



**Al Imam Mohammad Ibn Saud Islamic University**  
**College of Computer and Information Sciences**  
**Information Technology Department**

## ***Checking in/out Using NFC Protocol***

Project Submitted in Partial Fulfillment for the Degree of B.Sc. in "Information Technology"

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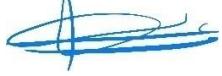
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# ***Checking in/out Using NFC Protocol***

## **Declaration**

We Waad Fahad Abuhaimed, Ghson Hussein Alkahtani, and Ghadh Abdulrahman Alsulihem being members of final year project group number 4 , declare that this report contains only work completed by members of our group except for information obtained in a legitimate way from literature, company or university sources. All information from these other sources has been duly referenced and acknowledged in accordance with the University Policy on Plagiarism.

Furthermore, we declare that in completing the project, the individual group members had the following responsibilities and contributed in the following proportions to the final outcomes of the project:

| <b>Responsibilities<sup>1</sup></b> | <b>Contribution<sup>2</sup><br/>%</b> | <b>Signature</b>   |
|-------------------------------------|---------------------------------------|--|
| Team member                         | 100%                                  |  |
| Team member                         | 100%                                  |  |
| Team member                         | 100%                                  |  |

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<sup>1</sup> Write down your responsibilities in the project

<sup>2</sup> Must add to 100%

## **تعهد بحفظ حقوق الملكية الفكرية للكلية**

أتعهد بعدم المشاركة في الفعاليات أو المبادرات أو المسابقات ذات العلاقة دونأخذ موافقة خطية مسبقة من الكلية ، وأقر بمعرفتي أنني إذا خالفت هذا التعهد ستمحاسبتي وفق اللوائح والأنظمة .

## **Acknowledgment**

First and foremost, we would like to present our deepest gratitude to Almighty ALLAH for his bounties and blessings and for giving us the ability to finish this project. We would like to express our appreciation and our sincere gratitude to our supervisor T. Shatha Alajlan for her time, energy, and experience throughout this project. This journey would not have been possible without her valuable advice and support. In addition, special thanks to all the faculty members whom we have worked with over the last five years, they had a great role in cultivating and developing our skills and capabilities. Finally, we would like to thank our families and friends for continued encouragement and support during this project and along the years of study.

## **Abstract**

When it comes to taking attendance, it is a must for students and workers. It is one of the important assessment components, but nowadays it is still done manually which leads to a problem which is unnecessary use of paper, also makes it hard for the administration to keep track of that amount of paper and since human action is involved it could lead to some errors.

And if take the current events into consideration regarding the pandemic so, having people pass the same paper or when it requires a fingerprint it could cause bigger problems.

Therefore, the idea of an attendance system is highly needed for fast tracking and collecting of information, the system is made by conducting data analysis and collection to design and implement the system needed.

The purpose of this project is to collect attendance using the NFC protocol technology which does not require any human interaction, only the NFC reader and a phone with a software to connect it to it which leads to easy and fast registry.

## Abstract (in Arabic)

عندما يتعلق الأمر بأخذ الحضور فإنه يجب على الطلاب والموظفين القيام بذلك. إنه عنصر من عناصر التقييم الأساسية، لكنه لا يزال يتم بديهياً في الوقت الحاضر، مما قد يخلق مشكلة استخدام الورق بكثرة ، بالإضافة إلى ذلك قد تجد الإدارة صعوبة في تتبع أو مراجعة هذا الكم من الورق ، ولأن السلوك البشري مطلوب ، فهو قد يؤدي إلى التسبب بأخطاء.

وبالنظر إلى الأحداث الحالية المحيطة بالوباء، فإن تمرين الأشخاص لنفس الورقة أو عند استخدام بصمة الإصبع يمكن أن يؤدي ذلك إلى الكثير من المخاطر.

لذلك، هناك حاجة ماسة لفكرة نظام تسجيل حضور لتمكين التتبع السريع وجمع المعلومات، يتكون النظام من خلال عملية إجراء تحليل البيانات وجمع البيانات لتصميم وتنفيذ النظام المطلوب.

الغرض من هذا المشروع هو جمع الحضور باستخدام بروتوكول NFC وهي تكنولوجيا لا تتطلب أي تفاعل بشري، فقط قارئ NFC و هاتف به البرنامج لربطه به مما يؤدي إلى تسجيل سهل وسريع.

## **List of Abbreviations**

|      |                                 |
|------|---------------------------------|
| RFID | Radio Frequency Identification  |
| NFC  | Near Field Communication        |
| NFCR | Near Field Communication Reader |
| IoT  | Internet of Things              |
| CIO  | Checking in and out             |
| SAS  | Smart Attendance System         |

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# **Chapter One: Introduction**

# **1 Introduction**

## **1.1 Introduction**

In our lives there are many dangers and due to the recent events in the world (COVID-19 pandemic), touching surfaces has become a concern to us, direct contact with surfaces and people may lead to negative consequences for us and our loved ones.

That is where our idea came from, propose this solution of an NFC (Near Field Communication) reader which is a set of communication protocols for communication between two electronic devices over a short distance, will link it to an application on the phone for a fast check in-and-out with no need for any contact , Agility is ideal with hardware because do the work in part and are confident from the last stage so there is no reason to disassemble the work every time and make it from the first to the end .

Often times, employers encounter problems when registering attendance, including the problem of disconnecting the power source and also that the employee's fingerprint does not match the one saved in the database, and it is also possible that the employee recognition is slow.

Among the solutions found [1] (Smart Attendance Paper), [2] (Android Based Attendance Management System Paper) the first talks about R305 fingerprint sensor system.

The second talks about the barcode system in a card that is scanned by the Android application to record attendance.

In our project, will connect the device's NFC(Near Field Communication) reader with the app to make the attendance registration process more accurate, fast, and easy to use for all users.

The next section is problem definition talk about the ideal and the consequences for the reader of the feasibility report , section project scope talk about the project scope include and not include and the boundaries/limitations and sections impact local and global talk how impact for locally and globally, section aims and objectives talk about the goals and section alternative solutions talk about evaluation of alternative solution and cost/benefit analysis , section method

approach talk discuss development methodology and report structure section talk about explain each chapter in the report.

## **1.2 Problem Definition**

The suggestion is an NFC (Near Field Communication) reader linked to an app that performs automatic presence processwith complete accuracy and speed without the need for additional resources. Unfortunately,dedicated attendance systems don't provide all of these points precisely: speed and accuracy.

Other systems such as biometrics can be applied to aid, but these systems become more expensive as they require regular maintenance.

In case of preparation via NFC(Near Field Communication) reader with the app it will cover many important factors, working accuracy is high and fast.

## **1.3 Project Scope**

The project scope involves determining and listing specific project goals and illustrates things that are specifically not going to be addressed by the project, and the obstacles and boundaries coming up during developing this project.

NFCR is an Android mobile app that depends on employee attendance.

The app is linked to NFCR, where the employee has a barcode or code that is passed ontothe NFCR device and thus the employee's attendance is recorded.

Supports one language: English.

It serves all companies around the world, not just locally.

The application will not be available any other global environment for now.The project may be supported in the IOS devices.

Information reading will not work without the software required and a phone, also thephone must be in close range with the reader.

For now, the system supports English language only.

The geographical domain will be based in Riyadh city, and the human domain is everyoneinside a working institution.

## **1.4 Local Impact**

The Checking in/out Using NFC(Near Field Communication) Protocol will be developed to facilitate the attendance recording process in any educational institution.

Whereas the complete process includes maintaining the records and preventing the impersonation will be accomplished smoothly and time-consuming manner. So, its use in college extant is certain.

It does not require a lot of techniques such as fingerprint reader that costs a lot. Help minimize wasted time on attendance.

## **1.5 Global Impact**

Everything has attendance and absence, so saving up lost time in attendance will create acceptance of the system.

And attendance will make it easier and more informative, only the organization that will be using it will need to link the app to its databases.

## **1.6 Aims and Objectives**

The aim of the project is to develop an application that makes the attendance process more efficient, which is one of the main important factors for the application of attendance management, such as accuracy, speed and reducing surface contact to prevent the transmission of bacteria and germs.

In all projects and plans, whether commercial, educational, or otherwise, there must be goals when implementing attendance as they will achieve these goals:

- Appropriately applying NFC technology.
- Providing an easy way to improve the method of attendance and departure registration.
- Providing an easy application interface.
- Make the method of recording attendance more flexible.
- Every person responsible for their own attendance

## 1.7 Alternative Solutions

A comparison between the proposed system in this project and different systems was made showing In Table.1, it shows the used methodology used according to every paper mentioned together with a couple characteristics such as cost: which is the amount of money needed to create this technique.

Speed: how fast is the recording process of the class attendance information.

User friendly: how easy it is for users to understand and use.

The assessment will be based on three words (low, middle, or high).

| Name of Paper   | Method Used                             | Speed  | Cost | User Friendly |
|---|---|--------|------|---------------|
| Student attendance system and notification of college subject schedule based on classroom using IBEACON [3] | Bluetooth Low Energy (Bluetooth beacon) | Middle | Low  | High          |
| Portable biometric attendance system using IoT [4]  | Fingerprint                             | High   | High | Middle        |
| IoT Based smart attendance system (SAS) using RFID [5]  | RFID                                    | High   | High | Middle        |
| IAAS: IoT-Based automatic attendance system with photo recognition in smart campus [6]                      | Face Recognition                        | High   | High | High          |

Table 1:Alternative solutions

## 1.8 Method / Approach

In this project, the agile software development methodology was chosen, because of the fact that it is successful in developing different types of IT projects offering enhanced flexibility to embrace growing requirements and be on track with the new trends.

It also provides the freedom for adjustable planning and development that leads to fulfilled requirements.

Agile methodology is established on the iterative and incremental development, where requirements are growing through the joint efforts of the team in work and the clients to reach the desired results.

Many methodologies can be considered kinds of agile for example Scrum framework which is suitable for when the project and the team are considered to be small and share the same location.

One of the challenges that were encountered was conducting meetings for the team members which can lead in more project iterations and more adjustments.

On the other hand, since the risks can be known at early phases feedback can be taken in consideration to change the priority and plan for the day as it goes, thus gives some flexibility [7]. Figure.1 maps the stages of the methodology.

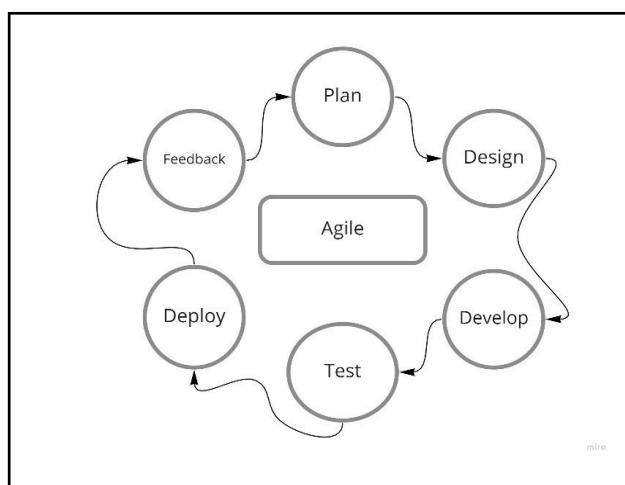


Figure 1: Agile Methodology

### 1.8.1 Plan Phase

In this stage, requirements were collected and analyzed, system specifications determined including scope and user needs, and acquiring the NFC reader.

### **1.8.1 Design Phase**

In the design stage, system specifications were designed including architecture design, interface, database, and program design.

### **1.8.2 Develop Phase**

Here, implementation for the first iteration started by coding using Java.

In this project an application was developed to connect with the NFC reader.

### **1.8.3 Test Phase**

This stage is where finishing up the software iteration is with testing the system functionality and seeing if it worked as intended and has no bugs.

Then it will go to the releasing phase.

### **1.8.4 Deployment Phase**

In the final step, the software is released, and it is kept running smoothly for monitoring, also training for users on the software is done.

### **1.8.5 Feedback**

Here, final notes are made to do more iterations if needed.

## **1.9 Project Timeline**

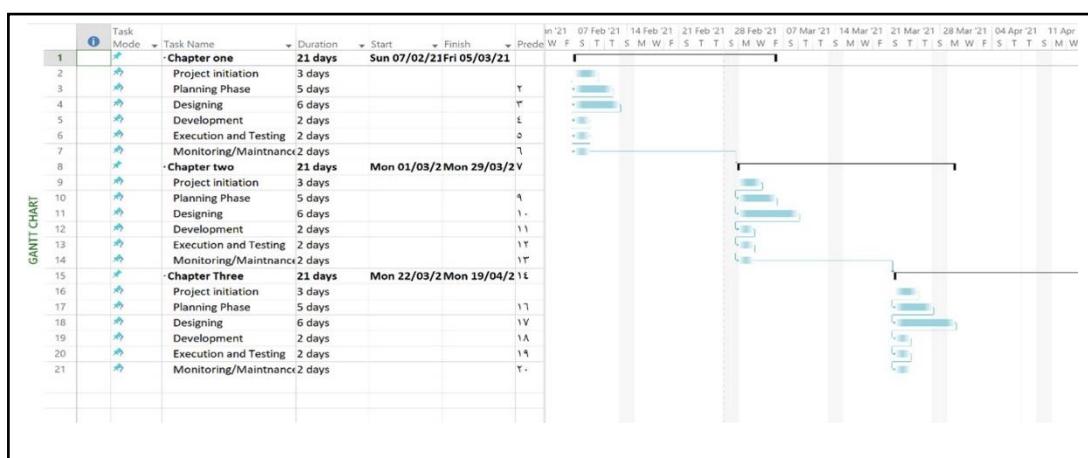


Figure 2:TimeLine (Part1)

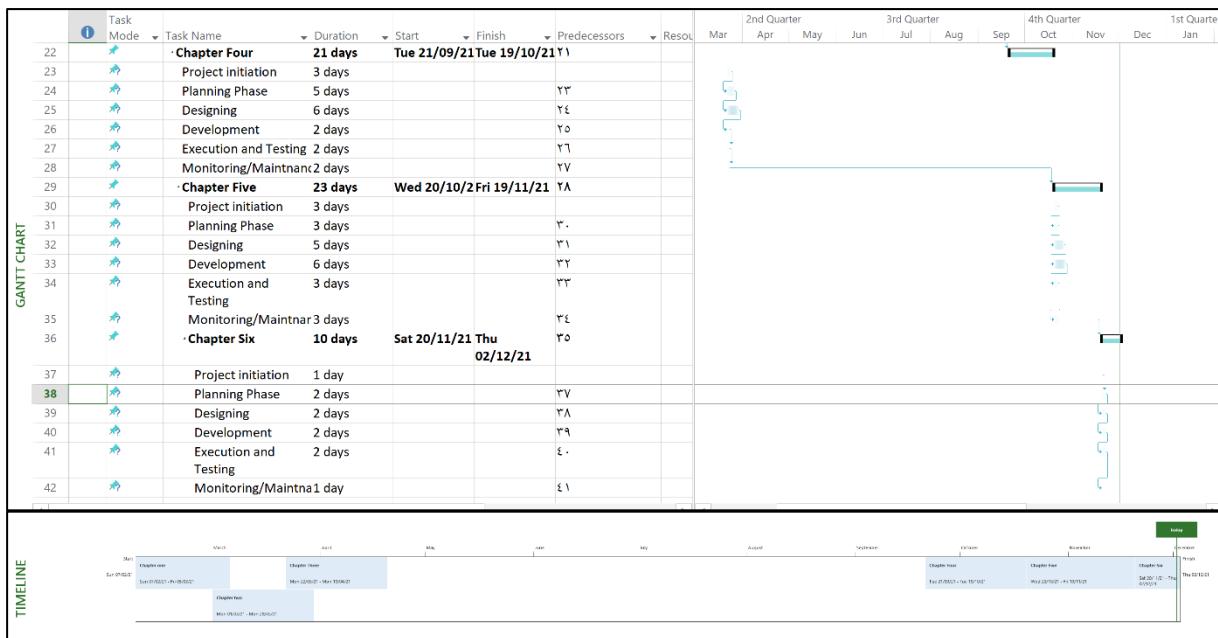


Figure 3: TimeLine (Part2)

## 1.10 Report Structure

The “Checking in and out Using NFC (Near Field Communication) Protocol” project report consists of the following chapters:

### 1.10.1 Chapter One

For chapter one, it is treated as an introduction to the project where the problem is explained and what methodology is used to deal with this problem.

Also, what is needed to be done and searched to reach this solution and make sure it meets the desired aims and goals.

It also discusses the impact this project will have locally and globally.

The alternative solutions will be discussed and compared to the proposed solution. In the end, there will be a summary of the chapter.

### 1.10.2 Chapter Two

In this chapter, it will have an introduction to start what will be discussed in this chapter. The background will give the basic knowledge for understanding the problem and the history behind it and how attendance was like and why it was not practical to keep doing it the way it was.

Related work is to be discussed here too of other existing systems, their advantages, and disadvantages and how to improve the proposed solution from them.

### **1.10.3 Chapter Three**

For this chapter, it will have a brief introduction then the system will be put into perspective with other systems of the same field.

Gathering the system functional and non-functional requirements.

A prototype of the systems interface will be made and how the system architecture will look like. A description of the hardware, software, and communication interfaces as well. In the end it will show some diagrams made such as the class diagram and conclude with a summary of the chapter.

### **1.10.4 Chapter Four**

For this chapter , it is implementation chapter it contain introduction of a chapter , Programming languages and tools it uses , Procedure Description for software and hardware and summary of a chapter .

### **1.10.5 Chapter Fifth**

For this chapter is testing for the project , will contain introduction of a chapter , we will use many test types: unit , Integration , User acceptance and Cases , Also discussion and summary of chapter .

### **1.10.6 Chapter Six**

For this chapter , this is the last chapter is conclusion and future work of the project.

## **1.11Summary**

The Checking in/out Using NFC (Near Field Communication) Protocol It will be designed as an app or a website and link it with the NFC reader also, the result will be easy, to be used and understood by anyone to help with fast and safe registry where each person is responsible for its own attendance.

Will be developed as efficiently and effectively as envisioned to make a difference and help with the current situation were using the outcome of the project will lead to less interaction with surfaces and yet a fast registry.

And since all countries are developing with the power of their education.

So, it is necessary to develop the education and the means used to continuity to provide a wonderful and easy methodology.

As far as it was said, it is a real problem to keep taking attendance on paper.

## **Chapter Two: Literature Review**

## **2 Literature Review**

### **2.1 Introduction**

As it has mentioned in the previous chapter, it discussed the problem definition and the global and local impact of the application on society and the environment. The evaluation of alternative solutions to the problem has been described.

The project scope described the work inside the scope for the application.

This chapter will describe the ability of software and systems that are accessible in the environment which is related to Checking in/out Using the NFC (Near Field Communication) system.

More about RFID which based Attendance System uses an RFID reader to get pieces of information through a special card issued to each student, working on this in a research paper [8].

And more about the NFC (Near Field Communication), how it is connected, work, and more about the protocols. And compared between Bluetooth and NFC (Near Field Communication).

### **2.2 Background**

There are many organizations that strive to use the best technologies to be at the best level and this project aims to make them achieve this by ending the problem of manual attendance.

If this project applied to schools, it would take time and effort from the teachers and the students based on the questionnaire that worked on this project,

the teachers believed that the usual way of attendance was unusual and the Checking in/out Using the NFC (Near Field Communication) system much useful, fast, easy to use more than other systems such as Bluetooth attendance systems,(see Figure.4),

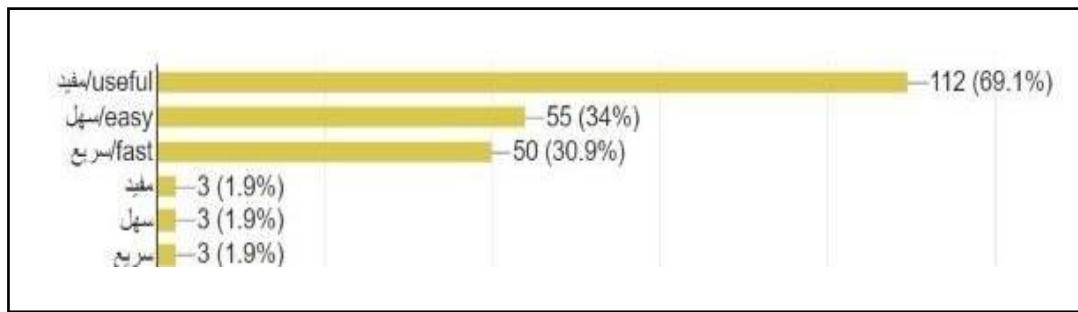


Figure 4:NFC System Survey

And there were 50% of students hoping to use this system to save them time and health due to the recent events in the world (COVID-19 pandemic) (see Figure 5).

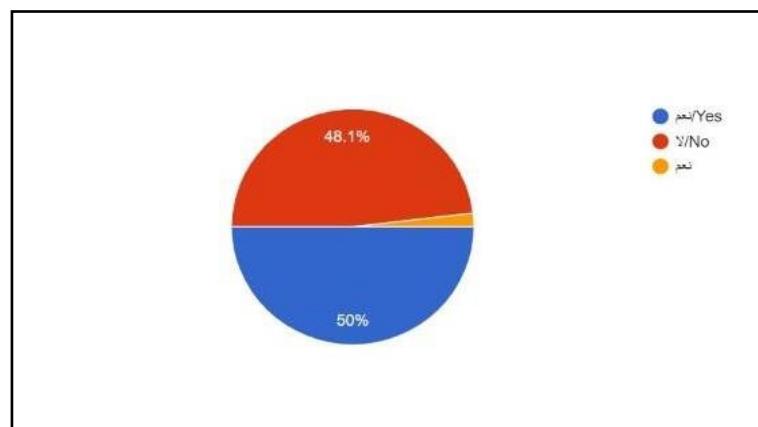


Figure 5:Student Survey

### 2.2.1 Checking In/Out Using NFC

Recently, An NFC (Near Field Communication) Reader which is a set of communication protocols for connecting between two devices over a short connection distance.

Will link it to an application that has been installed to the device for a fast check in-and-out with no need for any connection (see Figure 6).

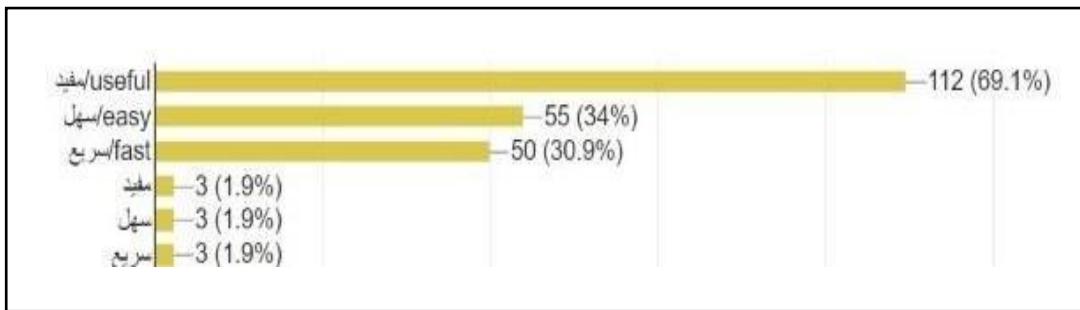


Figure 6:NFC System Survey

Which that means the NFC (Near Field Communication)  
Reader will make the live and the use much better.

## 2.3 Related Work

This project is interested in reviewing the literature on the attendance system.  
It will be investigating the previous literature talk about the general attendance system then it will focus on the RFID system (you can see a comparison of these systems in Table 1) then Bluetooth after that it will check a NFCR.

### 2.3.1 RFID system

RFID based Attendance System uses RFID reader to get the student information through a special card issued to each student (Arulogun O. T. at all) were worked on this in their research paper [8] or microchip technologies called "tags" can be embedded into student ID card, this says in (T. S. Lim et al paper) [9] This is one of its advantages.

