

# **E Tendering and Monitoring**

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**DEPARTMENT OF COMPUTER SCIENCES  
COMSATS UNIVERSITY ISLAMABAD,  
ATTOCK CAMPUS – PAKISTAN**

SESSION 2017-2021

# **E Tendering and Monitoring**

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A DISSERTATION SUBMITTED AS A PARTIAL FULFILLMENT OF THE  
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**DEPARTMENT OF COMPUTER SCIENCES  
COMSATS UNIVERSITY ISLAMABAD,  
ATTOCK CAMPUS – PAKISTAN**

SESSION 2017-2021

## UNDERTAKEN

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# FINAL APPROVAL

Certified that we have read this E tendering and Monitoring project report submitted by Mr. (Saif Muzaffar, Muhammad Bilal) and it is, in our judgment, of sufficient standard to warrant its acceptance by the Department of Computer Science, University of Islamabad, Attock Cantt, for the (BS/MSc degree) in Computer Science.

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# **DEDICATION**

**Every challenging work needs self-effects as well as the guidance of elders especially those who were very close to our hearts. My humble efforts I dedicate to my sweet and loving.**

## **ALLAH**

**My creator my strong pillar, my source of inspiration, wisdom, knowledge, and understanding.**

## **Father and mother**

**Whose affection, love, encourage and prays of day and night make me able to get such success and honor.**

## **Teachers**

**Along with all hardworking and respected teachers.**

# Acknowledgement

All applause is to Almighty Allah who gave to us a brief part of His limitless information by temperance of which we had the option to achieve this difficult errand. We are significantly obligated to our venture boss "**Miss Sadia Ejaz**". Without her management, exhortation and significant direction, fulfillment of this task would have been suspicious. We are profoundly obliged to them for their consolation and constant assistance during this work. What's more, we are additionally appreciative to our folks and family who have been a consistent wellspring of support for us and presented to us the estimations of trustworthiness and difficult work.

Saif Muzaffar

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Muhammad Bilal

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# PROJECT BRIEF

PROJECT NAME	E TENDERING AND MONITORING
ORGANIZATION NAME	COMSATS UNIVERSITY ISLAMABAD, ATTOCK CAMPUS
OBJECTIVE	TO PROVIDE EASE TO CONSTRUCTORS MAKE REGISTER WORK DIGITALLY AND BIDING SYSTEM ONLINE AND MONITOR THE WORK ONLINE.
UNDERTAKEN BY	SAIF MUZAFFAR, MUHAMMAD BILAL
SUPERVISED BY	MISS SADIA EJAZ COMPUTER SCIENCE COMSATS UNIVERSITY ISLAMABAD, ATTOCK CAMPUS
STARTED IN	SEPTEMBER 2017
COMPLETED ON	MAY 2021
COMPUTER USED	HP (ELITEBOOK 8470P)
SOURCE LANGUAGE	JAVA, XML

OPERATING SYSTEM

WINDOW 10

TOOLS USED

ANDROID STUDIO 4.0.1



# **ABSTRACT**

We are well aware of the tendering system in Attock, which is a very hectic task for contractors. Every contractor has a very difficult and hectic job to win the bidding session, the contractors have to travel miles for just the entry for bidding. So we are coming with an idea for the ease of contractors, our project will help contractors and will save time and headaches for contractors. Our project will help them and contractors will be able to apply for bidding through our project which will save the time and travel of contractors. The bidding will also be done online through an application. The bidding sheet will be uploaded on our application for contractors. For the whole process Construction Company have to sign up for our application. Users can fill the bidding sheet online and it will save the hard work of the user. The low rate bid will automatically come to the top of the list of bidders in front of the PUBLIC HEALTH DEPARTMENT view. When the tender is issued to the registered company then we monitor the work of the issued tender for the site where the work has been in progress by the laboratory test of the material used in the work. On the behalf of the test issued by the laboratory we have to approve/disapprove the work and then the bills are generated.

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# **Chapter 1**

## **INTRODUCTION**

# **1 Introduction**

E Tendering and monitoring is a cycle of doing whole Tendering Cycle Online including accommodation of value offer, checking of work progress, giving of bills with the end goal that Efficiency, Economy, and Speed of Internet can be saddled. We are developing an Android application that will monitor the process and progress. Contractors will be able to communicate with public health authorities through the app. Contractors will have a nice and easy interface to bid and receive bid forms. The department will be able to check progress, place bids, replay to contractors, check the progress by laboratory reports, generating the bills, etc. Android apps will have many features that can make stakeholders entertain. This can save a lot of time and money for travel and traditional meetings. Most importantly, it will save energy and people will be able to spend a good time with their families.

## **1.1 Brief**

We often get to hear that the businessmen are always busy having meetings and we usually find them on calls. Sundays and Holidays are no for them. It is saying that the more and the big business are the less burden you will face. But in either of these cases, there are problems. Like if the business is on small scale, the workers will have to work more. If the business is on large scale, then more people will be doing work that costs more. Literally, in every case, there are either labor or cost problems. So we came up with a solution. Everybody uses smartphones. Our idea is to replace some parts with smartphones. We are developing an Android app that will monitor the processes and progress. The contractor would be able to communicate with the public health department through the app. The contractor will have a nice and easy interface to bid and receiving the bidding sheets. While the Department will be able to check the progress, make bids, replay to contractors, etc. Android application will have a lot of features to entertain the stakeholders. This will save a lot of time and money that is spent on travel and traditional meetings etc. Above all, it will save energy and people will be able to spend some time with their family. We belong to a society where business is the most common profession and people indulged themselves completely into it. So this motivates us to bring ease to this field by taking away the worries and problems by removing unnecessary traditional tasks that have been followed. This application will shift the business on technology, change the directions of worries and give the business a boost.

## **1.2 Relevance to Course Modules**

In Computer Science we study theoretical aspects of computer technology and computer usages. The Principal and areas of studies in Computer Science have included computer architecture and networking, cyber-security, database management system, human-computer interaction(HCI), graphics, numerical computation, programming languages (JAVA, etc.), software engineering, and theories of the computer's world.

This project is an android based application. Utilizing different modules this application is relevant to different courses like, using JAVA programming language backend will be developed, using XML frontend will be designed, and firebase database will be used for storing data, data sending or retrieving from the database. There have so many relevant modules and work which is related to BCS courses if we focus on little bit things one by one.

### **1.2.1.1 Android development**

Android Studio is the IDE that provides Google to develop professional Android applications. It is used to develop a different variety of applications for the Android operating system. It is an IDE & platform to design a user-friendly interface by drag and drop.

### **1.2.1.2 Java**

Java is a class-based, object-arranged programming language designed to have execution conditions that do not exceed reasonable expectations as much as possible. It is a widely-used programming language. It is recommended that application engineers write it once and run it anywhere (WORA), which means that the assembled Java code can be run at all stages of helping Java without recompilation. Java applications are usually accumulated as byte code, which can be run on any Java Virtual Machine (JVM), with little attention to basic PC engineering. The sentence structure of Java is similar to that of C and C++ but has fewer low-level offices than these two. The Java runtime provides dynamic features (for example, reflection and runtime code adjustment), which are usually inaccessible in dialects that are customary to collect. Starting in 2019, Java is one of the most famous programming dialects used by GitHub, especially for customer worker web applications, with a detailed 9 million engineers.

### **1.2.1.3 Report Writing Skills**

This course is about learning how to write reports and other formal documentation, and, in our project, we need to write our documentation, so this course is helping a lot in this task.

### **1.2.1.4 Software Engineering**

Software engineering is the systematic application of engineering methods in software development.

## **1.3 Project Background**

We have a place with a general public where business is the most regular calling and individuals entertained themselves totally into it. So this spurs us to get facilitate this recorded by taking the concerns and issues by eliminating pointless conventional undertakings that have been followed. This use of our own will move the business on innovation, change the headings of stresses and give the business a lift. We as a whole skill organization works and everyone needs an agreeable employment climate and arranged life. Our task will have the option to show all the offer sheets running as of now to the contractual workers. It will make contractual workers' pay on the app or bid on the app. The notification will be shipped off to the person who has won the offer. The person who bid on the offer but doesn't win the offer gets the notification "sorry try next time".

We are well aware of the tendering system in Attock, which is a very hectic task for contractors. Every contractor has a very difficult and hectic job to win the bidding session, the contractor has to travel miles for just the entry for bidding. So we are coming with an idea for the ease of contractors, our project will help contractors and will save time and headaches for contractors. Our project will help them and contractors will be able to apply for bidding through our project which will save the time and travel of contractors. The bidding will also be done online through an application. The bidding sheet will be uploaded on our application for contractors. For the whole process Construction Company have to sign up in our application. Users can fill the bidding sheet online and it will save the hard work of the user. The low rate bid will automatically come to the top of the list of bidders in front of the PUBLIC HEALTH DEPARTMENT view. When the tender is issued to the registered company then we monitor the work of the issued tender for the site where the work has been in progress by the laboratory test of the material used in the work. On the behalf of the test issued by the laboratory we have to approve/disapprove the work and then the

bills are generated.

## **1.4 Literature Review**

We see the different websites and android apps that show just tender information. There is an android app in South Africa in which they just show the tender information and upcoming tenders. In Pakistan (KPK) the e-tendering app use in the NHA department but in Punjab, there is no such application. So we are working on this application for the PHE department (Punjab). The reason why our project is different from others. In KPK e-tendering app the user registers companies and gets information of upcoming tenders. The user can bid on the tender but department admins cannot monitor their work online.

## **1.5 Analysis from Literature Review**

The existing e-tendering applications just welcome the user to show the details of the tender and the user gets updates about the upcoming tender. The existing websites also just show the tender updates and upcoming tenders. As compared to those applications our app user can view tender details, bid on tender, get notifications about tenders, and the admin also monitors the working online. They provide information about the tenders.

### **1.5.1 Problem identify in current portal**

- The electronic tendering app made by the NHA department is implemented only in KPK.
- The electronic tendering app was failed in Punjab because Punjab projects are different from KPK.
- The current android app just shows the information about tenders.
- Users cannot bid on the bid sheet online.
- The user cannot get notifications about tenders or winning tender.

## 1.5.2 Comparative Analysis

Comparative study table:

Table 1-1 Comparative study

Company	Difficult UI	Bid-on-tender (ONLINE)	Application Notification	PUNJAB (PHE)
E-tendering (NHA)	YES	NO	NO	NO
E-tendering (ours)	NO	YES	YES	YES

## 1.6 Methodology and Software Lifecycle for this Project

First of all, the user goes to sign up and register their company, after registration user can log in to their id by verifying their email address. When the user login to the application there is a dashboard screen from where the user searches tender or bid on tender online. After bidding on tender the tender admin calculates and assigns tender the user gets the notification about the winning and losing tender. After the winning of the tender, our system will monitor the work wined by the user and the user will update us about the work by the consulted laboratory tests. We use an iterative approach to develop this application.

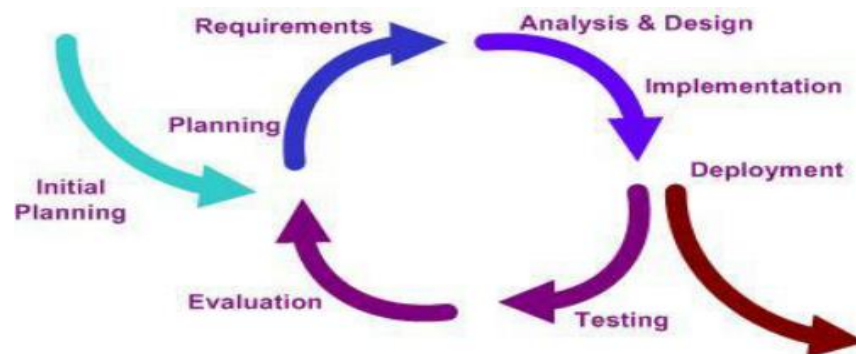


Figure 1-1 Iterative Model

## **1.7 Rationale behind selected methodology**

In this model, you can start with some of the software specifications and develop the first version of the software. After the first version if there is a need to change the software, then a new version of the software is created with a new iteration. Every release of the Iterative Model finishes in an exact and fixed period that is called iteration. The reason behind this approach is that it is easily measurable and small chunks are easy to test and debug as compare to developing the whole software and then testing it, at this point debugging becomes difficult. So, we would like to work under a supervisor because we want to learn more about our project and if the supervisor wants some changes or an updated project then we can easily make the changes in the new version.

## **Chapter 2**

### **PROBLEM DEFINITION**



- **Problem Definition**

We belong to a society where business is the most common profession and people indulged themselves completely into it. So this motivates us to bring ease to this field by taking away the worries and problems by removing unnecessary traditional tasks that have been followed. This application will shift the business on technology, change the directions of worries and give the business a boost. We all know how businesses works and everybody wants a comfortable job environment and sorted life.

## **2.1 Problem Statement**

The major reason is, we are very much aware of offering framework in Attock, which is a feverish undertaking for temporary workers. Each contractual worker has an exceptionally troublesome and chaotic task to win the offering meeting, a contract-based worker needs to travel miles for simply the passage for the offering. So we are accompanying a thought for the simplicity of temporary workers, our venture will support contract-based workers and will spare the time and migraine of contract-based workers. Our venture will support them and temporary workers will have the option to apply for offering through our task which will spare the time and travel of temporary workers. The offering will likewise be done online through the application.

## **2.2 Deliverables and Development Requirements**

The propose system we are going to developed is android base so, keeping on mind the development requirements have hardware and software requirements which is given below:

### **2.2.1 Software Specification**

- **Operating System**
  - Windows
- **Development**
  - Android Studio
- **Front-End Design**
  - XML

Extensible Mark-up Language (XML) used for describing data. Basic of XML syntax well

be helpful for designing interactive interface, layouts and perceiving data/info feeds from internet. It is basically used for designing the whole frame of application including buttons, layouts, sidebar, searching design etc.

