

Fix it

ABD ALRHMAN M. S. ABU SBEIT 0165657
MOHAMMED BASEM OBAID 0161132
OMAR SAMI AYESH ABU-SAIF 0165419

Project Supervisors:
Dr. Ruba Obiedat
Ms. Mariam Itriq



COMPUTER SCIENCE & BUSINESS INFORMATION TECHNOLOGY
Departments
KING ABDULLAH II SCHOOL OF INFORMATION TECHNOLOGY THE
UNIVERSITY OF JORDAN

July 2019

TABLE OF CONTENTS

Content

ABSTRACT	i
ACKNOWLEDGEMENTS	ii
LIST OF TABLES	iii
LIST OF FIGURES	v
LIST OF SYMBOLS	vi

CHAPTER 1 INTRODUCTION

- 1.1 Preamble**
- 1.2 Project Motivations**
- 1.3 Problem Statements**
- 1.4 Project Aim and Objectives**
- 1.5 Project Scope**
- 1.6 Project Hardware and Software Requirements**
- 1.7 Project Limitations**
- 1.8 Project Expected Output**
- 1.9 Project Schedule**
- 1.10 Report Outline**

CHAPTER 2 EXISTING SYSTEMS

- 2.1 Introduction**
- 2.2 Existing Systems**
- 2.3 Overall Problems of Existing Systems**
- 2.4 Overall Solutions Approach**
- 2.5 Summary**

CHAPTER 3 SYSTEM REQUIREMENTS ENGINEERING AND ANALYSIS

- 3.1 Introduction**
- 3.2 Feasibility Study**
- 3.3 Requirements Elicitation Techniques**
- 3.4 Targeted Users**
- 3.5 Functional Requirements Definition**
- 3.6 Functional Requirements Specification**
- 3.7 Non-Functional Requirements**
- 3.8 Summary**

CHAPTER 4 SYSTEM DESIGN

4.1 Introduction

4.2 Context Diagram

4.3 Data Flow Diagram (DFD)

4.4 Entity Relationship Diagram (ERD)

4.5 UML Use Case Diagram

4.6 UML Sequence Diagram

4.7 UML Class Diagram

4.8 Summary

CHAPTER 5 SYSTEM IMPLEMENTATION

5.1 Introduction

5.2 Implementation Requirements and Components

5.3 Graphical User Interface (GUI) Implementation

5.4 Other Components Implementation

5.5 Summary

CHAPTER 6 SYSTEM TESTING AND INSTALLATION

6.1 Introduction

6.2 Heuristic Evaluation

6.3 Cooperative Evaluation

6.4 Summary

CHAPTER 7 EXPERIMENTAL RESULTS AND ANALYSIS

6.1 Introduction

6.2 Overall Weakness

6.3 Overall Strengths

6.4 Overall Experimental Results Analysis

6.5 Summary

ABSTRACT

This project is novel in the sense of being a semi-hybrid of real-world handymen work, and applications such as Uber and Talabat, it stems from the idea that in our quickly advancing world, people find it more and more tiring every day to leave the house for routine tasks, so we created an application that allows you to order handyman services, just like you would order your food online or even a cab, we started with a questionnaire spread across our friends and university colleagues, to see if this idea is even feasible and check if we can project it into the realm of reality, only then we laid a map out for how it is going to be built, we made a feasibility study, and studied and constructed many different diagrams, all of which you can kindly check in this documentation of the application fix-it, this application is another addition towards a modernized world where everything is done through a simple click of a button from your readily available smartphone.

ACKNOWLEDGEMENT

We would like to express our great gratitude and appreciation to Dr. Ruba Obiedat and Ms. Mariam Itriq for their valuable and constructive suggestions during the planning and development of this documentation. Their willingness to give their time so generously has been very much appreciated.

LIST OF TABLES

1. **Table 1.1 Project schedule**
2. **Table 3.1 Personnel - Feasibility study**
3. **Table 3.2 Hardware & Software - Feasibility study**
4. **Table 3.3 Maintenance - Feasibility study**
5. **Table 3.4 Feasibility Analysis - Estimated Costs & Benefits**
6. **Table 3.5 Feasibility Analysis - Accumulated Costs & Benefits**
7. **Table 3.6 Functional Requirement**
8. **Table 3.7 Non-Functional**
9. **Table 6.1 List of Heuristics of Usability Evaluation and their Descriptions**
10. **Table 6.2 Severity Ratings and their Descriptions**
11. **Table 6.3 Summary of Violations by Heuristics**
12. **Table 6.4 Summary of Violations by Severity Rating for Participant 1**
13. **Table 6.5 Summary of Violations by Severity Rating for Participant 2**
14. **Table 6.6 Summary of Violations by Severity Rating for Participant 3**
15. **Table 6.7 Details About the Participants**
16. **Table 6.8 Cooperative Evaluation Tasks**
17. **Table 6.9 Task Completion Time in Minutes and Seconds**
18. **Table 6.10 Participants Response to the Post-Test Questionnaire**

LIST OF FIGURES

- Figure 3.1: First questionnaire question**
- Figure 3.2: Second questionnaire question**
- Figure 3.3: Third questionnaire question**
- Figure 3.4: Fourth questionnaire question**
- Figure 3.5: Fifth questionnaire question**
- Figure 3.6: Sixth questionnaire question**
- Figure 4.1: Context Diagram**
- Figure 4.2: Data Flow Diagram**
- Figure 4.3: Entity Relationship Diagram**
- Figure 4.4: Use Case Diagram**
- Figure 4.5: Login Sequence Diagram**
- Figure 4.6: making appointment sequence diagram user point of view**
- Figure 4.7: Making appointment Sequence Diagram worker point of view**
- Figure 4.8: edit profile**
- Figure 4.9: add or delete worker**
- Figure 4.10: delete user**
- Figure 4.11: Class Diagram**
- Figure 5.1: Database form**

CHAPTER ONE: INTRODUCTION

1.1 Preamble

We, the members of this team, in order to establish a good relationship between handymen and clients, do ordain this application for the general purpose of society.

Article 1: Name

Section 1: The name of this application shall be (Fix it), hereafter referred to as (Fix).

Section 2: The workers(handymen) shall do the field reformations. The supervisor(observer) analyzes the problem and classifies it to the function sections.

Article 2: Purpose

The purpose of this application shall be:

- Most people don't trust workers depending on the expertise of dealing with them, so we are trying to fill the gap (cheating, deception, and fraudulence) by building a trusted system that keeps an eye on the process of the operations.
- Making life easier by creating a solution to fix or build everything in daily life.

1.2 Project Motivation

Our project aims to bridge the gap that divides the people and the workforce (e.g., plumbers, blacksmiths, electricians, ...ETC), most people have no experience with such handiwork, so to avoid the confusion and fear of being cheated out of money, we decided as a team to build the bridge between people and workers by establishing a relation between them to achieve the needed target.

1.3 Problem Statement

What?

The main issue we are trying to solve is finding a well-trusted handyman. On the other hand, saving money and time should be considered, usually, the good handymen are rarely available and in far-away areas, that means a long traveling time to find the right handyman, which is unfavorable for our customer, to waste their precious time on their day off trying to find a professional without any leads or a clue of as to how.

Why?

One of the main reasons to build this project is to save people of fraudulence and to make their life easier by providing them with this application to pick the right handyman, all of which our application strives to solve, in order to destroy the wall dividing both groups.

1.4 Project Aim and Objectives

In this project we aim to narrow the said gap between the market and the customer and create easier ways of doing mundane tasks of home repairs, by using an application that provides you access to our network of highly specialized and trained handymen, offering the most competitive prices on the market, and our trustworthy reputation, with our support systems, and see-through billing system, you are sure to get what you paid for without getting cheated, all with a simple click from your smartphone, you get access to a whole market of pro handymen.

Our objectives shall include:

- 1-review the local populace uptake on handiwork, and how acceptable they are of online services.
- 2-compare the user statistics between different age groups, so we can create a project suitable for all age groups.
- 3-identify the improvements needed or alterations on the application to be able to integrate it seamlessly into our society.
- 4-investigate perceptions and attitudes into online service providing applications.

1.5 Project Scope

We expect to deliver a prototype of a working application over the course of three months, we have no budget constraint for the prototype, but we are on a tight time constraint of three months, the resources that are available to us include, our team of three IT students, our mobile development courses, testing devices that are under android OS, we don't expect to be able to finish an IOS prototype of our project under the current time constraint, neither do we have access to mac OS that we can develop the iOS version under, our database for the prototype is going to be firebase that is provided by Google.

1.6 Project Software and Hardware Requirements

We would require servers to maintain the user's database, testing devices with both Android and iOS operating systems, work stations for developing the application for both operating systems, Android studio, and swift for android and IOS respectively.

