

Final Year Project Report

A thesis submitted in the partial fulfillment of degree of BSE

E- Tendering



Bahria University Islamabad

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DECLARATION

Certified that this project report “E-Tendering” is the bona fide work of “Saqib Saeed & Muzammil Ishfaq” who carried out the project work under my supervision.

(Signature of Supervisor)

Dr. Awais Majeed

CERTIFICATE

To be provided by the University.

ACKNOWLEDGMENT

Thanks to Allah almighty for giving us strength and ability to understand, learn and complete this project.

We would also admire the help and guidance of our supervisor and all the teachers motivating us when we are down.

The success of this project would not have been possible without the kind support and guidance of teachers and organization, and we are immensely blessed to have got this along the duration of our project. We would like to extend our profound gratitude to every one of them.

ABSTRACT

In the past, there was not any process for bidding against tenders online. All processes were manual. If any new tender were issued then the organization would give an advertisement on its website, newspaper, or any other media. Newspapers contain only few details of tender, if any more details are required then the contractors must physically visit the organization. All process from issue of a new tender to allocate a tender to the contractor would have to be done on paper and personally. So, the Bidder's, contractor's portfolio and bid details are managed manually. No online registration and subscription were provided. This E-Tendering app (electronic tendering app) facilitates the complete tendering process from the advertising of the requirement through to the placing of the bid on this app. All the Bidder details can be shown in this app. The app will first ask for NTN number. If the bidding organization is not a national tax payer then bid cannot be placed. An interested bidding organization would download/access the tender specification. The respective bidding organization would review the requirements. Based on the tender specifications, the bidding organization would prepare a bid. In E-Tendering app Bidder can bid for the Product using the app and portfolio can be submitted at the time of bidding.

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CHAPTER – 1
INTRODUCTION

1.1 Motivation

As the world is now becoming smart everything is moving towards automation. The main motivation behind E-Tendering is to automate the tendering and bidding process and to minimize dishonesty. The manual tendering process contains a lot of dishonesty. Deserving companies are unable to get the project while some dishonest people with their tricks take the tender away from their hands. This application will allow user to float his tender online and also enable bidders to bid against tender of their choice in a secure way by encrypting his bid documents.

1.2 Problem Statement (one or two sentences)

The manual tendering process contains a lot of dishonesty. Deserving companies are unable to get the project while some dishonest people with their tricks take the tender away from their hands.

1.3 Goals /Objectives

Some of the primary goals of this project are:

- Online Bid against the tenders floating online.
- Encrypt the bid documents.
- Try to minimize dishonesty.

1.4 Main Contributions

Previous work done in this field only includes floating of tender online.

Bidding against floating tenders and bid encryption is a whole new idea. Bidder can now bid online against the tender of his choice. His bid will stay encrypted till the last date. So, level of dishonesty will decrease. We try to minimize dishonesty from this beautiful world. There is still a lot of effort required to eliminate it.

User after reading this document will get to know what we are trying to do and what is our purpose to create this application.

1.5 Thesis Organization

Thesis is based on 6 chapters. Each chapter is explaining its own part to make it useful for the readers and users to understand the application.

CHAPTER – 2: BACKGROUND/ LITERATURE REVIEW

2.1 Description of system under use:

When the Tendering company wants to buy goods or materials, first they organize a committee that identifies the type of goods that should be bought, after the identification they propose the goods to the highest body in the organization; then the highest body of the organization assesses the goods that provided by the auction committee and then it decides whether they should buy or not. We have spent time analyzing users and observing the way they prepare tenders. After the approval made by the highest body, the company brings it to the media, and the committee decides the place where bidding should be held and the starting and closing date of bidding.

During the bid planning process and the preparation of bidding documents, the tendering company shall ensure that there is enough budget allocation.

I. Preparation of bidding documents

The Tendering Company prepares the tendering documents and incorporates the technical specifications based on the standard tendering documents. The bidding document is prepared based on the approved annual procurement plan which provides important details like quantities, cost estimates, method of procurement etc. Once the Tendering document is ready it must be given to the Tender Committee which will review and provide comments. The Tendering document is then finalized. In accordance with the procurement law, the tendering document should provide the following information:

- a. The specific requirements relating to the goods, works or services being procured and the time limit for delivery or completion.
- b. The general and specific conditions governing the contract if the performance security is provided.
- c. The tender number assigned to the procurement proceedings by the procuring entity.
- d. Instructions for the preparation and submission of Bidders including:
 - ❖ The Tendering form.

- ❖ The number of copies to be submitted with the original bid.
- ❖ Any Tender security required, the form and amount of such security.
- ❖ Any proof evidencing the bidder's qualifications.
- ❖ A statement of where and when bids shall be submitted.
- ❖ A statement of where and when the bids shall be opened.
- ❖ A statement of the period during which tenders shall remain valid.
- ❖ The procedures and criteria for bid evaluation and comparison.
- ❖ A statement that the Tendering company may cancel the bids at any time before the signing of the contract.
- ❖ Anything else as may be provided by the tender document in accordance with this Law or public procurement regulations.

After the Tendering company announces the venue and the items for auctions to the general public through electronic or print media; The bidders who wish to take part in the auction should first take the document (the form that contains the list of materials which are proposed to be buy or wanted documents and other documents with a blank space that bidders will fill the price they wish) and then arrive at the venue of the auction on the given date and time with the necessary document. This method restricts most of the interested bidders out of the city or region to decline their offer or interest as they can't be available on the day of auction. Another flaw of this method is the piles of paperwork that must be maintained then keep it save for the future. They must keep track of the bidders and the sellers until their final settlement. Bidders submit bids that they want with in post which is sealed by wax and put it in an auction box. This process requires physical presence of the bidder himself/herself or by their agents. When the bidding time expires the auction process will be closed. After the closing date of the process then the Tendering company collects these bids from the bidders and evaluate these bids. Finally, the auction committee decide the winner bidder who bids lowest will be selected. Then Tendering Company pays the required amount of money for the bidder and in turn the winner gives the material. The tendering company details, their notices and

documents, bidder's records and bid details are managed manually. No online registration and subscription provided.

I. Bidding Process:

The bidding process which involves both the technical bid and the financial bid is not automated. Bidders send the necessary documents like their tax and certificate, technical resources data and their quotations through post.

In the bidding process, technical bid is the first stage if the materials need specification wherein the bidders have to give the proof of his solvency and the data about his financial position. Then he is required to give the details of the technical resources available with him. Both the technical bid and the price bid are kept in two separate covers which are again kept in one main cover.

Only those bidders' price bid is opened whose financial records and technical bid are satisfactory. Earned Money Deposit of those bidders who are not qualified at the technical bid stage may be refunded or returned, in form of CPO.

After proper evaluation, the final bid is selected and the bidder whose bid is selected will have to pay some amount as a security deposit. This amount will be adjusted later.

1.2 Problems of Existing System

The problem with public auction is that the participation of the public is very limited. This public auction is managed manually and involves lot of paperwork. Another headache of the currently working system is to track each bidding process and to make it finish in financial settlement.

In present, there is no process for online submission of bids. All processes work offline on paperwork. If any new Tender is issue then organization gives an advertisement in TV, newspaper, or any other resources. Newspaper contains only few details of materials, if any more detail required then bidder physically visits the organization. Manual procurement transactions can take up to 20-30

days to process, including all the time spent exchanging paperwork and contacting suppliers etc. An integrated e-Procurement solution can be used to simplify the procurement process.

Generally existing System:

- ❖ No Automated Bidding Process: The bidding process is completely manual and so very time consuming. There is no provision for online bidding.
- ❖ Security: The manual process is not very secure. In the new system, the passwords are generated and are made safe using hashing so only the members know their passwords.
- ❖ Not as Accurate and Fast: Retrieving information is slower as everything is managed manually. Since everything is managed manually; there might be a lack of accuracy.
- ❖ No Searching Facility: There are no searching facilities for bidders such as quick search mechanism in the existing system.
- ❖ It consumes more personnel power and material wastage like paper, ink related to printing documents for the sake of procurement guideline for employment.
- ❖ The existing system has a problem of keeping the records separately because of using a file-based system.
- ❖ Users are using Word or Excel to record companies' names and personal details, writing one record many times in different sheets which leads to inconsistency of data. Consequently, users are facing the problem of getting reports on time because of searching the information related to one tender in different files.
- ❖ The existing system has many problems associated with it, for instance: it wastes time for recording the process of tender information.
- ❖ In the existing system, the process of evaluating tenders takes a lot of time to do analysis and to compare documents as they (users) write down and also remember they have to search for the documents they

want manually.

- ❖ It is hard to get reports on time because they must write manually. In other words, each record they keep is not in the format of reports, and at the time of issuing the report, they must type it manually.
- ❖ Bidders who need to sell the things, he attends the place of bidding.
- ❖ It covers only limited Area, Bidders far from the organization will not participate.
- ❖ Limited Bidders and Tenderers.

2.3 Proposed System

While this model may seem anarchic, an increasing degree of control is being exercised by a centralized procurement management function (Procurement and Contracts Officer) that oversees the development of centrally negotiated contracts with suppliers of key goods and services required throughout the organization. Conditions of Contract, Service Level Agreements and Pricing are all negotiated through one point of contact thereby ensuring consistency and ease of a management.

2.3.1 Overview of the Proposed system

The motto of the new system will be AAA, 'Anyone, Anytime, Anywhere'. That what it really is? The "E-Tendering" is online auction house so the bidder doesn't need to go anywhere, instead they can take part in the auction just sitting in the comfort of their living room, be it during the day or night.

Need for new system

- ❖ To automate the bidding process and provide the tender details online:
 - ✓ The bidders should be able to make a bid online. All the important details of the tenders should be made available online.
- ❖ To check the status of Tenders
 - ✓ Such a facility will enable the contractors to know the status (Allocated/Non-Allocated) of the tenders easily and quickly.
- ❖ Faster retrieval of information:
 - ✓ Retrieval of information becomes easier compared to the

manual system. Details regarding bidders, feedback, documents etc. are available easily.

2.3.2 How our system overcome the shortcomings of Current System

1. Floating of tenders online.
2. Online submission of bids.
3. Encryption of bids.
4. Implement the level of security so that every user will be able to access the information according to their role in the system.

This new system will avoid the duplication of data that leads to consistency of data.

CHAPTER – 3: SYSTEM REQUIREMENTS

3.1 Interface Requirements

3.1.1 User Interface

All the E-tendering interfaces are made simple and easy to understand. Meaningful buttons and fields are used to easily understand the functionality without any need of manual. Any user who has little knowledge of computer can easily use this application.

3.1.1.1 Register Interface

This interface is accessible to any user coming to use the application. By providing information and clicking register button users can get themselves register.

3.1.1.2 Login Interface

Registered users by providing their credentials and clicking on login button can get login and freely use the application.

3.1.1.3 Top Search

User can search for tender of his choice by selecting his choices.

3.1.1.4 Post Tender Interface

After providing few details user is taken to requirement forms, where he can add requirements according to his own choice.

3.1.1.5 Add Bid Interface

After successful login user can bid against tender of his choice. He has to upload both technical and financial bids.

3.1.1.6 Tender List Interface

It will show the list of active tenders.

3.2 Functional Requirements

3.2.1 Functional Requirement #1: Sign Up

The user after providing his credentials can sign up into the system. His information will be stored in database.

3.2.2 Functional Requirement #2: Sign In

The user needs to use his credentials for sign up that he has provided while sign up into the system.

3.2.3 Functional Requirement #3: Post Tender

If the user has signed up as a tenderer, he will be taken to post tender page where he can post tender by providing information needed to post a tender.

3.2.4 Functional Requirement #4: Add bid

If the user has signed in as bidder, he will be taken to bidder page where he can bid against tender of his choice. Once he submitted his bid that bid will remain encrypted till the last date of bid submission. After last date no one can submit bids and tenderer can access the submitted bids.

3.2.5 Functional Requirement #5: Result

Tenderer will first approve technical bid then he approves financial bid and announce a winner and upload a contract document.