- **Back end**

- Java

The backend rationale will be created by utilizing java in our task. Essential structure square of android application advancement is the programming language which is java. Java gets one of the most mainstream programming advancement dialects utilized by programming designers in this day and age.

### **2.2.2 Hardware Requirements**

- Intel i5-core with 2.7 processor
- 8.00 GB Installed memory
- Android Smart Phone

### **2.2.3 Tools**

- Android Studio and SDK (Designing and Development)
- Star UML (for designing Diagrams)
- Database Firebase
- Java Programming language

## **2.3 Current System**

By considering related issues there have many applications that have been developed by different developers the thing is that this developed application has some constraints utilizing interactive, generalize, user-friendly, and specified for specifics regions.

- **South Africa Online tenders**

In this online tender system, the user can search the tender by the id or place in South Africa and the application have the functionality of a calendar in which the user finds news of tender and upcoming updates. But there is no bidding option online the user comes to the department and fills the rates of tenders.

- **KPK NFA tender system**

KPK tender system is based on the online projects in which the user first registers their company and login their account and find the tenders in tender box. If the user wants to bid, there is also an option of bidding but after bidding the user must come to the department for their checks and finding that they win or lose the tender. The department monitor the work manually for example the department officer goes to the site and monitor the work.

## **Chapter 3**

# **REQUIREMENT ANALYSIS**

### 3 Requirement Analysis

We'll clarify the use case chart, practical necessities, and non-useful prerequisites of the proposed system. Functional requirements explain the system its components. Functional requirements would also explain in upcoming chapters by using different pictures and diagrams. Functional requirements will also describe the behavior of the system. A non-functional requirement is a requirement that specifies existing criteria that could be used to operate a system that deals with reliability etc., rather than specific behaviors that the application must do.

#### 3.1 Use Case Diagram

A sensible image of the associations among the segments of a structure is called a use case outline. A use case diagram is a technique utilized as a part of framework investigation to perceive and arrange framework necessities. We design UML (Unified Modelling Language) figures to model a framework simply and efficiently. UML describes several types of the diagram to cover all aspects of the framework because it is not enough to define all aspects of the system using single UML diagram.

The user-case system diagram defines the relationship between the user of the system (Actor) and the functionality of the system. It is also known as the behavior diagram. It identifies the different users and the functionalities of the system and the relationship between them.

Use case system diagram describe the actor, use-case and the system.

- **User (Actor):** System user.
- **Use-case (Diagram):** Indicate System Functionality.
- **System:** System is the block that contains the use cases

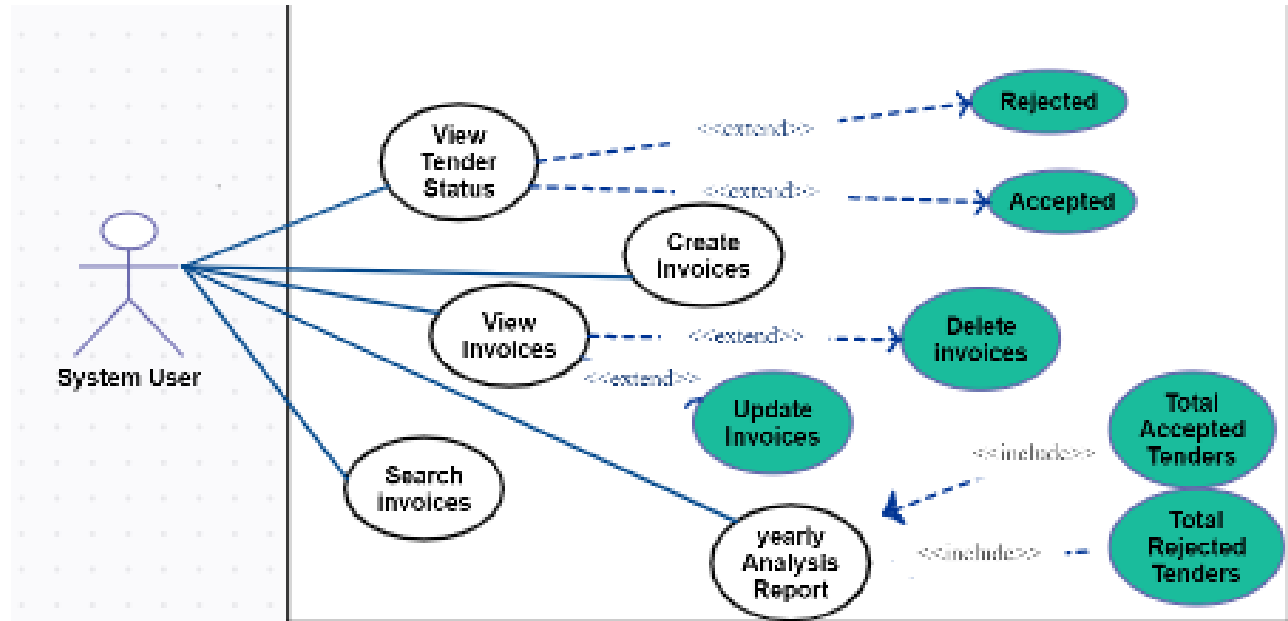


Figure 1-2 Use Case Diagram

### 3.1.1 Detailed Use Case Diagram

Table 3-1 User view info use case

Use Case Id	User ID
Use Case Name	View information
Actor	Company/User
Summary	System provides all information to user.
Precondition	User must have internet access.
Include	None
Extend	Tenders, Bidding, View Bid Sheet, Monitoring etc.

## 3.2 Requirement Specifications

Requirements specification describes functional requirement and non-functional requirements explain system its components respectively. Functional requirements would also explain in upcoming chapters by using different pictures and diagrams. Functional requirements will also describe the behavior of the system. A non-functional requirement is a requirement that

specifies existing criteria that could be used to operate a system that deals with reliability etc., rather than specific behaviors that the application must do.

### **3.3 Non-Functional Requirement**

#### **3.3.1 Performance**

No delay in execution and show result quickly.

#### **3.3.2 Accuracy**

Provide authentic and concrete information's.

#### **3.3.3 Maintenance**

For maintenance it is easy to change the system according to his own requirements.

#### **3.3.4 Efficiency**

The proposed system is time efficient and gives the users required output without any delay.

#### **3.3.5 Integrity**

System stored data will accurate, good and updated.

#### **3.3.6 User Friendly**

The interface of system will be user friendly and easy to use so that all users can easily access this application and can get recommendation if not now about famous places.

#### **3.3.7 Reliability**

System will be able to be used for long time. This application must perform its intended functions and operations without experiencing failure.

### **3.4 Functional Requirement**

If we discuss Functional requirements, then it describes the functionality of the proposed system. E tendering app consists of different modules. Each module has its functional requirements.

Following are the given modules of the E tendering android app.

- Admin panel
- Company panel/user panel
- Calculation
- Login
- Registration

- Biding
- Monitoring
- **Admin Panel**

Admin can perform following functionalities.

- ❖ Login via email and password
- ❖ Change the password
- ❖ Delete records of users from database.
- ❖ View record of the user.
- ❖ Update/Add/Delete/View the details of users.
- ❖ Upload Bid sheet.
- ❖ Monitoring

- **Company/Users**

User can perform following functionalities.

- ❖ User can view the details of Tenders.
- ❖ User can search the tenders.
- ❖ User can bid the tender.
- ❖ User can view their profile.
- ❖ User can view useful information.
- ❖ User can contact us.

- **Login**

- ❖ Users login to the system by entering his/her email and password to getting access of system. Without valid email they will not be able to login.

- **Registration**

- ❖ If user want to use the application then he/she must be registered, unregistered user can't view tenders or bid sheet doesn't get recommendation. To get registered a user must enter their whole personal information which are asked by this application. Without entering the correct/real personal information user can't be registered



## **Chapter 4**

# **DESIGN AND ARCHITECTURE**

## 4 Design and Architecture

The Android working framework comprises various layers as appeared beneath. These layers incorporate diverse sorts of utilization, various libraries, a bit of Linux which is the center of OS, the system of use and the latter is runtime android. The first layer is called the android application layer in any android framework. Here we can locate some significant elements like short informing administration application, maps, program, contacts, electronic mail applications, calls.

The second layer of android working framework design is outline work of use. It is the diagram of the structure utilizes by programming engineers. The application interface is accessible for advancement reasons and it comprises fundamental instruments and uses to make the more intricate application in android.

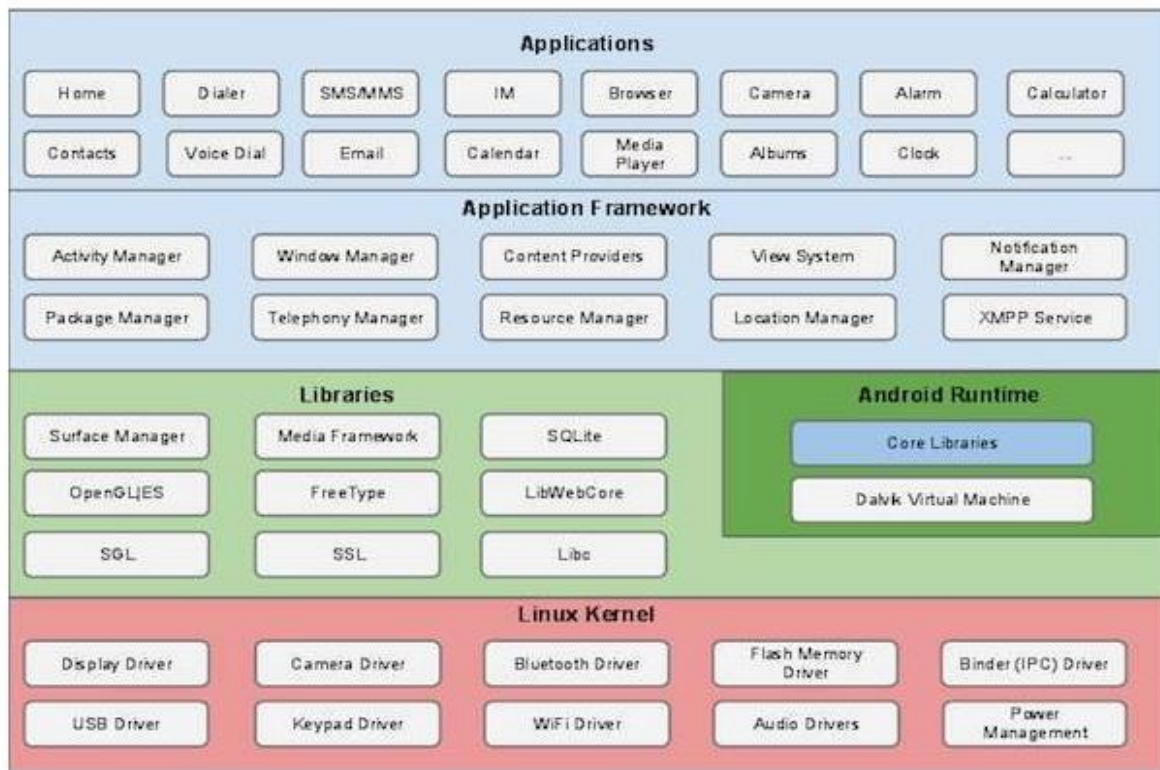


Figure 1-3: System Architecture

These layers will be used by different android system components for different components. The developer uses these available libraries for different tasks or reuse system functionality. Layer-fourth of the system is the android runtime. It is special software which creates new processes independently for android application. The last and fifth layer is the Linux kernel in android architecture. The framework is used for system's memories management, to access system files, and different inter-system processes of communication, power management software, and networking.

## 4.1 Life Cycle of Android Application

Android application has four states as described below:

### 4.1.1 Active and Running State

In this state action runs in front and shows center around it. Client utilizes this movement and discernible totally.

### 4.1.2 Paused State

In paused state, the program is halfway recognizable to the client however it isn't obvious to the client and centered. At the point when some other action runs which doesn't conceal the entire screen then this occurred.

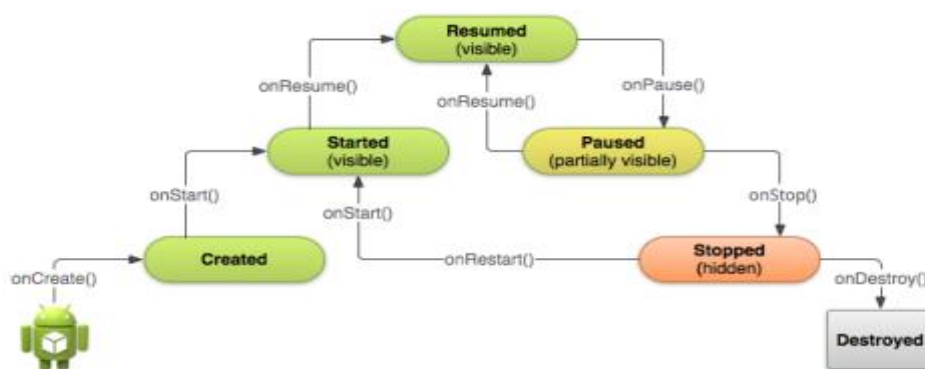


Figure 1-4: Android life cycle

### 4.1.3 Stopped State

A stopped state is considered when the principal screen isn't demonstrating any movement. The view is hazy and another movement running behind it. In this express, the movement running in foundation utilizes assets like memory and so forth, yet it very well may be halted by the task supervisor where we have accessible choices to clear the running application.

### 4.1.4 Dead or Destroyed State

When running application has not anymore in memory called a wrecked state? It very well might be the application was not opened at this point previously or after beginning the application is cleared from memory to spare memory assets.