1.7 Project Limitations

We may face some problems; some elderly people have difficulty using smartphones and people may not trust the estimated prices that the workers will ask for. On the other hand, there might be some trust issue between the client and the workers, we will also face opposition and resistance from the local handymen that won't agree to be a part of our application, they would denounce our efforts in front of their customers so that we won't eat up their work market.

1.8 Project Expected Output

The "Fix it" application will be available for Android, in this phase we will focus on the mobile application and if it spreads out, we might generate a website and iOS platforms in the future.

1.9 Project Schedule

Task No.	Task	Team Member (Responsible)	Duration
T1	Planning	Abdalkhman, Mohammed and Omar	7-Feb - 13-Feb (7 Days)
T2	Questionnaire	Abdalkhman	15-Feb - 21-Feb (7 Days)
T3	Interviews	Mohammed	23-Feb – 25-Feb (3 Days)
T4	Brain storming	Abdalkhman, Mohammed and Omar	6-March – 10-March (5 Days)
T5	Analyze Data	Omar	10-March – 12-March (3 Days)
T6	Feasibility Study	Abdalkhman	25-March – 28-March (4 Days)
T7	Functional Requirements	Omar	1-April – 4-April (4 Days)
T8	Non-Functional Requirements	Abdalkhman, Mohammed	6-April – 10-April (5 Days)
T9	Introduce Prototype	Abdalkhman, Mohammed and omar	11-June – 16-June (6 days)
T10	Design	Abdalkhman, Mohammed and omar	17-June – 22June (6 days)
T11	Development	Abdalkhman, Mohammed and omar	23-June – 26June (34 days)
T12	Testing	Abdalkhman, Mohammed and omar	27-June – 30June (4 days)

Table (1.1): Project schedule

1.10 Report Outline

Title: Fix it

Thesis: This document discusses the application that we have thought up and describes how we ourselves envision the system that we are going to create.

I. Introduction:

In the first chapter, we discuss our project, how it came to be, the problem it aims to solve, all of our hardware and software requirements, our limitations and, the expected output that comes out of it.

II. Existing systems:

In the second chapter, we gave examples to similar systems that tried to tackle the same issue, we take notice of their problems and limitations to avoid falling into their mistakes.

III. System requirements engineering and analysis:

In the third chapter, we conduct the feasibility study, to check whether the application can be made a reality, we show our techniques used to gather the requirements, make our targeted users clear, and define all the functional and non-functional requirements.

IV. System design:

4.1 Introduction

In the fourth chapter, we introduce all of our diagrams, ranging from the context diagram, going through to the data flow diagram, entity relationship diagram, use case diagram, sequence diagram, and finally ending with the class diagram.

V. System Implementation

In the fifth chapter, we discuss the main implementation details describing the form of the firebase database also defining the used tools to generate the graphical user interface, on the other hand, we mentioned the used plugins that we used to implement widgets.

VI. System testing and installation

In the sixth chapter, we discuss the heuristics evaluation mentioning the heuristics of usability evaluation and their descriptions. identify the most important improvements to consider with the minimum time and effort using cooperative evaluation to help us in the designing phase.

VII. Conclusion and Future work

In the seventh chapter, we mention overall strengths and weaknesses also some of the planned future works

CHAPTER TWO: RELATED EXISTING SYSTEMS

2.1 INTRODUCTION

There are many applications such as our own, that either help the user find a handyman or give them the steps to solve the problem on their own, the biggest problem is none of these applications includes Jordan, which means we need to create a local application, the similar applications all have advantages and disadvantages, we are going to incorporate their pros without the cons, for the best user-friendly experience, that's concise and to the point.

2.2 EXISTING SYSTEMS

Most similar applications are either in their demo phase (not operational as of yet), or simply provide a platform for the handyman to project themselves onto, which makes such applications obsolete with the existence of social media platforms such as Facebook that can be used to market handymen, unlike our application that plans on hiring contracted handymen, that are certified professionals, to gain and build up the customers trust in us.

2.3 OVERALL PROBLEMS OF EXISTING SYSTEM

- 1- The GUI is unresponsive, filled with advertisements, cluttered, and hard to navigate.
- 2- The applications don't consider the existence of the middle east, and the services provided by them aren't provided in this region whatsoever.
- 3- There is a lot of ambiguity concerning the work expertise and the ability of the handymen to get the job done on these applications.
- 4- The applications barely get any support or updates and are filled with bugs and security risks.
- 5- Very bad and discouraging feedback from the users.

2.4 OVERALL SOLUTIONS APPROACH

We are going to distinguish ourselves from the other applications, by being transparent with our work, having the handymen take courses, and get their certificates, we will provide warranty on a selection of our handiwork, our payment system is going to be through providing the customer a receipt of all the bought parts for the repair, adding on the top the fee of the handyman, providing an on-site check, for example, a building project, we will send an expert with needed tools, all our users will have a file created for their previous operations and repairs (client history).

2.5 SUMMARY

Our application distinguishes itself through providing reliable certified service, through a completely transparent system, where our clients can always be sure that they are getting top of the line service, with a warranty on some of our work, and competitive prices, including the ease of access and use of our application, and not waste any time trying to look up local professional handymen.

CHAPTER THREE: SYSTEM REQUIREMENTS ENGINEERING AND ANALYSIS

3.1 introduction

In this chapter, we discuss the feasibility of our application, where we dive into the costs of creating such an application, looking at the wages of the people and the hardware, and looking to the future if it is maintainable, we also discuss the results of the questionnaire we made, while diving into the functional and non-functional requirements, and at last we gloss over our targeted users.

3.2 Feasibility Study

3.2.1 Operational Feasibility

From our questionnaire and interviews, we have found that a lot of users have expressed their willingness to use the application because it will help get a handyman with expert, dealing with an organization is much easier and this may reduce prices.

3.2.2 Technical Feasibility

From the current technical resources, it is possible to develop the application, the technology needed to develop the application is also available.

3.2.3 Schedule Feasibility

Given the expertise working on the project, the project deadlines are reasonable.

3.2.4 Economic Feasibility

3.2.4.1 Costs

A. Tangible Costs

Development Costs:

Personnel:

3	System Analysts (100 hours/ JOD20.00/hour)	JOD 6000
1	GUI Designer (40 hours/ JOD15.00/hour)	JOD 600
1	Database Specialist (15 hours/ JOD20.00)	JOD 300

Table (3.1): Personnel - Feasibility study

Hardware & Software:

1	Android Studio	JOD 17.5
1	SQL Server (Enterprise)	JOD 9979

Table (3.2): Hardware & Software - Feasibility study

Total Development Costs: JOD 16,896.5

*SQL Server is considered to be a future plans depending on the number of users and that might raise quickly .

Annual Costs:

Maintenance:

SQL Server maintenance	JOD 2000
------------------------	----------

Table (3.3): Maintenance - Feasibility study

Total Annual Costs: JOD 2000

Total Costs: JOD 18,896.5

3.2.4.2 Benefits

A. Tangible Benefits:

1. Resource Cost Savings
2. Less expensive equipment.
3. Reduced equipment maintenance.

B. Intangible Benefits:

1. Increased customer satisfaction.
2. More efficient operations.

3.2.4.3 Feasibility Analysis:

Year	Estimated Net Operating Costs	Estimated Net Benefits
0	18,896.5	0
1	1500	10,000
2	1000	17,000
3	1850	22,250
4	2250	27,500
5	3000	37,500

Table (3.4): Feasibility Analysis – Estimated Costs & Benefits

Year	0	1	2	3	4	5
Estimated Net Operating Costs	18,896.5	1500	1000	1850	2250	3000
Estimated Net Benefits	0	10,000	17,000	22,250	27,500	37,500
Discount Factor	1	0.943	0.889	0.839	0.792	0.747
Accumulated Costs	18,896.5	19,233.9	19,021.5	19,503.8	20,193.2	21,286.9
Accumulated Benefits	0	9,430	24,003	41,320.75	60,786	85,344.75
Accumulated Benefits – Accumulated Costs	(18,896.5)	(9,803.9)	4,981.5	21,816.95	40,592.8	64,057.85

Table (3.5): Feasibility Analysis – Accumulated Costs & Benefits

Discount Rate = 6%

Net Present value = Accumulated Benefits – Accumulated Costs = 64,057.85

ROI = (Benefits – Costs)/Costs = (114,250-28,496.5)/ 28,496.5= 3.01

Annual ROI = ROI/Number of years = 3.01/5 = 0.602

Payback period = Year 2

3.3 Requirements Elicitation Techniques

We are going to adhere to 4 techniques for our requirements elicitation

- Brainstorming:

Our team of three individuals did brainstorming sessions over many meetings of how the application is supposed to work, and what requirements it should fulfill, this was our first stepping stone on the way to fulfilling our goal of creating this application.