3.2.6 Functional Requirement #6: Search

The users can search tender of their choice by referencing type, province, and district of tender.

3.2.7 Functional Requirement #7: Add review

Users can add reviews about companies by searching the name of the company and by clicking on add review button.

3.3 Use Cases (Use case description)

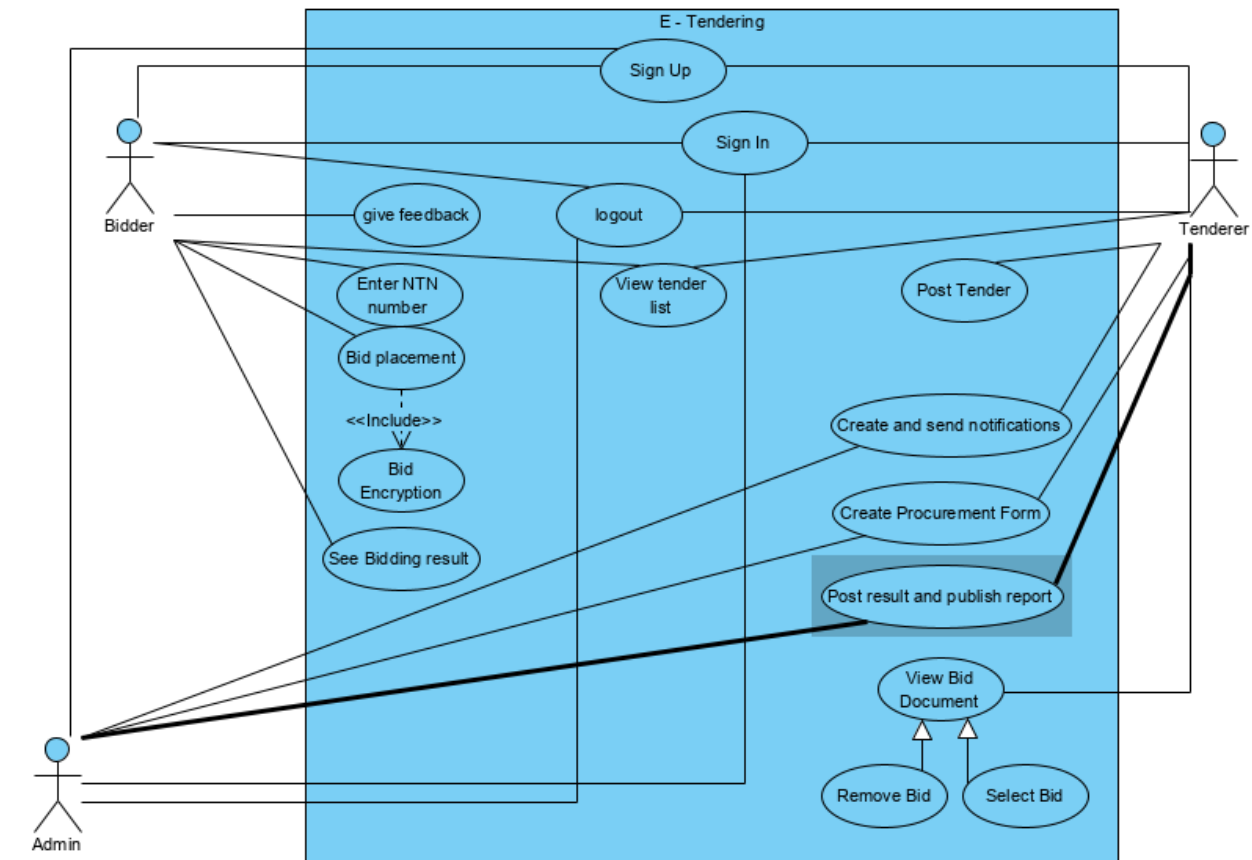


Table 1. Use case description for Signup

Name:	Sign up
ID	1
Extend	----
Include	-----
Actors	Procuring Entity, Admin, Bidder
Description	The Actors open app home page and click Sign up button to go his own page
Pre-condition	The actors go to the app home page and sign up.
Post condition	The actors can login into the app.
Basic Course of Action	The actors request signs up. The actors get sign up form The actors fill the requirements. The System approves sign up. End of use case

Alternate	A1: If the information is invalid or incomplete
Course of Action	A2. The system asks to fill the appropriate information. A3. The actors fill the appropriate information on the form. A4. The use case continues from step 3

Table 2. Use case description for log in

Name:	Login
ID	2
Extend	----
Include	-----
Actors	Procuring Entity, Admin, Bidder
Description	The actors open app's home page and click login button to go to his own page
Pre-condition	The actors go to the app's home page and login
Post condition	The actor's login into their own page
Basic Course of Action	The actors request login The actors get login form The actors fill the requirement. The System approves login End of use case
Alternate	A1: If the information is invalid or incomplete
Course of Action	A2. The system asks to fill the appropriate information. A3. The actors fill the appropriate information on the form. A4. The use case continues from step 3

Table 3. Use case description for logout

Use case name	Logout System
ID	3
Primary Actor	Administrator
Secondary Actor	Tenderer, Bidder
Preconditions	A valid procuring entity logged on to the system

Flow of event	After finishing access, the system, the users will logout the system. It is more for the security. After Log out, the user goes back to home page.
Post conditions:	

Table 4. Use Case Description for Post Tender Document

Use case name	Post Tender document
ID	4
Primary Actor	Procuring Entity, Administrator.
Preconditions	A valid procuring entity logged on to the system
Flow of event	Choose Upload tender option. Browse where tender document is saved and upload it. .
Post conditions:	Tender document available for bidders.

Table 5. Use Case Description for Create Procurement form

Use case name	Create Procurement form
ID	5
Primary Actor	Procuring entity, Administrator.
Preconditions	A valid procuring entity logged on to the system. Fill necessary information.
Flow of event	Fill the form demanding information from the bidder. Save and Publish form.
Post conditions	For a tender necessary information obtained from bidder along with the bid document.

Table 6. Use Case Description for View bid documents.

Use case name	View bid documents.
ID	6.
Primary Actor	Procuring entity, Administrator.
Preconditions	A valid procuring entity logged on to the system.

	Tender posted.
Flow of event	Download bid documents. View all the details.
Post conditions:	Examine bid documents to determine the winner.

Table 7. Use Case Description for post bidding winner and publish bidding report.

Use case name	Post bidding winner and publish bidding report.
ID	7
Primary Actor	Procuring entity, Administrator.
Preconditions	A valid procuring entity logged on to the system. Bidding deadline passed.
Flow of event	Procuring entity create a report of all bidders and who are fail in evaluation and who wins and publish it.
Post conditions:	The winning bidder is awarded the contract. Report Published for the public viewing.

Table 8. Use Case Description for Create and send notification

Use case name	Create and send notification
ID	8
Primary Actor	Procuring entity, Administrator.
Preconditions	A valid procuring entity logged on to the system.
Flow of event	Choose to create and send notification menu Create notification and send it to all bidders.
Post conditions:	All bidders notified.

Table 9. Use Case Description for View tender details.

Use case name	View tender details.
ID	9
Primary Actor	Bidder.
Preconditions	A valid bidder logged on to the system.

Flow of event	Download tender document. View all the details.
Post conditions:	Bidder will submit the bid documents.

Table 10. Use Case Description Submit bid document

Use case name	Submit bid document
ID	10
Primary Actor	Bidder
Preconditions	A valid bidder logged on to the system.
Flow of event	Choose Submit bid document menu. Upload bid document for selected tender.
Post conditions:	Bid document submitted.

Table 11. Use Case Description for view bidding result.

Use case name	View bidding result.
ID	11
Primary Actor	Bidder.
Preconditions	A valid bidder logged on to the system. Bid document and procurement form submitted by the bidder for a particular tender.
Flow of event	From main page Choose results menu. Click on result you need.
Post conditions:	Contract is awarded to the winner.

3.4 Non-Functional Requirements

3.4.1 Performance

E-Tendering application will interact with different kind of users, it is expected that system would perform functionally all the requirements specified

- Application should not take more than 10 seconds to load.
- Application should perform any kind of processing within 10 seconds.
- Application should be able to handle expected and unexpected errors in a way that data should not be lost.
- Application should process 200 multiple users at one time.
- Application should be able to handle all user's data without any fault.

3.4.2 Reliability

Application should be reliable and do make sure that any user authorized/unauthorized cannot harm the database. Application will have to make sure the secure way of information sharing between users so their information cannot be misused.

3.4.3 Security

- Application should use secure database.
- Data of each user should be kept confidential by the Application.
- Only the registered users can use the functionalities.
- Bid must remain inaccessible to all user until the closing date.
- Only admin have rights to access user's data in case of any mishap.

3.4.4 Availability

˘ The system is always available; the user can access it using an application. This is only restricted during down time of the database and they can handle this problem by reserving backup databases on the other server.

CHAPTER – 4: SYSTEM DESIGN

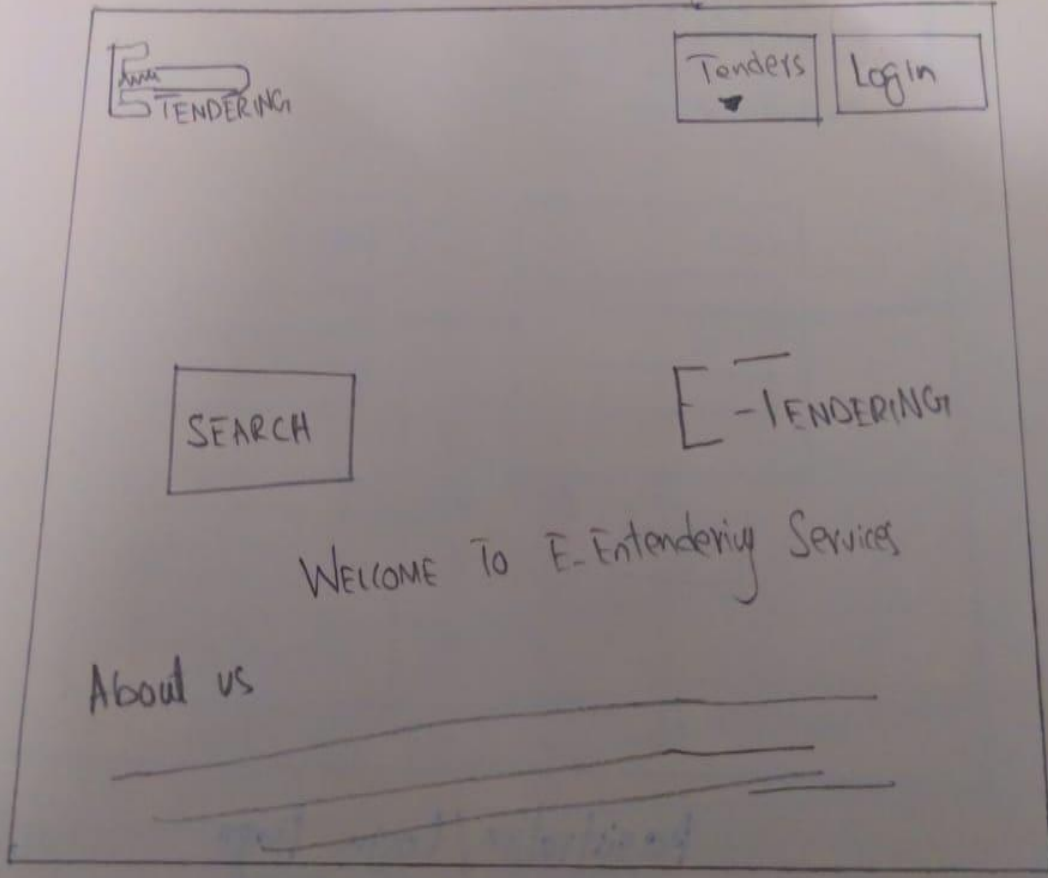
4.1 Design Approach

The approach we have used to make this app is completely easy to understand and is functional. There are three actors in our application i.e. Admin, bidder, and tenderer. All of them have their completely different roles. Each actor has his own functionality all roles related to actor are considered as sub roles. Completing sub roles will complete a role of specific actor. In this way all actors performing their roles separately and making this app a functional application.