In android life cycle streaming capacity have performed which is the show in the above figure

- 5 Starting an action in the android telephone, it calls the onCreate () work. This capacity instates the information basics and makes UI.
- 6 **OnStar ()** capacity will be called even client has not seen the movement yet. The action is as yet halted so we should know why.
- 7 **On Resume ()** work client can connect with movement and can see it on a telephone screen. In stack, the situation of movement will be on the highest point of the stack. Presently application is running and the client gives input.
- 8 **On Pause ()** capacity could be gotten to when it is in the dynamic express; the application is prepared to continue when the client presses the home catch or one other action is running on top.
- 9 **On Stop ()** work when action is not, at this point obvious to the client on screen, it will be entered halted state and on Stop () work summoned. This may have happened when new action open and cover the entire screen. At the point when the movement has gone to complete the process of running and will going to end.
- 10 **On Destroy ()** capacity will be called before the action is the crush. On the two cases framework conjure this get back to either movement is completing because of client totally excuse the action and the framework is briefly crushing the action because of framework arrangement changed. At the point when the action moves to demolish state, the life cycle will get the on Destroy occasion. The life cycle will tidy up before annihilating the movement.

## 4.2 Data Representation [Diagram + Description]

Following are the given modules consist of the product which goes to be developing. We are documenting only the salient/customer properties and methods of every module to keep the description more readable and simple.

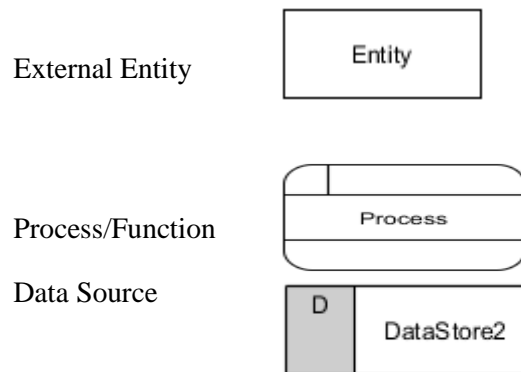


Figure 1-5: Data Flow

- **External Entity**

External entity is the user of proposed system who is interacting with the system to use different functionalities off the system.

- **Process/Function**

It is the functionality of the system

- **Data Source**

Data source is the data table in the database where the record is stored, or record is retrieved.

## 4.3 Process Flow / Representation

In process flow diagram we will represent DFD and Sequence diagram for all modules which is given below.

Methodology is a systematic process to make the development of software easy, in which we divide our project into different phases which are related to each other. There are many methodologies but we used Waterfall development approach.

### 4.3.1 Activity Diagram

Activity diagrams are graphical representations of the workflow of system modules. Activity diagrams are constructed by using the different number of shapes, connected with arrows. The most important shape types:

- Actions represent by rounded rectangles.
- Decisions represent by a diamond shape.
- The first node represents the initial node of the workflow.
- Last node represents the final node.

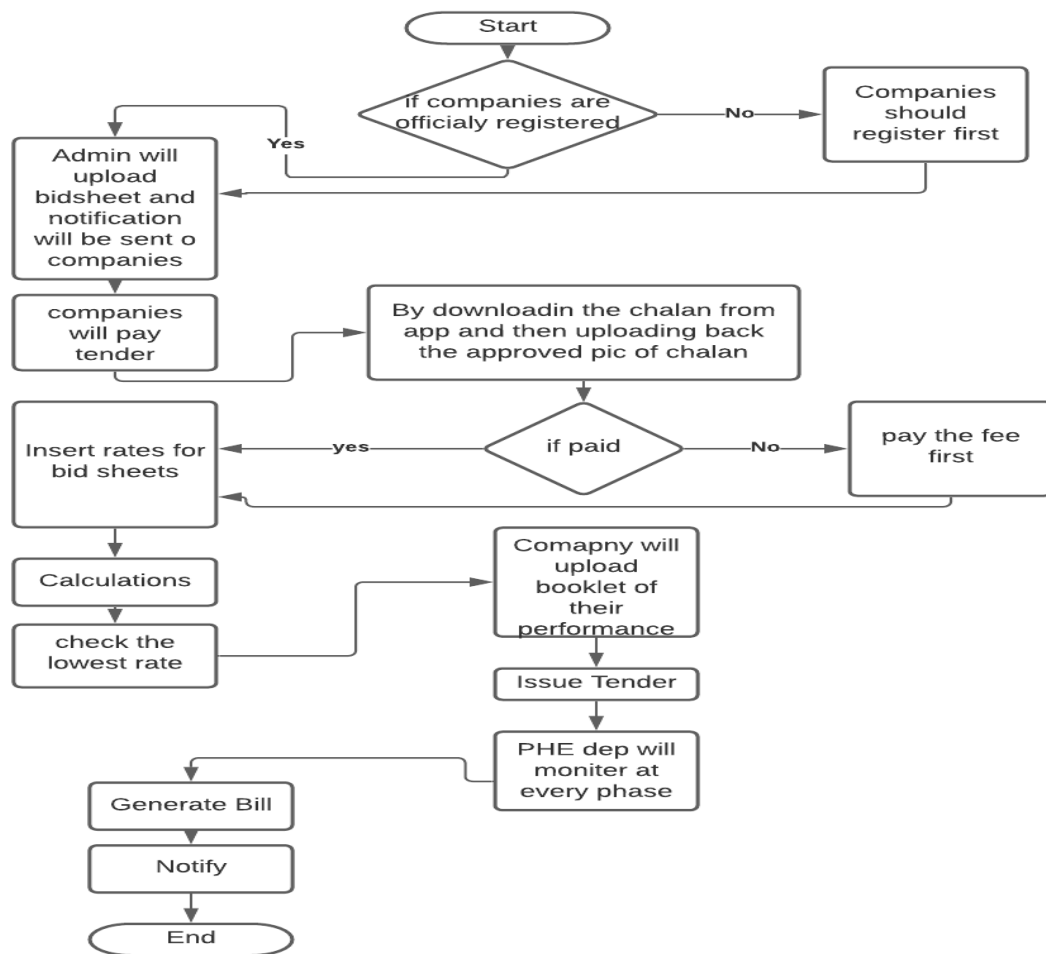
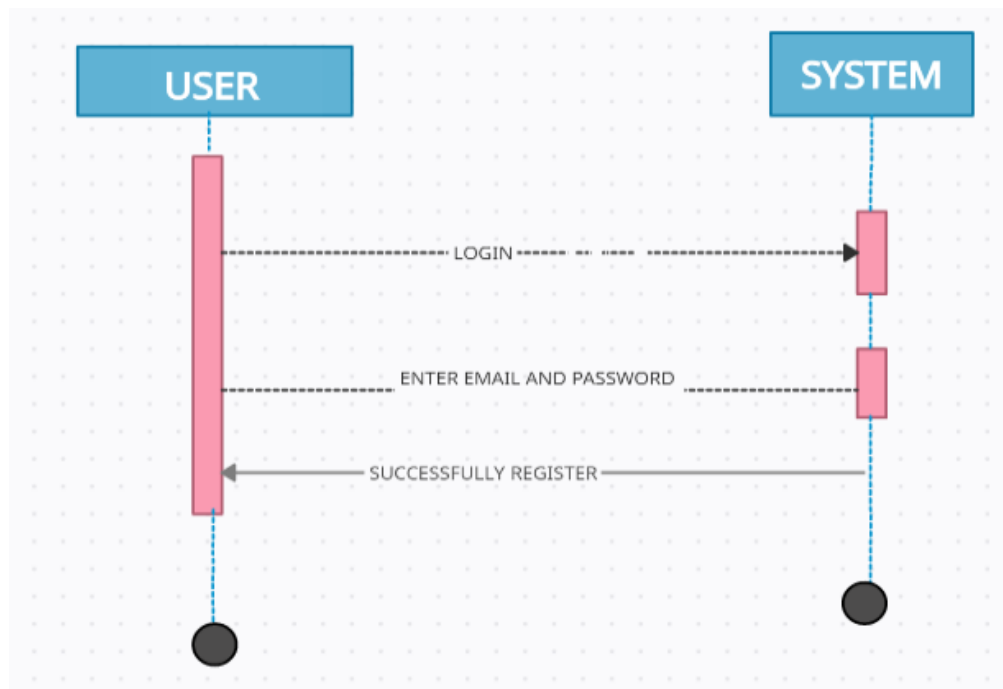


Figure 1-6 Activity Diagram

## 4.4 Design Models

### 4.4.1 Sequence Diagram

Sequence diagram is basically representing the interaction of different object in a specific order. It describes the sequence of the exchange of messages between the objects.



*Figure 1-7 Sequence Diagram for login*

User goes to login area. After the authentication from database user login in the system and have different option to perform different task as describe in above Fig.

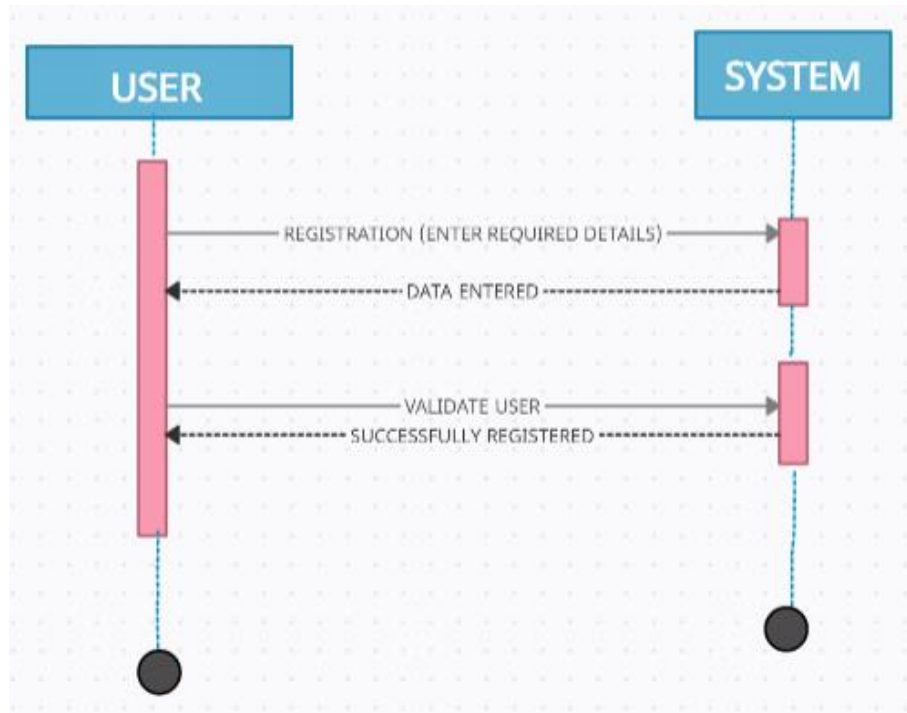


Figure 1-8 Sequence Diagram for Registration

User goes to register area. After the registration complete from database user login in the system and have different option to perform different task as describe in above fig.

