rely on its existing resources.

In concluding, the new tool was successfully implemented as described in previous chapters and it is functioning as intended.

Recommendations

I would like to suggest RISA and other institutions who want to request different tools to use the new system . In the future the application I would update it and add many other functionalities that are not included in this one so that it will keep being interesting.

Ending by inviting every interested people and researchers think about any other functions that could lead to the improvement of this work in order to improve this topic in different research activities in Rwanda.

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- Cascading style sheet: https://en.wikipedia.org/wiki/CSS

APPENDICES

Plagiarism Report