- Interviews:

Interviews make it harder for us to reach more people, but we can ask deeper questions about the requirements, the people we are going to interview are going to include family, friends, and colleagues.

- Observation:

Just from generally observing the local market here in Jordan we can come up with a conceptual model that is going to bring all the needed solutions to the table and help us create the perfect application for this region.

- Questionnaires/surveys:

In order to understand what the users really need we will create surveys and questionnaires and spread them, so we can use the data we gather from them in order to create the application that suits the biggest slice of the populace.

Did you ever look for a handyman?

61 responses

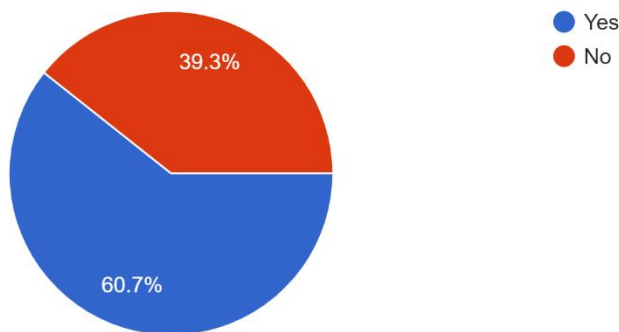


Figure 3.1: First questionnaire question

Do you find dealing with handymen difficult?

61 responses

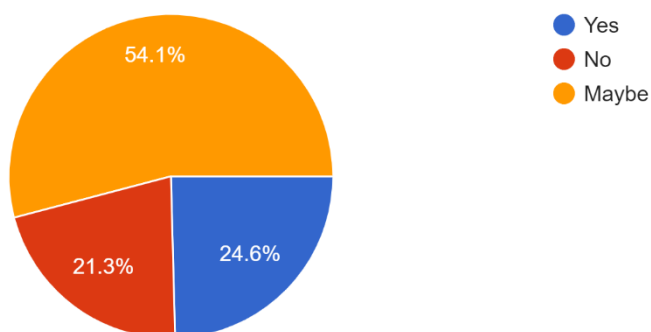


Figure 3.2: Second questionnaire question

Did you ever feel like you got cheated by a handyman?

61 responses

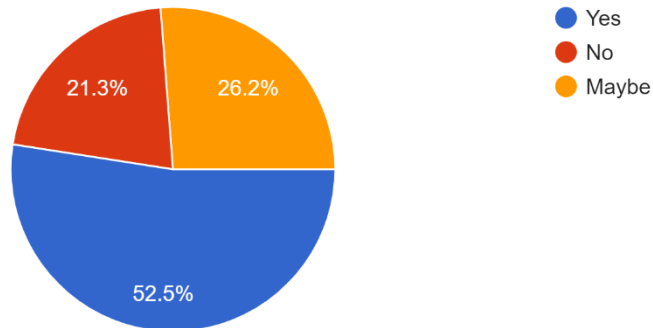


Figure 3.3: Third questionnaire question

Do you think handymen working under an organisation would be better than a freelancing handyman?

61 responses

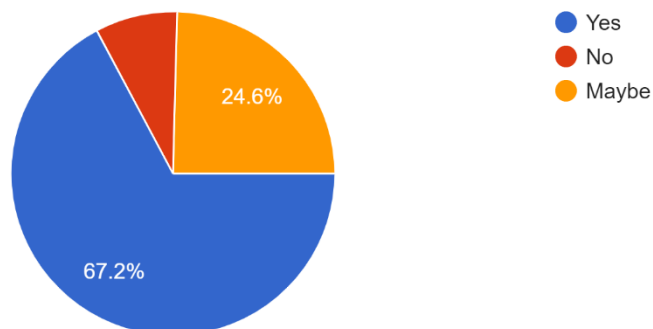


Figure 3.4: Fourth questionnaire question

Do you prefer dealing with handyman working within an organisation through a mobile application?

61 responses

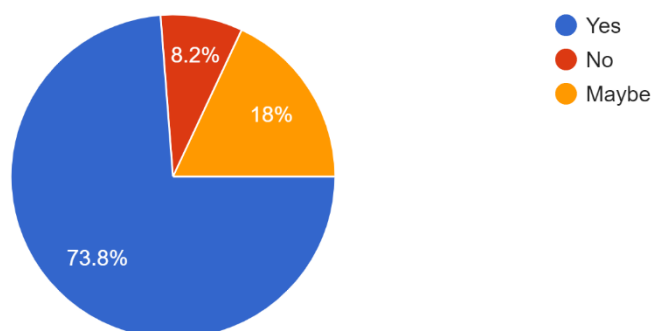


Figure 3.5: Fifth questionnaire question

Do you think this type of application would be useful in Jordan?

61 responses

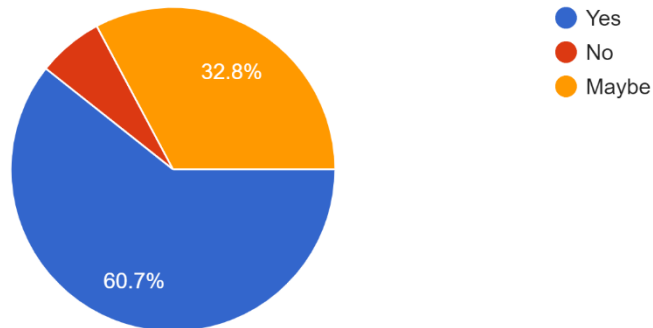


Figure 3.6: Sixth questionnaire question

3.4 Targeted Users

We strive to target the users that are unfamiliar with the handyman work, either because they are busy with their day-to-day work like for example doctors or business men, or simply the users that are afraid of being cheated out of money because they don't know better about handy work.

Our expected age range is going to be from 20 to 50 years old, people younger than 20 wouldn't need to interact with such an environment, and people older than 50 would lack the basic understanding of how smartphones and their respective applications operate.

3.5 Functional Requirements Definition

Functional Requirement Number	Requirement	Description
FR1	User Registration	The System provides the new users with the ability to create an account as the main step for the operation.
FR2	Confirmation of User Registration	The application will return the user's account details.
FR3	Picture upload	Upload profile picture.
FR4	Chatting	The ability to communicate between user and worker using the application.
FR5	Changing user name	The application allows the user to change his current user name.
FR6	Data backup	All data must be copied to a backup database and stored until needed, and that's provided by Firebase.

FR7	Sending the issues	The application offers the ability to send the issues by scheduling it on a form, choosing the specialist, and specifying the location
FR8	Making an appointment	After sending the issue, the client picks a worker with the same field of job, and the worker has the choice to take it or not (confirmation time: 5 minutes).
FR9	Reviews	After the job is done the customer has the right to give feedback or just rate it using a direct 5/5 stars.
FR10	Forget password	The ability to change the user password by sending an email with a password change link to their email.

Table (3.6): Functional Requirement

3.6 Functional Requirements Specification

A. User Registration:

1. The user will enter his name.
2. The user will create a password.
3. The user will re-type the password for authentication.
4. The user will enter his e-mail.

B. Data backup:

A copy must be generated for User Information, Handyman Information, Payment Information, and Receipts.

C. Sending the issues:

1. User will choose a specialist.
2. specifying the location.
3. pick a suitable date

D. Making an appointment:

1. Users choose a worker from the available workers.
2. the worker has the right to take it or not (in five minutes).
3. If the worker didn't take it the user has to choose another worker.

E. Reviews:

After work is done User can send feedback about the handyman, and the work or just rate it using a direct 5/5 stars.

3.7 Non-Functional Requirements

Non-Functional Requirement Number	Requirement	Specification
NFR1	Usability	The System must be easy to use and satisfy the needs of the user.
NFR2	Availability	The System will be available whenever the user needs it.
NFR3	Accessibility	The System is accessible once the user downloads the application from the application store.
NFR4	System Update	The System will be updated whether bugs are found, or modifications are needed.
NFR5	Security	User information is private, and no one can access it but the organization and the handyman who will work for them, payment information is private to the user only and the bank.
NFR6	Performance	The System should be responsive and fast.
NFR7	Portability	The System will be made available to Android users.

Table (3.7): Non-Functional Requirement

3.8 Summary

We strongly believe that this application can succeed and change the way people deal with handyworks, after studying it we find it feasible, it is profitable, and the people have shown that they would use such an application, and it would make it easier for everyone especially the handyman, which would lead them to enhance their skills, and help them gain a better reputation in the eyes of the people.

CHAPTER FOUR: SYSTEM DESIGN

4.1 Introduction

In this chapter, we discuss in detail our system design, going through all the diagrams ranging from context diagram to UML class diagram, all of the diagrams that are related to our project can be found in this chapter.

