PEOPLE'S DEMOCRATIC REPUBLIC OF ALGERIA
MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH
UNIVERSITY MOHAMED BOUDIAF - M'SILA

FACULTY: Mathematics and Computer Science
DEPARTMENT: Computer Science
N°:……

DOMAIN: Mathematics and Computer Science
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Dissertation submitted to obtain Master degree

By: Mohamed Bouhadef,
Omar Mennad.

SUBJECT

Application for parental control of pupils

Supported before the jury composed of:

…….	University of M'sila	President
Mr.Barkat Abdelbasset	University of M'sila	Supervisor
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GENERAL INTRODUCTION

The world has recently witnessed a great evolution in the field of Computer science, as the latter has become the right hand of man, with its contribution to solving most problems, making it an integral part of our lives. Mobile phones have witnessed a great evolution, as the phone was used only for voice calls and SMS text messages, and now, after this evolution, the phone has involved in everything for humans life, as it becomes available for many uses, including playing media (voice, image, video), installing applications, and connecting to the internet.

Recently, Algeria has begun to keep pace with this technology development, where some institutions have started using the internet to facilitate the communication with their customers, or to provide online services. Among these institutions, the Algeria post company considered the leader of this wave in Algeria, where an application called *Baridi mo*b was created that makes it easier for customers to view their balance, transfer money and many other services. In another side, Algerian universities start to use the internet to register students, display their notes and publish announcements instead of the old paper method.

Although the internet has facilitated numerous things for people, including Algerian citizens, there are still challenges and obstacles that parents and guardians face. This is especially true for those who work away from home or have limitations, such as special needs, making it difficult for them to monitor their children's activities and daily attendance at school. Consequently, this situation can have a negative impact on their children's behavior, leading to frequent absences and associations with undesirable peers. These circumstances pose a danger to their overall well-being. In this context, we decided to create a mobile application for parents to allow them control their children in the schools with an easy way, so that the application shows all their children's activities inside the school on a daily basis. In addition, we are going to create an administrative application to manage the pupils' activities.

This thesis is divided into two chapters in which we will explain the steps of developing the parental control application for pupils and the administrative application. Where, in the first chapter, we will deal with some concepts and definitions about the education system in Algeria, the Unified Modeling Language UML. While the second chapter is devoted to explain the

development of our applications. A general conclusion conclude the thesis where we talk about the importance of this application in Algerian schools.

Chapter 1

Definitions And Concepts

1.1. Introduction:

This chapter is divided into two parts. In the first part, we will talk about the education system in Algeria, and in the second part, we will show some concepts of Unified Modeling Language (UML), and explain how to use them in the process of the development of our applications.

1.2. The education system in Algeria

1.2.1. Definition

The education system in Algeria is considered one of the most important government sectors in the country, it aims to provide educational opportunities for all the pupils and students to develop their abilities and skills. The education system is divided into three phases: the first one is the primary phase, and the second is the middle phase, to finally finish with the high education phase [1]. In this thesis, we will focus on the middle phase because it represent our case study.

1.2.2. Middle education system

The phase of the middle education consists of four levels (first, second, third and fourth). At the fourth level, Students must have the middle education certificate exam, and they cannot pass to the next phase unless they succeeded in this exam.

1.2.3. Middle school administrative system

In the middle school phase the education is guaranteed in facilities called CEM (Collège d'enseignement moyen in french), The CEMs are supervised and directed by several administrators, the most important of them is the director and supervisors, which are related to our work and objectives.

1- **The director:** In summary, the school principal plays a crucial role in guiding and managing the school, ensuring the quality of education, and maintaining a positive educational environment. [2]

2- **The supervisors:** Each supervisor has classes to be supervised by him, where he controls the movement of pupils in the hallways and the corridors, and he ensure

suitable atmosphere for study, in addition, he monitor the attendances of pupils with a history record of the absences. Moreover, he informs the administration of any emergency or any malfunction inside or outside the classes. [2]

1.2.4. Parents and School administration connection:

There are two ways to communicate between the school administration and parents in Algeria, the first one is the using of a correspondence book, which is a book hold by the pupil itself, where it used by the teachers and the administration to write some remarks or notes which the parent can consulted latter. The second way is the using of paper mail messages to send notifications and important information to parents, these letters could be distributed by pupils or sent directly to the parents.

Both methods are not secure due to the possibility that the message will not arrive correctly, especially when the remarks or the messages about the pupils are negative. We can think that the easiest solution is that the parents should visit the school of their children from time to time. However, it is not always possible, because there are some parents who work away from their place of residence, or parents who do not have time or are incapable (with special needs), they will not be able to visit the school and monitor the activity of their children.

All of the above made us think then decided to create these applications.

1.3. UML

1.3.1. Concept

The Unified Modeling Language (UML) was created to forge a common, semantically and syntactically rich visual modeling language for the architecture, design, and implementation of complex software systems both structurally and behaviorally. UML has applications beyond software development, such as process flow in manufacturing. [3]

There are several types of UML diagrams and each one of them serves a different purpose, in this thesis we will use only three of these diagrams: Use Case Diagram, Class Diagram and Sequence Diagram, because they are suitable and sufficient to explain the behavior and structure of our applications.