These cards can be read during motion. And it's fast and smart system.  
Once the RFID reader has received the student information, it will send it to the computer. So, when the student wants to attend himself, the student uses his / her card by swiping or moving their ID cards over the RFID reader which is located at the entrance of lecture halls, the information will then be entered and sent to the databases.

However, one important drawback about this system is the RFID tag read rates degrade tremendously as it comes closer to electronic devices.

If the card number is no longer in the database for reasons such as (the loss of this card has been reported, so the number was deleted from the databases, or this card is for a person who is no longer a university student) then buzzer is turned on [8]. In paper [8] and [9] For RFID based systems, the process needs monitoring as to who is scanning the tag to avoid proxies (For example, someone passes his or her card and the card of his college who is not present).

The scanning time is approximately the same as the time it takes to manually count the students in the class, the student will have to wait for his role to prepare himself, Rather than attention to the lecturer.

### **2.3.1 Biometrics**

Biometrics is a technique for measuring body measurements. It is defined as the standards for human characteristics. Biometrics authentication is used in computer science as a form of user identification. Biometric identifiers are distinct and measurable characteristics in the classification and description of individuals. Examples include fingerprints, face recognition, DNA, iris recognition, etc. the project will present some of the researchers work on the biometrics system. O. Okokpujie, et al. [10] Design and Implementation of a Student Attendance System Using Iris Biometric Recognition the proposed system is an automated class attendance system proposed that uses iris biometric to take class attendance. During enrolment, the eye is first photographed. So, all students are first enrolled by taking their particulars and storing it in the database. Along with their unique digital iris template that will be taken by the iris scanner, an algorithm creates a template of the eye's iris pattern and stores it in a database. When identifying, the eye image is taken, and the iris template created is compared with the templates stored in the database for a match. If a match is found, the individual is identified as attended. The main aim of this paper is to propose a cheap and feasible automated attendance system using the iris as the biometric for enrolment and identification. KAR, et al. [11] Study of implementing automated attendance system using face recognition technique, this paper describes a method for Student's Attendance System which will integrate with the face recognition technology using

PCA algorithm. The system will record the attendance of the students in the classroom environment automatically and it will provide the facilities to the faculty to access the information of the students easily by maintaining a record of the student attendance. The present authors used the eigenface approach to face recognition. The system analyses the face identification computing eigenface which are faces composed of eigenvectors. The eigenface compares identify the presence of a face and its identity. In the begging the system must be initialized by supply it with a set of face images. This is used to define theface space which is a set of images that are a face like. By comparing it with known faces and using some statistical analysis it can be determined whether the image presented is a face at all. Hence, if the system identifies the image to be a face, it will determine whetherit knows the identity of it or not. The optional final step is that if an unknown face is seen repeatedly, the system can learn to recognize it.

### **2.3.1 NFC**

NFC or (Near Field Communication) known as a wireless communication technology that iscommonly embedded in smartphones, in addition to ir(\*infrared) and Bluetooth. NFC technology enables to exchange data between gadgets and tools with just a touch in shortheadline, and it only takes less than ten second.[12] NFC Based Mobile Attendance Systemwith Facial Authorization on Raspberry Pi and Cloud Server, Manual attendance registration requires a lot of paper on summarizing process. It has a fingerprint attendance machine deficiency in the detection process, and it tends to be wrong or a slow process,especially if the fingerprint is dirty and wet. In this paper they propose mobile attendancesystem can reduce paper usage and time efficiency in the attendance process and attendance recapitulation. With the cloud storage, it will facilitate the process of storage and datamanagement. Once the application is installed on the mobile device, the student can create attendance, student identification data, ID number, name and dates absent/present mark andsubject. He must fill student names along with associated student ID number. With thecloud storage, it allows us to store a large amount. of data without need for physical storage media. Mobile attendance system

can also be used by parents to monitor their children's presence in the following lecture attendance. By using the Raspbian Operating System in raspberry, it will be very flexible in both the backend application development using programming languages such as python, java etc. and also provide flexibility to developers in terms of device support and library system that has been provided either by default or add-ons. Raspberry also has advantages in terms of dimensions and size, affordable price, and power consumption is small.

No longer need manual 24 settings such a connection when the user is using a Bluetooth signal, NFC has been automatically connect the two devices quickly as needed. And in this work, Additional evidence that the student has indeed made a series of absences will be used as a face authorization.

| Name of paper   | Method used      | Speed | Cost | Attend student at one time |
|---|------------------|-------|------|----------------------------|
| <b>RFID-based students attendance management system.</b><br>[8][9]  | RFID             | High  | High | Middle                     |
| <b>Design and Implementation of a Student Attendance System Using Iris Biometric Recognition.[10]</b>     | Iris Recognition | High  | High | Middle                     |
| <b>NFC Based Mobile Attendance System with Facial Authorization on Raspberry Pi and Cloud Server.[12]</b> | NFC              | High  | Low  | High                       |
| <b>Study of implementing automated attendance system using face recognition technique.[11]</b>            | Face Recognition | High  | High | Middle                     |

Table 2:Related work

### 2.3.1 Conclusion

To conclude everything stated above, many technologies were used to take attendance eachone has its own benefit and drawback, like, the RFID reader where each student has his own card to sweep on the reader fast when attending a class and some disadvantages werediscussed too.

Other way for taking attendance is Biometric authentication to identify students or workers by fingerprints, DNA, or iris recognition each one of these ways has been discussed and details on how it works, and what is good and bad about it.

Lastly similar paper to the technology proposed in this project was discussed in detail and places it can be implemented in, and why it is better.

In the end a table showing a comparison between these technologies were presented.

## **2.4 Summary**

To summarize, this chapter focused on reviewing the main issue this project is trying to solve searching to understand it better and how attendance was, was it done efficiently or not. The background section presented the necessary information about the history of attendance why the old way was not as good and why we need to change it.

Similar technologies were discussed in detail in the related work section some examples were given from different papers such as RFID, Biometric, and the technology chosen in this project.

Talking about each technology to understand how it works, advantages and disadvantages were stated too, how these technologies help in the attendance process.

Comparing between the projects method and other papers in terms of functionalities, speed, and cost to shed light on how this technology would be better than other technologies used before.

## **Chapter Three: System Analysis and Design**

## **3 System Analysis and Design**

### **3.1 Introduction**

In the previous chapter, a background on the project have been discussed which gave a clear knowledge on the problem this project is solving, also it gave a couple of different methods from different papers to compare it with the technology used here.

This chapter will outline the applications proposed analysis, design, and specification. Checking in and out or (CIO) that uses the NFC (Near Field Communication) protocol will help individuals to keep track of their attendance and absences in an easy way and on the go in a user-friendly application and interface downloaded on the individuals' phone, they open it, log in to their account, and when they want to scan it to the reader, they bring it close enough to scan, and it will automatically record the attendance.

Using this system will save time and effort, also, it will increase efficiency and productivity having to reduce the time usually taken for attendance.

This chapter will also discuss the perspective of the system proposed and its main function that will perform and will show the method used for gathering the system requirements, listing the functional and non-functional requirements, UML diagrams.

Designing the first look on the user interface will also be presented.

Finally, a summary will highlight the main points mentioned in this chapter.

### **3.2 System Perspective**

The CIO system is independent and self-contained of other systems.

It will function and be programmed without relying on previous systems.

(SAS) or Smart Attendance System is an IoT based system using RFID technology which is an essential block of IoT.

RFID are wireless microchip devices that operates automatically for identification functions on many frequencies (low, high, ultra-high frequency), it needs a reader and tags. It fetches the data from cloud and let it be accessible at all times [5].

It has some similarities to the (CIO) Checking In and Out system, where the NFC protocol needs a configured reader to read from individuals phones where the Android application is downloaded on.

Both the organization and the individual are registered in the app to have data be viewed by both parties.

### 3.3 Requirements Elicitation Techniques

Requirement's elicitation is about finding requirements and information from users using different techniques to back up the idea of the project and meet the needs of the user.

To reach a wide range of users it was best to collect information through questionnaires.

#### 3.3.1 Questionnaire:

In this section, a couple of questions have been prepared to find out about the user needs and the systems requirements according to it.

It has been distributed among a variety of people through social media, and it was answered by 232 people and more.

##### 3.3.1.1 Questionnaires summarize:

- 1- First question was about would it be useful to have an attendance and absence application on your device.

Figure.7 shows that 87.1% agreed that it would be useful, while 12.5% think not.

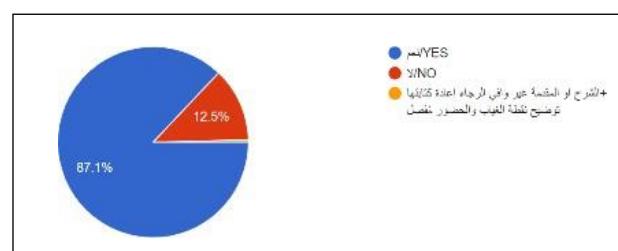


Figure 7: Use of attendance application.

- 2- Second question was if the users prefer to see their absence and presence in a listin their phones. Figure.8 shows that 93.1% agree and the other 6.9% think it is unnecessary.

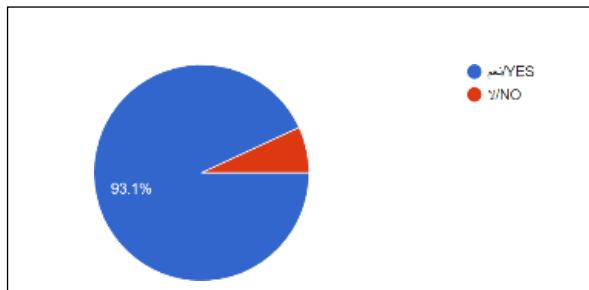


Figure 8: Prefer list of attendance information.

- 3- Third question was about if this system will be useful to save time and effort. Figure.9 shows that 92.7% agree and the other 7.3% disagreed.

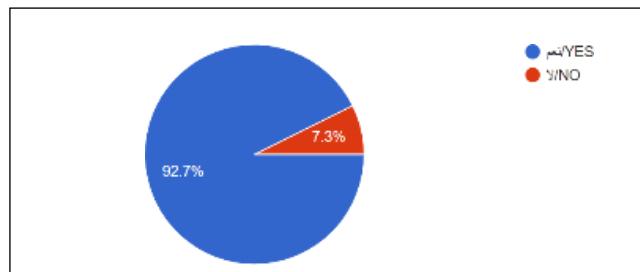


Figure 9: System to save time and effort.

- 4- Fourth question shows if the program will prevent teachers from forgetting to call someone.

Figure.10 shows that 76.7% agree and 17.7% disagree, and 5.6% of people have different opinions.

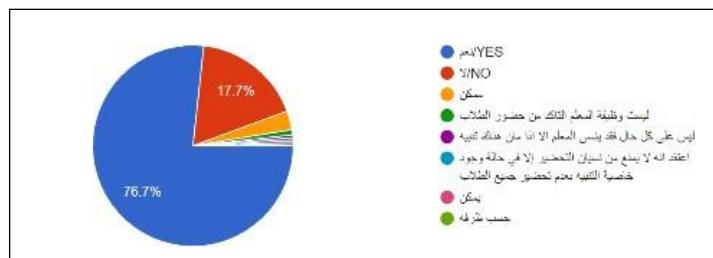


Figure 10: Forgetting call someone.

- 5- Fifth question was about in case of disabilities, will the system benefit them (Suchas: deaf, Mute, blind and people with mental disabilities).

Figure. 11 shows that 81.5% agree that it would be helpful to them and

10.8% donot agree, the other 7.7% give different opinions.



Figure 11:In case disabilities.

- 6- Sixth question was, in the paper-based educational system, if they think that this program will save preparation or attendance time for other useful things. Figure.12 shows that 89.2% agree and 8.6% disagree, with other 2.2%.

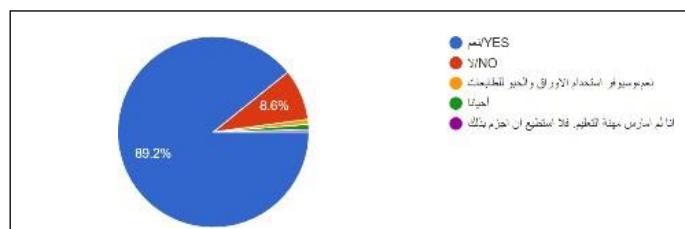


Figure 12:Save preparation time.

- 7- Seventh question was about if developing attendance software will contribute to reducing attendance manipulation.

Figure.13 shows that 91.4% agree and 7.8% disagree.

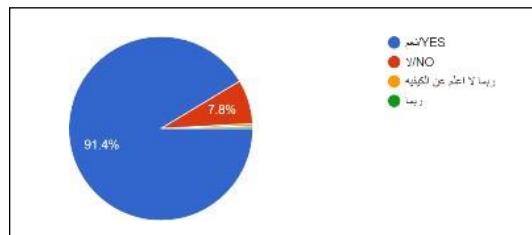


Figure 13:Reducing attendance manipulation.

### 3.4 System Requirement

#### 1.10.7 Functional Requirement

The functional requirements are considered the main function or behavior of a system, andhere are the CIO functional requirements:

- **User**
  - The user shall sign up by entering his personal information to the system.
  - The user shall enter a code provided by the organization.
  - The user can view his account.
  - The user can scan from the attendance page.
- **Organization**
  - The organization shall sign up by entering the company information to the system.
  - The organization shall create a code to give their employees.
  - The organization can view their employees accounts and information.
- **NFC**
  - The NFC take the attendance information.
  - The NFC store the attendance information into database.

### **1.10.8 Use-Case**

The main actors in this system as shown in the use case figure Figure.14 are the user (Employee) and the organization that user is working for and the NFC reader, both the worker and the organization must have the application.

They need to sign up, the worker adds the company he is working for by a code given by his company.

The user opens the scan page through the attendance page and bring near the reader for registry.

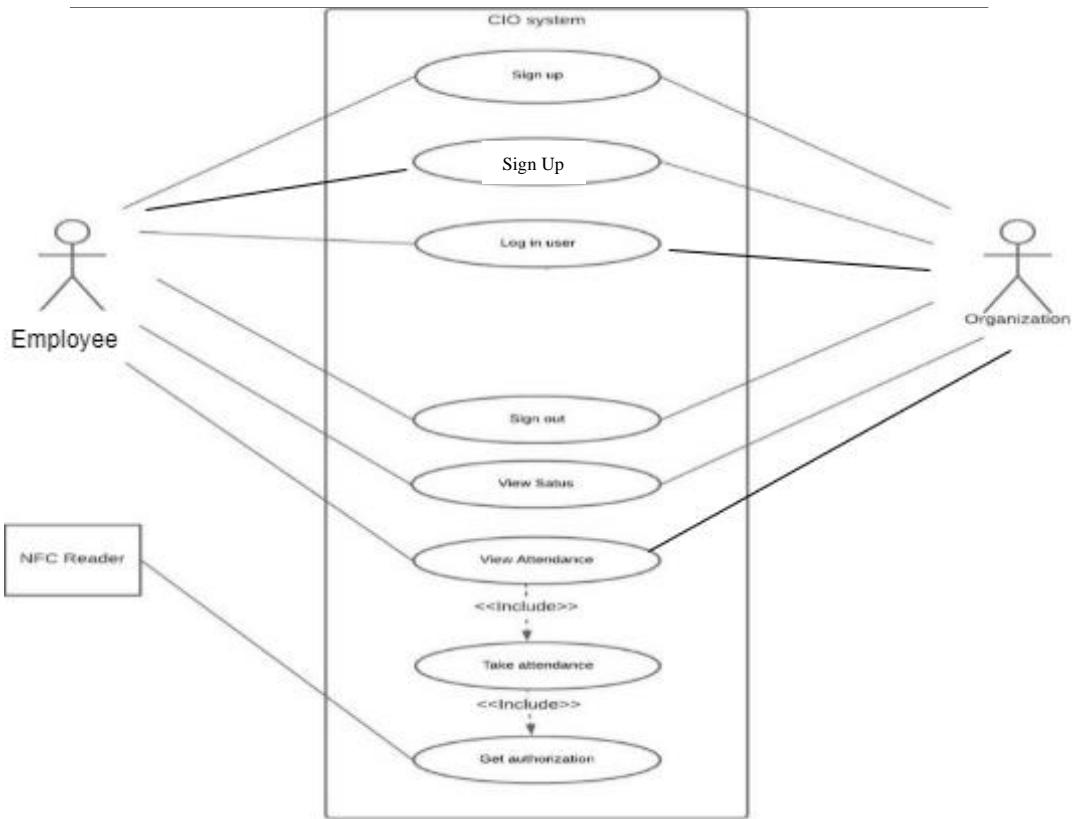


Figure 14: Use case diagram.

|                        |  |
|------------------------|--|
| Use Case ID:           | 01   |
| Use Case Name:         | Sign up for the attendance application.  |
| Actors:                | Users  |
| Brief description:     | The user enter her/his own information (Full name [first name, last name], email, password, and the gender) in the mobile application to create a new account.   |
| Pre-Condition:         | Download the mobile application.   |
| Post Condition:        | <ul style="list-style-type: none"> <li>• Save the user information into database.</li> <li>• Signup of user in the mobile application.</li> </ul>  |
| Primary flow of event: | <ol style="list-style-type: none"> <li>1. User downloads a file application.</li> <li>2. The user enters all his data information.</li> <li>3. The user then clicks Register.</li> <li>4. Save the user information in database.</li> <li>5. View his / her profile and he / she can enter thecode and use attendance technology.</li> </ol> |
| Error flow event:      | <ul style="list-style-type: none"> <li>• If the user does not fill in Required fields.</li> <li>• If the user entered an invalid value.</li> </ul>   |

Table 3: User sign up use case.

|                        |   |
|------------------------|---|
| Use Case ID:           | 02  |
| Use Case Name:         | Sign up for the attendance application.   |
| Actors:                | organization  |
| Brief description:     | The organization enters their information<br>(Facility name, email,<br>Password and facility code)<br>In the mobile application<br>To create a new account.   |
| Pre-Condition:         | Download the application.<br>Have awn code.   |
| Post Condition:        | <ul style="list-style-type: none"> <li>• Save the user information into database.</li> <li>• Let the user enter and take their presence</li> </ul>  |
| Primary flow of event: | <ol style="list-style-type: none"> <li>1. The organization downloads a file application.</li> <li>2. The user enters the code.</li> <li>3. The user then near the phone from the reader to take their presence.</li> <li>4. Save the username in the database.</li> </ol> |
| Error flow event:      | <ul style="list-style-type: none"> <li>• If the user does not have an account.</li> <li>• If the user entered without passing the device on the reader</li> </ul>   |

Table 4:Organization sign up use case

|                        |  |
|------------------------|--|
| Use Case ID:           | 03   |
| Use Case Name:         | login  |
| Actors:                | user   |
| Brief description:     | The user can enters to his information<br>In the mobile application<br>To show his page and information.   |
| Pre-Condition:         | Download the application.  |
| Post Condition:        | <ul style="list-style-type: none"> <li>• show the user information from database.</li> <li>• Let the user know their presence and absent.</li> </ul>                       |
| Primary flow of event: | <ol style="list-style-type: none"> <li>1. enter the username and password.</li> <li>2. The user enters the code.</li> <li>3. Save the username in the database.</li> </ol> |
| Error flow event:      | If the user does not have an account.  |

Table 5:User log in use case.

|                        |   |
|------------------------|---|
| Use Case ID:           | 04  |
| Use Case Name:         | Attendances page  |
| Actors:                | User, organization  |
| Brief description:     | <ul style="list-style-type: none"> <li>The user can enter to his Attendances information from the application to show his page and information.</li> <li>And the organization can see the employee Attendances info from the database.</li> </ul> |
| Pre-Condition:         | <ul style="list-style-type: none"> <li>Download the application.</li> <li>Near the phone from the reader to take their presence.</li> </ul>   |
| Post Condition:        | <ul style="list-style-type: none"> <li>show the user attendances information from database.</li> <li>Let the user know their presence and absent.</li> <li>Let the organization take the attendances.</li> </ul>                                  |
| Primary flow of event: | Make sure there is an account for the user and code for the attendances place.  |
| Error flow event:      | <ul style="list-style-type: none"> <li>If the user does not have an account.</li> <li>If the organization does not have an area code.</li> </ul>  |

Table 6:User, organization attendance page use case.

### 1.10.9 Non-Functional Requirement

Non-functional requirements are considered as important and critical as the functional requirements mentioned above.

Usually defined as the systems properties and behavior such as environmental and implementation constraints, performance, and platform dependencies [13].

The non-functional requirements of this project are:

- Usability

The system should be easy and simple to use for any user.

- Availability

The application must be available 24/7.

- Performance

The system must function with speed to capture and present data.

- Scalability

Future capabilities and features could be added.

- Efficiency

The system should work in an efficient manner when capturing data and updating it.

## 3.5 User Interface Prototype

### 3.5.1 Home page:

Home page can the user (Employee) and organization (Facility) choose the right option for them, as shown in figure.15.

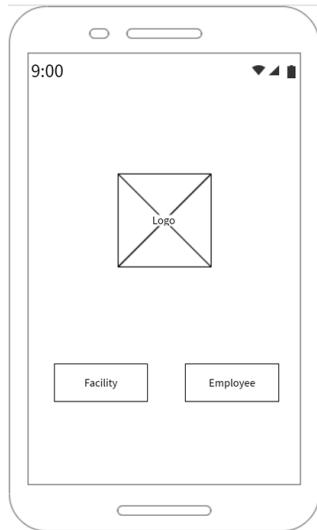


Figure 15:Home Page

### 3.5.2 Login page:

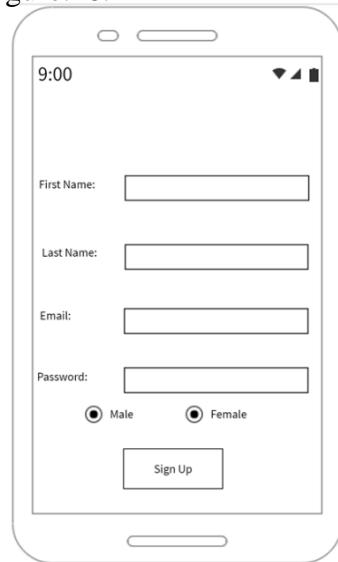
Login page where the user (Employee) and organization (Facility) that have an account can access the application by enter email and password or did not have an account can create new account by click the login button, as shown in figure.16.



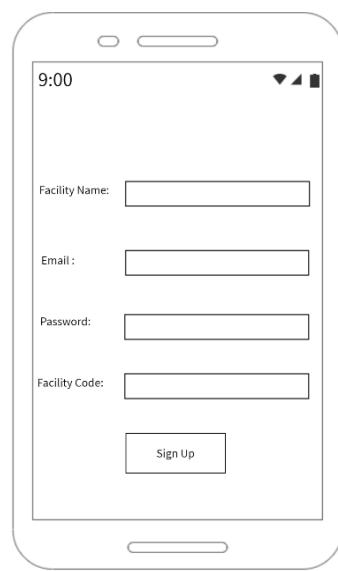
Figure 16:Login Page

### **1.10.10 Sign up page:**

Sign up page where the user (Employee) and organization (Facility) make new account can access the application by enter the right information, as shown in figure.17 and figure.18.



*Figure 17: Sign up user  
(Employee).*



*Figure 18: Sign up organization  
(Facility).*

### **3.5.2.1 Private enter facility code page for the user (Employee):**

After the user (employee) sign up, shows him page the enter facility code then he writes the code given to him from his workplace, figure.19.



*Figure 19:Private enter facility code page for the user (Employee).*

### **3.5.4 User (Employee) pages:**

#### **3.5.4.1 Account page:**

Figure.20 shows that the user (Employee) can access and see his attendances, absents and delays by clicking on the page he wants.