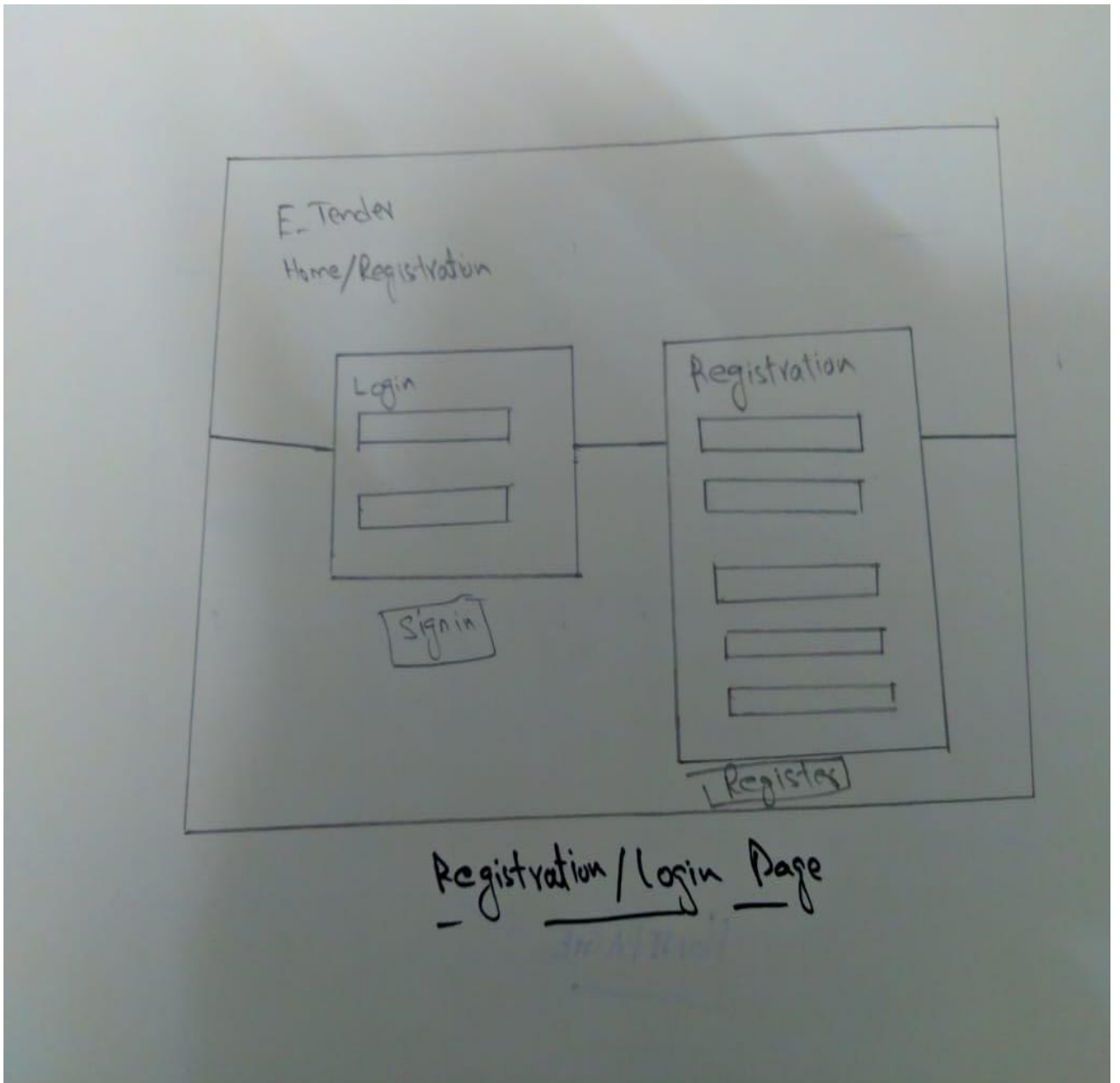
4.2 Design Constraints

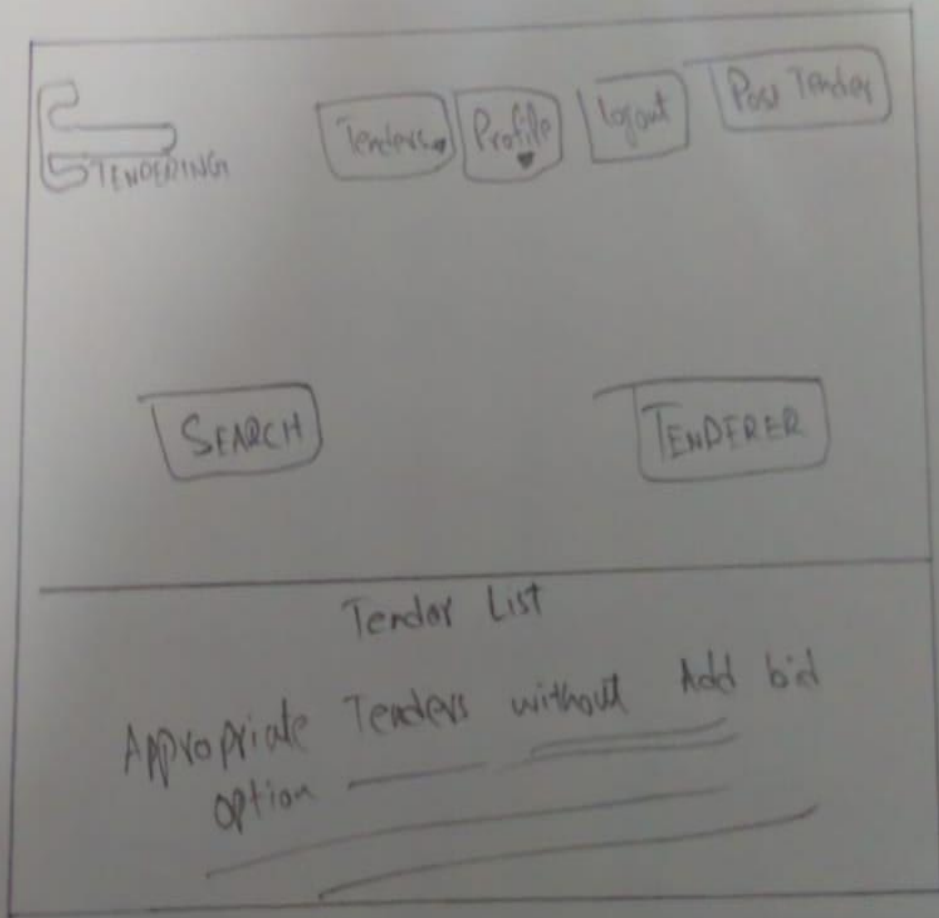
Here are the implementation constraints must be faced and limitations of this system.

- Only supportive platform for this application right now is web and android.
- Application's user interface should be easy to operate so it can be easily used by naïve users.
- Users must possess NTN number.
- The end user must have the basic understanding of the web/android.
- Information of tenderers and bidders will be stored in a database.
- Users making account on this Application must fill registration form and all should be stored in the database.
- Application must maintain large data storage resources for multiple users.
- Only authorized person having valid id and password can login and use product services.
- User's device Wi-Fi should be enabled
- **4.3 Interface Design**
- 4.3.1 Low Fidelity Prototype