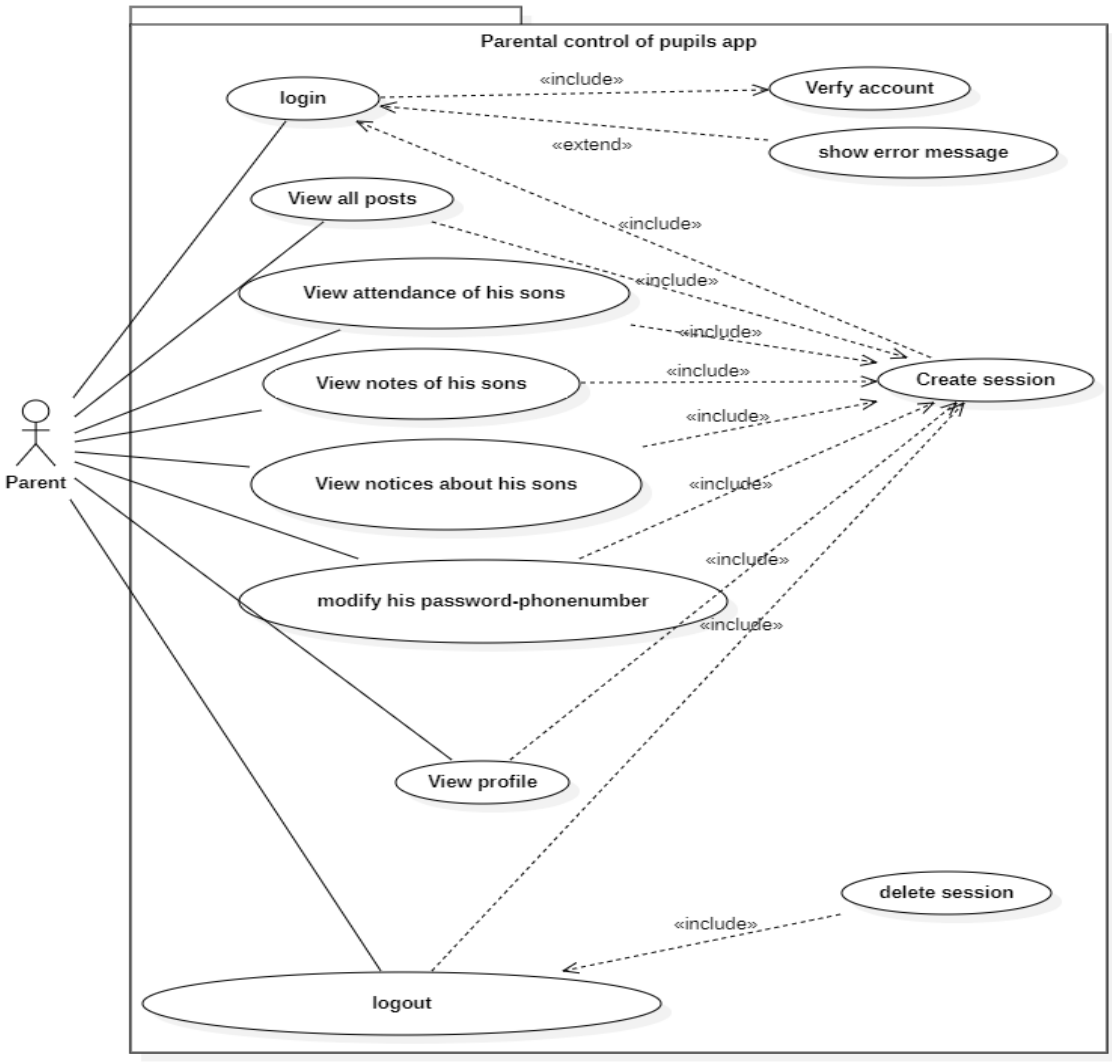
1.3.2. Use Case Diagram

Components of use case diagram is actors and functional requirements and relationships. In our application, we identified the following four actors: the parent, the manager, the admin and the teacher.

In the next paragraphs, we will provide the uses case diagram of each actor with a short textual explanation.

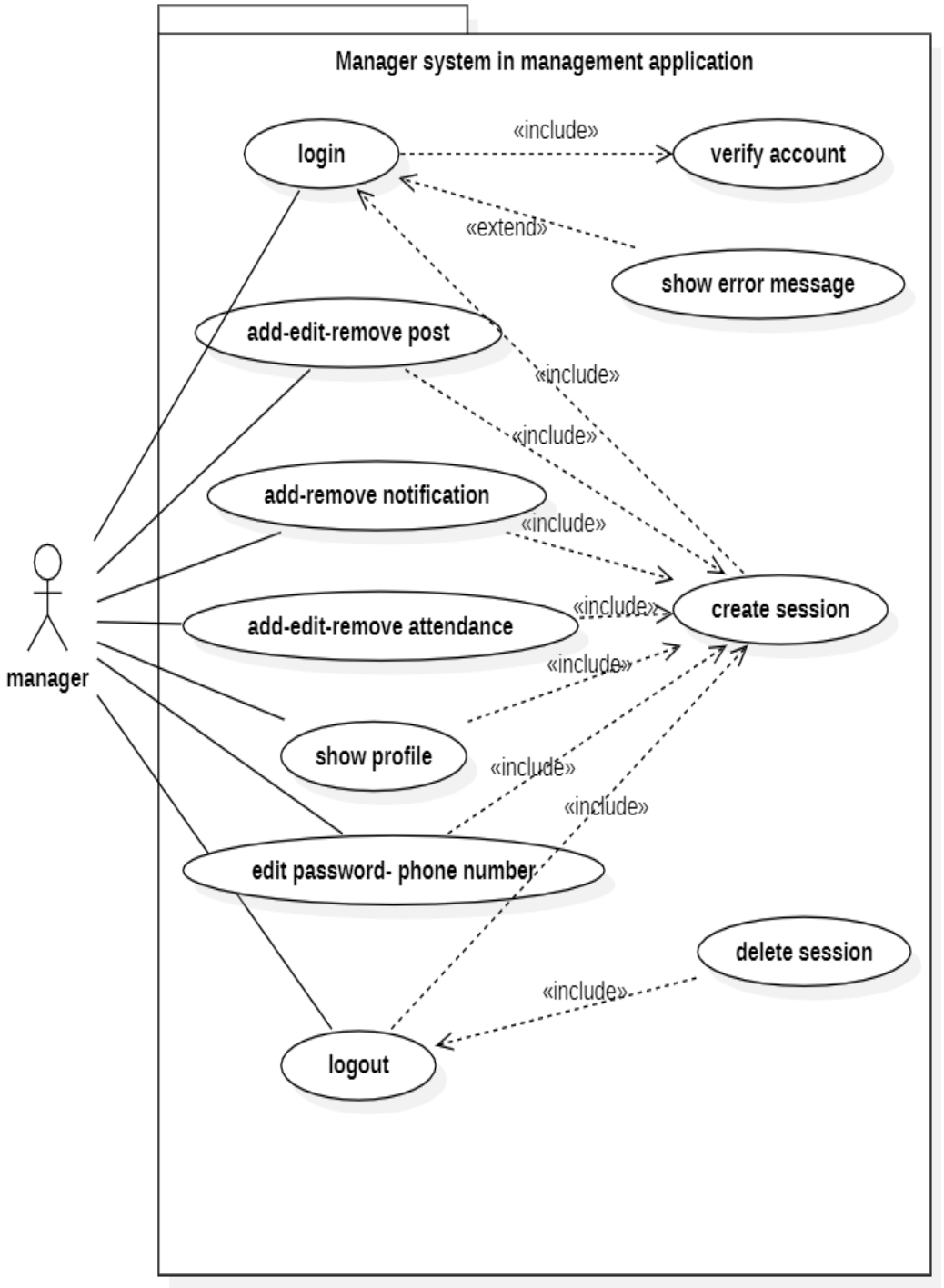
1. **Parent:** he must have at least one of his children in this school, to give him the authority to access to the application.