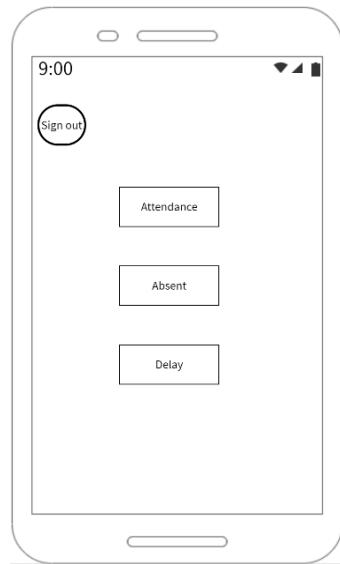


Figure 20:Account page.

### 3.5.4.2 Attendances page:

Figure.21 shows the user (Employee) his attendances by the day and time from start to endand scan the NFC reader.

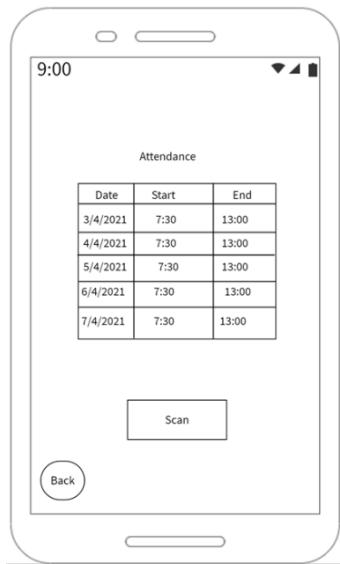


Figure 21:Attendances page.

### 3.5.4.3 Absents page:

Figure.22shows the user (Employee) his absents by the day and time from start to end.

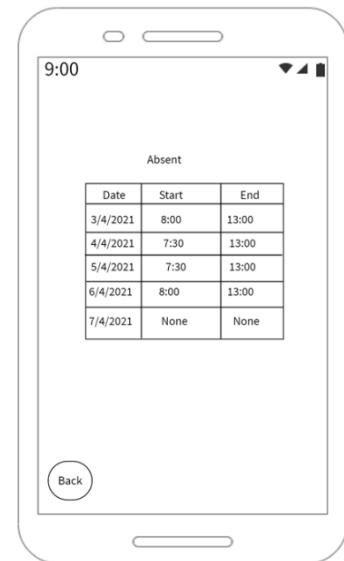


Figure 22:Absents page.

#### 3.5.4.4 Delays page:

Figure.23 shows the user (Employee) his delays by the day and time from start to end.

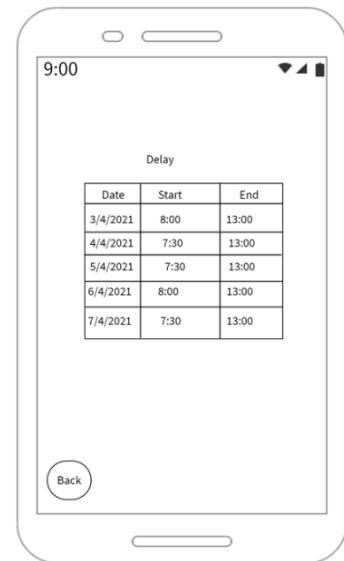


Figure 23:Delays page.

#### 3.5.5 Organization (Facility) pages:

##### 3.5.5.1 Account page:

Figure.24 shows the Organization (Facility) can access and see attendances, absents, and delays for their employees by click the worker button and can search by specific worker.



Figure 24:Account page.

### 3.5.5.2 Attendances information page for worker:

Figure.25 shows the Organization (Facility) the attendance and absent, delay for the worker by the day and the time.

|          | Attendance   | absent | Delay |
|----------|--------------|--------|-------|
| 3/4/2021 | 7:30 - 13:00 | None   | None  |
| 3/4/2021 | None         | Yes    | None  |
| 3/4/2021 | 7:30 - 13:00 | None   | None  |
| 3/4/2021 | 7:30 - 13:00 | None   | None  |
| 3/4/2021 | 7:30 - 13:00 | None   | None  |

Figure 25:Attendances information page for worker.

## 3.6 System Design

### 1.10.11 Architectural Design



Figure 26: The Architectural Design CIO.

The architectural design of the projects system in figure.26 shows that the system depends on two components: hardware and software. The hardware used in the system .

Is the NFC (Near Field Communication) reader and a phone. for software it will be an application on the android system called “CIO”. Attendance will be registered when the software is open and near the NFC reader, attendance will be sent to the database to store it, when the organization wants to see any employee information, they open the application to view them.

### 1.10.12 Class Diagram

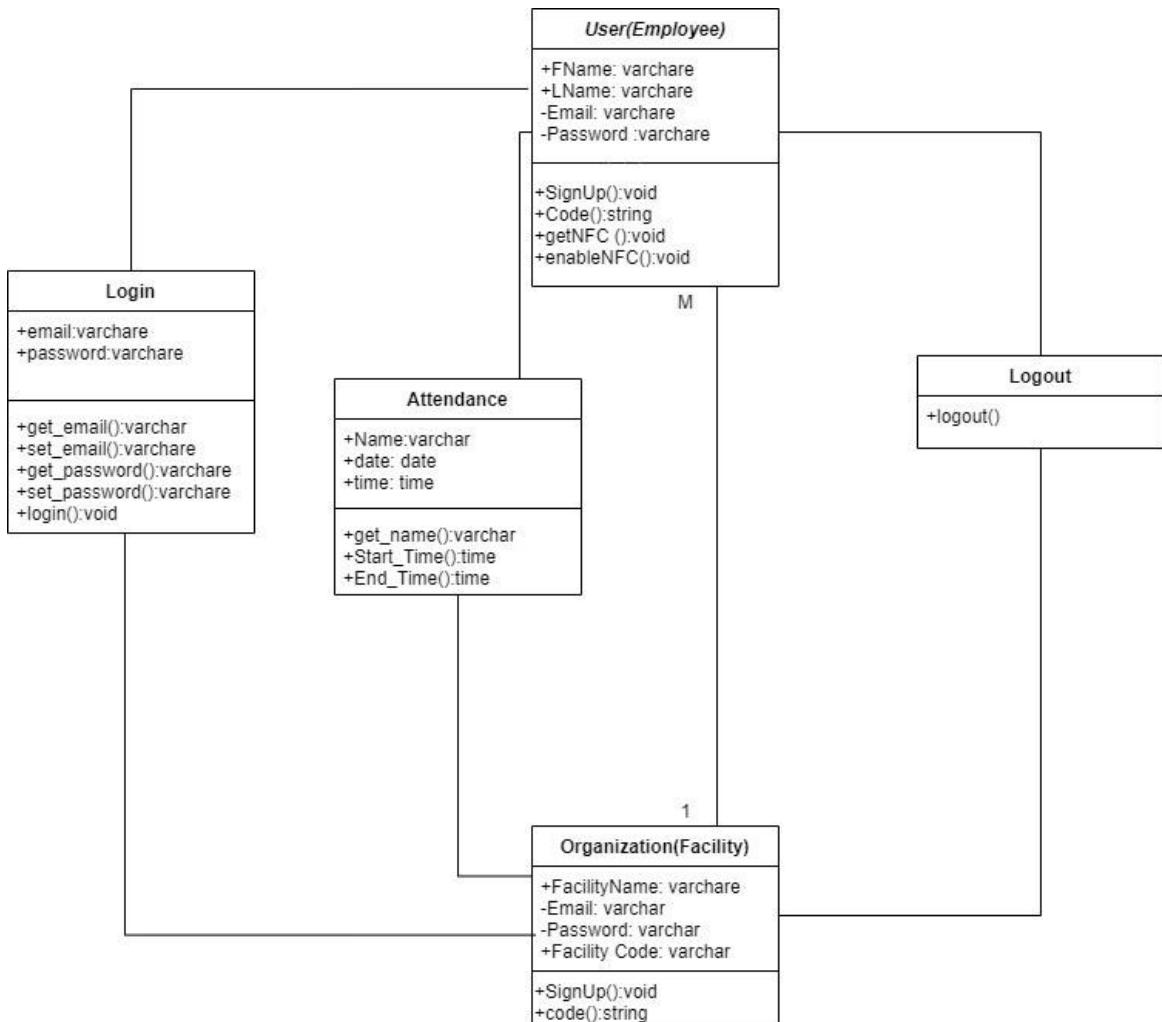


Figure 27:Class Diagram

### 1.10.13 Sequence Diagram

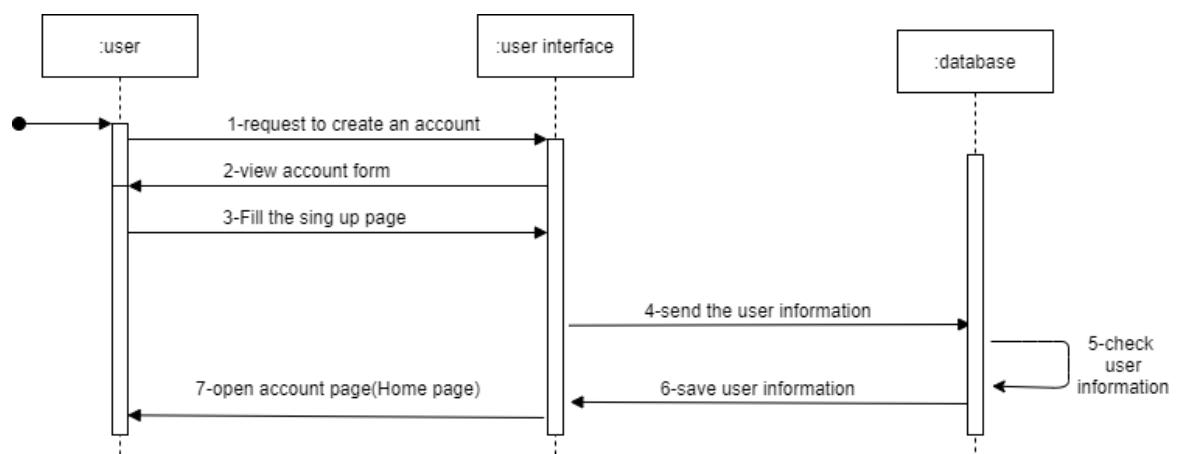


Figure 28:Sequence Diagram of Sign up for user.

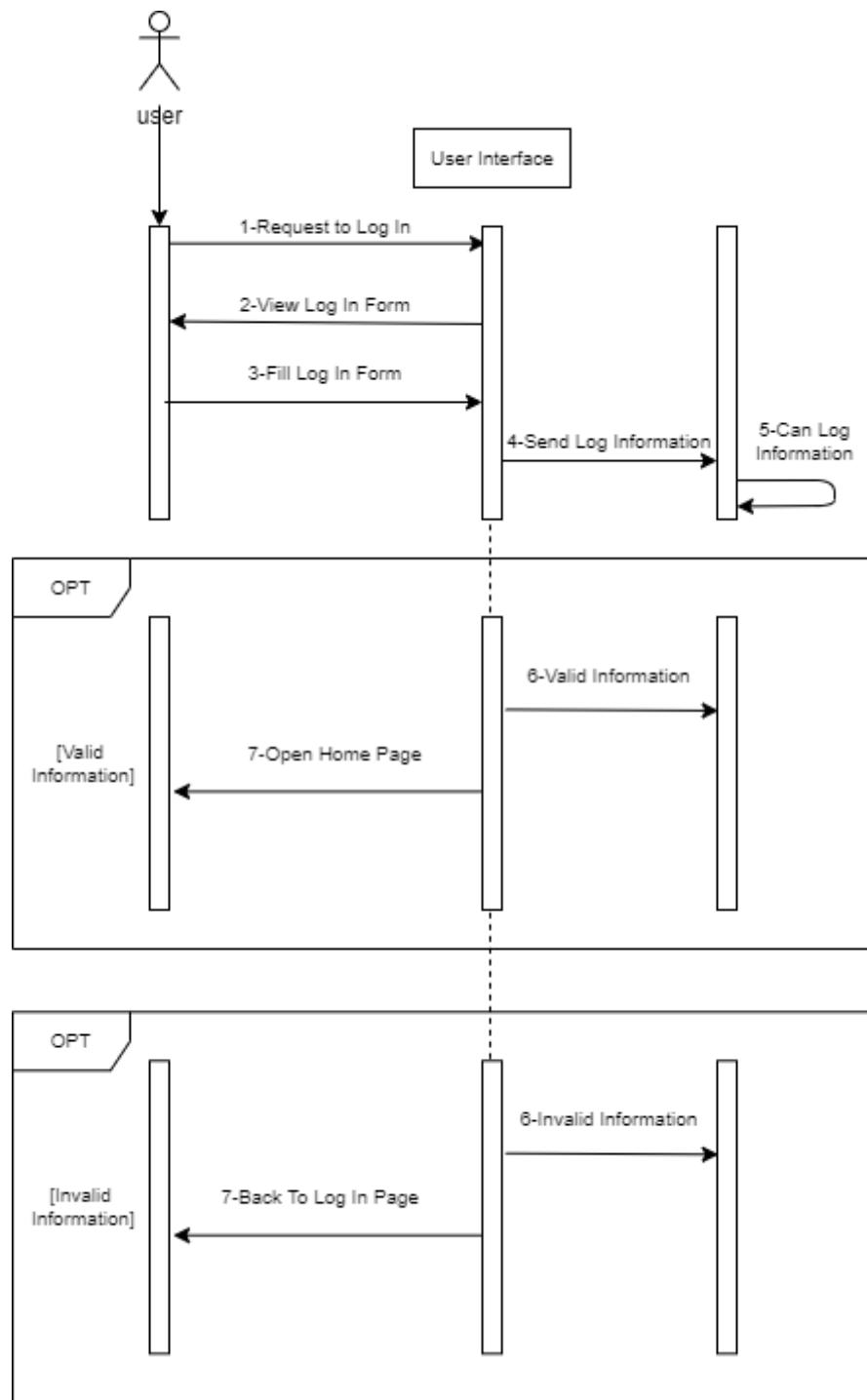


Figure 29: Sequence Diagram for User Login.

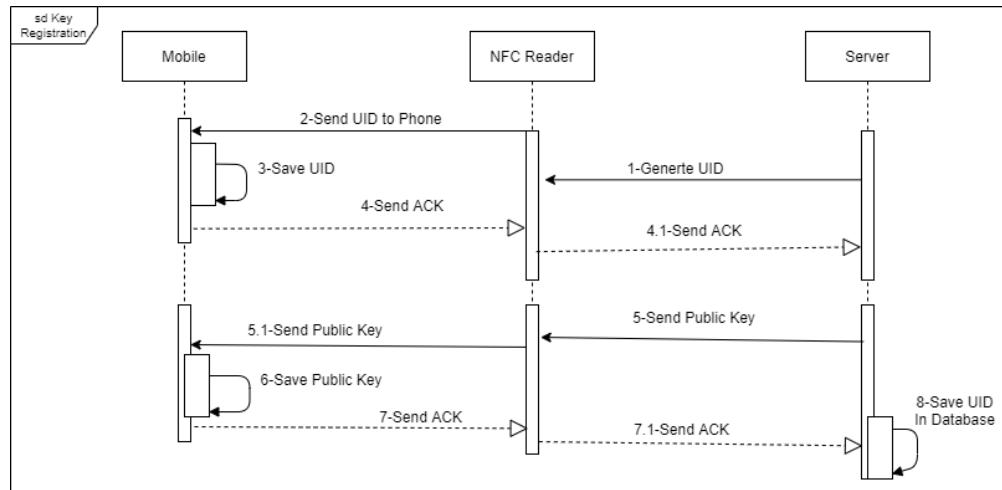


Figure 30: Sequence Diagram for NFC.

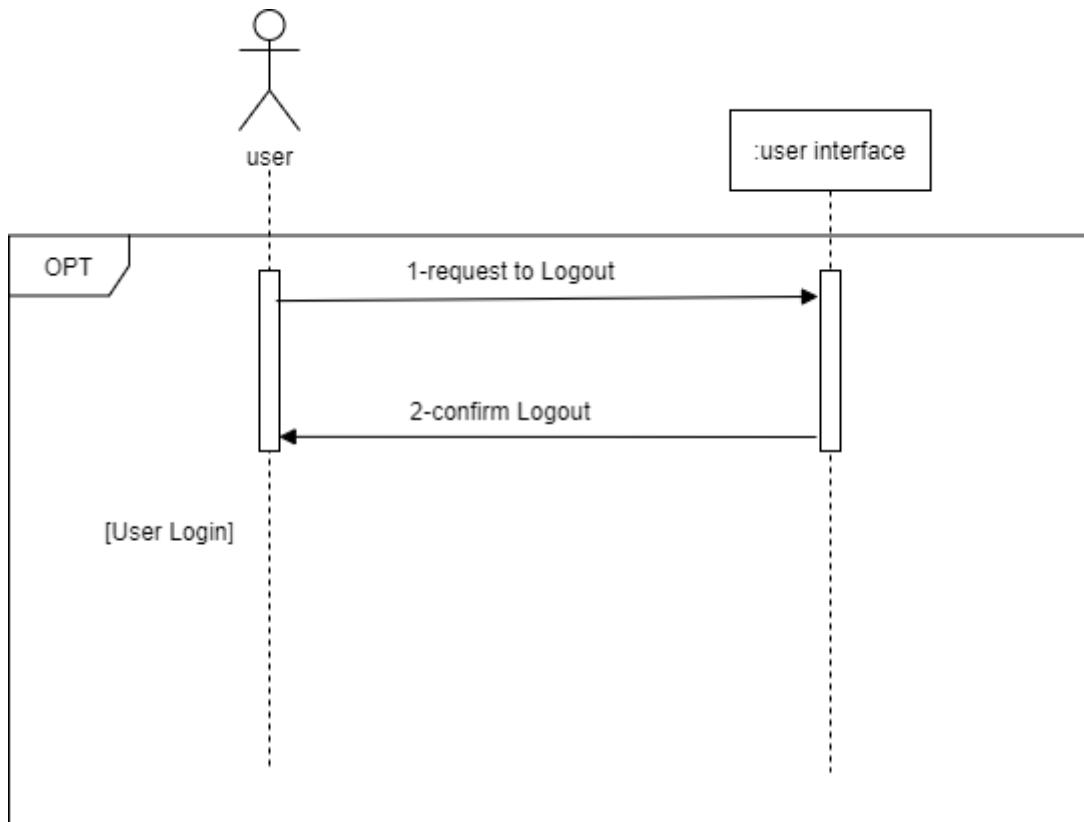


Figure 31: Sequence Diagram for User Logout.

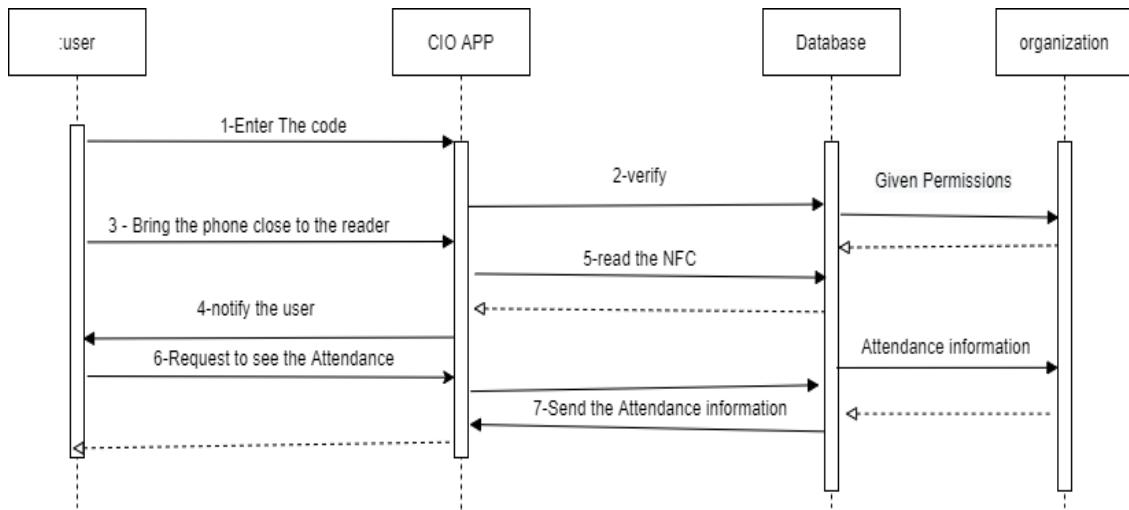


Figure 32: Sequence Diagram for how the app work.

### 1.10.14 Database Design (if any)

- **ER Diagram**

In figure.33 The relationships of prime entities that will be stored in the database.

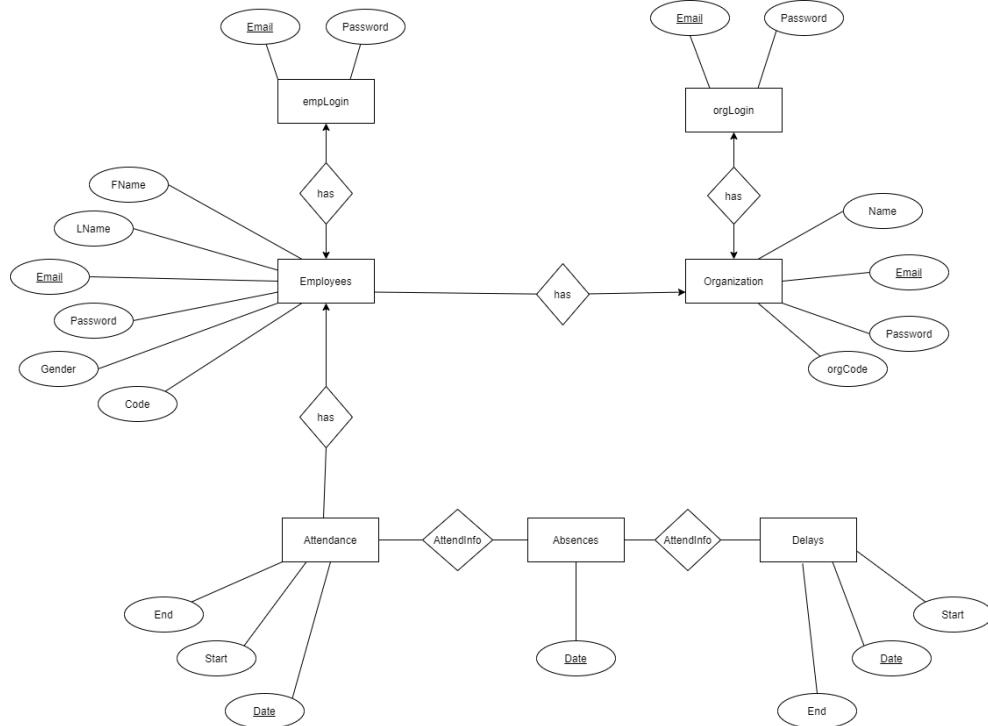


Figure 33: ER Diagram.

### 3.6.1.1 Data Dictionary

The employee and the organization are the users of the CIO system.

Therefore, their information must be stored in a database.

| Name     | Type    | Description   |
|----------|---------|---|
| Email    | Text    | User Email  |
| FName    | Text    | User first name   |
| LName    | Text    | User last name  |
| Password | Integer | Account password  |
| Gender   | Text    | The user gender   |
| Code     | Integer | The organization code to let the user enter (Next page) |

Table 7: Employee sign up.

| Name  | Type | Description      |
|-------|------|------------------|
| Date  | Date | Event date       |
| Start | Time | Event start time |
| End   | Time | Event end time   |

Table 8: Attendance's page.

| Name     | Type    | Description           |
|----------|---------|-----------------------|
| Email    | Text    | Organization email    |
| Name     | Text    | Organization name     |
| Password | Integer | Organization password |
| OrgCode  | Integer | Organization code     |

Table 9: Sign up for organization.

| Name  | Type | Description           |
|-------|------|-----------------------|
| Date  | Date | The delays date       |
| Start | Time | The delays start time |
| End   | Time | The delays end time   |

Table 10: The Delays

| Name | Type | Description      |
|------|------|------------------|
| Date | Date | The absence date |

Table 11: Absence.

| Name     | Type    | Description   |
|----------|---------|---|
| Email    | Text    | User Email for both login(Employee and organization)        |
| Password | Integer | Account password for both login (Employee and organization) |

*Table 12: Log In for both (Employee and Organization).*

### 3.7 Summary

The project has collected more information about the problem, provided a full explanation of the system characteristics, to effectively design standards and enabling the start of designing the system.