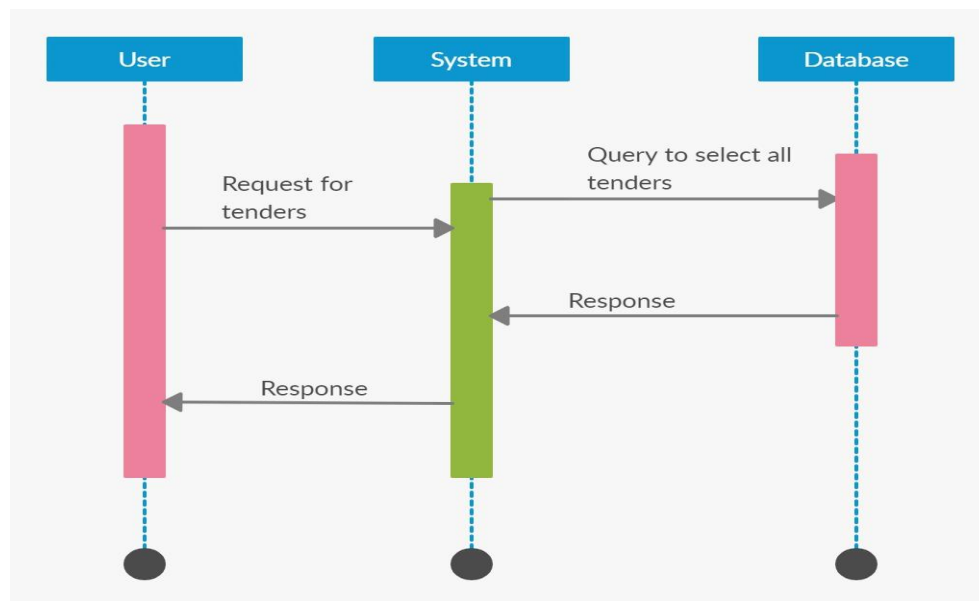


Figure 1-9 Sequence Diagram for Tender Search



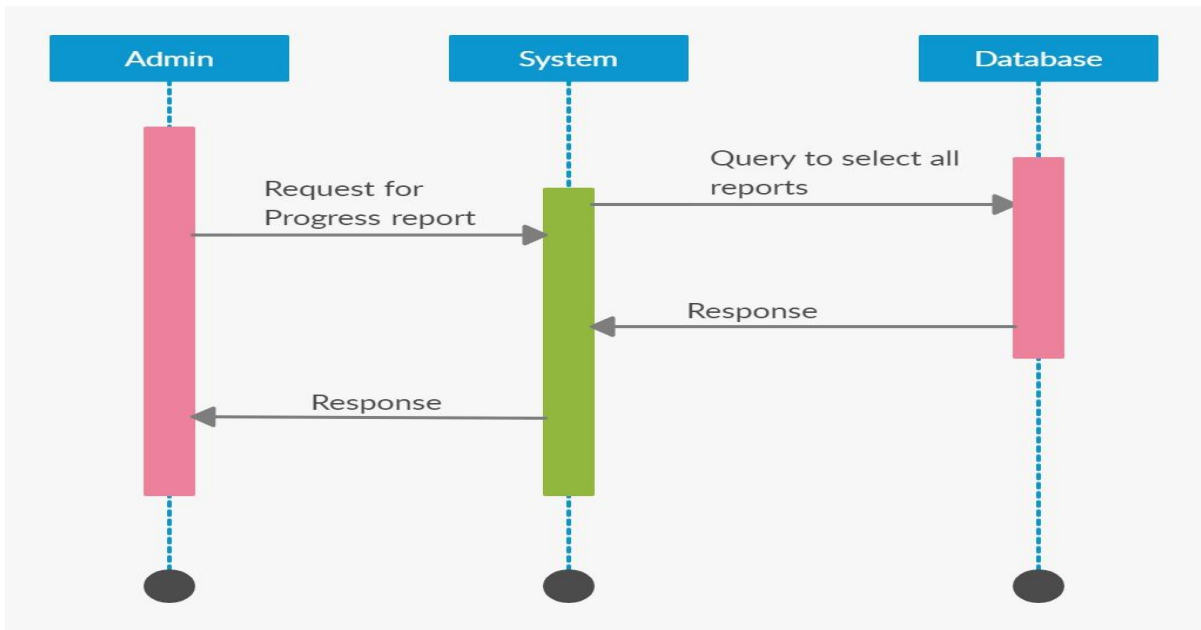


Figure 1-10 Sequence Diagram for Monitoring

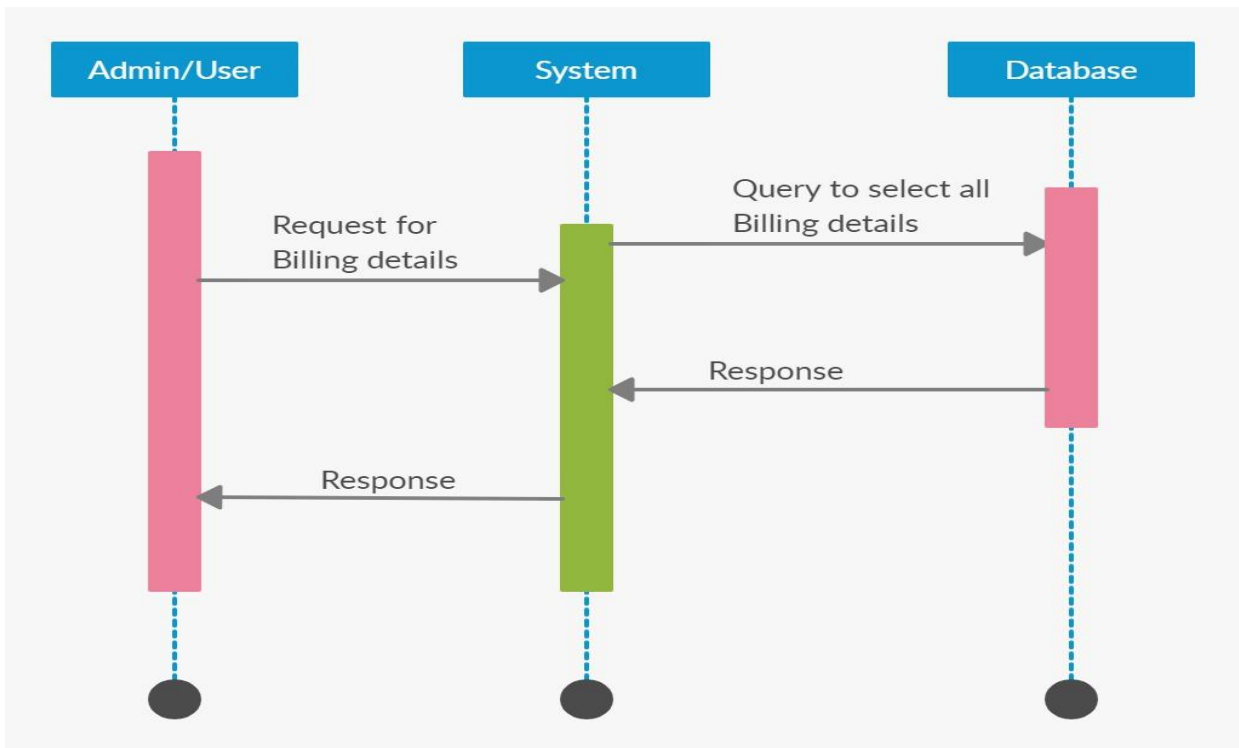


Figure 1-11 Sequence Diagram for Billing

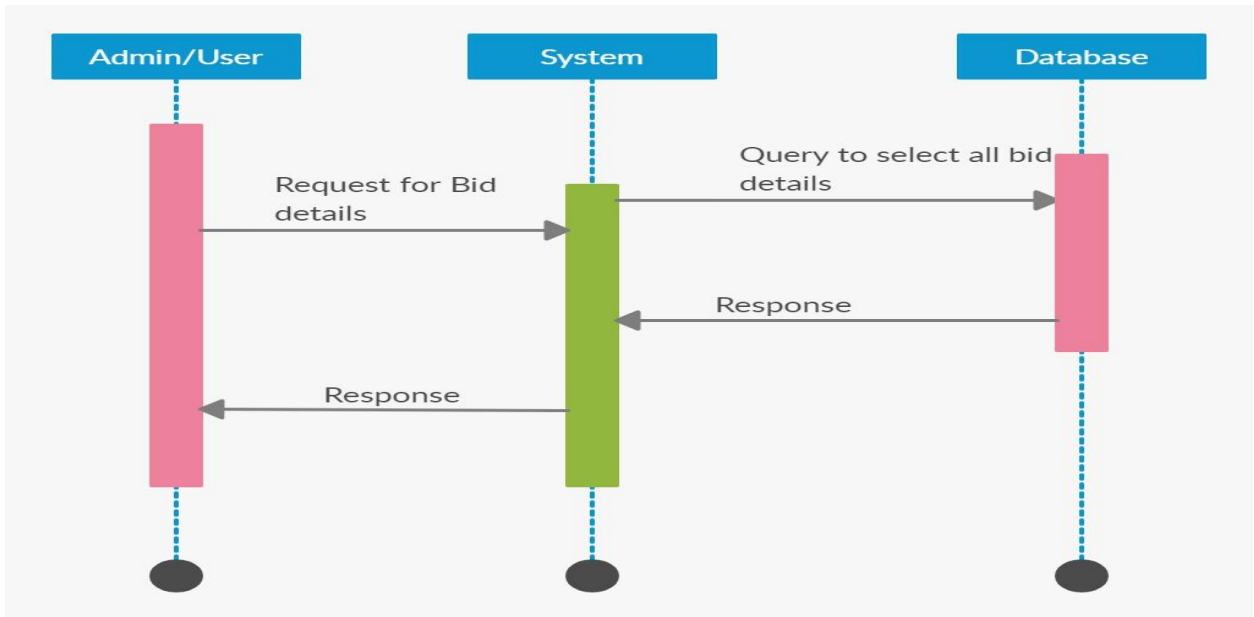


Figure 1-12 Sequence Diagram for Bidding

## 4.5 DFD Levels Diagrams

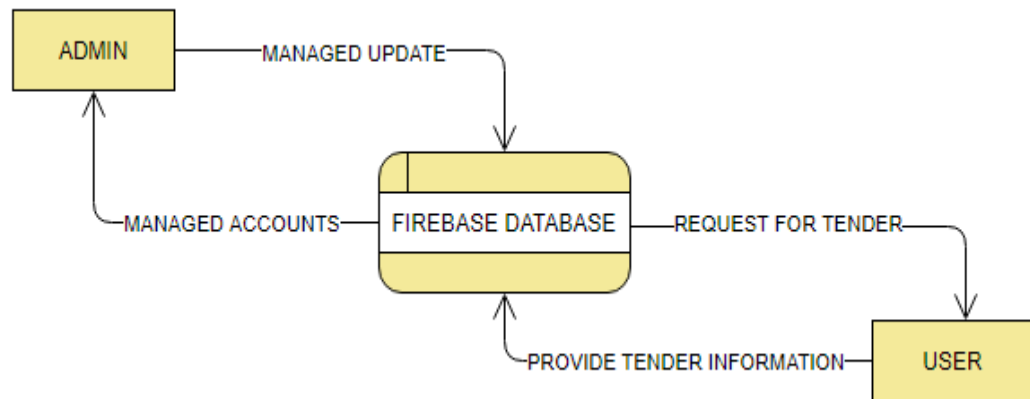


Figure 1-13: System DFD level 0

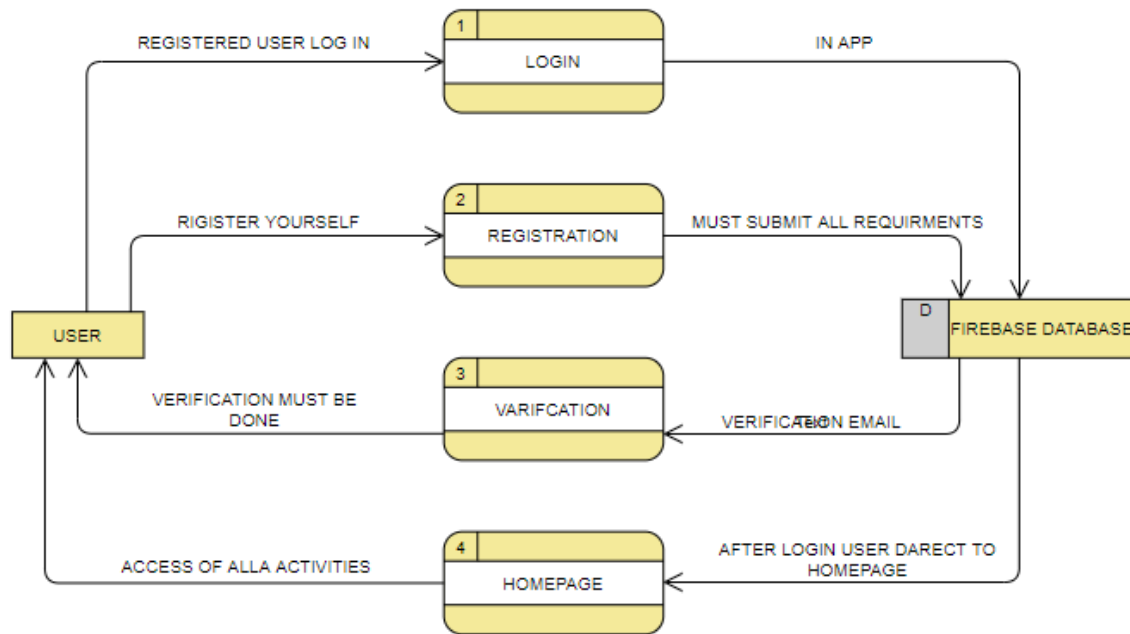


Figure 1-14: System DFD level 1 User Login

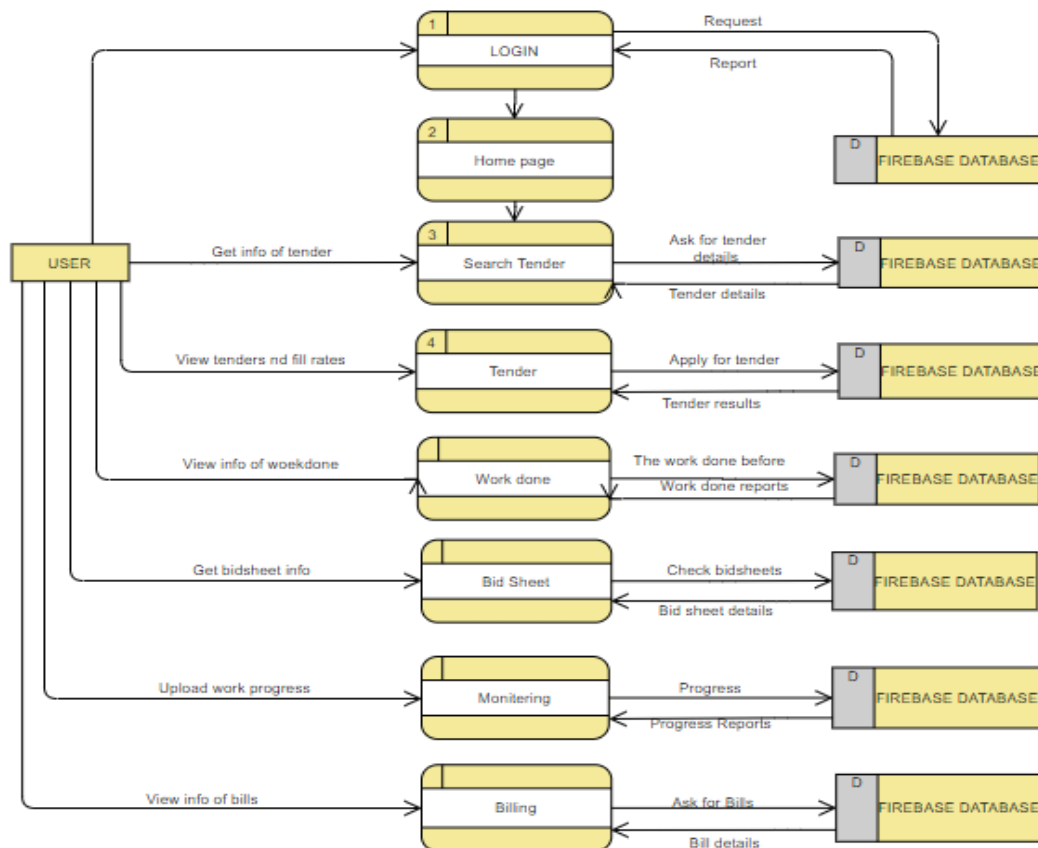


Figure 1-15: System DFD level 2 User

## **Chapter 5**

# **IMPLIMENTATION**

## **5 Implementation**

In this chapter, we will discuss the techniques and tools we use to develop the project. This phase is the most prominent phase of development; from this step, we transform our idea into a meaningful picture. This is a significant and challenging step toward learning or developing skills. An application is the result of the successful implementation of tools and technologies. Following are the tools and techniques we use during the development of our application.