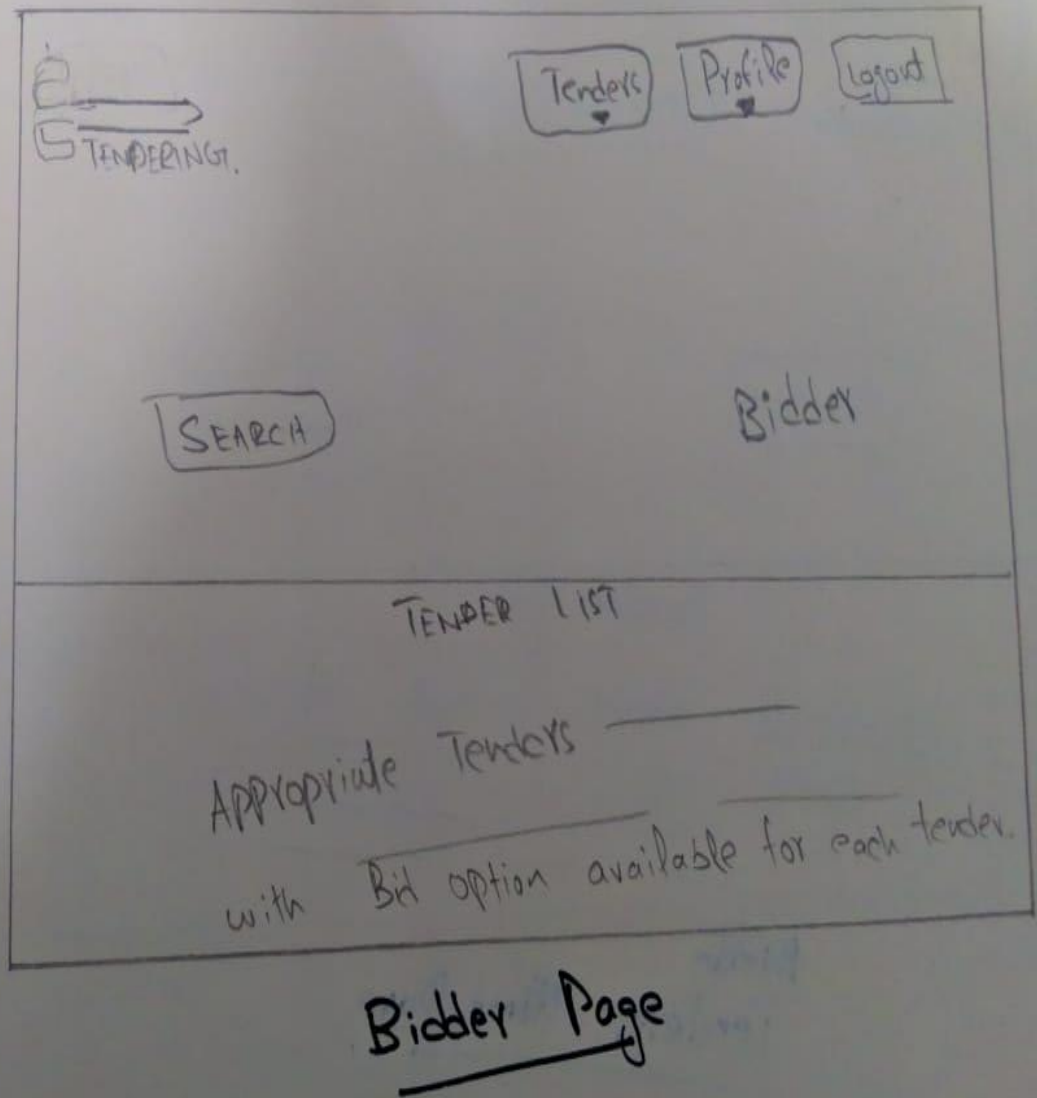


HOME PAGE

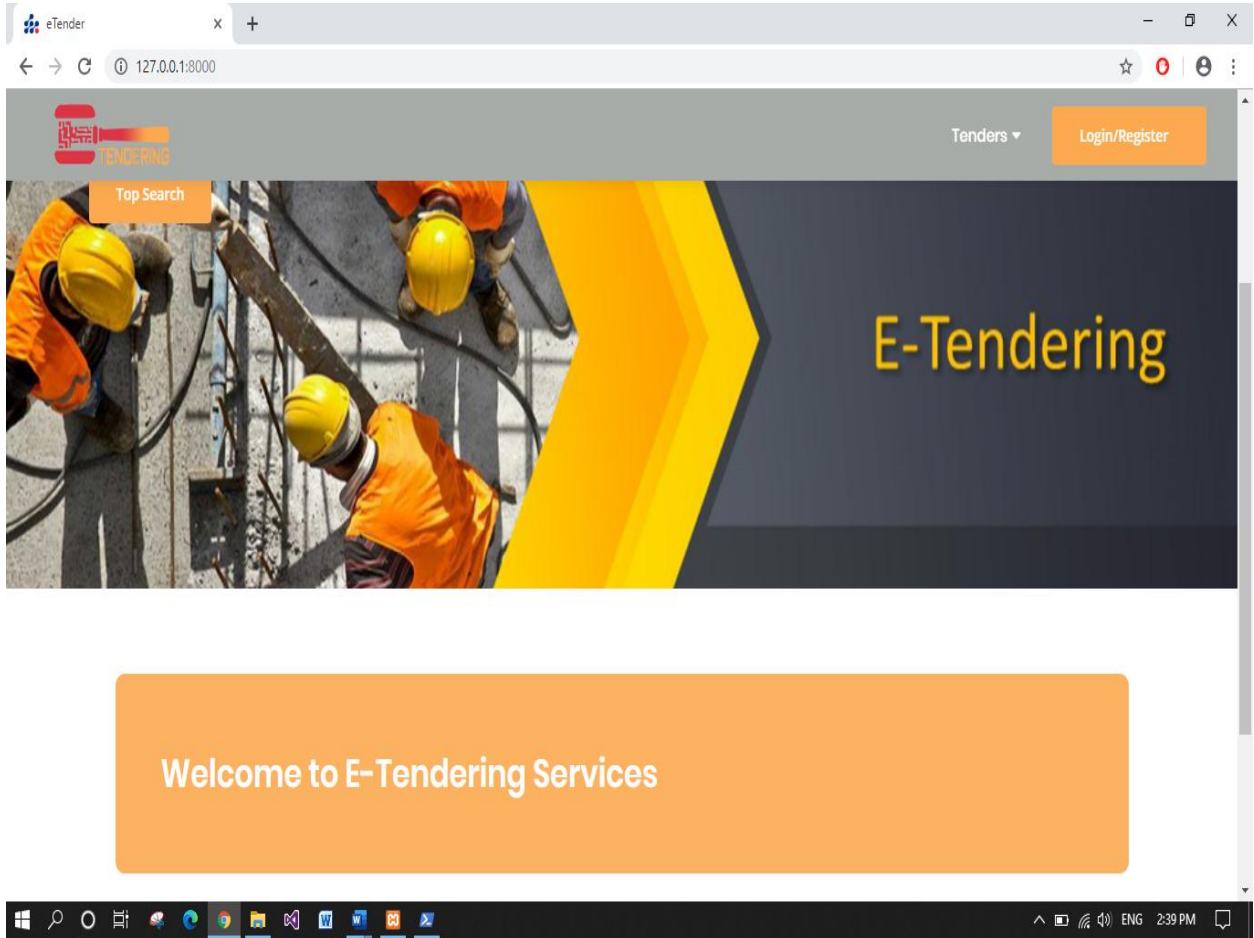




~~Appropriate~~
Tenderer Page



4.3.2 High Fidelity Prototype



eTender x +

127.0.0.1:8000/Clientlogin

eTender

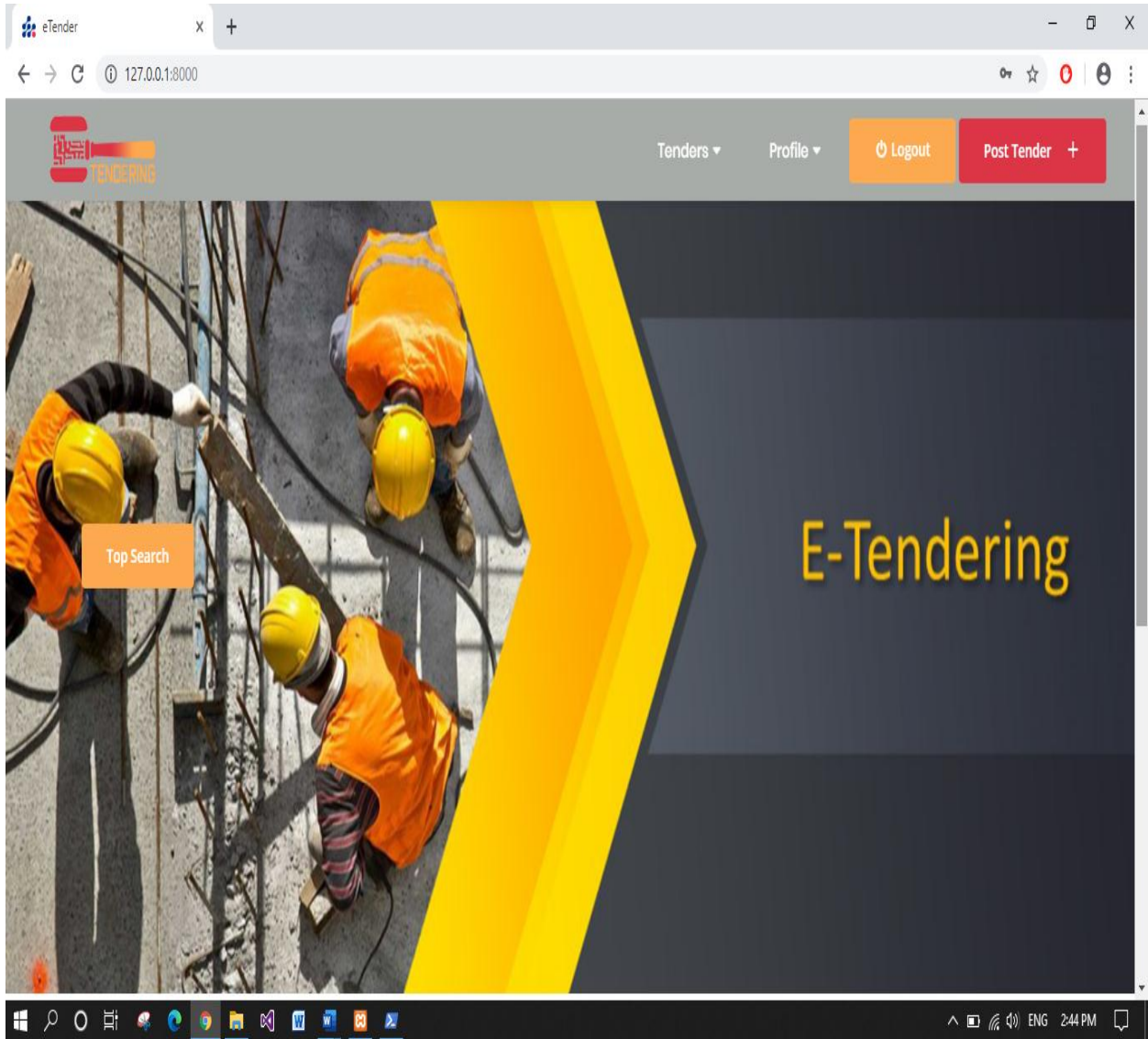
Home / Registration

Tender Opportunity

Login


Registration

Windows taskbar: ENG 2:40 PM



eTender x +

127.0.0.1:8000/post-tender

 Tenders ▾ Profile ▾ Logout Post Tender +

fhwgfndjfer

Company NTN* 735643765345 Company Name* abccc

Company Email* assdd@asdd.com Company Contact Number* 0332-4344721

Company Address* lahore

Reset Submit

Windows taskbar: ENG 2:48 PM

eTender x +

127.0.0.1:8000/post-tender/technical/1

Tenders Profile Logout Post Tender +

Add Technical Requirement

+ Financial Requirement
All Tenders

Technical Requirement*

Add New Requirement +

e

d

c

b

a

127.0.0.1:8000/post-tender/financial/1

Windows taskbar: ENG 2:49 PM



Add Financial Requirement

+ Tenders

All Tenders

Financial Requirement*



- e
- d
- c
- b
- a


eTender x +

127.0.0.1:8000/tender-list

Tenders Profile Logout Post Tender +

Tender List

Road Construction

Posted by Saqib8  Download

fhwgfhdfjfer [View Detail](#)

Open 08 Jul, 2020 Close 09 Jul, 2020

Status Active Category Construction

Windows taskbar: ENG 2:50 PM

eTender x +

127.0.0.1:8000/post-bid/1

Tenders Profile Logout

Requirements

Requirements

Technical	Financial
a	a
b	b
c	c
d	d
e	e

Close

Company Name*
Company Name

Experience*
Company Expe

Email*
Email

Upload Technical
Choose File No file chosen

Reset Submit

Windows taskbar: ENG 2:52 PM

Post Bid [Requirements](#)

Company Name* <input type="text" value="gdfsagdf"/>	Company NTN Number* <input type="text" value="5425463248"/>
Experience* <input type="text" value="2 years"/>	Contact Person* <input type="text" value="saqib9"/>
Email* <input type="text" value="saqibsaeed0@gmail.com"/>	Contact Number* <input type="text" value="0213-2516548"/>
Upload Technical Document* <input type="button" value="Choose File"/> New Microsoft Word Document.docx	Upload Financial Document* <input type="button" value="Choose File"/> New Microsoft Word Document.docx

The screenshot shows a web browser window with the address bar displaying "127.0.0.1:8000/tender-list". The website header includes the "eTender" logo, navigation links for "Tenders" and "Profile", and a "Logout" button. The main content area is titled "Tender List" and features a single tender card for "Road Construction".

Tender Card Details:

- Title:** Road Construction
- Posted by:** Saqib8
- Reference:** fhwgfhdjfhner
- View Detail:** View Detail
- Open:** 08 Jul, 2020
- Close:** 09 Jul, 2020
- Bids:** Bids [1]
- Action:** + Add bid

The browser's taskbar at the bottom shows the Windows Start button, search icon, and various application icons. The system tray on the right indicates the language is set to "ENG" and the time is "2:53 PM".