The features of the system are, taking attendance via NFC (Near Field Communication) protocol, it will also register the user (Employee) when he enters the organization (Facility) code to determine if the user works in the organization or not.

In addition, attendance recording by scan using the NFC Reader, the estimated time is 3 to 4 months to complete the entire system.

You can also see the expected time for each part of the implementation in detail in the Figure.2.

In the next chapter, the project will start implementing and testing the system to make sure that all the requirements are met and ensure that it works as expected.

## **Chapter Four: Implementation**

## 4 Implementation

### 4.1 Introduction

The previous chapter focused on analysing the system and choosing the design requirements. It gave a good understanding of the system and its requirements, a first look on the systems interfaces, and database design. This chapter will focus on the actual work, giving detailed description of the implementation of the system, what languages will be used and the needed software and hardware. Detailed description of each interface and the functions it contains. In the database section there will be a detailed information about how the database is implemented and its functions. For the procedures description section, it will include the main code that the system is relying on or has a significant importance to the system.

### 4.2 Programming Languages and Tools

Beginners and experts both can write perfect code to solve the problem they are having in different depending on the way they are thinking, so with best practices, more knowledge, and training the code will be more professional.

After searching for the most appropriate language for the application, and considering standard methods as much as possible,

XML (programming language) was used to write the application. on the other side, java was the best for fetching data from the database and implementation of some operations like inserting and reviewing.

And the JavaScript for the server and the NFC Reader.

The reason for choosing those languages is that they are easy to learn and have many sources.

| The software used |  |
|-------------------|--|
| Android Studio    | Android Studio is an Android Developer Environment (IDE) for Android development. In which applications are created version 3.3 and 2.4 is used. |
| Windows system    | Are personal computer operating system developed by Microsoft.<br>It has many versions.  |

|                |  |
|----------------|--|
| Microsoft Word | the purpose of Microsoft Word is to allow users to type, save, and modify documents.   |
| Firebase       | Firebase is a platform developed by Google for creating mobile and web applications.   |
| TestReader.apk | It is a fast and compact utility for comfortable text reading. Key features are: FB2, RTF, HTML, TXT formats support, reading from ZIP-archives, saving last read position, smooth scroll through pages, view files from arbitrary position, a lot of encodings, custom fonts support, customized color themes, text search.                   |
| Visual Studio  | is an integrated development environment (IDE) from Microsoft. It is used to develop computer programs, as well as websites, web apps, web services and mobile apps. Visual Studio uses Microsoft software development platforms such as Windows API, Windows Forms, Windows Presentation Foundation, Windows Store and Microsoft Silverlight. |
| Node.js        | As an asynchronous event-driven JavaScript runtime, Node.js is designed to build scalable network applications. In the following "hello world" example, many connections can be handled concurrently. Upon each connection, the callback is fired, but if there is no work to be done, Node.js will sleep.                                     |

*Table 13:Software used*

| The hardware used                |   |
|----------------------------------|---|
| Mobile phone<br>(Android System) | A mobile phone is a portable wireless device that allows users to make and receive calls and text message and can browse the web and play games and download application.<br>Some of which are based on the Android operating system.<br>The phones used are HAWAII P30, Galaxy S4 and Galaxy Grand1. |
| Personal computer                | The laptops used to develop the project are ACRE and HP.<br>The HP is: Windows 10, 11th Gen Intel(R) Core(TM) i7-1165G7 @ 2.80GHz 2.80 GHz , with memory 12 GB  |
| NFC card                         | NFC or Near Field Communication known as a wireless communication technology that is commonly embedded in smartphones, in addition to ir(*infrared) and Bluetooth. NFC technology enables to exchange data  |

|            |   |
|------------|---|
|            | between gadgets and tools with just a touch in shortdistance, and it only takes less than ten second  |
| NFC Reader | NFC device for easily reading and writing (encoding) NFC Tags and Smart Cards using a PC, a Mac, a tablet or a smartphone. External NFC readers can be connected via USB, Bluetooth, or Ethernet to transmit data to devices. |
| Modem      | To connect to the internet  |

*Table 14:Hardware used.*

### 4.3 User Interface Implementation

The system interfaces were designed using the Android Studio program.

In this interface, the App asks the user to choose between two options.

The first choice (Facility) drives the user to the facility pages which is for the companies only.

The second choice (Employee) is to drive the user to the employee's pages which is for the company employees only.



*Figure 34:First page.*



The image shows a mobile sign-in screen for facility users. At the top, there are standard device status icons. Below them are two input fields: 'Email' and 'Password'. Underneath these fields are two teal-colored rounded rectangular buttons labeled 'SIGN IN' and 'NEW ACCOUNT'. The background of the screen features a subtle, abstract graphic of blue and grey curved lines.

Figure 35: Facility Sign in.

This is the sign-in for the facility users page the users should have an account to complete the process.



The image shows a mobile sign-in screen for employee users. It has a similar layout to Figure 35, featuring 'Email' and 'Password' input fields, 'SIGN IN' and 'NEW ACCOUNT' buttons, and a blue line background. The status bar at the top indicates signal strength, battery level (83%), and time (17:06).

Figure 36: Employee Sign In.

This is the sign-in for the employee users page the users should have an account to complete the process.



First Name: gh

Last Name: sh

Email: ghso@gmail.com

Password: \*\*\*\*

Enter Facility code: ...

Card Number: .

Male

Female

**SIGN UP**

Figure 37:Employee Sign-up.

If the users do not have an account, they could create a new account from here.



Facility Name: ghCo

Email: ghCo@gmail.com

Password: \*\*\*

Facility Code: ...

**SIGN UP**

Figure 38:Facility Sign-up.

Same here for facility users.

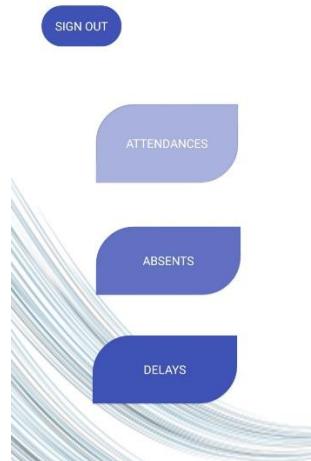


Figure 39:Account page

The account page shows that the user (Employee) can access and see his attendance, absents, and delays.



### Absent



BACK

Figure 40:Absent page.



### Attendance



BACK

Figure 41:Attendance page.



Delay



BACK

Figure 42: Delays page



SIGN OUT



Figure 43: Facility account page

The account page shows that the (Facility) can access and see the list of employees.



ghson hussien

Sarah ahmad

emp3 i

BACK

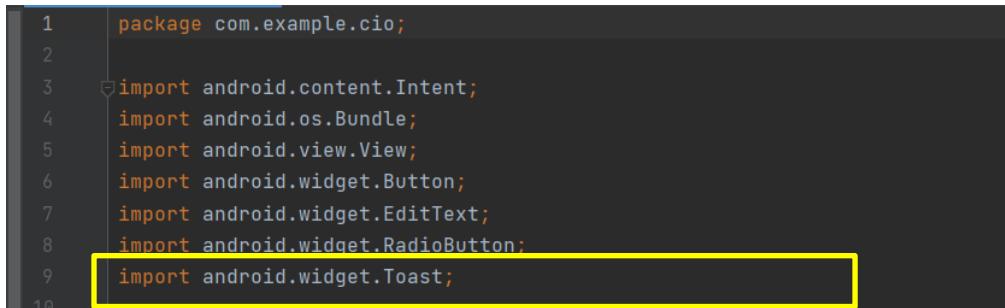
Figure 44: Attendance information the worker for facility.

here the company can see the employee's information.

#### 4.4 Database Implementation

The database was from firebase platform, it's connected the app project with real time database and tests the codes and functionality there.

So, we can see the updates and procedures easily and manage the database.



```
1 package com.example.cio;
2
3 import android.content.Intent;
4 import android.os.Bundle;
5 import android.view.View;
6 import android.widget.Button;
7 import android.widget.EditText;
8 import android.widget.RadioButton;
9 import android.widget.Toast;
10
```

Figure 45:Toast library

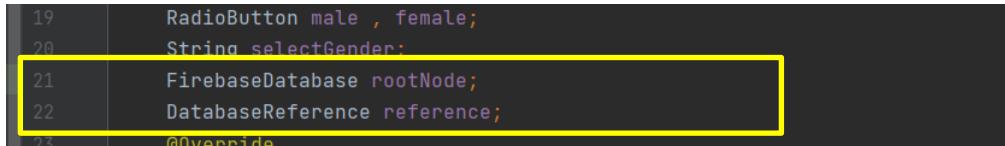
A toast library is a view containing a quick little message for the user. The toast class helps you create and show those messages.



```
12
13 import com.google.firebase.database.DatabaseReference;
14 import com.google.firebase.database.FirebaseDatabase;
15
```

Figure 46:Import firebase.

Import the firebase to use it in the code.



```
19 RadioButton male , female;
20 String selectGender;
21 FirebaseDatabase rootNode;
22 DatabaseReference reference;
23 @Override
```

Figure 47:References.

Reference the root or child location in your Database by calling.



```
41 rootNode = FirebaseDatabase.getInstance();
42 reference = rootNode.getReference();
43
```

Figure 48:Get data.

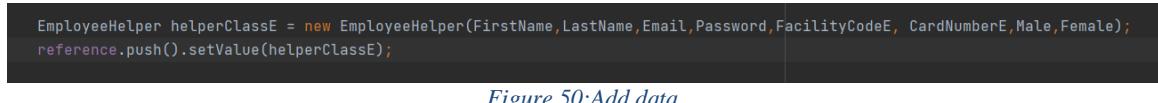
Get the data from database.



```
42 reference = rootNode.getReference();
43
```

Figure 49:Get reference.

Get the reference from the database employee.



```
EmployeeHelper helperClassE = new EmployeeHelper(FirstName,LastName,Email,Password,FacilityCodeE, CardNumberE,Male,Female);
reference.push().setValue(helperClassE);
```

Figure 50:Add data.

Add the data in the database for Employee.

```
package com.example.cio;

public class EmployeeHelper {

    String FirstName, LastName, Email;
    int Password, FacilityCodeE, CardNumber;
    String Male, Female;

    public EmployeeHelper() {
    }

    public EmployeeHelper(String firstName, String lastName, String email, int password, int facilityCodeE, int cardNumber, String male, String female) {
        FirstName = firstName;
        LastName = lastName;
        Email = email;
        Password = password;
        FacilityCodeE = facilityCodeE;
        CardNumber = cardNumber;
        Male = male;
        Female = female;
    }

    public String getFirstName() { return FirstName; }

    public void setFirstName(String firstName) { FirstName = firstName; }

    public String getLastName() { return LastName; }

    public void setLastName(String lastName) { LastName = lastName; }

    public String getEmail() { return Email; }

    public void setEmail(String email) { Email = email; }

    public int getPassword() { return Password; }

    public void setPassword(int password) { Password = password; }

    public int getFacilityCodeE() { return FacilityCodeE; }

    public void setFacilityCodeE(int facilityCodeE) { FacilityCodeE = facilityCodeE; }

    public int getCardNumber() { return CardNumber; }

    public void setCardNumber(int cardNumber) { CardNumber = cardNumber; }

    public String getMale() { return Male; }

    public void setMale(String male) { Male = male; }

    public String getFemale() { return Female; }

    public void setFemale(String female) { Female = female; }
}
```

Figure 51:Employee Helper class.

Defined the gets and sets methods for Helped the helperclassE() object from Employee.java class.

```
rootNode = FirebaseDatabase.getInstance();
reference = rootNode.getReference( path: "Facility");
```

Figure 52:Get data and reference (Facility).

Get the data and reference from the database for Facility.

```
public class FacilityHelper {

    String FacilityName,Email;
    int Password,FacilityCode;

    public FacilityHelper() {

    }

    public FacilityHelper(String facilityName, String email, int password, int facilityCode) {
        FacilityName = facilityName;
        Email = email;
        Password = password;
        FacilityCode = facilityCode;
    }

    public String getFacilityName() { return FacilityName; }

    public void setFacilityName(String facilityName) { FacilityName = facilityName; }

    public String getEmail() { return Email; }

    public void setEmail(String email) { Email = email; }

    public int getPassword() { return Password; }

    public void setPassword(int password) { Password = password; }

    public int getFacilityCode() { return FacilityCode; }

    public void setFacilityCode(int facilityCode) { FacilityCode = facilityCode; }
}
```

Figure 53: Facility Helper class.

Defined the gets and sets methods for Helped the helperclassF() object from Facility.java class.

```
FacilityHelper helperClassF = new FacilityHelper(FacilityName,Email,Password,FacilityCode);
reference.setValue(helperClassF);
```

Figure 54: Add data.

Add the data to the database.

## 4.5 Packages and Classes Description

In this section a clear description of packages used for the program will be provided, as well as classes with their description. Then the main library used for implementing the project.

### 4.5.1 Packages

| Name of Package | Description  |
|-----------------|--|
| App             | This package contains all the packages located within the android studio.  |
| Com.example.CIO | This package contains all the classes used in the application.   |
| Drawable        | This package contains all the images within each application interface.  |
| Layout          | This package contains all the interfaces used in the application.  |
| Values          | This package contains all the formats of colours, lines and information within each interface in the application.  |
| Mipmap          | This package contains the icon of the application.   |
| Anim            | This package contains animations defined in XML that modifies properties of the target object, such as background colour or alpha value over a set amount of time. |
| font            | Package contains a font source that defines a custom font that you can use in the app.   |

*Figure 55: package*

#### 4.5.2 Classes

| Name of Class       | Description   |
|---------------------|---|
| Absent_paga         | Retrieves absent data from the database for display.  |
| Account_page        | A page for the user to choose what page to display the information in that page or have the choice to sign out.                                   |
| AccountPageFacility | Page for facilities they have two choices either enter a page to search for employees and display their information or sign out of their account. |
| Attendance_Info     | View attendance information retrieved from database.  |
| Attendance_page     | Retrieves attendance data from the database for display.  |

|                 |   |
|-----------------|---|
| Delay_page      | Retrieves delay data from the database for display.   |
| Employee_SignUp | Page for the employees to enter their information with the code given from the facility and the card number they have. Then it will be saved in the database. |
| EmployeeHelper  | Help for employee sign up to retrieve attributes with set and get functions.  |
| EmployeeLogin   | Login page where the employee enters his email and password then it gets matched to the one saved in the database to enter to the employee main page.         |
| Facility_SignUp | Page for the facility to enter their information with the facility code to register in the app, then it will be saved in the database.                        |
| FacilityHelper  | Help for facility sign up to retrieve attributes with set and get functions.  |
| FacilityLogin   | Login page where the facility can enter their email and password and match it with the data saved in the database then enter to the facility main page.       |
| MainActivity    | This is the first page in the app, where the employee or facility can choose the right button for them to login.  |
| Worker_page     | Page for viewing employees working in the facility where the data is retrieved from the database.   |

*Figure 56:Classes.*

#### 4.5.3 Libraries

| Name of Library      | Description  |
|----------------------|--|
| Google-service. json | Link between the firebase for our database with the project. |

*Figure 57:librariess.*

## 4.6 Procedures Description

The Software and hardware describe the critical code to operate CIO system.

## 1.10.15 Software

### 4.6.1.1 Link between facility with employee

Link the new employee with the facility by the facility code

```
facilityRef.addListenerForSingleValueEvent(new ValueEventListener() {
    @Override
    public void onDataChange(@NonNull DataSnapshot snapshot) {
        if(snapshot.exists()){
            for(DataSnapshot data : snapshot.getChildren()){
                Facility facility = data.getValue(Facility.class);
                if(String.valueOf(facility.getFacilityCode()).equals(facilityCode)){
                    validCode = true;
                    Log.d( tag, "Facility Code: ", msg: "Yes it was triggered!");
                }
            }
            if(!validCode){
                Toast.makeText(getApplicationContext(), text: "Invalid Facility Code Contact Admin", Toast.LENGTH_LONG).show();
            }
        }
    }
})
```

Figure 58:Link employee with facility.

### 4.6.1.2 Link server with database in firebase

Here link the server with our database in firebase

```
1 import admin from 'firebase-admin';
2 import { v4 as uuidv4 } from 'uuid';
3
4 import { serviceAccountKey } from '../config/serviceAccountKey.js';
5
6 admin.initializeApp({
7     credential: admin.credential.cert(serviceAccountKey),
8     databaseURL: 'https://cion-fec03-default.firebaseio.com',
9 });
10
11 export const serviceAccountKey = {
12     type: 'service_account',
13     project_id: 'cion-fec03',
14     private_key_id: '988d586641b848eb8481439cc9f8a37fe8bfd4e3',
15     private_key: '-----BEGIN PRIVATE KEY-----\nMIIEvgIBADANBgkqhkiG9w0BAQEFAASCBKgwgSkAgEAAoIBAQcJ56I',
16     client_email: 'firebase-adminsdk-fze3p@cion-fec03.firebaseio.gserviceaccount.com',
17     client_id: '100598589625163445923',
18     auth_uri: 'https://accounts.google.com/o/oauth2/auth',
19     token_uri: 'https://oauth2.googleapis.com/token',
20     auth_provider_x509_cert_url: 'https://www.googleapis.com/oauth2/v1/certs',
21     client_x509_cert_url:
22     | 'https://www.googleapis.com/robot/v1/metadata/x509.firebaseio-adminsdk-fze3p%40cion-fec03.firebaseio.gse
23 };
24
```

Figure 59:Link server with database.

## 1.10.16 Hardware

### 4.6.1.3 NFC Reader with card

Make the NFC Reader take the attend information from the card .

```

nfc.on('reader', (reader) => {
  console.log(`[${reader.reader.name}] device attached`);

  reader.on('card', async (card) => {
    console.log(`[${reader.reader.name}] card detected`, card.uid);

    const timestamp = new Date();
    let cardNumber;
    const availableCards = await getCardsUidObj();

    availableCards.cardUids.forEach((availableCard, index) => {
      if (availableCard.id === card.uid) {
        cardNumber = index;
      }
    });
  });
}

```

*Figure 60:NFC Reader with card.*

#### 4.6.1.4 NFC Reader

This package make the NFC Reader device read.

```

1 import { NFC } from 'nfc-pcsc';
2 import snap from 'node-snap';

```

*Figure 61:NFC Reader.*

If the employee take the attendance more than one time this error appears to him.

```

95
96 nfc.on('error', (err) => {
97   | console.log('an error occurred', err);
98 });
99

```

*Figure 62:NFC Error*

## 4.7 Summary

To summarize, this chapter discussed the implementation process and the languages used to create and write the application, the hardware used to help in the process of making the application. Screenshots of all interfaces included with descriptions under each interface to describe its purpose.

Database description was given clearly with reasons for the chosen languages.

Classes and packages used where mentioned in detail alongside the libraries involved in implementing the application.

Pieces of code from the application were presented but only the ones critical to run the system, they were described also.

## **Chapter Five: Testing and Results**

## 5 Testing and Results

### 5.1 Introduction

The previous chapter focused on the system implementation process that provided a detailed description. This chapter will present the system testing and results. The System Testing section contains the unit testing that shows the results of each function, integration testing that describe the result of multiple function test, user acceptance testing that confirms that the system is ready for operational use, and finally the test cases. The Discussion section has discussed the results, limitations, and obstacles that faced us during different phases. Ending with the Summary section, which summarizes this chapter.

### 5.2 System Testing

#### 1.10.17 Unit Testing

In tables below a full description of each unit of software is tested to validate that each unit performs as expected.

| Unit Testing | Inputs   | Expected Output   | Pass/Fail Criteria |
|--------------|--|---|--------------------|
| Sign up      | <ul style="list-style-type: none"><li>• Enter the facility the (Facility name , email , password , facility code)</li><li>• Enter the Employee the (First name, last name , email , password , facility code , card number ,</li></ul> | <ul style="list-style-type: none"><li>• Facility account page</li><li>• Employee account page</li></ul> | Pass               |

|   |                    |  |  |
|---|--------------------|--|--|
|   | choose the gender) |  |  |
| <b>Actual Result</b>  |                    |  |  |
| Facility sign up  |                    |  |  |
|    |                    |  |  |
| Employee sign up  |                    |  |  |
|  |                    |  |  |
| Facility account page   |                    |  |  |

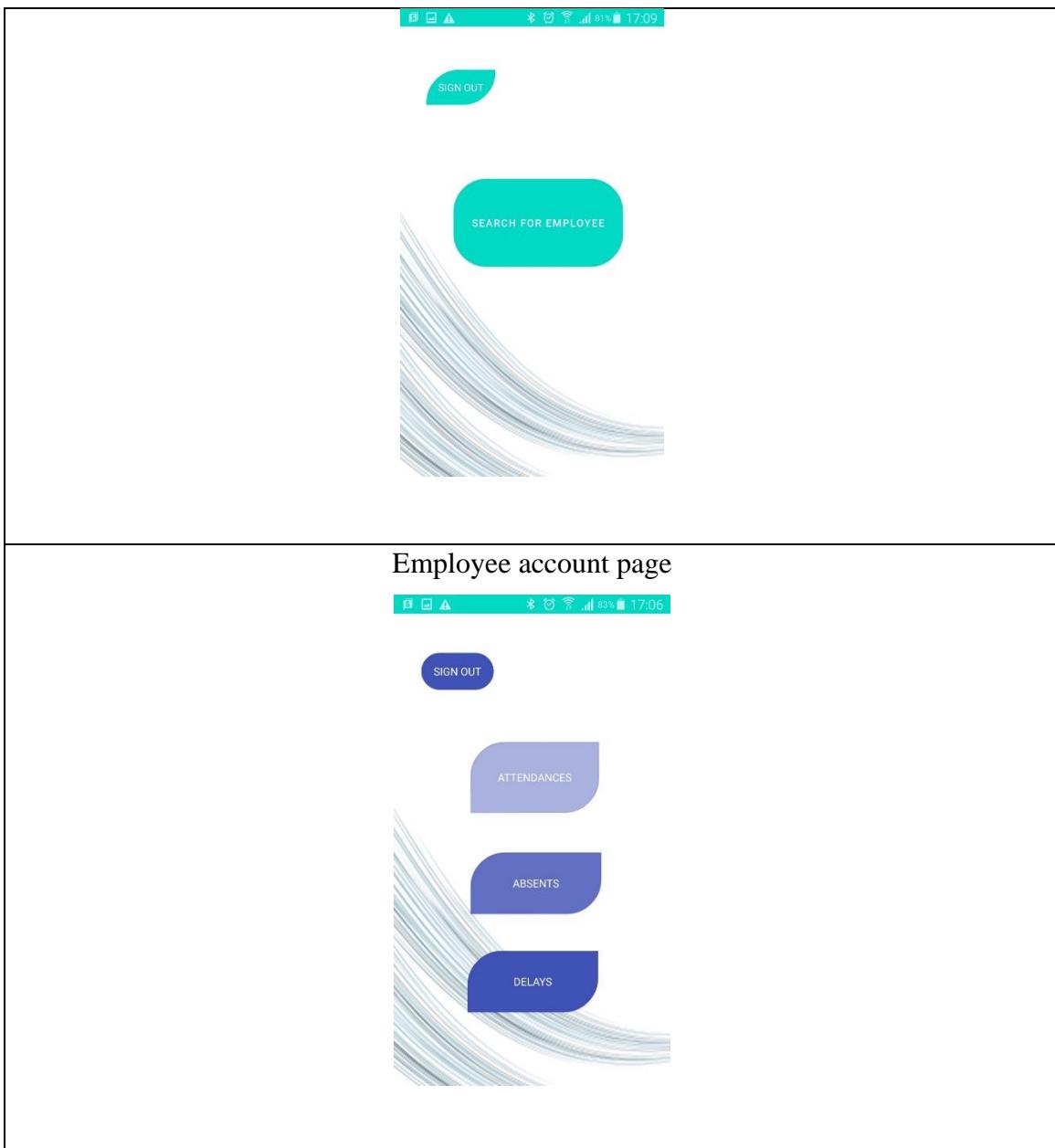


Table 15:Sign up facility and employee

| <b>Unit Testing</b> | <b>Inputs</b>  | <b>Expected Output</b>  | <b>Pass/Fail Criteria</b> |
|---------------------|--|---|---------------------------|
| Sign in             | <ul style="list-style-type: none"> <li>• Enter the facility the(email , password)</li> <br/> <li>• Enter the Employee the</li> </ul> | <ul style="list-style-type: none"> <li>• Facility account page</li> </ul> | Pass                      |

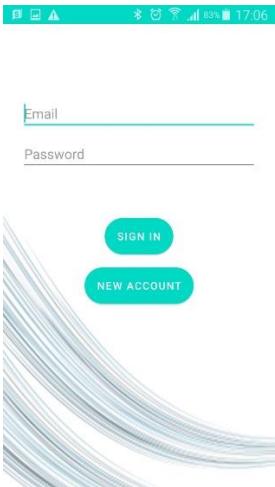
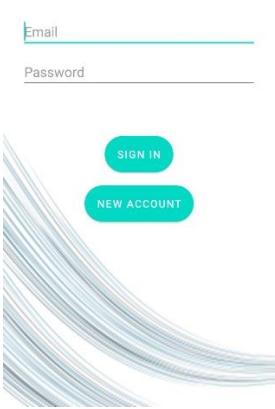
|                      |                       |   |   |
|----------------------|-----------------------|---|---|
|                      | (email ,<br>password) | <ul style="list-style-type: none"> <li>Employee<br/>account page</li> </ul> |   |
| <b>Actual Result</b> |                       |   |   |
| Facility sign in     |                       |   |    |
| Employee sign in     |                       |   |  |

Table 16:Sign in facility and employee.

| Unit Testing      | Inputs   | Expected Output   | Pass/Fail Criteria |
|-------------------|--|---|--------------------|
| Button attendance | <ul style="list-style-type: none"> <li>At the first time<br/>the Employee<br/>put the card in<br/>the top of the<br/>NFC Reader</li> </ul> | <ul style="list-style-type: none"> <li>Attendance<br/>Check-in(at the<br/>facility<br/>specified time)</li> </ul> | Pass               |

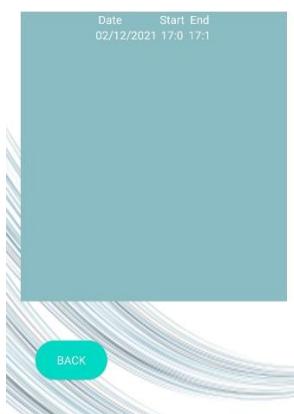
|  |   |   |  |
|--|---|---|--|
|  | <ul style="list-style-type: none"> <li>At the last time the Employee put the card in the top of the NFC Reader</li> </ul> | <ul style="list-style-type: none"> <li>Attendance Check-out (at the facility specified time)</li> </ul> |  |
|--|---|---|--|

### Actual Result

#### Check In

 Saving screenshot...