### **5.1 Tools and Technologies**

#### **5.1.1 Tools**

- Android Studio 4.2
- MS Word and PowerPoint

#### **5.1.2 Languages**

- Java
- xml

#### **5.1.3 Database**

- Firebase Database
- Firebase-database:19.5.0
- Playservices-location:17.1.0
- Playservices-places:17.0.0
- Glide

### **5.2 Development Stages**

After the designing phase, we move towards the developmental phase to have a clear demonstration of the project. In the implementation phase, we will discuss the phases, which we face incrementally during the development of the application. We use a payment method.

#### **5.2.1 Payment Method Integration (Jazz Cash)**

This is a simple all-in-one online bank account. This account works on your phone number. If you are a merchant and you often carry plenty of money then may harm you in a dangerous situation. Or you may need special protection while caring money around.

Hence business dealers can give their mobile number as the bank account number. Ask them to transfer money into a bank account through this Merchant service. In our project the user first pay the tender fee through this payment method and after user can bid on tender.

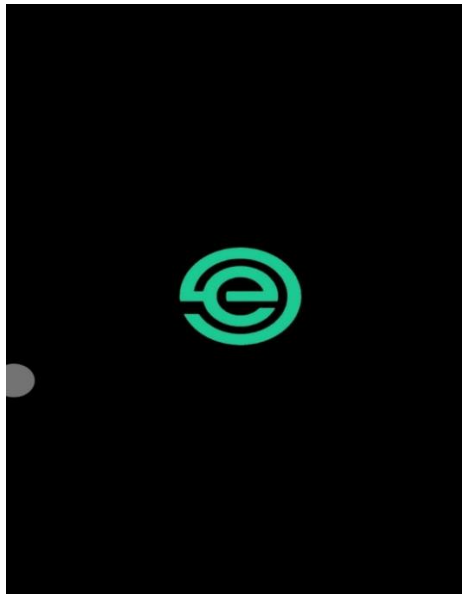
### **5.2.2 Calculations**

When the tender admin uploads a new tender and adds tender details. In tender details, there are many rates per item. The system automatically adds all the item rates and shows the user when they bidding on the tender. On the other hand, when the tender bidding date is closed the tender admin clicks on calculate, and assigning the tender will automatically assign to the lowest bidding contractor/ user. This is a simple all-in-one online bank account. This account works on your phone number. If you are a merchant and you often carry plenty of money then may harm you in a dangerous situation. Or you may need special protection while caring money around. Hence business dealers can give their mobile number as the bank account number. Ask them to transfer money into a bank account through this

## **5.3 User Interface**

### **5.3.1 Splash Screen**

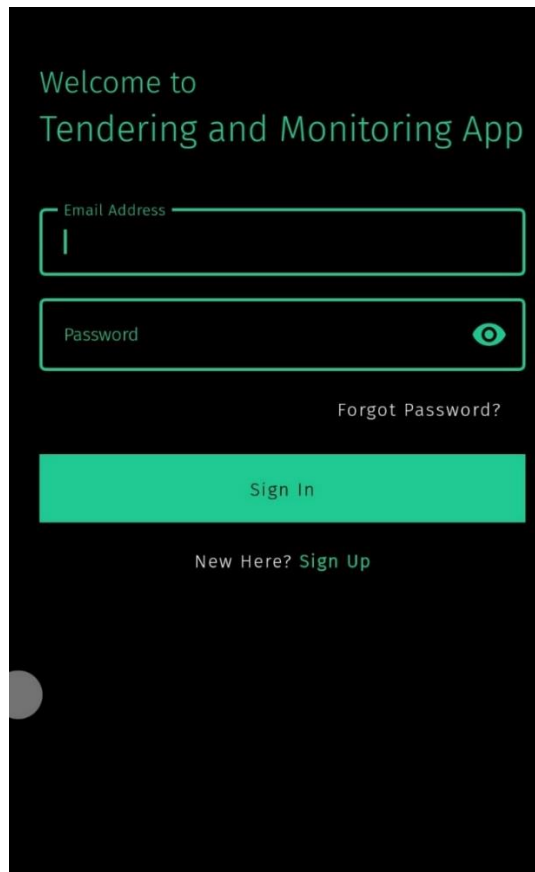
A splash screen is a graphical control element consisting of a window containing an image, a logo, and the current version of the software. A splash screen can appear while a game or program is launching. A splash page is an introduction page on a application.



*Figure 1-16 Splash Screen*

### 5.3.2 Login Page

A login page is a application page or an entry page to application that requires user identification and authentication, regularly performed by entering a username and password combination. Logins may provide access to an entire site or part of a application.



The image shows a mobile application login screen with a dark blue background. At the top, the text "Welcome to" is in light blue, followed by "Tendering and Monitoring App" in a larger, bold, light blue font. Below this, there are two input fields: "Email Address" and "Password". The "Email Address" field has a light blue border and contains the letter "I". The "Password" field has a light blue border and a light blue eye icon on the right side. Below the "Password" field, there is a link "Forgot Password?" in light blue. A large, solid blue button with the text "Sign In" in white is centered below the "Forgot Password?" link. At the bottom, there is a link "New Here? Sign Up" in light blue. A small, light blue circle is visible on the left side of the screen, likely a part of a mobile interface.

*Figure 1-17 Login Page*

### 5.3.3 Signup

If the user doesn't have their account in-app then the user must register first and after signup, the user can log in. For signup, the user must give the valid email, password, and other data and after a click on signup, the user gets a verification email after verifying the user can log in.

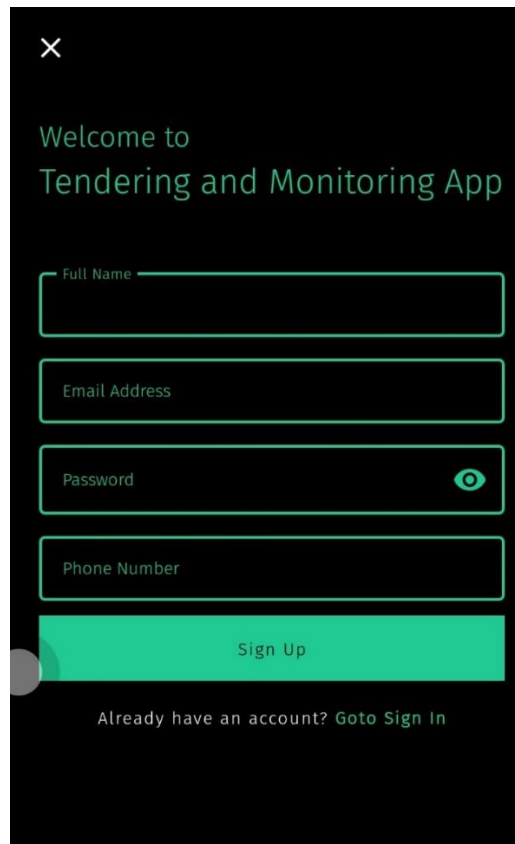


Figure 1-18 Signup page

### 5.3.4 Email Verification

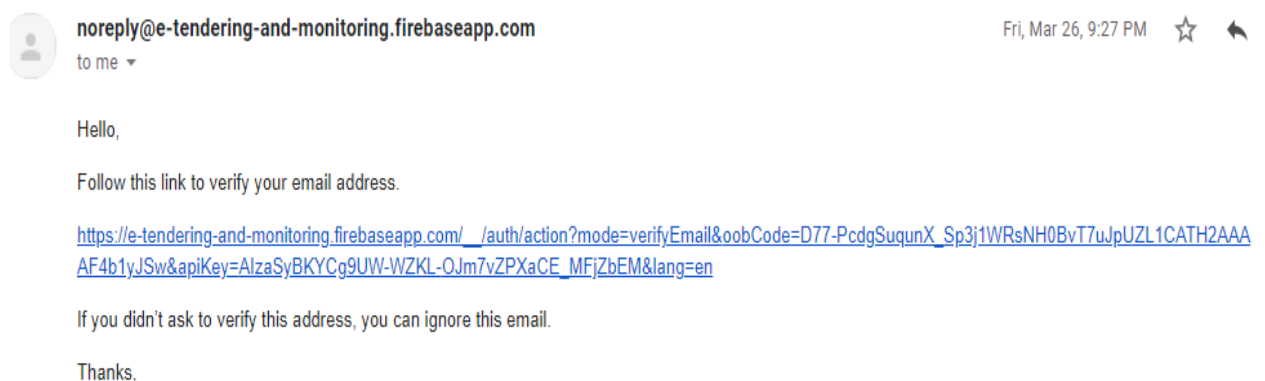


Figure 1-19 Email verification



### 5.3.5 Forget Password

In case the user forgets their password there is an option for resetting your password through email.

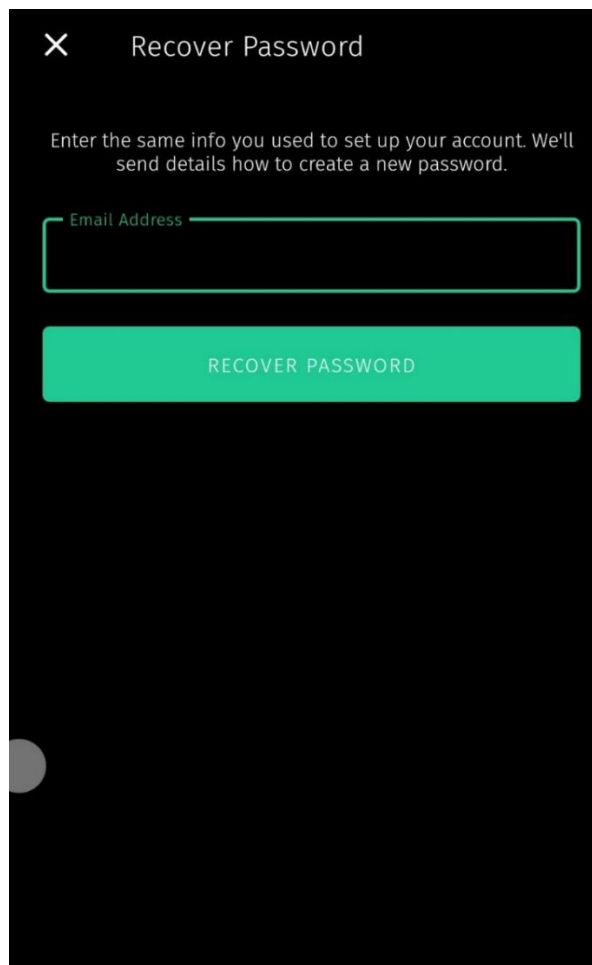
A mobile app interface for recovering a password. It features a dark blue background. At the top, there is a close button (X) and the title "Recover Password". Below the title, a message reads: "Enter the same info you used to set up your account. We'll send details how to create a new password." There is a text input field labeled "Email Address" with a light blue border. Below the input field is a large orange button with the text "RECOVER PASSWORD".

Figure 1-20 Forget password

When the user put their email address the user get the reset password link on the given email address.

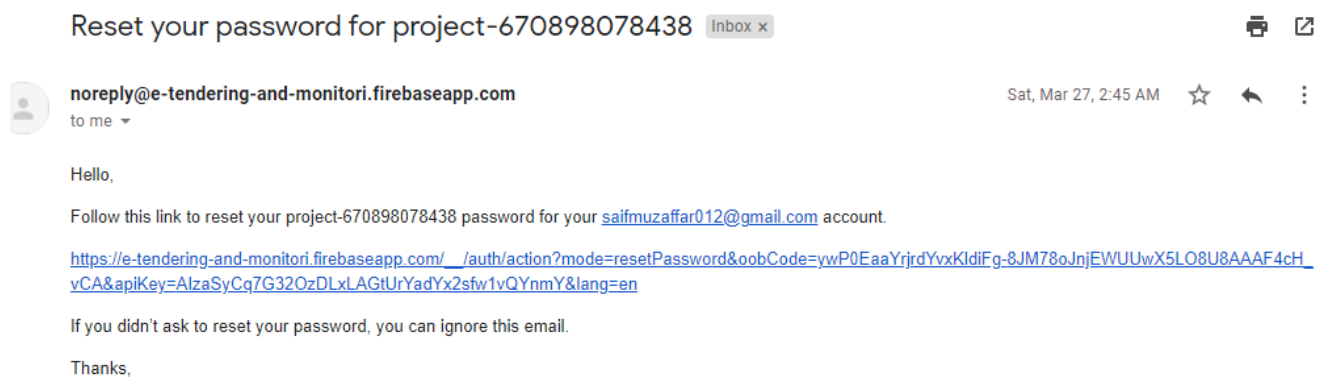


Figure 1-21 Reset password email

### 5.3.6 Dashboard Screen and navigation bar

A dashboard is a user interface that, somewhat resembling an automobile's dashboard, organizes and presents information in a way that is easy to read. When the user login there is a dashboard screen with different functions.

In Navigation Bar there is a user profile and the user can easily access the tender type in which they are interested. I.e. Roads, Buildings, Streets, and at last there is a sign-out button.