   The parent can view all posts, view attendance and notes of his son(s), receive notifications about his son(s), modify his password, add or modify phone number, view his profile and logout. All of this after login and create session. (see Figure XX)



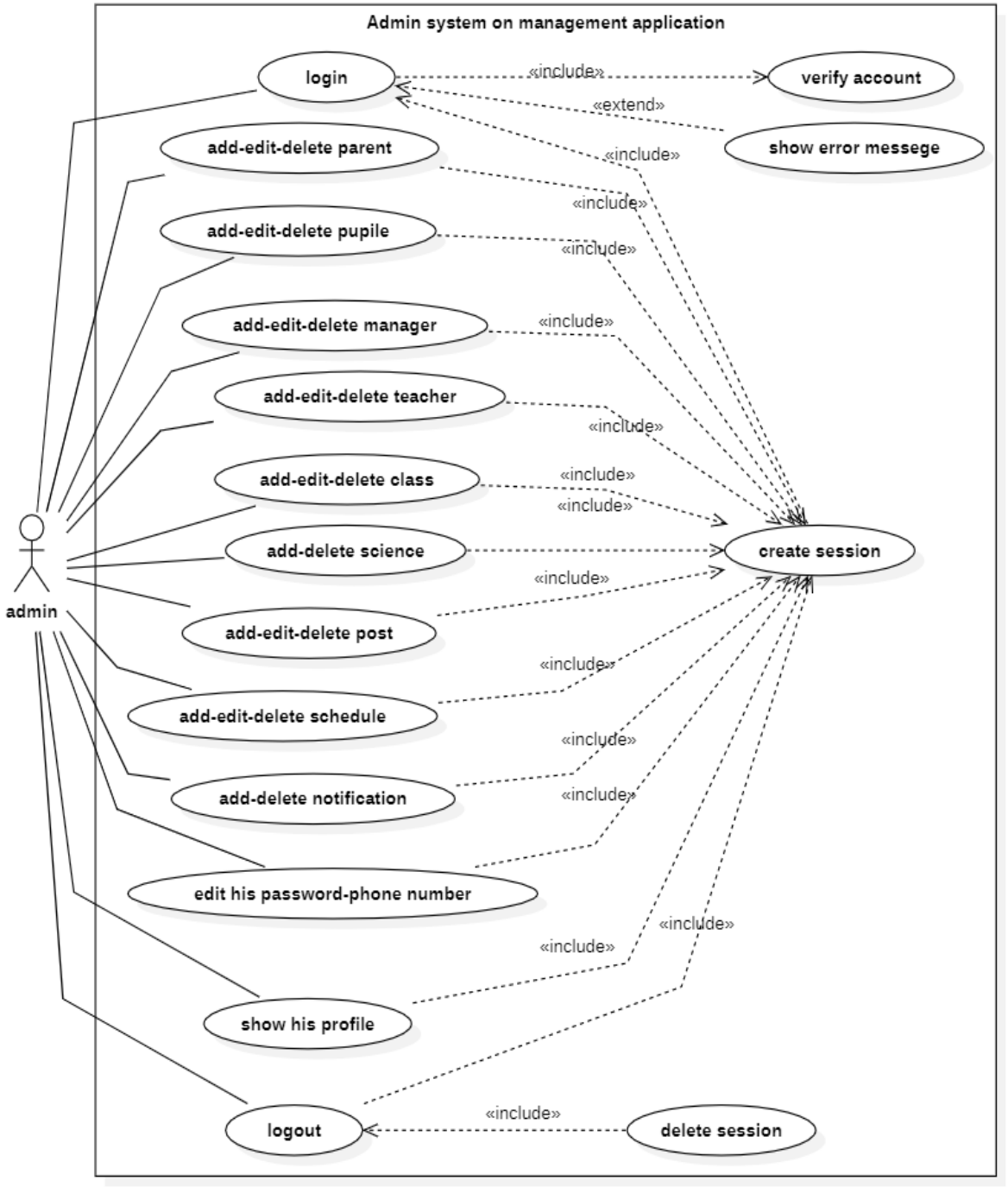
2. Manager:… to be completed

The manager can add posts, attendance, notifications and phone number, edit his posts, attendance and password, remove his posts, notifications and attendance, and show his profile and logout. All of this after login and create session. (see figure XX)



3. Admin:… to be completed

The admin have many features, the admin can add new parents, managers, pupils, teachers, posts, notifications, classes, sciences and schedules, delete parents, managers, pupils, teachers, posts, notifications, classes, sciences, schedules and add phone number to his account, edit parents, managers, pupils, teachers, posts, classes and schedules, edit his password and phone number…



4. **Teacher**:

This system on the management application and the teacher represent the actor

Figure 1.3: admin use case diagram

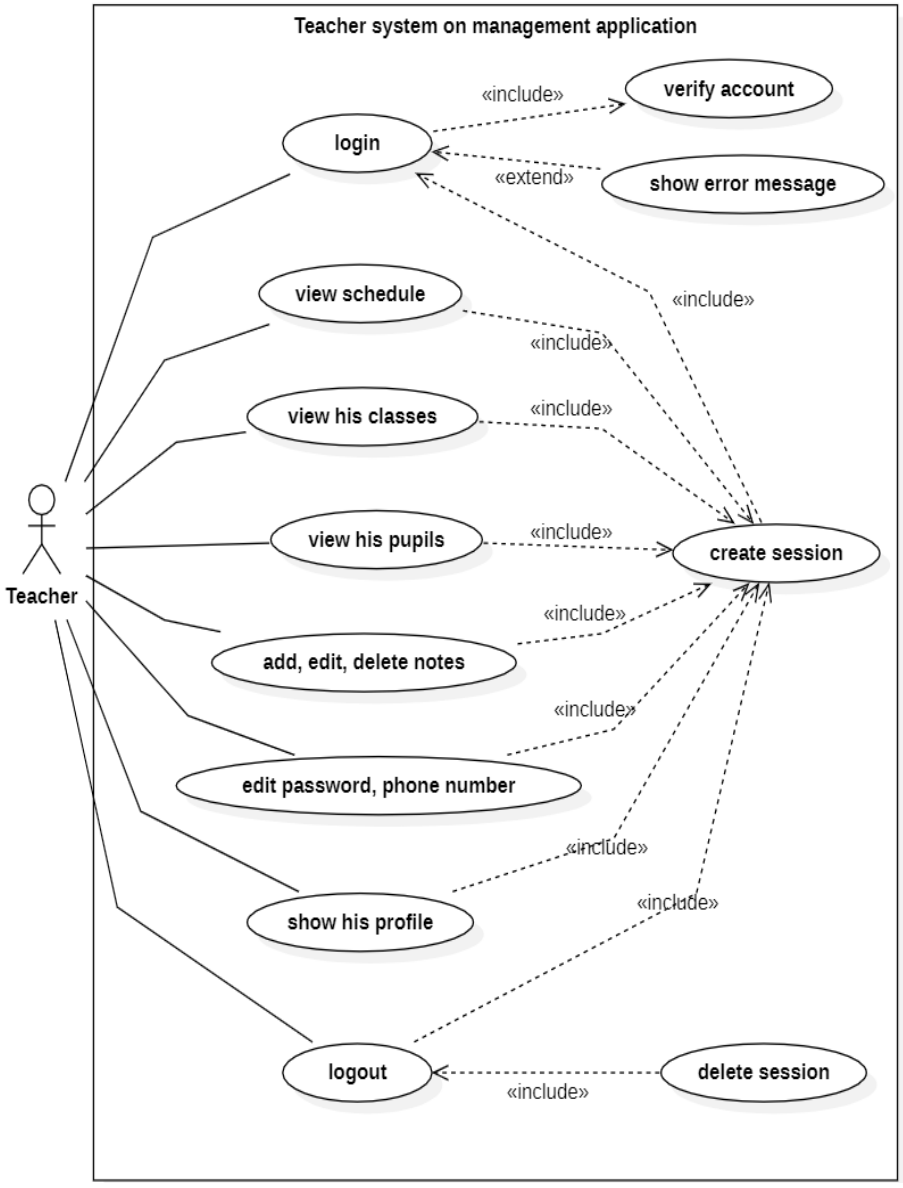


Figure 1.4: Teacher use case diagram

1.3.3. Class Diagram

The class diagram is the most commonly used UML diagram, and the principal foundation of any object-oriented solution. Classes within a system, attributes and operations and the relationship between each class. Classes are grouped together to create class diagrams when diagramming large systems. [3]

The class diagram components we will use it in our explanation:

1- Class: The class is composed of three sections: Upper section for the name of the class, middle section to attributes, and lower section to methods.

2- Relationships: there are four types of relationships used in our application:

1. Generalization: a generalization is a relationship between a parent class (superclass) and a child class (subclass). In this, the child class is inherited from the parent class. [4]
2. Association: it describes a static or physical connection between two or more objects. It depicts how many objects are there in the relationship. [4]
3. Aggregation: An aggregation is a subset of association, the child class can exist independently of its parent class. [4]
4. Composition: the composition is a subset of aggregation. But if parent class is deleted, then the child class also will deleted. [4]

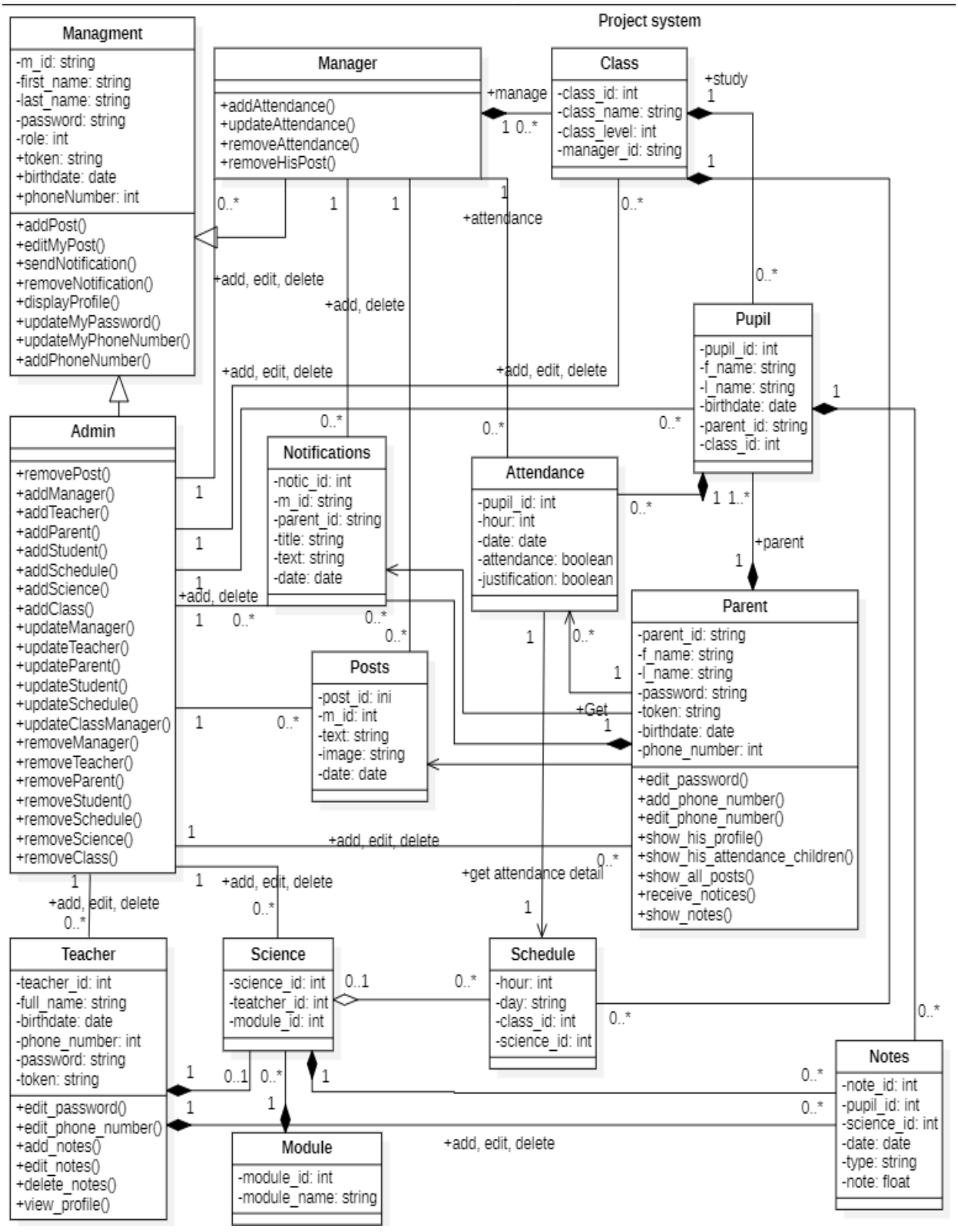


Figure 1.5: Project system class diagram

1.3.4. Sequence Diagram:

UML Sequence Diagrams are interaction diagrams that detail how operations are carried out, they capture the interaction between objects in the context of a collaboration. Reference

In the next lines, we will provide just one sequence diagram for each actor, because they are almost similar and the changes are insignificant.

1- The parent consult the attendance sequence diagram:

This diagram (see Figure XX) shows how the parent consult to the attendance, where the process start