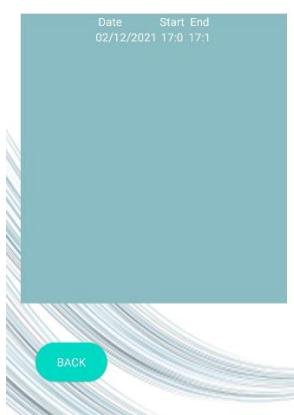
#### Attendance



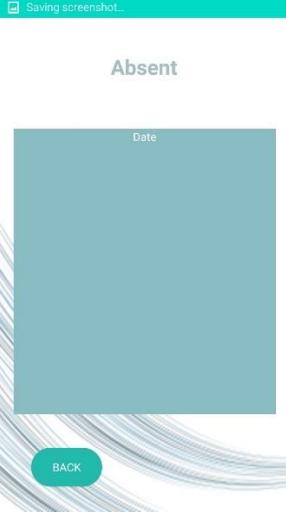
#### Check Out

 Saving screenshot...

#### Attendance



*Table 17:attendance page from employee account page.*

| <b>Unit Testing</b>  | <b>Inputs</b>   | <b>Expected Output</b>                                   | <b>Pass/Fail Criteria</b> |
|--|---|--|---------------------------|
| Button absent  | <ul style="list-style-type: none"> <li>If the employee not attend(after end the day if not check-in)</li> </ul> | <ul style="list-style-type: none"> <li>absent</li> </ul> | Pass                      |
| <b>Actual Result</b>   |   |  |                           |
|  <p>The screenshot shows a mobile application interface. At the top, there is a green bar with the text "Saving screenshot...". Below this, the word "Absent" is displayed in a large, bold, black font. Underneath "Absent", there is a teal-colored rectangular area labeled "Date". At the bottom of the screen, there is a small circular button labeled "BACK" with a wavy pattern behind it.</p> |   |  |                           |

*Table 18:absent page from employee account page.*

| <b>Unit Testing</b> | <b>Inputs</b>  | <b>Expected Output</b>                                  | <b>Pass/Fail Criteria</b> |
|---------------------|--|---|---------------------------|
| Button delay        | <ul style="list-style-type: none"> <li>If the employee attend after the facility specified time (calculate delay by the mints (hour-start hour)* 60 + mint) The delay calculation starts from the beginning of working hours,</li> </ul> | <ul style="list-style-type: none"> <li>Delay</li> </ul> | Pass                      |

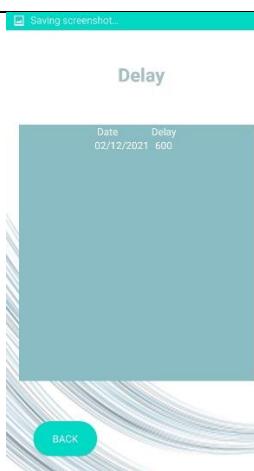
|   |                             |  |  |
|---|-----------------------------|--|--|
|   | even if it is a minute late |  |  |
| <b>Actual Result</b>  |                             |  |  |
|  |                             |  |  |

Table 19:delay page from employee account page.

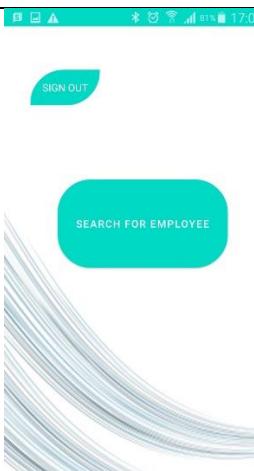
| Unit Testing  | Inputs  | Expected Output   | Pass/Fail Criteria |
|---|---|---|--------------------|
| Search by worker  | <ul style="list-style-type: none"> <li>In facility account</li> </ul> | <ul style="list-style-type: none"> <li>The worker page</li> </ul> | Pass               |
| <b>Actual Result</b>  |   |   |                    |
|  |   |   |                    |

Table 20:Facility account page.

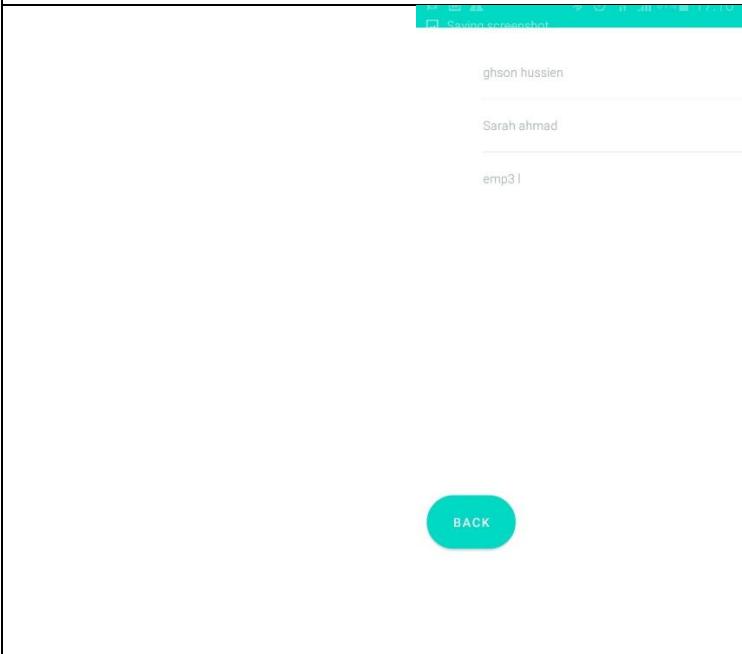
| <b>Unit Testing</b>  | <b>Inputs</b>  | <b>Expected Output</b>  | <b>Pass/Fail Criteria</b> |
|--|--|---|---------------------------|
| The worker   | <ul style="list-style-type: none"> <li>In the worker page can choose a certain employee and show attendance information for her</li> </ul> | <ul style="list-style-type: none"> <li>Account page for a certain employee</li> </ul> | Pass                      |
| <b>Actual Result</b>   |  |   |                           |
|  |  |   |                           |

Table 21:worker page.

| <b>Unit Testing</b>  | <b>Inputs</b>  | <b>Expected Output</b>                                      | <b>Pass/Fail Criteria</b> |
|----------------------|--|---|---------------------------|
| Sign out             | <ul style="list-style-type: none"> <li>In account facility page</li> <li>In account employee page</li> </ul> | <ul style="list-style-type: none"> <li>Home page</li> </ul> | Pass                      |
| <b>Actual Result</b> |  |   |                           |



Table 22:sign out employee and facility.

### 1.10.18 Integration Testing

The main functionality in this section is to test the connected component. As shown in tables below the integration test clarify actors, input, output, and if there are any unexpected behaviors.

| Purpose              | Input | Expected Output   | Test result  |
|----------------------|-------|-------------------|--|
| Green light          | Card  | Record attendance | Put the card on the top of NFC Reader successful recording |
| <b>Actual Result</b> |       |                   |  |
|                      |       |                   |  |

|    |       |                       |  |
|--|-------|-----------------------|--|
| Purpose  | Input | Expected Output       | Test result  |
| Red light  | none  | Not Record attendance | The card not on the top of NFC Reader the attend not recording but the device attached |
| Actual Result  |       |                       |  |
|    |       |                       |  |
| <pre>[node] 2.0.15 [nodem] to restart at any time, enter `rs` [nodem] watching path(s): "*" [nodem] watching extensions: js,mjs,json [ACS ACR122 0] device attached [ACS ACR122 0] card detected 30d49d [ACS ACR122 0] card removed 30d49d [ACS ACR122 0] device removed updateAttendance() [2021-12-02T15:58:06.372Z] #firebasedatabase: FIREBASE WARNING: Using an unspecified index. Your data will be downloaded and filtered on the client. Consider adding ".indexOn": "id" at /Attendance to your security rules for better performance. [ACS ACR122 0] an error occurred [Error: SCardGetStatusChange error: The Smart Card resource Manager is not running. (0x8000000d)] [ACS ACR122 0] device removed</pre> |       |                       |  |

Table 23: Integration test.

| Purpose | Input | Expected Output | Test result |
|---------|-------|-----------------|-------------|
|---------|-------|-----------------|-------------|

|                                   |      |                |   |
|-----------------------------------|------|----------------|---|
| If the device disconnect the wire | None | Removed device | In the server have attention removed device |
| <b>Actual Result</b>              |      |                |   |

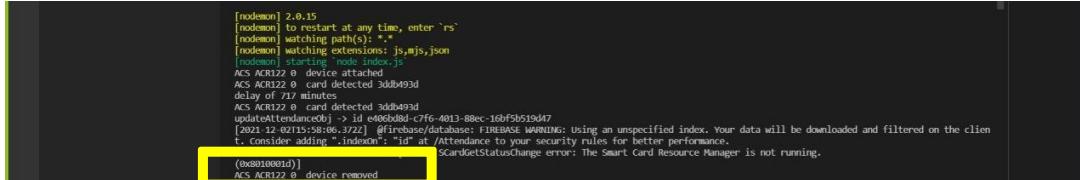
  


Table 24: Integration test (removed device )

### 1.10.19 User Acceptance Testing

The user acceptance testing goal is to give the users a chance to interact with the software and find out if everything works as it should. Also, to discover if there are any overlooked, miscommunicated, and so on. An evaluation form has been created to measure user satisfaction with the system. Figure.44 below shows the result of this evaluation.

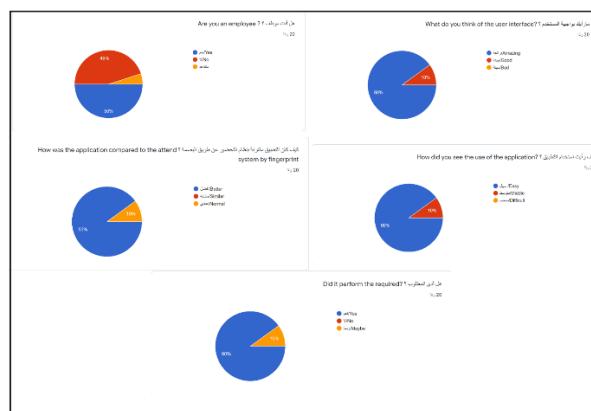


Figure 63:Acceptance Test.

### 1.10.20 Test Cases

The goal of test cases is to detect if there are any defects in the system and test all the possible actions in it. The tables below provide the purpose for each test case, inputs, expected output, actual result, and whether the test passed or failed.

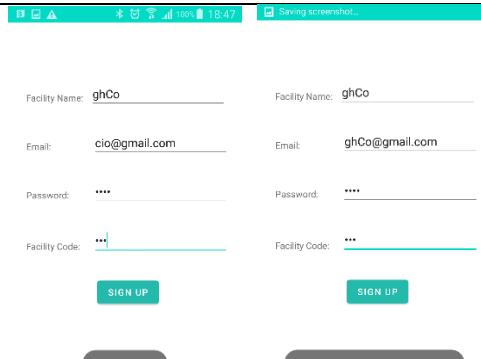
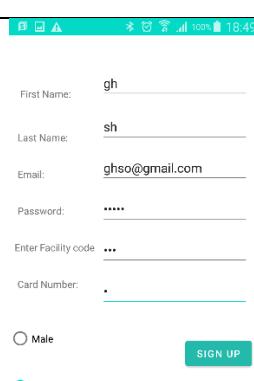
| Purpose  | Input  | Expected Output              | Pass/Fail Criteria |
|--|--|------------------------------|--------------------|
| Sign up the facility with not used information   | Enter (Facility name , email , password , facility code) | Facility account page        | Pass               |
| <b>Actual Result</b>   |  |                              |                    |
| <br>Facility Name: ghCo _____<br>Email: ghCo@gmail.com _____<br>Password: **** _____<br>Facility Code: *** _____<br><span style="background-color: #009640; color: white; padding: 2px 10px; border-radius: 5px;">SIGN UP</span>  |  |                              |                    |
| Purpose  | Input  | Expected Output              | Pass/Fail Criteria |
| Sign up the facility with used information   | Enter (Facility name , email , password , facility code) | Used email and facility code | Fail               |
| <b>Actual Result</b>   |  |                              |                    |
| <br>Facility Name: ghCo _____      Facility Name: ghCo _____<br>Email: cio@gmail.com _____      Email: ghCo@gmail.com _____<br>Password: **** _____      Password: **** _____<br>Facility Code: *** _____      Facility Code: *** _____<br><span style="background-color: #009640; color: white; padding: 2px 10px; border-radius: 5px;">SIGN UP</span><br><span style="background-color: #e0e0e0; border-radius: 50%; padding: 5px; margin-right: 10px;">Email is in use</span> <span style="background-color: #e0e0e0; border-radius: 50%; padding: 5px;">Facility Code is in use contact Admin</span> |  |                              |                    |

Table 25:Sign up facility test case.

| Purpose  | Input  | Expected Output                   | Pass/Fail Criteria |
|--|--|-----------------------------------|--------------------|
| Sign up the employee with correct and not used information                         | <ul style="list-style-type: none"> <li>Enter (First name, last name , email , password , facility code , card number , choose the gender)</li> </ul> | Employee account page             | Pass               |
| <b>Actual Result</b>   |  |                                   |                    |
|  |  |                                   |                    |
| Purpose  | Input  | Expected Output                   | Pass/Fail Criteria |
| Sign up the employee with incorrect and used information                           | <ul style="list-style-type: none"> <li>Enter (First name, last name, email , password , facility code , card number , choose the gender)</li> </ul>  | Wrong facility code and used card | Fail               |
| <b>Actual Result</b>   |  |                                   |                    |

First Name: gh

Last Name: sh

Email: ghso@gmail.com

Password: \*\*\*\*

Enter Facility code: \*\*\*

Card Number: 4

Male       Female

Male       Female

Card is already in use

Invalid Facility Code Contact Admin.

Table 26:Sign up employee test case.

| Purpose   | Input  | Expected Output                              | Pass/Fail Criteria |
|---|--|--|--------------------|
| Sign in the facility and employee with correct information  | <ul style="list-style-type: none"> <li>Enter email and password</li> </ul> | Facility account page, Employee account page | Pass               |
| <b>Actual Result</b>  |  |  |                    |
| Purpose   | Input  | Expected Output                              | Pass/Fail Criteria |
| Sign in the facility and employee with incorrect information  | <ul style="list-style-type: none"> <li>Enter email and password</li> </ul> | Wrong password                               | Fail               |
| <b>Actual Result</b>  |  |  |                    |
| <p>qjh.qh@gmail.com</p> <p>....</p> <p><input type="button" value="SIGN IN"/></p> <p><input type="button" value="NEW ACCOUNT"/></p> <p>Wrong Credentials!</p> |  |  |                    |

Table 27:sign in test case.

| <b>Purpose</b>   | <b>Input</b> | <b>Expected Output</b> | <b>Pass/Fail Criteria</b> |
|--|--------------|------------------------|---------------------------|
| Put the card on the top of NFC Reader  | Card         | Record attendance      | Pass                      |
| <b>Actual Result</b>   |              |                        |                           |
|    |              |                        |                           |
| <b>Purpose</b>   | <b>Input</b> | <b>Expected Output</b> | <b>Pass/Fail Criteria</b> |
| The card not on the top of NFC Reader  | none         | Not Record attendance  | Pass                      |
| <b>Actual Result</b>   |              |                        |                           |
|  |              |                        |                           |

Table 28:hardware test case.

### **5.3 Discussion**

The aim of the project is to develop an application that makes the attendance process more efficient.

And in our project, the NFC reader was connected with the CIO app to make the attendance registration process more accurate, fast, and easy to use for all users.

The specific objectives of this project have been achieved.

The team has faced several obstacles and limitations during the construction period of the project.

Among the most important of these obstacles is dealing with the NFC reader , There was no NFC reader in our city and we had to order it from outside Saudi Arabia, and it took a lot of time, and when it arrived, it did not accept programming and writing on it, and it took a lot of time and research to find a solution to this problem, and then another problem came, which is the device's failure to accept direct connection with the application at the time We used a third party, which is the smart card, to be a link between the application and the device, and when solving these problems, there was a problem with the Android Studio versions, which is the application used in programming our application (CIO), and it took us a lot of effort and time, especially since it was a self-research and the last problem is some human failure problems in Attempts to avoid them as much as possible, some business logic problems and finally some interface and database problems.

### **5.4 Summary**

This chapter focused on testing different cases of the system, different components applied to make sure system is working at its best, described different phases and how were they tested.

Next chapter will be a summary of all the work done to making this project, and the main results, problems faced during testing and how they were resolved. In addition, discuss further improvements and suggestions for future work and updates.

## **Chapter Six: Conclusion and Future Work**

## **6 Conclusion and Future Work**

### **6.1 Conclusion**

Through this long journey to make this project come to life, creating the application (CIO) to help make taking attendance easier and faster, after analyzing the survey done at the beginning results showed how important it is making an application work faster and look appealing and easy to use, it help employees and companies keep track of all needed information on the go and whenever required. (CIO) is a reliable solution for both employees and companies. During this journey many obstacles and challenges were faced that were successfully overcome, it gave the team members knowledge and good experience, and lessons, including:

- Improving searching skills.
- Time management and teamwork.
- Working with new programs and environments.

### **6.2 Future Work**

The next phase for this project will be adding some features and improvements to the system by:

- Develop the application to support Arabic language.
- Allowing the employee to register for more than one facility.
- Develop the application to send notification to users.
- Allow the facility to search for employees by name.