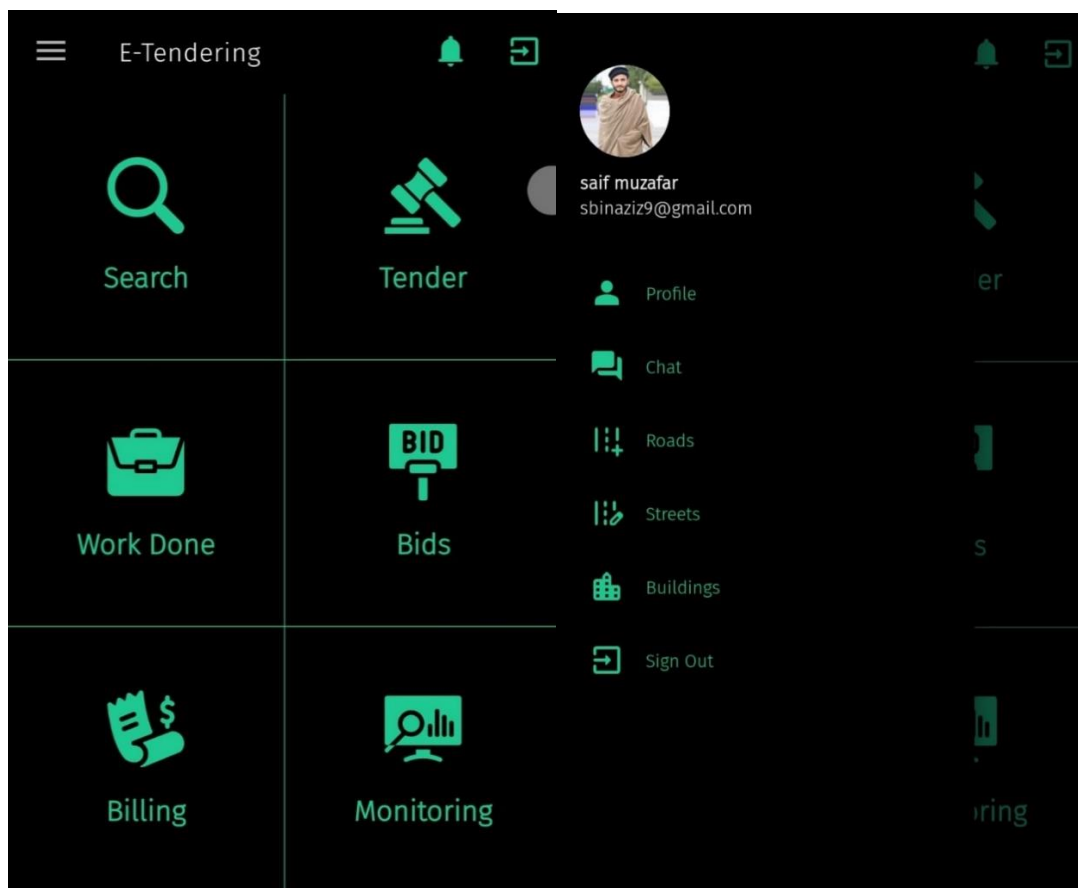
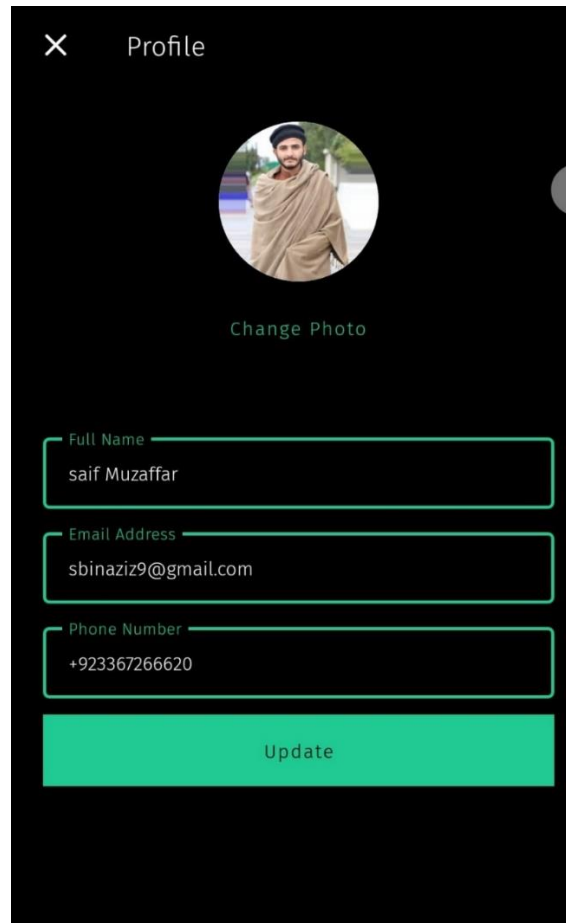


Figure 1-22 Dashboard screen and navigation bar

### 5.3.7 Profile

In profile, the user uploads their image or shows data like name, email, and phone number. Users also can change or update their information.



Profile

Change Photo

Full Name  
saif Muzaffar

Email Address  
sbinaziz9@gmail.com

Phone Number  
+923367266620

Update

Figure 1-23 Profile

### 5.3.8 Search and tenders

In search, users can search tenders by categories like roads, streets, and buildings or places. On the other hand in tender users find all the tenders uploaded by admin and view the details of tender and get the bid sheet in details and bid by getting information about tender.

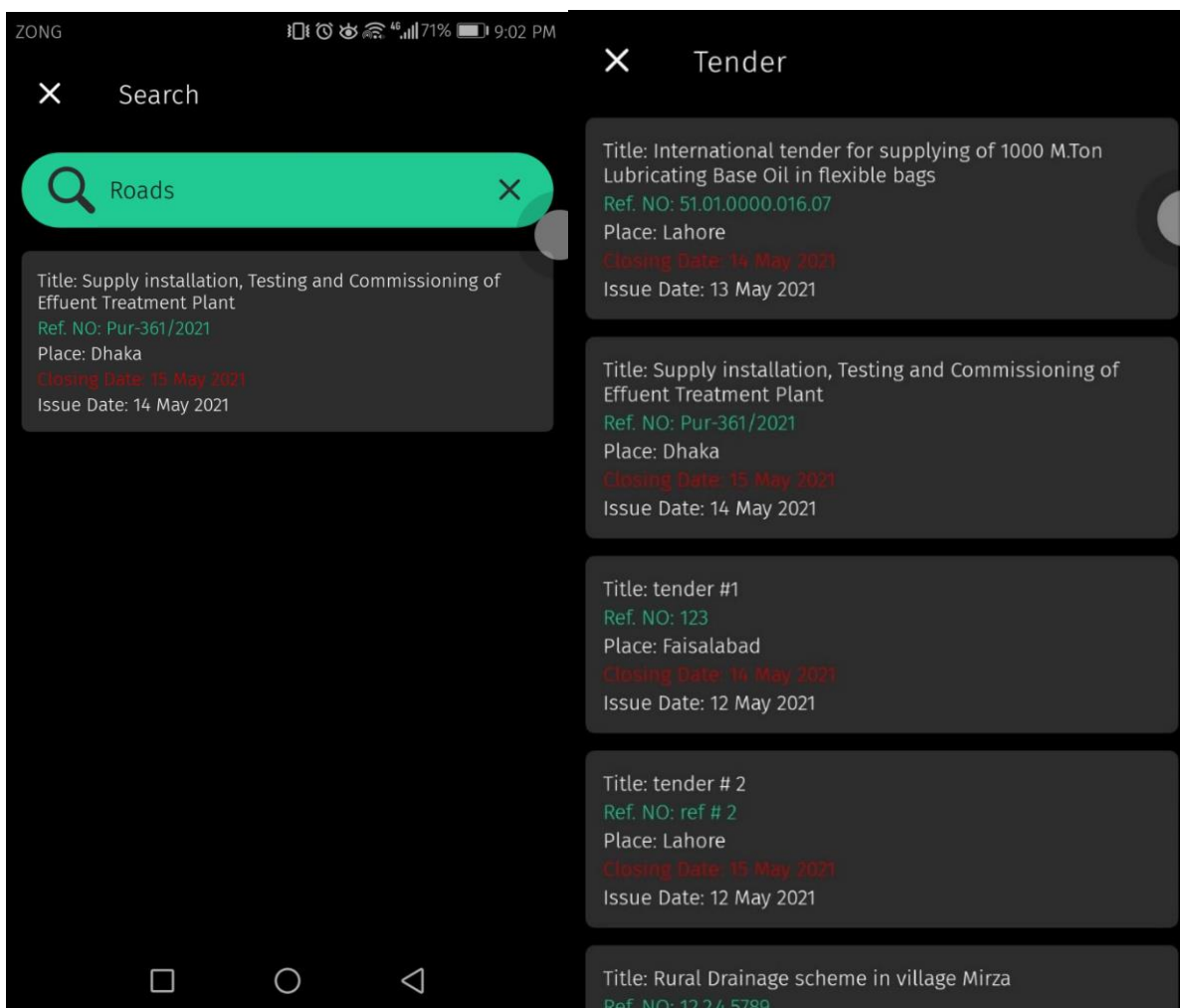


Figure 1-24 Search Tender and tenders

When the user checks all the tenders and if the user clicks on one tender there is more detail about tender now there is one more button of view detail. If the user is interested then click on view details and get the bid sheet on their screen.

×

12.2.4.5789

×

12.2.4.5789

Ref. No	12.24.5789	Sr. #	Ch.#	Item#	Description
Country	Pakistan	1	18	19	Providing laying dry brick payment in streets or road etc, sand grouted laid in proper cambe, including preparation, pcc dividing in panels
Date of entry	13 May 2021				
State	Punjab				
Purchaser	Government of Pakistan (GOP)	2	3	10	Earthwork excavation in irrigat channels drains, etc to designe section, grades and profiles excavation material disposed and dashed within 5ft
Category	Streets				
Tender Fee	5000.0				
Tender Details	Rural Drainage Scheme in Village Mirza thesis district Attock drain type-1 Pcc in street, spillage Drain / storm water channel and other allied works. Time limit is 18 months and e.money is Rd.2.060 million.				

View Detail

Bid

Figure 1-25 Tenders Details and bid sheet

After reading or understanding the tender if the user is interested they can bid on it simply the user clicks on the bid button. When the user clicks on the bid button there is the platform of jazz cash where the user first pays the tender fee and then bid on tender. Then the user selects the mobile account option and enters the number and sends the money through jazz cash.

The image displays two sequential screens from the Jazz Cash mobile application. Both screens feature the Jazz Cash logo at the top and a progress bar with three steps: 1. SELECT, 2. PAY, and 3. FINISH.

**Left Screen (Step 1: SELECT):**

- Header: Please select payment method
- Payment Method: Credit/Debit Card (with a dropdown arrow)
- ORDER DETAILS section:
  - Outlet: Hussnain Raza Arshad
  - Order ID: billRef
  - Description: Description of transaction
  - Amount: **PKR 5000.00**
- Session will expire in:

**Right Screen (Step 2: PAY):**

- Header: Please enter wallet details
- Instruction: Please unlock your phone, you will receive a Mobile PIN input prompt for verification
- Mobile Account Number \* (with a masked input field showing 03XXXXXXXX)
- Navigation buttons: BACK and PAY
- ORDER DETAILS section (partially visible):
  - Outlet: Hussnain Raza Arshad

Figure 1-26 Jazz Cash and sending tender fee

When the user sending the tender fee the user can bid on the tender. Now the user fills the rate and waits for tender admin and when the tender admin calculates and assigns the tender, the billing admin has to verify that the user pays their tender fee against the bidding tender. After verification of the billing admin, the project/ tender is assigned to the user.

Pur-361/2021

Sr. #	Ch.#	Item#	Description
1	3	20	Dressing of earthwork (done by machinery or otherwise and left unrest) to designed section.
2	6	3	Cement concrete brick or stone ballast 1/2 to 2 gauge in foundation and plinth 1:7:20
5	11	19	Pointing flush on stone work, L to 20 inch ( 6.00 m) height.

Bid tender

Tender Amount: 42828, Enter Yours

CANCEL

BID

Bid

Figure 1-27 bidding on tender

### 5.3.9 Monitoring

When the project is assigned to the contractor/user the assigned tender is shown in bids and they have to start their work and upload images and laboratory tests. After Uploading the image and laboratory test report the monitoring admin monitor the work and verify the work. When the work is verified by the monitoring admin then the billing admin passes the bills and the user collects their checks from the office manually.

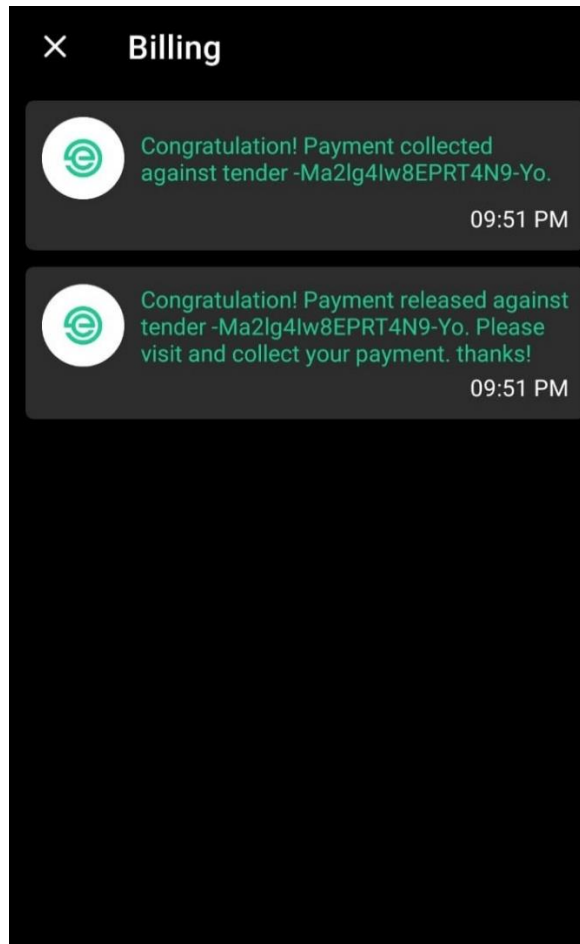
The figure displays two mobile application screens. The left screen, titled with a close button (X), shows project details: 'Title: Rural Drainage scheme in village Mirza', 'Ref. NO: 12.2.4.5789', 'Place: Attack', 'Closing Date: 14 May 2021', and 'Issue Date: 13 May 2021'. Below this information is a green button labeled 'Upload Progress'. The right screen, also titled with a close button (X) and 'Upload Progress', features two text-based options: 'Attach photos' and 'Attach Laboratory Test (Pdf)'. At the bottom of this screen is a large green button labeled 'Upload'.