4.2 Context Diagram

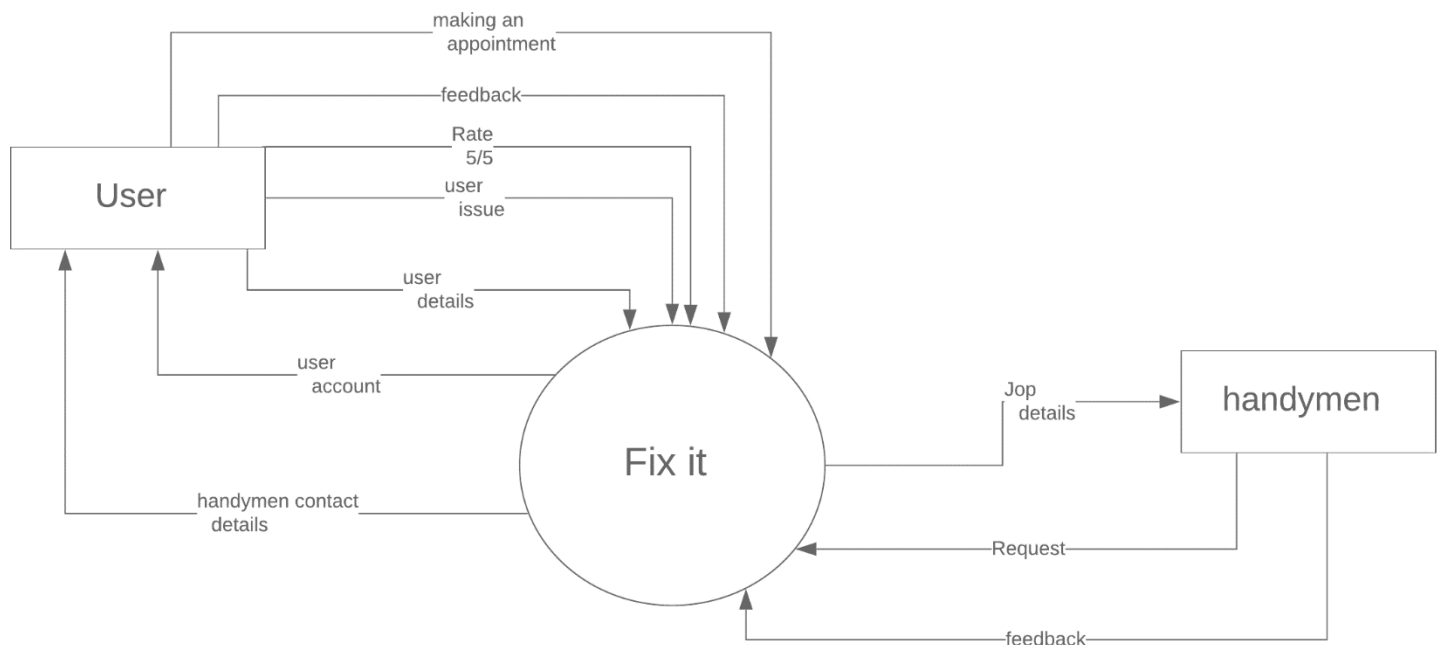


Figure 4.1: Context Diagram

4.3 Data Flow Diagram (DFD)

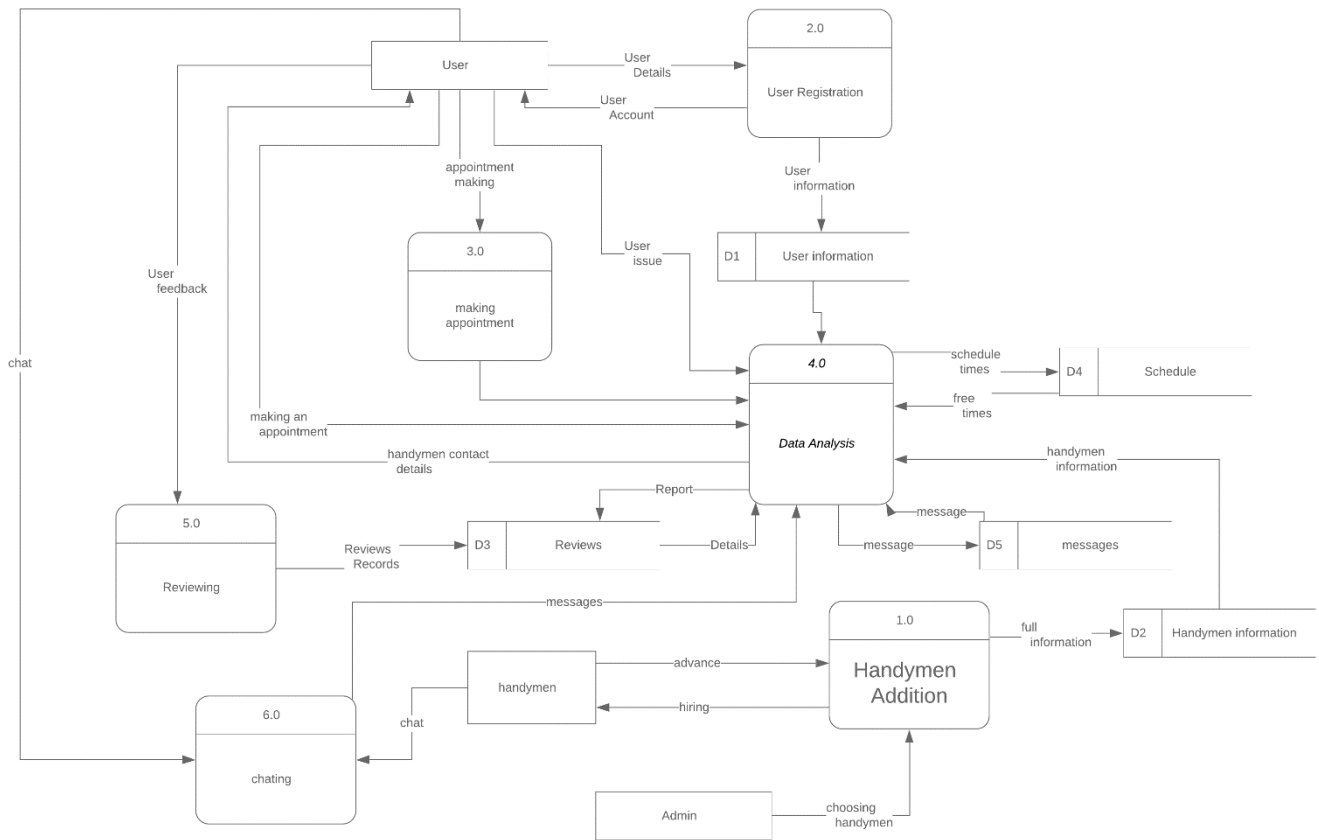


Figure 4.2: Data Flow Diagram

4.4 Entity Relationship Diagram (ERD)

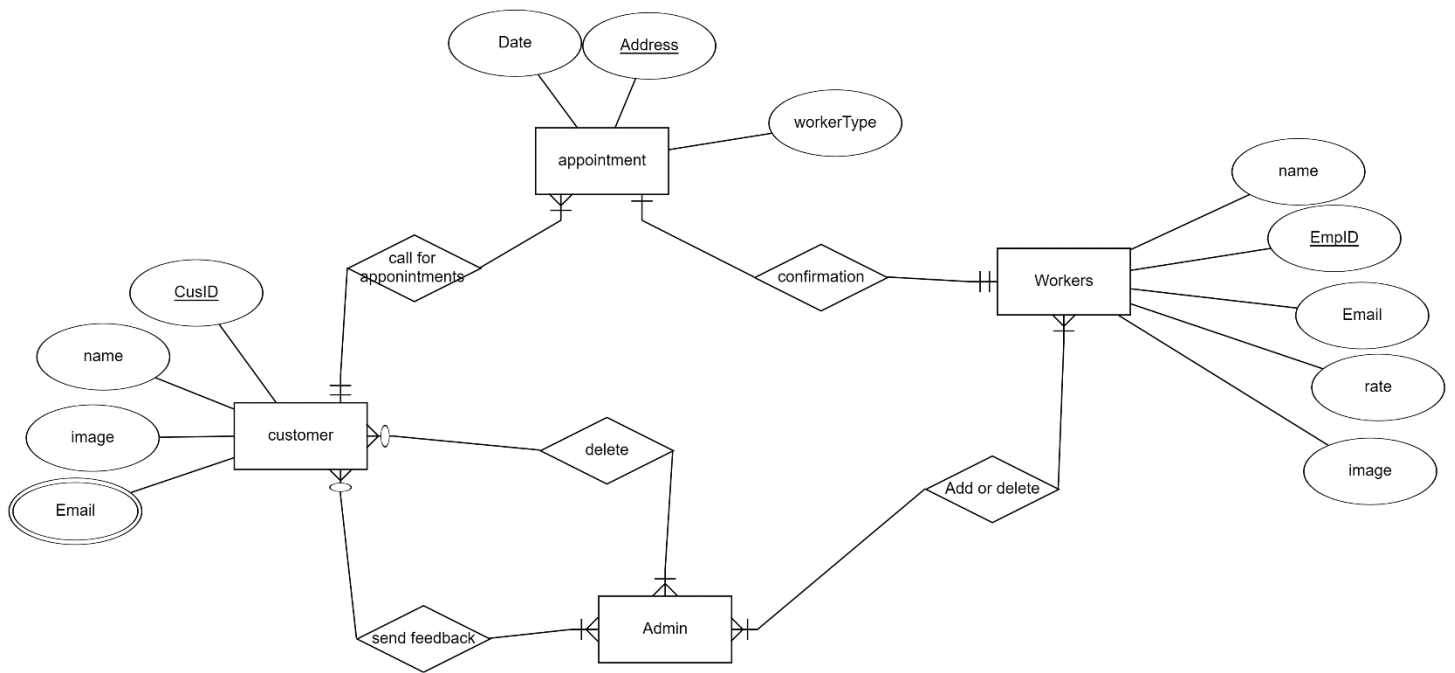


Figure 4.3: Entity Relationship Diagram

4.5 UML Use Case Diagram

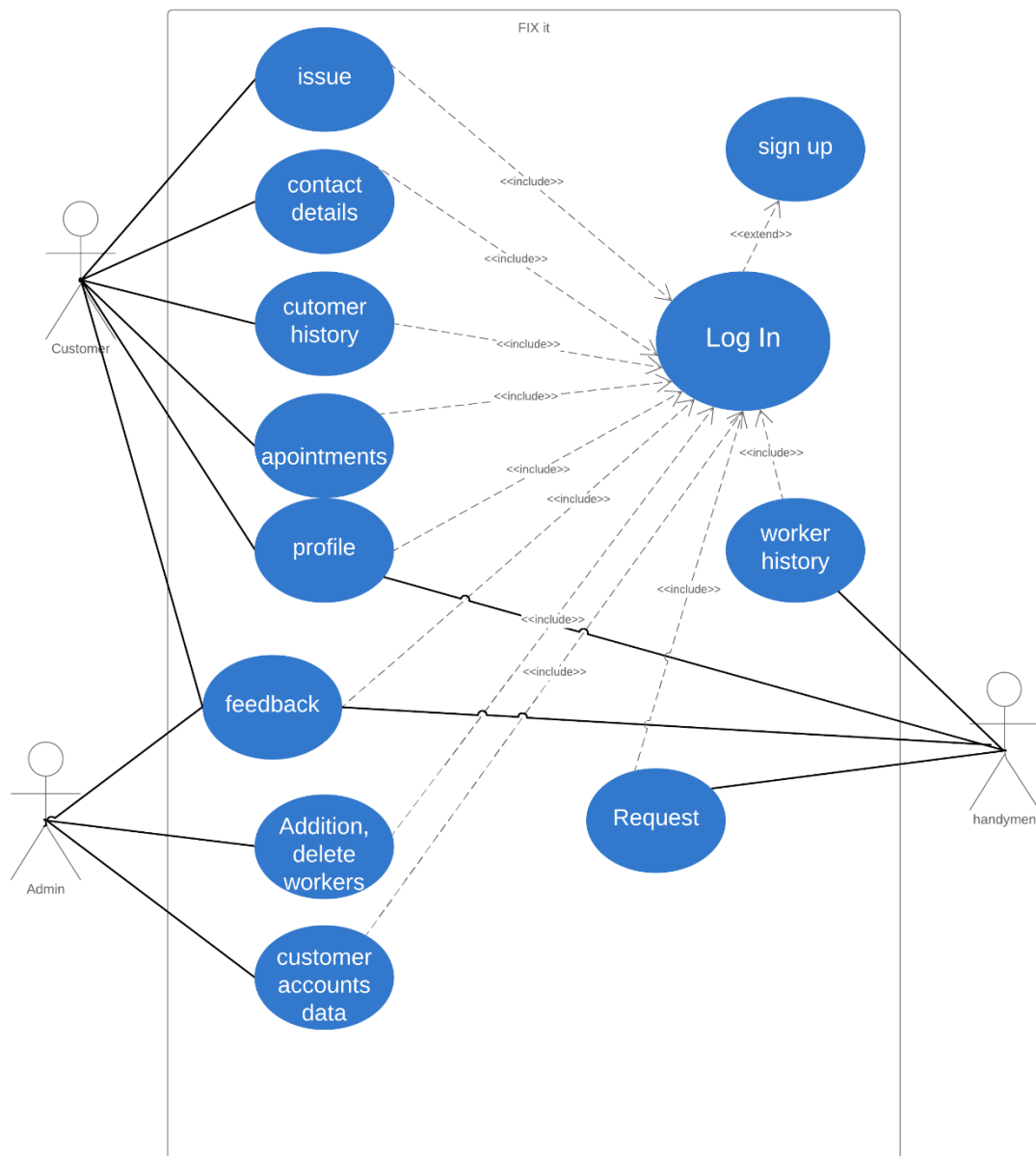


Figure 4.4: Use Case Diagram

4.6 UML Sequence Diagram

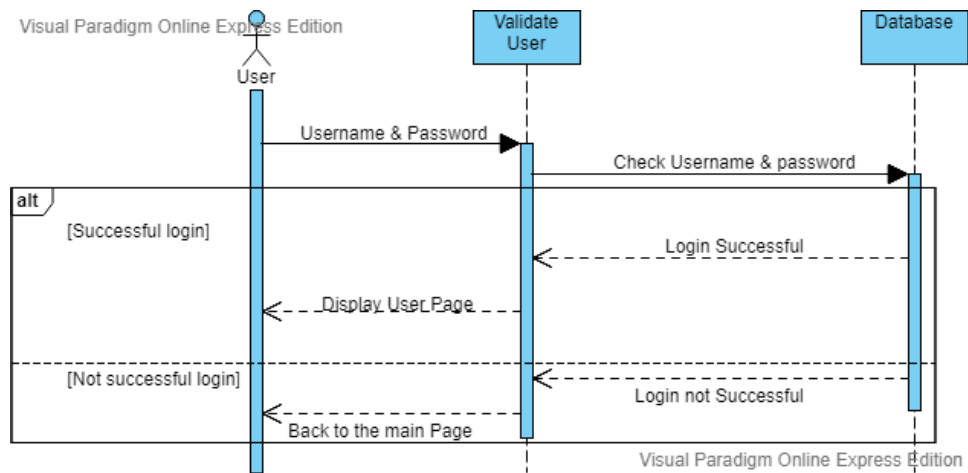


Figure 4.5: Login Sequence Diagram

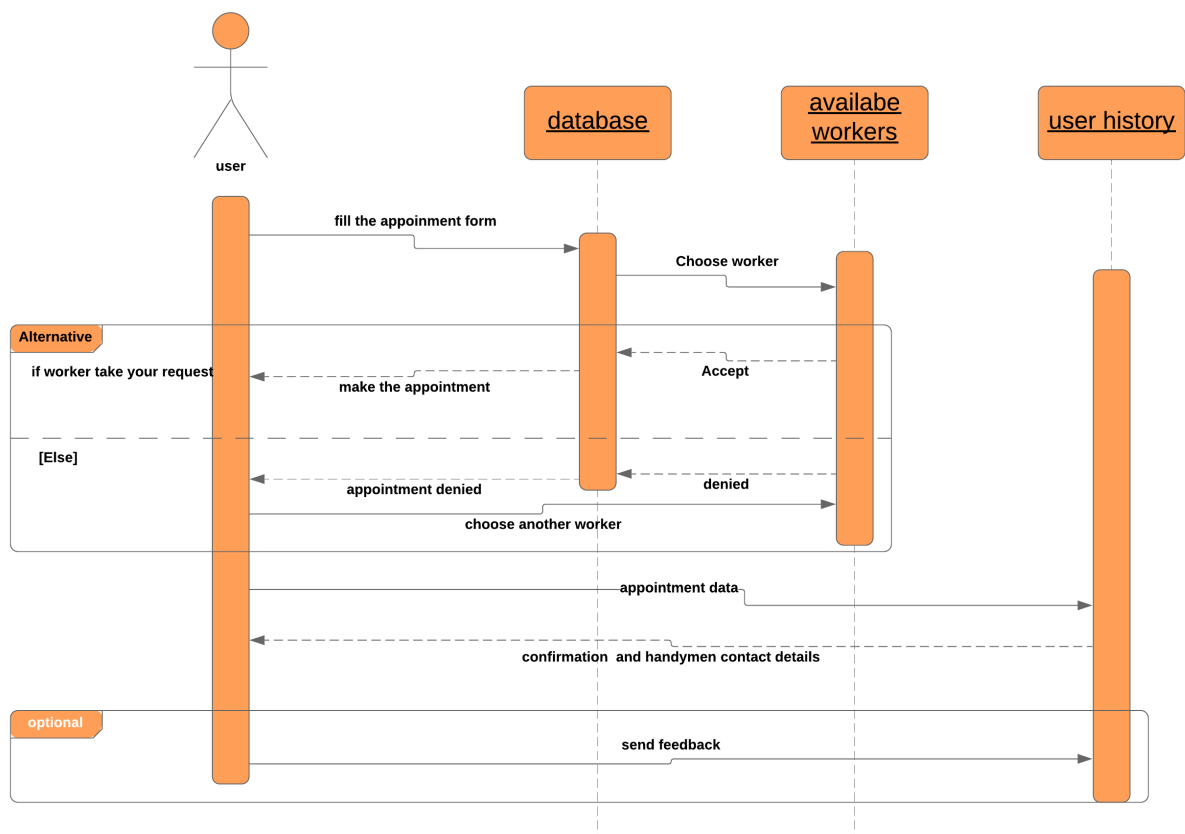


Figure 4.6: making appointment sequence diagram user point of view