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## **Appendix**

## A. Code Snippets

```
src > utils > JS firebase.js > ...
1 import admin from 'firebase-admin';
2 import { v4 as uuidv4 } from 'uuid';
3
4 import { serviceAccountKey } from '../config/serviceAccountKey.js';
5
6 admin.initializeApp({
7   credential: admin.credential.cert(serviceAccountKey),
8   databaseURL: 'https://cion-fec03-default.firebaseio.com',
9 });
10
11 const db = admin.database();
12 const auth = admin.auth();
13 const employeesRef = db.ref('Employee');
14 const facilityRef = db.ref('Facility');
15 const attendanceRef = db.ref('Attendance');
16 const delaysRef = db.ref('Delays');
17 const absenceRef = db.ref('Absence');
18 const cardUidsRef = db.ref('CardUids');
19
20 // TODO add facility code to the attendance Object
21 export const createAttendanceObj = async (
22   email,
23   timestamp
24   // facilityCode
25 ) => {
26   attendanceRef.push().set({
27     id: uuidv4(),
28     email,
29     date: new Date().toLocaleDateString(),
30     checkIn: timestamp,
31     checkOut: null,
32     // facilityCode,
33   });
34 };
35
36 export const createDelayObj = async (email, delay) => {
37   delaysRef.push().set({
38     id: uuidv4(),
39     email,
40     delay,
41     date: new Date().toLocaleDateString(),
42   });
43 };
44
45 export const createAbsenceObj = (email) => {
46   absenceRef.push().set({
47     id: uuidv4(),
48     email,
49     date: new Date().toLocaleDateString(),
50   });
51 };
52
53 export const hasAttended = async (email, date) => {
54   const attendanceRecord = await getAttendanceObj(email, date);
55   var attended = false;
56
57   if (attendanceRecord != null) {
58     attended = true;
59   }
60 }
61
62 return { attended, attendanceRecord };
63
64 const getAttendanceObj = async (email, date) => {
65   const snapshot = await attendanceRef.once('value');
66   const attendanceRecords = snapshot.val();
67   let existingAttendanceDetails = null;
68
69   if (attendanceRecords) {
70     existingAttendanceDetails = Object.values(attendanceRecords).find(
71       (attendanceRecord) => {
72         return (
73           attendanceRecord.email === email && attendanceRecord.date === date
74         );
75       }
76     );
77   }
78
79   return existingAttendanceDetails;
80 };
81
82 export const getEmployeeObj = async (cardNumber = null) => {
83   try {
84     const snapshot = await employeesRef.once('value');
85     const employees = snapshot.val();
86     let existingEmployee = null;
87
88     if (cardNumber !== null) {
89       existingEmployee = employees[cardNumber];
90     }
91   } catch (error) {
92     console.error(`Error fetching employee data: ${error.message}`);
93   }
94
95   return existingEmployee;
96 };
97
98 export const getFacilityObj = async (facilityCode) => {
99   const facilityRef = db.ref('Facility');
100
101   const snapshot = await facilityRef.orderByChild('code').equalTo(facilityCode).once('value');
102
103   if (snapshot.exists()) {
104     const facilityData = snapshot.val();
105     return facilityData;
106   }
107
108   return null;
109 };
110
111 export const getCardUidsObj = async () => {
112   const cardUidsRef = db.ref('CardUids');
113
114   const snapshot = await cardUidsRef.once('value');
115
116   if (snapshot.exists()) {
117     const cardUidsData = snapshot.val();
118     return cardUidsData;
119   }
120
121   return null;
122 };
123
124 export const getDelaysObj = async () => {
125   const delaysRef = db.ref('Delays');
126
127   const snapshot = await delaysRef.once('value');
128
129   if (snapshot.exists()) {
130     const delaysData = snapshot.val();
131     return delaysData;
132   }
133
134   return null;
135 };
136
137 export const getAbsenceObj = async () => {
138   const absenceRef = db.ref('Absence');
139
140   const snapshot = await absenceRef.once('value');
141
142   if (snapshot.exists()) {
143     const absenceData = snapshot.val();
144     return absenceData;
145   }
146
147   return null;
148 };
149
150 export const getAttendanceObj = async () => {
151   const attendanceRef = db.ref('Attendance');
152
153   const snapshot = await attendanceRef.once('value');
154
155   if (snapshot.exists()) {
156     const attendanceData = snapshot.val();
157     return attendanceData;
158   }
159
160   return null;
161 };
162
163 export const getEmployeesObj = async () => {
164   const employeesRef = db.ref('Employee');
165
166   const snapshot = await employeesRef.once('value');
167
168   if (snapshot.exists()) {
169     const employeesData = snapshot.val();
170     return employeesData;
171   }
172
173   return null;
174 };
175
176 export const getFacilitiesObj = async () => {
177   const facilityRef = db.ref('Facility');
178
179   const snapshot = await facilityRef.once('value');
180
181   if (snapshot.exists()) {
182     const facilityData = snapshot.val();
183     return facilityData;
184   }
185
186   return null;
187 };
188
189 export const getCardUidsObj = async () => {
190   const cardUidsRef = db.ref('CardUids');
191
192   const snapshot = await cardUidsRef.once('value');
193
194   if (snapshot.exists()) {
195     const cardUidsData = snapshot.val();
196     return cardUidsData;
197   }
198
199   return null;
200 };
201
202 export const getDelaysObj = async () => {
203   const delaysRef = db.ref('Delays');
204
205   const snapshot = await delaysRef.once('value');
206
207   if (snapshot.exists()) {
208     const delaysData = snapshot.val();
209     return delaysData;
210   }
211
212   return null;
213 };
214
215 export const getAbsenceObj = async () => {
216   const absenceRef = db.ref('Absence');
217
218   const snapshot = await absenceRef.once('value');
219
220   if (snapshot.exists()) {
221     const absenceData = snapshot.val();
222     return absenceData;
223   }
224
225   return null;
226 };
227
228 export const getAttendanceObj = async () => {
229   const attendanceRef = db.ref('Attendance');
230
231   const snapshot = await attendanceRef.once('value');
232
233   if (snapshot.exists()) {
234     const attendanceData = snapshot.val();
235     return attendanceData;
236   }
237
238   return null;
239 };
240
241 export const getEmployeesObj = async () => {
242   const employeesRef = db.ref('Employee');
243
244   const snapshot = await employeesRef.once('value');
245
246   if (snapshot.exists()) {
247     const employeesData = snapshot.val();
248     return employeesData;
249   }
250
251   return null;
252 };
253
254 export const getFacilitiesObj = async () => {
255   const facilityRef = db.ref('Facility');
256
257   const snapshot = await facilityRef.once('value');
258
259   if (snapshot.exists()) {
260     const facilityData = snapshot.val();
261     return facilityData;
262   }
263
264   return null;
265 };
266
267 export const getCardUidsObj = async () => {
268   const cardUidsRef = db.ref('CardUids');
269
270   const snapshot = await cardUidsRef.once('value');
271
272   if (snapshot.exists()) {
273     const cardUidsData = snapshot.val();
274     return cardUidsData;
275   }
276
277   return null;
278 };
279
280 export const getDelaysObj = async () => {
281   const delaysRef = db.ref('Delays');
282
283   const snapshot = await delaysRef.once('value');
284
285   if (snapshot.exists()) {
286     const delaysData = snapshot.val();
287     return delaysData;
288   }
289
290   return null;
291 };
292
293 export const getAbsenceObj = async () => {
294   const absenceRef = db.ref('Absence');
295
296   const snapshot = await absenceRef.once('value');
297
298   if (snapshot.exists()) {
299     const absenceData = snapshot.val();
300     return absenceData;
301   }
302
303   return null;
304 };
305
306 export const getAttendanceObj = async () => {
307   const attendanceRef = db.ref('Attendance');
308
309   const snapshot = await attendanceRef.once('value');
310
311   if (snapshot.exists()) {
312     const attendanceData = snapshot.val();
313     return attendanceData;
314   }
315
316   return null;
317 };
318
319 export const getEmployeesObj = async () => {
320   const employeesRef = db.ref('Employee');
321
322   const snapshot = await employeesRef.once('value');
323
324   if (snapshot.exists()) {
325     const employeesData = snapshot.val();
326     return employeesData;
327   }
328
329   return null;
330 };
331
332 export const getFacilitiesObj = async () => {
333   const facilityRef = db.ref('Facility');
334
335   const snapshot = await facilityRef.once('value');
336
337   if (snapshot.exists()) {
338     const facilityData = snapshot.val();
339     return facilityData;
340   }
341
342   return null;
343 };
344
345 export const getCardUidsObj = async () => {
346   const cardUidsRef = db.ref('CardUids');
347
348   const snapshot = await cardUidsRef.once('value');
349
350   if (snapshot.exists()) {
351     const cardUidsData = snapshot.val();
352     return cardUidsData;
353   }
354
355   return null;
356 };
357
358 export const getDelaysObj = async () => {
359   const delaysRef = db.ref('Delays');
360
361   const snapshot = await delaysRef.once('value');
362
363   if (snapshot.exists()) {
364     const delaysData = snapshot.val();
365     return delaysData;
366   }
367
368   return null;
369 };
370
371 export const getAbsenceObj = async () => {
372   const absenceRef = db.ref('Absence');
373
374   const snapshot = await absenceRef.once('value');
375
376   if (snapshot.exists()) {
377     const absenceData = snapshot.val();
378     return absenceData;
379   }
380
381   return null;
382 };
383
384 export const getAttendanceObj = async () => {
385   const attendanceRef = db.ref('Attendance');
386
387   const snapshot = await attendanceRef.once('value');
388
389   if (snapshot.exists()) {
390     const attendanceData = snapshot.val();
391     return attendanceData;
392   }
393
394   return null;
395 };
396
397 export const getEmployeesObj = async () => {
398   const employeesRef = db.ref('Employee');
399
400   const snapshot = await employeesRef.once('value');
401
402   if (snapshot.exists()) {
403     const employeesData = snapshot.val();
404     return employeesData;
405   }
406
407   return null;
408 };
409
410 export const getFacilitiesObj = async () => {
411   const facilityRef = db.ref('Facility');
412
413   const snapshot = await facilityRef.once('value');
414
415   if (snapshot.exists()) {
416     const facilityData = snapshot.val();
417     return facilityData;
418   }
419
420   return null;
421 };
422
423 export const getCardUidsObj = async () => {
424   const cardUidsRef = db.ref('CardUids');
425
426   const snapshot = await cardUidsRef.once('value');
427
428   if (snapshot.exists()) {
429     const cardUidsData = snapshot.val();
430     return cardUidsData;
431   }
432
433   return null;
434 };
435
436 export const getDelaysObj = async () => {
437   const delaysRef = db.ref('Delays');
438
439   const snapshot = await delaysRef.once('value');
440
441   if (snapshot.exists()) {
442     const delaysData = snapshot.val();
443     return delaysData;
444   }
445
446   return null;
447 };
448
449 export const getAbsenceObj = async () => {
450   const absenceRef = db.ref('Absence');
451
452   const snapshot = await absenceRef.once('value');
453
454   if (snapshot.exists()) {
455     const absenceData = snapshot.val();
456     return absenceData;
457   }
458
459   return null;
460 };
461
462 export const getAttendanceObj = async () => {
463   const attendanceRef = db.ref('Attendance');
464
465   const snapshot = await attendanceRef.once('value');
466
467   if (snapshot.exists()) {
468     const attendanceData = snapshot.val();
469     return attendanceData;
470   }
471
472   return null;
473 };
474
475 export const getEmployeesObj = async () => {
476   const employeesRef = db.ref('Employee');
477
478   const snapshot = await employeesRef.once('value');
479
480   if (snapshot.exists()) {
481     const employeesData = snapshot.val();
482     return employeesData;
483   }
484
485   return null;
486 };
487
488 export const getFacilitiesObj = async () => {
489   const facilityRef = db.ref('Facility');
490
491   const snapshot = await facilityRef.once('value');
492
493   if (snapshot.exists()) {
494     const facilityData = snapshot.val();
495     return facilityData;
496   }
497
498   return null;
499 };
500
501 export const getCardUidsObj = async () => {
502   const cardUidsRef = db.ref('CardUids');
503
504   const snapshot = await cardUidsRef.once('value');
505
506   if (snapshot.exists()) {
507     const cardUidsData = snapshot.val();
508     return cardUidsData;
509   }
510
511   return null;
512 };
513
514 export const getDelaysObj = async () => {
515   const delaysRef = db.ref('Delays');
516
517   const snapshot = await delaysRef.once('value');
518
519   if (snapshot.exists()) {
520     const delaysData = snapshot.val();
521     return delaysData;
522   }
523
524   return null;
525 };
526
527 export const getAbsenceObj = async () => {
528   const absenceRef = db.ref('Absence');
529
530   const snapshot = await absenceRef.once('value');
531
532   if (snapshot.exists()) {
533     const absenceData = snapshot.val();
534     return absenceData;
535   }
536
537   return null;
538 };
539
540 export const getAttendanceObj = async () => {
541   const attendanceRef = db.ref('Attendance');
542
543   const snapshot = await attendanceRef.once('value');
544
545   if (snapshot.exists()) {
546     const attendanceData = snapshot.val();
547     return attendanceData;
548   }
549
550   return null;
551 };
552
553 export const getEmployeesObj = async () => {
554   const employeesRef = db.ref('Employee');
555
556   const snapshot = await employeesRef.once('value');
557
558   if (snapshot.exists()) {
559     const employeesData = snapshot.val();
560     return employeesData;
561   }
562
563   return null;
564 };
565
566 export const getFacilitiesObj = async () => {
567   const facilityRef = db.ref('Facility');
568
569   const snapshot = await facilityRef.once('value');
570
571   if (snapshot.exists()) {
572     const facilityData = snapshot.val();
573     return facilityData;
574   }
575
576   return null;
577 };
578
579 export const getCardUidsObj = async () => {
580   const cardUidsRef = db.ref('CardUids');
581
582   const snapshot = await cardUidsRef.once('value');
583
584   if (snapshot.exists()) {
585     const cardUidsData = snapshot.val();
586     return cardUidsData;
587   }
588
589   return null;
590 };
591
592 export const getDelaysObj = async () => {
593   const delaysRef = db.ref('Delays');
594
595   const snapshot = await delaysRef.once('value');
596
597   if (snapshot.exists()) {
598     const delaysData = snapshot.val();
599     return delaysData;
600   }
601
602   return null;
603 };
604
605 export const getAbsenceObj = async () => {
606   const absenceRef = db.ref('Absence');
607
608   const snapshot = await absenceRef.once('value');
609
610   if (snapshot.exists()) {
611     const absenceData = snapshot.val();
612     return absenceData;
613   }
614
615   return null;
616 };
617
618 export const getAttendanceObj = async () => {
619   const attendanceRef = db.ref('Attendance');
620
621   const snapshot = await attendanceRef.once('value');
622
623   if (snapshot.exists()) {
624     const attendanceData = snapshot.val();
625     return attendanceData;
626   }
627
628   return null;
629 };
630
631 export const getEmployeesObj = async () => {
632   const employeesRef = db.ref('Employee');
633
634   const snapshot = await employeesRef.once('value');
635
636   if (snapshot.exists()) {
637     const employeesData = snapshot.val();
638     return employeesData;
639   }
640
641   return null;
642 };
643
644 export const getFacilitiesObj = async () => {
645   const facilityRef = db.ref('Facility');
646
647   const snapshot = await facilityRef.once('value');
648
649   if (snapshot.exists()) {
650     const facilityData = snapshot.val();
651     return facilityData;
652   }
653
654   return null;
655 };
656
657 export const getCardUidsObj = async () => {
658   const cardUidsRef = db.ref('CardUids');
659
660   const snapshot = await cardUidsRef.once('value');
661
662   if (snapshot.exists()) {
663     const cardUidsData = snapshot.val();
664     return cardUidsData;
665   }
666
667   return null;
668 };
669
670 export const getDelaysObj = async () => {
671   const delaysRef = db.ref('Delays');
672
673   const snapshot = await delaysRef.once('value');
674
675   if (snapshot.exists()) {
676     const delaysData = snapshot.val();
677     return delaysData;
678   }
679
680   return null;
681 };
682
683 export const getAbsenceObj = async () => {
684   const absenceRef = db.ref('Absence');
685
686   const snapshot = await absenceRef.once('value');
687
688   if (snapshot.exists()) {
689     const absenceData = snapshot.val();
690     return absenceData;
691   }
692
693   return null;
694 };
695
696 export const getAttendanceObj = async () => {
697   const attendanceRef = db.ref('Attendance');
698
699   const snapshot = await attendanceRef.once('value');
700
701   if (snapshot.exists()) {
702     const attendanceData = snapshot.val();
703     return attendanceData;
704   }
705
706   return null;
707 };
708
709 export const getEmployeesObj = async () => {
710   const employeesRef = db.ref('Employee');
711
712   const snapshot = await employeesRef.once('value');
713
714   if (snapshot.exists()) {
715     const employeesData = snapshot.val();
716     return employeesData;
717   }
718
719   return null;
720 };
721
722 export const getFacilitiesObj = async () => {
723   const facilityRef = db.ref('Facility');
724
725   const snapshot = await facilityRef.once('value');
726
727   if (snapshot.exists()) {
728     const facilityData = snapshot.val();
729     return facilityData;
730   }
731
732   return null;
733 };
734
735 export const getCardUidsObj = async () => {
736   const cardUidsRef = db.ref('CardUids');
737
738   const snapshot = await cardUidsRef.once('value');
739
740   if (snapshot.exists()) {
741     const cardUidsData = snapshot.val();
742     return cardUidsData;
743   }
744
745   return null;
746 };
747
748 export const getDelaysObj = async () => {
749   const delaysRef = db.ref('Delays');
750
751   const snapshot = await delaysRef.once('value');
752
753   if (snapshot.exists()) {
754     const delaysData = snapshot.val();
755     return delaysData;
756   }
757
758   return null;
759 };
760
761 export const getAbsenceObj = async () => {
762   const absenceRef = db.ref('Absence');
763
764   const snapshot = await absenceRef.once('value');
765
766   if (snapshot.exists()) {
767     const absenceData = snapshot.val();
768     return absenceData;
769   }
770
771   return null;
772 };
773
774 export const getAttendanceObj = async () => {
775   const attendanceRef = db.ref('Attendance');
776
777   const snapshot = await attendanceRef.once('value');
778
779   if (snapshot.exists()) {
780     const attendanceData = snapshot.val();
781     return attendanceData;
782   }
783
784   return null;
785 };
786
787 export const getEmployeesObj = async () => {
788   const employeesRef = db.ref('Employee');
789
790   const snapshot = await employeesRef.once('value');
791
792   if (snapshot.exists()) {
793     const employeesData = snapshot.val();
794     return employeesData;
795   }
796
797   return null;
798 };
799
800 export const getFacilitiesObj = async () => {
801   const facilityRef = db.ref('Facility');
802
803   const snapshot = await facilityRef.once('value');
804
805   if (snapshot.exists()) {
806     const facilityData = snapshot.val();
807     return facilityData;
808   }
809
810   return null;
811 };
812
813 export const getCardUidsObj = async () => {
814   const cardUidsRef = db.ref('CardUids');
815
816   const snapshot = await cardUidsRef.once('value');
817
818   if (snapshot.exists()) {
819     const cardUidsData = snapshot.val();
820     return cardUidsData;
821   }
822
823   return null;
824 };
825
826 export const getDelaysObj = async () => {
827   const delaysRef = db.ref('Delays');
828
829   const snapshot = await delaysRef.once('value');
830
831   if (snapshot.exists()) {
832     const delaysData = snapshot.val();
833     return delaysData;
834   }
835
836   return null;
837 };
838
839 export const getAbsenceObj = async () => {
840   const absenceRef = db.ref('Absence');
841
842   const snapshot = await absenceRef.once('value');
843
844   if (snapshot.exists()) {
845     const absenceData = snapshot.val();
846     return absenceData;
847   }
848
849   return null;
850 };
851
852 export const getAttendanceObj = async () => {
853   const attendanceRef = db.ref('Attendance');
854
855   const snapshot = await attendanceRef.once('value');
856
857   if (snapshot.exists()) {
858     const attendanceData = snapshot.val();
859     return attendanceData;
860   }
861
862   return null;
863 };
864
865 export const getEmployeesObj = async () => {
866   const employeesRef = db.ref('Employee');
867
868   const snapshot = await employeesRef.once('value');
869
870   if (snapshot.exists()) {
871     const employeesData = snapshot.val();
872     return employeesData;
873   }
874
875   return null;
876 };
877
878 export const getFacilitiesObj = async () => {
879   const facilityRef = db.ref('Facility');
880
881   const snapshot = await facilityRef.once('value');
882
883   if (snapshot.exists()) {
884     const facilityData = snapshot.val();
885     return facilityData;
886   }
887
888   return null;
889 };
890
891 export const getCardUidsObj = async () => {
892   const cardUidsRef = db.ref('CardUids');
893
894   const snapshot = await cardUidsRef.once('value');
895
896   if (snapshot.exists()) {
897     const cardUidsData = snapshot.val();
898     return cardUidsData;
899   }
900
901   return null;
902 };
903
904 export const getDelaysObj = async () => {
905   const delaysRef = db.ref('Delays');
906
907   const snapshot = await delaysRef.once('value');
908
909   if (snapshot.exists()) {
910     const delaysData = snapshot.val();
911     return delaysData;
912   }
913
914   return null;
915 };
916
917 export const getAbsenceObj = async () => {
918   const absenceRef = db.ref('Absence');
919
920   const snapshot = await absenceRef.once('value');
921
922   if (snapshot.exists()) {
923     const absenceData = snapshot.val();
924     return absenceData;
925   }
926
927   return null;
928 };
929
930 export const getAttendanceObj = async () => {
931   const attendanceRef = db.ref('Attendance');
932
933   const snapshot = await attendanceRef.once('value');
934
935   if (snapshot.exists()) {
936     const attendanceData = snapshot.val();
937     return attendanceData;
938   }
939
940   return null;
941 };
942
943 export const getEmployeesObj = async () => {
944   const employeesRef = db.ref('Employee');
945
946   const snapshot = await employeesRef.once('value');
947
948   if (snapshot.exists()) {
949     const employeesData = snapshot.val();
950     return employeesData;
951   }
952
953   return null;
954 };
955
956 export const getFacilitiesObj = async () => {
957   const facilityRef = db.ref('Facility');
958
959   const snapshot = await facilityRef.once('value');
960
961   if (snapshot.exists()) {
962     const facilityData = snapshot.val();
963     return facilityData;
964   }
965
966   return null;
967 };
968
969 export const getCardUidsObj = async () => {
970   const cardUidsRef = db.ref('CardUids');
971
972   const snapshot = await cardUidsRef.once('value');
973
974   if (snapshot.exists()) {
975     const cardUidsData = snapshot.val();
976     return cardUidsData;
977   }
978
979   return null;
980 };
981
982 export const getDelaysObj = async () => {
983   const delaysRef = db.ref('Delays');
984
985   const snapshot = await delaysRef.once('value');
986
987   if (snapshot.exists()) {
988     const delaysData = snapshot.val();
989     return delaysData;
990   }
991
992   return null;
993 };
994
995 export const getAbsenceObj = async () => {
996   const absenceRef = db.ref('Absence');
997
998   const snapshot = await absenceRef.once('value');
999
1000  if (snapshot.exists()) {
1001    const absenceData = snapshot.val();
1002    return absenceData;
1003  }
1004
1005  return null;
1006 };
1007
1008 export const getAttendanceObj = async () => {
1009   const attendanceRef = db.ref('Attendance');
1010
1011   const snapshot = await attendanceRef.once('value');
1012
1013   if (snapshot.exists()) {
1014     const attendanceData = snapshot.val();
1015     return attendanceData;
1016   }
1017
1018   return null;
1019 };
1020
1021 export const getEmployeesObj = async () => {
1022   const employeesRef = db.ref('Employee');
1023
1024   const snapshot = await employeesRef.once('value');
1025
1026   if (snapshot.exists()) {
1027     const employeesData = snapshot.val();
1028     return employeesData;
1029   }
1030
1031   return null;
1032 };
1033
1034 export const getFacilitiesObj = async () => {
1035   const facilityRef = db.ref('Facility');
1036
1037   const snapshot = await facilityRef.once('value');
1038
1039   if (snapshot.exists()) {
1040     const facilityData = snapshot.val();
1041     return facilityData;
1042   }
1043
1044   return null;
1045 };
1046
1047 export const getCardUidsObj = async () => {
1048   const cardUidsRef = db.ref('CardUids');
1049
1050   const snapshot = await cardUidsRef.once('value');
1051
1052   if (snapshot.exists()) {
1053     const cardUidsData = snapshot.val();
1054     return cardUidsData;
1055   }
1056
1057   return null;
1058 };
1059
1060 export const getDelaysObj = async () => {
1061   const delaysRef = db.ref('Delays');
1062
1063   const snapshot = await delaysRef.once('value');
1064
1065   if (snapshot.exists()) {
1066     const delaysData = snapshot.val();
1067     return delaysData;
1068   }
1069
1070   return null;
1071 };
1072
1073 export const getAbsenceObj = async () => {
1074   const absenceRef = db.ref('Absence');
1075
1076   const snapshot = await absenceRef.once('value');
1077
1078   if (snapshot.exists()) {
1079     const absenceData = snapshot.val();
1080     return absenceData;
1081   }
1082
1083   return null;
1084 };
1085
1086 export const getAttendanceObj = async () => {
1087   const attendanceRef = db.ref('Attendance');
1088
1089   const snapshot = await attendanceRef.once('value');
1090
1091   if (snapshot.exists()) {
1092     const attendanceData = snapshot.val();
1093     return attendanceData;
1094   }
1095
1096   return null;
1097 };
1098
1099 export const getEmployeesObj = async () => {
1100   const employeesRef = db.ref('Employee');
1101
1102   const snapshot = await employeesRef.once('value');
1103
1104   if (snapshot.exists()) {
1105     const employeesData = snapshot.val();
1106     return employeesData;
1107   }
1108
1109   return null;
1110 };
1111
1112 export const getFacilitiesObj = async () => {
1113   const facilityRef = db.ref('Facility');
1114
1115   const snapshot = await facilityRef.once('value');
1116
1117   if (snapshot.exists()) {
1118     const facilityData = snapshot.val();
1119     return facilityData;
1120   }
1121
1122   return null;
1123 };
1124
1125 export const getCardUidsObj = async () => {
1126   const cardUidsRef = db.ref('CardUids');
1127
1128   const snapshot = await cardUidsRef.once('value');
1129
1130   if (snapshot.exists()) {
1131     const cardUidsData = snapshot.val();
1132     return cardUidsData;
1133   }
1134
1135   return null;
1136 };
1137
1138 export const getDelaysObj = async () => {
1139   const delaysRef = db.ref('Delays');
1140
1141   const snapshot = await delaysRef.once('value');
1142
1143   if (snapshot.exists()) {
1144     const delaysData = snapshot.val();
1145     return delaysData;
1146   }
1147
1148   return null;
1149 };
1150
1151 export const getAbsenceObj = async () => {
1152   const absenceRef = db.ref('Absence');
1153
1154   const snapshot = await absenceRef.once('value');
1155
1156   if (snapshot.exists()) {
1157     const absenceData = snapshot.val();
1158     return absenceData;
1159   }
1160
1161   return null;
1162 };
1163
1164 export const getAttendanceObj = async () => {
1165   const attendanceRef = db.ref('Attendance');
1166
1167   const snapshot = await attendanceRef.once('value');
1168
1169   if (snapshot.exists()) {
1170     const attendanceData = snapshot.val();
1171     return attendanceData;
1172   }
1173
1174   return null;
1175 };
1176
1177 export const getEmployeesObj = async () => {
1178   const employeesRef = db.ref('Employee');
1179
1180   const snapshot = await employeesRef.once('value');
1181
1182   if (snapshot.exists()) {
1183     const employeesData = snapshot.val();
1184     return employeesData;
1185   }
1186
1187   return null;
1188 };
1189
1190 export const getFacilitiesObj = async () => {
1191   const facilityRef = db.ref('Facility');
1192
1193   const snapshot = await facilityRef.once('value');
1194
1195   if (snapshot.exists()) {
1196     const facilityData = snapshot.val();
1197     return facilityData;
1198   }
1199
1200   return null;
1201 };
1202
1203 export const getCardUidsObj = async () => {
1204   const cardUidsRef = db.ref('CardUids');
1205
1206   const snapshot = await cardUidsRef.once('value');
1207
1208   if (snapshot.exists()) {
1209     const cardUidsData = snapshot.val();
1210     return cardUidsData;
1211   }
1212
1213   return null;
1214 };
1215
1216 export const getDelaysObj = async () => {
1217   const delaysRef = db.ref('Delays');
1218
1219   const snapshot = await delaysRef.once('value');
1220
1221   if (snapshot.exists()) {
1222     const delaysData = snapshot.val();
1223     return delaysData;
1224   }
1225
1226   return null;
1227 };
1228
1229 export const getAbsenceObj = async () => {
1230   const absenceRef = db.ref('Absence');
1231
1232   const snapshot = await absenceRef.once('value');
1233
1234   if (snapshot.exists()) {
1235     const absenceData = snapshot.val();
1236     return absenceData;
1237   }
1238
1239   return null;
1240 };
1241
1242 export const getAttendanceObj = async () => {
1243   const attendanceRef = db.ref('Attendance');
1244
1245   const snapshot = await attendanceRef.once('value');
1246
1247   if (snapshot.exists()) {
1248     const attendanceData = snapshot.val();
1249     return attendanceData;
1250   }
1251
1252   return null;
1253 };
1254
1255 export const getEmployeesObj = async () => {
1256   const employeesRef = db.ref('Employee');
1257
1258   const snapshot = await employeesRef.once('value');
1259
1260   if (snapshot.exists()) {
1261     const employeesData = snapshot.val();
1262     return employeesData;
1263   }
1264
1265   return null;
1266 };
1267
1268 export const getFacilitiesObj = async () => {
1269   const facilityRef = db.ref('Facility');
1270
1271   const snapshot = await facilityRef.once('value');
1272
1273   if (snapshot.exists()) {
1274     const facilityData = snapshot.val();
1275     return facilityData;
1276   }
1277
1278   return null;
1279 };
1280
1281 export const getCardUidsObj = async () => {
1282   const cardUidsRef = db.ref('CardUids');
1283
1284   const snapshot = await cardUidsRef.once('value');
1285
1286   if (snapshot.exists()) {
1287     const cardUidsData = snapshot.val();
1288     return cardUidsData;
1289   }
1290
1291   return null;
1292 };
1293
1294 export const getDelaysObj = async () => {
1295   const delaysRef = db.ref('Delays');
1296
1297   const snapshot = await delaysRef.once('value');
1298
1299   if (snapshot.exists()) {
1300     const delaysData = snapshot.val();
1301     return delaysData;
1302   }
1303
1304   return null;
1305 };
1306
1307 export const getAbsenceObj = async () => {
1308   const absenceRef = db.ref('Absence');
1309
1310   const snapshot = await absenceRef.once('value');
1311
1312   if (snapshot.exists()) {
1313     const absenceData = snapshot.val();
1314     return absenceData;
1315   }
1316
1317   return null;
1318 };
1319
1320 export const getAttendanceObj = async () => {
1321   const attendanceRef = db.ref('Attendance');
1322
1323   const snapshot = await attendanceRef.once('value');
1324
1325   if (snapshot.exists()) {
1326     const attendanceData = snapshot.val();
1327     return attendanceData;
1328   }
1329
1330   return null;
1331 };
1332
1333 export const getEmployeesObj = async () => {
1334   const employeesRef = db.ref('Employee');
1335
1336   const snapshot = await employeesRef.once('value');
1337
1338   if (snapshot.exists()) {
1339     const employeesData = snapshot.val();
1340     return employeesData;
1341   }
1342
1343   return null;
1344 };
1345
1346 export const getFacilitiesObj = async () => {
1347   const facilityRef = db.ref('Facility');
1348
1349   const snapshot = await facilityRef.once('value');
1350
1351   if (snapshot.exists()) {
1352     const facilityData = snapshot.val();
1353     return facilityData;
1354   }
1355
1356   return null;
1357 };
1358
1359 export const getCardUidsObj = async () => {
1360   const cardUidsRef = db.ref('CardUids');
1361
1362   const snapshot = await cardUidsRef.once('value');
1363
1364   if (snapshot.exists()) {
1365     const cardUidsData = snapshot.val();
1366     return cardUidsData;
1367   }
1368
1369   return null;
1370 };
1371
1372 export const getDelaysObj = async () => {
1373   const delaysRef = db.ref('Delays');
1374
1375   const snapshot = await delaysRef.once('value');
1376
1377   if (snapshot.exists()) {
1378     const delaysData = snapshot.val();
1379     return delaysData;
1380   }
1381
1382   return null;
1383 };
1384
1385 export const getAbsenceObj = async () => {
1386   const absenceRef = db.ref('Absence');
1387
1388   const snapshot = await absenceRef.once('value');
1389
1390   if (snapshot.exists()) {
1391     const absenceData = snapshot.val();
1392     return absenceData;
1393   }
1394
1395   return null;
1396 };
1397
1398 export const getAttendanceObj = async () => {
1399   const attendanceRef = db.ref('Attendance');
1400
1401   const snapshot = await attendanceRef.once('value');
1402
1403   if (snapshot.exists()) {
1404     const attendanceData = snapshot.val();
1405     return attendanceData;
1406   }
1407
1408   return null;
1409 };
1410
1411 export const getEmployeesObj = async () => {
1412   const employeesRef = db.ref('Employee');
1413
1414   const snapshot = await employeesRef.once('value');
1415
1416   if (snapshot.exists()) {
1417     const employeesData = snapshot.val();
1418     return employeesData;
1419   }
1420
1421   return null;
1422 };
1423
1424 export const getFacilitiesObj = async () => {
1425   const facilityRef = db.ref('Facility');
1426
1427   const snapshot = await facilityRef.once('value');
1428
1429   if (snapshot.exists()) {
1430     const facilityData = snapshot.val();
1431     return facilityData;
1432   }
1433
1434   return null;
1435 };
1436
1437 export const getCardUidsObj = async () => {
1438   const cardUidsRef = db.ref('CardUids');
1439
1440   const snapshot = await cardUidsRef.once('value');
1441
1442   if (snapshot.exists()) {
1443     const cardUidsData = snapshot.val();
1444     return cardUidsData;
1445   }
1446
1447   return null;
1448 };
1449
1450 export const getDelaysObj = async () => {
1451   const delaysRef = db.ref('Delays');
1452
1453   const snapshot = await delaysRef.once('value');
1454
1455   if (snapshot.exists()) {
1456     const delaysData = snapshot
```