Laravel x + 127.0.0.1:8000/home

TENDERING

User Management

Admin welcome Admin

DASHBOARD

- Client Info
- Tenders

Add New Tender
+

All Tenders
1

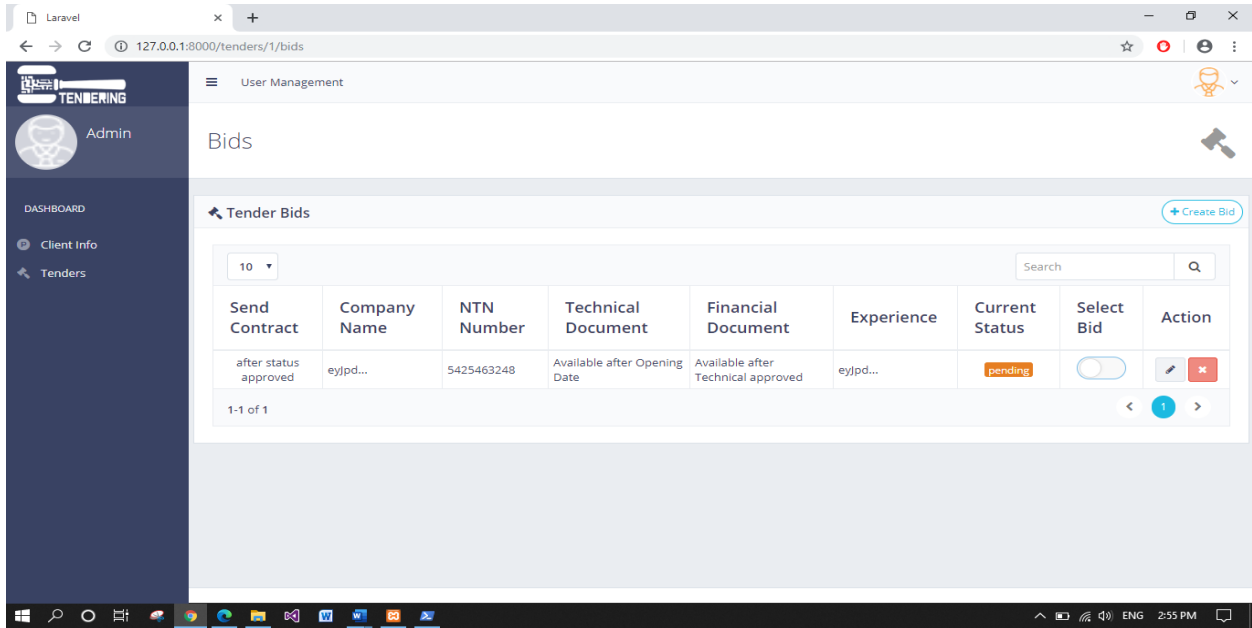
Active Tenders
1

Active Tenders

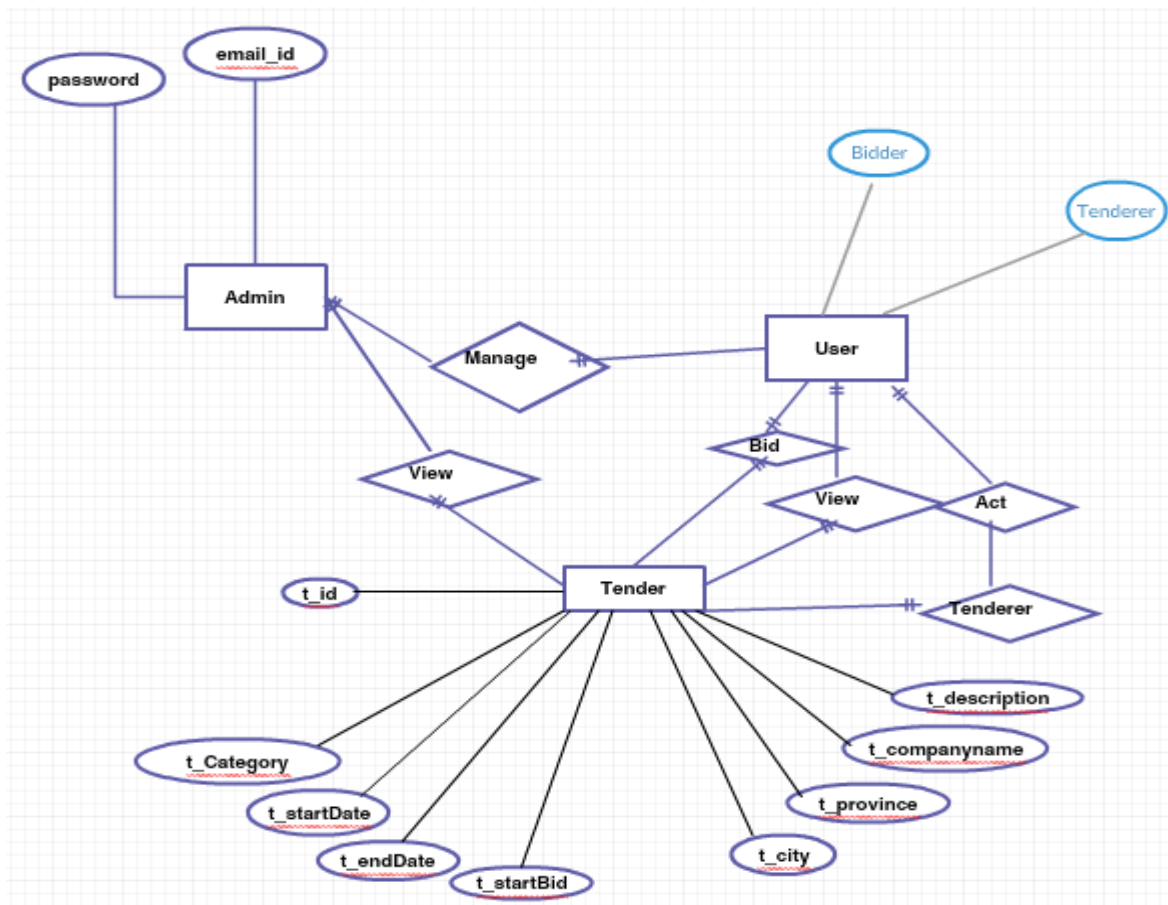
ID	Title	Open Date	Close Date	Document	Tender Category	Status
1	Road Construction	2020-07-08	2020-07-09	Download	Construction	Active

1-1 of 1

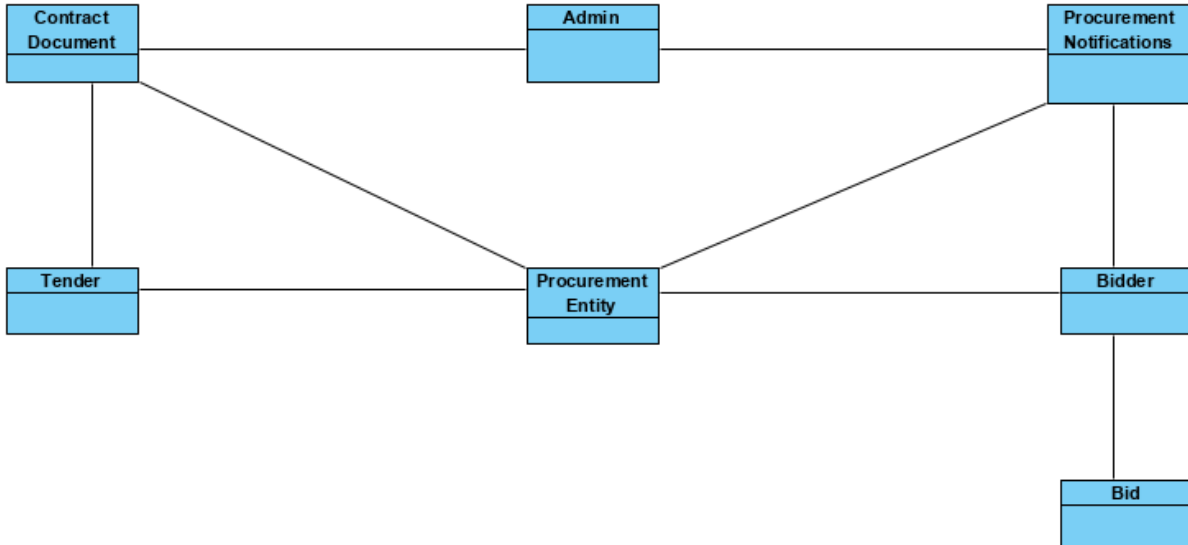
Windows Taskbar: 2:55 PM, ENG



4.4 Entity-Relational Diagrams (ERD)



4.5 Domain Model

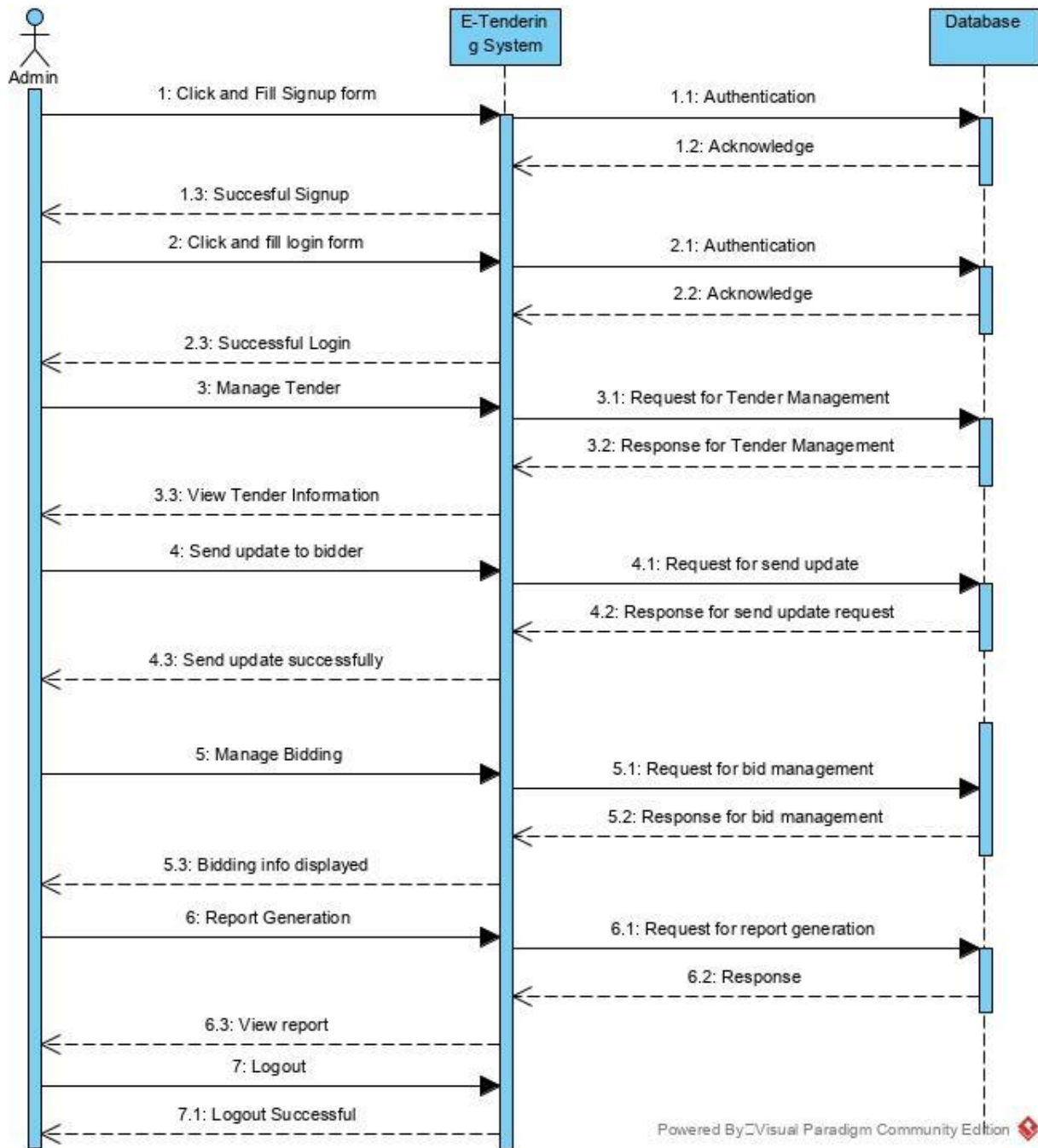


4.6 Design Approach

The approach we have used to make this app is completely easy to understand and is functional. There are three actors in our application i.e. Admin, bidder, and tenderer. All of them have their completely different roles. Each actor has his own functionality all roles related to actor are considered as sub roles. Completing sub roles will complete a role of specific actor. In this way all actors performing their roles separately and making this app a functional application.