Figure 1-28 Monitoring



### 5.3.10 Billing

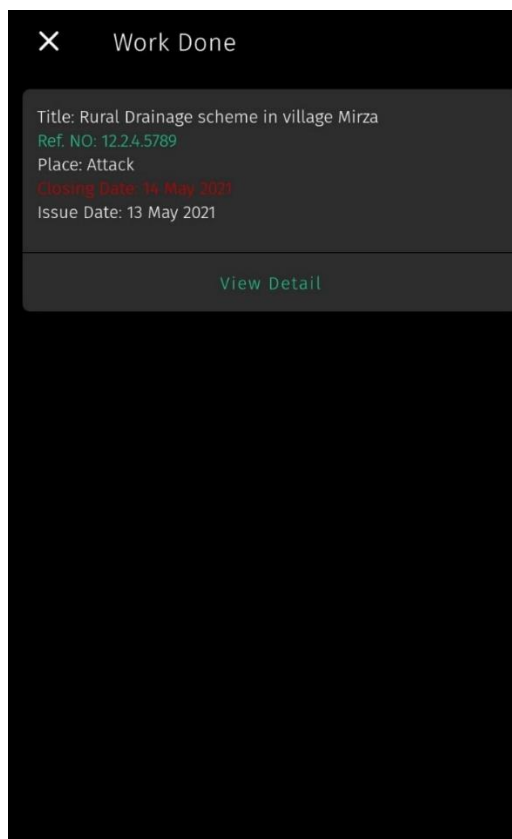
In billing when the billing admin passes the bills the user gets the notification of passed bills and when the user/ contractor collects the checks there will be notification “Congratulation! Payment collected”.



*Figure 1-29 Billing*

### 5.3.11 Work Done

When the monitoring admin passes the project then project details go to billing and the user work done box.



*Figure 1-30 Work done*

## 5.4 Admins Interface

### 5.4.1 Tender Admin

There is an admin who handles the tenders. The tender admin uploads new tender and tender details. There is a tick mark on the right side of the screen by clicking on it tender admin can upload a new tender with tender basic details.

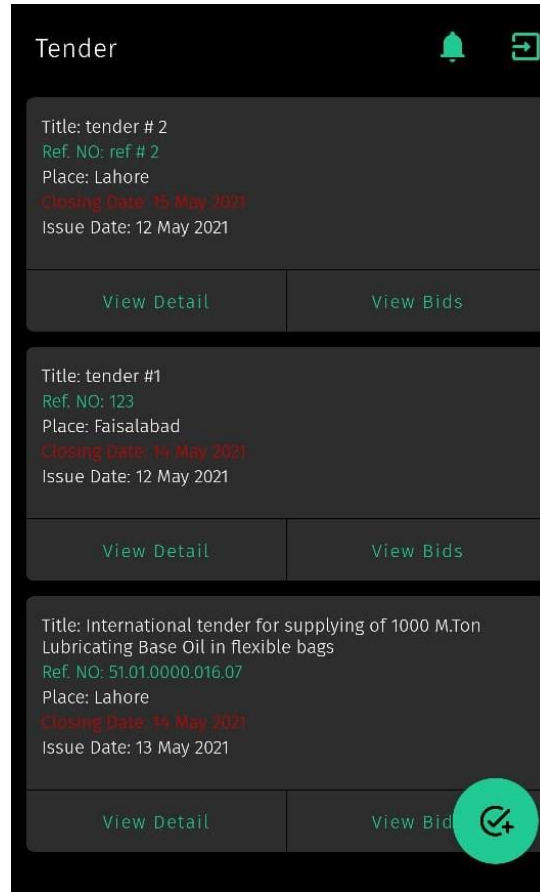


Figure 1-31 Tender Admin

There is bid sheet where the tender admin add new item details and descriptions with government rates.

51.01.0000.016.07						
Sr. #	Ch.#	Item#	Description	Qty	Unit	Rate
1	4	19	Dismantling of cement concrete 1:2:4	539	%cut	5808
2	3	10	Earthwork excavation in irrigation channels, drains, etc. To design section, grades and profiles, excavated material disposed off and dressed within 50 ft. ( 15 m ) lead:- ordinary	1734	%Cft	4237
3	6	3	Cement concrete brick or stone ballast 1/2 to 2" gauge in foundation and plinth. 1:6:12	1029	%Cft	10063
4	7	4	Pacca brick work in foundation and plinth ratio 1:5	792	%Cft	17856
5	20	3	Pacca brick work on edge laid in reimbursement in cement sand mortar in sides of drains on other works where required all joints to be completely filled and struck flush ratio 1:5	3168	%Sft	7817
6	20	1	Tega farmed of pacca brick work on end laid in and over cement sand mortar 4.5" thick 1:5	2535	%Rft	5462
7	20	6	Constructing Punjab standard drain of cement concrete 1:2-2/2:5	3380	Rft	

Figure 1-32 Bid sheet details

There is Add tender detail from where tender admin add tender details/ bid sheet and tender admin upload new tender with basic details.

×

Add Tender Detail

Chur

Item#

Description

Qty

Unit

Rate

Add Tender Detail

Figure 1-33 Add tender details

**Add Tender**

Tender title

Reference Number

Issue Date

Closing Date

Date of entry

Category

Place

Country

Category

Place

Country

Place

Country

State

Purchaser

Tender Details

Tender Fee

Add Tender

Figure 1-34 Add Tender

The tender admin finds the bids by contractor/ user and assigns them by clicking on calculation and assigning. On the other hand, the tender admin gets notifications from the user who bids on the new tender.

**Bids**

Hussnain Raza  
1580

saif muzafar  
50000

Saeed Abbas  
60000

saad  
56000

Shayan  
58000

hamza arshad  
52900

CALCULATE & ASSIGN

**Notifications**

New tender bid received from hamza arshad  
03:42 PM

New tender bid received from Hussnain Raza  
Wed, 19 May 2021 13:42

New tender uploaded.  
Wed, 19 May 2021 13:38

New tender bid received from hamza arshad  
Wed, 12 May 2021 21:44

New tender bid received from hamza arshad  
Wed, 12 May 2021 21:42

Figure 1-35 Bids and Notifications

## 5.4.2 Monitoring Admin

Monitoring admin is that who handles the monitoring or project. The monitoring admin gets the project details from the contractor/ user in form of pictures and also a laboratory test of the material/ project. The monitoring admin monitors the work and checks the laboratory test. After monitoring the admin give feedback to the contractor/user in the chat

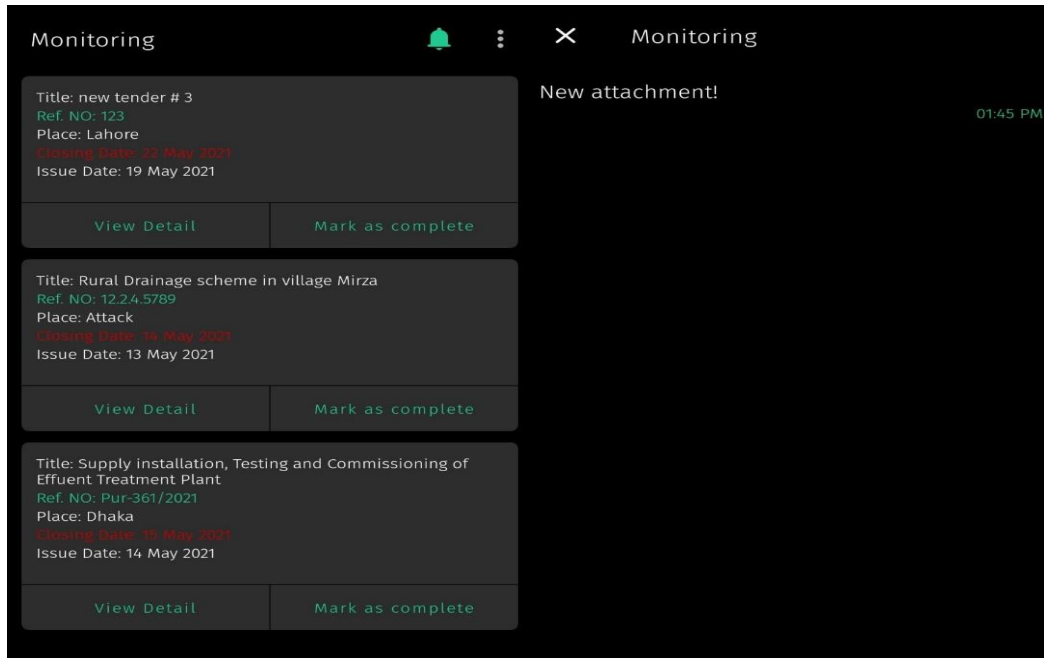


Figure I-36 Monitoring Admin

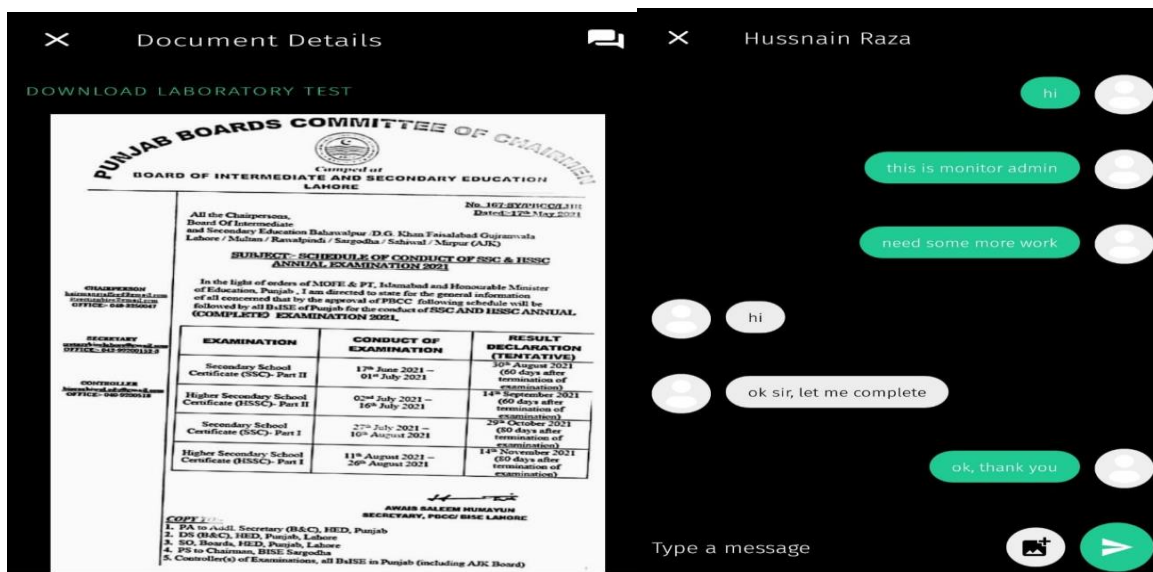


Figure I-37 Monitoring and feedback

### 5.4.3 Billing Admin

When the monitoring admin passes the project and clicks on the mark as complete then the project added in work done and the billing admin releases the payment. When the billing admin clicks on release payment the user/ contractor gets the notification “Your check is ready to get from office / visit the office. After collecting the payment the billing admin click on collected the user again get the notification “you collected you payment against XYZ project.

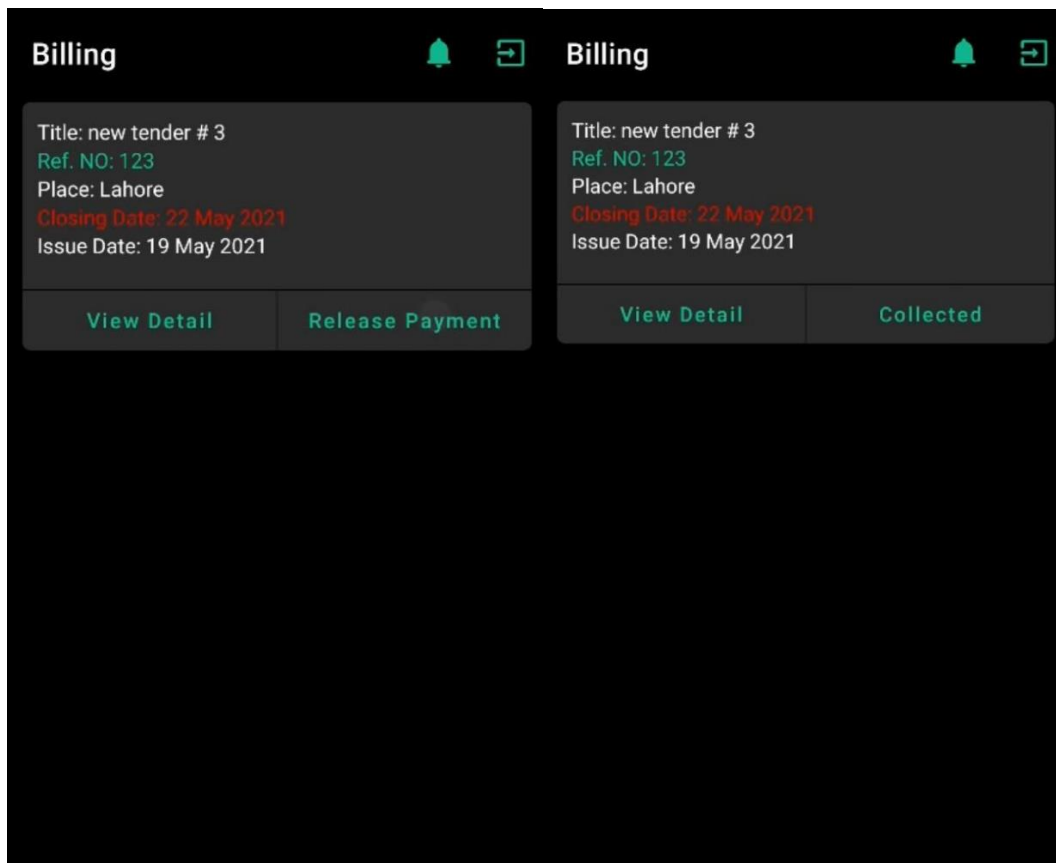


Figure 1-38 Billing Admin

# **Chapter 6**

## **Testing and Evaluation**



## **6 Testing and evaluation**

### **6.1 Manual Testing**

Once we create any application we must check or analyze its features so that when it gets delivered, it is free of error, bugs, and other issues. The process of testing any software manually. To ensure completeness of testing. By following some written test plan that leads it to test cases. The test cases are done one by one by a person who is involved in the testing phase or testers. It is done in an automated way without using any tool. The main purpose of manual testing is to resolve or fix bugs and issues in software. It is the most primitive technique that helps to find bugs in the application. Every new application must be tested manually first. The two main reasons for ensuring the quality of software are given below:

- Finding out errors that arise during running the application.
- Check that the application fulfills the system requirement or not

#### **6.1.1 System testing**

System testing validates the integrated software product. It takes an input of all integrated components. It is performed on the entire system. It tells the expectation of the customer. It tells us the actual result or behavior of the product when the system is tested. In our system, we will test that all functions and calculations are correctly or not we check the tenders searching, tenders and biddings, work done, monitoring, notifications, billings and then finalized our project after all testing of our android application.