*Figure 64:database with server*

```

src > utils > JS firebase.js > ...
88   if (cardNumber !== null) {
89     if (employees) {
90       existingEmployee = Object.values(employees).find((employee) => {
91         return employee.cardNumber === cardNumber;
92       });
93     }
94
95     if (!existingEmployee) {
96       existingEmployee = {
97         email: null,
98       };
99       console.error('Error: [firebase] No user found');
100      // throw Error('No user found');
101    }
102  }
103
104  return { existingEmployee, employees };
105 } catch (error) {
106   console.error('getEmployeeObj() =>', error);
107 }
108 };
109
110 export const getCardsUidObj = async () => {
111   try {
112     const snapshot = await cardUidsRef.once('value');
113     const cardUids = snapshot.val();
114
115     return { cardUids };
116   } catch (error) {
117     console.error('getEmployeeObj() =>', error);
118   }
119 };
120
121 export const updateAttendanceObj = async (id, updates) => {
122   try {
123     console.log('updateAttendanceObj -> id', id);
124     let userId;
125
126     attendanceRef
127       .orderByChild('id')
128       .equalTo(id)
129       .on('value', function (snapshot) {
130         snapshot.forEach(function (data) {
131           userId = data.key;
132         });
133
134         attendanceRef.child(userId).update(updates);
135       });
136   } catch (error) {
137     console.error('updateAttendanceObj =>', error);
138   }
139 };
140

```

Figure 65:database with server(part2)

```

JS index.js > ...
1 import { NFC } from '_nfc-pcsc';
2 import cron from 'node-cron';
3
4 import {
5   getEmployeeObj,
6   createAttendanceObj,
7   createDelayObj,
8   hasAttended,
9   updateAttendanceObj,
10  getCardsUidObj,
11 } from './src/utils/firebase.js';
12 import config from './src/config/index.js';
13 import { checkAbsence } from './src/utils/checkAbsence.js';
14
15 const everyDayAtEndWorkingHour = `00 00 ${config.endWorkingHour} * * *`; // this will run daily at
16
17 const absenceCheckInterval = cron.schedule(
18   everyDayAtEndWorkingHour,
19   checkAbsence,
20   { scheduled: false }
21 );
22
23 const nfc = new NFC(); // optionally you can pass logger
24
25 absenceCheckInterval.start();
26 |
27 nfc.on('reader', (reader) => {
28   console.log(` ${reader.reader.name} device attached`);
29
30   reader.on('card', async (card) => {
JS index.js > ...
30   reader.on('card', async (card) => {
31     console.log(` ${reader.reader.name} card detected`, card.uid);
32
33     const timestamp = new Date();
34     let cardNumber;
35     const availableCards = await getCardsUidObj();
36
37     availableCards.cardUids.forEach((availableCard, index) => {
38       if (availableCard.id === card.uid) {
39         cardNumber = index;
40       }
41     });
42
43     const { existingEmployee } = await getEmployeeObj(cardNumber);
44
45     if (existingEmployee.email !== null) {
46       const { attended, attendanceRecord } = await hasAttended(
47         existingEmployee.email,
48         new Date().toLocaleDateString()
49       );
50
51       if (!attended) {
52         const checkInTime = `${timestamp.getHours()}:${timestamp.getMinutes()}`;
53
54         await createAttendanceObj(existingEmployee.email, checkInTime);
55
56         if (timestamp.getHours() <= config.startWorkingHour) {
57           if (timestamp.getMinutes() == 0) {
58             console.log('attended on time');
59           } else {

```

Figure 66:server with NFC

```

JS index.js > ...
59     } else {
60         const delay = timestamp.getMinutes();
61         console.log(`has a delay of ${delay} minutes`);
62         await createDelayObj(existingEmployee.email, delay);
63     }
64 } else {
65     const delay =
66     (timestamp.getHours() - config.startWorkingHour) * 60 +
67     timestamp.getMinutes();
68
69     console.log(`delay of ${delay} minutes`);
70
71     await createDelayObj(existingEmployee.email, delay);
72 }
73 } else if (!attendanceRecord.checkOut) {
74     const checkOutTime = `${timestamp.getHours()}:${timestamp.getMinutes()}`;
75
76     await updateAttendanceObj(attendanceRecord.id, {
77         checkOut: checkOutTime,
78     });
79 }
80 }
81 });
82
83 reader.on('card.off', (card) => {
84     // console.log(`${reader.reader.name} card removed`, card);
85 });
86
87 reader.on('error', (err) => {
88     console.log(`${reader.reader.name} an error occurred`, err);
JS index.js > ...
89     console.log(`${reader.reader.name} an error occurred`, err);
90 });
91 reader.on('end', () => {
92     console.log(`${reader.reader.name} device removed`);
93 });
94 });
95
96 nfc.on('error', (err) => {
97     console.log('an error occurred', err);
98 });
99

```

Figure 67:server with NFC (part2).

```

    ...
Attendances.setOnClickListener(new View.OnClickListener(){
    @Override
    public void onClick(View v) {
        Intent inttent =new Intent( mContext: Account_page.this, Attendence_page.class);
        startActivity(inttent);
    }
});

Absents.setOnClickListener(new View.OnClickListener(){
    @Override
    public void onClick(View v) {
        Intent inttent =new Intent( mContext: Account_page.this, Absents_paga.class);
        startActivity(inttent);
    }
});

Delays.setOnClickListener(new View.OnClickListener(){
    @Override
    public void onClick(View v) {
        Intent inttent =new Intent( mContext: Account_page.this, Delays_page.class);
        startActivity(inttent);
    }
});

SignOut.setOnClickListener(new View.OnClickListener(){
    @Override
    public void onClick(View v) {
        String email = prefs.getString( key: "employeeUsername",  defaultValue: "NO");
        int password = prefs.getInt( key: "password",  defaultValue: 0);
        Log.d( tag: "Email from account: ", email);
        Log.d( tag: "Password from Account: ", String.valueOf(password));
        editor.clear();
        editor.commit();
        Intent inttent =new Intent( mContext: Account_page.this, MainActivity.class);
        startActivity(inttent);
    }
});

```

Android Studio Arctic Fox | 2020.3.1  
Update...

Figure 68:EmployeeAccountMajorFunction.

```
listView = (ListView) findViewById(R.id.worker_list);
arrayList = new ArrayList<Employee>();
employeeAdapter = new EmployeeAdapter(getApplicationContext(), arrayList);

listView.setAdapter(employeeAdapter);
listView.setOnItemClickListener(new AdapterView.OnItemClickListener() {
    @Override
    public void onItemClick(AdapterView<?> parent, View view, int position, long id) {
        Employee employee = (Employee) parent.getAdapter().getItem(position);

        editor.putString("employeeUsername", employee.getEmail());
        editor.apply();

        Intent intentt =new Intent( packageContext: Worker_page.this, Account_page.class);
        startActivity(intentt);
    }
});

SignOut.setOnClickListener(new View.OnClickListener(){
    @Override
    public void onClick(View v) {
        String email = prefs.getString( key: "facilityUsername", defValue: "NO");
        int password = prefs.getInt( key: "password", defValue: 0);
        int facilityCode = prefs.getInt( key: "facilityCode", defValue: 0);
        Log.d( tag: "Email from account: ", email);
        Log.d( tag: "Password from Account: ", String.valueOf(password));
        Log.d( tag: "FacilityCode", String.valueOf(facilityCode));
        editor.clear();
        editor.commit();
        Intent intentt =new Intent( packageContext: AccountPageFacility.this, MainActivity.class);
        startActivity(intentt);
    }
});
```

Figure 69: facilityMajorFunction

```

42
43
44 on SignUp.setOnClickListerner(new View.OnClickListerner() {
45     @Override
46     public void onClick(View view) {
47         rootNode = FirebaseDatabase.getInstance();
48         facilityRef = rootNode.getReference(path: "Facility");
49         validCode = true;
50         isValid = true;
51
52         SharedPreference s prefs = getApplicationContext().getSharedPreference(name: "cio.Preferences", MODE_PRIVATE);
53         SharedPreference.Editor editor = prefs.edit();
54
55         String FacilityName = FacilityN.getText().toString();
56         int Password = Integer.parseInt(password.getText().toString());
57         String Email = email.getText().toString();
58         int FacilityCode = Integer.parseInt(FacilityC.getText().toString());
59         String facilityCode = FacilityC.getText().toString();
60
61         facilityRef.addListenerForSingleValueEvent(new ValueEventListener() {
62             @Override
63             public void onDataChange(@NonNull DataSnapshot snapshot) {
64                 if(snapshot.exists()){
65                     for(DataSnapshot data : snapshot.getChildren()){
66                         com.example.cio.data.Facility facility = data.getValue(Facility.class);
67                         if(String.valueOf(facility.getFacilityCode()).equals(facilityCode)){
68                             validCode = false;
69                             Log.d(tag: "Facility Code: ", msg: "Yes it was triggered!");
70                         }
71                     }
72                     if(Email.equals(facility.getEmail())){
73                         isValid = false;
74                         Toast.makeText(getApplicationContext(), text: "Email is in use", Toast.LENGTH_LONG).show();
75                     }
76                 }
77             }
78             if(!validCode){
79                 Toast.makeText(getApplicationContext(), text: "Facility Code is in use contact Admin", Toast.LENGTH_LONG).show();
80             }
81             if(validCode && isValid) {
82
83                 Facility helperClassF = new Facility(FacilityName,Email,Password,FacilityCode);
84                 facilityRef.push().setValue(helperClassF);
85                 Intent intent =new Intent(packageContext: Facility_SignUp.this, AccountPageFacility.class);
86                 startActivity(intent);
87
88                 editor.putString("facilityUsername", Email);
89                 editor.putLong("password", Password);
90                 editor.putInt("facilityCode", FacilityCode);
91                 editor.apply();
92             }
93         }
94     }
95 }

```

Figure 70: FacilitySignUpCode.

```
57     SignIn.setOnClickListener(new View.OnClickListener() {
58
59     @Override
60     public void onClick(View v) {
61
62         String userEmail = email.getText().toString();
63         String userPassword = password.getText().toString();
64         Log.d( tag: "Email is: ", userEmail);
65         Log.d( tag: "Password is: ", userPassword);
66
67         facilityRef.addListenerForSingleValueEvent(new ValueEventListener() {
68             @Override
69             public void onDataChange(@NotNull DataSnapshot snapshot) {
70                 if(snapshot.exists()){
71                     for (DataSnapshot data : snapshot.getChildren()){
72                         Facility facility = data.getValue(Facility.class);
73                         if(facility.getEmail().equals(userEmail)){
74                             if(String.valueOf(facility.getPassword()).equals(userPassword)){
75                                 editor.putString("facilityUsername", facility.getEmail());
76                                 editor.putInt("password", facility.getPassword());
77                                 editor.putInt("facilityCode", facility.getFacilityCode());
78                                 editor.apply();
79                                 Intent intent = new Intent( packageContext: FacilityLogin.this, AccountPageFacility.class);
80                                 startActivity(intent);
81                             } else {
82                                 Toast.makeText(getApplicationContext(), text: "Wrong Credentials!", Toast.LENGTH_LONG).show();
83                             }
84                         }
85                     }
86                 }
87             }
88         });
89     }
90 }
```

Figure 71:FacilitysignInCode.

```

52     SignUp.setOnClickListener(new View.OnClickListener() {
53         @Override
54         public void onClick(View v) {
55             isValid = true;
56             validCode = false;
57
58             rootNode = FirebaseDatabase.getInstance();
59             employeeRef = rootNode.getReference( path: "Employee");
60             facilityRef = rootNode.getReference( path: "Facility");
61
62             SharedPreferences prefs = getApplicationContext().getSharedPreferences( name: "cio.Preferences", MODE_PRIVATE);
63             SharedPreferences.Editor editor = prefs.edit();
64
65             String FirstName = FirstName.getText().toString();
66             String LastName = LastName.getText().toString();
67             String Email = email.getText().toString();
68             int Password = Integer.parseInt(password.getText().toString());
69             int FacilityCodeE = Integer.parseInt(FacilityCodeE.getText().toString());
70             int CardNumberE = Integer.parseInt(CardNumber.getText().toString());
71             String cardId = CardNumber.getText().toString();
72             String facilityCode = FacilityCodeE.getText().toString();
73             String[] availableCardIds = {"1", "2", "3", "4", "5"};
74             String Male = male.getText().toString();
75             String Female = female.getText().toString();
76             if(male.isChecked()){
77                 gender = male.getText().toString();
78             }else if (female.isChecked()){
79                 gender = female.getText().toString();
80             }
81             Toast.makeText(getApplicationContext(),gender,Toast.LENGTH_LONG).show();
82
83             employeeRef.addListenerForSingleValueEvent(new ValueEventListener() {
84                 @Override
85                 public void onDataChange(@NonNull DataSnapshot snapshot) {
86                     if(snapshot.exists()){
87                         for (DataSnapshot data : snapshot.getChildren()){
88                             Employee employee = data.getValue(Employee.class);
89                             Log.d("Employee Data: ", employee.getCardNumber().toString());
90                             if(employee.getEmail().equals(Email)) {
91                                 isValid = false;
92                                 Toast.makeText(getApplicationContext(), text: "The Email is already used", Toast.LENGTH_LONG).show();
93                             }
94                             if(String.valueOf(employee.getCardNumber()).equals(cardId)){
95                                 isValid = false;
96                                 Toast.makeText(getApplicationContext(), text: "Card is already in use", Toast.LENGTH_LONG).show();
97                             }
98                             if(!Arrays.asList(availableCardIds).contains(cardId)){
99                                 isValid = false;
100                                Toast.makeText(getApplicationContext(), text: "Invalid Card ID", Toast.LENGTH_LONG).show();
101                            }
102                        }
103                    }
104                }
105            }
106
107            facilityRef.addListenerForSingleValueEvent(new ValueEventListener() {
108                @Override
109                public void onDataChange(@NonNull DataSnapshot snapshot) {
110                    if(snapshot.exists()){
111                        for(DataSnapshot data : snapshot.getChildren()){
112                            Facility facility = data.getValue(Facility.class);
113                            if(String.valueOf(facility.getFacilityCode()).equals(facilityCode)){
114                                validCode = true;
115                                Log.d( tag: "Facility Code: ", msg: "Yes it was triggered!");
116                            }
117                        }
118                        if(!validCode){
119                            Toast.makeText(getApplicationContext(), text: "Invalid Facility Code Contact Admin", Toast.LENGTH_LONG).show();
120                        }
121                    }
122                }
123            }
124            if(isValid && validCode) {
125                Log.d( tag: "MAH", msg: "NEVER GOT HERE? ");
126                Employee helperClassE = new Employee(FirstName, LastName, Email, Password, FacilityCodeE, CardNumberE,
127                employeeRef.push().setValue(helperClassE));
128
129                editor.putString("employeeUsername", Email);
130                editor.putInt("password", Password);
131                editor.apply();
132
133                Intent intent = new Intent( packageContext: Employee.SignUp.this, Account.page.class);

```

Figure 72:Employee sign Up Code.

```
56     SignIn.setOnClickListener(new View.OnClickListener(){  
57         @Override  
58         public void onClick(View v) {  
59             String userEmail = email.getText().toString();  
60             String userPassword = password.getText().toString();  
61             Log.d( tag: "Email is: ", userEmail);  
62             Log.d( tag: "Password is: ", userPassword);  
63             employeeRef.addListenerForSingleValueEvent(new ValueEventListener() {  
64                 @Override  
65                 public void onDataChange(@NonNull DataSnapshot snapshot) {  
66                     if(snapshot.exists()){  
67                         for (DataSnapshot data : snapshot.getChildren()){  
68                             Employee employee = data.getValue(Employee.class);  
69                             if(employee.getEmail().equals(userEmail)){  
70                                 if(String.valueOf(employee.getPassword()).equals(userPassword)){  
71                                     editor.putString("employeeUsername", employee.getEmail());  
72                                     editor.putInt("password", employee.getPassword());  
73                                     editor.apply();  
74                                     Intent intent = new Intent( packageContext: EmployeeLogin.this, Account_page.class);  
75                                     startActivity(intent);  
76                                 } else {  
77                                     Toast.makeText(getApplicationContext(), text: "Wrong Credentials!", Toast.LENGTH_LONG).show();  
78                                 }  
79                             }  
80                         }  
81                     } else{  
82                         Log.d( tag: "Firebase: ", msg: "No Data here!");  
83                         Toast.makeText(getApplicationContext(), text: "No Data in DB", Toast.LENGTH_LONG).show();  
84                     }  
85                 }  
86             }  
87         }  
88     }  
89 }  
90 }
```

Figure 73:EmployeeSignIn.