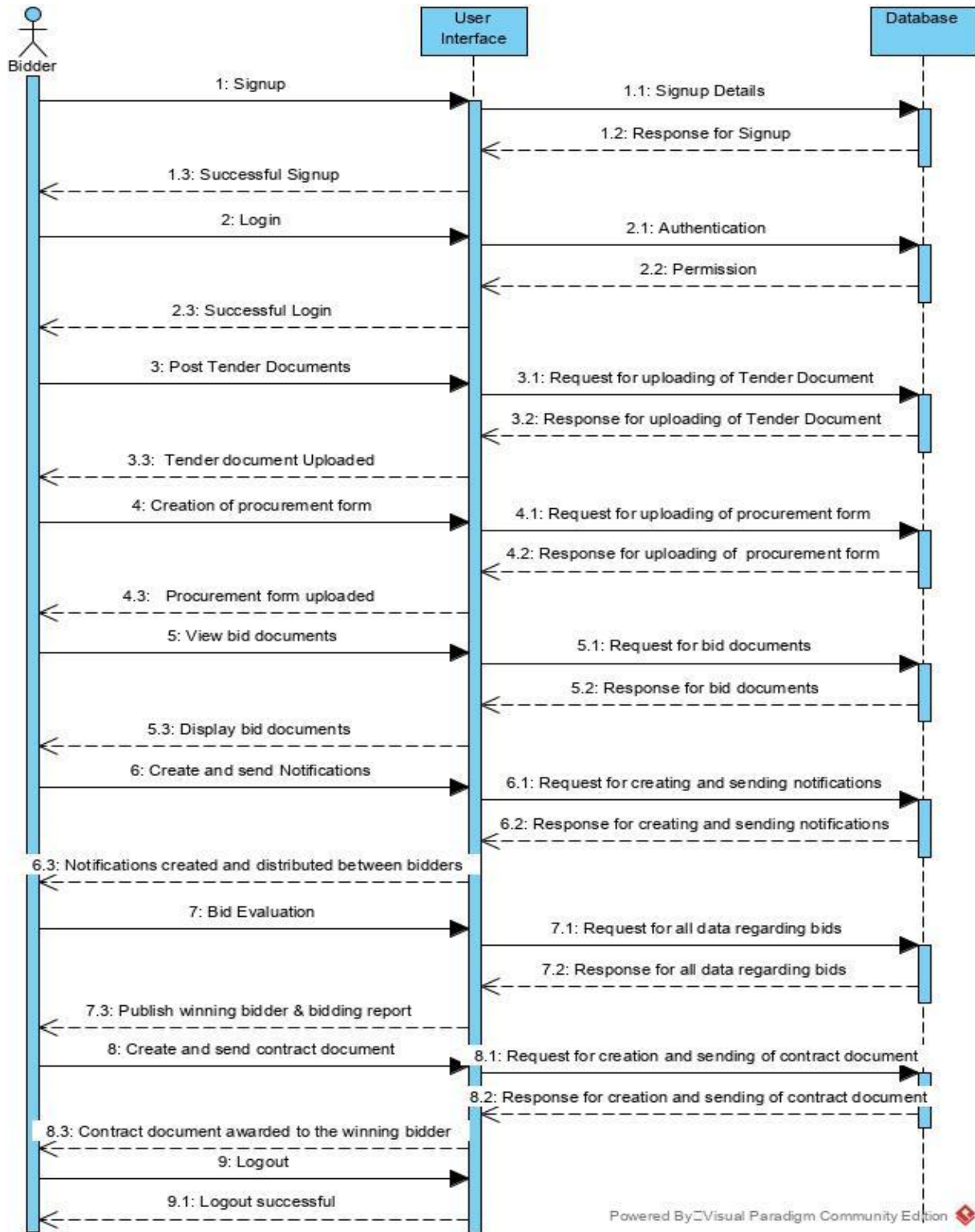
4.7 Sequence Diagram

Admin:

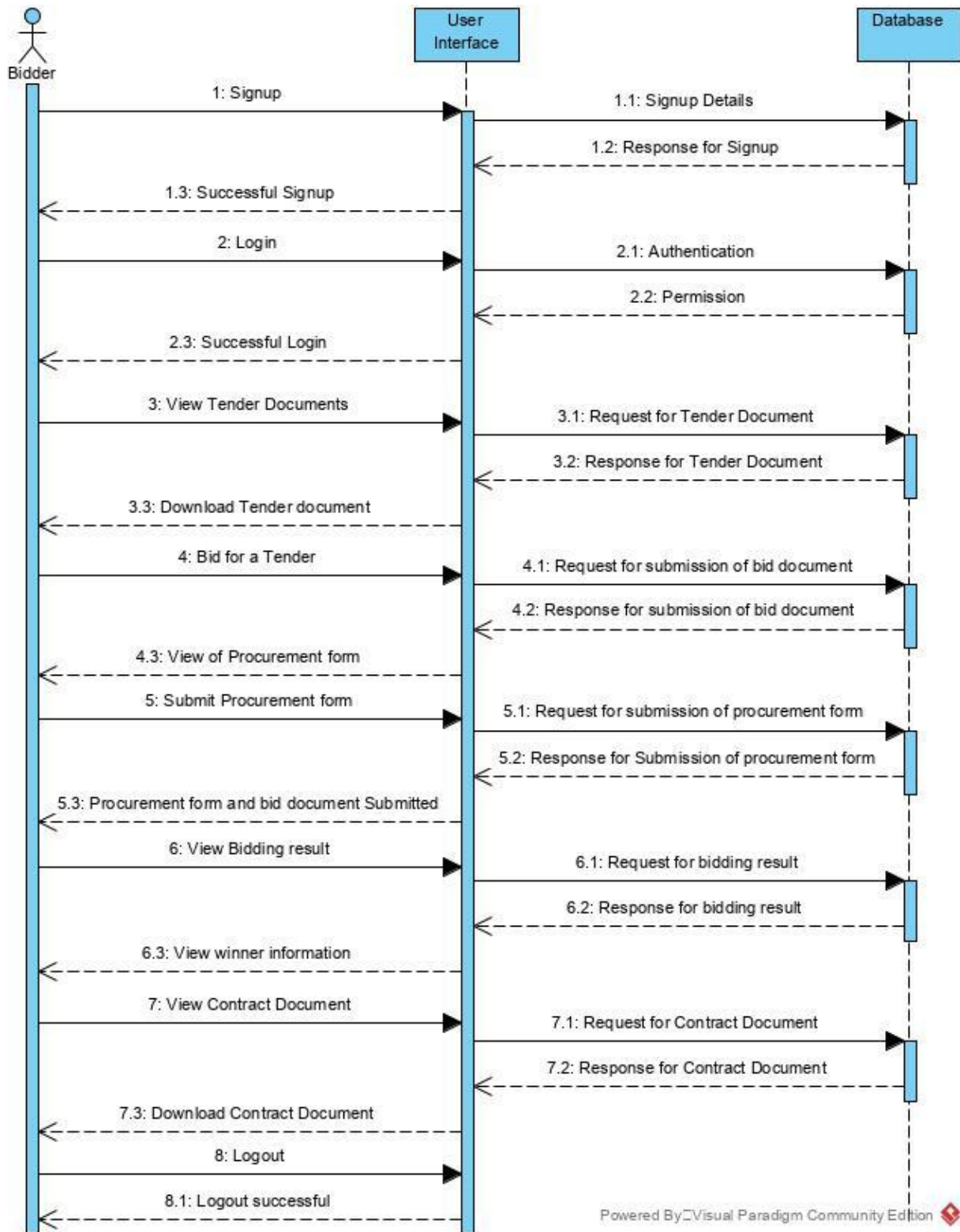


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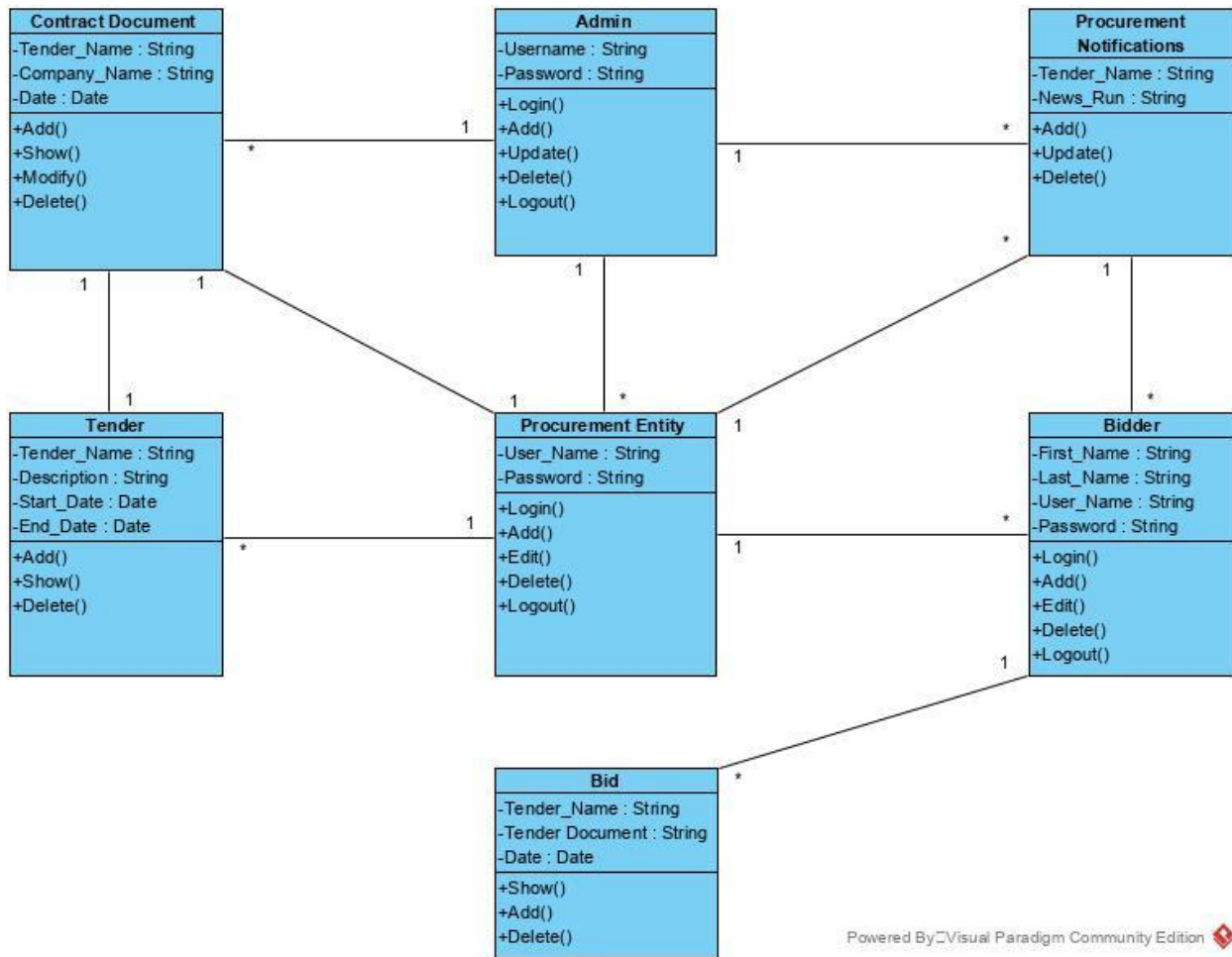
Tenderer:



Bidder:



Class Diagram

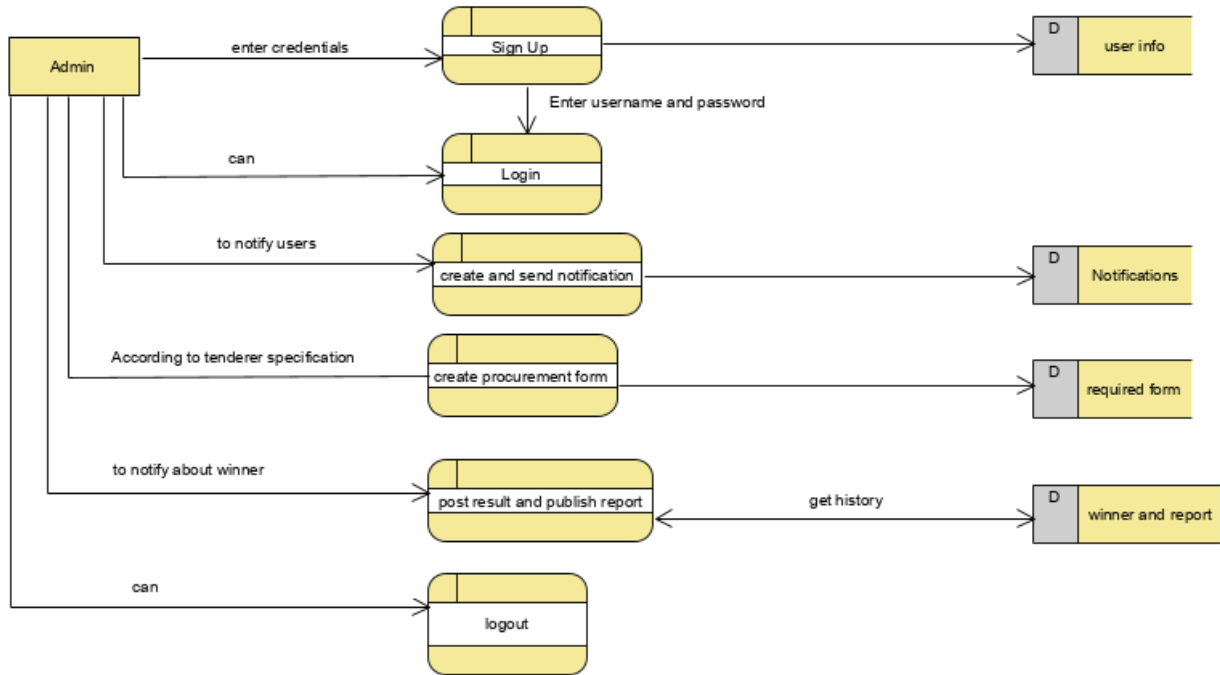


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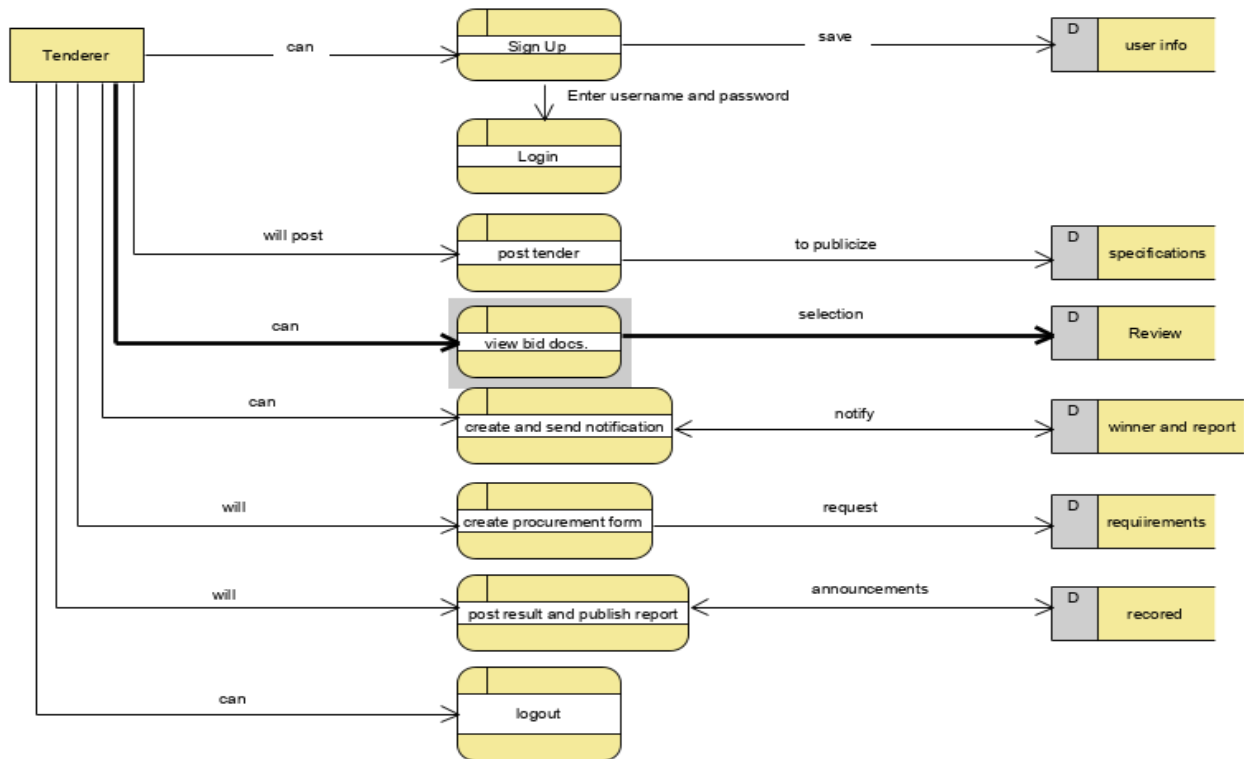
4.8 Logical Data Models and Functional Flows

4.8.1 Functional Flow

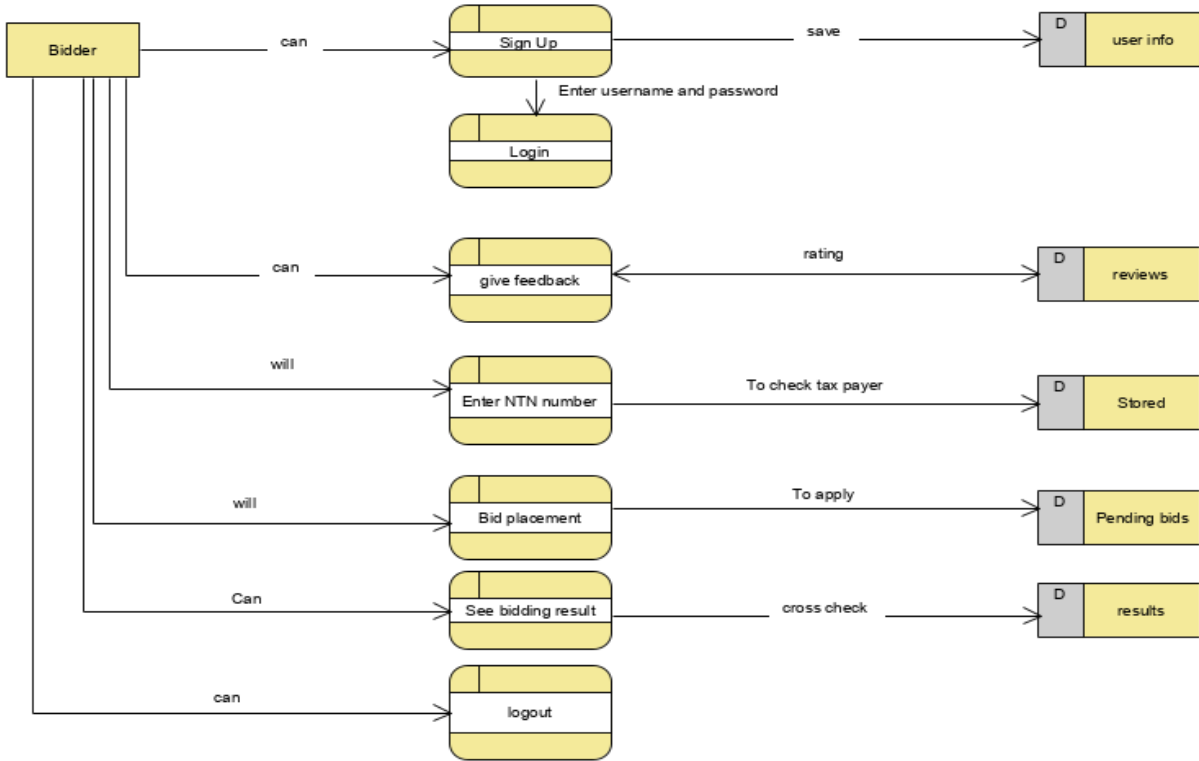
Admin



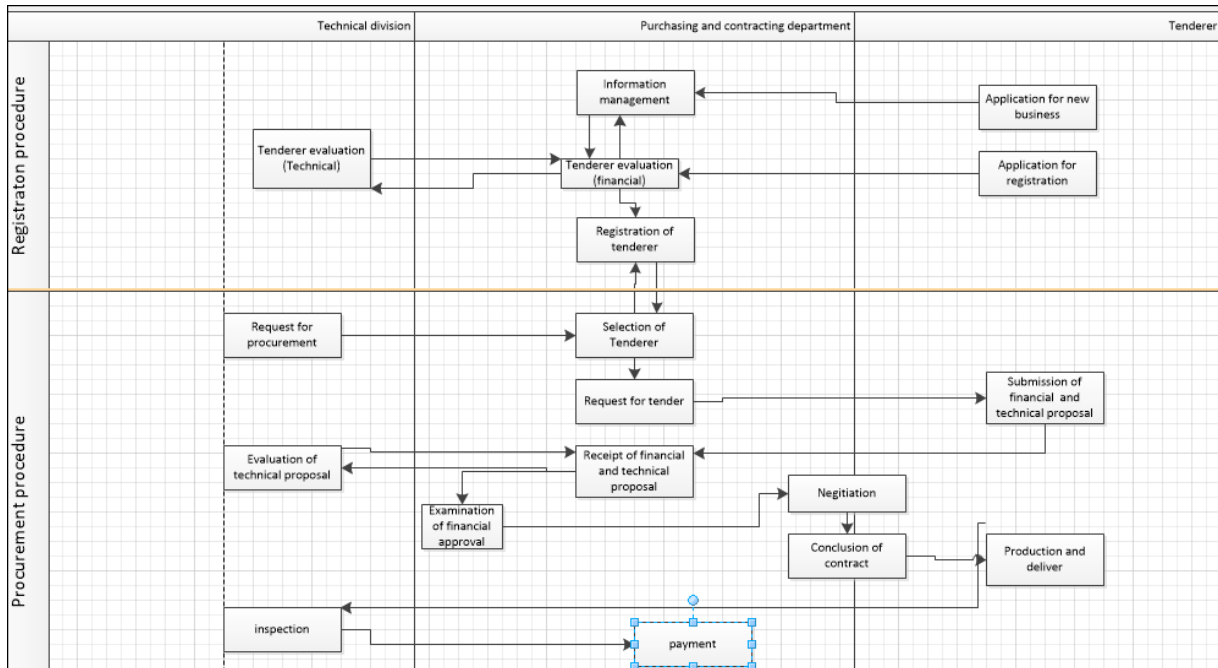
Tenderer:



Bidder:



4.8.2 Logical Data Model



CHAPTER – 5: SYSTEM IMPLEMENTATION

5.1 Tools Used

- For Backend

- 1) PHP(Laravel):

We have used Laravel in our project because Laravel is a web application framework with expressive, elegant syntax. We believe development must be an enjoyable, creative experience to be truly fulfilling. Laravel attempts to take the pain out of development by easing common tasks used in most web projects, such as authentication, routing, sessions, and caching.

Laravel aims to make the development process a pleasing one for the developer without sacrificing application functionality. Happy developers make the best code. To this end, we have attempted to combine the very best of what we have seen in other web frameworks, including frameworks implemented in other languages, such as Ruby on Rails, ASP.NET MVC, and Sinatra.

Laravel is accessible, yet powerful, providing powerful tools needed for large, robust applications. A superb inversion of control container, expressive migration system, and tightly integrated unit testing support give you the tools you need to build any application with which you are tasked.

- For Frontend

- 2) JavaScript:

We have used JavaScript in our project as JavaScript is most used as a client-side scripting language. This means that JavaScript code is written into an HTML page. When a user requests an HTML page with JavaScript in it, the script is sent to the browser and it is up to the browser to do something with it.

The fact that the script is in the HTML page means that your scripts can be seen and copied by whoever views your page. Nonetheless, to my mind this openness is a great

advantage, because the flip side is that you can view, study and use any JavaScript you encounter on the WWW.

JavaScript can be used in other contexts than a Web browser. Netscape created server-side JavaScript as a CGI-language that can do roughly the same as Perl or ASP. There is no reason why JavaScript couldn't be used to write real, complex programs. However, this site exclusively deals with the use of JavaScript in web browsers.

3) jQuery

We have used jQuery because jQuery is a lightweight, "write less, do more", JavaScript library.

The purpose of jQuery is to make it much easier to use JavaScript on your website.

jQuery takes a lot of common tasks that require many lines of JavaScript code to accomplish and wraps them into methods that you can call with a single line of code.

jQuery also simplifies a lot of the complicated things from JavaScript, like AJAX calls and DOM manipulation.