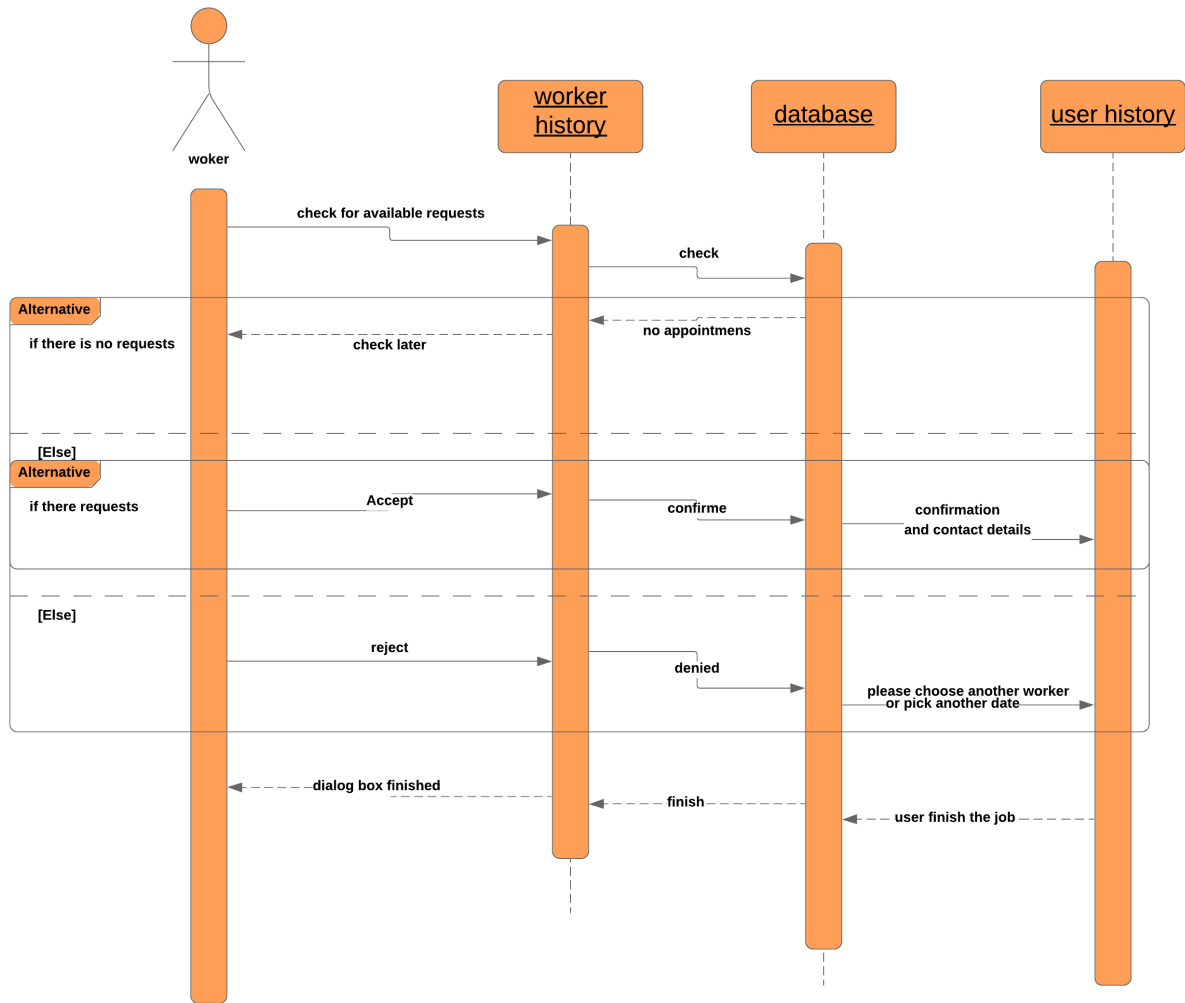


Figure 4.7: Making appointment Sequence Diagram worker point of view

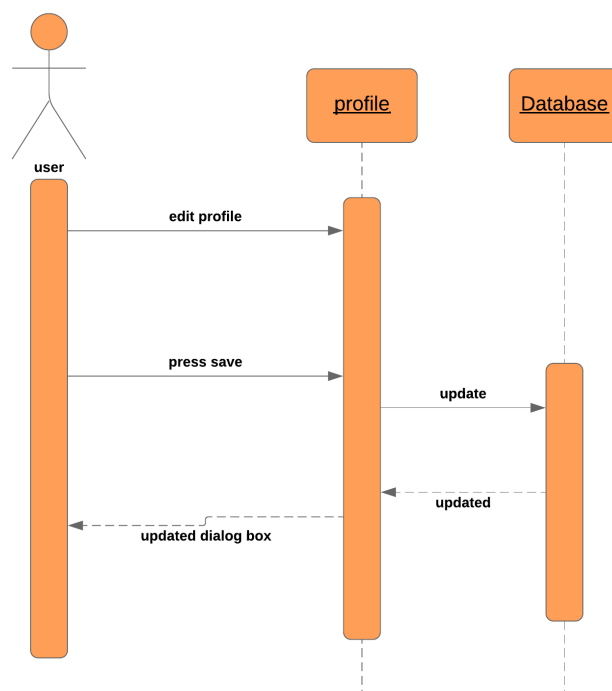


Figure 4.8: edit profile

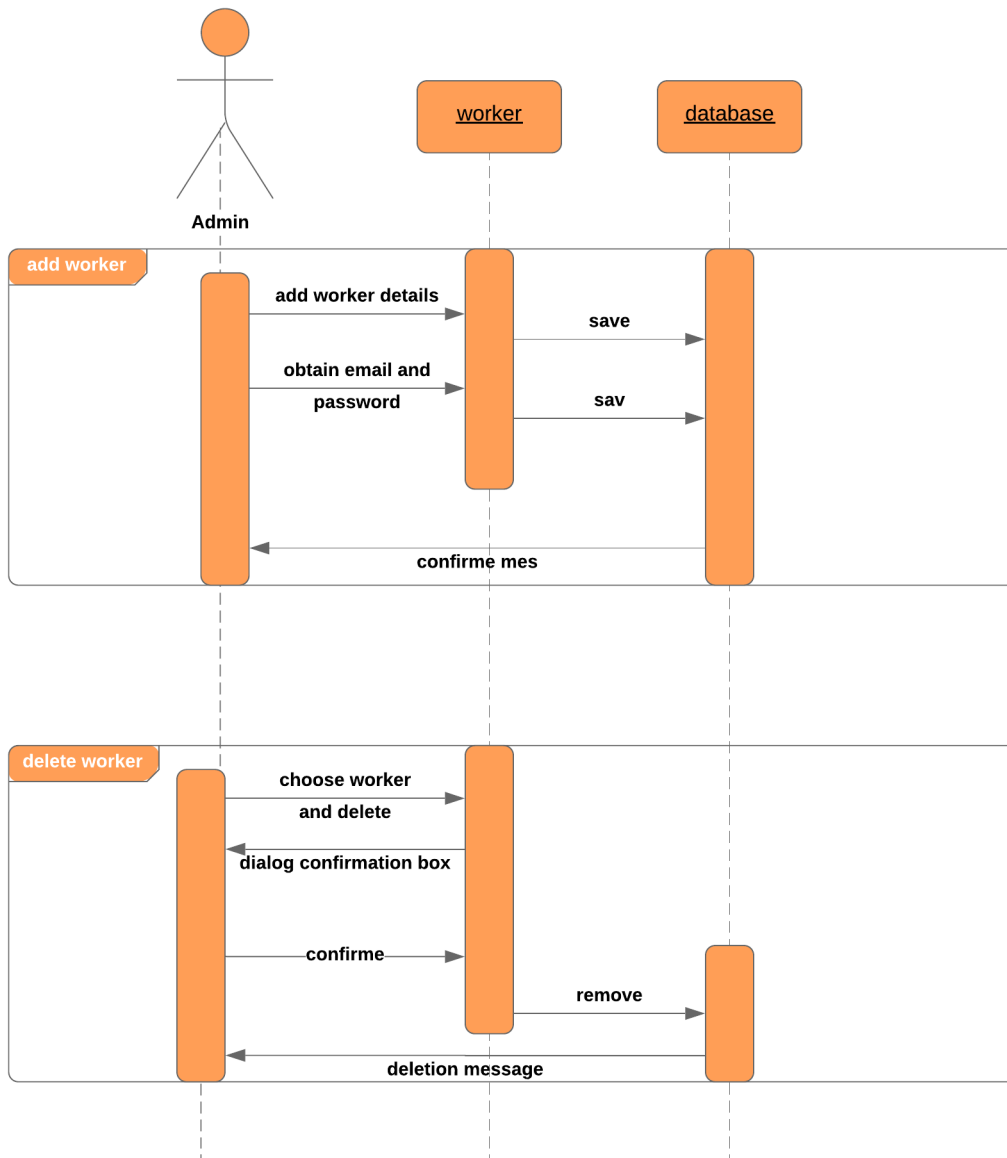


Figure 4.9: add or delete worker

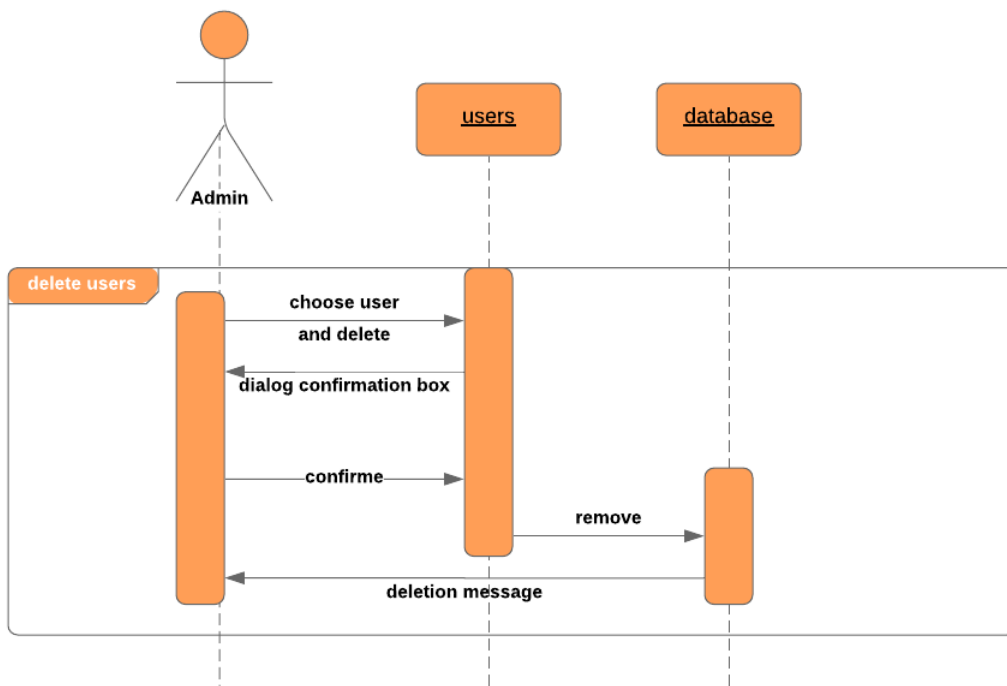


Figure 4.10: add or delete worker

4.7 UML Class Diagram

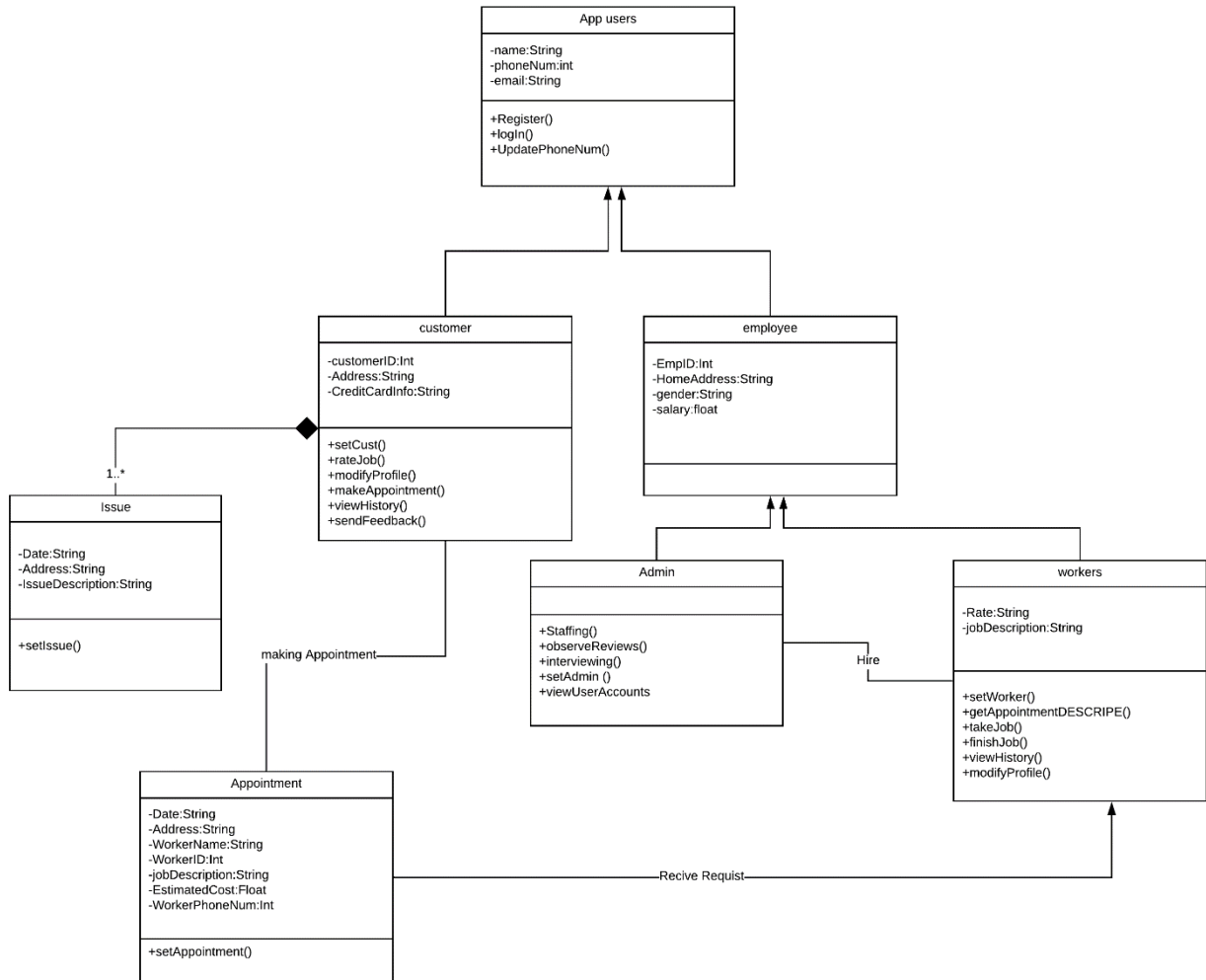


Figure 4.11: Class Diagram

4.8 Summary

This chapter went into detail on all the diagrams that our code is going to be based upon, and we are going to adhere to them in order to form the application that we envisioned.

CHAPTER 5

SYSTEM IMPLEMENTATION

5.1 Introduction

Implementation is the realization of an application; also, implementation encompasses all the processes involved in getting new software operating properly in its environment, configuration and running, testing, and making necessary changes.

5.2 Database Implementation

We use Firebase for database services that include: authentication, real-time database, cloud synchronization.



Figure 5.1: Database form

5.3 Graphical User Interface Implementation

We used XML layout android to generate the GUI pages using android studio

5.4 Other Components Implementation

We have used the google maven repositories for the application plugins. In addition, we have used google- play plugins to implement widgets.

5.5 Summary

In this chapter, we discussed the implementation details of the mobile applications including tools and the GUI implementation.

CHAPTER 6

SYSTEM TESTING AND INSTALLATION

6.1 Introduction

The testing phase is an evaluation conducted to provide information about the quality of the system which is being developed. It is the process of verifying and validating that an application is working as expected and satisfies both functional and non-functional requirements.