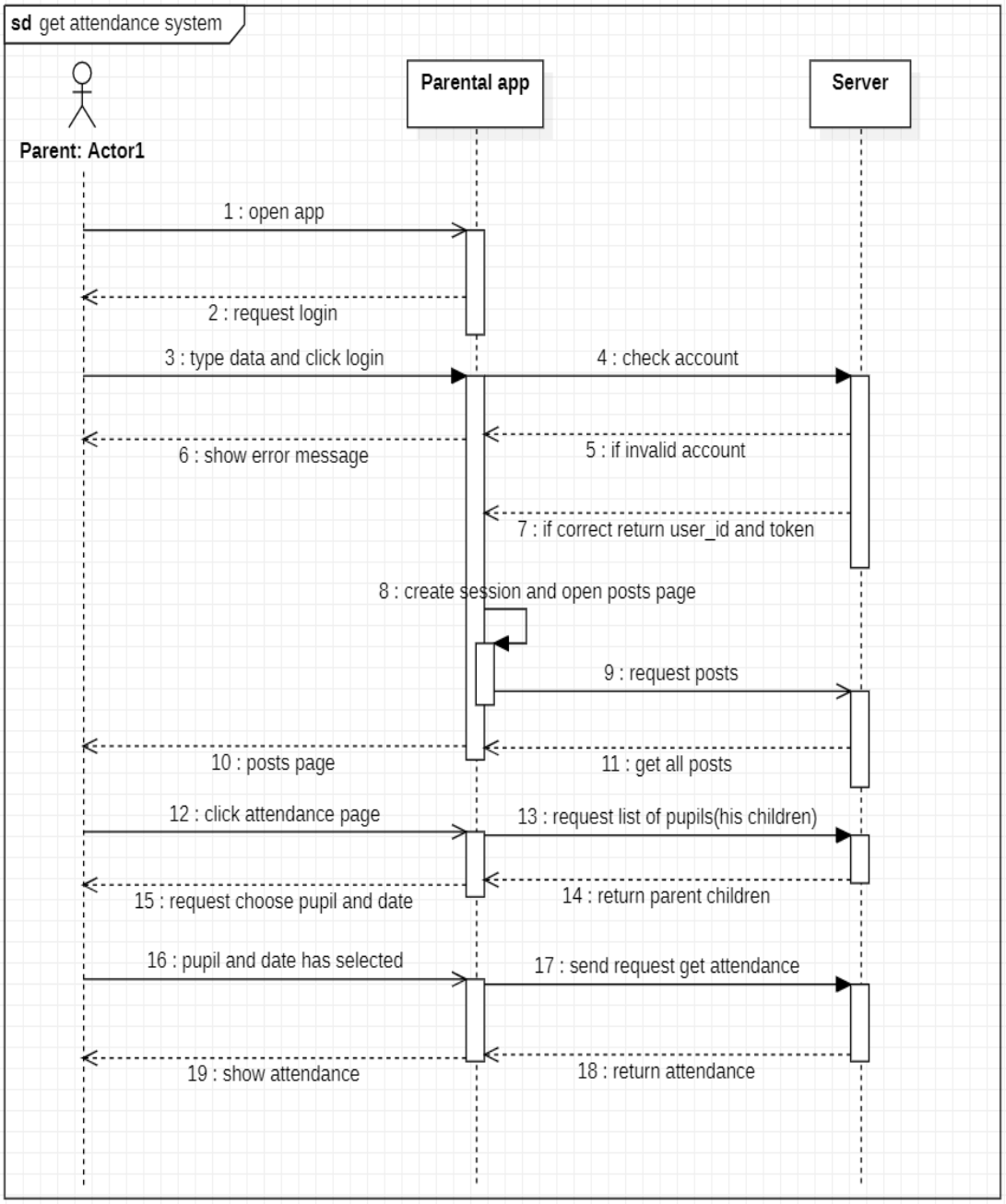


Figure 1.6: how parent get attendance – sequence diagram

2- Manager sequence diagram:

In this diagram, we will show how the manager add attendance to class.

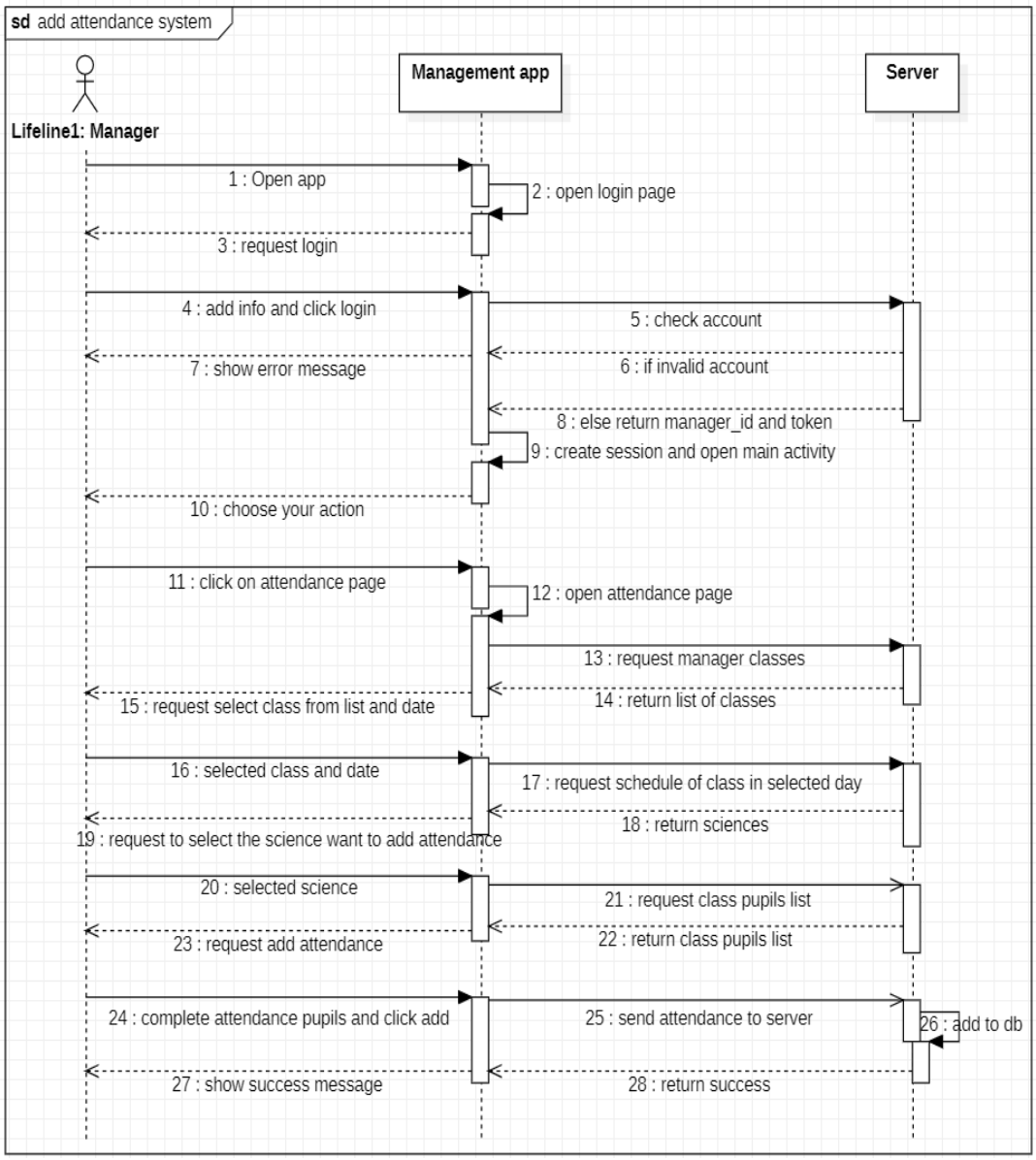


Figure 1.7: Add attendance sequence diagram

Manager login, in the main activity the manager choose attendance page after that from list of classes, manager select class and select date the app return the sciences of this class in the selected date, manager select the science he want to add attendance and get list of pupils in this class, add attendance of the pupils and click add.