## B. Presentation Slides

**Cio**

# Checking in/out Using NFC Protocol

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Supervised by:  
Shatha Abdulaziz Alajlan

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## Introduction

In our lives there are many dangers and due to the recent events in the world (COVID-19 pandemic), touching surfaces has become a concern to us, direct contact with surfaces and people may lead to negative consequences for us and our loved ones.

NFC (Near Field Communication) reader which is a set of communication protocols for communication between two electronic devices over a short distance, will link it to an application on the phone for a fast check in-and-out with no need for any contact

## Problem definition

The suggestion is an NFC reader linked to an app that performs automatic presence process with complete accuracy and speed without the need for additional resources. Unfortunately, dedicated attendance systems don't provide all of these points precisely: speed and accuracy.

Other systems such as biometrics can be applied to aid, but these systems become more expensive as they require regular maintenance.

In case of preparation via NFC reader with the app it will cover many important factors, working accuracy is high and fast.

**Scope**

**Organization**





**Employees**



**Local and Global Impact**



- Developed to facilitate the attendance recording process



- Saving up lost time in attendance will create acceptance of the system.

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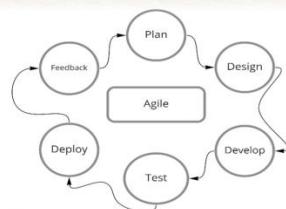
**Related Work**

| Name of paper   | Method used | Speed | Cost | Attend student at one time |
|---|-------------|-------|------|----------------------------|
| RFID-based students attendance management system.   | RFID        | High  | High | Middle                     |
| Design and Implementation of a Iris Student Attendance System Using Iris Recognition Biometric Recognition. |             | High  | High | Middle                     |
| NFC Based Mobile Attendance System with Facial Authorization on Raspberry Pi and Cloud Server.              | NFC         | High  | Low  | High                       |
| Study of implementing automated attendance system using face recognition technique.                         |             | High  | High | Middle                     |

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## Methodology



The approach of the project is agile.

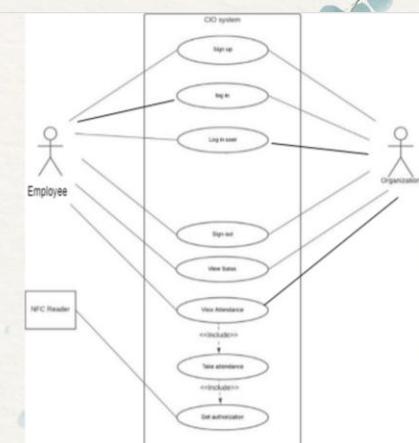
## System Analysis and Design

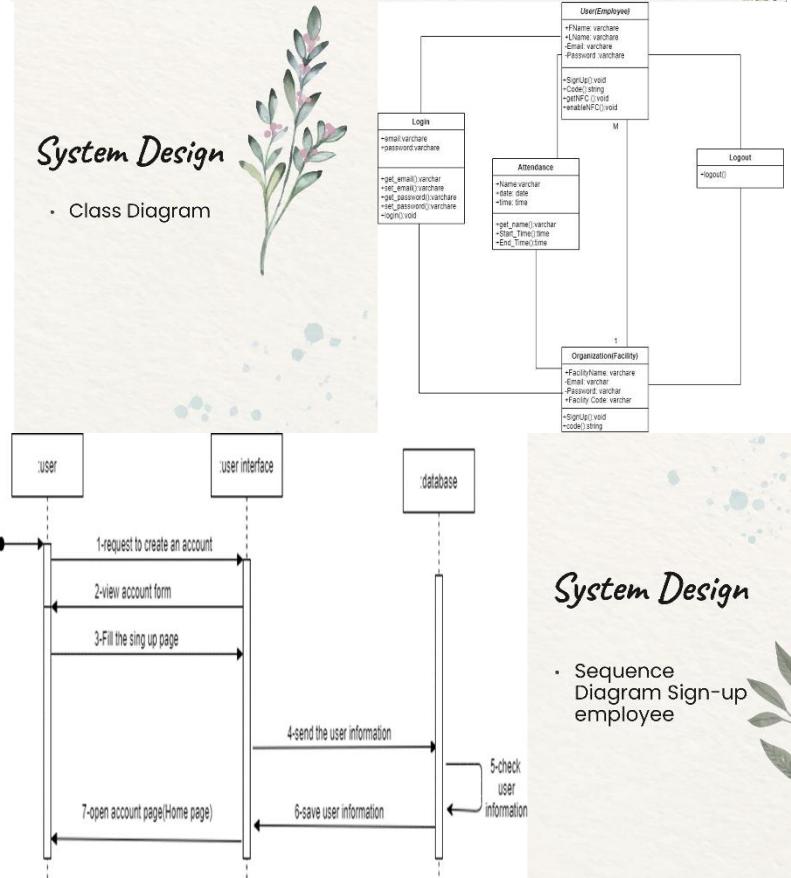
System Requirement →



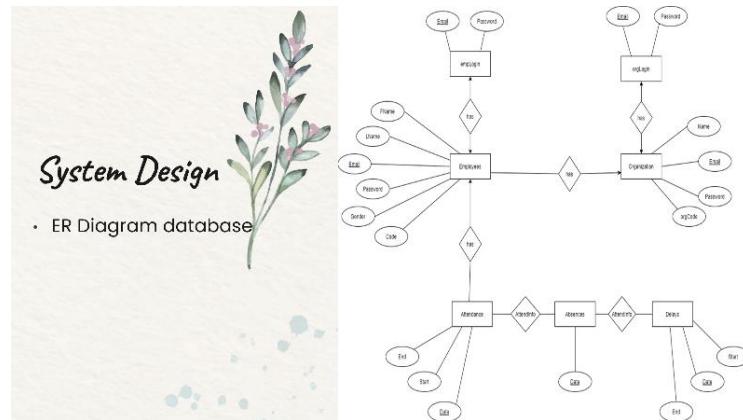
### Functional Requirement

• Use Case









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## Implementation



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*Testing (Employee)*



*Testing (Facility)*

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- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>01 - Introduction           <ul style="list-style-type: none"> <li>• Problem Definition</li> <li>• Aims and Objectives</li> <li>• Scope</li> <li>• Local and Global Impact</li> </ul> </li> <br/> <li>02 - Related Work</li> <br/> <li>03 - System Analysis and Design           <ul style="list-style-type: none"> <li>• Methodology</li> <li>• Use Case</li> <li>• Architecture Design</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>04 - Implementation</li> <br/> <li>05 - Testing</li> <br/> <li>06 - Conclusion and Future Work</li> <br/> <li>07 - Demo Test</li> </ul> |
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## Conclusion

- Working with new programs and environments.
- Time management and teamwork.
- Improving searching skills.

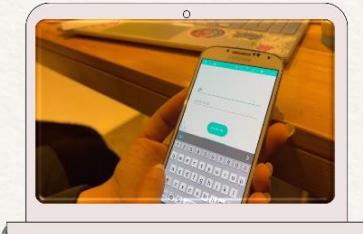
## Future Work

- Develop the application to support Arabic language.
- Develop the application to send notification to users.
- Allowing the employee to register for more than one facility.
- Allow the facility to search for employees by name.

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## Product demo



## References

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- T.S.Lim,S.C.Sim, and M.M.Mansor,"RFID based attendance system,"in 2009 IEEE Symposium on Industrial Electronics Applications ,2009.vol.2,pp.778 - 782.
- K.O.Okopujie,E.Noma-Osaghae, O.J.Okesola, S.N.John, and O.Robert, "Design and Implementation of a Student Attendance system Using Iris Biometric Recognition" in 2017 International Conference on Computational Science and Computational Intelligence (CSCI),2017,p.563 - 567.
- N.Kar, M.K.Debbarma, A.Saha, and D.Rudra Pal, "Study of implementing automated attendance system using face recognition technique ,," Int. J. Comput. Commun. Eng., 2012.
- Siti Ummi Masruroh; Andrew Fiade; Imelda Ristanti Julia "NFC Based Mobile Attendance System with Facial Authorization on Raspberry Pi and Cloud Server,"2018 6th International Conference on Cyber and IT Service Management(CITSM),Parapatan,Indonesia,2018, DOI: 10.1109/CITSM.2018.8674293

## C. Miscellaneous

### Questionnaires

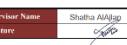
|   |  |
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| <p>* ١- هل تظر أنه من المفيدة و/or ملائمة للمحضور والغياب على جهازك؟<br/>attendance app on your device</p> <p>YES/نعم <input type="radio"/><br/>NO/لا <input type="radio"/><br/>غير متأكد <input type="radio"/></p>   | <p>* ٣- هل تعتقد أن تطوير برنامج للمحضور والغياب مساعدة في تطوير المجتمع في المستقبل؟<br/>Do you think that developing an attendance and absence program will contribute to the development of society in the future?</p> <p>YES/نعم <input type="radio"/><br/>NO/لا <input type="radio"/><br/>غير متأكد <input type="radio"/></p>   |
| <p>* ٢- هل تفضل رؤية جهازك ومحضورك في قائمة في جهازك؟<br/>Do you prefer to see your absence and presence in a list in your device</p> <p>YES/نعم <input type="radio"/><br/>NO/لا <input type="radio"/><br/>غير متأكد <input type="radio"/></p>  | <p>* ٤- هل تعتقد أن تطوير التغييرات سبب لها في تقليل من التلاعب بالمحضور?<br/>Do you think that developing an absence attendance program will contribute to reducing attendance manipulation</p> <p>YES/نعم <input type="radio"/><br/>NO/لا <input type="radio"/><br/>غير متأكد <input type="radio"/></p>  |
| <p>* ٥- هل تعتقد أن هذا البرنامج يسimplify الوقت وتحدد effort?<br/>Do you think this program will save time and effort?</p> <p>YES/نعم <input type="radio"/><br/>NO/لا <input type="radio"/><br/>غير متأكد <input type="radio"/></p>  | <p>* ٦- تخيل أنك معلم وسوف تستخدم هذا البرنامج لمنعه هنا من أسماء المحضور تلخص ما<br/>use this program, this will prevent the teacher from forgetting to call someone</p> <p>YES/نعم <input type="radio"/><br/>NO/لا <input type="radio"/><br/>غير متأكد <input type="radio"/></p>   |
| <p>* ٧- في حالة الإعاقات هل ترى أن البرنامج سيعطيهم؟ (مثل، النسمة والشلل والعمى وذوي الإعاقة العقلية)<br/>In the case of disabilities, do you think that our program will benefit them? (Such as: deaf, mute, blind and people with mental disabilities)</p> <p>YES/نعم <input type="radio"/><br/>NO/لا <input type="radio"/><br/>غير متأكد <input type="radio"/></p> | <p>* ٨- في حالة استخدام المعلمين للبرنامج لا يستمع الطالب لاسمها و/or يسمع خطأ في المحضور هل ترى أن البرنامج يمنع هذه الحالة؟<br/>Sometimes students don't hear their names when teachers are calling them. Do you think that our program will prevent this situation</p> <p>YES/نعم <input type="radio"/><br/>NO/لا <input type="radio"/><br/>غير متأكد <input type="radio"/></p> |
| <p>* ٩- في النظام التعليمي التقليدي هل ترى أن هذا البرنامج سيساعد وقت التحضير في أيام الامتحان؟<br/>In the paper-based educational system, do you think that this program will save preparation time for other useful things</p> <p>YES/نعم <input type="radio"/><br/>NO/لا <input type="radio"/><br/>غير متأكد <input type="radio"/></p>                             | <p>الاسم (الإلكتروني) _____<br/>عنوان البريد الإلكتروني _____</p>  |
| <p>* ١٠- هل تذهب أن من الممكن أن البرنامج يقلل من الخطأ في تحديد أسماء؟<br/>Do you think it is possible that our program reduces the Name spelling/ pronunciation issue</p> <p>YES/نعم <input type="radio"/><br/>NO/لا <input type="radio"/><br/>غير متأكد <input type="radio"/></p>  | <p>هل ترغب في إضافة بعض الأفكار الإبداعية؟<br/>do you want to add some creative ideas?<br/>عنوان البريد الإلكتروني _____</p>   |

# D. Meetings

## GP1:

| IT492-Weekly Meeting Form   |  |   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
|---|--|---|------------------|--|-------------|---|-----------|-----------|------|------------------|------|---------|--|--|--------------|----|-----------|----------------|----------|---|------------|----------|---|----------------|----------|---|------------------|----------|---|---|-------------|-----------------------|----------------|----------------------|-----------|
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| Shatha AlAjlan  | 43001700                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Ali Hassan  | 43001800                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
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| Yousef AlMousawi  | 43001901                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
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| Shatha AlAjlan  | 43001700                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Ali Hassan  | 43001800                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
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| Yousef AlMousawi  | 43001901                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
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| Shatha AlAjlan  | 43001700                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Ali Hassan  | 43001800                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Amal AlMousawi  | 43001900                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Yousef AlMousawi  | 43001901                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Discuss in and out using NFC protocol   | Responsible                            |   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| All the group members   | Shatha AlAjlan                         |   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
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| Project Title   | Checking in and out using NFC protocol | Meeting No.   | 4                |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Group No.   | 2020/2021                              | Date  | 12/February/2021 |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Time  | 8:30 pm                                |   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Student Name  | ID                                     | Signature   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Shatha AlAjlan  | 43001700                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Ali Hassan  | 43001800                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Amal AlMousawi  | 43001900                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Yousef AlMousawi  | 43001901                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Discuss in and out using NFC protocol   | Responsible                            |   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| All the group members   | Shatha AlAjlan                         |   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
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| Project Title   | Checking in and out using NFC protocol | Meeting No.   | 4                |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Group No.   | 2020/2021                              | Date  | 12/February/2021 |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Time  | 8:30 pm                                |   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Student Name  | ID                                     | Signature   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Shatha AlAjlan  | 43001700                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Ali Hassan  | 43001800                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Amal AlMousawi  | 43001900                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Yousef AlMousawi  | 43001901                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Discuss in and out using NFC protocol   | Responsible                            |   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| All the group members   | Shatha AlAjlan                         |   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
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| Group No.   | 2020/2021                              | Date  | 12/February/2021 |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Time  | 8:30 pm                                |   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Student Name  | ID                                     | Signature   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Shatha AlAjlan  | 43001700                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Ali Hassan  | 43001800                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Amal AlMousawi  | 43001900                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| Yousef AlMousawi  | 43001901                               |  |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| All the team members  | Responsible                            |   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| All the team members  | Chapter 3                              |   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |
| All the team members  | Chapter 3                              |   |                  |  |             |   |           |           |      |                  |      |         |  |  |              |    |           |                |          |   |            |          |   |                |          |   |                  |          |   |   |             |                       |                |                      |           |

## GP2:

| <div style="border: 1px solid black; padding: 10px;"> <p><b>IT492-Weekly Meeting Form</b></p> <p><b>General Information</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Project Title</td> <td colspan="3">Checking in and out using NFC protocol</td> </tr> <tr> <td>Group No.</td> <td>1</td> <td>Meeting No.</td> <td>1</td> </tr> <tr> <td>Date</td> <td colspan="3">21/September/2021 Time 10:00-11:00 Am</td> </tr> </table> <p><b>Attending Students</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Student Name</th> <th>ID</th> <th>Signature</th> </tr> </thead> <tbody> <tr> <td>1 Waad Tahad alsharmed</td> <td>438017280</td> <td></td> </tr> <tr> <td>2 Ghosn husein alkantari</td> <td>438018815</td> <td></td> </tr> <tr> <td>3 Ghada abdulrahman alsharmed</td> <td>438019051</td> <td></td> </tr> </tbody> </table> <p><b>Discussed Topics and List of Accomplished Tasks</b></p> <p>Reviews about what we doing, and order the hardware</p> <p><b>Upcoming Tasks</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Upcoming Task</th> <th>Waad</th> <th>Responsibility</th> </tr> </thead> <tbody> <tr> <td>Create 4 pages for the application</td> <td>Waad</td> <td>Ghada</td> </tr> <tr> <td>Create 4 pages for the application</td> <td>Ghada</td> <td>Ghson</td> </tr> <tr> <td>Create 4 pages for the application</td> <td>Ghson</td> <td></td> </tr> </tbody> </table> <p>Supervisor Name: Shatha AlAjalan<br/>Signature: </p> </div> | Project Title                          | Checking in and out using NFC protocol   |   |  | Group No. | 1 | Meeting No. | 1 | Date | 21/September/2021 Time 10:00-11:00 Am |  |  | Student Name | ID | Signature | 1 Waad Tahad alsharmed | 438017280 |  | 2 Ghosn husein alkantari | 438018815 |  | 3 Ghada abdulrahman alsharmed | 438019051 |  | Upcoming Task | Waad | Responsibility | Create 4 pages for the application | Waad | Ghada | Create 4 pages for the application | Ghada | Ghson | Create 4 pages for the application | Ghson |  | <div style="border: 1px solid black; padding: 10px;"> <p><b>IT492-Weekly Meeting Form</b></p> <p><b>General Information</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Project Title</td> <td colspan="3">Checking in and out using NFC protocol</td> </tr> <tr> <td>Group No.</td> <td>2</td> <td>Meeting No.</td> <td>2</td> </tr> <tr> <td>Date</td> <td colspan="3">12/October/2021 Time 10:00-11:00 Am</td> </tr> </table> <p><b>Attending Students</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Student Name</th> <th>ID</th> <th>Signature</th> </tr> </thead> <tbody> <tr> <td>1 Waad Tahad alsharmed</td> <td>438017280</td> <td></td> </tr> <tr> <td>2 Ghosn husein alkantari</td> <td>438018815</td> <td></td> </tr> <tr> <td>3 Ghada abdulrahman alsharmed</td> <td>438019051</td> <td></td> </tr> </tbody> </table> <p><b>Discussed Topics and List of Accomplished Tasks</b></p> <p>About what we doing</p> <p><b>Upcoming Tasks</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Upcoming Task</th> <th>Waad</th> <th>Responsibility</th> </tr> </thead> <tbody> <tr> <td>All the chapters</td> <td>Waad</td> <td>Ghada</td> </tr> <tr> <td>All the chapters</td> <td>Ghada</td> <td>Ghson</td> </tr> <tr> <td>All the chapters</td> <td>Ghson</td> <td></td> </tr> </tbody> </table> <p>Supervisor Name: Shatha AlAjalan<br/>Signature: </p> </div> | Project Title | Checking in and out using NFC protocol |  |  | Group No. | 2 | Meeting No. | 2 | Date | 12/October/2021 Time 10:00-11:00 Am |  |  | Student Name | ID | Signature | 1 Waad Tahad alsharmed | 438017280 |  | 2 Ghosn husein alkantari | 438018815 |  | 3 Ghada abdulrahman alsharmed | 438019051 |  | Upcoming Task | Waad | Responsibility | All the chapters | Waad | Ghada | All the chapters | Ghada | Ghson | All the chapters | Ghson |  |
|--|--|--|---|--|-----------|---|-------------|---|------|---------------------------------------|--|--|--------------|----|-----------|------------------------|-----------|---|--------------------------|-----------|---|-------------------------------|-----------|---|---------------|------|----------------|------------------------------------|------|-------|------------------------------------|-------|-------|------------------------------------|-------|--|---|---------------|--|--|--|-----------|---|-------------|---|------|-------------------------------------|--|--|--------------|----|-----------|------------------------|-----------|--|--------------------------|-----------|--|-------------------------------|-----------|--|---------------|------|----------------|------------------|------|-------|------------------|-------|-------|------------------|-------|--|
| Project Title  | Checking in and out using NFC protocol |  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Group No.  | 1                                      | Meeting No.  | 1 |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
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| Student Name   | ID                                     | Signature  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| 1 Waad Tahad alsharmed   | 438017280                              |   |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| 2 Ghosn husein alkantari   | 438018815                              |   |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| 3 Ghada abdulrahman alsharmed  | 438019051                              |   |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Upcoming Task  | Waad                                   | Responsibility   |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Create 4 pages for the application   | Waad                                   | Ghada  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Create 4 pages for the application   | Ghada                                  | Ghson  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Create 4 pages for the application   | Ghson                                  |  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Project Title  | Checking in and out using NFC protocol |  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Group No.  | 2                                      | Meeting No.  | 2 |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Date   | 12/October/2021 Time 10:00-11:00 Am    |  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Student Name   | ID                                     | Signature  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| 1 Waad Tahad alsharmed   | 438017280                              |  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| 2 Ghosn husein alkantari   | 438018815                              |  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| 3 Ghada abdulrahman alsharmed  | 438019051                              |  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Upcoming Task  | Waad                                   | Responsibility   |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| All the chapters   | Waad                                   | Ghada  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| All the chapters   | Ghada                                  | Ghson  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| All the chapters   | Ghson                                  |  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Imam University   CCIS   Doc. No. oo6-oi-201710316   |  |  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Imam University   CCIS   Doc. No. oo6-oi-201710316   |  |  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Imam University   CCIS   Doc. No. oo6-oi-201710316   |  |  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Imam University   CCIS   Doc. No. oo6-oi-201710316   |  |  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Imam University   CCIS   Doc. No. oo6-oi-201710316   |  |  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |
| Imam University   CCIS   Doc. No. oo6-oi-201710316   |  |  |   |  |           |   |             |   |      |                                       |  |  |              |    |           |                        |           |   |                          |           |   |                               |           |   |               |      |                |                                    |      |       |                                    |       |       |                                    |       |  |   |               |  |  |  |           |   |             |   |      |                                     |  |  |              |    |           |                        |           |  |                          |           |  |                               |           |  |               |      |                |                  |      |       |                  |       |       |                  |       |  |

## E. User Manual

First, download the following:

- <https://code.visualstudio.com/>
- <https://developer.android.com/studio>
- <https://nodejs.org/en/download/>

Open the firebase platform:

<https://console.firebaseio.google.com/u/0/project/cio-db/database/cio-db-default-rtdb/data>

Use this Email:ciogp30@gmail.com

    Password: Cio12345678

Connect with the internet

Open Visual studio code, do the following steps:

- File\_open\_folder\_choose"cio-server"
- View\_Termenal\_write the following command : >npm I ,”to install packages”
- Wait to download the files the write\_the\_command : >npm start , “start the NFC”

Connect the NFC Reader device with your laptop.

Connect your phone with the internet.

Open Android studio, do the following steps:

- File\_open\_folder\_choose"cio\_master"
- Connect your phone with your laptop
- First choose your device then run the application

Enter to the application, do the instructor to use the application :

sign up and sign in for both (employee and facility):

there are two factors to discuss the first one is when you are the company so if you don't have an account you should press on sign up button and start to fill in your information and choose a unique facility code if you write a facility code was used you will see an error message sees the facility code is used and if you have an account already so you can sign in with your Email and Password and you will see the button that makes you see your employees and if you press on it will display the name of employees in a list if you select one of them it will take you to the attendance page.

The second one is the employees, if the employee is new they can sign up and fill in the information and there are two important requires which is facility code and card number,

the facility code should exist, which means there is a company with that code and for the card number we have only 5 cards so for each employee a card and the employee can't take a card used from someone else and if the users have an account they can sign in with the Email and Password and it will take you to the attendance page.

Attendance page:

there are three options "attendance", "absence", and "delay", the attendance option shows to you the date of when you attend and the start date which is the check-in time and end which is the check-out time, the absence option starts calculate from the start hour of work and end of the day so you have all the day to attend, and for the delay option it starts calculating the delay from the first minute you don't check-in. the delay is calculated on minutes not hours.

NFC reader and the cards:

so if you are an employee you just come to the company on time and make the card near to the NFC reader and the NFC reader will attend you as check-in and if the working hour ends you do the same way of the card and the reader will make you go as check out the same way in delay and if there is no check-in and out an all the day that is the absence idea.