4) Ajax

We have used AJAX as AJAX is a technique for creating fast and dynamic web pages.

AJAX allows web pages to be updated asynchronously by exchanging small amounts of data with the server behind the scenes. This means that it is possible to update parts of a web page, without reloading the whole page.

Classic web pages, (which do not use AJAX) must reload the entire page if the content should change.

5) HTML5

HTML is used to create electronic documents(called pages) that are displayed on the World Wide Web. Each page contains a series of connections to other pages called hyperlinks. Every web page you see on the Internet is written using one version of HTML code or another.

HTML code ensures the proper formatting of text and images for your Internet browser. Without HTML, a browser would not know how to display text as elements or load images or other

elements. HTML also provides a basic structure of the page, upon which Cascading Style Sheets are overlaid to change its appearance. One could think of HTML as the bones (structure) of a web page, and CSS as its skin (appearance).

6) CSS 3

CSS is the language for describing the presentation of Web pages, including colors, layout, and fonts. It allows one to adapt the presentation to different types of devices, such as large screens, small screens, or printers. CSS is independent of HTML and can be used with any XML-based markup language. The separation of HTML from CSS makes it easier to maintain sites, share style sheets across pages, and tailor pages to different environments. This is referred to as the separation of structure (or: content) from presentation.

- Database

7) MySQL

We have also used MYSQL database in implementation of our project. It is used as purpose for exchanging information between different users. MYSQL stores the data in the form of tables. One can create multiples tables in one database. However, to access these tables or add anything in those tables direct functionality from client end cannot work. It needs a server behind to handle these queries where client request for any information. In our case we are using WAMP server behind it which provide access of information to users who request for it. It is used to make secure information sharing. This will help in protecting information and as a result no information can be misused or lost.

- Android

8) Java

As we are developing an android application as our project, we are using android studio for its implementation. The default programming language that runs on android studio is Java. Java is one of the powerful languages which allow its programmers to write programs in simple English like commands. These commands can thus be easily readable and understandable.java improved the version of C++ to make better use of it. As in our we are creating mobile application the level of security for implementing it should be high and Java serves as solution for this. The other main use of java that makes it important is its portability that does not restrict it for single platform. Java uses object-oriented approach for its programming pattern which enables to divide

the complex program into multiple objects and thus these objects then can be reusable in further work.

As for the numbers of programmers using Java and platform adopting gives an influence that it will strongly stay in market for many future years. And the reason behind its huge usage in market is because of its incredible library that contains built in classes and functions that can be reusable by programmers for easy implementation of their work.

9) XML

Extensible Markup Language (XML) is used to describe data. The XML standard is a flexible way to create information formats and electronically share structured data via the public Internet, as well as via corporate networks.

XML code, a formal recommendation from the World Wide Web Consortium (W3C), is similar to Hypertext Markup Language (HTML). Both XML and HTML contain markup symbols to describe page or file contents. HTML code describes Web page content (mainly text and graphic images) only in terms of how it is to be displayed and interacted with.

XML data is known as self-describing or self-defining, meaning that the structure of the data is embedded with the data, thus when the data arrives there is no need to pre-build the structure to store the data; it is dynamically understood within the XML. The XML format can be used by any individual or group of individuals or companies that want to share information in a consistent way. XML is actually a simpler and easier-to-use subset of the Standard Generalized Markup Language (SGML), which is the standard to create a document structure.

5.2 Algorithms

We have used following algorithms for encryption and decryption of bid documents and are provided by Laravel

- 1) AES 256 and 128 algorithms

Encryption is a process of converting a plain text to a message using some algorithms such that any third user cannot read the information. This is helpful for transmitting sensitive information because there are fewer chances for an intruder to target the information transferred.

Encryption is performed using a process called Cryptography. The text which is to be encrypted is termed as Plain Text and the text or the message obtained after the encryption is called Cipher Text. The process of converting cipher text to plain text is called Decryption.

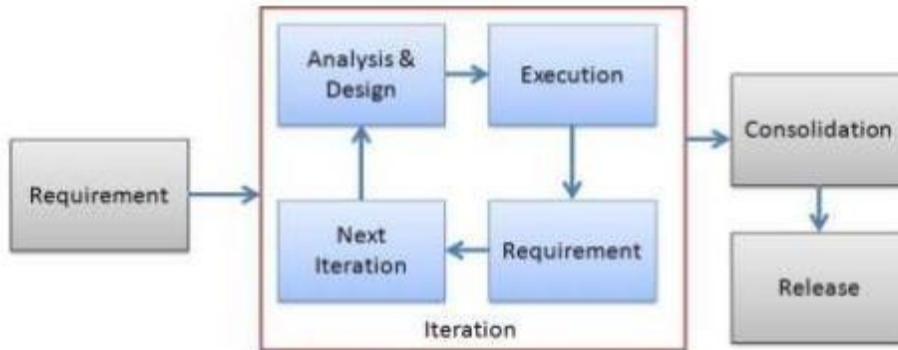
Laravel uses AES-256 and AES-128 encryption, which uses Open SSL for encryption. All the values included in Laravel are signed using the protocol Message Authentication Code so that the underlying value cannot be tampered with once it is encrypted.

5.3 Methodologies

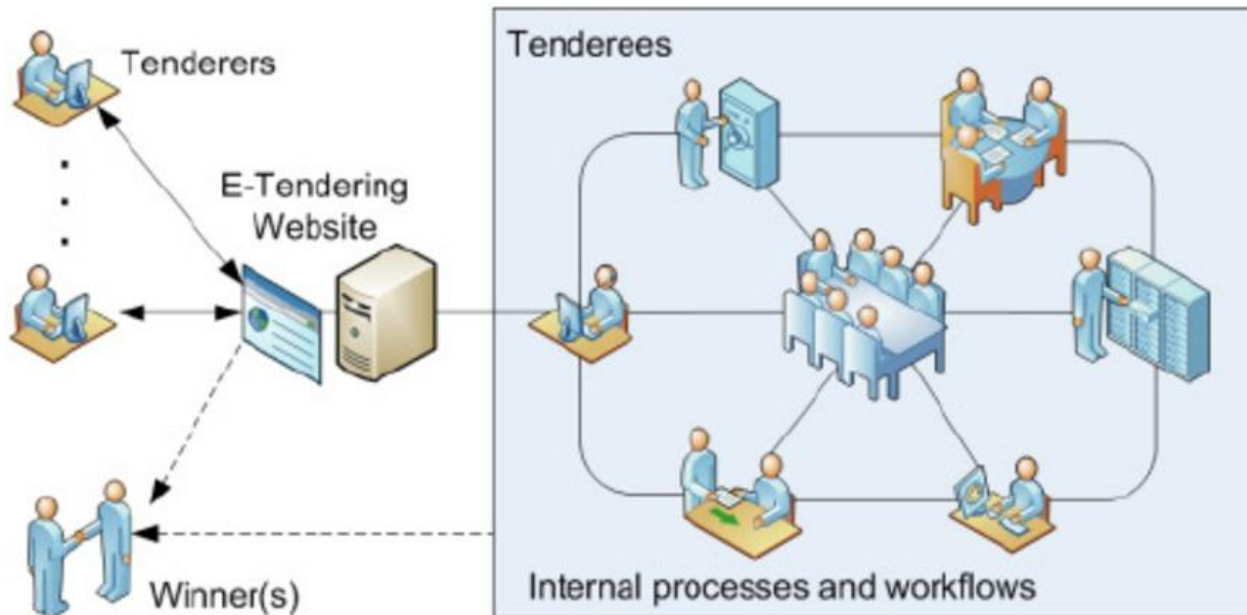
- 1) Agile Software Development cycle

To implement our project in efficient way we used methodology of agile software development lifecycle. The use of Agile Software Development [5] has increased in many areas due to its lot of advantages. The processes in agile software lifecycles carried out in such a way that firstly all the requirements have been gathered and then continuous evaluation is made in the form of iterations. As iteration completes it is evaluated properly on its requirements that all its requirements are met. If the results are successful, then it is moved to next iteration otherwise it remains in that same iteration. We have followed this same technique in our project as we have gathered all requirements in the start. Then we classified the features in form of modules. Then each module is developed in form of iteration. After completion of one module we have moved to next module and so on. One of the major advantages of this lifecycle is that requirements or design can be changed even in the middle of developments process or whenever such case arises. Also, we can maintain code or implementation of it in so easy way in comparison to the waterfall lifecycle. As with waterfall lifecycle we cannot change requirements or design when the development of project started so there is no flexibility in this approach. In waterfall model programmer needs to understand most of project's workflow during the initial phases. Also, one of the main drawbacks is that we cannot start constructing our project unless design process is completed. However, with agile methodology these drawbacks can be removed as

projects is computed in form of iterations you can create and test each module before going to next iteration, so the efficiency of project construction increases. That is why we have approached this project using agile methodology by applying its principles.



5.4 System Architecture



In this design, we present the design of an E-Tendering System which aims at improving the efficiency as well as transparency of the tendering process. In addition to a prototype which we developed as a proof-of-concept; we modelled this architecture using a Business Process Reengineering tool. We showed that certain processes could be automated by leveraging the power of Internet and information technology and that operating costs could be lowered in the new model. Various tendering schemes can be supported.

CHAPTER – 6: SYSTEM TESTING

6.1 Test Strategy

A Correct system must accomplish the following:

- Compute correct results
- Operate safely and cause the system containing the software to operate safely
- Perform the tasks required by the system containing the software to operate safely.
- Perform the tasks required by the system containing the software, as explained in the software applications.
- Achieve these goals for all inputs.
- Recognize inputs outside its domain.

We shall see that satisfying these pre-requisites depends on a variety of things. One of these things is to provide clear and correct software specifications. Testing like development can easily become task that perpetuates itself. As such, the application specifications and subsequently the test plan, should define the minimum acceptable quality to ship the application.

6.1.1 Unit Testing

In the initial phase small modules were developed and tested individually.

6.1.2 Integrated Testing

In the second phase after combining those small modules we again tested the complete integrated module.

6.1.3 System Testing

After completing the code and integrating modules we are successfully able to test the system manually.

6.2 Test Cases

Test case ID	Scenario ID	Scenario	Input 1	Input 2	Input 3	Expected output	Post condition	Pass/fail criteria
1	1.1	Sign up	Username/saqib	email/saqib@gmail.com	Password/asd12345	Successful signup	signup complete	Home screen
2	1.2	Login	email/saqi	Password/	-----	Successful	Invalid	Home

			b@gmail.com	asd12345		login	username or password	screen/Try again
3	1.3	Post tender	Start date, End date, category, NTN, district, province, contact number, document	Add technical and financial requirements	-----	Tender Posted	Tender Posted	Tender occur in list
4	1.4	Add Bid	NTN, district, province, contact number	Upload Technical and Financial Bid documents		Bid submitted	Bid submitted	Bid added successfully
5	1.5	Add review	Click on add review	-----	-----	Review Added	Review added	Review occur in reviews
6	1.6	Search tender	Select category, province, district	-----	-----	Show tender list	Tender list shown	No tenders in list/list of tenders

References/Bibliography

- [1]<https://www.researchgate.net/publication/221547680> Design of a web-based tendering system for e-Government procurement
- [2]<https://www.researchgate.net/publication/221547680> Design of a web-based tendering system for e-Government procurement
- [3]<https://www.codeproject.com/Articles/616070/Agile-Methodology>
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- [5]https://www.tutorialspoint.com/laravel/laravel_encryption.htm#:~:text=Laravel%20uses%20AES%2D256%20and,with%20once%20it%20is%20encrypted.
- [6]<https://www.w3.org/standards/webdesign/htmlcss#:~:text=CSS%20is%20the%20language%20for,any%20XML%2Dbased%20markup%20language.>
- [7]https://www.w3schools.com/php/php_ajax_intro.asp#:~:text=AJAX%20is%20a%20technique%20for,without%20reloading%20the%20whole%20page.