3- Admin sequence diagram:

In this diagram, we will show how the Admin add new parent.

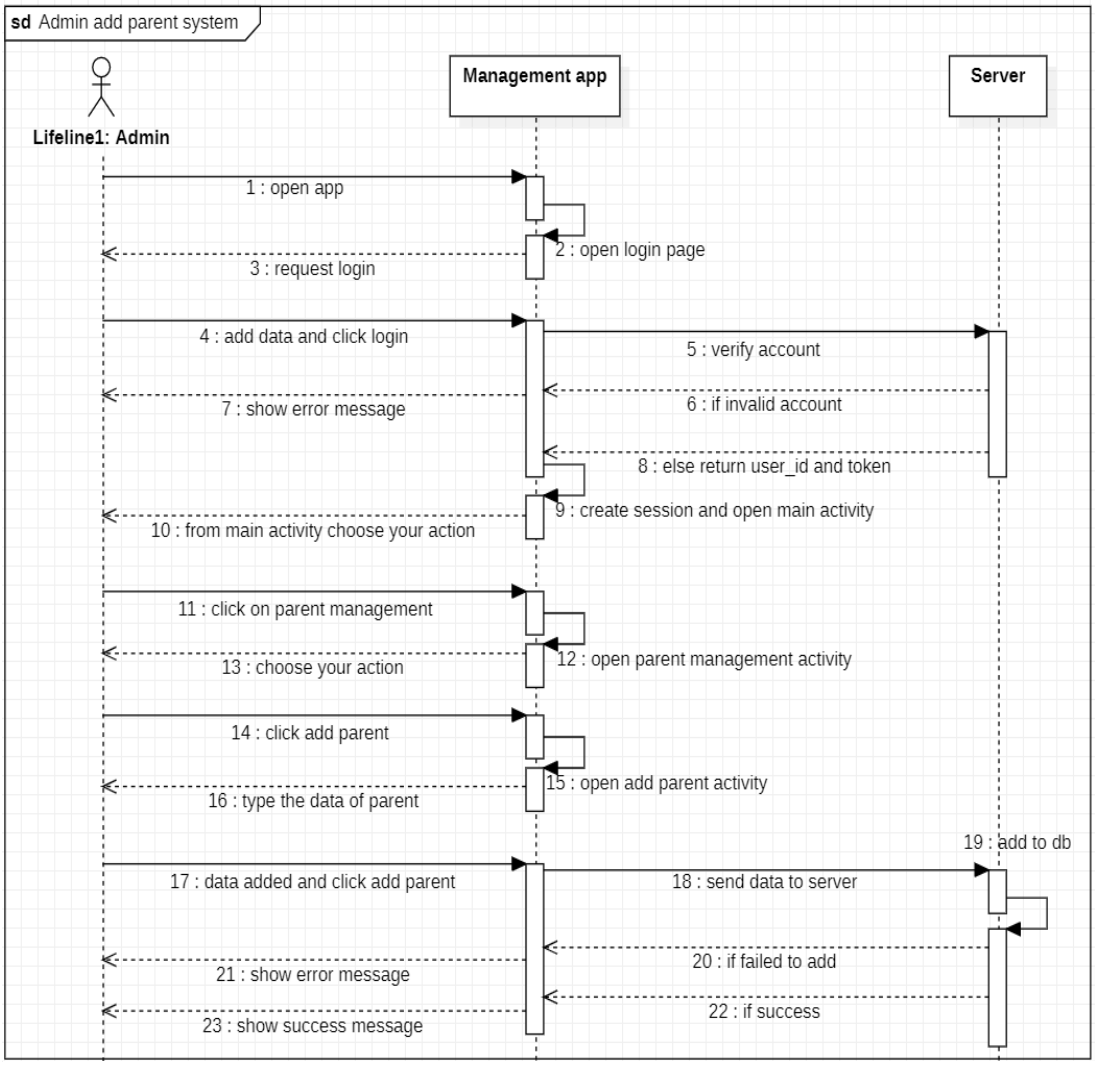


Figure 1.8: add parent sequence diagram

After the admin login, from the main activity admin click on parents and pupils management to go to new activity and click add parent to open new activity. The admin type data of the new parent (username, first and last name, birthdate, password and phone number) and click add.

4- Teacher sequence diagram:

In this diagram, we will show how teacher add notes to pupils.