#### **6.1.2 Unit Testing**

In unit testing, the smallest part of an application is tested independently. We check each unit of our system in accordance with user requirements. We check each piece of code to check the continuity and flow of an application. Every module has a relation with the previous and next steps. We can find errors by inspect code by click on analyze after the inspection result, we can see detailed errors and warnings messages. USB debugging mode helps to the copied the app via USB to the device for testing. We also faced several exception handlings during done this project. Unit testing for the whole application has been mentioned.

### 6.1.3 Function Testing

In functional testing, we generate test cases to check the functionality of each part and its accuracy compared with the actual outcome. It is the stage where we analyze the accuracy of the application as correct or not. We not only tried to make every functionality performing but also had a focus on making it easy and attractive. We went through the complete process of testing. Starting with user authentication, log in through the app, and see all the results that happen in the app. Admin is responsible for managing data firebase. They are performed to check the usefulness of the application from the user point of view.

#### 6.1.1.1 Test Cases Results

Test Cases and Results Test cases are created for each of the functional requirements. These test cases provide the action to test case; expected results and actual results along with test Fail/Pass remarks.

#### 6.1.1.2 User Sign-in

Objective: To ensure Sign in working correctly

**Table 6-1 user Sign-in**

No	Action	Expected results	Actual results	P/F
1	Click on the Login button without filled the Email Address	Highlight as required fields	Highlight as required fields	P
2	Enter an unregistered	Highlight as enter registered Email	Highlight as enter registered email	P
3	Enter the wrong email	Highlight as a show error message	Highlight as a show error message	P
4	Enter the registered email and password	Successfully login	Successfully login	P

### 6.1.1.3 User Sign-up

Objective: To ensure Sign-up working correctly

**Table 6-2 User Sign-up**

<b>No</b>	<b>Action</b>	<b>Expected results</b>	<b>Actual results</b>	<b>P/F</b>
<b>1</b>	Click on signup With empty fields.	Highlight as required fields	Highlight as required fields	<b>P</b>
<b>2</b>	Enter wrong email address	Highlight as required correct email Address.	Highlight as required correct email Address.	<b>P</b>
<b>3</b>	Enter the wrong Password	Highlight as entering a correct password	Highlight as the wrong input.	<b>P</b>
<b>4</b>	Enter wrong verification code	Highlight as error	Showed error message	<b>P</b>

### 6.1.1.4 Search Tender

Objective: To ensure tenders searching is working correctly

**Table 6-3 User Search tender**

<b>No</b>	<b>Action</b>	<b>Expected results</b>	<b>Actual results</b>	<b>P/F</b>
<b>1</b>	Click on Search tender box	New activity open	New activity open	<b>P</b>
<b>2</b>	Search by Category (Road, streets, buildings)	Successfully search	Successfully search	<b>P</b>
<b>3</b>	Search by place	Successfully search	Successfully search	<b>P</b>
<b>4</b>	Click on cross sign or back	Successfully work	Successfully work	<b>P</b>

#### 6.1.1.5 Tenders

Objective: To ensure tenders is working correctly

**Table 6-4 User tenders**

<b>No</b>	<b>Action</b>	<b>Expected results</b>	<b>Actual results</b>	<b>P/F</b>
<b>1</b>	Click on tender box	New activity open	New activity open	<b>P</b>
<b>2</b>	All tender shown uploaded by admin	Successfully work	Successfully work	<b>P</b>
<b>3</b>	View Details of any tender	Successfully shown	Successfully shown	<b>P</b>
<b>4</b>	Click on cross sign or back	Successfully work	Successfully work	<b>P</b>

#### 6.1.1.6 Bid on tender

Objective: To ensure bid on tender is working correctly

**Table 6-5 User bid on tender**

<b>No</b>	<b>Action</b>	<b>Expected results</b>	<b>Actual results</b>	<b>P/F</b>
<b>1</b>	Click on tender details	New activity open	New activity open	<b>P</b>
<b>2</b>	View Bid button bellow	Successfully shown	Successfully shown	<b>P</b>
<b>3</b>	Click on bid button	Go to jazz cash platform	Successfully goes to jazz cash platform	<b>P</b>
<b>4</b>	Select mobile account and fill mobile number	Successfully selected or filled	Successfully selected or filled	<b>P</b>
<b>5</b>	Click on pay	Successfully pay	Successfully pay	<b>P</b>
<b>6</b>	Bidding field shown and fill your rate	Successfully shown and bided	Successfully shown and bided	<b>p</b>

<b>7</b>	Click on cross sign or back	Successfully work	Successfully work	<b>P</b>
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#### 6.1.1.7 Monitoring

Objective: To ensure tender monitoring is working correctly

**Table 6-6 User monitoring**

<b>No</b>	<b>Action</b>	<b>Expected results</b>	<b>Actual results</b>	<b>P/F</b>
<b>1</b>	Click on monitoring box	New activity open	New activity open	<b>P</b>
<b>2</b>	Attached file / image filed shown	Successfully	Successfully	<b>P</b>
<b>3</b>	Click on upload button without attaching file / image	Error message shown "at least one file or image attached "	Successfully worked	<b>P</b>
<b>4</b>	Attach file/ image go to device files / gallery	Successfully	Successfully worked	<b>p</b>
<b>5</b>	Click on upload with image / file	Uploaded	Successfully	
<b>6</b>	Click on cross sign or back	Successfully work	Successfully work	<b>P</b>

#### 6.1.1.8 Billing

Objective: To ensure tenders billing is working correctly

**Table 6-7 User billing**

<b>No</b>	<b>Action</b>	<b>Expected results</b>	<b>Actual results</b>	<b>P/F</b>
<b>1</b>	Click on billing box	New activity open	New activity open	<b>P</b>
<b>2</b>	Get notifications of passed bills and collected bills	Successfully get	Successfully worked	<b>P</b>

<b>3</b>	Click on cross sign or back	Successfully work	Successfully work	<b>P</b>
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#### 6.1.1.9 Work done

Objective: To ensure work done is working correctly

**Table 6-8 User work done**

<b>No</b>	<b>Action</b>	<b>Expected results</b>	<b>Actual results</b>	<b>P/F</b>
<b>1</b>	Click on work done box	New activity open	New activity open	<b>P</b>
<b>2</b>	Those work/project you did the tender details are in work done	Successful	Successful	<b>P</b>
<b>3</b>	Click on cross sign or back	Successfully work	Successfully work	<b>P</b>

#### 6.1.1.10 Navigation bar

Objective: To ensure Navigation bar is working correctly

**Table 6-9 User navigation**

<b>No</b>	<b>Action</b>	<b>Expected results</b>	<b>Actual results</b>	<b>P/F</b>
<b>1</b>	Click on Navigation icon on left top corner	New side bar come	New side bar come	<b>P</b>
<b>2</b>	Click on profile upload user image or update details	Image uploaded and updated details	Image uploaded and updated details	<b>P</b>
<b>3</b>	Click on streets, buildings, roads one by one	Tender shown by category	Successfully worked	<b>P</b>
<b>4</b>	Click on sign out	Sign out successfully	Sign out successfully	<b>p</b>
<b>5</b>	Click on cross sign or back	Successfully work	Successfully work	<b>P</b>

#### 6.1.1.11 Logout

Objective: To ensure user log-out working correctly

**Table 6-10 Log-out**

No	Action	Expected results	Actual results	P/F
1	Click logout sign on top right corner	Log out	Logged out	P

#### 6.1.1.12 Tenders Admin

Objective: To ensure tenders Admin is working correctly

**Table 6-11 Tender admin**

No	Action	Expected results	Actual results	P/F
1	Click on the Login button without filled the Email Address	Highlight as required fields	Highlight as required fields	P
2	Enter the wrong email	Highlight as a show error message	Highlight as a show error message	P
3	Enter the registered email and password	Successfully login	Successfully login	P
4	All tender shown uploaded by admin	Successfully work	Successfully work	P
5	Click on tick mark on below right corner	New activity open	New activity open	P
6	For adding new tender fill all the fields	All fields filled	All fields filled	p
7	Click add tender button before filling all field	Highlight as a show error message	Highlight as a show error message	p
8	Click on view details button	New activity open	New activity open	p

<b>9</b>	Click on tick mark on below right corner	Add tender details/ bid sheet	Add tender details / bid sheet	<b>p</b>
<b>10</b>	Click add tender details button before filling all field	Highlight as a show error message	Highlight as a show error message	<b>p</b>
<b>11</b>	Click on view bids	Show all user/ contractors bids	Show all user/ contractors bids	<b>p</b>
<b>12</b>	Click on calculate and assign button	Automatically calculate and assign tender of lower bid contractor / user	Automatically calculate and assign tender of lower bid contractor / user	<b>p</b>
<b>13</b>	Click on bell icon on right top corner	Show all the notifications or user bids and new tenders	Show all the notifications or user bids and new tenders	<b>p</b>
<b>14</b>	Click on cross sign or back	Successfully work	Successfully work	<b>P</b>

#### 6.1.1.13 Monitoring Admin

Objective: To ensure monitoring Admin is working correctly

**Table 6-12 Monitoring admin**

<b>No</b>	<b>Action</b>	<b>Expected results</b>	<b>Actual results</b>	<b>P/F</b>
<b>1</b>	Click on the Login button without filled the Email Address	Highlight as required fields	Highlight as required fields	<b>P</b>
<b>2</b>	Enter the wrong email	Highlight as a show error message	Highlight as a show error message	<b>P</b>
<b>3</b>	Enter the registered email and password	Successfully login	Successfully login	<b>P</b>
<b>4</b>	All tender shown assigned by tender admin	Successfully work	Successfully work	<b>P</b>



<b>5</b>	Click on view details button	New activity open	New activity open	<b>p</b>
<b>6</b>	Show all the pictures and laboratory tests uploaded by specific user	Successfully work	Successfully work	<b>P</b>
<b>7</b>	Click on message icon on top right corner	Give feedback to user by chat	Give feedback to user by chat	<b>p</b>
<b>8</b>	From user side message received from monitoring admin	Successfully work	Successfully work	<b>P</b>
<b>9</b>	Click on mark as complete	Tender goes to user work done and billing admin	Tender goes to user work done and billing admin	<b>p</b>
<b>10</b>	Click logout sign on top right corner	Log out	Logged out	<b>P</b>

#### 6.1.1.14 Billing Admin

Objective: To ensure billing Admin is working correctly

**Table 6-13 Billing admin**

<b>No</b>	<b>Action</b>	<b>Expected results</b>	<b>Actual results</b>	<b>P/F</b>
<b>1</b>	Click on the Login button without filled the Email Address	Highlight as required fields	Highlight as required fields	<b>P</b>
<b>2</b>	Enter the wrong email	Highlight as a show error message	Highlight as a show error message	<b>P</b>
<b>3</b>	Enter the registered email and password	Successfully login	Successfully login	<b>P</b>

<b>4</b>	Show all the tenders mark as completed by monitoring admin	Successfully work	Successfully worked	<b>p</b>
<b>5</b>	Click on view details	Show tender details / bid sheet	Show tender details/ bid sheet	<b>p</b>
<b>6</b>	Click on release payment	User get notification of releasing payment against xyz project/tender	User get notification of releasing payment against xyz project/tender	<b>p</b>
<b>7</b>	After clicking on release payment	Button change to collected	Button change to collected	<b>p</b>
<b>8</b>	Click on collected	User get notification when they collect the payment	Get notification again about collecting payment	<b>p</b>
<b>9</b>	Admin approve the tender fee pay by user	Successfully work	Successfully worked	<b>P</b>
<b>10</b>	Click on bell icon	Get notifications about new verifications or releasing payment	Get notifications about new verifications or releasing payment	<b>p</b>
<b>11</b>	Click logout sign on top right corner	Log out	Logged out	<b>P</b>

## **CHAPTER 7**

### **Conclusion and Future Work**

## **7 Conclusion**

### **7.1 Conclusion**

Due to the fast changes in the era of computerized technology we need to convert manual systems to automated systems. Our “E-Tendering” application helps the contractors and government construction departments. Our application makes it easy to bid on tenders anywhere, the admin simply uploads the tender in-app and the contractors bid on it from their homes or any place in the world. This application helps contractors in time, fuels, and their important time to come PHE department for tender bid.

There is no such app that guides the contractors using such a technique we used for bidding easily. Contractors come out of their precious time just to bid but it is not confirmed that the tender will be found or not. Sometimes the contractor is in an emergency so he can't do a tender bid. So, that's why we created this application that will help the contractor to bid from the house and this will save the contractor time, petrol, and other expenses.

### **7.2 Future work**

The following can be implemented as future Work.

1. We will relate this application with different departments i.e. PWD, NHA, and local government the application updated with departments.
2. We also can add the registration in the department through license the contractor give documents and their license for registration online.
3. Make a website for E- tendering and monitoring.
4. We will add more functionalities in this application (i.e.) Add bank accounts and other payment methods.
5. Add check collection system also online, payments directly send to contractor account.
6. Use Map for tender place visiting and tender city departments.

## **CHAPTER 8**

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