System testing is divided into various levels including Unit Testing, System Testing, and Acceptance Testing, they are all performed during the testing phase. However, Unit and System Testing are performed by the testing team and developers, whereas Acceptance Testing is done by the end-user.

This chapter clarifies how heuristic and cooperative evaluation techniques are used to test the Usability of our application which can be found in sections 6.2 and 6.3, respectively. Section 6.4 deals with the Requirements Validation and Completeness. Section 6.5 clarifies System Installation steps needed to be done to implement and run our application, lastly, section 6.6 summarizes the overall conclusion of this chapter.

6.2 Heuristic Evaluation

Heuristic evaluation is usability experts review your user interface such as lists, combo boxes, and database connection and compare it against accepted usability principles. This evaluation was performed on Android application by Three Information Technology (IT) experts who basically examined the interface and judged its compliance with recognized usability principles known as heuristics. Furthermore, the next table lists the heuristics of usability evaluation and their descriptions.

Numbering Schema	Heuristics	Description
H1	Visibility of system status	The system should always keep users informed about what is going on, through the history option which gives you the ability to track your appointment status
H2	Match between system and the real world	The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.
H3	User control and freedom	Users often choose system functions by mistake, the appointment form is super flexible you can change anything before saving the appointment and if there is a mistake after saving it you can delete the whole appointment from the history option
H4	Consistency and standards	Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.
H5	Error prevention	Even better than a good error message is a careful design that prevents a problem from occurring in the first place, like the main errors in the authentication level.
H6	Recognition rather than recall	Make objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.
H7	Flexibility and efficiency of use	Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.
H8	Aesthetic and minimalist design	Dialogues should not contain information that is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.
H9	Help users recognize, diagnose, and recover from errors	Error messages should be expressed in plain language (no codes), precisely indicating the problem, and constructively suggesting a solution.
H10	Help and documentation	Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

Table 6.1: List of Heuristics of Usability Evaluation and their Descriptions

Severity Rating	Description
0	I don't agree that this is a usability problem at all.
1	The cosmetic problem only: need not be fixed unless extra time is available on the project.
2	Minor usability problem: fixing this should be given low priority.
3	Major usability problem: important to fix, so should be given high priority.
4	Usability catastrophe: imperative to fix this before the product can be released.

Table 6.2: Severity Ratings and their Descriptions

Heuristic Numbering Scheme	Frequency	Ratio (%)
H1	5	7.57
H2	5	7.57
H3	5	7.57
H4	10	15.15
H5	7	10.61
H6	6	9.09
H7	8	12.12
H8	5	7.57
H9	5	7.57
H10	10	15.15
Total:	66	100%

Table 6.3: Summary of Violations by Heuristics

Summary of Violations by Severity Rating for participants will be listed below in tables.

Severity Rating	Frequency	Ratio (%)
0	34	51.51
1	8	12.12
2	7	10.60
3	2	3.03
4	15	22.7
Total	66	100%

Table 6.4: Summary of Violations by Severity Rating for Participant 1

Severity Rating	Frequency	Ratio (%)
0	32	48.48
1	7	10.61
2	11	16.66
3	2	3.03
4	14	21.21
Total	66	100%

Table 6.5: Summary of Violations by Severity Rating for Participant 2

Severity Rating	Frequency	Ratio (%)
0	32	48.48
1	12	18.18
2	5	7.57
3	3	4.54
4	14	21.21
Total	66	100%

Table 6.6: Summary of Violations by Severity Rating for Participant 3

6.3 Cooperative Evaluation

Cooperative Evaluation involves the user as an active participant in the assessment process. Detecting as many potential exhaustive problems as possible is not the objective of this evaluation. Rather, it is to help designers identify the most important improvements to consider with the minimum time and effort.

To conduct the Cooperative Evaluation for App four participants were selected randomly. Since our targeted audience is Information Technology (IT) students in our faculty, all participants were from King Abdullah I School for Information Technology (KASIT) at the University of Jordan. Table (11): shows further details about these participants.

No.	Criteria	Participant 1	Participant 2
1.	Name	Ishaq	Ahamd
2.	Gender	Male	Male
3.	Age	21	21
4.	Educational level	Under-Graduated	Under-Graduated
5.	Programs taken	CS	CS
6.	Institution	KASIT	KASIT

Table 6.7: Details About the Participants

6.3.1 Pre-Evaluation Procedures

Going through the following procedure was a must in order for the Cooperation Evaluation to begin.

- 1) Cooperative Evaluation form and post-test questionnaire had to be prepared carefully with the consensus of all group members.
- 2) Finding Information Technology (IT) students who don't mind performing this evaluation was our next step. By walking around throughout our faculty corridors many students were asked to perform the evaluation.
- 3) A brief introduction to App was given to participants before starting the evaluation.
- 4) Instructions and a brief description of the evaluation procedures were given to participants.

6.3.2 Evaluation Procedures

During the evaluation session, participants were accompanied in order to help them when they faced problems in performing a specific task. Figure 10 shows the Cooperative Evaluation tasks that are tested by the participants. However, the actual testing forms are included in Appendix C.

Task No.	Task
1	Registration
2	Login
3	Add Appointment
4	Choose worker
5	Delete from history
6	Chat
7	Provide Feedback
8	Change username and picture
9	Rate
10	Send Feedback to admin
11	Accept pending job
12	Finish a job
13	Delete user
14	Delete worker

Table 6.8: Cooperative Evaluation Tasks

The next table includes results of the Cooperative Evaluation showing task completion times for participants compared against the default time allocated for each task.

Task No.	Default Time	Participation1	Participation2
1	00.30	00.40	00.47
2	01.20	01.25	01.40
3	00.30	00.25	00.37
4	01.00	01.17	01.30
5	00.40	00.30	00.51
6	00.10	00.15	00.08
7	00.50	00.46	00.58
8	00.70	00.75	00.65
9	00.60	00.45	00.62
10	01.20	01.30	01.10
11	01.40	01.45	01.25
12	00.20	00.15	00.30
13	00.30	00.25	00.35
14	00.40	00.47	00.37
Total Completion Time	08.06	08.08	10.07

Table 6.9: Task Completion Time in Minutes and Seconds

6.3.3 Post-Evaluation Procedures

After completing all tasks specified in the Cooperative Evaluation Test, participants were asked to fill a post-test questionnaire which is included in Appendix D. This questionnaire aims to capture the feelings and thoughts regarding this experience. The next table presents participants' responses to this post-test questionnaire.

No.	Statement	Participation1	Participation2
1	The App is easy to use?	Yes	Yes
2	The App has accomplished its goals?	Yes	Yes
3	The App's interface is good?	Yes	No
4	It is easy to understand the Functionality of the Application without prior experience?	Yes	No
5	Do you think the app might compete with the local handymen	No	No
6	The application is complete?	Yes	Yes

Table 6.10: Participants Response to the Post-Test Questionnaire

6.4 Summary

Heuristic and Cooperative Evaluations were applied to the application each of these evaluations has its own method in assessing the overall usability of the application. A heuristic for example is done by professional IT experts who examine the User Interface design by comparing it with some standard principles, while Cooperative Evaluation is done by targeted users by documenting the time needed for previously defined tasks to be completed. After performing both evaluations, results were represented in tables as shown earlier. Requirements Validation and completeness were also accomplished to ensure that all functional requirements are implemented properly in our application.

CHAPTER 7

CONCLUSION AND FUTURE WORK

7.1 Introduction

Finally, in the last chapter of our project documentation, we are going to talk about strength points and weak points, and our intended future work to improve our system.

7.2 Overall Weakness

- 1- The strongest apparent weakness would be the lack of customer trust in our pricing model.
- 2- The system lacks map navigation.
- 3- All our workers may be busy on certain days which means the user will not get serviced on that given day.
- 4- The inability to give a certain price before the worker come to make an on-sight review.
- 5- Our pricing is affected by the constant change of spare parts prices
- 6- We cannot provide the spare parts, so we get stocked by the local market

7.3 Overall Strengths

- 1- The app has an easy-to-use and friendly GUI.
- 2- The application provides the handymen with trusted ongoing jobs.
- 3- The user does not have to leave his house to find the right handymen.
- 4- The application runs on a huge percentage of Android devices.
- 5- We provide the customers with an official receipt contrary to the regular handymen.

7.4 Future Work

- We plan to fully cooperate with a supplier of spare parts instead of local market.
- We plan to include online payments.
- We plan to include multilingual GUI support.
- We plan to provide the IOS users with a version of our application.
- We plan to add google maps to make the location addressing easier on both sides.
- We plan to obtain our servers for better service.

7.5 Summary

In this chapter, we explained our project weaknesses and strengths, and we mentioned our future work aims.