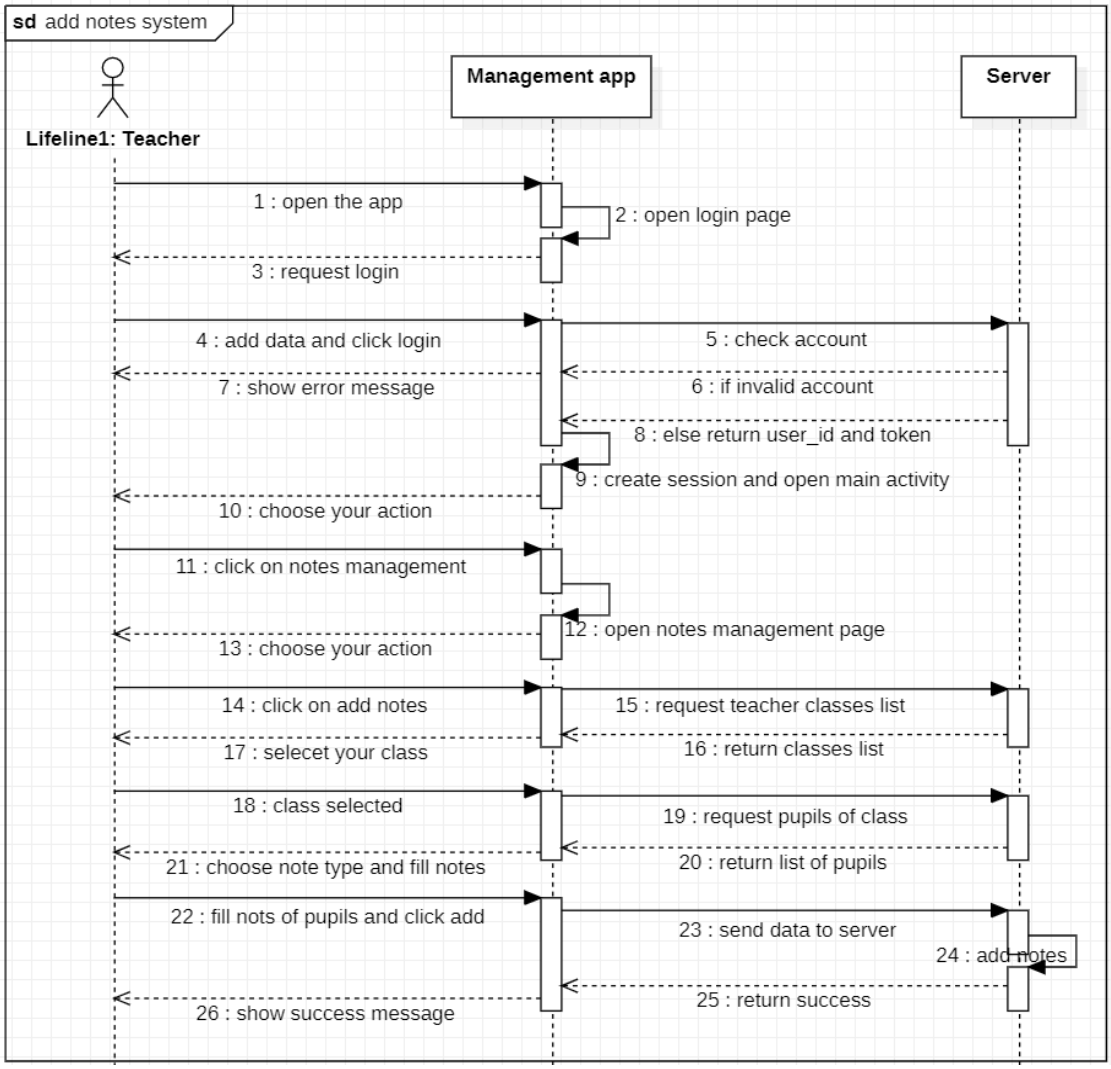


Figure 1.9: add notes sequence diagram

1.4. Conclusion:

Chapter 2

Development And Implementation

2.1. Introduction

Based on the conceptual ideas developed in the previous chapter, the next step is to start the development and the implementation of our application. There for we started by identifying the appropriate development environment and programming languages that help us to achieve our objectives.

2.2. Development environment

In this project, we used Android Studio, XAMPP, MySQL and Visual Studio Code programs.

2.2.1. Android Studio:

Android Studio is the official Integrated Development Environment (IDE) for Android app development. Based on the powerful code editor and developer tools from IntelliJ IDEA. [5]

2.2.2. XAMPP:

XAMPP is an abbreviation where X stands for Cross-Platform, A stands for Apache, M stands for MySQL, and the Ps stand for PHP and Perl, respectively. It is an open-source package of web solutions, which includes Apache distribution for many servers and command-line executables along with modules such as Apache server, MariaDB, PHP and Perl. [6]

2.2.3. MySQL:

MySQL is the most popular Open Source SQL database management system, is developed, distributed, and supported by Oracle Corporation. [7]

2.2.4. Visual Studio Code:

Visual Studio Code is a code editor redefined and optimized for building and debugging modern web and cloud applications. Visual Studio Code is free and available on your favorite platform - Linux, macOS, and Windows. [8]

2.3. Programming languages used:

To develop our apps we used Java, XML, JSON, PHP and SQL.

2.3.1. Java:

Java is a programming language and computing platform first released by Sun Microsystems in 1995. It has evolved from humble beginnings to power a large share of today's digital world, by providing the reliable platform upon which many services and applications are built. New, innovative products and digital services designed for the futurecontinue to rely on Java, as well. [9]

2.3.2. XML:

Extensible Markup Language (XML) lets you define and store data in a shareable manner. XML supports information exchange between computer systems such as websites, databases, and third-party applications. Predefined rules make it easy to transmit data as XML files over any network because the recipient can use those rules to read the data accurately and efficiently. [10]

2.3.3. JSON:

JSON is a text-based data format following JavaScript object syntax, which was popularized by Douglas Crockford. Even though it closely resembles JavaScript object literal syntax, it can be used independently from JavaScript, and many programming environments feature the ability to read (parse) and generate JSON. [11]

2.3.4. PHP:

PHP (recursive acronym for PHP: Hypertext Preprocessor) is a widely-used open source general-purpose scripting language that is especially suited for web development. [12]

2.3.5. SQL:

Structured Query Language (SQL) is a standardized programming language that is used to manage relational databases and perform various operations on the data in them. Initially created in the 1970s, SQL is regularly used not only by database administrators, but also by developers writing data integration scripts and data analysts looking to set up and run analytical queries. [13]

Send the data from android app using JSON to PHP page and receive data from PHP page type JSON, is called REST-API. A REST API (also known as RESTful API) is an Application Programming Interface (API or web API) that conforms to the constraints of REST architectural style and allows for interaction with RESTful web services. REST stands for representational state transfer and was created by computer scientist Roy Fielding. [14]

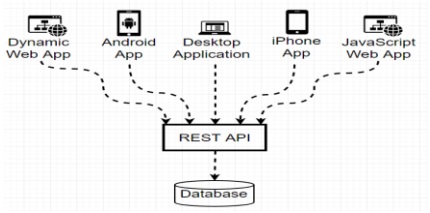


Figure 2.1: REST-API

2.4. Parental app:

In the parent application, we will show the most important interfaces and some functions.

2.4.1. Login page:

In the login page, the parent enter (username or phone number) and password and click Login.

Figure 2.2: Login page

2.4.2. Publications page:

On the Publications page, all the school's publications will appear, the publications is public, sorted by time.

Figure 2.3: Publications page

2.4.3. Attendance page:

The attendance page is the most important thing in the application, where the list of daily attendance for pupils will be displayed.

At the top of the page, the parents choose the student (the son) from the list of children studying in that school and choose the day from the calendar.

Figure 2.4: choose pupil

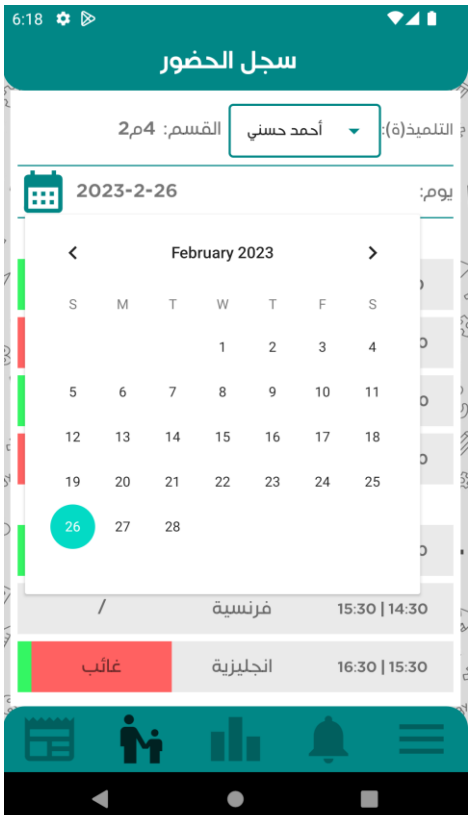


Figure 2.5: choose date

When the pupil and date are selected, the application will execute the AsyncTask class and pass it the data “user_id” and “token” from session and selected pupil id and date.

```
@Override
protected String doInBackground(Void...voids) {
    this.query = "http://10.0.2.2/rest_api/attendance.php";
    this.jsn = "{"+
            "\"user\":\""+user_id+"\","+
            "\"token\":\""+token+"\","+
            "\"pupil\":\""+pupil+"\","+
            "\"date\":\""+date+"\""+
            "}";
    String result = PostRequest.sendPostRequest(query,jsn);
    return result;
}
```

Figure 2.6: post request parameter

Where user_id is ID of the parent and token used to protect the REST-API. In the *sendPostRequest()* method, there are two parameters "*query*" and "*jsn*", where "*query*" is the link of the PHP page "*attendance.php*" and "jsn" is data from the type JSON.

```
public static String sendPostRequest(String url, String jsn){
    String result="";
    URL obj = null;
    try {
        obj = new URL(url);
        HttpURLConnection con = (HttpURLConnection) obj.openConnection();

        // إعداد نوع الطلب وطول البيانات المرسلة
        con.setRequestMethod("POST");
        con.setRequestProperty("Content-Type", "application/json; charset=utf-8");
        con.setRequestProperty("User-Agent", "Mozilla/5.0");
        con.setRequestProperty("Accept-Language", "ar,en,fr");

        // إرسال البيانات المرسلة
        con.setDoOutput(true);
        OutputStreamWriter wr = new OutputStreamWriter(con.getOutputStream(), StandardCharsets.UTF_8);

        wr.write(jsn);
        wr.flush();
        wr.close();

        // قراءة الرد
        BufferedReader in = new BufferedReader(new InputStreamReader(con.getInputStream(), StandardCharsets.UTF_8));
        String inputLine;
        StringBuilder response = new StringBuilder();
        while ((inputLine = in.readLine()) != null) {
            response.append(inputLine);
        }
        in.close();
        result = response.toString();
    } catch (Exception e) {
        Log.e( tag: "logy",e.getMessage());
    }

    return result;
}
```

Figure 2.7: send post request method

We used the *HttpURLConnection* class to send and receive data from the REST-API using POST method, the *sendPostRequest()* method is return JSON data from PHP page.

In the PHP page, will receive data type JSON using POST method and check the user_id and token is exist in the database or not, if exist the page will return result, else the page will return “Forbidden 403”.

```php
$sql1 = "SELECT id_f FROM fathers WHERE id_f = '$f_id' AND token = '$token'";

if(mysqli_num_rows(mysqli_query($conn,$sql1))>0){

    $sample = "SELECT scheduler.hour,model.model_name,presentation.present, presentation.just
    FROM scheduler LEFT JOIN model ON ( model.model_id IN (SELECT model_id FROM mod_teat WHERE id = scheduler.model_id) )
    LEFT JOIN presentation ON (presentation.p_date = '$date' AND presentation.t_id = '$t_id' AND presentation.hour = scheduler.hour)
    WHERE scheduler.class_id IN (SELECT student.class_id FROM student WHERE student.t_id = '$t_id') AND scheduler.day='$day' ORDER BY scheduler.hour ASC";

    $result = mysqli_query($conn,$sample);

    if(mysqli_num_rows($result)>0){


        $response[] = array(
            "resp"=>"1"
        );
        while(($row = mysqli_fetch_assoc($result))!=null) array_push($response,$row);


    }
    else $response[] = array(
        "resp"=>"0"
    );


    print(json_encode($response,JSON_UNESCAPED_UNICODE));
}

else echo "<center><h1>Forbidden 403</h1></center>";
```

Figure 2.8: PHP file

After check and getting data from the database, PHP file will return a JSON data.


```
[
 {"resp":"1"},{"hour":"1","model_name":"عربية","present":"1","just":null},
 {"hour":"2","model_name":"عربية","present":"0","just":null},
 {"hour":"3","model_name":"فرنسية","present":"1","just":null},
 {"hour":"4","model_name":"انجليزية","present":"0","just":"0"},
 {"hour":"5","model_name":"رياضيات","present":"1","just":null},
 {"hour":"6","model_name":"رياضيات","present":null,"just":null},
 {"hour":"7","model_name":"اعلام الي","present":"0","just":"1"}
]
```


Figure 2.9: JSON data

The application receives this data and uses it in the interface like figure 2.3 and 2.4

2.4.4. Notes page:

On the Notes page, parent choose the pupil (son) from the list to display the latest notes made by the school teachers.

Figure 2.10: Notes page

The first column on the right represents the name of the subject, the second is the type of note, the third is the note from 20, and the fourth is the date of publication of the note.

2.4.5. Notifications page:

The school sends notifications to parents about their children, the notifications are private.

Figure 2.11: notifications page

The white notifications is a notifications that has been read. Other notifications have not been read.

2.4.6. Menu page:

In the menu, there are many buttons. The menu is a collection of options provided to parents to help them access information and other options.

Figure 2.12: menu

1- First button is the personal information and parent children information:

Figure 2.13: personal information

2- Add or change phone number:

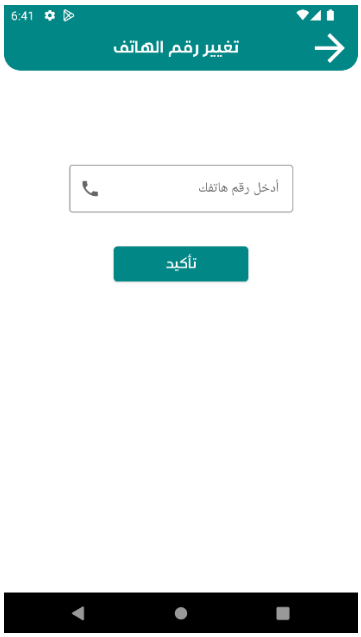


Figure 2.14: add phone number

3- Change password:

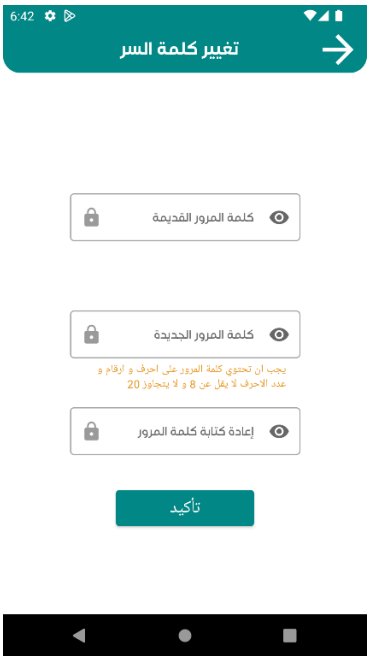


Figure 2.15: change password

4- The Logout button, on parent click on it will delete season data and logout and open Login page…

2.5. Management app:

CONCLUSION

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